

SNEAK PREVIEW

■ Over 25 New Tools ■ Special Woodworking Edition ■

# WORKBENCH<sup>®</sup>

THE ORIGINAL HOME WOODWORKING AND IMPROVEMENT MAGAZINE

❖ Improve Your Shop – Build A  
**ROLLING TOOL BOX**

❖ The Perfect Holiday Gift:  
**HEIRLOOM CHEST  
PROJECT**

❖ Complete Guide To  
**REFINISHING WOOD  
FLOORS**

❖ Step-By-Step Plans –  
**CRAFTSMAN-STYLE  
MODULAR BOOKCASE**

November/December 1998/\$3.95  
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Fire and water combine to make the steam that powers this mighty sawmill, still going strong after a century of faithful service.



# On The Hunt

Smoke! Flames lickin' the nylon carpet. The smell of rubber too hot to handle. That's what was coming from my shoes after racing six to ten miles every day for eight days in a row covering the two biggest woodworking shows of the year. How do I know we beat feet for at least six miles a day? Out of curiosity, Assistant Editor Dave Stone wore a pedometer, and that's what he clocked. But harder on us than the miles was enduring excruciatingly painful amounts of hype and glitz (if I hear the word "ultimate" or the phrase "for the new millenium" one more time, I think I'll explode).



So now you'll be the first on your block to see the latest and greatest new tools, hardware, and other woodworking products that really matter. I'm sorry you can't get your hands on this stuff right now, like we did, but the article on page 45 is the next best thing. I'll wager at least one or two of our choices will have you reaching for the phone and your wallet.

Speaking of new things, I decided some time ago to target this issue as our Special Woodworking Edition.

The timing of the tool shows, and the fact that most of us hole up in the shop as the holidays near, led me to devote most of this issue to woodworking projects. There are three meaty plans here, and building any one of them will challenge your craftsmanship and give you some new bragging rights.

But just so you don't suffer complete withdrawal from home improvement, you'll find stories on sanding wood floors and choosing the right floor finish (pages 26 and 30). A lot of this information came from my firsthand experience with "The Beast," as the guy at the rental center called the floor sander he rented to me. It's still woodworking, and as long as you don't get too ambitious you can complete a floor in four to five days — in plenty of time before holiday guests arrive. Besides, refinished floors will give you more to impress the relatives with — charm and wit aren't always enough!

Finally, I'm issuing a Tips alert. I assure you, your fellow *Workbench* readers will love to read about your shortcuts and ideas, so don't be shy about sending us your tips. And besides cash and a cool *Workbench* hat, we're sweetening the pot. The Stanley Works is now sponsoring one tip in each issue, and they'll send an award to readers who submit the winning tips. Take a look at page 15 for details, but remember, you can't win if you don't play.

*Chris*



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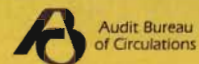
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# Questions & Answers

## Flexible Mortar Helps Paved Porch Resist Freeze-Thaw

**Q** *The paving job on the porch in the July/August issue looks very nice, but will it stand up to the freeze-thaw conditions we have in northern Ohio? Would a foam or cellular filler strip between the brick and vertical wood siding be advisable?*

*Robert Wilging  
Avon Lake, OH*

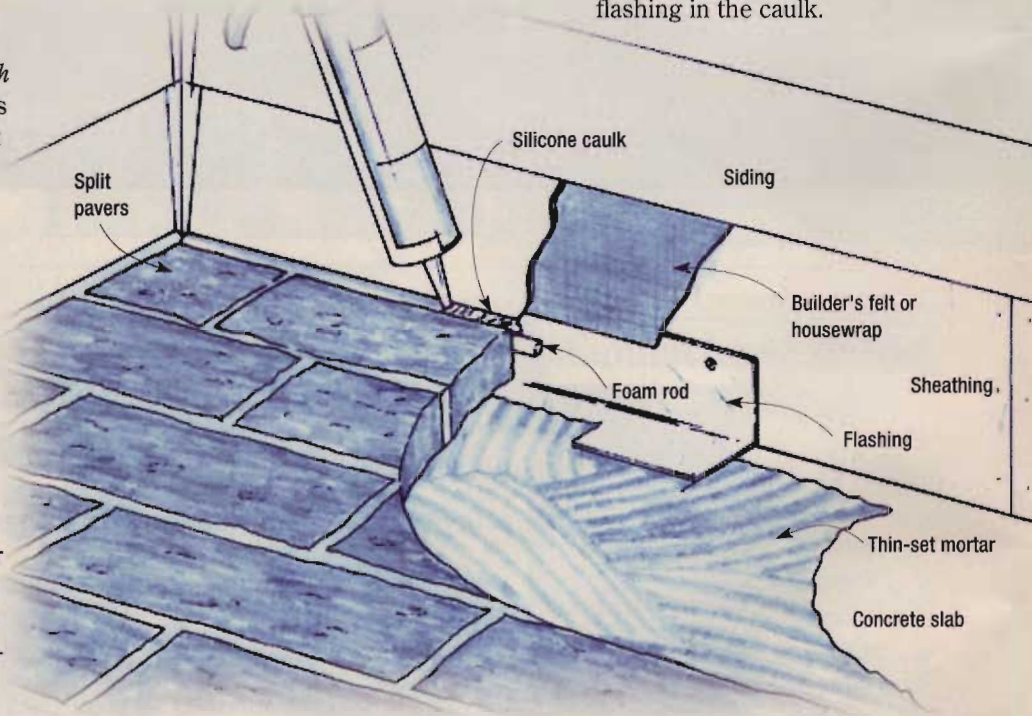
As for the junction between the brick and house, the proper treatment depends on the type of joint. For a brick-to-masonry joint, inserting a round, closed-cell foam caulk strip into the gap works well. To ensure a watertight seal, apply a bead of silicone along both sides of the foam strip and at the exposed ends.

