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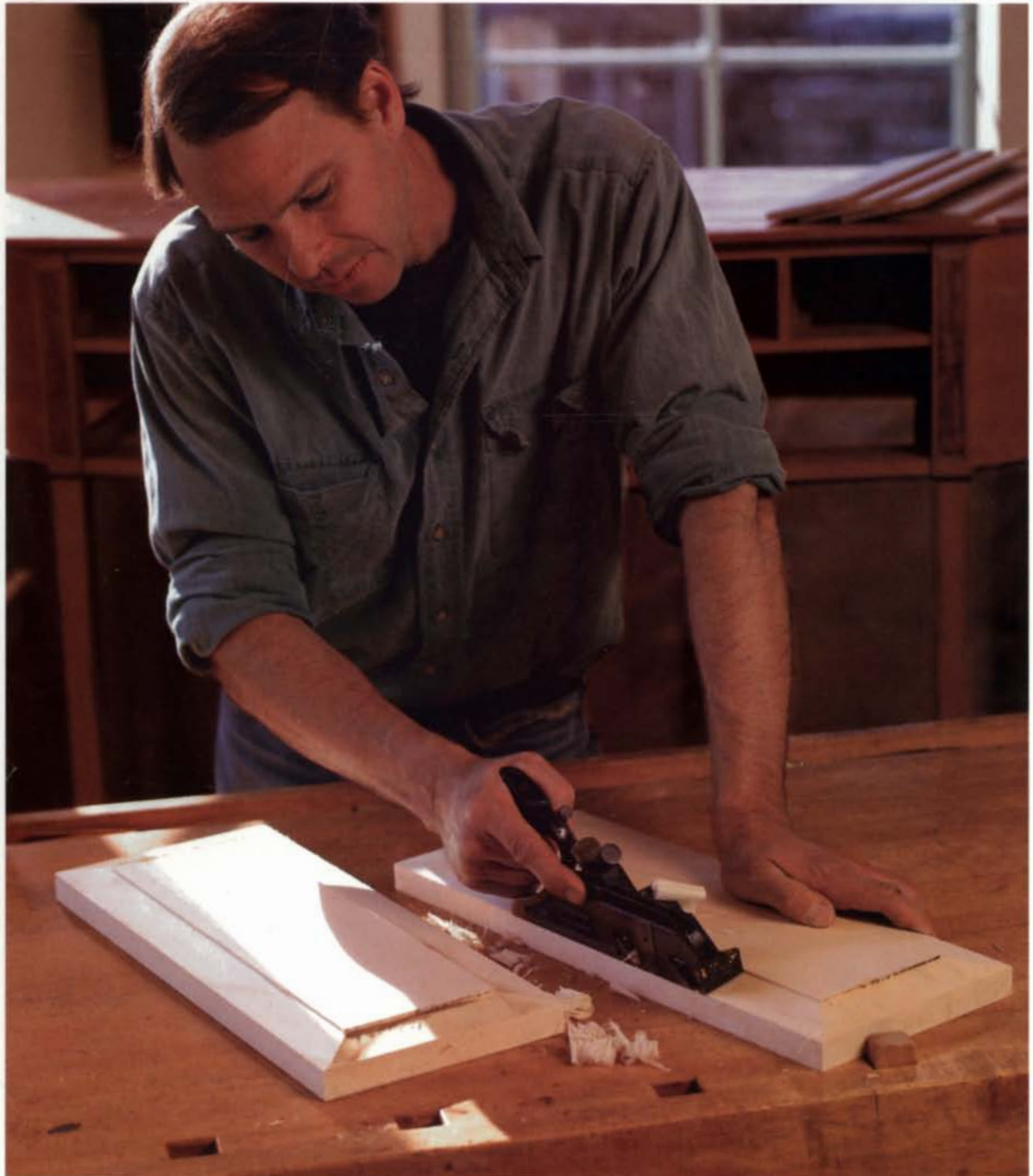
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On the cover:

Rabbet planes not only cut rabbets and dados, but also clean up machine cuts for joinery. Garrett Hack tells you how to select this indispensable item for your shop on p. 48. Photo: Boyd Hagen

***Our new cover design** is one that harkens back to the early years of Fine Woodworking, yet keeps pace with readers' growing appetites for quicker communication.*



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Make a tablesaw sled, p. 66



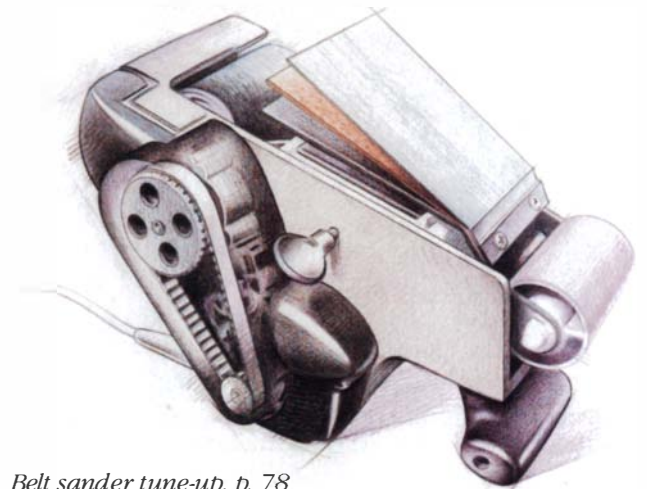
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Belt sander tune-up, p. 78

Hand tools and power tools—For goodness sakes, please do not start the hand tool vs. power tool nonsense again. I refer to some of the letters and the article “Good Work” by John Brown in the December 1997 issue (*FWW* #127, pp. 8, 94-97). This argument demonstrates that provincialism is universal.

Woodworking is both a craft and an art. It is not limited by the boundaries of either. Many of us—maybe most—engage in woodworking primarily because we need furniture and other workable items. That does not mean we do not try to produce the best our talents will allow.

This rancor over the pureness of hand tools vs. the unfeeling technology of power tools is foolishness. Craftsmen and artisans often use both. Does the wood know or care? Certainly not, and the finished product is often indistinguishable. I would point out that Sam Maloof uses an air-driven die grinder to form the sinewy lines that make his furniture unique and outstanding. Purity is irrelevant.

Our parameters are these: Someone must love to build it; someone must love to use it. If those are satisfied, the method has no meaning. We explore within a broad set of boundaries. Our strength is our variety of ways. It is our diversity that makes us interesting and immortal.

—Steve Horton, Henderson, N.V.

I always enjoy the range of woodworking methods and approaches presented in *Fine Woodworking*. Articles covering the spectrum from Luddites like John Brown to the Apostles of Abram offer important design and technical perspective. I’m sure you will get plenty of response to Mr. Brown’s extreme philosophy as presented in his “Good Work” article in the December issue.

Brown’s call for a return to the use of hand tools is particularly myopic because his arguments only apply to his particular situation. The apprenticeship hours needed to acquire hand-tool skills are only available to full-time woodworking professionals. The exclusive design and construction of unique chairs in short runs is well suited to the use of hand tools. A shop used only to make chairs will be less expensive to outfit with hand tools than with power tools.

My situation is very different. As an architect, my ability to design unique and meaningful woodworking projects usually exceeds my ability to produce them. My projects range from Christmas ornaments to substantial furniture. My shop hours are too limited to develop hand-tool skills. I’ve never made more than several versions of any item, which does not allow the luxury of prototype work to refine project-specific hand-tool skills. I don’t own limited-use woodworking machines, but a bit for my router costs less than a molding plane, so power tools are more economical for me. When a project leaves my shop, the fact that it is well formed, cleanly finished and works smoothly allows the design of the piece to take center stage.

Here’s my point: I’m proud of the methods used in my shop. They are appropriate for my situation, and I bet they are for many other woodworkers as well. I’ll keep Mr. Brown’s comments in mind the next time I decide to build 23 Windsor chairs.

—David S. Wright, Greenville, S.C.

Safe home-shop spray booths—As I read the question in your December issue (*FWW* #127, p. 24) about eyes burning when spraying lacquer, I realized I am entering the no-spray season because I am afraid to spray lacquer in my shop during the winter. Because of the explosion hazard, I generally do my spraying outdoors in the summer.

Please consider doing an article on home-shop spray booths and precautions. Perhaps I could complete my winter projects before spring if I knew how to set up a safe spray booth.

—Lee Gayman, Mechanicsburg, Pa.

How about more on woodshops—I’ve been a subscriber to *Fine Woodworking* for several years now and thoroughly enjoy the magazine. As an intermediate-level woodworker, I really enjoy seeing

Writing an article

Fine Woodworking is a reader-written magazine. We welcome proposals, manuscripts, photographs and ideas from our readers, amateur or professional. We’ll acknowledge all submissions and return those we can’t publish. Send your contributions to *Fine Woodworking*, PO Box 5506, Newtown, CT 06470-5506.

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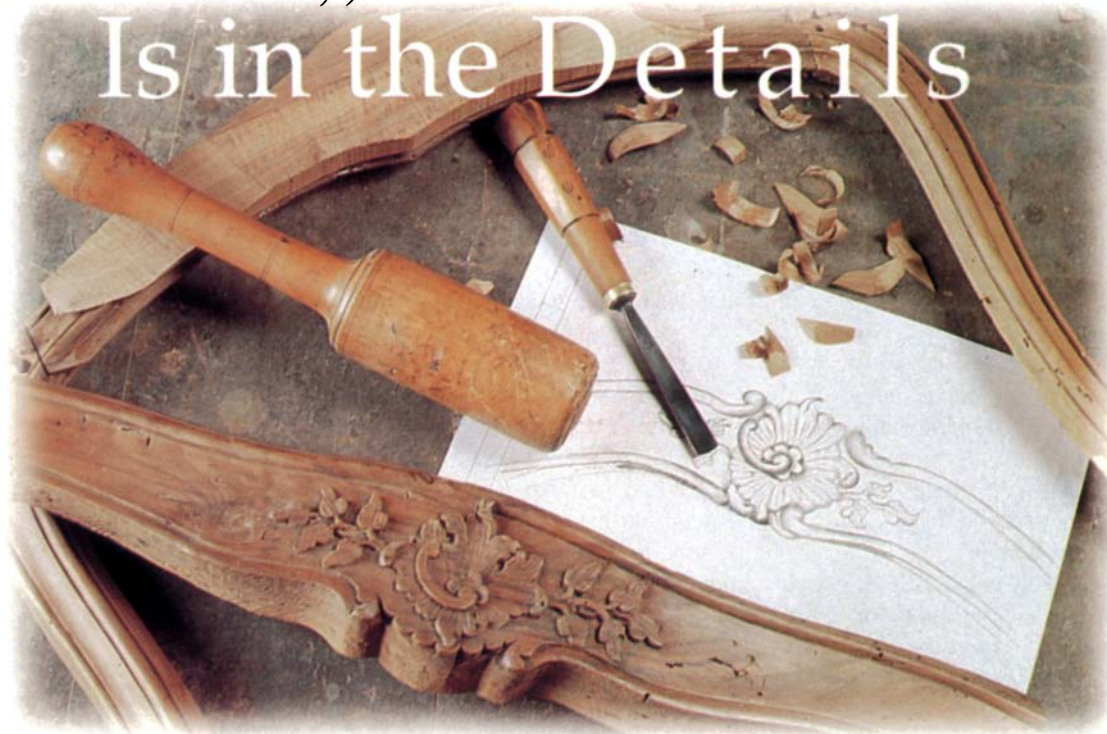
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what real experts and artisans can create. I am always amazed.

A few years ago, I purchased a copy of your book by Scott Landis about woodworking shops. (I have since set up a modest woodworking shop in my basement and often refer to your book for ideas.) In fact, as I look through each new issue of *Fine Woodworking*, I always look in the background of the pictures to catch a glimpse of the author's shop.

This brings me to my point: The Taunton Press should produce a follow-up to Landis' book on woodshops. Perhaps *Fine Woodworking* could profile various woodworkers' shops. It seems every issue has a segment devoted to a new tool test or comparison, so how about the same for woodshops?

Personally, I would really enjoy this. The other woodworking magazines out there have never appealed to me because of the backyard whirligigs. However, I do enjoy other wood magazines when they do a profile on a shop layout, shop ideas or work areas.

—David Fernelius, Minneapolis, Minn.

Branch out into stick furniture—I was captivated by Carter Sio's essay on stick furniture (*FWW* #126, p. 130). Perhaps you could run a full-blown article on the topic, either by Mr. Sio or by his instructor, Michael Emmons, so that the rest of us can have a go. Fine, as in refined, it might not be, but fine as in dandy it would be.

—John Ewing, Preuschoorf, France

Glue solidifies wood threads—In the October 1997 issue (*FWW* #126, p. 63), Pat Warner wrote about using machine taps to cut threads in hardwoods, saying that

they're plenty strong if you do it right. Well, he is right, but I do something that makes these threads far stronger and far more durable. After I cut the threads with the tap, I run a little thin cyanoacrylate (CA) glue onto those threads, let it soak in and set up, then run the tap back through. The threads are as tight and smooth as if I had cut them into metal. It is important to use *thin* CA glue, because that is the only stuff that will soak in well.

—Michael Husted, Austin, Texas

Back cover missed the mark—Many years ago when *Fine Woodworking* first appeared, it filled a need for a good publication in a field that did not see excellent work recognized in any regular publication. *Fine Woodworking* quickly became the only quality woodworking magazine with a national circulation.

Since then, there has been a steady diet of meaningful and informative articles for professional and amateur wood craftsmen. There are exceptions and at times substandard performances.

One such substandard item was in the October 1997 issue (*FWW* #126) and was featured in a position of some honor on the back cover: "30 Years in the Making," a three-legged, exquisitely crafted European cherry table.

Certainly this creation had the markings of good craftsmanship. But the problem is that the design seemed to suffer from a skewed sense of aesthetic value. Why would anyone spend so much care and good wood on a warped, bow-legged, almost useless and unstable table concept? To go to so much trouble to simply craft a tour de force, albeit a well-done one, does not constitute fine woodworking.

The maker showed us that this difficult concept could be built. The real question is why did *Fine Woodworking* select this for such an honor? Fine woodworking shouldn't really be based on creating mere novelty and trickery.

—Raymond Wisniewski,
Glastonbury, Conn.

Basic power-tool repairs—In reference to Robert Vaughan's article on repairing electrical tools (*FWW* #126, pp. 84-87), I have a suggestion. When I have trouble with one of the electrical tools in my shop, the first thing I do is take the tool far enough apart to expose the switch, then squirt it with some contact cleaner. This almost always fixes the problem. I have only replaced one switch in 20 years, and that was before I found contact cleaner.

Right now, I am using Radio Shack electronic cleaner (\$10.99 for a 5.5-oz. can). In addition, 3M makes Heavy Duty contact cleaner (\$35 for a 20-oz. can), which I order through my local electrical supplier. It doesn't take much cleaner to get a switch working again, so I think it is the quickest, cheapest thing to do first.

—Chuck Lakin, Waterville, Maine

I have to disagree with one of Robert Vaughan's recommendations in "Basic Repairs for Portable Power Tools." It is a bad idea to solder the ends of wires that are to be fastened by screws to a terminal. The solder that coats the strands of the wire makes a neat looking installation, but solder is subject to cold flow.

When the terminal screw is tightened, the solder tends to flow away from the pressure of the screw. Over time, the connection will become loose, the

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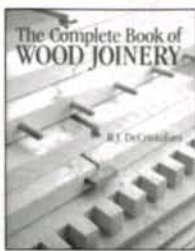
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Jewelry chest with Isoloc "Wave" joint. One of six patterns.

Isoloc "Clover" joint in jig.

loose connection creates resistance to current flow and heat builds up. Sometimes, enough heat is produced to melt away the solder, and the subsequent increase in resistance and heat can cause a fire or at least some dramatic smoke. If you are lucky, the connection will simply loosen, and the device just won't work.

I use crimp-on terminals where space permits. Otherwise, I twist the wire end and dress it as neatly as possible around the screw. —*John Barstow, Arcata, Calif.*

Another method for pattern transfers—In my sojourns into musical instrument construction, I occasionally find it necessary to develop symmetrical drawings for headstock and fretboard ornamentation. I use the same basic process as John Saggio (“Methods of Work,” *FWW* #125, pp. 26, 28), except that I eliminate the need to fold and position the carbon paper by, instead, placing the folded pattern sheet directly on top of the carbon paper.

The design transfers just as well, and only a slight shift in position exposes fresh carbon for subsequent drawings. Several small designs can be made on the same sheet. —*Randy Cordle, Urbana, Ill.*

Saw techniques questioned—I am an avid reader of *Fine Woodworking*. In fact, I am a charter subscriber, with every issue since the first one on my bookshelf. I enjoy your magazine, one of the first of its kind and, in my opinion, the best. I am a serious woodworker and have been a teacher of high school woodworking for the past 30 years. That said, I am compelled to comment on your excellent article “Building a Humidor” (*FWW* #127, pp. 44-49).

What I consider to be two errors are pictured on p. 45. First, the author, Rick Allyn, is shown cutting a rabbet with the workpiece between the fence and the dado blade. The dado blade should be against a piece of 3/4-in. pine attached to the fence. This allows no chance of kickback or of cutting into

the good surface if the piece wanders away from the fence.

Second, the adjacent picture shows crosscutting a veneered board with the veneer side down. It should be on top to minimize tearout on the veneer.

I was very impressed with Mr. Allyn's work, but surprised with regard to these two basic concepts of woodworking.

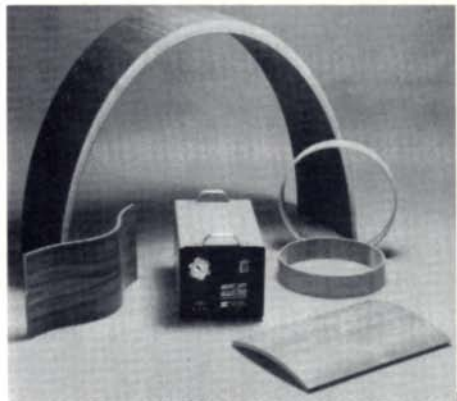
—*James Vasi, Cheektowaga, N.Y.*

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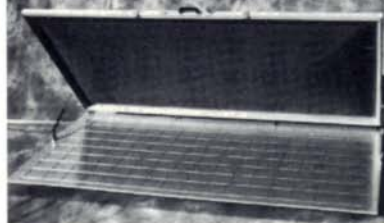
—*John Lively, editor-in-chief*

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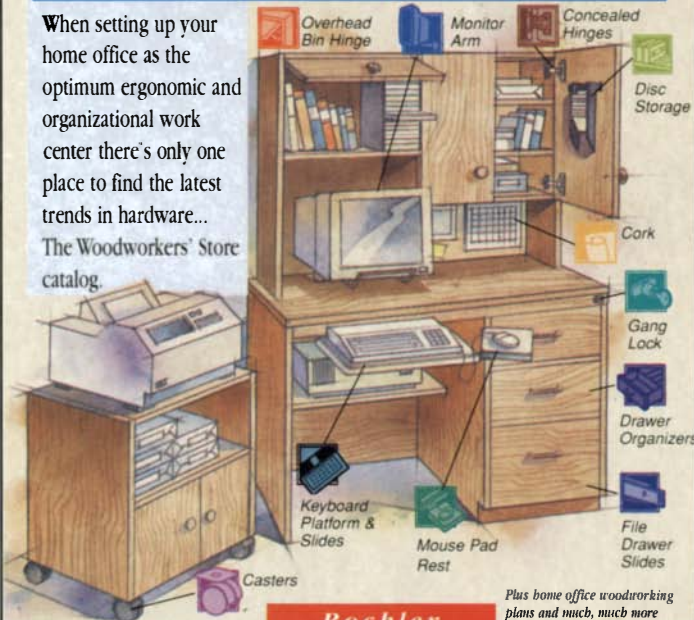
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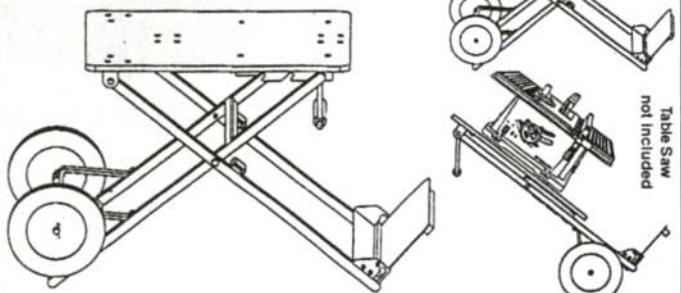
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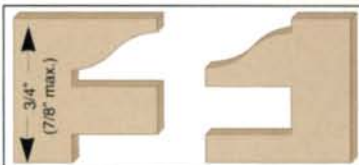


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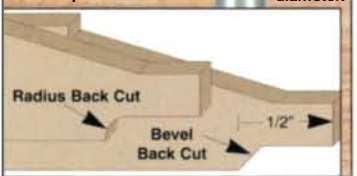
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Blades for old Boice-Crane scroll saw

About a year ago, I purchased an old floor model Boice-Crane C-arm scroll saw. The saw is heavy, has a 20-in.-sq. cast-iron table and has a 24-in. capacity from blade to arm. It seems to work fine, but the saw didn't have a blade when I purchased it, and I don't have a manual to tell me how to set up this saw. It appears that the blade length would be about 10½ in. or 11 in. Do you know where I can find blades for and information about this saw?

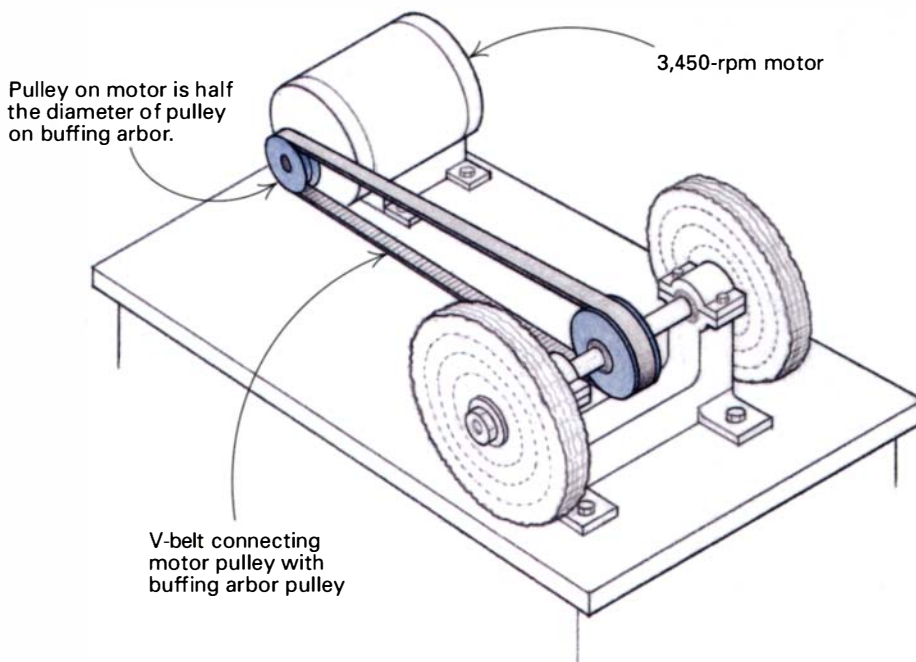
—David Anderson, Laurium, Mich.

Robert Vaughan replies: Your Boice-Crane scroll saw can be adjusted to take a blade anywhere from 5 in. (the standard length) to 9 in. long. Scroll-saw blades are widely available. Your machine is quite versatile and will cut stock up to 5 in. thick with a 9-in.-long blade. The last new cost I remember seeing for that machine was about \$1,700.

In addition to using scroll-saw blades in your saw, you can also use bandsaw blade stock. Be sure that the set is ground off the teeth at the ends of the blade before clamping it in the chuck jaws, though. Otherwise, the jaws won't hold well.

Reducing the speed of a motor for buffing or grinding

Motors that run at 3,450 rpm are more common than those that run at 1,725 rpm, so woodworkers often use them for grinders or buffers. These faster motors can burn wood or steel, however, because they generate a lot of heat. Using a larger pulley on the arbor that holds the buffing or grinding wheels than on the motor reduces the effective speed of the motor, and reduces the risk of burning whatever it is you're working on.



To obtain a manual, try the current owners of Boice-Crane, the Gothenburg Manufacturing Co. (P.O. Box 182, Gothenburg, NE 69138; 308-537-3628). [Robert Vaughan maintains, repairs and restores woodworking machinery in Roanoke, Va. He is a contributing editor to *Fine Woodworking*.]

Reducing an electric motor's speed for buffing

I have a ½-hp, 3,450-rpm motor I want to use for buffing hardwoods. I'd like to run it at 1,725 rpm so the wood doesn't burn. What's the best way of doing this? And is a ½-hp motor powerful enough?

—Edward Jonke, Glen Arm, Md.

Gary Rogowski replies: The simplest and best way to reduce the speed of the buffing wheels is to separate the motor and the buffing wheels, connecting them with a V-belt and pulleys of two different sizes. To reduce the speed of your 3,450-rpm motor by half, use a pulley on the arbor that is twice the diameter of the motor pulley (see the drawing below). Just as with bicycle gears, the small pulley on the motor will rotate twice for each rotation of the arbor pulley, reducing the speed of the larger

pulley to 1,725 rpm. If you put several pulleys on the arbor shaft, you can vary the speed of the buffing wheels.

A ½-hp motor is plenty powerful for buffing. The most important factor, as you've already realized, is speed, and reducing the speed at the buffing wheels to 1,725 rpm should be sufficient to prevent the wood that you're buffing from being burned.

[Gary Rogowski designs and builds furniture in Portland, Ore., and is a contributing editor to *Fine Woodworking*.]

Sliding-dovetail tabletop connection?

I'd like to use a pair of large sliding dovetails to connect the top of a dining table to its base. The dovetails would be on the top edge of the base's two slab ends. A heavy rail will connect these two ends at the floor. My only concern—because the top is a full 40 in. wide—is that the joint may be difficult to assemble. If it's too tight, it won't go together, but if it's too loose, the table will wobble. Am I going to have problems with this joint?

—Ernest Giglio, Bernardsville, N.J.

Garrett Hack replies: A full-length sliding dovetail is probably not the best joint to connect a large tabletop and its base. There are at least two problems with this construction. The first, as you're aware, is that a joint that fits tightly over the full width of the table is going to be all but impossible to drive home. The more accurately you cut the joint—in hopes of creating a strong wobble-free connection between top and base—the greater the likelihood that the two won't even go together.

The second problem is that sliding dovetails by themselves don't provide a rigid enough structural support for a tabletop of this size. Though this connection would work fine for a much smaller table, your table is apt to wobble end to end right from the outset. Any wobble will compress the wood fibers within the joint, making the problem worse.

An alternative method is to make a series of shorter sliding dovetails that mate with dovetailed slots in the underside of the table. (For a complete description of this joint and how to make



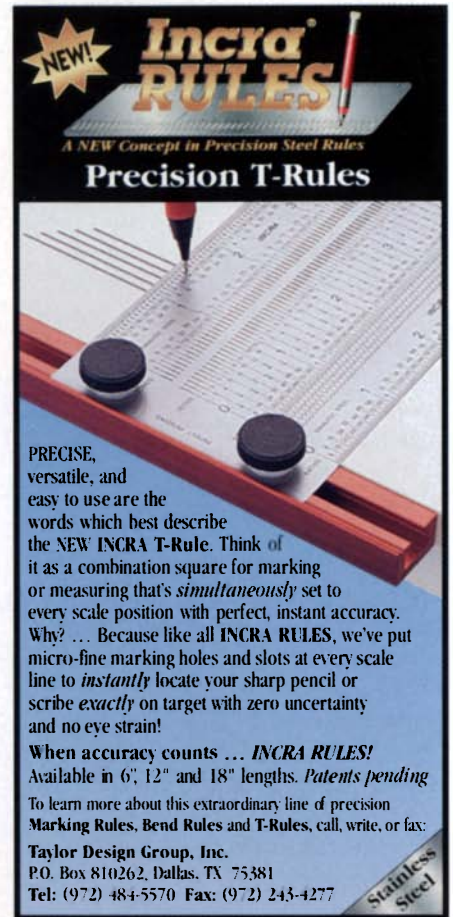
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it, see *FWW* #123, pp. 62-65.) These joints can be tricky to cut, but they're a good solution in this situation as long as you add some rigidity to the structure.

To get that rigidity, I'd add a pair of stretchers right under the top, running lengthwise between the legs. If you keep them well back from the edge, they'll be relatively inconspicuous and won't interfere with the aesthetics of your design. Make them as wide as possible, but no less than 4 in. where they meet the legs. If you're concerned about seeing the stretchers, reduce them in width toward the center with a curve. To make the whole structure more rigid, I'd also add a few buttons or screws to connect the top to these stretchers.

[Garrett Hack farms, writes and makes furniture in Thetford Center, Vt.]

Folding a bandsaw blade

I used to be able to fold a bandsaw blade with no trouble at all, but somehow I have lost the knack of doing it. I believe it can be done in several different ways and would appreciate it if you would explain how it is done.

—Herman Fersenheim,
Woodstock Valley, Conn.

Vincent Laurence replies: I've always folded bandsaw blades the way that Tage Frid taught, by holding the blade with

two hands, my foot holding it to the floor, then folding it forward into a U-shape. As I fold it down, I turn my palms forward and thumbs outward until the sides coil into circles.

To see if there was a consensus, I asked other *Fine Woodworking* staff members how each folded a bandsaw blade. Two other methods were demonstrated, and I've been converted. We all agreed that the safest and easiest method is the one in the drawing below. Hold the blade to the floor with your toes, sawteeth facing out, and twist your wrist 360°, pushing down slightly as you turn. The blade will coil down on itself into three loops.

[Vincent Laurence is an associate editor of *Fine Woodworking*.]

Determining thickness of strips for bent laminations

I recently built a large L-shaped desk for a client. The outside corner of the desk is curved, with a radius of 36 in. I built up the red-oak edging for this radius by gluing together eight 1/4-in.-thick strips, using Titebond II yellow glue. The trouble is I spent nearly a week trying strips of different thicknesses, soaking them and then letting them dry before finally, successfully, gluing up the lamination. Is there any way of determining the optimal thickness

for each strip in a lamination with a given radius? —Tom Epps, Denver, Colo.

Lon Schleining replies: There are no hard and fast formulas for determining strip, or ply, thickness for bent laminations, but there are several rules of thumb that will reduce the hassles and increase your chances of success. First the tighter the radius, the thinner each ply needs to be. Not only will thinner plies bend more easily, but they'll also be less prone to springback.

To find the correct thickness for the individual plies, cut a single layer of the material you plan to use. Try bending it to the radius you need. The ideal thickness will depend, in part, on the type of wood, its moisture content and its temperature. If the test piece feels like it might crack, it's too thick. Continue planing it, reducing its thickness until it bends around the form quite easily. Once you've established the correct thickness of an individual layer, mill enough of them to build up the piece to its overall thickness.

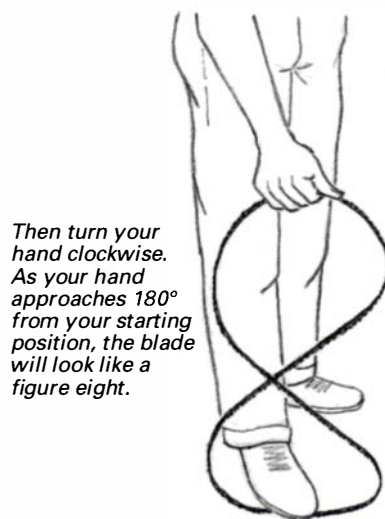
Soaking the layers, as you say you've done, may seem to make them more flexible, but in the long run does more harm than good. Even after the wood seems completely dry, there's a good chance there's still water in the pores, and that will affect the penetration of the glue and the bond between the

Folding a bandsaw blade

Folding a bandsaw blade is trickier to explain than it is to do. The illustrations below show the process, step by step.



First hold the blade beneath your toes, grasping the blade at the top with your arm twisted so your thumb is pointing out and your elbow is facing away from your body.



Then turn your hand clockwise. As your hand approaches 180° from your starting position, the blade will look like a figure eight.



Continue turning your hand while following the blade down until your thumb is pointing outward again. The blade will have coiled up on itself.

individual plies. Soaking can be avoided entirely by simply making the layers thin enough to bend easily.

I always do a dry run first to reduce the likelihood of problems when it's time for the real thing. Once I've had a successful dry run, I apply glue to both sides of each ply except for the two outside surfaces. Then I get as many clamps as possible in place as fast as I can—especially if it's warm.

Be aware that all of the common polyvinyl acetate woodworking glues (white and yellow glues) remain slightly flexible even after they're fully cured. In some applications, this is an asset, but for bent laminations, it means that over time, the glue joints will start to creep and the lamination will straighten out some. A better choice for a bent lamination would be a plastic resin (or urea formaldehyde) glue, resorcinol or one of the boatbuilding epoxies. These glues cure harder and have virtually no elasticity, making them much better suited for bent laminations. [Lon Schleining builds custom staircases

in Long Beach, Calif., and teaches woodworking at Cerritos College in Norwalk, Calif.]

Cause of raised gluelines

I'm having a problem with raised gluelines. I've made a number of pieces of furniture in different woods. All of the wood was kiln-dried and had several months to acclimate to my shop. I am using Titebond II glue. I sand all surfaces flush just before finishing, but a few weeks later, the raised gluelines are back. What's going on?

—Rick Seiss, Aiken, S.C.

Mario Rodriguez replies: The only possible explanation I can think of is that the wood you're using is continuing to dry and shrink—unevenly—even after you've finished each piece. Even wood that has come to equilibrium moisture content in your shop may dry out further once it's brought into a centrally heated house. If you continue to have problems with raised gluelines, you should consider purchasing a moisture meter to

check the moisture content of the lumber that you're working with.

[Mario Rodriguez teaches woodworking at the Fashion Institute of Technology in New York City. He is a contributing editor to *Fine Woodworking*.]

Parts for a Belsaw planer

I own a Belsaw planer and need some rubber rollers and would like to buy a custom-made molding head. I think the company was bought out, however, and I don't know how to get in touch. Can you help? —Jon Gullett, Washington, Ill.