If the brick abuts wood siding, you need to divert the water with flashing. Ideally, the flashing would be bedded in the concrete substrate and shaped so it fits under the siding with a lip that extends over the brick. If the brick is already installed (as shown below), apply sealant or an asphaltic caulk to the joint, then bed the flashing in the caulk.

**A** The porch that was featured in "A Grand Entrance" (*Workbench* July/August 1998) is on a home in Des Moines, Iowa where the winters are at least as bitter as those in Ohio. So we planned the installation to stand up to such conditions.

As indicated in the article, we mixed our thin-set mortar using a latex additive instead of water. The additive not only improves the bonding capabilities of the mortar, it also makes it somewhat flexible so it can better withstand freeze-thaw cycles.

We also cleaned the concrete thoroughly before laying the brick. Once it was down, we applied a sealer prior to grouting and again after the grout was cleaned up. As an added precaution, we'd follow up with annual applications of sealer.

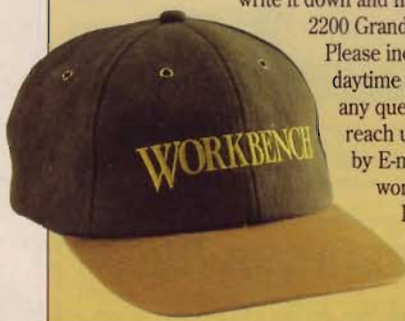


## SHARE YOUR QUESTIONS!

If you have a question about woodworking or home improvement, write it down and mail it to WORKBENCH Q&A, 2200 Grand Ave., Des Moines, IA 50312.

Please include your name, address and daytime phone number in case we have any questions for you. You can also reach us via Fax at (515) 283-2003 or by E-mail message at [workbench@workbenchmag.com](mailto:workbench@workbenchmag.com).

If we publish your question, we'll send you one of our handsome and fashionable *Workbench* caps.



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## Workshop Plans

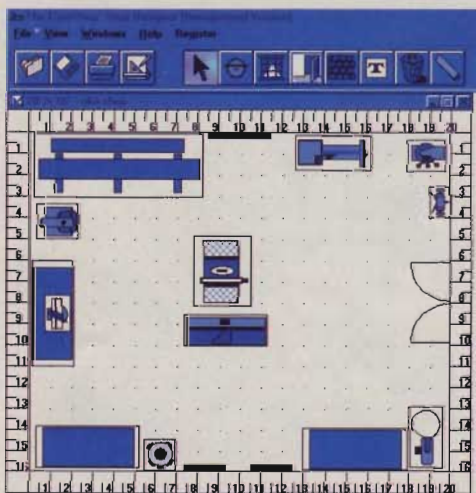
**Q** We are building an addition to our home that will include an area for a workshop. I'm searching for pictures or plans for a good workshop — any suggestions?

David Woodburn  
Heber, AZ

**A** There are a number of books of all types and sizes. Some of the better ones we've seen are *The Workshop Book* by Scott Landis, *Setting Up Your Own Workshop* by Bill Stankus, *The Workshop* by Jim Kingshott and *Fine Woodworking on Small Workshop*, a collection of shop setup ideas from past issues.

If you have Internet access, you may want to check out a "shareware" program called *The EasyShop: Shop Designer* (Information Architects at [www.infoarchitects.com](http://www.infoarchitects.com)). This Windows compatible program lets you establish the perimeter walls of your shop, then drop in scaled icons for most major categories of woodworking tools, as well as benches and lumber racks. You can place the icons in the shop and move them around on screen — much easier than rearranging the real things. It even gives you the dust collection requirements for each piece of equipment and lets you run piping.

You can download a working trial version of *Shop Designer* for free, but if you find you use it, a licensed version will cost \$19.95 plus shipping.

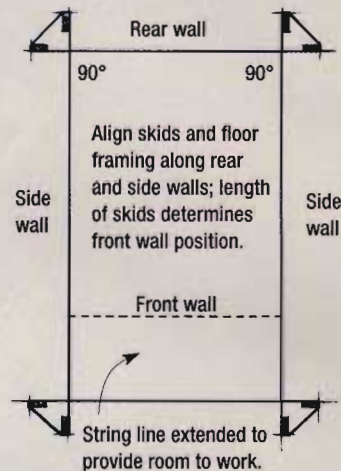


## Garden Shed Stringing Stretched

**Q** The article on the garden shed seems to be straightforward, but Figures 3 and 4 show your carpenter standing inside the stringline. The string guideline diagram shows the stringline the same size as the shed. Did I miss something?