Vincent Laurence replies: I spoke with a customer-service representative at Belsaw (still in business under that name) who said most parts for their older planers are still available. For specifics, contact Belsaw directly (4111 Central Ave. N.E., Minneapolis, MN 55421; 612-781-0575).

Do you have a question you'd like us to consider for the column? Send it to Questions & Answers, Fine Woodworking, P.O. Box 5506, Newtown, CT 06470-5506.



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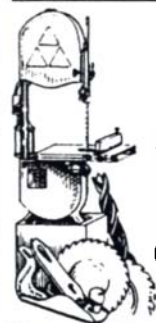
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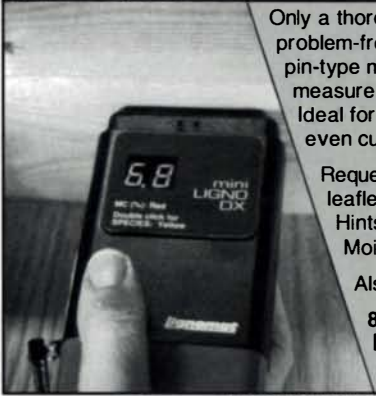
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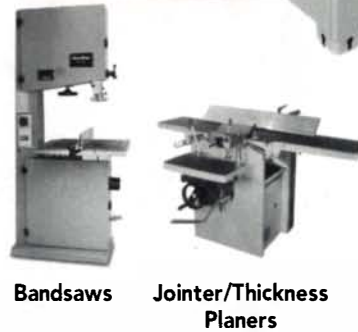
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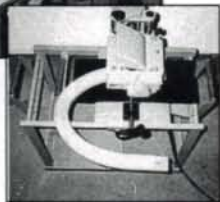
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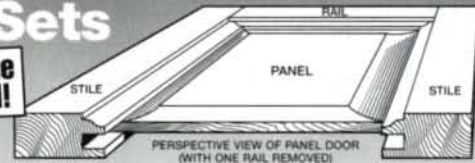
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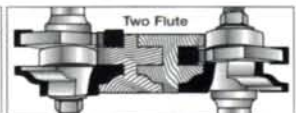
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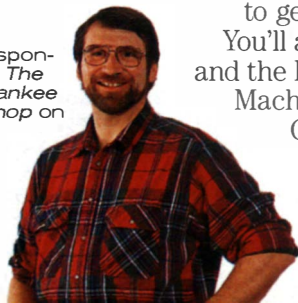
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A. Veritas® Miter Hook

Measuring accurately from an inside corner is simple with this miter hook developed by a trim carpenter. Just press the pins into the end grain (the pins are slightly angled to draw the hook in snugly) and hook your tape measure into the slot that is exactly even with the miter end. A rare-earth magnet grips the tape as you measure. Also usable for outside corners where the hook works the same way, except pins are not necessary.



The hook is handy in a shop as well — anywhere you need to do mitered corners. Machined from high-impact ABS, it has hardened pins and two rare-earth magnets. It is fully reversible; the magnets are exposed on both sides.

FW315 Miter Hook **\$6.95**

A Tape for Cabinetmakers

A customer recently wrote to say, in essence, "Why can't you sell a decent 10-foot tape that I can slip in my apron pocket without it weighing me down? Everything you sell is long, wide, and heavy. I want something slim, light, and handy." Here it is and, better yet, we offer it in right-to-left reading version (which we call a "right-hander's" tape) as well as the usual left-to-right reading version (a "left-hander's" tape). The vast majority of tape measures made today read from left to right, which is OK for just measuring, but becomes a major problem when a right-hander needs to measure and mark something; you end up either having to hold the pencil in your left hand or switching the tape to your left hand and then having to read tape markings that are upside down. The solution is a tape that reads right-to-left. Then you can hold the tape in your left hand and mark with your right hand.

This tape is perfect for keeping on the bench or in an apron and, at just over 2½ oz, you hardly notice it in your apron pocket. So that left-handers can enjoy it also, we made it in a left-to-right reading version as well.

B. FW317 RH Cab. ½"×10' Tape **\$3.95**

C. FW318 LH Cab. ½"×10' Tape **\$3.95**

D. Veritas® 4-Way Speed Frame Clamp

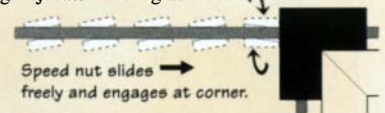
The fastest-adjusting frame clamp on the market. Completely knurled for good grip, the 4 speed-clamping nuts* are designed to let you make fast adjustments, yet hold securely when you tighten them. They are cross drilled to slide easily on the rods until they come up against a corner clamp; then their threads engage. To release them, you just have to back them off a turn or two and they are then free sliding again. The clamp includes 4 corners (strong, glass-filled nylon with brass inserts), 4 speed-clamping nuts, eight 24" long ¼"-20 threaded rods, and 4 coupling nuts. The rods and coupling nuts have a black-oxide finish. Maximum capacity is 47" square or 71"×23" rectangle.

FW355 Frame Clamp Set **\$24.95**

FW356 Speed Nuts, set of 4 **\$ 7.95**

*Speed-Clamping Nuts

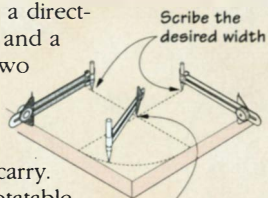
These nuts are quick-adjusting because they are cross drilled (at first glance the hole appears to be off-center). This unique design allows you to move them along a threaded rod without turning them; their threads do not engage until they meet the clamping corner (or any obstruction). Then you tighten them. The threads disengage when you loosen the nuts, allowing the same free-sliding adjustment along the rods.



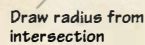


E. Veritas® Carpenter's Gauge

The Veritas® Carpenter's Gauge was specifically designed to be carried in an apron or pocket. It is both a direct-reading compass and a marking gauge, two things that carpenters frequently need but find hard to carry.



This tool has a rotatable head, which locks vertically for use and horizontally for storage and tip protection. It is direct reading, both for radius and diameter, in inches and centimetres. It is useful in a cabinet shop because of the direct-reading feature, which substantially reduces errors, as well as for the fast corner radiusing. Made of brass, stainless steel and high-impact ABS, it is 7 1/2" long overall, and will scribe circles up to 12" diameter.



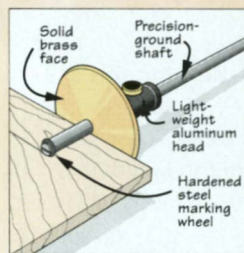
FW314 Carpenter's Gauge **\$14.95**

F. Veritas® Wheel Marking Gauge

Avoid the shortcomings of standard pin marking gauges. Our marking gauge will perfectly scribe at any point of its circumference. Since the hardened steel wheel is both sharp and bevelled only on the inside, it cuts through grain and forces the gauge face against the stock,



maintaining accuracy. It cuts rather than tears and leaves a clean mark, even on cross grain. The gauge is easy to set since it has an internal O-ring to keep light but constant friction on the stem. The anodized aluminum head has a 1/8" thick brass face and a brass thumbscrew. A very comfortable gauge to use.



FW320 Wheel Marking Gauge **\$18.95**

G. Veritas® Precision Square

This stainless-steel square is an ideal size for cabinetmaking. But more important, it has the accuracy of an engineer's square — .001" per inch of length. It is graduated on both the interior and exterior faces, and all four faces are ground to the same accuracy. This means that you can use the square for layout or machinery setup. It is also graduated on both sides — the 3" leg in 32nds and the 6" leg in 16ths. The etched markings are permanent and easy to read because the square has a non-glare finish. The relieved interior corner ensures that the square seats well, even over saw whiskers. Excellent value in a superbly made square.

FW312 Precision Square **\$11.95**

H. Veritas® Sliding Square

This is a cabinetmaker's layout square. Laying out mortises and tenons, letting in hinges, transferring locations — all of these can be done faster and more accurately with this square than any other. The joy is that you always have ample reference face against your work without having to flop the square. You can also work in two axes at once, e.g., measuring in 2" and over 1 1/2" is simple, substantially reducing the possibility of error. The stainless-steel blade is 3" wide and 6" long, graduated on both edges (to 4") and across the end. It has a matte finish, which not only makes it easy to read by eliminating glare, but lets you record dimensions on it with a pencil. The diamond cut-out in the blade holds a pencil tip in position and makes it particularly easy to draw lines parallel to an edge. The locking mechanism is the traditional notched pin used on combination squares. The opposed bearing surface is a hardened steel rod, embedded in the anodized aluminum stock.

FW310 Sliding Square **\$21.95**

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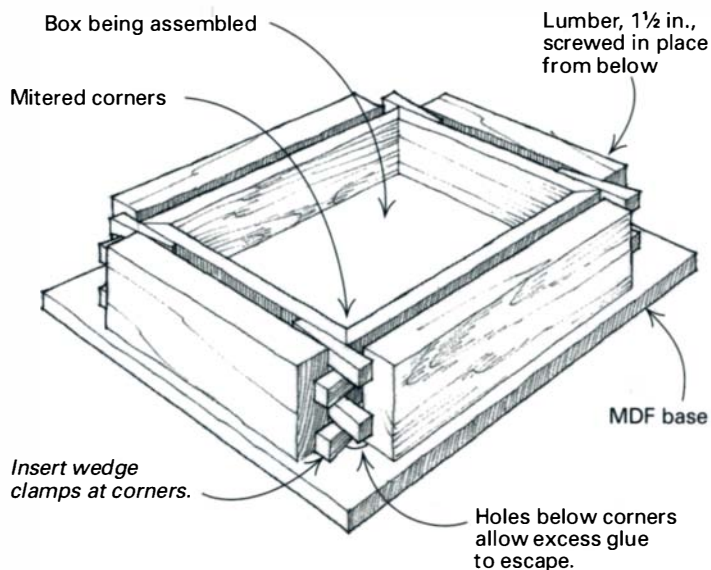
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Box assembly jig



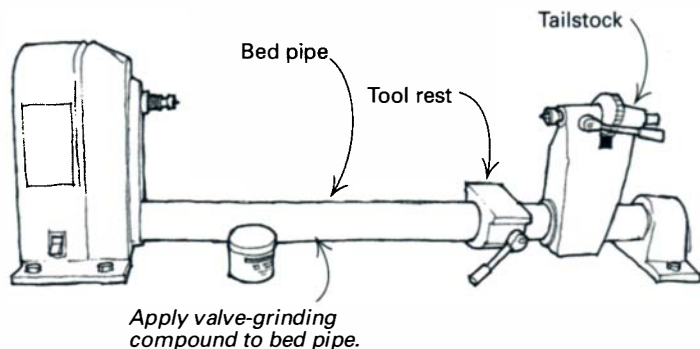
A commission for six identical boxes led me to develop this assembly jig. The jig consists of four 1½-in.-thick pine supports mounted to a ¾-in. medium-density fiberboard (MDF) base with long, beefy screws. I cut each support ½ in. shorter in length than the corresponding box side to allow space into which I drive wedges that do the clamping.

To use the jig, I apply glue to the four mitered corners of the box and place the box in the jig. Then I insert pine wedges between the supports and the box sides to compress each corner of the box. A 1-in. hole in the base directly under each corner keeps excess glue from bonding the box to the base.

With this jig, I can glue and assemble a box in less than 10 minutes with virtually no racking. The corners are tight and uniform.

—Mark Maiocco, Spotsylvania, Va.

Un-sticking machine parts



The tool rest and tailstock on my lathe were difficult to slide back and forth on the cylindrical bed. At times, I had to tap them with a mallet to make an adjustment. I finally solved the problem with automotive valve-grinding compound.

I applied a thin coating of the grease-based compound all over the bed pipe. With the levers unlocked, I moved the tool rest and the tailstock back and forth over the bed, essentially grinding off the high spots that were causing the trouble. I kept up the grinding action until the fixtures moved freely on the bed.

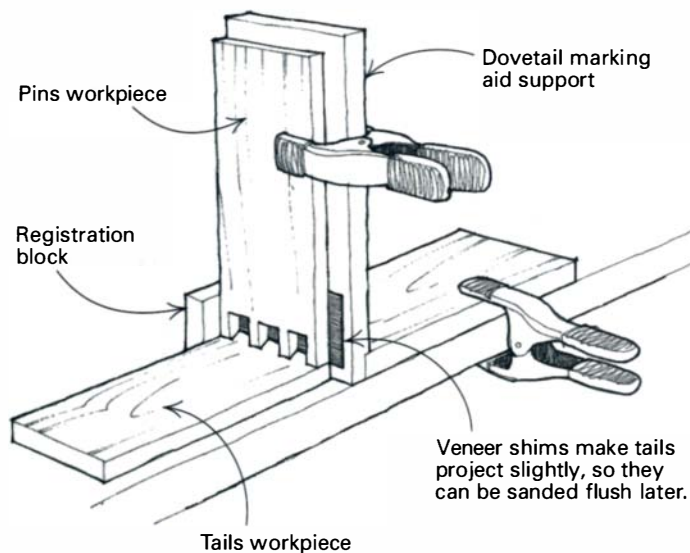
After cleaning off the compound with a degreaser, I applied car wax to the entire bed. I suspect this same procedure would loosen up a stubborn tablesaw rip fence as well as solve other similar machinery problems around the shop.

—Bob Kelland, St. John's, Newfoundland, Canada

Quick tip: For an improvement over waxed paper or newspaper to protect your work surface, try some mirrored Mylar film used on windows. The stuff is nearly indestructible, comes in different widths, and glue drips and finish spills wipe right off. The material is a bit pricey, but you might be able to buy some leftovers at a discount from a car-windshield or glass supplier.

—Ben R. George, Long Beach, Calif.

Aid for marking dovetails



When making dovetails by hand, it is easy to introduce errors while marking the outline of the tails from the pins. This is the sort of three-handed job that requires keeping the workpieces aligned perfectly in two different directions while holding everything rock-steady. It further complicates things if you want to shift the registration slightly so the tails will be a bit long for sanding off later.

I have found that by using a simple right-angle support, I can reduce these marking errors. The support is simply a couple of scrap pieces screwed together at 90° with a stop block added on one edge to align the edges of the two workpieces. I clamp the support to the workbench, align the two workpieces and clamp the vertical workpiece to the support with spring clamps. I place a piece of veneer (about 1/32 in. thick) behind the vertical workpiece so the tails will protrude a bit.

I like to mark lighter woods with a pencil that has a chisel point sharpened down to the center of the lead on one side. This allows

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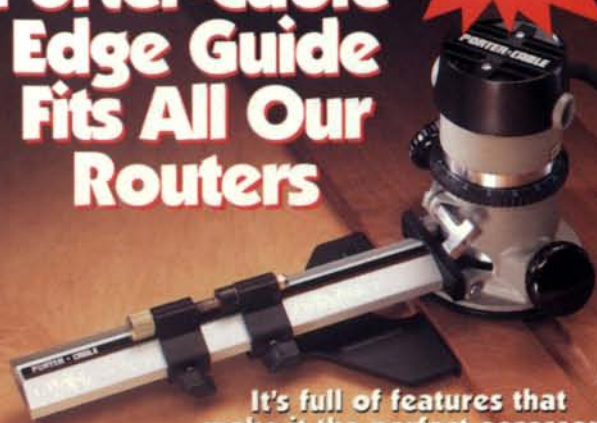
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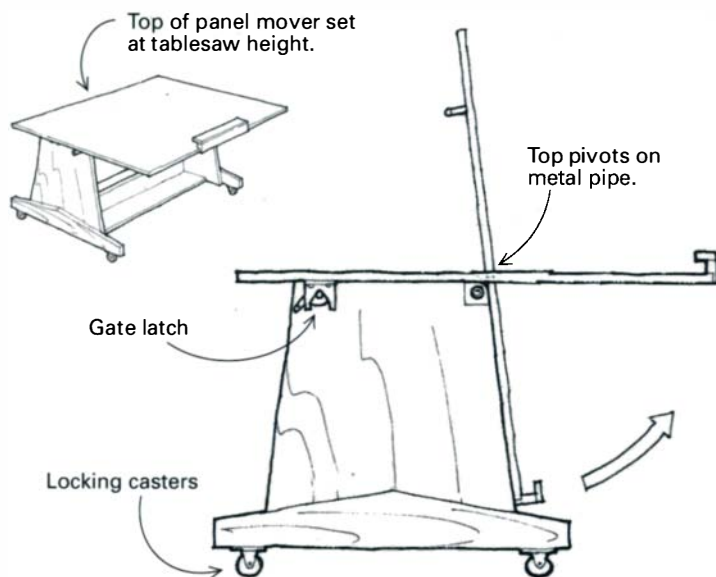
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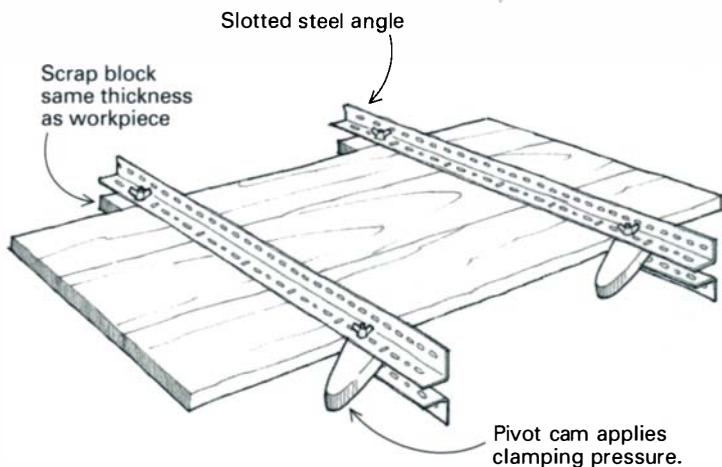
precise tracing of the pin outline. On darker woods, a knife scratch is easier to read.
 —John M. Van Buren, Herndon, Va.

Pivoting panel mover



This panel mover enables one person to easily load a full 4-ft. by 8-ft. sheet of plywood, move it around the shop, raise the panel to horizontal and lock it securely at the right level to push it through the tablesaw. The top pivots on a metal pipe mounted through holes in the vertical supports and into lumber attached to the underside. The unit also serves as a fine movable workbench. One unique feature of the fixture is the use of a gate latch to lock the pivoting panel at horizontal. Other construction details are shown in the sketch.
 —David Carter, Victoria, B.C., Canada

Adjustable shopmade clamps



Woodworkers needing to edge-join boards on a regular basis should consider using slotted-steel angle to construct a clamping

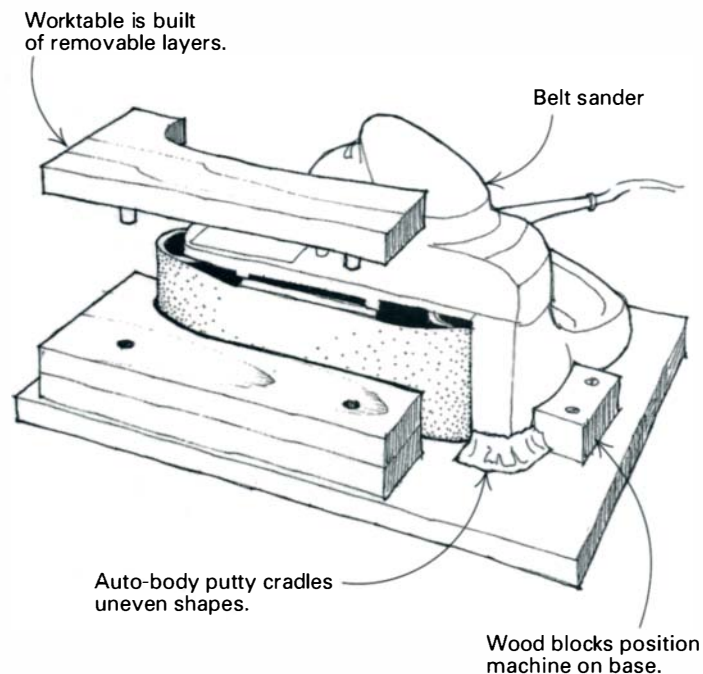
jig. The slotted angle is available in a variety of weights and strengths for use in shelving systems in libraries and warehouses. Holes or slots are punched along the length of the material for a variety of bolt placements.

A clamping jig can be made by fixing two pieces of the angle together with bolts and wing nuts at each end. One bolt secures a fixed spacer the same thickness as the planks to be edge-glued. The other bolt holds a cam clamp, also of the same thickness, which applies pressure to the plank edges when the whole clamp is assembled.
 —A.W. Clarke, Moonta Mines, Australia

Quick tip: I like to unplug my stationary power tools when I leave my shop. So I tied a short length of orange plastic surveyor's ribbon to the plug end of each cord. A quick glance around the shop at the end of the day reveals any tools that are plugged in.

—Croxtton Gordon, Machipongo, Va.

Using a belt sander as an edge sander



To mount a portable belt sander for edge-sanding, start by placing the sander on a piece of 3/4-in. plywood so that the platen is square to the plywood. Attach small blocks to keep the sander in position, and press small amounts of freshly mixed auto-body putty under and around the sander to form a customized cradle. Be careful not to build up the putty in such a way that would prevent the sander from being removed from the cradle. Apply the putty in thin layers, and allow each layer to set before applying the next. Be sure to coat the sander with oil, or enclose it in a plastic bag to prevent the putty from bonding to the tool.

After the cradle is complete, trim the base and add a worktable. I made one by stacking several scraps of wood in front of the belt, as shown in the sketch. The layers allow me to use the full width of the belt and can be shaped around the front of the belt to provide some curve sanding. Each of the layers of wood has



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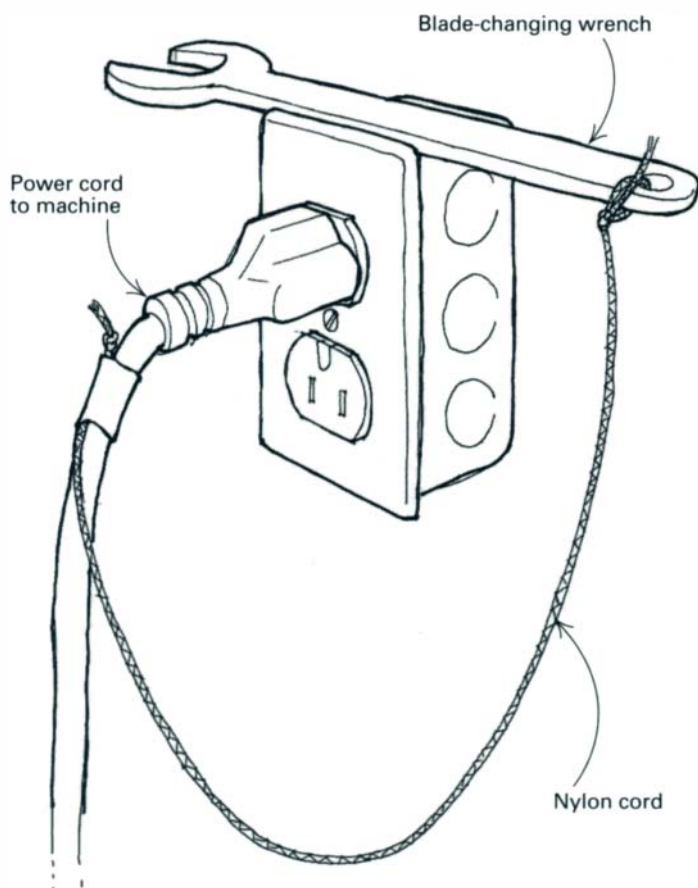
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two dowels in the bottom that engage a matching set of holes in the layer below it. —Omar V. Showalter, Harrisonburg, Va.

Quick tip: After running out of commercial pitch remover to clean my sawblades, I gathered some suggestions for home remedies from a newsgroup on the Internet (rec.woodworking). I tried almost all the suggestions I received. One of the most effective is to place the blade in an old cake pan, sprinkle baking soda on it and add a teapot full of boiling water. It works amazingly well.

Dark green, professional 409 glass cleaner and automotive carburetor cleaners both remove heavily burned pitch from router bits and sawblades, and they're much less expensive than commercial pitch removers. —Mike Vincent, Littleton, Colo.

Blade changing made safer



This simple arrangement ensures that I never forget to unplug my machines before changing blades or cutters. I've tethered each blade-changing wrench to the power cord for that machine, close to the plug. This means that to change my sawblade, for instance, I must pull the plug and take the wrench and the plug to the saw. For the tether, I use a length of thin nylon cord about 18 in. long. I knot one end of the cord through a hole in the wrench and tape the other end to the cord.

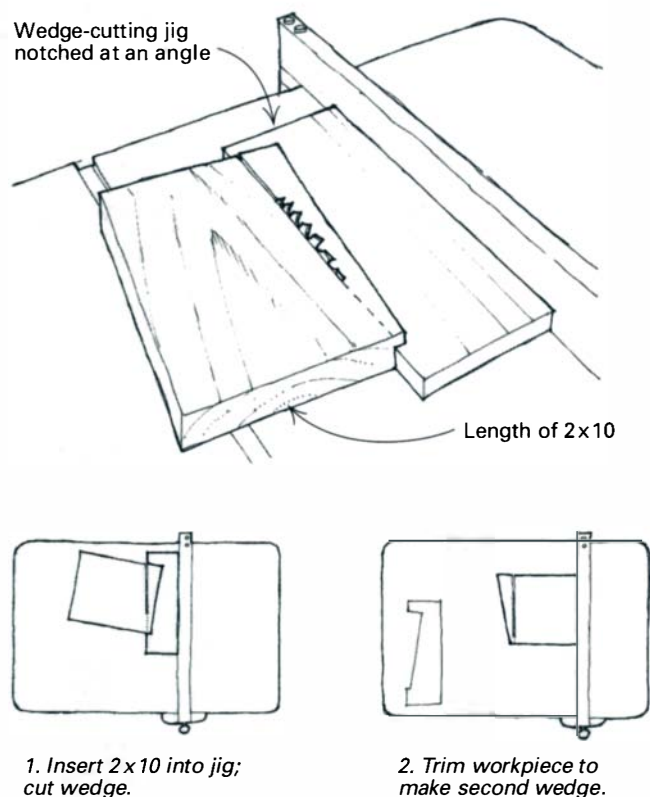
Because I have surface-mounted electrical outlets, I can set the wrench on top of the outlet. With flush outlets, you could use a small nail or screw to hang the wrench so its weight is not on the cord.

You'll get a few very desirable bonuses from this idea: You won't have the disaster of switching on the machine with the blade-changing wrench still engaged, and you'll never misplace the wrench. —B. Butters, Doncaster, South Yorkshire, England

Quick tip: I have reached the age where getting down to retrieve dropped nails and screws is becoming more and more difficult. So I made a magnetic sweeper by attaching a 12-in. length of flexible magnetic strip to a wooden block fitted with a handle.

—Don Anderson, Sequim, Wash.

Cutting wedges



I just glued up three large cherry panels using the vertical press described by Jim Tolpin (*FWW* #112, pp. 58-59). The press works great but relies on a lot of wedges. Here's how I cut the wedges quickly and accurately with a simple jig.

Start by notching a scrap of plywood with the desired wedge shape, as shown in the sketch. Cut a short length from a 2x10 to fit the notch in the plywood snugly. Place the workpiece into the notch, and run the plywood against the fence to slice off a wedge. Remove the wedge from the jig, and run the uncut edge of the 2x10 against the fence to produce a second wedge. Continue this sequence of cuts until the 2x10 is too small to handle safely.

—Karl Kirchofer, Seattle, Wash.

Methods of Work buys readers' tips, jigs and tricks. Send details, sketches (we'll redraw them) and photos to *Methods of Work*, Fine Woodworking, P.O. Box 5506, Newtown, CT 06470-5506. We will return only those contributions that include an SASE.

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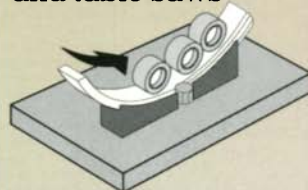
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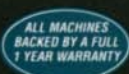


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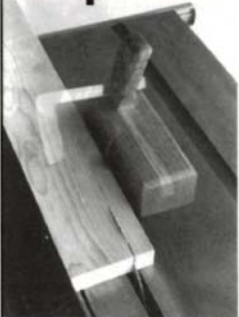


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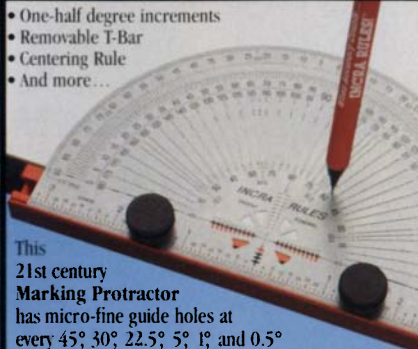
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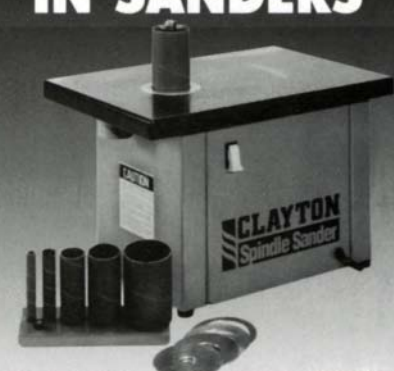
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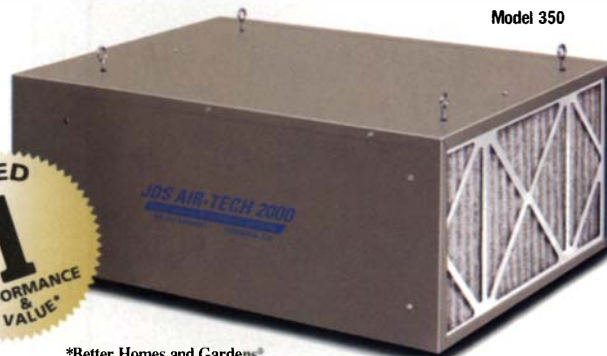
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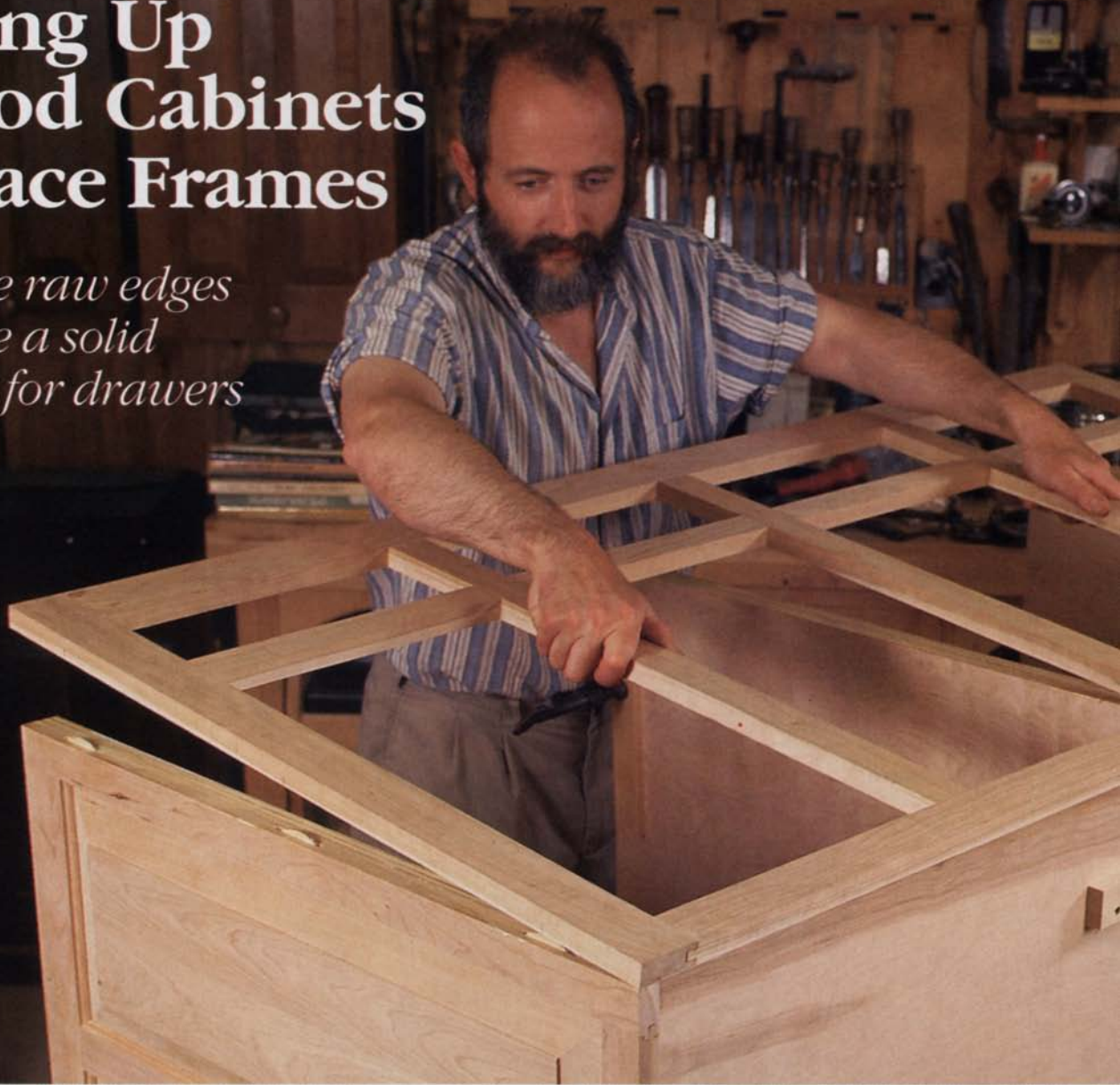
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Dressing Up Plywood Cabinets with Face Frames

Frames hide raw edges and provide a solid foundation for drawers and doors

by Joseph Beals



Face frames complete a cabinet. The author fits a face frame to a plywood carcass, giving the cabinet the appearance of solid-wood furniture.

One of the first face frames I built was a nightmare at every step. It was a maple behemoth, more than 11 ft. long, for a row of cabinets I had built at the job site. When I glued up the frame in my shop, the dowel joints would not line up until I fairly beat them together. I applied the finished frame on-site just as a thunderstorm blew in. I spread white glue on the back of the frame and used two hands, two knees and my forehead to hold it in place. A lightning bolt took out the power at about the third nail. As I set the

frame by kerosene lamp, I decided face frames must be the nastiest job invented.

I have made plenty of face frames since then, and they don't seem nearly as difficult anymore. I now make them with mortise-and-tenon joints and attach them to carcasses with biscuits or with counter-bored and plugged screws.

How a face frame is made is no more important than how it's designed. Face frames should be a subtle element in the composition of a cabinet. A face frame that draws attention to itself through awkward pro-

portions or wild grain isn't doing its job.

And no matter how face frames are made, they all do the same thing. A solid-wood face frame provides a finished front on casework that's usually made of some manufactured material such as plywood or fiberboard. The frame covers the raw edges, provides a place to hang doors, fit drawers and attach trim. Face frames are appropriate for a variety of practical, built-in and free-standing furniture.

Design face frames like doors

Parts of a face frame are best put together as if they were a conventional door frame: Outer stiles should run full height, with top and bottom rails let in between. Internal partitions should follow the same pattern (see the drawing below).

These rules serve well in most instances, but they should be modified when a pair of face frames are joined end to end. The joint between them will look best if the top and bottom rails butt into each other, rather than into side-by-side stiles. This will give the illusion of a continuous frame, which looks better.

It's important to use straight-grained, stable stock for face frames. Wild grain should be avoided, even when the rail or stile is fastened along its length, such as along a

cabinet bottom. It will draw the eye to a pattern that probably has no symmetry or other resolution. The frame should not compete visually with the doors and drawers it surrounds.

There are no best dimensions for the various rails, stiles and partitions, just some guidelines to keep them visually balanced. I mill rough 4/4 stock to $\frac{13}{16}$ in., but standard $\frac{3}{4}$ -in. stock is fine. The parts should be neither so wide as to appear clumsy nor so narrow as to seem fragile. The proportions of smaller parts such as drawer partitions should be reduced to keep them from looking oversized. For a face frame that will house flush-mounted doors and drawers, I find $1\frac{3}{4}$ in. to be the most satisfying width for ordinary stiles, and I derive other component dimensions from it.

Outside stiles need to be wider at corners because they form a joint. To make both appear $1\frac{3}{4}$ in. wide and maintain symmetry around the corner, one must be cut down to 1 in. wide or less. Working with such a narrow piece is not worth the effort, especially if grooved for a panel. I widen the front stile to $2\frac{1}{4}$ in. and make the side stile $1\frac{1}{2}$ in. wide. (For more on how to get around a corner, see the box on p. 47.)

You have several assembly choices

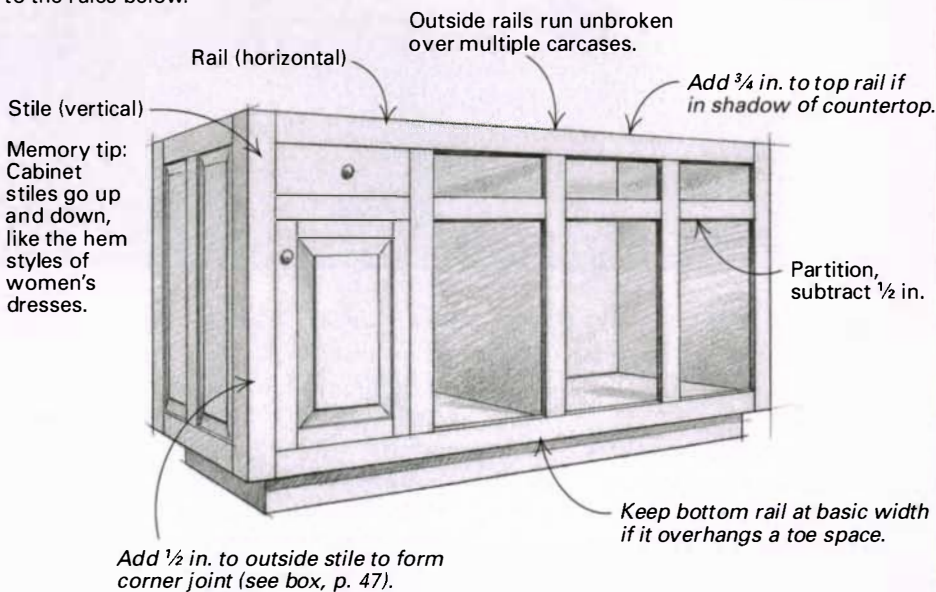
There are at least four ways to make a face frame: with dowels, biscuits, pocket screws or more traditional mortise-and-tenon joinery. Your choice will probably depend on what tools you have on hand and which method you have experience with. For me, the best approach is the old-fashioned way—the mortise and tenon—even if it takes a little longer and is a little more complicated. (The first three methods are explained in more detail on p. 44.)

Mortise-and-tenon joints are strong, very reliable and easily made. They give positive, foolproof alignment of parts. To cut mortises, I use a small slot mortising machine. You could use a router, which is also very fast and accurate.

I make the mortises about $\frac{3}{8}$ in. deep and about $\frac{5}{16}$ in. wide. It's not necessary to make them deeper because a face frame is not subject to particularly severe loading. They should be easy to put together but without too much play (see the photos

Guidelines for designing face frames

Start with a basic width of $1\frac{3}{4}$ in. for rails, stiles and partitions, and vary it according to the rules below.



Three common ways to build a frame

Face frame joints don't need to be particularly strong, but they should go together easily and be simple to align. Mortise-and-tenon joinery is traditional (see a description of my approach on pp. 46-47), but face frames can also be assembled with dowels, biscuits or pocket screws.

Dowels

Pros: Doweled face frames are easy to lay out because you don't need to figure in tenon lengths.

Cons: To prevent frame pieces from rotating, each joint requires two dowels, which can be difficult to align accurately. Once drilled, dowel holes can't be adjusted to compensate for even the smallest alignment mistakes during assembly. If used with yellow glue, doweled joints must be pressed tight at one go: a lapse of a minute or less will let a dowel seize with the joint open.

Biscuits

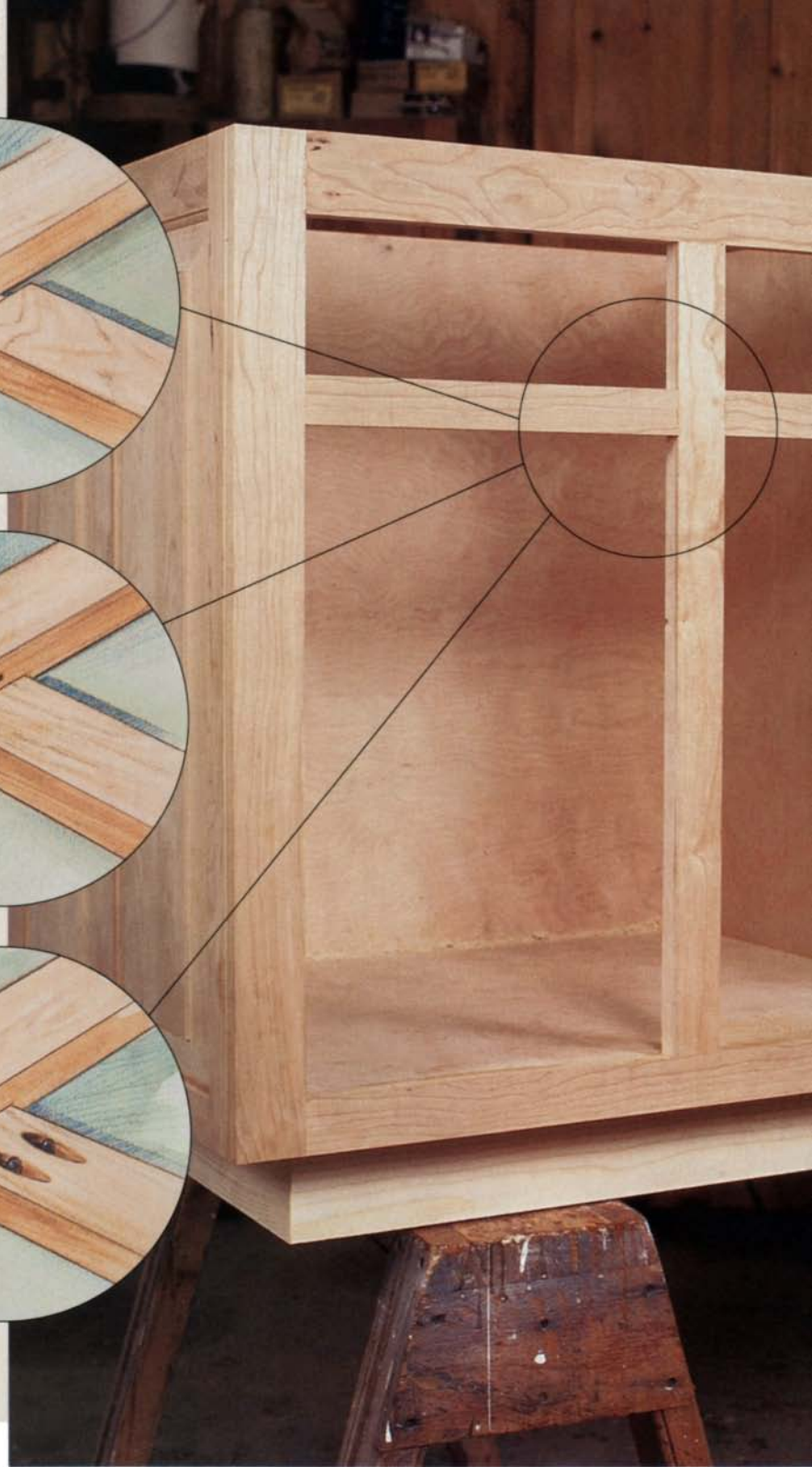
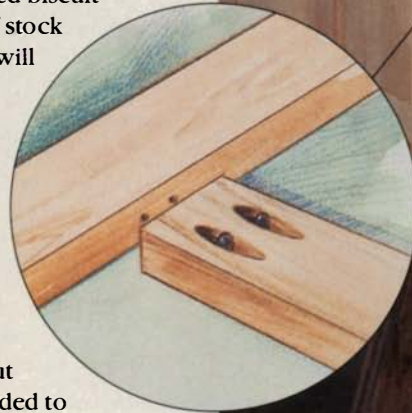
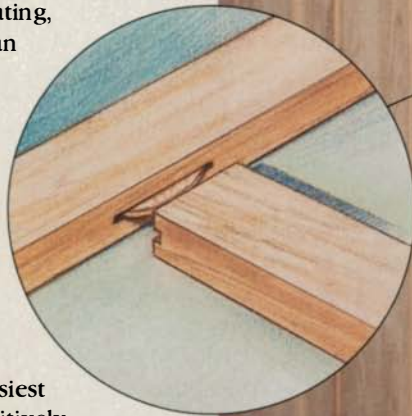
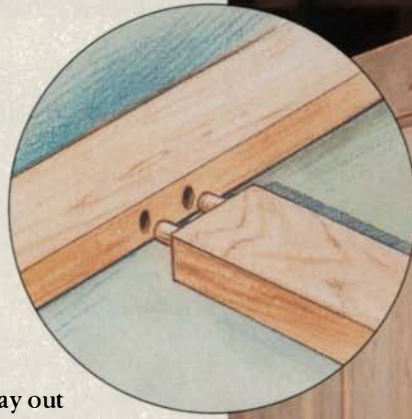
Pros: Biscuit joints are the fastest and easiest joint to make. They align quickly and positively.

Cons: Kerfs for the smallest standard-sized biscuit will break through and show on edges of stock narrower than $2\frac{3}{8}$ in. If a molding detail will be added to the inside of the face frame, biscuits may be the most convenient joinery choice.

Pocket screws

Pros: Pocket screws on the back of the frame make a fast and simple joint.

Cons: Joints are difficult to align perfectly flat and can't be adjusted in any practical manner during assembly without pulling out screws. A dedicated jig is needed to drill screw holes.



showing my approach on pp. 46-47).

When all the joints have been cut, I dry-fit the face frame and compare it to measurements on my drawings and the carcass. It helps to imagine the finished cabinet and overlay that mental picture on the face frame, in case something brutally obvious has slipped through the design process. If all is well, I glue it together.

I brush yellow glue in the mortises and

on the tenons and fit the frame together across sawhorses (see the bottom left photo on p. 46). I clamp across all joints with just enough pressure to bring the tenon shoulders home tight, checking once again to make sure the joints are flat. Adjustments can be made by shifting a clamp or moving it to the opposite side. However, unlike a door, a face frame does not need to be perfectly flat. Because it's relatively thin, the

frame will be fairly limber and will be drawn flat when fitted to the carcass. I also check each joint for square and lateral alignment, adjusting them with a hammer and block if necessary.

I measure diagonals to check the face frame for square (see the photo at right on p. 46). This is crucial, but easy to forget. To square a slightly racked face frame, I skew each clamp slightly. If that doesn't work, I

Attaching frames on the job site

It's often easier to apply face frames while cabinets are still in the shop, but very large or long cabinets are a different story. When a number of smaller cabinet components are put together on a job site, they can be joined with a common face frame. In that situation, frames can be attached to the cabinets with screws or nails.

Plugged screws

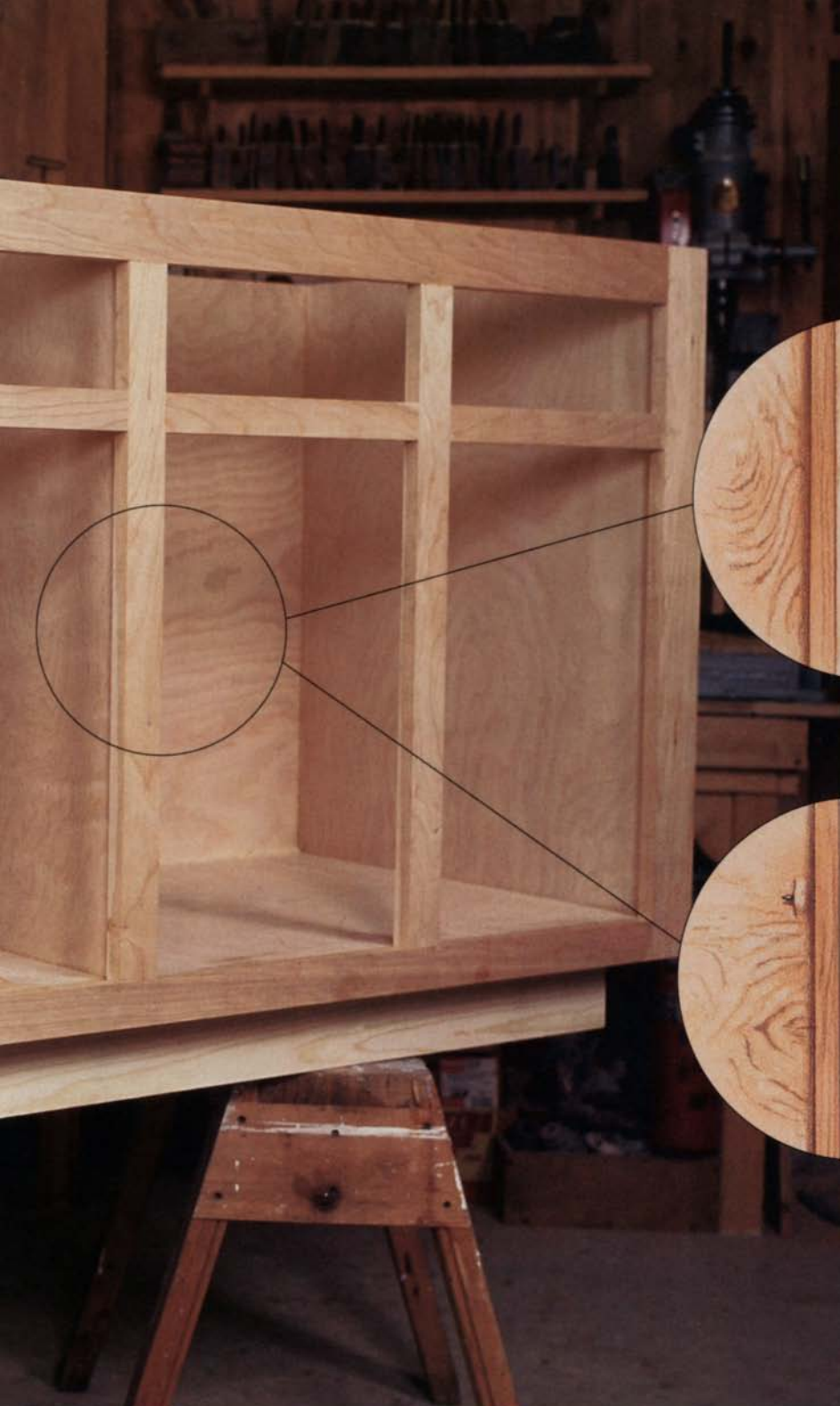
Pros: Plugged screws are useful when clamping a biscuit joint is not an option. They are the equal of biscuits for strength and overall convenience, and can be used with biscuits for better alignment. Use 1 $\frac{3}{8}$ -in. black drywall screws through a $\frac{13}{16}$ -in.-thick face frame. They grip well in plywood and do not require a pilot hole.

Cons: The plugs show if the cabinet is finished bright.

Nails

Pros: The oldest and simplest method is glue and nails, especially for painted work. Nail holes are small and can be filled easily.

Cons: Nails will sometimes wander sideways in a plywood edge, shifting the face frame. Occasionally, a nail will split the plywood or pop out of a cabinet side. Nailed frames are difficult to align exactly without biscuits.



add a clamp across the long diagonal to pull it into place. Despite every care, the square of the door and drawer openings on a complex face frame may not agree with the overall squareness of the frame. When this happens, I split the difference.

Attach face frame to carcasses

Whenever possible, I attach the face frame in my shop because all my tools are near-

by, and clamping a frame to a cabinet is much easier when the cabinet can be parked on a couple of sawhorses. Attaching them on-site is an option if the carcasses and frames are too big to carry as a single unit. Attaching a face frame to carcasses after they've been set in place is my last option, though there are circumstances when it's the best method.

No matter where you end up attaching

face frames, the single most demanding detail is keeping the top edge of the bottom rail flush with the inside of the cabinet bottom. (One exception is when the cabinet bottom becomes a door stop.) The veneers on most cabinet-grade plywoods are very thin and will not withstand much planing or sanding. The top edge of the bottom rail must, therefore, be fastened dead flush or a fraction proud to permit finishing to a

My way of making face frames



Use mortise-and-tenon joinery for a strong, easily aligned joint. To save time, cut the tenon shoulders on the table saw without changing the blade height.



Before glue-up, dry-fit the whole frame. This ensures all pieces will go together smoothly when coping with glue that sets quickly and an armload of clamps.



Sawhorses make clamping up easy. They'll let you fit clamps on both sides of the frame for even clamping pressure.



Only perfect rectangles have equal diagonals. The author compares diagonals to make sure the face frame is square. Angling the clamps corrects minor problems.

smooth joint. This joint has always been particularly important to me. I think it's a sign of sloppy work when it's not flush, but others may not be so obsessed.

Shop installation with biscuits and clamps—When I attach face frames in the shop, I use biscuits almost exclusively (see the top photo on the facing page). The biscuit joint is strong, accurate and doesn't show. Also, biscuits are invaluable along the bottom rail, which demands accurate positioning. However, it's foolish to trust the biscuit to align everything perfectly because there can be some occasional play in the slots. Even with biscuits, you should expect to make adjustments.

In some materials, such as medium-den-

sity fiberboard, biscuits may be the only practical attachment because screws hold poorly in the edge and tend to split the material. Although biscuits allow me to eliminate screws entirely, the disadvantage is that I need to use clamps (see the bottom photo on the facing page). Clamps tie up the carcass for at least an hour, and they always get in the way of cleaning off glue that squeezes out of the joints.

On-site installation with plugged screws—For a very long run of cabinets, on-site installation of face frames has some benefits. Long runs of cabinets look better when united with a single face frame, but attaching them all in the shop and moving them to the site later is impractical. Multiple

Biscuits are best. Although strong, biscuits can be difficult to align when the face frame hangs over the edge of the cabinet. Instead of resetting the fence on his biscuit joiner, the author uses a spacer block the thickness of the overhang to align the tool.

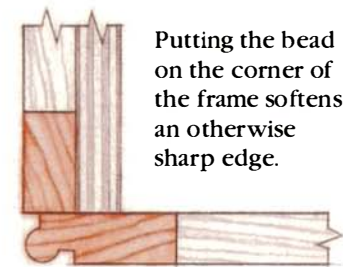
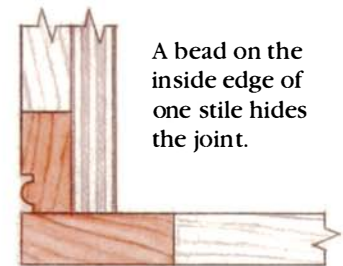
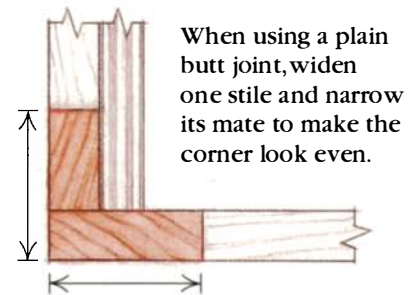


Clamp-up is a cinch with the carcass on its back. Face frames attached with biscuits need to be clamped. Sawhorses make it easy to reach all the edges of the carcass and face frame.



Turning a corner

As seen from the top, face frames can be joined at a cabinet corner in several ways.



cabinets should be set in place individually, then fastened together to ensure they're square, plumb and aligned.

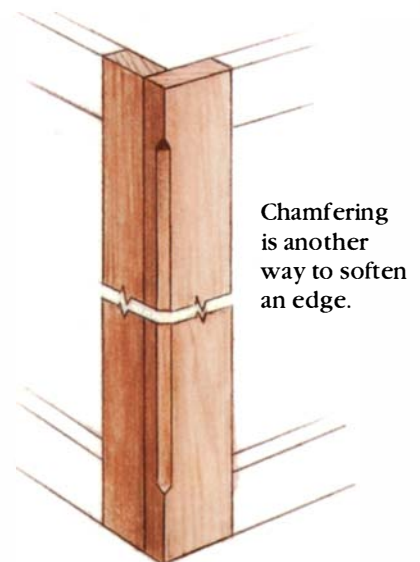
Shop installation of face frames is convenient because the cabinets can lie on their backs, which gives full access for clamping. On-site, after the cabinets are set against the walls, clamping access disappears. In this application, counterbored, plugged screws are hard to match for strength and overall convenience. Once they're in, the attachment is done. Screws grip well in plywood and do not require a pilot hole in the plywood edge.

To hide the screws, I use plugs cut from the same stock as the face frame. For bright finished work, I try to match grain pattern and color as well. After the glue dries, I

strike off most of the excess plug with a chisel and watch how the grain runs. If the grain runs down into the plug, some of the plug can pop off below the surface, leaving a tedious repair job. To avoid it, I finish paring off the plug from the other direction.

Plugged holes vanish under paint, but even with careful grain and color matching, that little circle is always visible under a bright finish. This isn't necessarily offensive, but it requires that screw holes be carefully and symmetrically aligned. I find that there is something pleasing about a thoughtful, geometric pattern of plugs along the edges of a face frame. □

Joseph Beals is a custom woodworker in Marshfield, Mass.



Rabbet Planes Are Real Shop Workhorses

*These versatile tools clean up machine cuts
and fine-tune joinery for a perfect fit*



by Garrett Hack

If I were headed to another part of the world for an extended stay and could pack only a small kit of woodworking tools, I would make sure I brought along at least one rabbet plane. From cutting and fitting rabbets and dados to making final adjustments to tenons, rabbet planes have no equal.

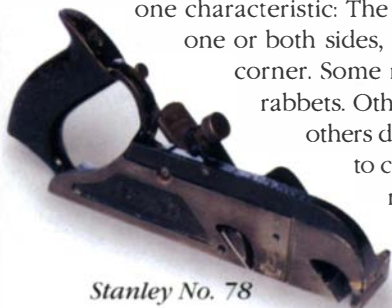
There are dozens of types of rabbet planes, but they all share one characteristic: The iron is flush with the plane body on one or both sides, allowing the plane to cut right into a corner. Some rabbet planes cut timber-frame sized rabbets. Others are better suited to fine work. Still others do very specialized jobs, like cutting into corners or widening grooves cut with a router or dado set.

In 1872, the Greenfield Tool Co. offered nearly 100 sizes and types of wooden rabbet planes and an

additional 38 models of fillisters (a fancier model that included a fence, a nicker to score cross-grain cuts and a depth stop). Cast iron later became the material of choice, and it wasn't long before there were even more choices in iron than there had been in wood. Many of the older rabbet planes are no longer in production, but a number of them are still being made (available through mail-order companies such as Garrett Wade, Lee Valley Tools and Woodcraft). The reason is simple: Rabbet planes have not outlived their usefulness, even in woodshops where much of the work is done by machine. Just two rabbet planes make a good starter kit (see the story on the facing page).

Two basic planes for all-around work

For general-purpose work, I turn to a basic rabbet plane—either a Stanley No. 78 (see the photo at left) or a No. 289. They can quickly adjust a rabbet that's been cut on the tablesaw or sink a rabbet



Stanley No. 78

Adding rabbet planes to your tool kit

What do you include in a kit of rabbet planes that will handle any job in a furnituremaking shop? Though no single rabbet plane can do everything, the No. 78 comes close—it can cut and adjust many different rabbets.

For fitting joints precisely and paring end-grain shoulders, however, the No. 78 is too coarse a tool. For these jobs a low-angle, fine-mouth, heavy shoulder plane is ideal. Any of the larger Stanleys work well—the No. 92, No. 93 or No. 94—and they can double as chisel planes.

I would also include a No. 90. If you do a lot of fine, precise work, a bullnose rabbet can really come in handy. —G.H.

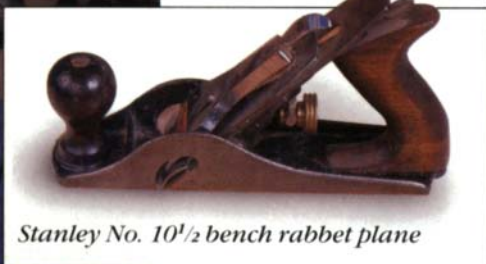
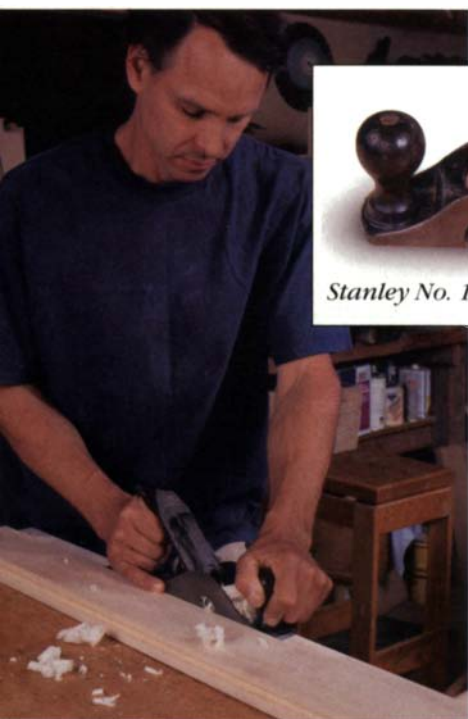


in the back of picture-frame stock. Because these planes are so simple to keep tuned and to use, it's often possible to cut a rabbet in less time than it takes to set up a router.

These planes were designed more for carpentry than furniture-making, so their mouths aren't as narrow as I'd like for fitting joints. This makes them better suited for less-than-fussy work. Stanley's No. 78 and the Record No. 778 (essentially the same tool) are the only basic rabbet planes I'm aware of that are still being made. Both are generally available. Because so many wooden rabbet planes of the same style were made, they are easy to find on the used-tool market.

Bench rabbet planes do large-scale work

Three Stanley planes, Nos. 10, 10¼ and 10½, were designed for planing large rabbets. All three are known as bench rabbet planes because they look identical to the No. 4 and No. 5 bench planes, except for the distinctive rabbet throat. Capable of the same heavy work as a bench plane, bench rabbet planes have double irons (an iron with a chipbreaker screwed to it), lateral and depth adjusters and the same style handles and knobs as their standard bench plane counterparts.



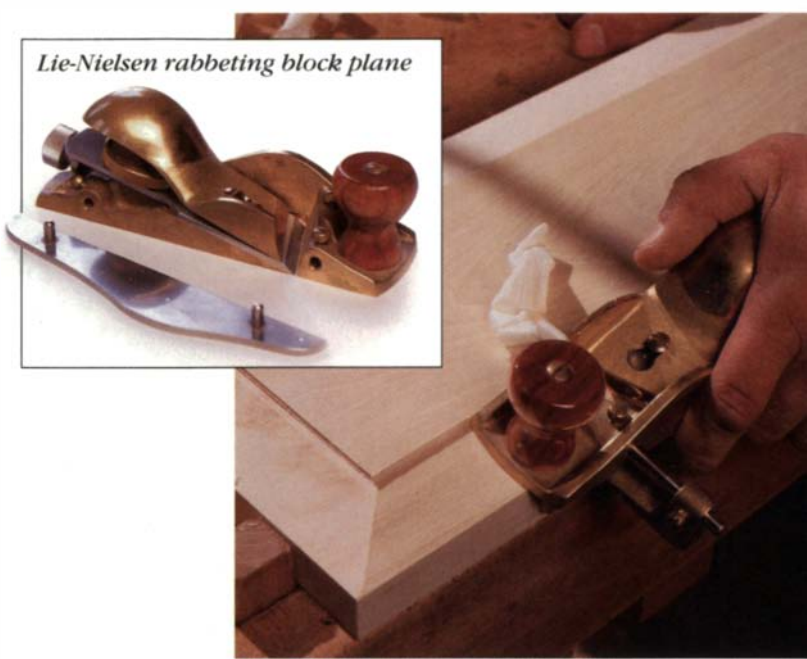
The Stanley No. 10, a favorite with timber framers, is still in production. With its long sole, the same as a 13-in. No. 5 jack plane, and its 2¼-in.-wide iron, the No. 10 is a useful plane for cleaning up timber frame tenons or big rabbets in door and window frames (see the photo at left). The

No. 10¼ is rare. It's the same length as the No. 10, but it has a tilting handle and knob and nickers. The No. 10½ bench rabbet plane is still being made (see the photo above). It's about 9 in. long and has a 2¼-in.-wide iron, the same as a No. 4 smooth plane.

Rabbeting block planes are suited to small work

For work in tight places, the smaller rabbeting block planes are handiest. The Stanley No. 140 looks like any other block plane, except that the iron is skewed and one side of the plane body is removable for rabbeting work. I've owned a Millers Falls No. 7 for years, which is a knockoff of the Stanley model (manufacturers copied many of the Stanley planes after the patents expired).

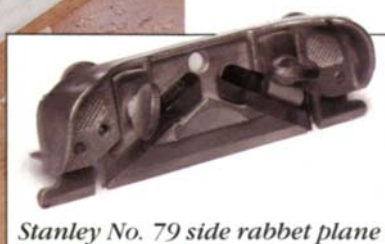
The No. 140 can be used to smooth the bevels of raised panels and to rabbet with one hand. The Sargent No. 507, which has its



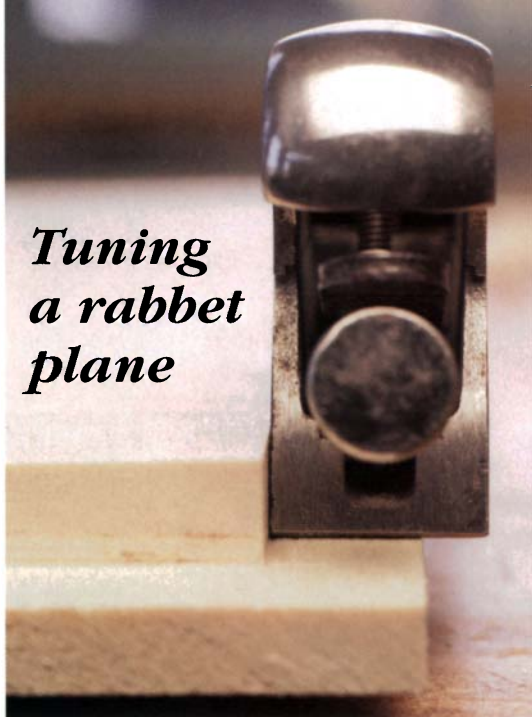
iron exposed on both sides, is useful if you encounter tearout when planing in one direction. The only rabbeting block plane I know of that is still being made today is the Lie-Nielsen skew block plane, which is based on the Stanley No. 140. The plane has a skewed iron that's designed to give a smoother slicing cut.

Side rabbet plane adjusts width of groove

Side rabbet planes are unusual because the iron projects from the side of the plane and takes shavings off walls of rabbets and dados. Stanley's right- and left-handed pair, the Nos. 98 and 99, are now out of production, though Lie-Nielsen reproductions are now being made (see the photos above). Stanley also came up with the No. 79, a tool with two irons—one for each direction—that's still being made (see the photos below). These planes are great for fitting or tapering the shoulder of a groove or a sliding



Tuning a rabbet plane



The key to tuning any rabbet plane is aligning the iron both with the sole and with the side (or sides) of the plane. The object is to have the cutting edge parallel with the sole and parallel with, and just barely peeking out, on the side. This is one of those things that's easier said than done, and it usually takes some experimenting.

Once the iron is aligned with the side, check that it's parallel with the sole. The only way to remedy any large misalignment is by grinding and rehonng the edge. With the iron properly ground and honed, careful honing in the future should keep

everything in alignment.

Skewed irons require one additional tune-up step: The back of the iron along the shoulder side has to be ground back so it's flush with the side of the plane.

The outside of the nicker or spur should be aligned with the cutting edge and should be honed knife sharp. Hone it only on the inside edge, and if necessary, bend it slightly (as though you were setting a sawtooth) to bring it into alignment with the iron.

Finally, a light coating of wax on the parts will make adjustments smoother. —G.H.

dovetail. If you need to take off just $\frac{1}{32}$ in. to get a shelf to fit in a dado perfectly, using one of these planes is just as fast and a lot safer than tapping on the router fence and taking another pass.