Robert Sneed  
Maitland, FL

**A** You've got sharp eyes, Robert. In the diagram (page 27, *Workbench*, May/June 1998), we felt it was important to show the Stringing Guidelines the same dimensions as the shed. During the actual construction however, we staked out the stringline somewhat longer than the shed for convenience. It still gave us the critical placement of the outer skids as well as the location of the shed's rear wall, but gave us room to maneuver the platform components



without snagging the string and having to restring the whole works. We didn't mean to confuse the issue by showing two apparently conflicting approaches to establishing the shed's location. It's one of those situations where you adapt on site to make the task at hand easier.

## Is The Board Warped or Bowed?

**Q** When I bought some treated lumber recently, the yard man and I disagreed on whether a particular board was warped or bowed. What is the correct term when a board curves along the edge grain?

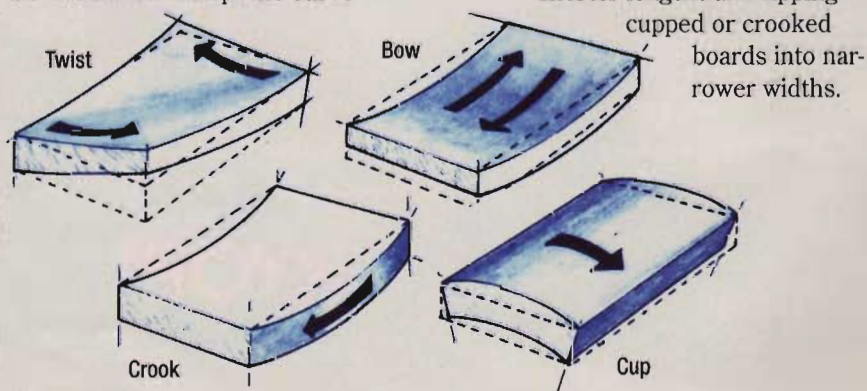
Bob Talbot  
Pasco, WA

**A** The situation you describe is commonly referred to as crook. Variations in grain cause one edge to shrink more than the other. Bow is similar except the curve

occurs on the face of the board when the grain in one face shrinks more than the grain in the other face.

Other terms you may hear associated with warp are cup and twist. A cupped board will curve across its width. As the name implies, twist is a spiral curve along the length of a board, sort of a combination of cupping and bowing.

If you have to use warped lumber, you can minimize the effects by cutting bowed or twisted lumber into shorter lengths and ripping cupped or crooked boards into narrower widths.



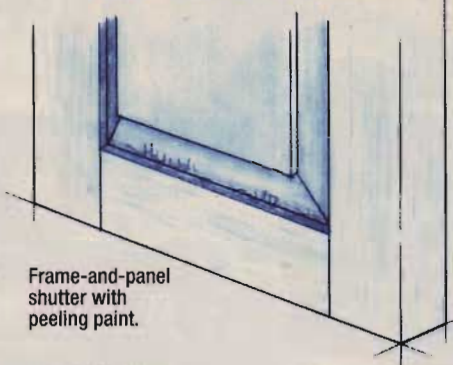
## Paint Raised Panels Prior to Assembly

**Q** After making cedar raised panel shutters, I noticed the area where the panel meets the rails and stiles has cracked and started to peel. I know the panel is going to move but how can I keep paint on that area?

Todd Burgess  
Lansing, MI

**A** Since the raised panels float in a groove cut in the rails and stiles and aren't glued in, it's best to paint them before you assemble the shutters. In fact, I've even masked off the areas where the rails and stiles are glued together and applied a coat of primer or exterior oil finish to the grooves as well.

In your case, you can try to remove a rail and slide the panel out. If the joints are too tight and you risk destroying the joint, consider routing around the perimeter of the frame

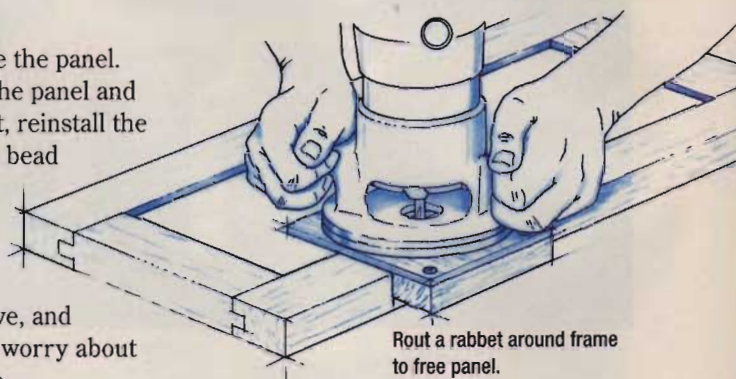


using an edge guide to cut a rabbet so you can remove the panel. Once you've painted the panel and the faces of the rabbet, reinstall the panel and apply a thin bead of silicone to retaining strips and tack them in place. The retainers will still allow the panel to move, and you shouldn't have to worry about peeling paint anymore.

Frame material routed away so panel can be removed for painting.



Retaining strip tacked in place with wire brads.



## Reclaim Attic with Circular Stairs

**Q** I'd like to put the attic space in my house to good use as a home office. The only access is via a set of pulldown, folding stairs. I want something more permanent, but would hate to lose a closet to install a regular stairway. Any suggestions?