Shoulder planes are precision rabbet planes

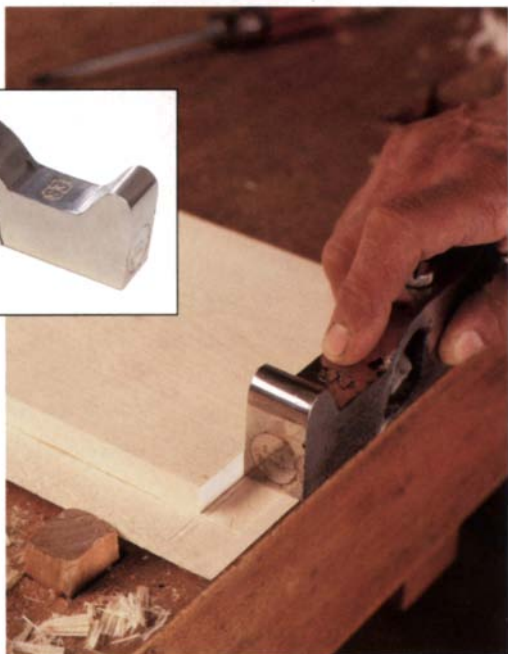
The sole and sides of a shoulder plane are machined or lapped precisely square so that the plane can be used on its side to trim the shoulder accurately while being guided by a tenon or the bottom of a rabbet (see the photos below). Stanley made four versions, each progressively longer and wider: Nos. 90, 92, 93 and 94. Only the No. 94 is no longer being made (a No. 91 was never produced).

One situation where a larger Stanley shoulder plane really makes sense is for cutting a long rabbet, like the one on the end of a tabletop that will receive breadboard ends.

All four of these planes have threaded adjusters for setting the



Stanley No. 93 shoulder plane



From rabbet plane to chisel plane—All four of the Stanley shoulder planes can be converted to chisel planes by removing the nose pieces, allowing the plane to cut right into a corner.

depth of the iron. The No. 90 has a bullnose for working into tight places, and the nose pieces on all four can be removed to turn them into chisel planes (see the photo above).

The Stanley designs are based on the classic British shoulder rabbets, either made from steel plates dovetailed together or cast from gunmetal. In both, a wood infill was sandwiched between the two sides of the plane body, and a wedge kept the irons in place. □

Garrett Hack builds furniture in Thetford Center, Vt. He is the author of The Handplane Book (The Taunton Press, 1997).

Lumber from Your Own Backyard

Hire a sawyer and his machine to reap furniture-grade lumber at great savings

by Gus Carlson



Early on in my career as a sawyer, I spent an entire day in a customer's yard cutting lumber for a barn frame. From time to time, I'd notice someone peeking through the curtains. When I'd finished up, the couple who lived there finally came out. They both helped me pack, and as we worked, I learned it had been the woman who had watched all day from the window. She was awestruck by the process of turning trees into lumber. As we were saying our good-byes, she touched my arm and said animatedly, "It's really like a miracle, isn't it?" Amen.

Hiring a sawyer to bring in a portable bandsaw mill is a great way to get lumber at a good price. Even if you don't live on a wooded site, chances are good that sometime during the year a friend, relative or neighbor will need a tree removed. Logs from

Locating a sawyer

These sawmill manufacturers can refer you to the owners of their mills.

Better Built Corp., Wilmington, Mass.; (508) 657-5636

Kasco Manufacturing Co. Inc., Shelbyville, Ind.; (317) 398-7973

Norwood Sawmills, Amherst, N.Y.; (800) 567-0404

Timberking, Kansas City, Mo.; (800) 942-4406

Timber Technology, Earlysville, Va.; (804) 978-4636

Wood-Mizer Products, Inc., Indianapolis, Ind.; (800) 553-0182

these trees can be cut into boards right on the spot for much less than you would pay at a lumberyard.

A bandsaw mill doesn't waste much wood

The advantages of having a bandsaw mill do the sawing are many. I have owned and operated such a mill for several years. The mill is mounted on wheels and can be towed on the highway with a pickup truck to the site where the trees were cut. This eliminates the difficulty and cost of transporting logs and, even more important, puts the milling operation directly under your observation. You're guaranteed to get all the lumber cut, and you can advise the sawyer how you'd like the log sawn. My mill, which is fairly typical, can saw logs up to 36 in. dia. and 21 ft. long, so all but the largest trees can be accommodated.

Another advantage of having your lumber bandsawn—especially for craftsmen interested in furniture-grade lumber—is that so much less wood ends up as sawdust than with any other method of milling (see the photo at right). Compared to a circular-saw mill, a bandsaw yields 25% to 30% more board feet from the same log. Chainsaw mills waste even more wood than a circular sawmill. I know—I owned one for years.

Bandsaw-mill manufacturers advertise this fact, but I still had a hard time believing it at first. Repeated measurements have convinced me, however, that a bandsaw consistently yields at least 25% more than the International Log Scale (an industry benchmark) suggests when sawing lumber 2 in. thick or less.

Finding a sawyer can sometimes be a challenge, but try looking in the yellow pages under "sawmills," or check the local paper's classified advertisements if you live in a relatively rural area. Also, the manufacturers of these mills provide a referral service, hooking up mill owners with people who have logs they want sawn (see the box on the facing page).

As with any custom work, you should give your sawyer a date as far in advance as you can. Chances are you'll be dealing with a small, independent businessman who has a backlog of five or six customers or orders and who must juggle logging, skidding, milling, kiln-drying and making deliveries. Order early or, even better, put in a standing request or one with a flexible date.

Avoid the very large and the very small

The cost of having lumber milled depends either directly or indirectly on the sawyer's production rate, so it's in the customer's best interest to understand the basics. Production rates vary according to a number of factors starting with the make and model of the mill. The larger the motor, obviously, the faster the saw can cut. Also, hydraulic log turners, loaders and clamps speed up production quite a bit. Even with a full contingent of hydraulics, there are still times when logs—especially large ones—have to be manipulated manually.

The logs themselves also make a difference in how fast a sawyer can process lumber. Hardwoods are a bit slower to cut than softwoods, with hickory the slowest, at least in my area. The size of the logs and dimensions of the lumber affect production rates as well: The smaller and shorter the logs, the slower the rate. Logs smaller than 8 in. dia. and less than 8 ft. long are too small to produce much lumber. At the other end of the spectrum, really huge logs are difficult and



Furniture or firewood: a logs-to-lumber checklist



Here's the payoff. At least some furniture-grade lumber is probably hiding in that backyard tree. But think carefully before calling in a sawyer.

How big is the tree?

- Logs smaller than 8 in. dia. and less than 8 ft. long are too small to produce much lumber.
- Without special equipment, really huge logs are difficult and dangerous to handle.

What condition is the tree in?

- Nails, barbed wire and other foreign objects can be imbedded in trees around houses and along fence lines.
- Crooked, split, rotten or insect-infected logs just aren't worth it.
- Avoid muddy logs unless the lumber is especially valuable.

Can a sawyer get to the tree?

- Easy access for trucks and a flat, clear spot for sawing are advantages.

It's not all suitable for furniture

- Lower-quality lumber will account for more than 50% of the tree's yield.



A big walnut tree is a prize. In most cases, it's not worth the time and effort to remove mud-encrusted bark from a tree. A black walnut this big, however, is a different story.



When you're ready to call a sawyer



Getting a custom job—An experienced sawyer can coax the best possible lumber out of a log. If you want to save money and speed production, offer to help.

When do you need the lumber?

Make arrangements with the sawyer as far in advance as possible; they're often very busy.

Are you willing to lend a hand?

A willingness to help can save you money and allow you to dictate how the log is sawn.

What kind of mill does the sawyer have?

A sawyer with a bandsaw mill will get you more lumber with less waste.

How do you want the wood cut?

It takes far less time to slab a log into consecutive planks than it does to saw for grade, but when your goal is top-grade lumber, the extra effort is worth it.

Where do you want everything?

Decide where logs will be stockpiled, where slabs will be discarded and where the finished lumber will be stacked.

This lumber is wet and heavy. Freshly cut boards like these may have a moisture content of 60%. Lumber should be stickered for proper drying, a process that will take at least a couple of months.



dangerous to handle without equipment like a backhoe or front-end loader. And it takes far less time to slab a log into consecutive planks than it does to saw for grade, which involves turning a log continually to look for its best face (see the photo at left).

I won't even consider cutting muddy logs unless they're very valuable (large walnut logs, for example). Lots of time can be wasted skinning the muddy bark off with axes, and if the mud isn't removed, the blade will dull almost instantly (see the bottom photo on p. 53).

Other dangers to the blade abound: Trees from around houses and along fence lines often harbor hidden nails, barbed wire and other foreign objects. Porcelain insulators are the worst I have hit. I charge \$20 each time the blade hits something. To sharpen and set a blade may take 20 minutes or more, and a new blade (1¼ in. wide with 7/8 in. between teeth) costs about \$25.

Don't bother with crooked, split, rotten or insect-infected logs. I make it a point to inform the customer when a log is not worth the effort. You should ask the sawyer you hire to do the same.

A well-organized milling site makes a big difference in maintaining steady production, too. Hilly or rough ground with rocks or stumps can slow things down and create hazards. Allow plenty of room, not only for the mill but also for trucks and tractors used to move the logs or lumber. A flat, clear spot perhaps 60 ft. sq. will do. Think in terms of where logs will be stockpiled, where slabs will be discarded and where the finished lumber will be stacked.

Often, customers want to help. I generally welcome it, and I enjoy working with them. Having help loading logs and off-loading slabs and lumber can nearly double the rate of production. Also, I'm sympathetic to woodworkers' desires to participate in making lumber from their own trees for their own furniture.

Price may be by the board foot or by the hour

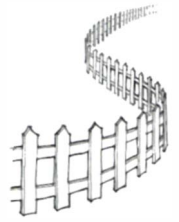
So how much does it cost to have lumber milled? I use two pricing methods: a board foot rate (one board foot is a volume of wood an inch thick, a foot wide and a foot long) and an hourly rate. When all the factors affecting production are known and there are several days of work (so things have a chance to average out), I feel comfortable quoting a board foot price—about 30 cents per board foot when working alone or as little as 20 cents per board foot if the owner helps. The board-foot price is often preferred by customers because there are seemingly no unknowns.

For smaller jobs or those with unknowns, I quote an hourly rate. For mill and sawyer, a charge of \$35 an hour is realistic, at least in my part of the country. In such cases, any site preparation or help or equipment furnished by the customer will maximize the time the saw is actually cutting the log. And only that yields lumber.

My experience has been that, even with inexperienced help, in eight or 10 hours, no more than 1,000 bd. ft. will be cut. At an average retail price of 75 cents per board foot (remember that we're talking about



Often 50% or more of a log will be less than furniture grade. Finding a use for lower-grade lumber will often determine whether sawing a log makes sense financially.



green, roughsawn lumber), that's \$750 worth of lumber for which you might pay \$350. Using the hourly rate, I've never had anyone say or even hint that they got a bad deal, probably because I always let the customer know how it will work out beforehand. The \$35 per hour and the 30 cents per board foot rates boil down to the same thing.

Keep in mind that this freshly cut lumber has a moisture content of 60% or so. It can be used immediately for outdoor utility structures like barns, fences and sheds, although flooring, siding and roofing boards should be air dried to, say, 20%. I know this isn't a universally shared opinion, but I think lumber for use in heated interior spaces should be kiln dried, a process that may add 30 cents per board foot to the cost of the lumber and may take several months or more depending on how long it's first air dried. That's still a bargain.

Not all of the lumber will be perfect

The value of the lumber depends upon its grade which, in turn, depends on good logs and the sawyer's skill—his ability to make every cut count. Grading rules can be quite complex, sometimes

reading like a set of tax-filing instructions. The basic goal, however, is straightforward and simple to understand: no knots, no splits, no stains, no worm holes, no defects—just straight, fine-grained, clear lumber. Generally speaking, the best lumber comes from the bottom of the tree—the first, or butt, and maybe the second log. The higher logs have more limbs and, therefore, more knots. Even the lower logs have knots in most cases, but they lurk deep inside the log, closer to the center. It's from the outside of the lower logs that the best lumber can be expected.

Oddly enough, finding a use for lower-grade lumber will often determine whether sawing a log makes sense financially. Often 50% or more of a log will be less than furniture grade, and you simply cannot leave half of the lumber in a pile, unused and unwanted, and still show a profit. Some milling projects never happen because there's not much of a market for the lower-grade lumber. Long live barns and fences. □

Gus Carlson harvests, saws and dries wood in and around East Haddam, Conn. He's also a retired architect who designs structures for his lumber customers.

Turning a nuisance tree into new kitchen cabinets

The property was surrounded by big, unkempt, leafy, maples and white oaks. Many weren't in the best of possible locations, such as the 60-ft.-tall white oak jammed right against the front of the house, splitting the view and the walkway in two. To my wife, this piece of Connecticut real estate we were considering was a nest of problems, including the faux Western-themed interior. "Bonanza Lite" we called it.

But I fell in love with the idea of living in a grove of trees. I saw opportunity in the living lumber at our doorstep. Only after I convinced my wife that the big white oak would make beautiful kitchen cabinets was she willing to make a bid for the house.

The owners gratefully accepted our offer and fled to California, leaving us a frighteningly tall, homemade snow gauge.

A few months later, the chainsaw crew arrived. It was music to my ears. Two guys finished off that big tree on a chilly February day, chipping all the smaller branches and leaving four 8-ft.-long logs and a jumbled pile of firewood.

A few days later the sawyer arrived. He was a big guy, dressed for the job in heavy cotton duck outerwear. I asked what had

motivated him to buy a \$25,000 sawmill with all the bells and whistles. He said he owned some acreage covered with southern pine and had harvested a chunk of it for his own use. But his dream, to build a log cabin with his son and use the mill to cut all the lumber needed for the home had been dashed. His son, following a serious accident, was no longer capable of strenuous activity. These days, the sawmill mostly sat idle in his garage.

I watched as he set it up, the machine still shiny and new looking. He seemed happy to put it to good use, to be breathing fresh air, like in the days when he worked as a utility company lineman. Manhandling thousand-pound logs, getting covered with fresh sawdust and working an eight-hour day still appealed to him.

There was one worry to contend with: hidden nails, a curse bedeviling most trees close to homes. The sawyer asked and I agreed to pay for damaged bandsaw blades. Sure enough, there were nails, but luckily only in the last log. After adding up all the costs—the tree trimmer and the sawyer and a couple of bandsaw blades—my 400 bd. ft. of clear quartersawn oak cost about \$1.50 a board foot, less than half the prevailing rate for kiln dried.

The leaves are falling now on the stickered pile, which has been exhaling water vapor for about eight months. It's time to haul it inside, to get the moisture content down from the current 14% to about 8%. By mid-winter, those boards will be reshaped into drawers and frame-and-panel doors. And then the Bonanza-Lite era of our kitchen will be ushered out gleefully with crowbar and sledgehammer.

—Anatole Burkin, associate editor



Homegrown lumber—The author harvested about 400 bd. ft. of white oak from a yard tree for about \$1.50 a board foot.

Designing on the Go: A Coffee Table Takes Shape

*Altering legs,
shelf and top leads
to a handsome table
in the spirit of the Shakers*

by Peter Turner

My sister Wendy offered me a deal I couldn't refuse. She'd give me one of her watercolor paintings if I made a worktable for her studio. She sent me a rough sketch showing a long, low table with a shelf beneath the top.

Then I started thinking. Why not turn Wendy's worktable into a prototype for something I could sell as a stock item in my booth at craft shows? Something everyone needs—a coffee table. This barter proved to be the start of a design-and-build process that produced four versions of this Shaker-style coffee table

and culminated in the table you see in the front photo. It gracefully serves its purpose and is not difficult to build.

Small changes produce big results

Along the way, I tried three different leg designs, three approaches to the shelf and top construction, and several different dimensions on the top. Wendy's worktable, at 20 in. high, was a little too tall to correspond to most sofas. I lowered the second version to 18 in. and added a 48-in. by 23-in. top. The legs, turned from 1 $\frac{3}{8}$ -in. stock, were slightly tapered and

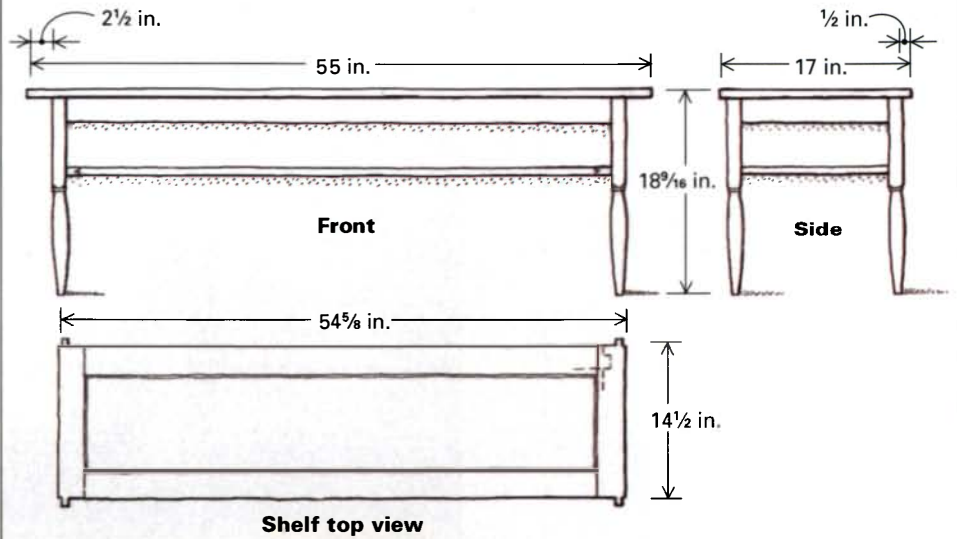
ended at $\frac{15}{16}$ in. at the floor (see the back table).

Both the top and the shelf had breadboard ends. Although very useful, the table's narrow width reminded me of an aircraft carrier, and the legs ended up looking like cigars.

A shortened incarnation, 36 in. by 18 in., with square, tapered legs followed (see the center table). I added a more intricate breadboard design, one with multiple tenons, after I read an article by Garrett

Shaker simplicity in a coffee table

An ample overhang on the top, turned legs and restrained design gives this coffee table a decidedly Shaker look. All joinery is mortise and tenon.



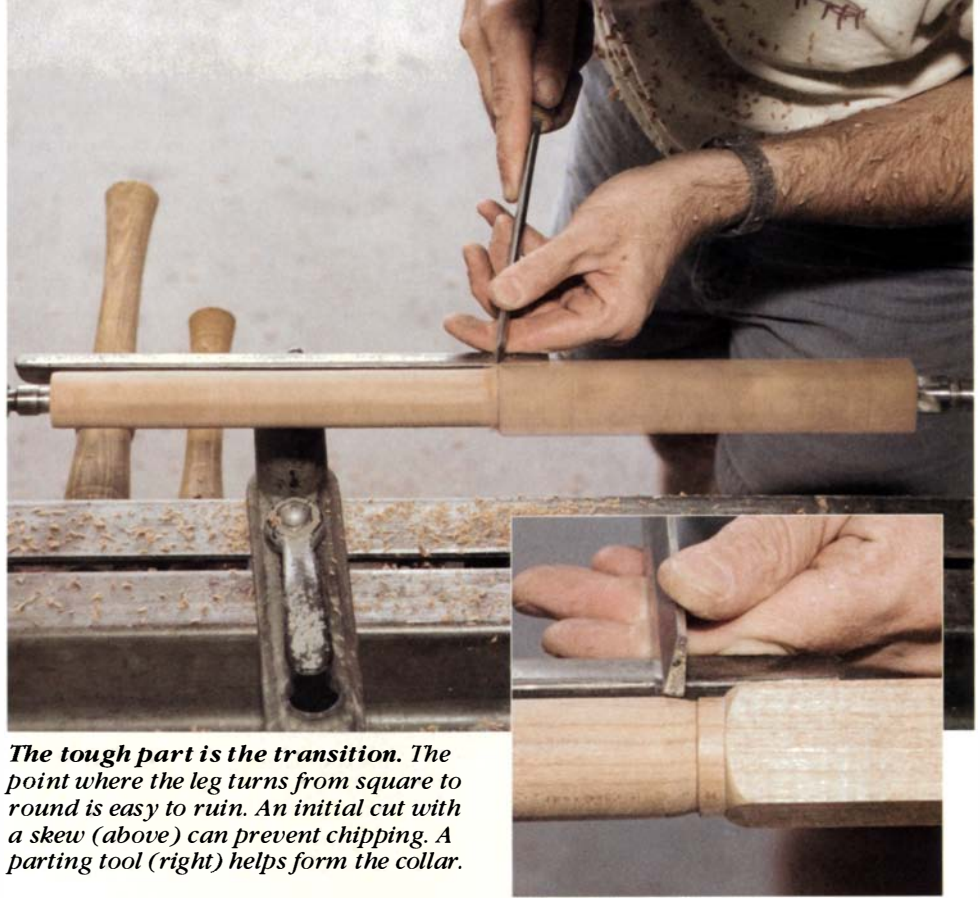
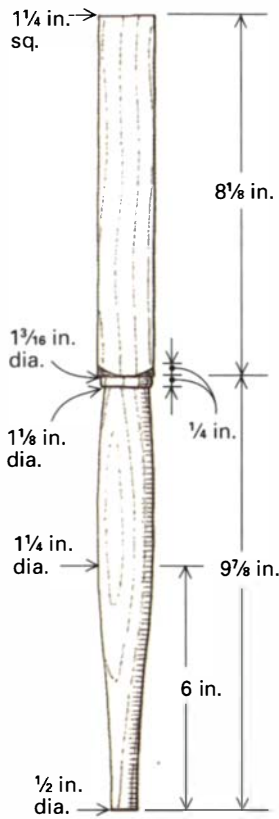
Hack describing his approach (see *FWW* #110, pp. 78-81). That was as much to try a new technique as it was to provide more strength and stability.

But some of these design features made the table too expensive. So to make the table easier and faster to build (and as a result less expensive), I reduced its complexity while retaining its usefulness and grace. Breadboard ends were eliminated on the top and replaced on the shelf with a frame-and-panel design, which I think is easier to make. And along the way, I refined the turned leg from its initial cigar shape to a more delicate



Keep trying. Peter Turner's work on this coffee table began with a request from his sister and a sketch (far left). After several tries, he settled on a graceful design that he could build quickly.

Thinner is more graceful
An early version of this turned leg was $1\frac{5}{16}$ in. dia. at the floor, but to the author, it looked too much like a cigar. He then developed this pattern, with a $\frac{1}{2}$ -in.-dia. foot.



The tough part is the transition. The point where the leg turns from square to round is easy to ruin. An initial cut with a skew (above) can prevent chipping. A parting tool (right) helps form the collar.

form. The first of these simpler versions was 18 in. high with a 48-in. by 18-in. top. I finally settled on a slightly longer version, with a 60-in. by 18-in. top that is $\frac{3}{16}$ in. thick. The shelf is $\frac{5}{8}$ in. thick.

Simple construction complements the design

There aren't many pieces to this table, and it doesn't require much material—in all, about 25 bd. ft. of $\frac{1}{4}$ lumber and 4 bd. ft. of $\frac{3}{4}$ wood for the legs. I use mortises and tenons to join both the apron pieces and the frame-and-panel shelf to the legs.

I start by turning the legs from $1\frac{1}{4}$ -in.-sq. stock. I'm by no means a master turner, so I use only a few turning tools on the legs:

a roughing-out gouge, a skew, a scraper and a parting tool. The gouge does most of the work, and the only tricky part is turning the pommel at the transition where the leg goes from square to round. The danger is chipping out corners of the leg where it remains square. So I use the tip of the skew to make a shallow cut at the transition point (see the top photo), then a scraper to round over the corners very gently. The detail I especially like is the $\frac{1}{4}$ -in.-wide collar at the transition from round to square (see the inset photo).

Once the legs are turned, I cut apron mortises in the legs and cut stile mortises in the shelf frame rails using a Multi-Router, which is a router-based joinery

tool. But it doesn't matter how you cut the mortises. They could be done with a router, a mortiser, a drill press and chisel, or entirely by hand. I make grooves for the shelf in the frame parts on a tablesaw to match the mortises.

When I cut apron and shelf frame tenons, I make sure the length between shoulders on both apron ends and shelf rails is identical so the legs stay square. This means I make the long aprons first and then the shelf, which has a $\frac{3}{8}$ -in. by $\frac{5}{8}$ -in. tenon at each corner. I clamp a long apron between two legs and mark shelf mortises in the legs directly from the shelf tenons. Once the shoulder-to-shoulder distance on the shelf is established, I cut

Making it Shaker when the Shakers didn't make it

Can't imagine a living room without a coffee table? The Shakers could. They didn't build coffee tables. To give my design a feeling that is reminiscent of Shaker work, I turned to my reference library (the four books I find most useful are listed on the facing page).

If you want to know more about the religious and social basis of Shaker craft, you can start with something called "Orders and Rules of the Church at Mount Lebanon: Millennial Laws of

Gospel Statutes & Ordinances." This summary of Shaker habits—described in some of the books I used—was published for church elders in several versions between 1821 and 1887. Laws covered general approaches to furniture, and they could be very specific: The 1845 laws required beds to be painted green and limited bedroom mirrors to 18 in. by 12 in.

For the design of this table, I looked at photos of Shaker work. The greater the variety and number of photographic examples I

the short apron pieces to match.

When fitting the shelf panel, I take the shrinking characteristics of the wood and the time of year into account. Various books provide formulas for figuring out how much each species of wood moves with changes in seasonal humidity.

I fitted the panel in this table in early October, when the weather was still warm, so I guessed the wood was close to its maximum width. The reveals around the edge of the panel are sized accordingly. The panel is flush on both

sides of the shelf.

A tenon on each corner of the shelf fits into a corresponding mortise in the leg. I rough out these mortises on the drill press and clean them up with a chisel.

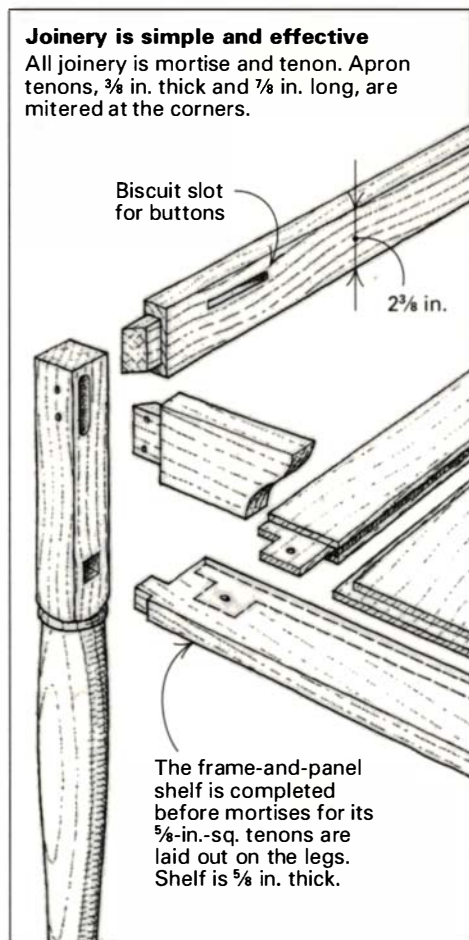
After assembly, finish up with citrus oil

Final assembly begins with a dry-fit (see the photo below). Then I glue together the long aprons and legs. The short end aprons and the fully sanded shelf are then glued into place and pinned (I use 1/8-in.-

dia. dowel for pins), two pins for each apron joint and one for each shelf joint. To attach the top, I use wooden buttons with tongues that fit biscuit slots cut on the inside edges of the aprons.

After bringing everything along to 320-grit sandpaper, I finish it with three coats of Livos oil, which has a pleasant smell and produces a nice satin sheen. □

Peter Turner makes furniture for a living in a South Portland, Maine, shop he shares with three other woodworkers.



Don't skip the dry-fit. Gluing up all the table parts shouldn't be a nightmare. A dry run pinpoints problems while they can still be corrected.

absorbed, the stronger my vocabulary became in the elements of form, scale, proportion and balance. This accumulated understanding allowed me to use specific design characteristics in this coffee table. Thin tops, 1/2 in. or 5/8 in., and ample overhangs, 2 in. to 3 in., on table ends are common on Shaker tables, so I adopted those elements here. The leg transition from square to collar to round came from a Shaker side table made in Enfield, N.H. Along with sound joinery and little decorative elaboration, the prudent selection of design elements evokes a harmony and balance present in the majority of Shaker work.

My list of most useful books includes:

- *The Complete Book of Shaker Furniture* by Timothy Rieman and Jean Burks (Harry N. Abrams, 1993)
- *Shop Drawings of Shaker Furniture and Woodware*, Vols. 1, 2 and 3 (The Berkshire Traveller Press, 1973-1977)
- *The Book of Shaker Furniture* by John Kassay (The University of Massachusetts Press, 1980)
- *Illustrated Guide to Shaker Furniture* by Robert Meader (Dover Publications, 1972)

—P.T.

Three Reliable Ways to Taper a Leg

Tapers can be cut quickly and accurately with a bandsaw, a thickness planer or a tablesaw

by Gary Rogowski

Table or desk legs that have been tapered top to bottom have a grace and delicacy that square legs just don't seem to have. Shaker furnituremakers exploited this leg style, and so have many others. Although legs may be tapered all the way around, more often than not I cut tapers on two adjoining faces of a leg. The process can be both quick and reliable.

Roughing out tapers is best done by machine; either a

bandsaw or a tablesaw is a good choice. Tapers also can be cut by mounting leg blanks on a jig that's passed through a thickness planer, a process that requires very little cleanup. Cleaning up the cuts also can be accomplished in a number of ways—on a jointer, with a router and a flush-trimming bit, or with a handplane.

How much taper a leg gets and which faces are tapered are personal choices best made with plenty of experimentation.



1 TAPERING ON THE BANDSAW

By far, the simplest and safest way to cut a taper is to draw lines on two adjacent faces of each leg and cut just to the waste side of the lines on a bandsaw, making straight cuts (see the photo at left).

The cut is not that difficult to make if your bandsaw is properly tuned and the blade is sharp. Mark out the taper on a milled leg blank, striking a line from the widest point, where the taper starts, to its narrowest point at the foot. If there's a flat near the top of the leg where an apron will intersect it, strike a line across the face of the leg where the taper begins or just slightly below it. The idea is to leave enough material on the leg so it can be cleaned up without making the leg too thin.

If the leg shape is one you might reproduce often, consider making a template of 1/4-in.-thick hardboard or medium-density fiberboard. The next time you need to lay out this taper, it will

Bandsawn tapers are safe and simple. Feed the leg blank slowly with one hand, steering as you go, and use the other hand to help guide the cut. Cut to the waste side of the line.



All four legs of a table can be tapered at once. The author's planer jig is made from a piece of $\frac{3}{4}$ -in.-thick plywood and three angled strips of wood to support the legs. Stops at either end of the plywood keep the legs in place.

take just a few seconds.

It's easier to sight down the layout line if you lower your head a bit as you make the cut. Use two hands to help guide the leg through the blade, feed slowly and try to compensate for any drift before you wander from the line. With practice, it becomes quite easy to cut a straight line on the bandsaw. But be careful to keep your fingers out of the way. It's easy to run your thumb into a bandsaw blade.

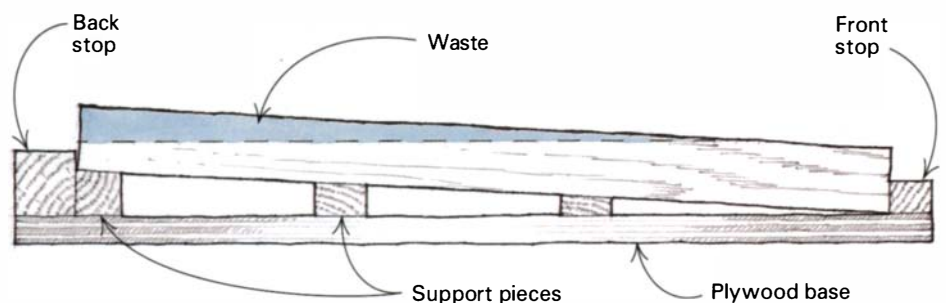
2 TAPERING WITH A THICKNESS PLANER

A thickness planer isn't the first tool that comes to mind for cutting tapers. But a planer will do an absolutely consistent job of tapering leg stock if you use the proper jig—one with a simple carriage that supports the legs at an angle and has stops at either end (see the photo above). The only real drawback is that it's fairly slow.

I made my jig from a piece of scrap plywood several inches longer than the length of the legs. To get the taper I

A tapered sled jig for the planer

Front and back stops prevent the leg blank from moving in the jig. Angled support pieces keep the blanks from flexing.



wanted, I drew the taper on one of the legs, placed the leg on the plywood base of the jig and raised one end until the taper line was parallel with the plywood. I measured this height near one end of the plywood, cut a support piece to fit there and glued it on. I added a stop just behind this stop.

The next step is to cut angled pieces that will support the legs and prevent them

from flexing under the pressure of the feed rollers in the planer. With these supports glued to the plywood base, I added another stop at the front end of the jig to capture the legs securely—I didn't want the stock moving around beneath the cutterhead.

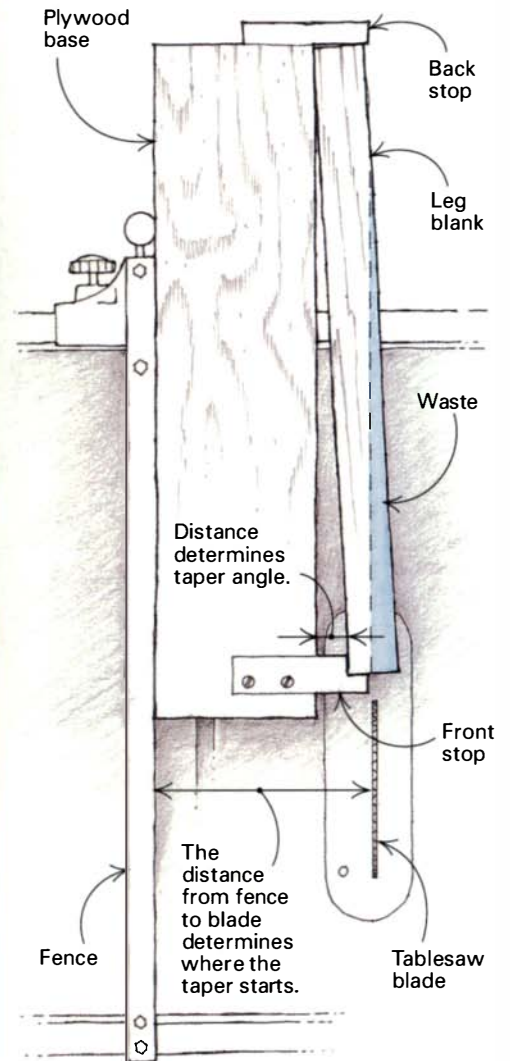
The best thing about this method of tapering legs is that all the legs for a project can be done at the same time. Take light passes, especially at first, to



Tablesawn tapers are fast and accurate. A dedicated jig like this one produces consistent results but is limited to a single angle and leg length.

A dedicated tablesaw jig for tapers

The front stop is rabbeted to fit securely against the plywood jig. A second rabbet holds the leg in place. A snug fit is essential.



minimize deflection of the stock. Also, make sure the legs don't rock on the support pieces. If they do, you'll see some vicious sniping.

3 TABLESAW TAPERING

The most commonly used tool for cutting tapers is the tablesaw—and why not? It's fast and, if the saw is well-tuned, very little cleanup is needed. You can either make a dedicated jig every time you need a

different taper, or you can use a hinged, universal tapering jig to cut many different tapers. I prefer using dedicated jigs because I often reproduce designs (see the photo above). With a dedicated jig, I'm assured of getting the same results every time.

The base of the jig is a straight, flat piece of plywood just a few inches longer than the leg stock. I cut it so its sides are parallel and its ends are square. Then I screw a back stop to one end to catch the wide part of the taper (see the drawing above). A front stop, near the other end of the jig, captures the leg and cants it from the plywood at the correct

angle for the desired taper.

To set up for the cut, measure from the inside edge of the jig to the widest part of the taper—either the corner of the leg if it's a full-length taper or a few inches shy of the corner if you want to leave a flat section on the leg for an apron. Use this measurement to set the distance from blade to fence. Keep the jig firmly against the fence, and feed steadily as you make the cut, running the narrow end of the leg into the blade first. For the second taper on a leg, rotate the leg blank 90° clockwise in the jig. By rotating the leg this way, a square, untapered face will rest on the tablesaw.

THREE WAYS TO CLEAN UP THE CUTS

Some cleanup is almost always required after you've cut the basic tapers. Even a planer can leave mill marks. Here are three simple methods for cleaning tapers.

Jointer: This tool does a great job of cleaning up sawmarks (see the bottom photo). I generally go straight from the bandsaw to the jointer. I set the infeed table for a light cut and use a push stick.

To avoid tearout, you should cut with the grain. That usually means the narrow end of the leg is last to go over the cutterhead. Inspect the taper first, though, checking for grain direction as well as for any high spots that may need to be taken down by hand before you joint the whole length of the taper.

Check, too, to see if one end or another needs more wood removed. You may be able to take slightly more off one end than another by varying the amount of hand pressure you apply. Make sure the tapers are well marked so you can tell when you're finished. Feed slowly to minimize cutterhead marks.

Router: A flush-trimming bit mounted in a router table is another quick way of cleaning up tapers, especially if you don't have a jointer (see the top photo). This technique also guarantees that all the tapers are precisely the same. Both top-bearing and bottom-bearing bits will do the job, and you can use the same



Template routing ensures consistent results. Both bottom-bearing bits (shown above) and top-bearing bits work. Double-faced tape secures the template to the legs.

templates here that you used to lay out tapers for the bandsaw. Double-faced tape works well to attach the template to each leg. For a production run, a jig with attached toggle clamps is better and faster.

When a bottom-bearing bit is used in a router table, you will have to make a tapered template for the second taper so the router bearing (which is at a fixed height) has something to ride on. You'll need thicker stock for this template.

Cut and clean up the first taper. Then mark the second taper on the template stock by placing it on the tapered leg and setting them both on a flat surface, like a bench or jointer bed. On the template stock, mark a line that's parallel with the bench or bed. Then cut and clean this second side. The template is ready for use.

Make sure the tapers have been cut close to the template shape; there shouldn't be more than $\frac{1}{16}$ in. of wood to clean up with the router. Set the height of the bit so that the bearing rides firmly against the template. Start the cut back just a little from the end of the leg. Work from the widest part of the taper to the narrowest. Rout the full length, and finish up with one smoothing pass.

Handplane: On wood that's not particularly gnarly, a well-tuned handplane can be used to clean up tapers straight off the bandsaw, planer or tablesaw. A plane also is a good choice for tapers that have been cleaned up with a jointer or router but still need a little more polishing.

Generally, you'll want to plane downhill



Handplane cleans tapers efficiently. A plane leaves a surface that's ready for finish, but take care to plane with the grain to avoid tearout.

(from the wide part of the taper down to the narrow), but you should check the grain direction of each face you're planing to be sure. The grain may surprise you. Make sure your stop or bench dog won't interfere with the plane at the end of its stroke. Mark a line across your stock at the start of the taper, and take lighter passes as you approach it. □

Gary Rogowski designs and builds furniture in Portland, Ore., and is a contributing editor to *Fine Woodworking*.



Jointer cleans up tapers quickly. A few light passes over the jointer should clean up any mill marks or other surface irregularities left after roughing out a leg by machine.

Repairing a Worn Finish Without Refinishing

Alcohol-soluble dyes bite into faded surfaces to restore color quickly

by Pinchas Wasserman



As a restorer, primarily of 20th-century furniture, one of my typical problems is how to improve an existing finish for a customer who is not ready to have the furniture stripped and refinished. More often than not, the furniture doesn't really need such drastic measures.

In cases like that, I've found alcohol-soluble dyes to be the most effective solution among the options available. These dyes receive mostly peripheral treatment in discussions about coloring wood. They are vastly more difficult to apply than oil-based pigment stains, and many of them are not as lightfast as water-soluble anilines. Yet when it comes to touching up existing finishes, I regard alcohol-soluble dyes as the premier colorant. Their capacity to bite

into a finish or sealed wood makes them uniquely suited for restoring worn finishes (see the bottom left photo).

Only your chemist knows for sure ...

Two kinds of alcohol-soluble dyes are commonly available: basic dyes and metal-complex dyes. Both may be sold as aniline dyes (see the box on the facing page). Basic dyes, available through many woodworking catalogs, are the most common and are available in a greater range of premixed wood-tone colors. Not all of these are considered lightfast. But with small areas of worn or chipped finishes, lightfastness is not that important.

Metal-complex dyes, which are manufactured by Ciba-Geigy



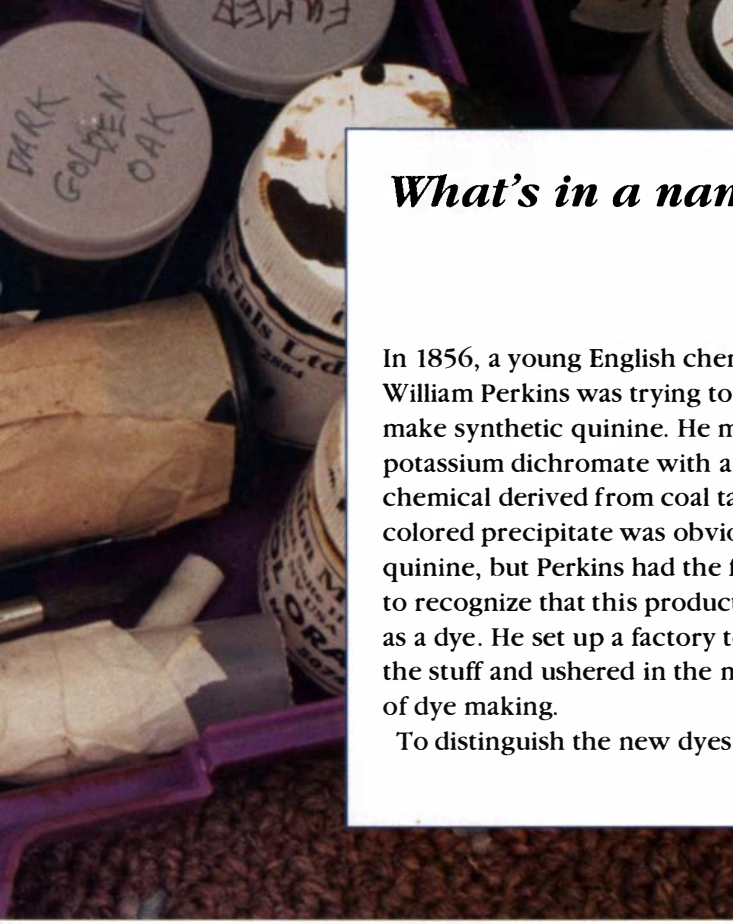
No stripping required. Working with alcohol-soluble dyes and a fine brush, the author makes repairs to this walnut desk that will be virtually undetectable.



Padding lacquer applied by cloth—Applied with a quick, buffing motion, padding lacquer blends finish repairs and seals in alcohol-soluble dyes.



Squirrel-hair brushes for blending large areas of color—Keep brushes soft and supple with occasional dips in denatured alcohol.



What's in a name? The story behind aniline dyes

by Jeff Jewitt

In 1856, a young English chemist named William Perkins was trying to find a way to make synthetic quinine. He mixed acidified potassium dichromate with aniline, a chemical derived from coal tar. The bluish-colored precipitate was obviously not quinine, but Perkins had the foresight to recognize that this product had potential as a dye. He set up a factory to manufacture the stuff and ushered in the modern era of dye making.

To distinguish the new dyes from the older,

natural dyes that were still widely used, the terms *aniline dye* and *coal-tar color* were applied to these products. Back then, the principal ingredient in most dyes was aniline. Although, aniline may or may not be used in the process today, the term *aniline dye* has stuck and is used loosely to refer to the entire class of synthetic dyes.

Jeff Jewitt restores furniture and sells dyes through Homestead Finishing Products in North Royalton, Ohio.

and BASF (see the sources of supply below), are less common, more expensive (not that you'll need much for touch-up work) and more resistant to fading. For practical purposes when touching up finishes, there is not a great difference between the two. Both are excellent, powerful dyes.

Mix dyes with alcohol and shellac, and apply small amounts with a brush or cloth

After mixing dyes with denatured alcohol, I combine the solution with a finish resin. I prefer shellac because it is less toxic and easier to manipulate than lacquer. If I make a mistake when applying the finish, it's relatively easy to remove with alcohol, provided the dyes are used on top of the finish and not on raw wood. The denatured alcohol in the finish may damage the surrounding surface, but that is easily repaired by applying padding lacquer and rapidly buffing the surface with a lint-free rag (see the bottom center photo on the facing page). Alcohol-soluble dyes also can be used to tint lacquer, which is a good choice if the repair area is large. I've had good luck with a brushing lacquer such as Deft's clear gloss. It dries relatively slowly.

Typically, I often use less resin for the initial coloring, then topcoat with a greater proportion of resin. First I dissolve the dye in pure alcohol, and then I add shellac in small amounts. I use mostly super blond shellac that I mix from dry flakes. It seems to work on both light and dark finishes. Zinsser's premixed clear shellac (available in most hardware stores) is a less expensive substitute, and its water and wax content is not a factor in touch-up work. Buttonlac, less refined than orange or blond shellac, is good for dark finishes and adds a little opacity to a dye. Alcohol dyes are transparent. If you need true opacity in a stain, you must turn to pigment powders, Japan colors or glazing stains to do the job.

I apply alcohol dyes in one of four ways: with a brush, a padding cloth, felt or an airbrush. Pointed red sable brushes, no. 2 and no. 4, are my most-used brushes for fine detail work. For larger areas, I use squirrel-hair polisher's mops, no. 4 and no. 8, the smaller being the more useful (see the bottom right photo on the facing page).

To match an existing finish, orange and blue-black dyes will suffice to create many of the common furniture browns. The steady addition of small amounts of black will lead you through maple browns to walnut. Often, the addition of yellow or red will swing the color one way or another. Try out your dye and shellac mix on a small area, and topcoat it to see how it will look. The topcoat will make the color look bolder and darker. □

Pinchas Wasserman often travels to client's homes to restore furniture. He lives in Lakewood, N.J.

Sources of supply

The first two companies on this list are manufacturers, and the rest are suppliers of dyes and/or brushes.

BASF, Mount Olive, N.J.; (800) 669-2273

Ciba-Geigy, Newport, Del.; (302) 992-5600

Homestead Finishing Products,
North Royalton, Ohio; (440) 582-8929

Liberon/Star Supplies, Mendocino, Calif.; (800) 245-5611

Olde Mill Cabinet Shoppe, York, Pa.; (717) 755-8884

Pearl Paint Co., New York, N.Y.; (800) 451-7327

W.D. Lockwood Co., New York, N.Y.; (212) 966-4046



A Tablesaw Sled for Precision Crosscutting

An indispensable jig that makes accurate miters, crosscuts and tenons a cinch

by Lon Schleining

Crosscutting with a standard table-saw miter gauge can be frustrating, inaccurate, even hazardous. Adding an extended fence helps, but the miter gauge still will be limited and imprecise. Don't bother with it. Instead, take the time to make a super-accurate, super-versatile and far safer crosscut sled.

A crosscut sled is a sliding table with runners that guide it over the saw in the miter-

gauge slots. It has a rear fence set perpendicular to the line of cut to hold the workpiece. Because it uses both miter slots, the sled is remarkably and reliably accurate. It also easily accepts any number of stop blocks, auxiliary fences and templates, allowing miters, tenons and many other specialty cuts. Nearly every small commercial shop I know uses some variation of this sled. I use mine primarily to square the



Miters



Crosscuts



Tenons

ends of 12-in.-wide stair treads.

Your sled should fit your work. There's no sense in making a huge, unwieldy sled if you'll use it mostly to cut 3-in. tenons. The one I use is 30 in. wide and 21 in. deep. It's capable of crosscutting a board up to 2 in. thick and 18 in. wide (see the top photo on the facing page). With a miter template (see the box on p. 68), the sled can cut a 45° miter on the end of a 3-in.-wide board. The rear fence is 5 in. high in the middle, 2½ in. high on the ends. Though I rarely crosscut a board thicker than 2 in., the fence needs to be at least 4 in. high to accommodate the height of the sawblade. The extra fence height also supports workpieces on end when I cut tenons.

Start with a solid platform of Baltic-birch plywood

I build jigs like this from what I call not-yet-used materials (some call it scrap). I used void-free ½-in. Baltic-birch plywood for the platform. Baltic birch is often mistaken for Finnish birch—its waterproof and much more costly cousin. Baltic birch is not as high quality, but for the price (about a dollar per square foot), it's perfect for making stable, durable jigs. But any plywood you have around the shop will probably work fine as long as it's flat.

The first step is to cut the platform to size. Make the platform as square as you can get it. You can check for square by measuring diagonally across the corners: The measurements should be the same across both corners. But before you make the sled, it's a good idea to make sure your tablesaw is tuned up.

For the sled to perform well, your saw's blade must be precisely parallel with the miter-gauge slots, and the table must be flat (for more on tuning up your tablesaw, see *FWW* #114, pp. 60-64).

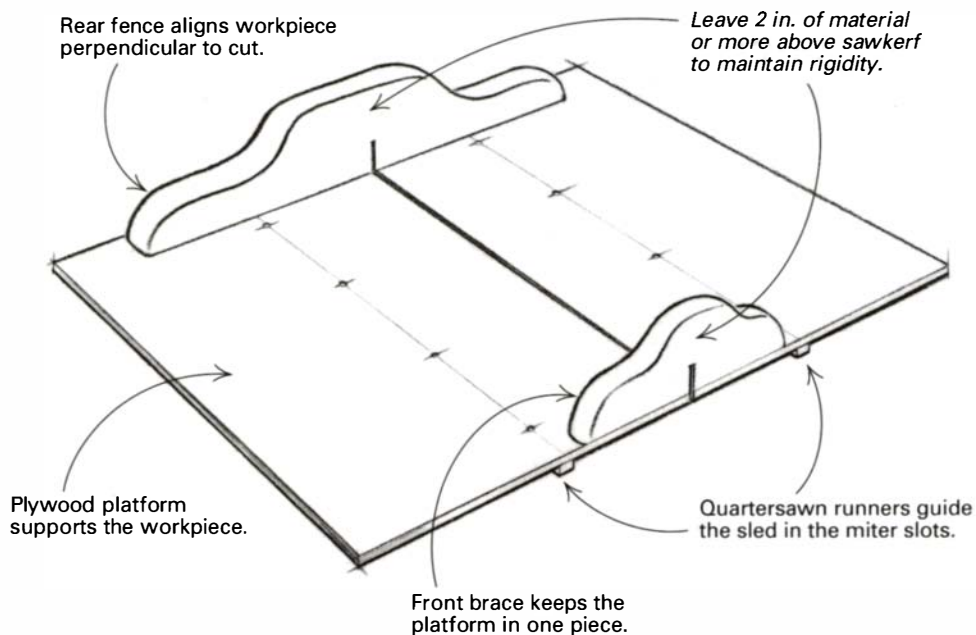
Quartersawn hardwood runners for smooth sliding

I prefer to make runners from oak, instead of buying steel ones, because I can control their fit in the miter slots. Wood runners pose a few problems, however, that should be taken into consideration. Expansion from seasonal humidity can cause them to bind in the miter slots, so I choose the material and its grain orientation carefully. They also need to be milled precisely.

Start with a close-grained flatsawn maple or oak board. Mill the thickness of the board to the width of the slot using a planer. Test the fit as you go, planing off a little

A basic crosscut sled

Tailor the size of the sled to fit the work you do. The crucial features are a rear fence perpendicular to the line of cut and runners that slide easily without slop.



material at a time. It should slide easily in the slot, but without slop (see the photos below). Next rip two runners from the board to a thickness slightly less than the depth of the miter slots, then cut them to length. By ripping strips off a flat-grained board, you have made quartersawn runners, which will be very stable. The idea is to make runners that don't rub against the bottom of the slots and raise the sled off the table, but that still engage as much of the miter slot as possible.

The first construction step is to fasten the runners to the platform. To make sure they

are right where they should be, attach them while they're in the miter slots. Lower the blade out of the way, and center the platform on the table, using the rip fence to keep the platform square on the runners (see the photo at left on p. 68). Lay out the holes for the screws so they're centered on the runners, and drill them in the platform only. The screws should pass freely through the holes in the plywood.

The size of the drill bit you choose for the pilot holes in the runners is very important. Thin runners will bulge or split if the pilot hole is too small. Even a small bulge will

START WITH THE RUNNERS



A perfect fit—Runner stock should slide freely in the miter slots (above). Finished runners should be just below the level of the table (right).



ATTACH THE PLATFORM TO THE RUNNERS



Use miter slots to align runners under platform. The rip fence keeps the platform square and centered while you lay out (above) and drill the pilot holes (right). To avoid splitting the runners, the holes should be slightly larger than the shank diameter of the screw.



make the runner bind in the miter slot. The holes should be slightly larger than the shank diameter of the screw. I use a dial caliper to measure the shank, and then I select the correct drill bit. On this sled, I used $\frac{5}{8}$ -in.-long #8 screws that have a shank diameter of 0.122 in., so a $\frac{1}{8}$ -in. drill bit (0.125 in.) was perfect.

First drill just one pilot hole in each runner, and insert a screw in each. These screws keep the runners firmly in place while you drill the other pilot holes. Remove the two screws, deburr all the holes, apply a small bead of glue to the runners and screw the platform to the runners. Clean off any glue that might have squeezed out.

Now take your incomplete sled for a test drive: move it back and forth in the miter

slots to see if it runs smoothly. It's easy to tell just where the oak runners are binding because they'll be shiny and gray from rubbing against the sides of the steel slots. While the glue is still soft, it is possible to move the runners slightly. You should only be concerned at this point with how smoothly the platform slides.

Make front brace and rear fence

The front brace's only job is to keep the platform in one piece. It doesn't much matter what size or shape it is (I add some gentle curves to mine) as long as it is a few inches higher than the sawblade's maximum cut—about 2 in. above the platform. I made this brace from $1\frac{1}{4}$ -in.-thick red oak, $3\frac{3}{4}$ in. high, and about as long as the width between the miter slots. Shape it, smooth it,

glue and screw it to the front of the table from the underside of the platform.

This is also the time to make the rear fence. I used some 2-in.-thick white oak 5 in. wide and 23 in. long. The rear fence should be pretty stout to hold the sled table together. If you don't have $8/4$ lumber, laminate two $4/4$ pieces together. Make sure the board is perfectly straight on the inside face, and square with the edge that will be attached to the platform.

Keeping things square becomes critical when you attach the rear fence. The most important thing to remember when making a sled is that, for the cut to be square, the rear fence must be square to the line of cut. If it's not, you have a useless sled.

Before you attach the rear fence, put the sled on the saw, raise the blade slightly

From 90° to 45° cuts with a simple template

With this template, you'll be able to make accurate miter cuts on your tablesaw. The template is nothing more than a piece of Baltic-birch plywood with two sides at 90° to each other and a back side that registers against the rear fence of the sled. This template sits far enough forward so that long workpieces clear the ends of the rear fence.

There are any number of ways to make such a shape. I used the opportunity to test the accuracy of my sled. First I laid out and rough cut the template from a corner of a sheet of plywood and got one of the sides straight on a jointer. This can also be done on the sled by aligning the edge over the sawkerf and nailing the template to the sled (don't let the nails go all the way through). I then cut the opposite side at 90° to the first using the rear fence.

To cut the base at 45° to the two sides, I cut to the layout line

on the base by aligning it over the kerf and nailing the template to the sled. I've rarely gotten a base perfect the first time.

To find out which way it's out, I center the point of the template on the sawkerf and align the base against the rear fence. Then I scribe its outline on the sled. I flip it over and check it against the scribe marks. If it sits perfectly between the lines, I'm on the money. If not, I recut the back of the template as required. Finally, I attach it to the sled with a few screws, make some trial miters and adjust accordingly. —L.S.



above the thickness of the platform and cut through the platform about two-thirds of the way from back to front, being very careful not to cut all the way through the platform (see the photos at right). Drill and countersink the holes in the platform, then securely clamp the fence to the platform so that it is square to the cut you just made. Use an accurate framing square to align it, checking from both sides of the fence. Now drill two center pilot holes (of four total) into the fence, and install the screws from the bottom side.

Before you can attach the rear fence once and for all, make some trial crosscuts and check the results. The position of the fence will almost certainly need fine-tuning. It's easy to rotate the rear fence back and forth a little with hammer taps or a bar clamp, even with the two screws snug. This is where patience is important. Keep making test cuts and adjusting as necessary until the cut is perfectly square. Don't, however, cut all the way through the platform at this time. Leave just enough plywood at the rear of the platform to hold the sled together; if you cut all the way through, the rear fence will be harder to align.

Attach the rear fence, and make more trial cuts

When the sled makes true 90° crosscuts, it's time to attach the rear fence permanently. Clamp a long 4-in. by 4-in. block to the sled platform so that it fits tight against the rear fence. It will keep the fence's place. Remove the two screws that are temporarily holding the fence. Apply glue and reinstall the fence with the rest of the screws. Carefully check its position against the block. Remove the clamps and the block, and immediately make a trial cut, still without cutting all the way through the platform.

Adjust the fence if necessary with hammer taps or clamps. Even though the sled is screwed and glued together at this point, it's still possible to make fine adjustments, but only for a few minutes after glue-up.

Before you spend too much time admiring your handy work, sand all the sharp edges and coat the bottom with a lubricant such as spray silicone or TopCote. Even then, you're not done. You still have guide blocks and templates to make. They will let your sled cut perfect tenons and miters. □

Lon Schleinig has designed and built stairs in Long Beach, Calif., for 19 years. He also teaches woodworking at Cerritos College in Norwalk, Calif.

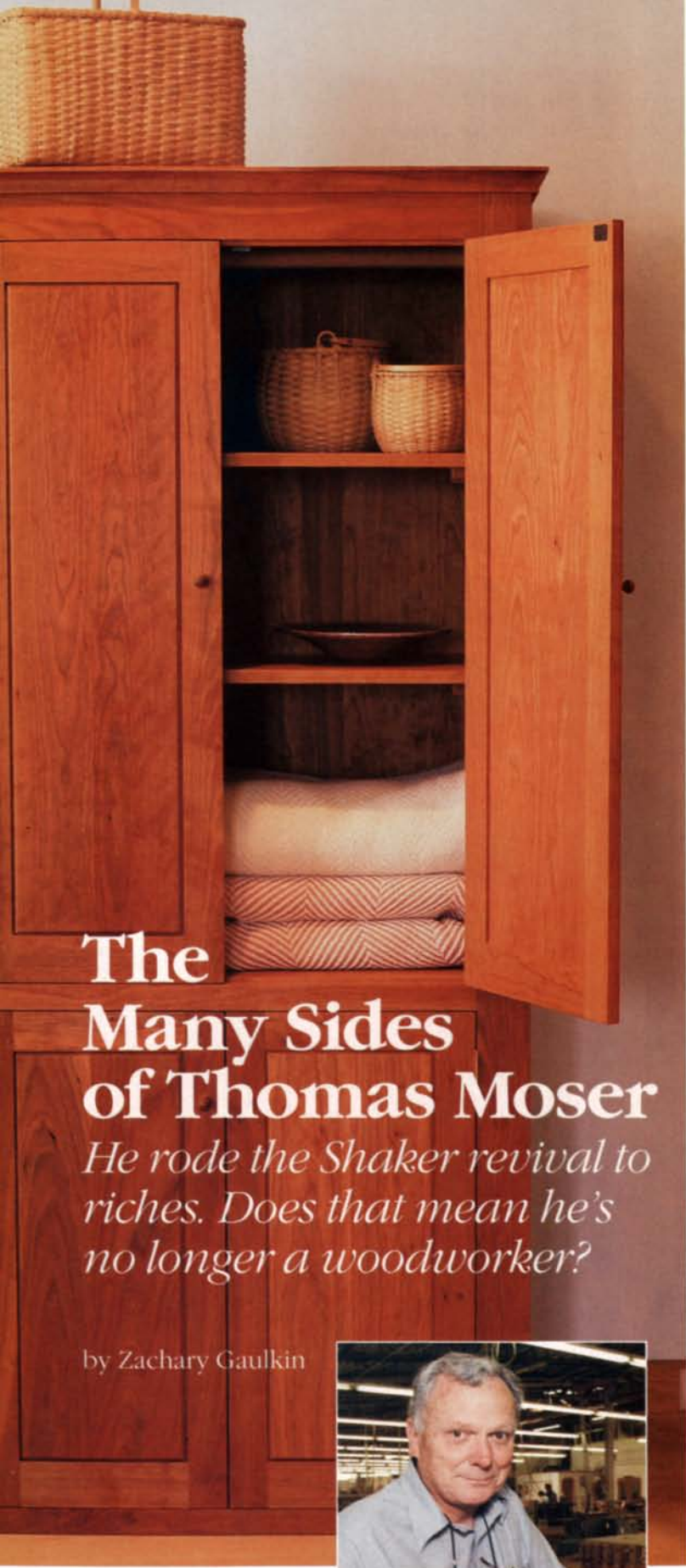
USE THE KERF TO SQUARE THE FENCE



Don't cut that sled in half. After you attach the front brace (left), cut only two-thirds of the way through the platform (right). The kerf is a reference to set the rear fence.



Square the fence to the sawkerf. Check the fence's alignment from both sides of the kerf. Attach the fence with only two screws before you make trial cuts.



The Many Sides of Thomas Moser

He rode the Shaker revival to riches. Does that mean he's no longer a woodworker?

by Zachary Gaulkin



“We make furniture just like the Shakers did,” Thomas Moser told an audience of woodworkers during a recent lecture. In the next breath, he described his shop: 65,000 square feet, 110 employees, a computer-guided router for cutting chair seats and a machine that dries glue in seconds using high-frequency radio waves. Just like the Shakers.

How can he get away with this statement? Because it's true. Thomas Moser Cabinetmakers of Auburn, Maine, builds furniture the old-fashioned way. The shop uses solid wood, dovetailed cases, mortise-and-tenon framework and hand-rubbed oil finishes. Compared with others in the high-volume world of production furniture, Moser might as well be making it like the Shakers.

Whatever you think of his furnituremaking style, Moser's effect on woodworking has been huge. He found a way to build hand-made furniture in a factory, he created a market for solid wood and natural finishes before they were fashionable, and his two books on Shaker furniture have inspired countless woodworkers and raised the public's appreciation for traditional joinery. After 25 years in business, Moser is still the role model for woodworkers trying to hit it big.

With a record like that, he should be a woodworker's hero, and yet his success has made him something of an outsider. He is often viewed as a businessman rather than a woodworker and, worse, one who advertises a handmade product but no longer delivers it. This is just one of Moser's many paradoxes. His name is synonymous with craftsmanship even though he never became a master cabinetmaker himself; he has a skilled eye for form and a wealth of knowledge, yet many woodworkers write off his success, attributing it to smart marketing; his furniture has the look of the hand-made, yet he's a manufacturer. Where is the truth? As usual, it's somewhere in between.

Don't confuse product and process

Moser's manufacturing approach—often scorned by one-of-a-kind woodworkers—is perhaps his greatest contribution to the field. Many have tried to imitate him, and even those who grumble about his assembly-line production call him a pioneer. No one disputes that his workmanship is far superior to mass-produced furniture and often surpasses custom work.

Moser was certainly not the first to mechanize craft. Michael Thonet, the Henry Ford of furniture, produced his bentwood chairs in the 19th century. Gustav Stickley's honest, Craftsman furniture was made in a factory. Moser's hero, the designer Hans Wegner (Moser went to Denmark to meet him) perfected high-quality woodworking on a production scale. Like these legends, Moser balances technology and what he calls “the imperative of the material,” the soundness of solid-wood design that he believes was lost in the industrial revolution.

Moser pulls it off by separating product and process. “In the early days of our shop, we also tried to replicate the methods (of the 19th century). We used Arkansas stones and stropped our chisels on leather. But that, I discovered in time, was a bit of an artifice. I got more and more interested in the means of producing furniture.”

His business started out like any custom shop: An order came in

Furnituremaker and businessman—Thomas Moser's shop grew from three employees in 1972 to more than 100 today, leading some woodworkers to say, “he's not one of us.” But many who know him say he still has the soul of a woodworker.

and one cabinetmaker handled the whole job, from picking out the lumber to putting on the finish. As the orders grew, things changed. First came the fluorescent lights, then air-powered tools. The handplanes started to disappear, and the creeping mechanization created unease in the shop. Moser was unfazed. "To them, it was bad enough that we had to use electricity."

Today, the true cabinetmakers are gone, but Moser retains handcraft where it counts. The parts are milled in advance, aged and carefully stored to match grain and color. The furniture is not assembled until an order comes in. Doors and drawers are fit by hand. Some curved chair backs are laminated in the radio-frequency machine, but dovetails are cut on a router not much differently from the way a hobbyist with a dovetail jig would do it. Moser describes his methods in his catalogs, and he stands behind his furniture (it comes with a lifetime guarantee). "The goal from the beginning was to make it quicker and still have the same result," says Stewart Wurtz, a Seattle furnituremaker who worked for Moser in the mid-1970s.

Moser's signature piece, the continuous-arm Windsor chair, is an object lesson in his evolution. The seats that had been carved with a chainsaw and smoothed by hand are now shaped on a computer-controlled router. The compound curve of the bent-laminated

"I don't design for catharsis."
Moser's design sense is distilled in his trademarked continuous-arm Windsor in ash and cherry: a simple, respectful treatment of a proven form. He replaced the lower stretchers with laminated knees to reinforce the legs.



back is glued up on steel forms, and the ash spindles are made by a subcontractor. Traces of DNA remain, though. Someone still shapes the sculpted back by hand and drills the holes for the wedged spindles by eye. "Mechanization actually improved the chairs," says Wurtz. "In the early days, it was all handmade, and there were errors here and there."

Marketing is a big part of making

From the outset, Moser seemed to have had a far grander vision than working at a bench. In 1972, he left a job teaching English at

Take away the pneumatics and this is how a garage woodworker would glue up a chair (right). The holes for the spindles on Moser's Windsor (below) is done the same way it was in 1972.



Parts are made in advance. In a concession to efficiency, Moser stocks parts for its biggest sellers (near left). To maintain the quality of a one-off piece, the inventory is carefully managed to match color and grain. Lena Paradis (above) holds up the bent-laminated back of the shop's continuous-arm Windsor.

How do you make a classic? Start with classic forms. “Classic to me has universality in mind, and universality is what makes great design,” Moser says. This Windsor-style settee with its bent-laminated stretcher is modern and familiar.

Bates College to open a shop in New Gloucester, Maine (his factory is now in nearby Auburn). Contrary to popular belief, he didn't go into furnituremaking cold. For years, he had repaired antiques, built reproductions and renovated old homes. It was through these projects that he found a calling in furniture.

He is a competent woodworker, but he never became a top-flight cabinetmaker. As one former employee quipped, the smartest thing Moser did was to stop making the furniture himself. He might disagree, but the talent Moser hired had a lot to do with his early reputation. Moser is fond of his “alumni association” (some are now close friends), and he claims they are the ones who are richer—literally—for the experience. “I can point to three or four million in annual sales today by people who used to work here,” he says. (Thos. Moser Cabinetmakers, by contrast, has more than \$8 million in sales.)

It wasn't always easy, especially in the beginning. He had four sons (they now work in the business) and had to sell his house to keep the shop afloat. He took all work—cabinetry, doors, a water-wheel. One customer recalls finding the whole family, including Moser's wife, Mary (who is also his full-time business partner), sanding tabletops in the shop.

Within a few years, Moser chose a path that bordered on heresy in the counter-cultural 1970s—marketing. He had a catalog before others thought of mail order, and he advertised it in *The New York*



er magazine. Showrooms followed in Portland, Maine, then New York, San Francisco and Philadelphia (which has since closed). His timing was perfect. He rode the Shaker revival to riches.