R.L. Jones  
Atlanta, GA

**A** One space-saving solution would be to install a spiral staircase. Most take up a small amount space — they come as small as 36" in diameter — and require only minor modifications to the existing attic floor framing.

Spiral staircase kits are available in styles to fit most home decors. To fit a particular floor-to-floor height, you can usually buy just the number of treads needed to fill the space. The Iron Shop (1-800-523-7427) offers kits in a variety of styles and materials.

## Tricks for Plumbing Tapered Post

**Q** I had to replace two straight, square posts on my front porch with two round, tapered ones. How do you plumb a tapered post?

Bob Robinson  
Alva, FL

**A** You can use a regular level to plumb the post — you just need to shim the top end of the level to the correct slope. Slope in this case is the amount that the post tapers over a given length.

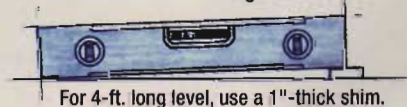
Start by measuring the diameter of the post at each end, and divide the diameter in half to determine the radius. Subtract the smaller measurement from the larger one. Say your post tapers evenly from a 12"-diameter to an 8"-diameter and is 96" long. Along one side of the post, that's 2" of taper in 8 ft., or 1/4" of taper for every foot of post.

If you have a 24" level, cut a small shim block 1/2"-thick and attach it to

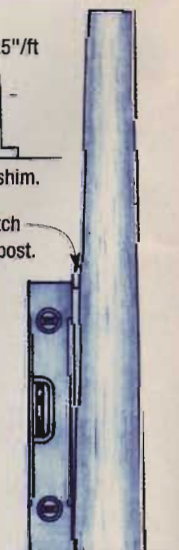
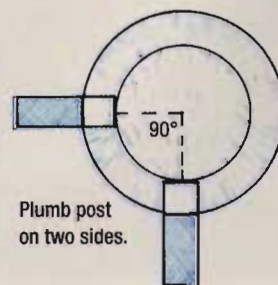
your level with double-face tape. When you place the level against the post, the shim will compensate for the taper and you'll be able to plumb the post the same as if it were square.

$$\text{Slope} = \frac{\text{Bottom radius} - \text{top radius}}{\text{length}}$$

$$\text{Slope} = \frac{6'' - 4''}{8''} \text{ or } .25''/\text{ft}$$



Shim level to match slope of tapered post.



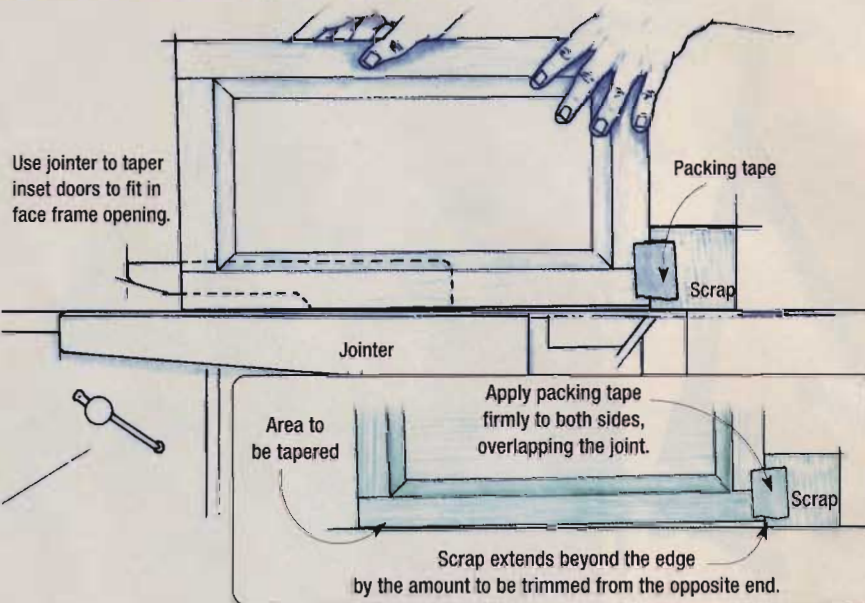
# Tips & Techniques

## Packing Tape Simplifies Jointing Tapers

If you've ever built a project with inset doors, then it's no mystery why most cabinets and storage furniture come with overlay doors. Fitting inset doors can be a real pain. But a buffet I built recently called for inset doors and it led me to find an easier way to fit them to the face frame opening.

The doors I was fitting needed a slight taper cut the length of one stile, removing  $\frac{1}{16}$ " at one end and tapering to zero at the other end. I ruled out using my table saw because I wasn't confident I could make a taper cut that fine. Besides, my jointer would give me a finished edge. But how to set it up for the correct taper?

Looking around my shop, I spied a roll of packing tape and I had my solution. I positioned a 2"-wide piece of scrap against the "zero" end of the door and let it extend beyond the edge  $\frac{1}{16}$ ", the amount I needed to remove. Then I lapped the joint on both sides with packing tape. You must make



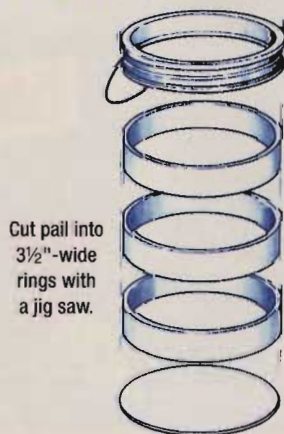
sure the scrap is the same thickness as the door. The scrap also must be butted tightly against the door and the tape firmly adhered to both pieces.

Once the scrap was firmly attached, I ran the door over the jointer until I'd

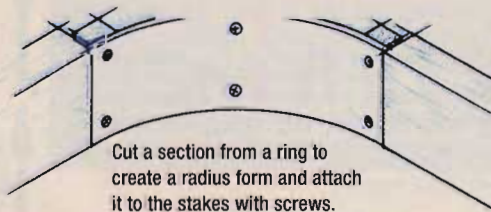
trimmed the scrap flush with the edge of the door. The tape doesn't interfere with the jointer fence, and it peels off easily once the taper is cut.

*Kerry Gibson*  
Workbench staff

## Use Plastic Pails for Concrete Forms



Cut pail into  $3\frac{1}{2}$ "-wide rings with a jig saw.



Cut a section from a ring to create a radius form and attach it to the stakes with screws.

A good way to make round corners in concrete forms is to cut rings from a five-gallon plastic pail — the kind joint compound comes in. These plastic forms work on inside or outside corners.

Layout the rings with a felt-tip marker, then cut them with a jig saw. I make a vertical cut to "open" each ring, then cut them to length. To hold them in position, I drive wooden stakes along the perimeter of the corner radius, then screw the plastic to the stakes.

The plastic retains its curved shape and gives a smoother radius than a piece of bent plywood. These plastic forms are also more readily available than sheet steel "professional" forms.

*Jim Walsh*  
Livonia, MI

## SHARE YOUR TIPS, JIGS, AND IDEAS

Do you have a unique way of doing something? Just write down your tip and mail it to *Workbench Tips & Techniques*, 2200 Grand Ave., Des Moines, IA 50312. Please include your name, address, and daytime phone number. If you prefer, e-mail us at [workbench@workbenchmag.com](mailto:workbench@workbenchmag.com).

We'll pay you \$50-\$150 and send you a *Workbench* cap if we publish your tip.

In addition, The Stanley Works has generously offered to sponsor *Tips & Techniques*, and will send an award for the tip in each issue best describing the creative use, care or application of tools.





## Tip Of The Month

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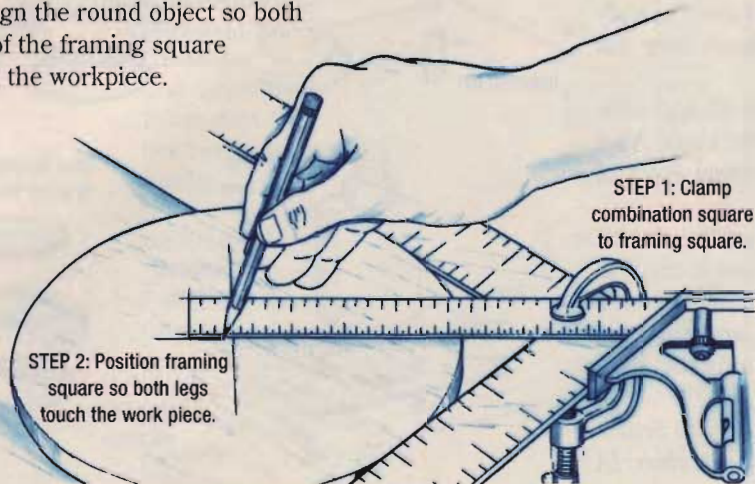
## Do-it-yourself Center Finder

Finding the center of something round is easy with a combination square, a framing square, and a clamp. Clamp the 45° angle of the combination square to the framing square so the edge of the smaller square's rule "splits" the 90° angle of the framing square.

Align the round object so both legs of the framing square touch the workpiece.

Draw a line on the workpiece along the edge of the combination square. Rotate the piece and make another mark. The "X" intersection where the two lines meet indicates the centerpoint. (The lines don't have to meet at 90°; you just need to create intersecting lines to find the center.)

Mark Gillum  
Naperville, IL



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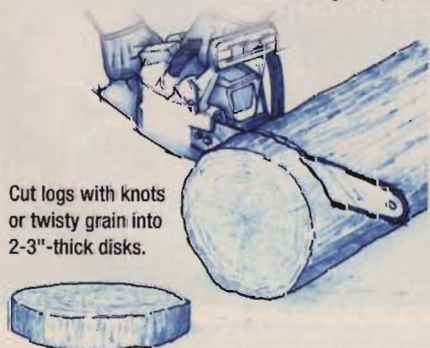
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## Don't Split, Slice