Timely furniture can also be timeless

Marketing aside, the essence of Moser's success is his ability to design winners. Talk to former employees and you get the feeling he has an instinct for classic forms. He's beyond confident. He's fearless. “I hope I don't sound boastful, but in a way, we are purveyors of taste,” he says, dashing all hope of humility. “My assumption is that I've got a pretty good eye. What I like I think other people will like.”

His furniture bears him out, at least in the sense that many people like it. John Rattenbury, the founder of Taliesin Architects and a student of Frank Lloyd Wright, furnished his 1997 design for *Life* magazine's Dream House with Tom Moser's furniture. “It's got a timeless quality,” Rattenbury says. “It's warm. It's not pretentious. It's not only well-crafted and refined, it's nicely in scale.”

In the cutthroat contract trade, which accounts for half of Moser's business (the other half is retail), his niche is reflected by his client list: the University of Pennsylvania, the J. Paul Getty Trust Center in Los Angeles, law libraries at UCLA and Yale, and *The*

Branching out from traditional roots—The Arts-and-Crafts look of Moser's “Windward” series is also smart manufacturing. The furniture is almost entirely composed of square-sectioned members that can be combined to create chairs, tables, beds and settees, such as the one shown at left.



New Yorker offices. By now, he's left his Shaker roots far behind. "His pieces fit with all styles of architecture," says Barry Stallman, an architect in Portland, Maine. "It's more traditional, but there's a timelessness to them. You could put one of his chairs in a Frank Gehry house and it would fit right in."

Timeless is the buzzword, and Moser designs explicitly to achieve that effect. But how can you choose to make something timeless any more than you can set out to write the great American novel? Moser has a ready answer: "Some people design products for cathartic reasons. When they're finished, they feel good about it. I don't design for catharsis. Catharsis is usually something nobody wants to be around. We do it for people, not just for ourselves, and if you do it with that mind-set, maybe you can make something that's a classic."

Still getting dirty in the shop

He embraces technology, he runs a multi-million dollar company, but he is still very much a woodworker. "He's got the soul of a woodworker," says Johns Congdon, who worked for Moser as a designer and now makes custom furniture in Vermont. "He still gets excited when he looks at a piece of wood."

I found him one afternoon not in his cramped, utilitarian office

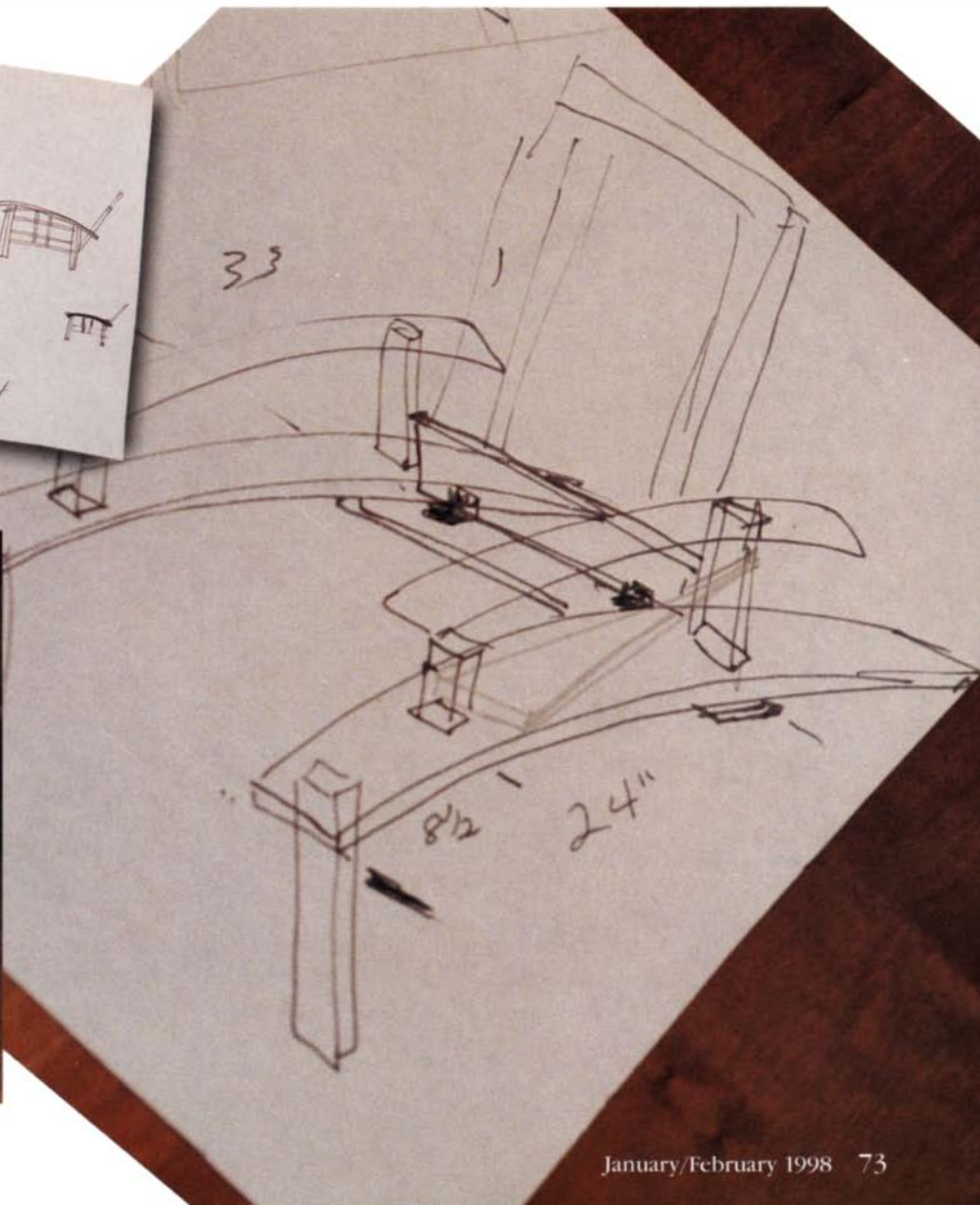
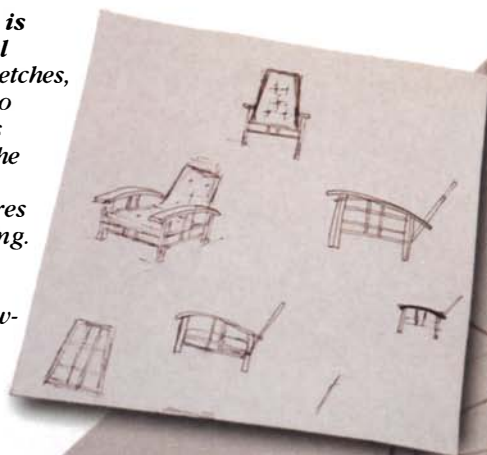
but ripping veneer on a tablesaw for a chair prototype. He helped build his new home (it recently appeared in *Architectural Digest*), and he chose to restore a fiberglass motor-sailer even though he probably can afford to go cruising in something new. His eyes still light up at the sublimity of a Shaker pulley, and he recently interrupted a meal to sketch a dining chair he saw in a restaurant. "I can't stop myself," he says. "I've got so many things I want to build."

How can it be that he's "not one of us," as more than one furnituremaker told me? Jealousy plays a part, but there's another reason. It's not just that he's broken a bond dear to many woodworkers—the personal conversation between maker and material. It's the belief (though not altogether fair) that he allows his customers to think one-of-a-kind craft is what they are getting.

At the same time, he has singlehandedly raised the tide for everyone. "He should get credit for exposing the world to us," meaning the custom craftsman, Congdon says. "You can say that he is running off of us, but we're running off of him, too." The fact that people argue about whether one of the country's most successful furnituremakers has somehow fallen from grace because of that success is perhaps the biggest paradox of all. □

Zachary Gaulkin is an associate editor of Fine Woodworking.

"Everything we do is based on historical forms." From his sketches, Moser goes directly to prototypes. Rick Foss (below) helps with the prototypes and then builds jigs and fixtures for the manufacturing. The pace is fast. This lounge chair went from concept to showroom in a matter of weeks.



A Basic Mirror Frame Detailed to Your Liking

Dress up a molded frame with fretwork cut from a spectacular piece of wood

by D. Douglas Mooberry



The key to a strong miter joint—The author cuts slots for splines in all four corners of a mirror frame.

Mirrors make great wedding presents. You can make them as small or as large as you like, depending on how generous you're feeling. Mirrors don't require a lot of material or time, either. I learned that in college, when I needed to come up with gifts and a little spending money.

After I graduated from college and was unable to find a business that wanted to make me president, I started making mirrors full time. Then other furniture projects came along, and mirrors got put on the sidelines, until I hired an apprentice.

Although I build Chippendale-style mirrors, the basic construction techniques are

applicable to any style mirror, with or without fretwork. Actually, you could use these techniques to build picture frames, too. Best of all, you don't even need clamps to assemble them.

Fretwork pattern is up to you

Copying an existing mirror is the easiest way to get a design. My mirror is a copy of one owned by my mother. Trace the design onto plain paper. Then go back with your pencil to refine any ragged curves. The fretwork on old mirrors usually looks symmetrical, but often it's not.

If you trace the fretwork from an old mirror, copy one-half of the design, or you can

use mine (see the drawing on p. 77). When copying it onto a workpiece, use both sides of the pattern for a mirror image. If you plan to make only one mirror, tape the design to the wood and cut away. For repeatability, make reusable templates out of scrap laminate or fiberboard.

If you don't have a mirror to copy, look in books and magazines. When you find a picture you like, blow it up on a photocopier to the desired size. Or use an existing design and modify it. Use ears from one design on another. But don't take away too many details, or you risk making something bland. Old mirrors have lots of details, lots of curves, little points and frills. Don't make

your mirror look like it was made at a factory with a pin router and a 1/4-in. bit.

SHAPING THE MOLDING

With a little creativity, you can mix and match stock router bits to create interesting moldings.

Select straighter-grained stock for the frame

Heavily figured woods, such as tiger or birds-eye maple, are prone to movement, and that can give you fits if the frame starts warping. In any given board, there are usually sections of greater and lesser figure. Use the less-figured areas for the frame, and the highly figured stock for the fretwork.

I try to keep a distance between my fingers and things that can cut them off. That's why I run molding using large stock whenever possible (see the top photo). Molding can be cut with a variety of router bits to get a specific shape (see the drawings at right). Or you may find one bit that gives you just what you want in a single pass. You're the designer, and you don't have to be a slave to someone else's ideas. There are many ways to shape a pleasing molding.

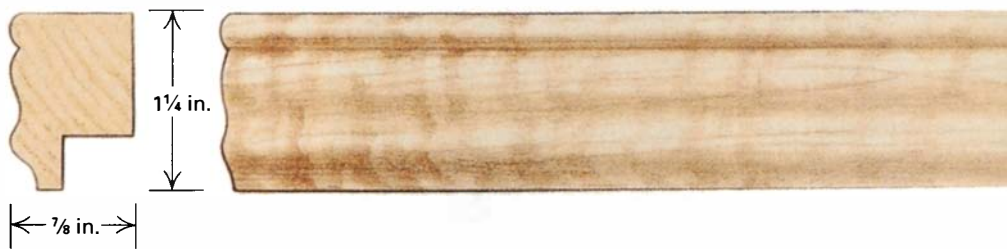
I use 1 1/4-in.-thick stock for the frame, and I shape the profile on the router table or shaper. When using various router bits to create a custom molding, draw out the profile on the edge of a board for a visual aid. Chuck in the first bit, make the necessary adjustments and mill all the stock the same way. Then set up the second bit, and do the same. This method not only saves you time, it ensures that the molding will match. One rule of woodworking is that every time you run molding, it comes out slightly different.

Next rip the molding 7/8 in. wide on the tablesaw. Then return to the router table and cut the rabbet on the back of the frame using a straight bit or rabbeting bit (see the bottom photo). The rabbet must be deep enough to hold the mirror glass and back panel. Don't forget to leave some room for the nails. I make my rabbets 3/8 in. wide by 1/2 in. deep.

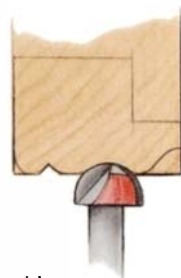
Splined miters join the frame

There are many ways to cut miters, but I prefer a chop saw. I set up a simple fence on the saw—just a 3/4-in. by 3-in. by 3-ft. scrap that allows me to set up a length stop. It's very important that the miter be exactly 45°. The graduations on a chop saw aren't always accurate; check your settings by cutting and fitting some scrap.

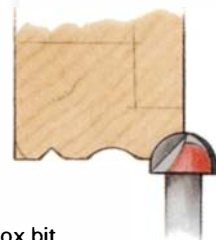
Now it's time for the real fun: sanding the molding. It is much easier to sand the molding before the frame is assembled. The better your tooling, the less you have to sand. When I first started making mirrors I had



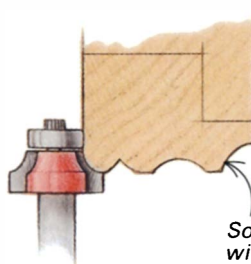
V-bit



Core-box bit,
1/2 in. dia.

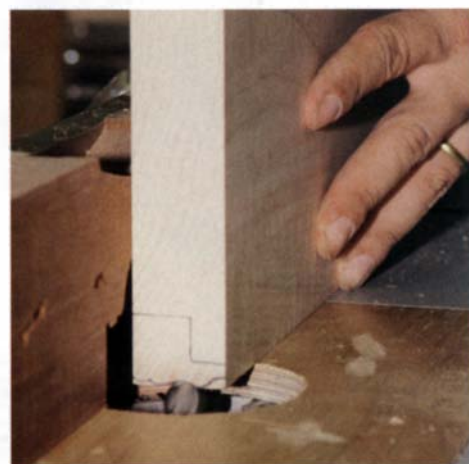


Core-box bit,
1/2 in. dia.



Roundover bit, 3/16 in. radius

Soften sharp edges with sandpaper or handplane.



Shape the frame. Start with wide stock. When using multiple router bits, sketch the molding profile before beginning.



Cut a rabbet for the glass and back panel. After the molding is machined and ripped to width, cut a rabbet 3/8 in. wide by 1/2 in. deep.

CONSTRUCTION OF A MIRROR

Install an auxiliary fence on the miter saw to prevent tearout. Cut the molded frame pieces to size, then glue and clamp (packing tape works well) the mitered corners. When dry, cut slots for the corner splines on the tablesaw with a V-jig. Glue the splines into the slots, then cut off the excess when the glue has set.



A view from the back

The glass and back panel fit into a rabbet cut into the rear of the frame.



Splines secure a miter-joined frame.

another cabinetmaker make moldings for me because I didn't have a fully equipped shop. This cabinet shop would sharpen their shaper knives every five years, whether they needed it or not. For me, this meant lots of sanding. I would sand till there was no skin left on my fingers and then wrap my fingertips in duct tape and sand some more.

I keep my tools sharp, so there's very little sanding needed these days. And I have found another essential tape for the shop—clear packing tape, the kind that stretches. I like it better than fancy clamps for joining miters and other joints. To assemble the frame, dab a little yellow glue on the mating surfaces of a miter, then wrap the two pieces tightly with tape. Put the whole frame together this way in one session, and make adjustments to all the miters as you glue up so that all the joints are tight. The larger the frame, the easier it goes together because it will flex to conform.

After the glue has dried, remove the tape, and cut the grooves for the corner splines to reinforce the frame. I cut the grooves on a tablesaw using a simple V-jig (see the photo on p. 74). The jig holds the frame at a 45° angle and safely guides it through a standard 1/8-in. kerf blade, cutting about 1 in. deep into each corner.

I plane spline stock, of the same wood as the frame, to 1/8 in. thick. Glue these strips into each corner (see the photo at left). Once the glue has set, cut off the excess, and sand or plane the joints smooth. Now cut a shallow dado into the top and bottom edges of the frame to hold the fretwork. (The side pieces are just edge-glued to the frame.)

Use a scroll saw for the fretwork

Trace or tape your design for the fretwork onto stock that's been resawn to 1/4 in. thick. Be sure to align the fretwork stock so that the grain runs in the same direction as the frame. In other words, the grain on the horizontal pieces runs left to right; the grain on the vertical fretwork runs up and down.

Before starting, look over your stock, and make sure the edges that attach to the frame are jointed before cutting out the patterns. It's very difficult to true up the edges of little pieces.

I use a variable-speed scroll saw and a fine-tooth blade to cut the fretwork. Many of the newer scroll saws, those that keep the blade under constant tension, cut very smoothly. If you cut right to the line with a fluid motion, you end up with cutouts that

require very little sanding and filing.

After the fretwork is cut out, clean up any rough edges, and sand the pieces up to 220-grit. Next glue the fretwork to the frame using rubber bands for clamps (see the bottom photo). I suggest gluing up one side at a time. If you try to do the entire mirror, you're likely to misalign a just-completed section while banding together another. For reinforcement, add glue blocks between the fretwork and frame on the back.

The top and bottom cutouts fit into 1/4-in.-deep grooves cut in the frame. I size these two pieces slightly wider than the frame. After glue-up, I trim them with a chisel; that makes a snug fit to the ears. After another go around with sanding, I finish the mirror with aniline stains and then shellac. When it's dry, I rub it out with steel wool and apply a couple of coats of paste wax. I like to finish both sides of the frame.

It's best to order the mirror glass after you've glued up the frame (see the box at right), just in case your plan dimensions have strayed from the actual piece. Cut the frame back out of 1/4-in. stock or plywood; size it for a snug fit. A good-fitting back will cover up a loose-fitting mirror.

If you want to have some fun, stick an old newspaper between the mirror and the back before assembling it. Fifty years from now, the person who replaces the mirror will appreciate the old headlines.

The mirror and back are held in place with brads partially nailed into the frame's rabbet. I use a nail gun because it's faster than predrilling little holes and then carefully tapping away at tiny nails with a hammer. Ironically, the brads from an air nailer look much like the handmade square-cut nails from Tremont Nail Co.

Finish by attaching a pair of picture hangers to the back, and string a piece of stranded wire between them. □

D. Douglas Mooberry builds custom and reproduction furniture in Unionville, Pa.

How to get scratch-free mirror glass

Glass-shop owners, like woodworkers, don't like to throw useable scraps away. When you order a small piece of glass, there's a chance it will come from an offcut that's been kicking around the shop. Oftentimes, these pieces will have suffered little scratches on the back, and you don't notice them until you've completely assembled your mirror. Specify that you want a scratch-free mirror, and check it before taking it home.

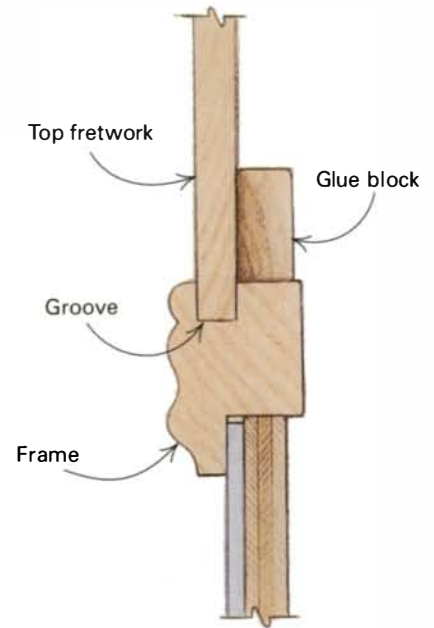
Always order your mirror glass 1/8 in. shy of the frame's inside dimensions. There are two reasons for that: possible frame shrinkage and inaccuracies at the glass-cutting shop.

I use 1/8-in.-thick clear mirror glass. If you prefer, you can go with 1/4 in., which has a better reflective quality (less distortion) because it's stiffer. But 1/4-in. glass is twice the weight, and you will have to make your frame 1/8 in. thicker to accommodate it.

Mirror glass can be ordered with a variety of tints, from gold to gray to brown, even peach, and that costs extra. You can also have the glass edge beveled. —D.D.M.

DRESSING UP A MIRROR FRAME WITH FRETWORK

The top and bottom fretsawn pieces fit into grooves cut into the frame; the side ears are edge-glued to the frame.



Side view detail



Clamp the fretwork to the frame. Rubber bands are great for holding the odd-shaped fretwork in place while the glue dries.



Tune Up Your Belt Sander

Tips on improving the performance of this versatile shop tool

by Sven Hanson

Re-energize the drive wheel

To make the rubber grab the belt better, the author uses a tire-traction compound.

File it flat

You may be surprised to discover that your platen isn't flat.

Get a new one

Manufacturers sell replacement cork pads that are cut to size.

Throw it out

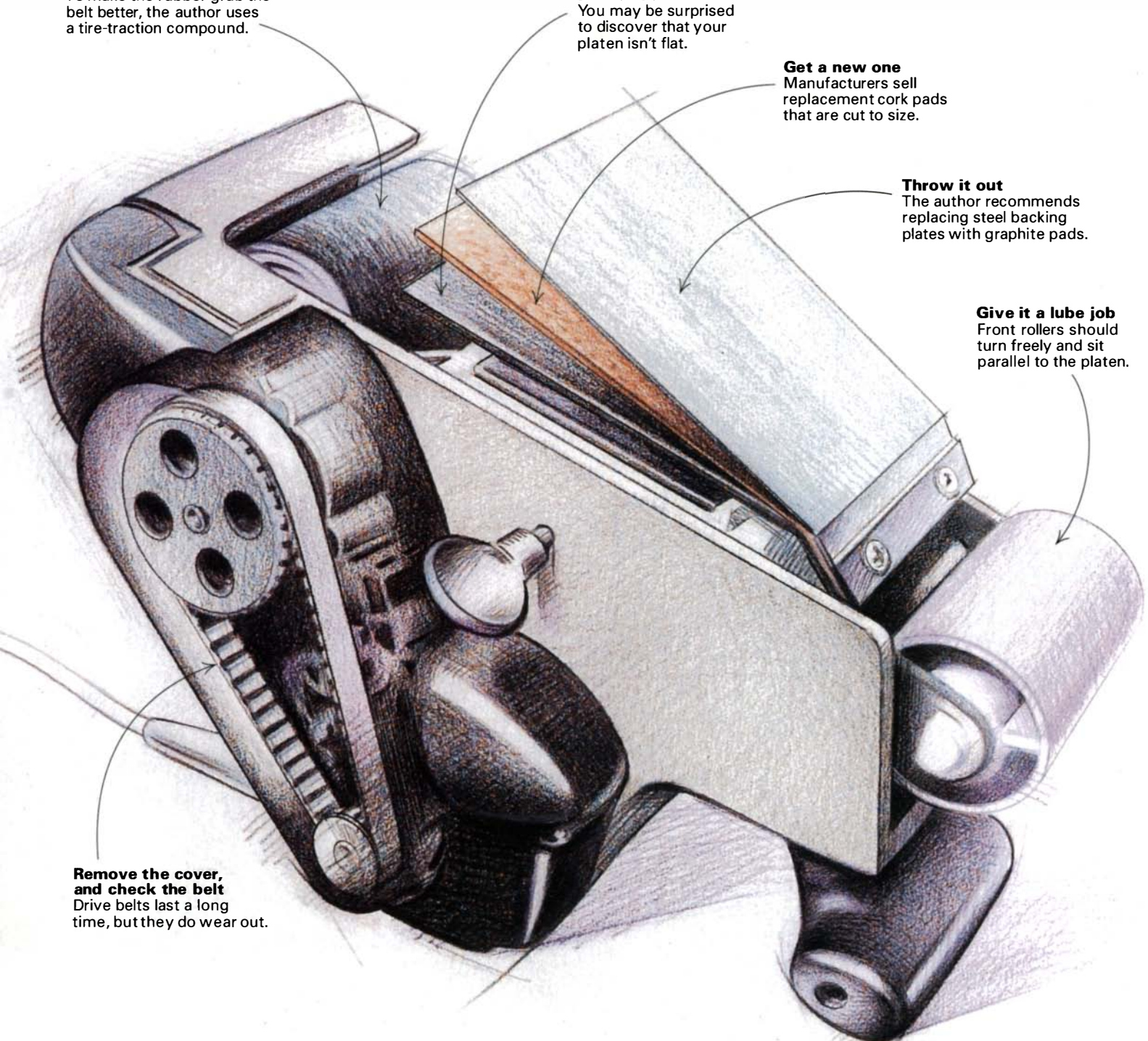
The author recommends replacing steel backing plates with graphite pads.

Give it a lube job

Front rollers should turn freely and sit parallel to the platen.

Remove the cover, and check the belt

Drive belts last a long time, but they do wear out.



To get the best, or even adequate performance, from a belt sander, it must have a flat platen, a straight-tracking belt and the proper abrasive. It will perform even better with an effective vacuum system.

When the pad area on the bottom of the sander has a twist or a high spot, one or two corners do all the work, leaving visible valleys in sanded areas. To check a used sander, or a new one before I buy it, I remove the metal friction plate and the soft pad beneath it, which is usually made of cork. I sight down the bottom as if I were sighting the sole of a handplane. The front and rear wheels should lie parallel to the platen, and the platen must be flat. I confirm this by checking the bottom with a straightedge (see the photo at right). I pay special attention to the diagonals and look for hollows or hills on the platen, which I level with a file.

Add a graphite pad

Graphite pads are far superior to the old steel-over-cork system that comes as a stock item on many sanders. The graphite pads replace the hard surface of the steel backer with a slick, spongy cloth. Graphite evens out the pressure against the workpiece and reduces friction. A graphite pad helps the sander run cooler and gives both the tool and the belt a longer life.

Klingspor (800-228-0000) and some woodworking suppliers sell graphite pads in a variety of sizes to fit different machines. They come with and without self-adhesive strips. For the best bargain, I cut pads for my belt sander from a roll of graphite made for a larger machine. I clamp a piece of graphite (without adhesive on the back) under the retainer bar and over the stock cork pad (see the top right photo). If the cork pad is worn down,



Is it flat? The author checks the platen of a belt sander with a straightedge. High spots should be filed off.



Graphite is cool. This self-lubricating product reduces friction and makes the belt run more smoothly, reducing stress on the machine.

it should also be replaced. The thicker the cork the better.

Enhance vacuum system

The belt sander cuts wood so effectively that it's often sanding loose sawdust instead of the work surface. Basic maintenance should include blowing the dust out of the motor housing and exhaust ports to keep the vacuum system clear of debris. Sometimes rougher grits create clogs of dust that I break loose with a soda straw or with two or three long pipe

cleaners twisted together.

When working in living spaces, I reduce dust output by attaching a vacuum cleaner to the sander with duct tape. I use naphtha later to remove the excess adhesive left by the tape.

Big wheels keep on turnin'

Periodically, I remove the drive wheel and paint it with a tire-traction compound sold by hobby shops for model car racing (see the bottom photos). This stuff is a rubber re-plasti-

cizer that gives the drive wheel a better grip on the belt. A slipping drive wheel causes poor tracking, making the belt more likely to fill up with resin, over-heat and burn the wood.

I regularly make sure the front wheel rolls freely and lubricate it according to the manufacturer's instructions. I also check the drive belt and the brushes periodically and replace them when necessary. □

Sven Hanson works wood in Albuquerque, N.M.



Hold still. An old leather belt and a pair of Vise-Grips hold the rubber drive wheel as the author backs off the axle nut (above). Tire-traction compound improves the grip (right).



Build a Bookcase with Doors

*Structure and details make the difference
in this Shaker-style case*



by Christian Becksvoort

The essence of good design is a piece of furniture that seems right just the way it is. There should be nothing to add and nothing to take away to improve it. That's what I aimed for with this cherry bookcase. It was to be Shaker inspired, quiet and unpretentious, but not boring.

The bookcase needed to fit beneath a window sill, so it is relatively small, about 24 in. wide and 40 in. high. Its appearance and size are not overpowering, so I relied on careful workmanship and just a few details to carry the design. Each of these construction details—a dovetailed molding at the top of the case, a mitered base

and a strip of wood whose end grain doesn't show just above the doors—required a fair amount of extra work. The details don't jump out at you, but together they give the bookcase an appeal that it wouldn't otherwise have.

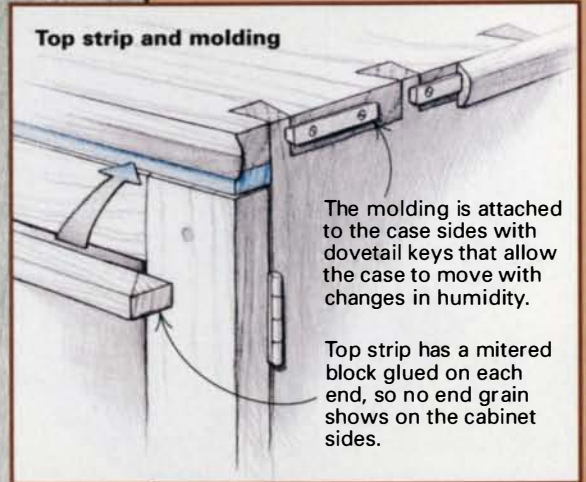
Dovetails hold the case together

The basic structure of this bookcase is quite simple: Two sides dovetailed to the top and three shelves connected to the sides with sliding dovetails. A frame-and-panel back is set into a rabbet at the case's back. To begin, I milled, crosscut and ripped to width

Key design details

As with most Shaker-style designs, this bookcase relies more on its proportions and quality craftsmanship than on flash or ornament for its beauty. A few simple details elevate it above the ordinary.

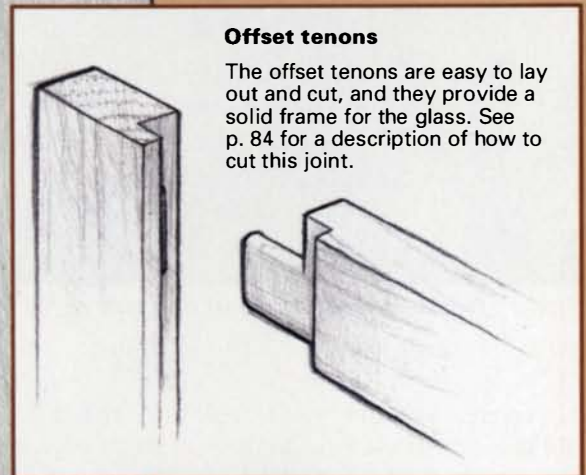
Top strip and molding



The molding is attached to the case sides with dovetail keys that allow the case to move with changes in humidity.

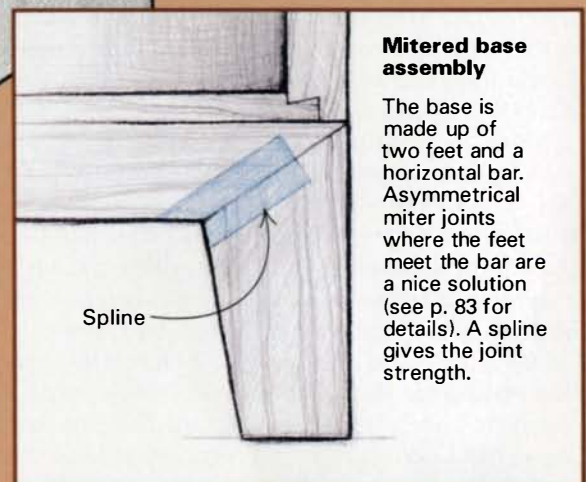
Top strip has a mitered block glued on each end, so no end grain shows on the cabinet sides.

Offset tenons

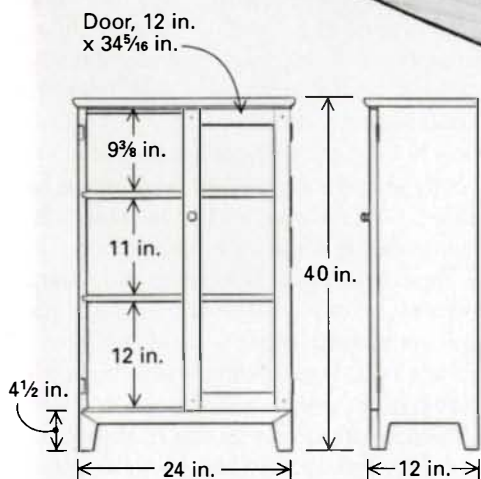


The offset tenons are easy to lay out and cut, and they provide a solid frame for the glass. See p. 84 for a description of how to cut this joint.

Mitered base assembly



The base is made up of two feet and a horizontal bar. Asymmetrical miter joints where the feet meet the bar are a nice solution (see p. 83 for details). A spline gives the joint strength.



Door, 12 in. x 34⁵/₁₆ in.

9¹/₈ in.

11 in.

12 in.

40 in.

4¹/₂ in.

24 in.

12 in.

Three tips for smoother dovetailing



Picture-frame clamp keeps top and side at 90° for layout.



Keep the case square. A piece of scrap cut to the interior dimension of the bookcase and placed at its base keeps the sides of the bookcase parallel and ensures that the top will clamp up square to the sides.



Sliding dovetails are glued just at the ends. By leaving the joint dry until it's within 2 in. or 3 in. of home, the author prevents the dovetails from binding. The mechanical connection is plenty strong even without glue in the middle.

the top and two sides from a single wide cherry board. I cut the rabbet for the back panel in the rear inside edge of each piece, and then I laid out and cut the dovetailed slots in the top. Because the top overhangs the sides by $\frac{3}{4}$ in. at the front of the case, the half-slot there is set back $\frac{3}{4}$ in. from the edge. To lay out the pins on the top of the sides, I used a picture-frame clamp, which holds the top and a side at precisely 90° to each other (see the photo at left above). Then I cut and chopped the pins.

I cut the foot profiles in the sides on the bandsaw, then laid out and routed the dovetailed slots for the three fixed shelves using a shop-built fixture to guide the router (described in *FWW* #119, p. 74). Before gluing the top and sides together, I sanded the insides. To be sure the top and sides glued up square, I placed a spacer stick between the two front feet when gluing and clamping the three pieces together (see the top right photo).

Routing the sliding dovetails on the ends of the shelves was next. After planing the shelves to thickness, then ripping and crosscutting them, I used the offcuts to set the fence on my router table. Once I had a perfect fit, I routed the dovetails on both ends of all three shelves and sanded them.

One at a time, I slid each shelf into its slot from the front, stopping

when 3 in. of shelf was still exposed. At this point, I applied glue to the dovetails at the top and to the slots underneath and tapped the shelf home, stopping when it was flush with the back rabbet and with the front (see the bottom right photo). I clamped the case from side to side, both front and back.