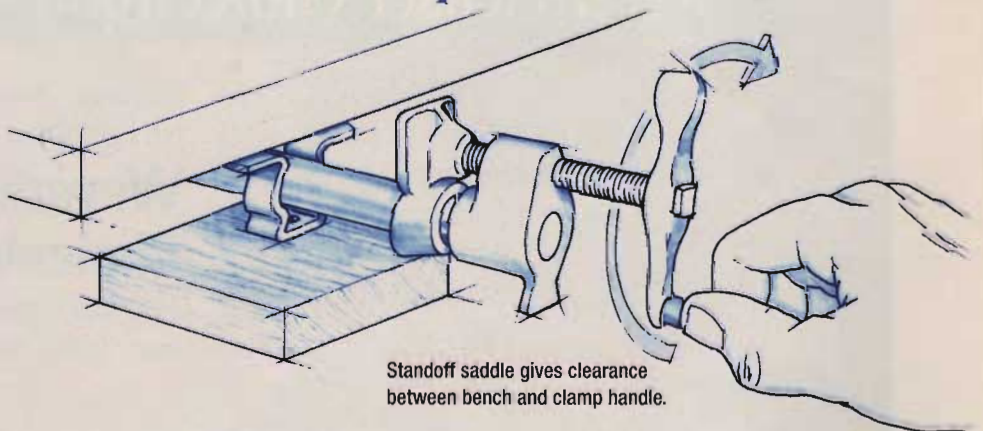
Your article on chain saws in the September/October issue prompted me to pass along a tip that has saved me lots of work over the years.

When cutting firewood, I typically cut limbs into short lengths, then split them into easy-burning "sticks." But knotty logs can be stubborn and resist splitting, so I quit trying to split them. Instead, when I come across a knotty limb, I slice the limb into disks a couple of inches thick. The disks burn just as well and save me hours of work with a splitting wedge.

Andy Vena  
Philadelphia, PA

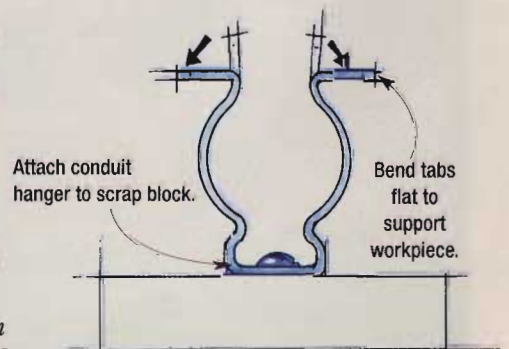


## Saddles Give Clamps Handle Room



I got tired of clamping panels on my benchtop and having my pipe clamp handles bump into the bench with every turn. So I fashioned some standoff saddles out of 1"-diameter conduit hangers and scrap plywood. The saddles hold the clamps upright and provide plenty of clearance for both the panel I'm gluing up and the handles of the pipe clamps.

Gerald Hudson  
Merrillville, IN



## Countertop Laminate Creates Custom Cabinet Knobs

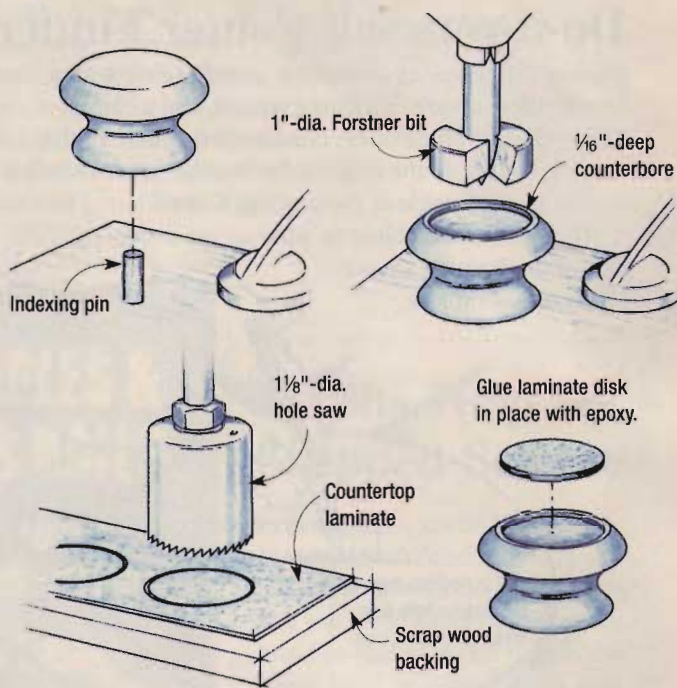
I couldn't find door pull knobs that looked good with my new kitchen cabinets and countertop, so I decided to make my own. I customized some store-bought wooden knobs by inlaying disks of leftover countertop laminate.

To create the recess for the laminate, I clamped a scrap board to my drill press table and drilled a  $\frac{3}{16}$ "-dia. hole. Without moving the board, I inserted a short piece of  $\frac{3}{16}$ "-dia. dowel as an indexing pin, then fit a knob over the dowel.

Next, I switched to a 1"-diameter Forstner bit and carefully drilled a  $\frac{1}{16}$ "-deep hole in the face of the knob. After drilling the rest of the knobs, I applied several coats of gloss spray enamel.

While I waited for the paint to dry, I removed the pilot bit from a  $1\frac{1}{8}$ "-dia. hole saw and chucked the saw in the drill press. Using a light touch, I cut a number of disks from a piece of leftover laminate. A little sanding smoothed the disks' edges, then I used a dab of epoxy to affix the disks in place on the knobs.

*Bob Settich  
Des Moines, IA*



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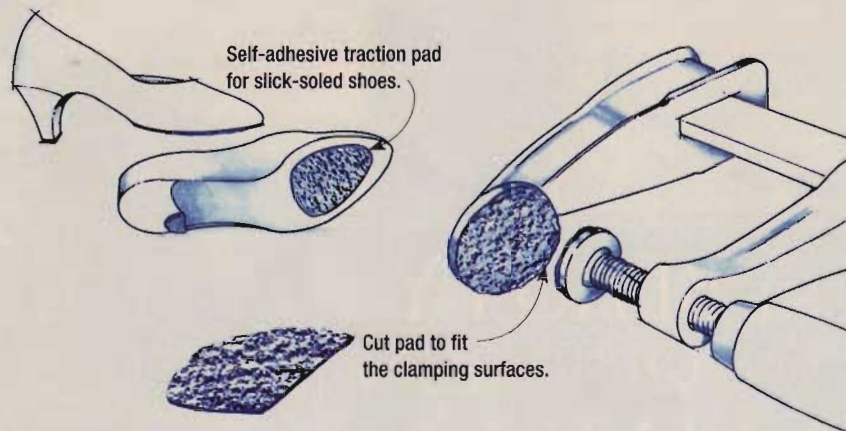
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## Shoe Pads Give Clamps Traction Too



Here's a quick way to make no-slip clamps. Use adhesive-backed cork or rubber pads designed to provide traction for slick leather soles on women's shoes (I found some made by Avery, the folks who make office labels). Available at many shoe stores, the pads are pretty durable, yet easily replaced if they become too scuffed or dirty. You can cut the pads to shape with scissors, peel off the paper backing and attach them to your clamps.

John Craddock  
St. Paul, MN

## Painless Splinters

My young son loves to help out his Dad around the shop and play with the wood scraps, but he often winds up with splinters in his little fingers. It used to be painful for him and frustrating for me trying to remove the splinters — he wouldn't hold still and I'd have a terrible time trying to get a grip on the splinter.

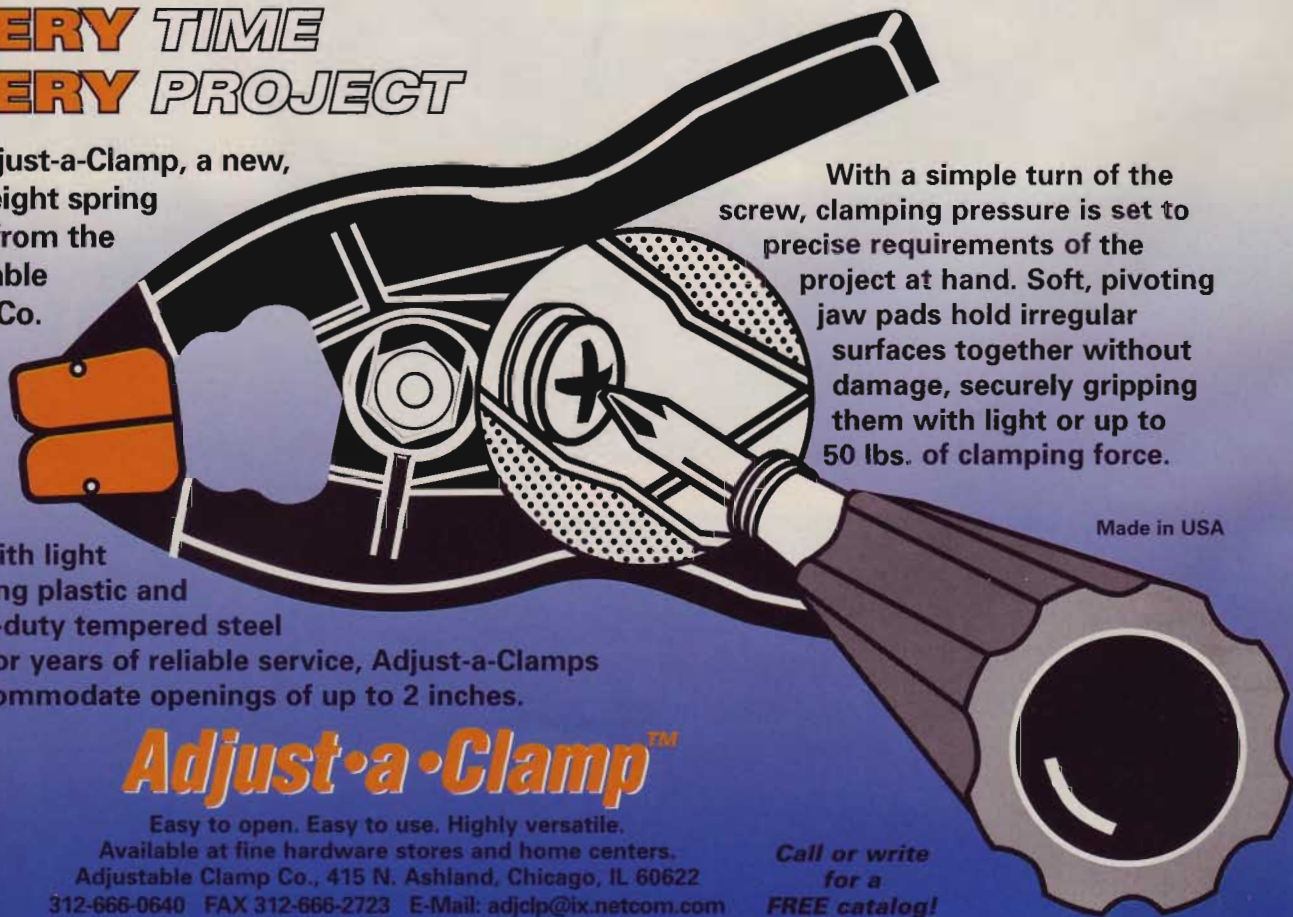
Out of desperation, I grabbed a tube of baby teething medicine (like Numzit or Orajel) and dabbed it around the splinter. After about 30 seconds, the skin was numb enough that I could pull the splinter without hurting him.