I built the frame-and-panel back about $\frac{1}{8}$ in. wider and longer than its opening. To fit it to the case, I started by running the top edge over the jointer, fitting one side and then, carefully, the other. I was careful to take even amounts off both sides. With help from a little block plane, the back eased in nicely.

After sanding the back, I held it in place, marked the location of the shelves on the back of the frame and glued the back into its rabbet. After the glue had dried, I drilled holes for 6d finishing nails at the marks I had made, one at the center of each shelf and one near each end. I countersunk these nails about $\frac{1}{8}$ in. deep and plugged the holes with whittled down cherry pegs. Then I sanded the back and softened all the edges with a worn piece of 220-grit paper.

There's only about 1 in. of case side extending below the bottom shelf and only the first and last 3 in. of the shelf is glued. So I glued and screwed two small blocks on the underside of the bottom shelf, one at the center of each end. I sanded the bottom edges of

the sides and back, as well as the angled sides of the feet. A belt sander quickly removed the rough spots, and a little hand-sanding eliminated the scratches.

Miters solve two aesthetic problems

I planned to hang the double doors so they went all the way to the outside edges of the case rather than inside the case. This would leave the doors standing $\frac{3}{4}$ in. off the front of the bookcase unless I added two horizontal strips of wood across the case front to even things out. One strip would go just above the doors and one just below. But I didn't want end grain showing on the sides of the case at the ends of the top strip, and I wasn't sure how to integrate the bottom strip into the foot assembly without it looking awkward. As it turned out, the solutions to both these design problems involved miters.

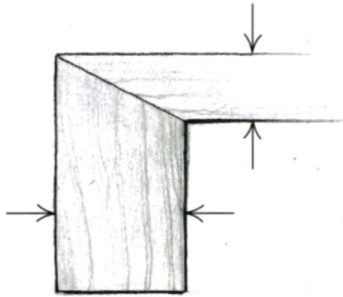
For the top strip, I decided to miter both ends and glue on little blocks oriented in the same direction as the case sides. Because the strip was glued to the overhang of the top as well as to the edge of the case sides, the end grain glue-up wasn't a problem. I started by

cutting a strip $1\frac{1}{16}$ in. sq. and 28 in. long from heartwood scrap left over from the sides. I set the blade at 45° and ripped just shy of 4 in. into this strip on the tablesaw, keeping the kerf on the waste side of the diagonal center and carefully backing out the strip from the blade. I crosscut the strip at 24 in. and set that piece aside for a moment. Then I cut two $\frac{7}{8}$ -in.-long pieces from the ripped triangular section. I mitered one end of the 24-in.-long piece at 45° , held it in place on the case, then marked and mitered the other end. I glued one of the little $\frac{7}{8}$ -in.-long blocks at each end of the 24-in.-long piece, using masking tape as a clamp.

After the glue had dried, I carefully jointed the strip at the ends and ripped it to $\frac{7}{16}$ in. wide by $\frac{3}{4}$ in. deep. I glued the piece to the top of the case, under the overhang. As a result, all you can see from the front or sides is face grain.

The foot assembly—two feet and a horizontal bar connecting them—is made using asymmetrical miters (see the drawing and photos below). I started with a single piece $\frac{3}{4}$ in. thick, 2 in. wide and 34 in. long. Then I cut a 5-in.-long piece off each end. After ripping the long piece to $1\frac{1}{4}$ in. wide, I laid out the miters, as shown

A quick miter for stock of different widths



1. Lay out the miter.

Holding the horizontal bar on the foot piece, the author marks the face of the foot and the bottom edge of the horizontal bar.

2. Connect the dots.

Straight lines between these marks and the corner of each piece establish the miters.

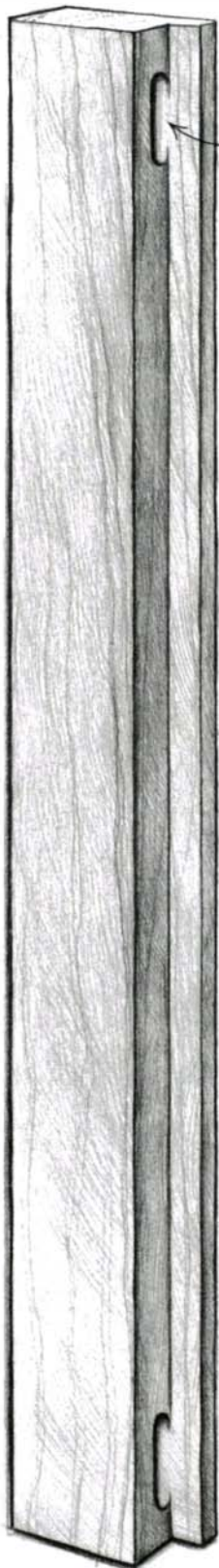
3. Cut to the line. The author uses a bandsaw to cut each miter, then trues them up on a disc sander. A handsaw and plane would work just as well.

4. Attach the base assembly to the case by gluing it to the case sides and the bottom half of the bottom shelf. The top half of the bottom shelf is exposed and acts as a doorstop.



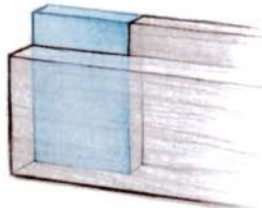
Frame joinery that you don't have to measure

The offset tenon shoulders on the rails make these door-frame joints look more difficult than they really are. The only real trick to getting joints that fit perfectly is to use the first shoulder as a reference when laying out the second, as shown below.

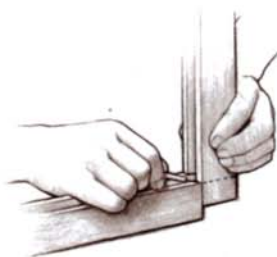


Rabbet and mortise the stile first. Start by cutting rabbets in rails and stiles and routing or chopping out mortises in stiles.

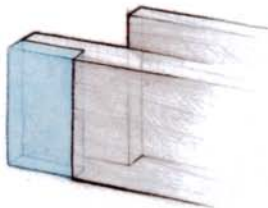
Cutting the offset tenon



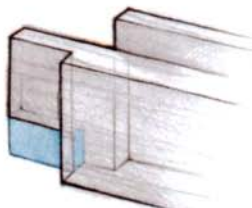
1. First shoulder. Cut outside shoulder of tenon. Determine depth by the rabbet; length is equal to the depth of the mortise plus the rabbet.



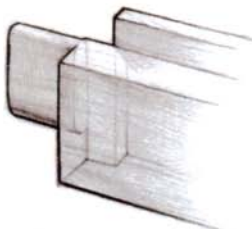
2. Scribe, don't measure. Rest the shoulder of the rail on the inside edge of the stile, then mark the location of the second shoulder.



3. Cut second shoulder. The inside shoulder of the tenon is shorter to compensate for the rabbet in the stile.



4. Size the tenon. The tenon should be slightly smaller than the mortise.



5. Round the tenon. Use a knife or a chisel to ease the tenon corners and to get them to fit the rounded mortise.

in photos 1 and 2 on p. 83. I cut the miters close to the line on the bandsaw (see photo 3 on p. 83) and sanded right up to the line on a disc sander.

To give this joint some strength (it's just end grain meeting end grain), I used a 1/4-in.-thick spline that stops short of the top of the joint, so it's hidden from view (see the drawing of the mitered base assembly on p. 81). When I glued up the assembly, I used a bar clamp to pull the joint in from end to end and two hand screws to exert pressure top to bottom. Once the glue had dried, I ran the whole assembly along the rip fence, crosscutting the legs to 4 1/2 in. Then I cut the foot angles and trimmed the protruding splines on the bandsaw. I sanded the underside of the horizontal bar and the foot angles next and glued the assembly onto the case (see photo 4 on p. 83).

To make the feet a little beefier, I installed glue blocks on their inside corners where the sides meet the front and the back. I took a piece about 7/8-in.-sq. and 10 in. long and ripped it diagonally on the bandsaw, using a V-block as a cradle. Then I held a piece in each corner, marked and cut it to its actual length and planed the bandsawn face smooth. I glued one into each corner, using a spring clamp for pressure.

After beltsanding the feet flush on the bottom, I drilled a 1/8-in.-deep, 3/4-in.-dia. hole in the center of the bottom of each foot with a Forstner bit. I drilled a 1/16-in.-dia. pilot hole in the center of each of those holes, then nailed in nylon furniture glides. Only about 1/16 in. protrudes, so they are not visible unless you happen to be lying on the floor. After using a block plane to chamfer the feet lightly all the way around, I sanded the whole case to 320-grit. Then I followed up with 0000 steel wool and eased any sharp edges.

Door-frame joinery looks tricky—but isn't

The two door frames for this bookcase are joined with mortise-and-tenon joints and are rabbeted in the back to accept glass. I used quartersawn stock for the frames, both to minimize wood movement and for appearance. After choosing the frame pieces and cutting them to length, I rabbeted them, making two cuts on the tablesaw. I saved the waste strips from the rabbeting operation for use as glass retaining bars. I laid out and bored the mortises in the four stiles next.

The rail tenons are a bit complex conceptually because they have offset shoulders, but the work is actually quite simple. The drawings at left explain the process. I cut the tenons on the table-saw, setting the fence for the shoulder distance and using the miter gauge to keep the cut straight. Then I eliminated the waste up to the cheek by running the rails back and forth over the blade beginning at its leading edge, taking off just a little with each pass over the blade. As the drawing at left shows, the trick to getting the shoulders to line up perfectly is to mark the second shoulder while using the first as a depth stop.

After all the tenons were cut, I rounded over their edges with a knife. Once they all fit, I glued and clamped the frames together, checking to be sure they were square. When the glue had dried, I pinned the joints all the way through with 1/4-in.-dia., 7/8-in.-long sections of cherry dowel. I used only one pin per joint because the tenons are quite small. Then I sanded and steel-wooled the doors as I had the case.

Fitting the doors was straightforward. I placed the case on its back on sawhorses and aligned the first door flush with the outside edge. I marked and jointed the top square, then the bottom, and repeated the process for the other door. I always try to get a

My 10¢ trick for hanging doors



Hinge location is marked on the edge of the case sides. Pinching a dime—about $\frac{3}{64}$ in. thick—between the top of the stile and the case gives the author the reveal he wants at the top of the door. Waste is removed with a laminate trimmer; then the joint is cleaned up with a paring chisel.



reveal of $\frac{1}{16}$ in. or less at the top and about $\frac{3}{32}$ in. at the bottom. Doors droop over time; they never creep up. Finally, I planed the inside edges of the two doors to get a $\frac{3}{32}$ -in. reveal between them. Because I used quartersawn stock, total movement for both doors, side to side, should be less than $\frac{1}{16}$ in.

I hinged the doors with 1½-in. broad brass hinges from Whitechapel Ltd. (P.O. Box 136, Wilson, WY 83014; 800-468-5534). I laid out the hinges in the doors first, scribing around the hinges with a knife. I routed out most of the waste for the door-hinge mortises using a laminate trimmer, and then I cleaned up the corners and edges with a wide chisel. I installed the hinges in the doors, waxing the screws to ease their entry.

To lay out the positions of the hinge mortises on the edges of the case sides, I laid the doors on the case, one at a time. I made sure the outside edge was flush while I pinched a dime between the top rail and the top of the case (see the photo at left above). I made a knife mark on both sides of each hinge, then removed the doors.

To lay out the perimeter of these hinge mortises, I laid a door upside down on a sawhorse, right next to the case, and held a hinge in place between the knife marks I'd just made. The barrel of the hinge acted as a depth stop, allowing me to mark out the perimeter of the mortise.

Before attaching the doors to the case, I

drilled for the knobs, which I'd already turned. To install the knobs, I dabbed a little glue in their mortises and used a hand screw to exert pressure on the knob until it was fully seated. I drilled holes in the upper shelf for round magnetic catches and recessed the strikes into the backs of the door stiles.

I applied a thumbnail molding on the front and sides of the bookcase. It is attached to dovetailed keys on the sides (see the photo below), so the molding wouldn't prevent the sides from moving (see *FWW* #122, pp. 52-55 for a more complete description of this process). Once the molding was finished, I sanded the back of the molding flush and sanded the entire top through 320-grit, finishing with 0000 steel wool.

After three coats of Tried and True varnish oil, steel-wooled between coats, the doors were ready for glass. I removed the doors and cut the retainer strips to length, leaving their ends square. Then I predrilled and nailed them in place over the glass with ½-in.-long brass escutcheon pins. After the doors had been rehung, I added leather buttons to the door stops, top and bottom, to deaden the thunk as the doors are shut. □



Molding is attached to case with dovetail keys. This prevents the case from cracking by letting the side expand and contract.

Christian Becksvoort is a professional furnituremaker in New Gloucester, Maine, and is a contributing editor to Fine Woodworking. He is writing a book on Shaker furniture.



Quality Control Taiwanese Style

American tool companies have sought ways to improve the quality of their imported machines

by Anatole Burkin

Woodworkers who pride themselves on owning nothing but American iron are becoming rare. Although it's possible to equip a shop solely with American-made woodworking tools, the choices are mostly limited to heavy-duty, industrial-grade machines or older, used machines. For light- and medium-duty tools, such as contractor's table-saws, miter saws and benchtop planers, the options are mostly limited to Taiwanese machines.

Taiwanese-made woodworking tools have occasioned lots of controversy in the past. But things are changing. Representatives from American companies that import

Taiwanese tools say modernization of manufacturing methods and quality-control measures have improved Taiwanese tools. To see for myself, I spent a week touring 16 woodworking machinery factories in and around the city of Taichung, a crowded, smog-choked metropolis of 700,000. The city is on the west coast of Taiwan, two hours south of the capital Taipei. I visited factories that make table-saws, jointers, planers, miter saws, dust collectors, motors, router bits and other woodworking tools

Delta's presence in Taiwan is strong. A worker cleans up a 15-in. planer made at Delta's partner factory, Kosta.



for many of the major tool companies.

I saw both old-fashioned and modern manufacturing methods. The shops I visited ranged from small operations with a handful of employees to factories with nearly 200 workers. Some plants I visited build tools exclusively for one name brand; others build machines for a dozen or more companies. Many of the well-known North American tool companies have some connection to Taiwan. Delta, DeWalt, General, Porter-Cable and Powermatic are among the many companies that maintain factories in the West and import products from Taiwan. I also visited factories that make tools for U.S. companies whose primary business is selling imported tools: Grizzly, Jet, Sunhill and Wilke (Bridgewood).

I gained some confidence that Taiwanese factories can produce good tools. To help ensure that, many American companies send their inspectors to monitor production. But I also left feeling confused by the labyrinthian network of suppliers, assembly plants and trading companies that work together, sometimes producing what look to be nearly identical tools under a variety of names. Labels can be misleading.

Ultimately, the best way to judge a tool is to test it in the workshop without any preconceived notions.

Taiwan's low-cost labor pool attracts manufacturers

Driving in Taiwan exercises many of the senses, especially those that register danger. Cars, scooters, bicycles and pedestrians fiercely compete for the right-of-way, seemingly oblivious to the rules of the road. Traffic lights, as a Taiwanese native explained to me, are meant "for reference only." Pileups invariably include a scooter or two, some carrying entire families. Despite the congestion and aggressive driving, the citizens avoid displaying their frustration. Horns rarely blare, and the middle finger isn't used as a rude salute. The sense of danger is also apparent in the factories, whose safety standards would shock the average OSHA inspector.

Taiwan has a labor pool of nine million. Taichung alone has 20,000 manufacturing plants that make textiles, footwear, sporting goods and machinery. The country's unemployment rate is less than 2%. Hourly employees work an average of five and a half days a week, or 44 hours. By American and European standards, the labor pool is a bargain: The average wage at a wood-working factory is about \$3.50 an hour. By contrast, factory workers at Delta's plant in Tupelo, Miss., make about \$12 an hour. It doesn't take a master's degree in business to figure out why manufacturing has gone to the Far East. Less restrictive environmental laws also make Taiwan favorable for establishing iron and aluminum foundries.

The Taiwanese were building metalworking and large woodworking machinery long before they began making small woodworking machines. Shiraz Balolia, president of Grizzly, started importing metalworking tools from Taiwan in 1975. "I had milling machines and lathes in my showroom," he said. "People would sometimes ask me if I had a jointer. I didn't know what a jointer was. I had enough inquiries that I decided to take a woodworking course.

Once I learned about woodworking machines, I started ordering them," he said.

There weren't a lot of woodworking machines to import, however. To fill the void, the Taiwanese began copying Delta and Powermatic tools. "I sent a Rockwell planer to Taiwan. Within a month and a half, they shipped a prototype to me," said Balolia. "I worked with Chiu Ting. At the time, Chiu Ting was less than a backyard shed operation. I essentially put them in business," he said. Today, Chiu Ting (which also goes by the name Geetech) builds thickness planers, jointers and other machines for more than a dozen companies worldwide, including Bridgewood, DeWalt, Jet and Powermatic.

Business opportunities in Taiwan didn't go unnoticed by the competition. In the mid-1980s, Delta contracted with Rexion, primarily a drill-press manufacturing plant at the time, to produce a motorized miter

Most major U.S. tool companies, including Delta, DeWalt, Porter-Cable and Powermatic, now import some of their machines from Taiwan.

What to ask when buying a new tool

My workshop at home is equipped with American, Japanese and Taiwanese woodworking machines. I bought some of them before I knew enough to make a good choice. Others I carefully selected. Experience has taught me that you can't judge a tool simply by country



Delta inspectors at work—Vibration and noise level measurements are among quality control checks performed on tablesaws.

of origin. I asked a number of woodworkers and tool company representatives for some guidelines on buying tools, Taiwanese or otherwise. Here are some criteria to consider and questions to ask.

- Does the company offer a warranty for both parts and labor?
- Does the company sell parts for its tools? Even for older models?
- Does the company that makes or imports the tool service it? Are there service centers near where you live?
- Are you buying the right tool for the job? If you plan to use the tool daily, don't expect a low-cost, underpowered model to do the job.

Also, be wary of stated horsepower ratings. Amperage is a better guide to a motor's potential power. And if the motor is approved by Underwriters Laboratories, chances are the stated amperage is accurate.

Talk to people who use tools. Visit a cabinet shop or woodworker and ask for advice. Or talk to someone at a repair shop. —A.B.



Safety standards are different. Workers at many Taiwanese factories, including this painter at Kosta, aren't required to wear respirators.

saw. Nevin Craig, president of Delta, is blunt when he describes his experience with Rexion, which has become one of the largest woodworking machinery manufacturing companies in Taiwan. "We showed them (Rexion) how to make miter boxes," he said. "They have no knowledge of woodworking. It's foreign to them. They don't conceptualize what the market demands from woodworking."

To get the kind of product they wanted,



Delta invested heavily in two Taiwanese companies, Kosta and Joinery. Delta expanded and remodeled those plants, employing many of the manufacturing techniques used at the company's Tupelo, Miss., plant, which still produces the heavier, industrial woodworking tools as well as parts for some Taiwanese tools.

Much of what comes out of Taiwan is first designed in the United States. Ryobi's B-3000 tablesaw is assembled at Rexion, but engineers at the Japanese-owned company's American division in South Carolina designed it. Rexion officials tout their research and design department's capabilities, but when I walked through the company's showroom in Taichung, most of the tools on display looked like tools that were originally developed in North America, Europe or Japan.

Manpower vs. machine power

Taiwanese tool factories have a large proportion of employees doing manual labor. At a similar plant in the United States, many of the hands-on tasks would be done by machines. Automation has, however, found its way into many Taiwanese factories, especially when it comes to machining metal parts to precise tolerances.

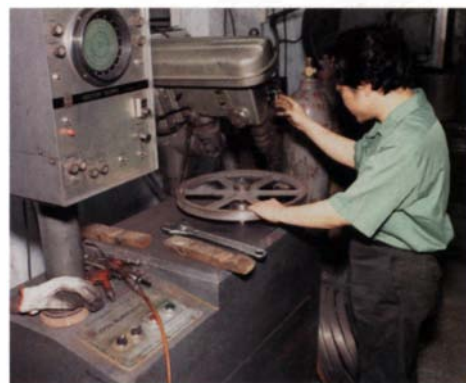
Computer numerically controlled (CNC) machines are commonly found at factories machining router bits, miter saw parts,

jointer beds, tablesaw tops and other critical components of woodworking machines. A CNC machine, which can cost tens of thousands of dollars, is programmed by an operator, then goes about its business cutting and grinding parts. These machines move parts into position and shape them from a variety of angles with multiple cutterheads. Extreme precision and consistency is possible. Twenty years ago in Taiwan, many of these milling operations were done manually, a method more prone to human error.

Modern metal-casting plants exist, too. At Shiny Pioneer Diecasting, a computer controls the vats of molten aluminum that

"The attitude in Taiwan has been that quality is the responsibility of the purchaser. But I'm working to change that."

—Clifford P. Rickmers,
Jet vice president of operations



Two ways to balance a wheel—A worker at the Grizzly factory (above) uses a modern electronic tool to balance a bandsaw wheel. The woman (left) at the Shih Hsin factory uses a mechanical method to perform the same task. Both workers use a drill press to remove small amounts of material when one section of the wheel is heavier.

shuttle overhead between huge injection molding machines. Every 10 seconds, another Delta miter saw part is pulled out of a mold and dropped into a crate to cool. Although I didn't visit iron casting plants, I was told many of them have upgraded to automated systems that produce castings that are more consistent, and hence stronger, than manually poured ones.

At the plants I visited, I didn't see any automated sheet-metal welding machines or laser-cutting tools or modern powder-coat painting systems, which are common at U.S. factories. Kosta, Delta's biggest Taiwanese partner factory, employs 180. Most employees work along conveyor-powered assembly lines using pneumatic tools to assemble tablesaws, compound miter saws and other tools. Kosta is an atypical Taiwanese tool company because it builds products for only one company, Delta.

Shih Hsin assembles tablesaws, bandsaws and dust collectors for Jet and other companies. The assembly line looks similar to Kosta's. Shih Hsin, which also goes by the name OAV (it's an acronym for the company's maxim: obligation, aggression,



Taiwanese factories may produce similar tools under different brand names. On this day, two lines of dust collectors were moving down the assembly line at Shih Hsin (also known as OAV). The blue one is a Jet.

validity), is growing rapidly. In 1996, Shih Hsin moved into its current plant on the outskirts of Taichung. Its payroll of 90 is expected to grow to 130. Safety standards here, as at most Taiwanese plants, seem lax by U.S. standards. Few workers wear eye, ear or respiratory protection. Ironically, at Shih Hsin someone had gone to great lengths to protect employees from a lesser threat: bugs. Outside, on a fence separating a farm field from the factory, hundreds of clear plastic bags filled with water had been strung up. I was told these homemade water balloons reflect the sun's glare, which repels flies. It works.

At Grizzly's partner factory, expansion

was also under way. The company currently has 100 employees. James Chen, co-owner of the plant, said he expects to hire 60 more workers in the next year. While I was there, carpenters were installing rosewood veneer panels and hardwood trim in Chen's new office. The workers were using Japanese handplanes to remove milling marks from cut molding. Their workbench doubled as a tablesaw. It was a simple plywood box held together with hinges and clasps. Underneath, an inverted circular saw had been attached to the top. A separate section of the box's top was free to move, like a sliding carriage. The carpenters were offered the use of a tablesaw, but

they declined, saying they were more comfortable using their own tools. Although their saw seemed crude, their workmanship was anything but.

Tool manufacturing in Taiwan is a cooperative process. Large plants such as Kosta, Shih Hsin and Grizzly assemble tools, but many parts are made elsewhere. No one really seems to know, but a good estimate is that several hundred businesses are devoted to making, machining and assembling woodworking tools in and around Taichung. A typical machine may contain parts from a dozen or more suppliers. Parts that look alike may actually be made by different vendors. Often these parts are not labeled, so it's impossible to track down where they came from.

Monitoring product quality

Tool company representatives say it's important to monitor Taiwanese subcontractors and assembly plants. Delta found the best way to ensure impartial inspections is to hire its own team, independent of the factories. Inspectors spend a lot of time on the road, visiting subcontractors and assembly plants. Delta's Taiwan office employs 28, which includes design engineers. Bridgewood, Grizzly, Jet and Powermatic officials said they, too, have employees in Taiwan, or send people there, to monitor the quality of their products. I was shown stacks of parts that had been rejected by inspectors at several of the factories I visited.

Lucas Chang, director of Delta's Taiwanese office, explained what it takes to get consistently good products from Taiwanese factories. "Shop owners know what's required for a product," he said. "It's a matter of how you watch over them. Taiwan businessmen are smart; they know how to make a little extra. They will build the product right as long as you *make* them build the product right."

Tool company representatives strike a common chord when explaining what it takes to get well-made machines from Taiwan. In a word, it's vigilance. "The attitude in Taiwan has been that quality is the responsibility of the purchaser," said Clifford P. Rickmers, Jet vice president of operations. "But I'm working to change that." Powermatic President George Delaney agrees. "You have to stay on top of it, or they (Taiwanese tool companies) will disappoint you." □

China: The new Taiwan

In the highly competitive woodworking tool market, manufacturers are constantly looking for ways to keep prices attractive to consumers. One way to reduce the cost of making a tool by 10% to 20% is to build it in the People's Republic of China where raw materials and labor cost less than in Taiwan. In 1996, China exported about \$24 million worth of woodworking machines to the United States, about 11% of Taiwan's total.

Many small bench grinders and drill presses, made by Delta and other companies, are made in China. Many makes of cordless drills and batteries, including those sold by Ryobi, are also being made in China. —A.B.

Anatole Burkin is an associate editor of Fine Woodworking.

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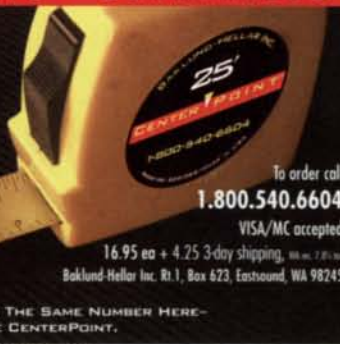
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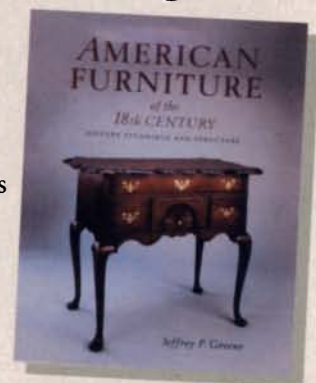
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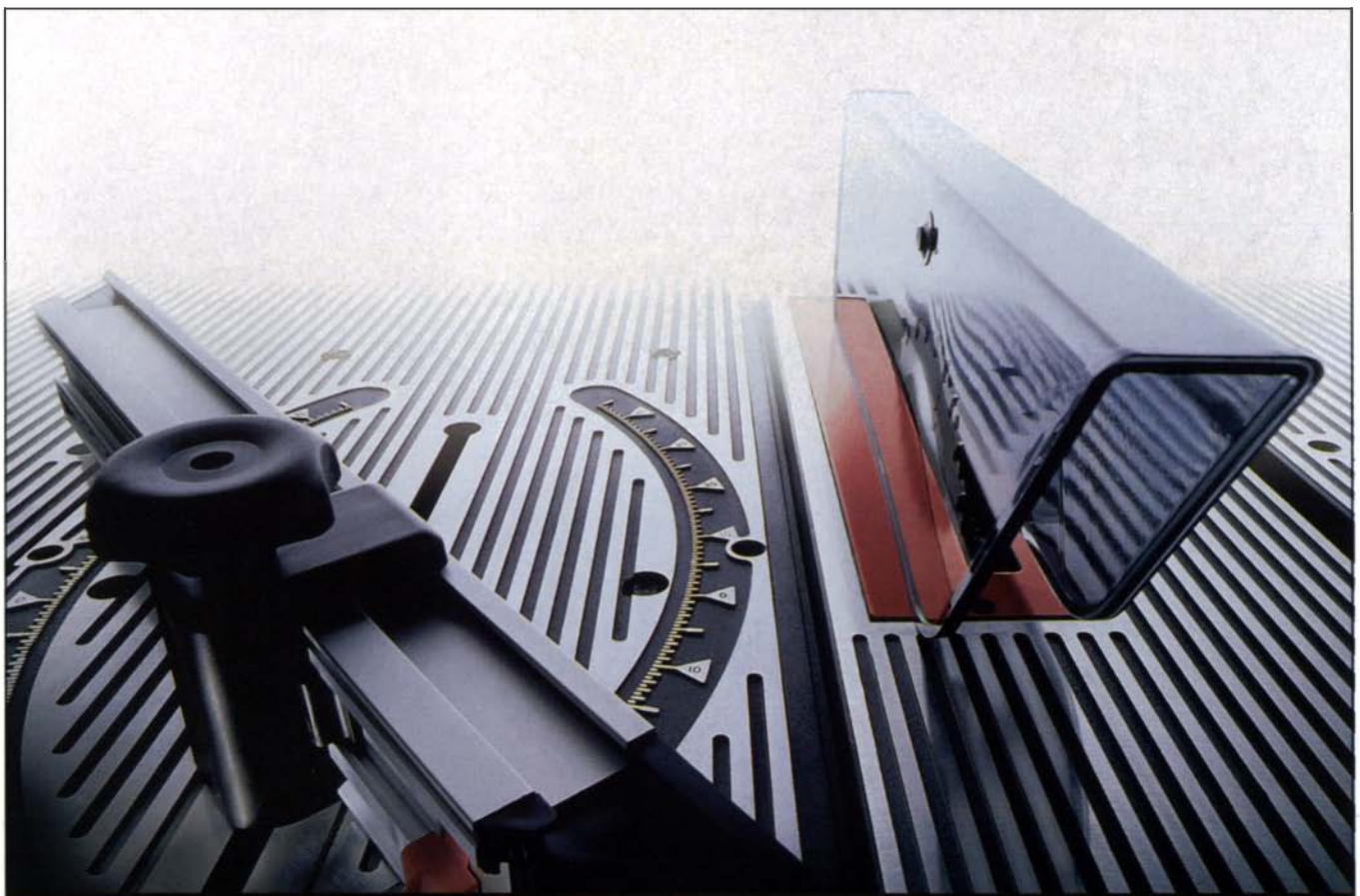
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Index to issues 122 through 127

This alphabetical index covers all the issues of *Fine Woodworking* magazine published during 1997 (FWW #122 through #127). *Fine Woodworking* magazine has published annual indexes in the January/February issues, starting with FWW #74. The Taunton Press also sells a cumulative index covering issues #1 through #120 for \$12.95. The format of each index reference is issue number:page numbers. A hyphen between page numbers means the discussion is continuous; commas between page numbers indicate an intermittent discussion. This index, like all previous indexes to *Fine Woodworking*, was prepared by Harriet Hodges, chairmaker.

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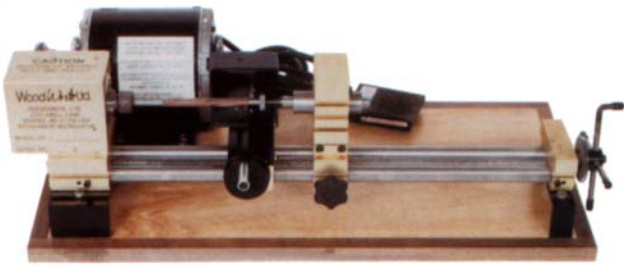
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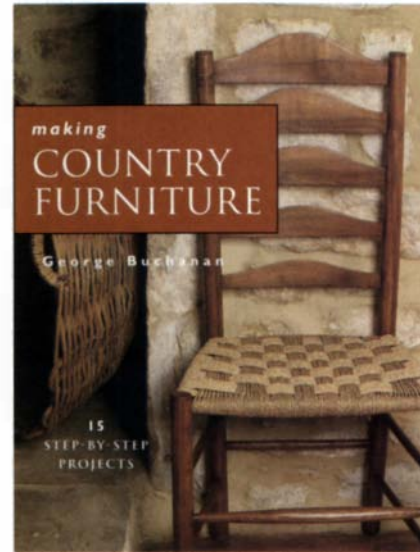
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Large stop switch comes in handy in emergencies

There's a new aftermarket safety device that solves the problem of trying to shut off a machine when your hands are busy gripping an unwieldy piece of stock. The ReiTech Easy Off Power Control is about 100 times bigger than a conventional push button and can be operated with a tap of the knee.

I installed an Easy Off on my 10-in. contractor's saw. It works as advertised: A light touch is all it takes to shut off power (see the photo at right). The recessed on-switch is easy to locate by feel, but far enough out of the way to avoid an accidental start. It excels for tablesaws but can be hooked up to other tools as well.

There are three models of switches: the EZO-CR for standard 120v machines, with or without magnetic starters; the EXO-MS for tools with magnetic starter switches; and the EZO-PP for 120v machines, which has power outage protection. I tried the latter model. With the EZO-PP, if power to the tool is interrupted, the tool won't restart suddenly when the power comes back on.

The 120v standard model sells for about \$90; the other two models for \$170. For a distributor, call ReiTech at (800) 385-6161.

—Jim Tolpin

Hard-to-miss switch—ReiTech offers a large, easy-to-reach replacement stop switch for power tools.



Screws that break, intentionally

I've sheared off the heads of more than a few screws when driving them too hard. It's not something I ever thought I'd want to do intentionally until I got my hands on a pack of Counter Snap screws. These screws are meant to break, leaving a small hole in the workpiece that can be filled with putty.

Counter Snap screws are scored slightly, about an inch below the head, and that's where they shear off. The screws must be driven through a metal guide, about 3/4 in. tall; when the head bottoms out against the


top of the guide, the screw snaps off just beneath the surface of the workpiece (see the top photo on p. 100). The concept is revolutionary, and like the guillotine, it works. I broke off a bunch of them when driving them directly into softwood, and each one snapped off perfectly, about 1/8 in. beneath the surface, leaving a hole about the size of a large finish nail. In hardwoods, the screws require a 7/64-in. pilot hole.

The manufacturer recommends these screws for multiple uses, including deck-

ing. But I discovered a problem: If the two pieces being joined aren't drawn tight before starting, the gap will remain after the screw has snapped. There is no second chance because the screw can't be backed out. Clamping the workpiece avoids the problem, but that's not always possible.

When I drove Counter Snap screws into decking, the screws lifted the boards about 1/16 in. off the joists, even when standing on the boards. Standard decking screws can cause the same lift, but I solve the problem

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by drilling a pilot hole in the decking. This way, the screw heads draw the boards down tight, eliminating the gap. You can't do that with Counter Snap screws because the heads break off.

Counter Snap screws are currently avail-

able in one size, a #8 by 3-in. screw (2 in. after the head snaps off). A package of 250 screws with a break-off fixture and driver bit costs about \$28. For more information, call the manufacturer, O'Berry Enterprises, at (800) 459-8428. —Gary Katz

Screws that break, on purpose—Counter Snap screws are driven with a jig that breaks off the head, leaving a counter-sunk screw with a small hole to fill.



DeVilbiss FinishLine spray guns are right for small shops

DeVilbiss recently introduced a line of spray guns aimed for the small shop or hobbyist. There are six guns to choose from in the FinishLine; I tried out a gravity-feed, high-volume, low-pressure (HVLP) gun (model no. FLG-631-318) and had good success in spraying shellac sealer, waterborne lacquer, solvent-borne lacquer and solvent-based varnish. The gun had trouble atomizing unthinned latex paint. But when I thinned it about 20%, it worked fine.

Because I'm used to a conventional gun, where the cup is below the spray head, I initially had some misgivings about how a gravity-feed gun would handle. I was surprised at how well-balanced and easy to maneuver this gun was.

The gun handle, fluid tip and gravity cup are made from plastic (see the photo at right). To test their durability, I soaked the fluid tip and gravity cup in lacquer thinner for 24 hours. There was no softening,

swelling or deterioration of the plastic. The metal parts are made from either polished cast aluminum or stainless steel, the same materials used in the higher-priced DeVilbiss guns.

The DeVilbiss FinishLine includes six models: two HVLP models, which require a 3 hp or larger compressor, and four conventional high-pressure guns, two of which are designed to be used with a 1.5-hp compressor. FinishLine guns sell for about \$150. —Chris Minick



Affordable spray guns—DeVilbiss FinishLine guns, which come in high-pressure and HVLP models, cost about \$150.

A drill press from Ryobi made especially for woodworkers

For considerably less money, you can buy a bench model drill press with nearly the same capacity of Ryobi's new 18½-in. drill press, more power, a larger chuck and a wider speed range. So why would you buy the Ryobi WDP 1850? Because this one is specifically designed for woodworking. Most drill presses are designed for metalworking, and we just make do.

The heart of the Ryobi is the VersaTable—a table, fence and clamp system designed to hold lumber. The machine also boasts some other features usually seen only on industrial-grade machines: variable speed (500 to 3,000 rpm) that's adjusted while the machine is running and, wonder of wonders, a work light in front of the quill, not behind it as on most drill presses, which eliminates shadows on the workpiece.

Fitted with large and easy-to-reach handles, the surprisingly rugged VersaTable can be moved left to right and front to back. The VersaTable is ideal for drilling multiple pieces with speed and accuracy. The table's tilt is limited to 45° in either direction, which means you can't clamp a long board and drill it from the end or drill compound angles unless you devise your own jigs. The table's fence is a bit cumbersome to align—mine also had a habit of binding—though once in place, it locks down securely. The VersaTable's integral clamp is a great idea, but it's stiff and cumbersome to use because it lacks a quick-release.

I also tried out Ryobi's accessory chisel-mortising attachment. It was easy to install over the quill, and the five-piece chisel-and-bit set came nicely sharpened. The manual that was supplied with the attachment, however, was a disappointment. It addressed installation, but it didn't cover use and maintenance.

Ryobi's new drill press is available discounted for about \$400. The mortising attachment with the five-piece chisel and bit set costs less than \$200. —J.T.

Jim Tolpin is a woodworker and writer in Port Townsend, Wash. Gary Katz is a carpenter in Reseda, Calif. Chris Minick is a contributing editor to Fine Woodworking.

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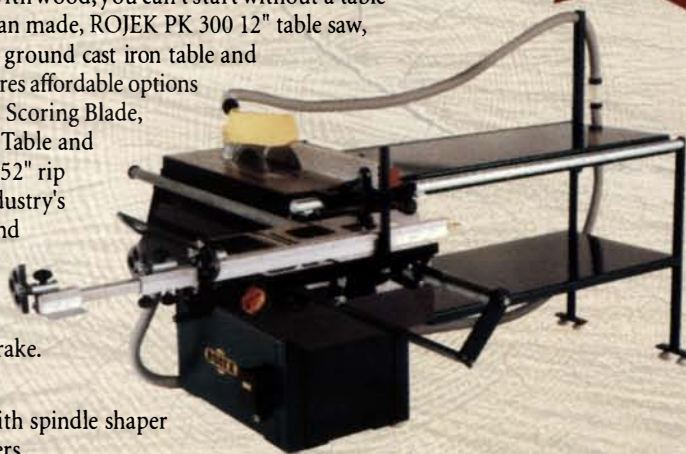
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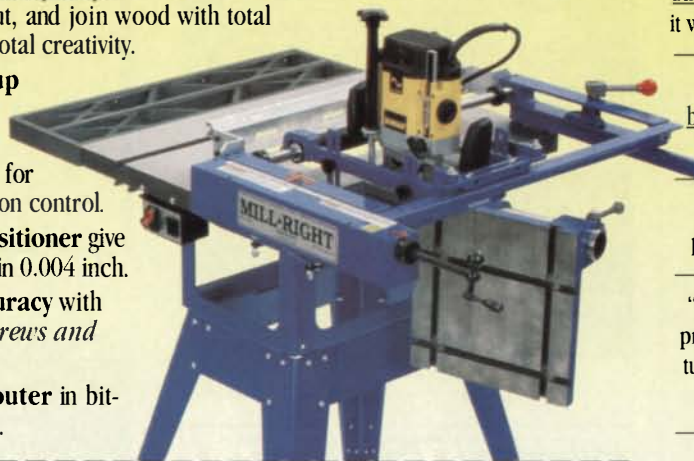
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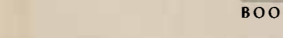
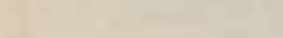
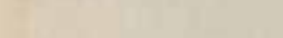
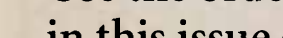
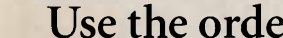
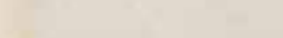
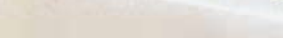
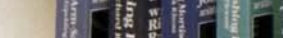
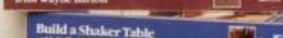
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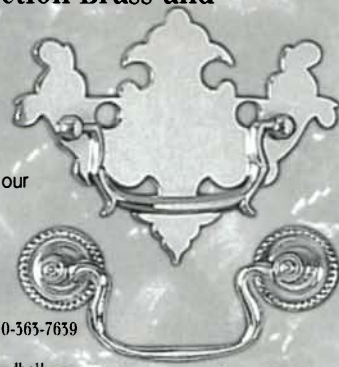
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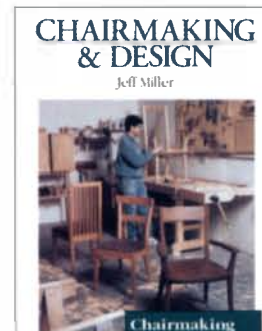
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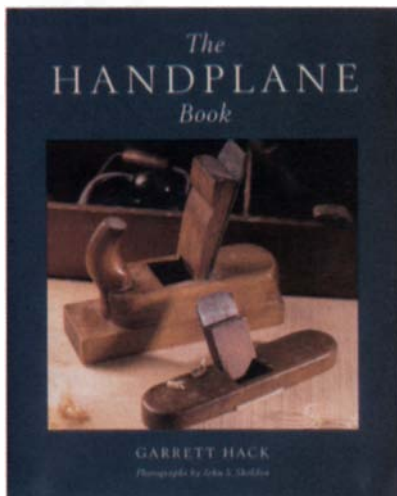
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The Handplane Book by Garrett Hack. *The Taunton Press, Newtown, Conn.* (800-888-8286); 1997. \$34.95, hardback; 264 pp.



I am a handplane fan from way back. Even though enthusiasts are naturally predisposed to like anything concerning their favorite obsession, they are often the harshest critics. So it says a lot for this book that it will appeal strongly to the connoisseur, even though it's written for the general woodworker.

Garrett Hack is a furniture maker who uses these tools. He's also a collector under their spell. The book is consequently both an excellent introduction for the potential user and filled with stunning color photos and technical drawings of the astonishingly wide variety of handplanes. Hack takes a close look at almost all the different classes: from bench and joinery planes to molding planes, scraper planes and a host of intriguing specialty planes such as curved-plow planes, core-box planes and shoe-peg planes.

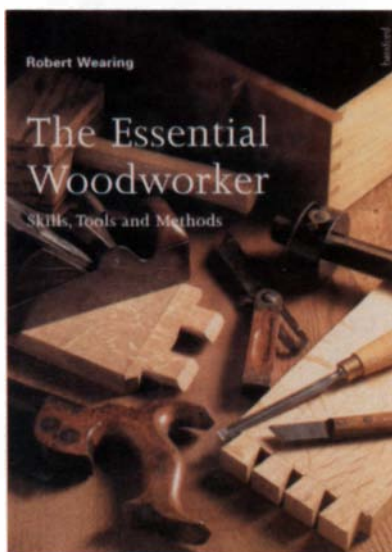
The beginning chapters investigate the plane's history, development and underlying mechanics. Chapters follow on tuning, sharpening and the fundamental techniques of using a plane. There are also chapters about old-tool auctions, tips on buying, storing and displaying planes. There's a good index, bibliography and a list of catalogs useful for the collector.

This book should be the standard manual on the subject for years to come, though some experts with strongly held opinions might argue with Hack over

some nomenclature and techniques. The clarity and completeness of the information, especially the practical advice, makes this book the next best thing to having a master at your elbow. Anyone with even the slightest appreciation of tools will treasure this volume to browse through.

—Graham Blackburn

The Essential Woodworker by Robert Wearing. *B.T. Batsford, Ltd. Distributed by Trafalgar Square, North Pomfret, Vt.* (800-423-4525); 1988. \$29.95, paperback; 160 pp.



In the woodworking workshops and classes I teach, I try to pass along the fundamentals with a good dose of encouragement and praise and, yes, some hand-holding. I've found that if beginners learn to perform simple tasks, they are likely to want to attempt more advanced operations. If they never get the simple things straight, it's only a matter of time before they quit woodworking altogether.

It was obvious to me that Wearing has taught woodworking and has come to the same conclusions. This book is woodworking thoroughly explained and abundantly illustrated. His slow and careful approach leaves nothing out. Wearing occasionally coddles his reader and goes over things a little too carefully. But I applaud him for it. Often, this is just what beginners need.

I don't know exactly how to summarize the book, however, because it lacks a

sharp focus and clear direction. It contains no measured drawings of projects to build: It's rather a long series of techniques practiced on test boards. Wearing starts with a chapter mostly about the use of a bench plane. From there, he offers chapters on making tables or stools, one on carcass construction, and ends with an excellent section on drawermaking. It's a bit confusing, but it all adds up to some very worthwhile information for beginners.

—Mario Rodriguez

The Business Manual by Frank Pollaro. *Lucky Publishing Co., East Orange, N.J.* (800-372-9169); 1997. \$49, loose-leaf binder; 98 pp.

As a group, woodworkers who spend their lives trying to make a living at their craft are not known to possess a high degree of business acumen. Having spent more years in that pursuit than I care to admit, I once joked that any woodworker who claimed to make money was either a liar or simply delusional. Pollaro may just be one of those few exceptions that prove the rule.

With this manual, Pollaro aims to share his own particular formula for success. The book is divided into three sections. The first, based on seminars that he has given, includes some amusing anecdotes from his own experience. He dishes out advice on everything from promoting an image to buying machinery and dealing with employees. In the second section, he provides and explains a number of business forms. In the third section, Pollaro reproduces his own employee manual.

Combining the roles of author and publisher, however, can have its drawbacks: This book is sorely in need of a good copy editor. Bad grammar competes with redundant text in a cry for help. But for anyone struggling with an existing woodworking business or considering starting one from scratch, this book could prove to be a useful tool.

—William Duckworth

Graham Blackburn is a furniture maker, woodworking writer and illustrator, and hand-tool enthusiast in Woodstock, N.Y. Mario Rodriguez is a contributing editor to FWW. William Duckworth is an associate editor of FWW.

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Listings of gallery shows, major woodworking fairs, lectures, workshops and exhibitions are free but are restricted to happenings of direct interest to woodworkers. Only workshops sponsored by not-for-profit groups are listed. We list events (including entry deadlines for future juried shows) that are current with the time period indicated on the cover of the magazine, with overlap when space permits. We go to press three months before the issue date of the magazine and must be notified well in advance. For example, the deadline for events to be held in March or April is January 1; for July and August, it's May 1, and so on.

ALABAMA: Meetings-Alabama Woodworkers Guild, second Thursday of each month at 7 p.m. Acton Moulding & Supply, Helena. Contact Leonard Sanders (205) 822-6876.

ALASKA: Meetings-Alaska Creative Woodworkers Association, fourth Monday of each month August to May at 7 p.m. Anchorage Museum. Arnold Geiger (907) 345-3077.

ARIZONA: Call for entries-Desert woodcarving show, Feb. 21-22. Phoenix Civic Plaza. Deadline: Feb. 20. For more info, call (602) 935-5648.

Exhibition-Turned Wood Now with John Perreault, thru Feb. 1. Arizona State University Art Museum and School of Art, Tempe. (602) 965-2787.

ARKANSAS: Meetings-Woodworker's Association of Arkansas, first Monday of each month at 7 p.m.; Central Arkansas Woodcarvers, second Tuesday at 7 p.m. and fourth Tuesday at 6:30 p.m. Arkansas Arts Center. (501) 985-1118.

Meetings-Ozark Woodturners, third Saturday of the month in Mountain Home. (870) 424-5893.

CALIFORNIA: Lecture-New Discoveries in Baltimore Painted Furniture: 1800-1840, Feb. 10. M.H. de Young Memorial Museum, Golden Gate Park, San Francisco. For more information, call (415) 499-0701.

Show-25th annual wildlife art show and carvers competition, Feb. 14-15. Holiday Inn On-The-Bay, Embarcadero, San Diego. Call Thelma Jennings (619) 486-4614.

DISTRICT OF COLUMBIA: Show-Washington, D.C. woodworking show, March 20-22. D.C. Armory, Exhibit Hall, 2001 E. Capitol St. (800) 826-8257.

FLORIDA: Meetings-South Florida Woodworking Guild, every second Monday. Constantine, Ft. Lauderdale. Call Charlie Womack (954) 561-0941 or (561) 447-8016.

Meetings-Central Florida Woodworkers Guild, second Thursday of each month. American Legion Hall, 2101 Lee Road, Orlando. Contact Bob Lamprey (407) 292-8324.

Meetings-St. Petersburg Woodcrafters Guild, fourth Thursday of each month at 7 p.m. P.V.T.I., 6100 154th Ave. N., St. Petersburg. Contact Wally Hebel (813) 898-0569.

Meetings-Capital City Woodcarvers, every Monday at 7 p.m. Senior Citizen Art Center. Lee Roberts (904) 893-4293.

Meetings-North Florida Woodturners, first Tuesday of each month. Contact John Penrod (904) 385-0608.

Meetings-Tallahassee Woodcrafters Society, second Tuesday of each month. For info, contact Walt Behrle (904) 668-6653 or Austin Tatum (904) 386-6876.

Meetings-Furniture Makers Guild, fourth Thursday of the month at Woodcraft Supply, 246 E. Semoran Blvd. Casselberry. Contact Gary West (407) 862-5677.

Show-Woodcrafters Club of Tampa's 13th annual fine furniture show, Feb. 5-16. Florida Expo Park, Tampa. Contact John Fischer (813) 645-8933.

Show-Central Florida woodworking show, Feb. 27-March 1. Florida State Fairgrounds, Special Events Center, 4800 U.S. Highway 301 N., Tampa. Call (800) 826-8257.

GEORGIA: Meetings-Woodworkers Guild of Georgia, second Monday of the month. Southern College of Technology, 1100 S. Marietta Parkway, Marietta. (404) 299-3972.

Show-Atlanta woodworking show, Feb. 20-22. Gwinnett Civic Center, 6400 Sugarloaf Parkway, Duluth. For more information, call (800) 826-8257.

IDAHO: Exhibition-Idaho Woodcarvers Guild's 11th annual competition and exhibit, March 7-8. Boise Center, 850 W. Front St., Boise. Call Doug Rose (208) 336-4312.

ILLINOIS: Meetings-Chicago Woodturners, second Tuesday of each month. York High School, Elmhurst. For more information, contact Harris Barbier (630) 964-0354.

Show-St. Louis woodworking show, Feb. 6-8. Gateway Center, One Gateway Drive, Collinsville. (800) 826-8257.

INDIANA: Show-Indianapolis woodworking show, Feb. 13-15. State Fairgrounds, Indianapolis. (800) 826-8257.

KANSAS: Show-Kansas City woodworking show, Jan. 30-Feb. 1. Overland Park International Trade Center. For more information, call (800) 826-8257.

KENTUCKY: Meetings-Kyana Woodcrafters, first Thursday of each month. Bethel United Church of Christ, 4004 Shelbyville Road, Louisville. Ray Thornton (502) 499-1388.

MAINE: Meetings-Guild of Maine Woodworkers, first Wednesday of each month. Call (800) 805-5100.

MARYLAND: Show-Baltimore woodworking show, Jan. 23-25. State Fair Cow Palace, 200 York Road, Timonium. Call (800) 826-8257.

Workshop-Make a Chair from a Tree, Feb. 16-21. Contact John Alexander (410) 685-4375.

Exhibition-Furn-Art-Ture: The Chair, Feb. 14-April 10. Meredith Gallery, 805 N. Charles St., Baltimore. Call Terry Heffner (410) 837-3575.

MASSACHUSETTS: Classes-Woodworking classes, Boston Center for Adult Education, 5 Commonwealth Ave., Boston. (617) 267-4430.

Classes-Woodworking, carving, Horizons New England Craft Program, 108 N. Main St., Sunderland. (413) 665-0300.

Classes-Woodworking classes, year-round. North Bennet Street School, 39 N. Bennet St., Boston. (617) 227-0155.

Workshop-19th annual wood identification workshop,



Expressions in Wood—Sixty-one wood objects, including this vessel by Dan Kvitka, on display at New York City's American Craft Museum illustrate the evolution of one couple's collection from functionalism to sculpture.

Jan. 13-16. University of Massachusetts, Amherst. For more information, contact Alice Szlosek (413) 545-2484.

Workshop-Woodturning with Giles Gilson, Jan. 17. Worcester Center for Crafts, 25 Sagamore Road, Worcester, 01605. (508) 753-8183.

MICHIGAN: Meetings-Metro Carvers of Michigan, second Tuesday of each month (except July and August) at 7:30 p.m. Helen Keller High School, 1505 N. Campbell Road, Royal Oak. (810) 771-1040.

Show-Turned Wood group show, Jan. 17-Feb. 28. Sybaris Gallery, 202 E. Third St., Royal Oak. (248) 544-3388.

MINNESOTA: Meetings-Minnesota Woodworkers Guild, third Tuesday of each month at 7:15 p.m. Demonstrations each month. Contact Richard Gotz (612) 544-7278.

MISSOURI: Meetings-Kansas City Woodworkers Guild, third Wednesday of each month. Eugene (816) 452-6379.

Meetings-St. Louis Woodworker's Guild, third Thursday of the month at 7 p.m. Woodcraft Store, Olive Blvd. Contact Barney Davey (314) 225-2357.

Class-Wood furniture design, Ron Diefenbacher, Jan. 13-April 28. Washington University Fine Arts Institute, St. Louis. For more information, call (314) 935-4643.

NEBRASKA: Meetings-Omaha Woodworkers Guild, third Tuesday of each month at 7 p.m. Libert Christian Center, 60th and L St., Omaha. Call John Cahill (402) 334-5550.

NEW JERSEY: Meetings-Central Jersey Woodworkers Association, second Wednesday of the month (except July and August) at 7 p.m. Old Brick Reformed Church, Newman Springs Road, Marlboro. (732) 576-3052.

Show-North Jersey woodworking show, Jan. 9-11. Garden State Exhibit Center, 50 Atrium Dr., Somerset. (800) 826-8257.

NEW MEXICO: Exhibition-Third Annual Santa Fe Furniture Expo, Jan. 16-18. Phoenix Civic Plaza, Hall D, Phoenix. (800) 299-9886.

NEW YORK: Meetings and classes-New York Woodturners Assoc. meets bi-monthly. YWCA, 610 Lexington Ave. (53rd St.), New York City. Howard Alalouf (914) 337-0226.

Meetings-Long Island Woodworker's Club, first Wednesday of the month September to June at 7:30 p.m. Brush Barn, 211 Jericho Turnpike, Smithtown. (516) 360-1216.

Classes-Traditional and contemporary woodworking. The Craft Students League at the YWCA, 610 Lexington Ave., New York City. For more information, call (212) 735-9731.

Call for entries-Woodstock-New Paltz arts and crafts fairs. Spring show, May 23-25, fall show, Sept. 5-7. Deadline for both: Feb. 1. Call Scott Rubinstein (914) 246-3414.

Show-Expressions in Wood: collection of Anita and Ron Wornick. Works in wood and the evolution of the art form from functional to sculptural. Jan. 27-March 22. American Craft Museum, 40 W. 53rd St., New York City. (212) 956-3535.

NORTH CAROLINA: Meetings-North Carolina Woodturners, second Saturday of each month. (704) 890-4451.

Workshops-Country Workshops winter classes. Contact Drew Langsner, 90 Mill Creek Road, Marshall, 28753.

Show-Charlotte woodworking show, March 6-8. Merchandise Mart, 2500 E. Independence Blvd. (800) 826-8257.

OHIO: Meetings-Cincinnati Woodworking Club, second Saturday of January, March, May, September and November at 9 a.m. Reading High School, Reading. Write the club at 10125 Montgomery, Cincinnati, 45242.

Meetings-Woodworkers of Central Ohio, second Saturday of November, February, April and June. For more info, call Chuck (614) 457-3704.

Workshop-Continuous Armchairs, Feb. 22-28. Lenox Workshops, 1192 Webster Rd., Jefferson, 44047. (440) 576-0311.

Show-Greater Columbus woodworking show, Jan. 16-18. Expo Center/Fairgrounds, 717 E. 17th Ave. (800) 826-8257.

OREGON: Meetings-Cascade Woodturner's Association, every third Thursday. (360) 834-6325.

Meetings-Guild of Oregon Woodworkers, every third Wednesday (except December) at 7 p.m. Call (503) 492-1515.

PENNSYLVANIA: Show-Mid-Atlantic woodcarving show and competition, April 4-5. Pennsylvania State Abington Campus Gym, Abington.

Show-Harrisburg woodworking show, March 27-29. Farm Show Complex, Cameron & Maclay Streets. (800) 826-8257.

Show-Mid-Atlantic woodworking & furniture show, April 3-4. Ft. Washington Expo Center. Keith Eidson (704) 459-9894.

TENNESSEE: Workshops-Arrowmont School of Arts and Crafts, Gatlinburg. For more info, call (423) 436-5860.

Classes-Lumber selection and more. Tennessee Valley Authority, 17 Ridgeway Road, Norris. (615) 632-1656.

Show-Nashville woodworking show, March 13-15. Nashville Convention Center, 601 Commerce St. (800) 826-8257.

TEXAS: Meetings-Woodturners of North Texas, last Thursday of each month at 7:30 p.m. Paxton Beautiful Woods Store, 1601 W. Berry St., Fort Worth. (817) 927-0611.

Show-Rio Grande Valley Woodcarvers show, Jan. 16-17. McAllen Civic Center. Dorothy Chapapas (956) 581-2448.

Meetings-North Texas Woodworker's Association, third Tuesday of each month. Contact Bruce May (972) 271-0125.

WASHINGTON: Meetings-Northwest Corner Woodworkers Association, first Tuesday of each month. For more info, call Mike Hess (360) 650-0964.

Workshop-Planemaking, Jan. 24. Center for Wooden Boats, 1010 Valley St., Seattle. (206) 382-2628.

CANADA: Call for entries-Vancouver Island Woodworkers' Guild: Explorations in Wood 1998, March 14-May 30. Deadline: Feb. 1. Maritime Museum of British Columbia, Victoria. For more information, call (250) 592-4938.

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Driftwood treasure from a friendly hermit

A section of Vineyard Sound off the southern coast of Massachusetts is known as The Graveyard for the many boats that have been dashed upon Sows and Pigs Reef. In the 1940s, a vessel laden with exotic hardwood added her carcass to those already on the bottom.

I didn't know about the ship when, four decades later, my wife and I worked as caretakers on a nearby island. We brought milk and eggs from our farm to Will, a friendly old hermit on neighboring Cuttyhunk, the only public island in the chain. Before moving back to the mainland, I visited Will to say good-bye. He gave me a pottery vase he'd thrown out of island clay and then motioned me silently toward the back of his house. Knowing my interest in wood, he pulled two log chunks from under his porch. The logs looked as if they'd been charred (see the photo above).

"Ebony," Will said as he handed me one. Surprised by its weight, I let the chunk slip out of my hands. It landed painfully on my instep. Will told me the story of the boat filled with wood breaking up on the reef.

Logs like these washed up on Cuttyhunk's south shore from time to time. Will told me to take the logs home and made me promise to make something "pretty."

We moved back to the mainland a short while later with my chunks of ebony in tow. They sat high and dry in my Rhode Island workshop and later moved with us to Connecticut. I finally decided to try carving one of the logs into a piece of sculpture. The logs are severely checked with an interesting bumpy texture, the result, no doubt, of being bounced along the rocky bottom of Vineyard Sound. I plan to incorporate that texture into the sculpture.

I also thought about making a few ebony bungs to accent a wide-board oak floor I recently installed. So I ran a small piece over a jointer and for the first time saw the beautiful, subtle deep purples, blacks and browns that have been waiting patiently for a half century to be exposed. Maybe I'll hold off on the plugs. I'm not sure I want to turn this piece of history into Swiss cheese.

—Roe Osborn, associate editor,
Fine Homebuilding magazine

American Association of Woodturners

Woodturners love sharing their work and techniques with others, even their competitors. A great place to see this happen is at the annual American Association of Woodturners (AAW) symposium, which I attended in July. Texas woodturner James Johnson explained the fraternity this way: "Woodturning is a solitary activity. Once a year these cave dwellers come out into the light and are delighted to be with other cave dwellers who share their love of woodturning."

The 11th annual event, held in San Antonio, Texas, included seminars and displays of products (see the photos below and on p. 118). Vendors showed off the latest tools, which included some made with unusual blends of steels to increase hardness. Vendors of exotic woods did a bustling business. You could buy whole logs or have a chunk chainsawed to your specifications right on the spot.

Powermatic and Oneway displayed their latest electronic, variable-speed wood lathes. Both companies are using three-phase motors equipped with frequency inverters in their machines. That's another way of saying you can plug these machines



Turners display their best efforts—A bowl by Mike Lee was among the turnings displayed at the woodturners' show.

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10"x40Tx1/8" or 3/32"	\$156	\$119	\$107	\$95
30T 1/8" or 3/32"	\$135	\$99	\$89	\$79
9"x40T	\$146	\$109	\$98	\$87
30T	\$125	\$99	\$89	\$79
*8-1/4"x40Tx3/32"	\$136	\$99	\$89	\$79
8"x40T 3/32"	\$136	\$99	\$89	\$79
30T	\$115	\$89	\$80	\$71
7-1/4"x30T 3/32"	\$112	\$69	\$62	\$55
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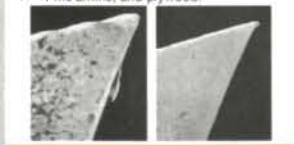
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9" x 80T x 1/8" & 3/32"K	\$207	\$179	14" x 80T x 1"	\$266	\$226
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Woodturners trade secrets—At the American Association of Woodturners annual symposium, Alan Lacer showed how to make your own turning tools.

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Attendees and demonstrators alike brought their works for an open display called the Instant Gallery. Everything from original fine artwork to simple spinning toy tops were exhibited.

Next year's woodturners' symposium will be held in Akron, Ohio, June 12-14. For information, contact AAW at 3200 Lexington Ave., Shoreview, MN, 55126; (612) 484-9094. Or you can send an e-mail message (aaw@compuserve.com).

—Robert M. Vaughan, contributing editor

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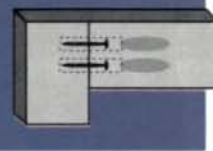
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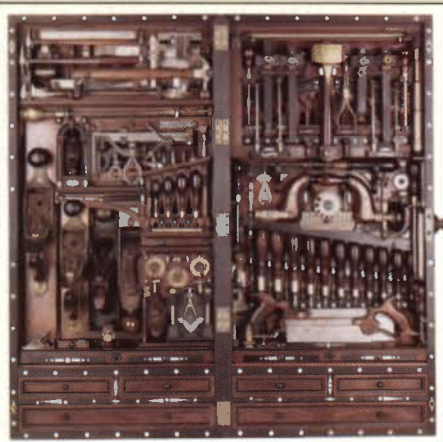


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The Collapsible Infant Seat

Let me tell a story on my friend Ignatius. It's been 15 years, after all, and I've altered his name beyond recognition in case he's trying to forget.

He saw it displayed in the window of an antique store: an old, table-mounted folding infant seat made of oak. It looked like something out of

H.G. Wells—a Victorian cockpit seat for a half-scale wooden moon rocket. It clamped—most ingeniously—by weight alone to a table edge; no legs down to the floor were needed. Ignatius' wife was expecting their first child. He bought it on the spot.

His bride took one look and sputtered loud vetoes. "No, and furthermore, never," was the gist of her end of the discussion.

Perhaps it was asking too much of her, he thought, to put her faith in a wooden infant seat without so much as a test. Because the antique seat had been built long before Underwriters Laboratories began testing buggy whips, it was Iggy's duty to test it.

Fortunately, a test subject of the right size and weight wandered into his shop. As cats went, Bilbo was a plump but dignified family companion feline. After Iggy clamped the seat on the workbench, he installed Bilbo in the hanging seat. The chair held, even as the fretting feline multiplied his feet by a factor of 10 and, finally, escaped. Iggy attempted to mount the chair on the kitchen table and, thereby, found a big hitch: The seat would fit at the head of the table, but not on the side because the bottom supporting arms hit the apron.

"Well, that won't work," said a relieved mother-to-be. "We can't put our baby at the head of the table." Iggy inquired why the heck not. The head of the table was the perfect place for the seat.

"No, Ignatius," she replied, "when that ancient, fragile contraption buckles or turns to dust, we'll have to *leap* around the table." *Contraption?* Iggy thought, returning downstairs to mull and contemplate. He saw it as a beautiful piece of antique furniture; his wife saw only an ancient and dangerous gizmo. It was clear that heroic doses of logic were lost on her.

But a good woodworker never gives up. Ignatius had one remaining chance to win her confidence. He would build a brand new identical copy of the infant seat out of the strongest wood he could find.

Some extra biographical data on Ignatius: Though a skilled woodworker, the operation of moving parts boggled him. The ability to visualize dynamic spatial relationships is a gift, not a skill, and one Iggy did not have. The chair had no fewer than 10 moving parts, supremely complicated. Nevertheless, Ignatius disassembled it and made duplicates of every part. Then he tried to put them together, and failed.

He examined, measured, partially assembled and completely disassembled both seats a dozen times. He'd often get as many as nine parts together, but find no way to wedge the tenth one in. He began to dream about odd and Escher-like ways of putting them together. It was no longer just a child seat, but a problem in dynamic, trapezoidal topology, a hellish calculus executed in Tinkertoys. Eventually, after weeks of prayer and fasting, he assembled the replicated seat.

The child was born, a healthy 8-lb. boy, and Iggy proudly produced his new antique infant seat. His wife saw only a new basket of the same old cobras, into which her idiotic co-parent wanted to drop their firstborn. But when he demonstrated the chair, by means of Bilbo the Reluctant Infant Surrogate, and the contraption failed to explode immediately, her "No way" became "Maybe I'll think about it."

Months passed. The day came when Iggy decided that his son was about the right size to eat solid food at the table: Thanksgiving. His whole family, nuclear, extended and in-laws gathered for supper, heads bowed. And there was little Iggy Jr., suspended at the end of the table in his antique folding infant seat, proudly smearing mashed potatoes into his face. It was a scene of much harmony and tranquility.

There is much to be said for the beauty of old child-dining inventions made of wood. By contrast, today's modern child seat is a fairly ugly piece of plastic and aluminum, and it won't even fold. But by golly, it's been tested and approved. It will not fail after 10 minutes of operation, in the middle of a Thanksgiving dinner, its arms suddenly buckling. It will not vertically delete one's only male heir from the table and cause relatives to leap over the table, the turkey and the gravy, to save him. Modern high chairs just don't do that.

Iggy Jr. landed safe but shaken on the soft body of Bilbo the Feline Fallbreaker who was eating turkey crumbs under the chair. All returned to the table to finish the meal—all except the antique folding infant seat, which spent the evening out-of-doors.

Shortly thereafter, I bought a lot of Ignatius' woodworking tools. At his wife's suggestion, he was getting out of furniture design.

Jeff Taylor is the author of Tools of the Trade: The Art and Craft of Carpentry, Chronicle Books (1996).

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Over the top, you say? This is the toned-down version. After spending a week researching ancient Egyptian furniture and artifacts and then some 600 hours pulling out every conceivable stop in building the desk in these photos, Matthew Smith and Robert Larson of Woodleaf, in Raleigh, N.C., are still rueful that their original color scheme of turquoise, rust, opal, gold and black was overruled in favor of a more subdued copper leaf and paint finish. The zippier colors would have been more in keeping with the Egyptian originals they studied, which sported ivory veneers, gold-leafing and inlays of silver, gold, colored glass and gemstones. In the tradition of the Pharaonic armies of craftsmen, Woodleaf's desk involved a team of artisans in addition to Smith and Larson: Paul Rolfe, of the Raleigh Carving Co., Vincent Puszynski, a local finisher, Earl Hines, a lapidary, and interior designer Angela Bradfield.



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