Now, when he gets a spliver, we numb the spot and he lets me pull the splinter without even squirming. (My 33-year-old woodworker husband also started using the stuff on his splinters and it works great!)

Margie Fazio  
Naperville, IL

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# News and Events

## Friendly Fiber Yields Positive Product

In algebra, multiplying two negative numbers yields a positive product. Wouldn't it be great if you could pull off the same trick in real life, having two problems meet and become one solution? Well, sometimes that happens, and engineered building panels are an encouraging example.

"Composite" panels such as MDF (medium-density fiberboard) and particleboard, both produced by mixing shredded wood waste or pulp with binder resins, use wood fiber more efficiently than solid wood products do. They put sawmill waste to good use, but the huge amounts of wood fiber the industry consumes still require harvesting of additional trees just to be shredded.

On the other end of this equation are North America's grain farmers, who burn thousands of acres of wheat and corn straw each year after harvesting their crops. It costs them time and money to burn the fields, and creates air quality problems in otherwise clean rural areas.

Over the last decade some smart people realized that these two problems were each other's solutions. This summer, Isobord Enterprises of Canada opened its first plant for producing wheat-straw panels for use in cabinets and construction.

Area farmers get paid for agricultural waste, air pollution gets reduced, and there's less pressure on forest environments and



resources. Research is also being done on other crop waste such as corn fiber, and on nontoxic plant-based adhesives for use as binders.

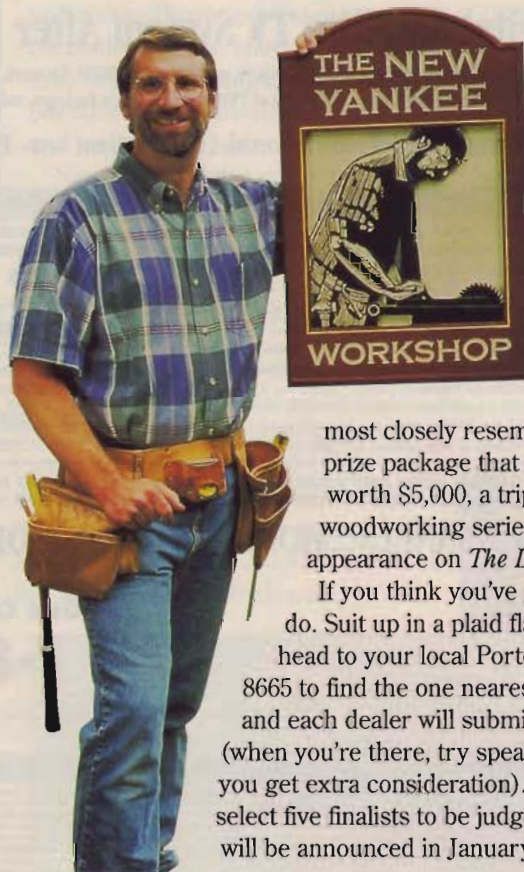
## Ladder Recall

Ladder manufacturer Krause Inc. of Roscoe, IL has issued a recall notice involving 73,000 ladders manufactured between December 1997 and May 1998. The company stated in its notice that a hinge on some ladders may unlock during use and cause the ladder to collapse.

Ladders affected by the recall are the 12-ft. MultiMatic (model 121482), the 16-ft. MultiMatic (model 121499), and the 12-ft. TriMatic (model 121321). To see if your ladder might be among those included in the recall, look on the side rail label for the UL (Underwriters Laboratories) Issue Numbers 7404 through 7488, 7494 and 7495, or CSA (Canadian Standards Association) Issue Numbers KL-0001, KL-0002, KL-0003, and KL-0004.

Owners should stop using these ladders immediately and can return them to the store of purchase for exchange or refund. For more information, contact Krause at (877) 572-8731.

## Porter-Cable Seeks Norm Clone



We're thinking Norm Abram, host of *The New Yankee Workshop* television program, wants a look-alike so he can finally take some time off, or maybe have a body double to handle dangerous carpentry stunts. Show co-sponsor Porter-Cable Corp., however, says its search for a Norm look-alike is all in fun.

Begun in October, a nationwide search for the man who most closely resembles Norm will culminate in a prize package that includes Porter-Cable power tools worth \$5,000, a trip to the shop where the popular woodworking series is filmed, and a television appearance on *The Late Show with David Letterman*. If you think you've got what it takes, here's what you do. Suit up in a plaid flannel shirt and blue jeans, and head to your local Porter-Cable dealer. (Call 1-800-487-8665 to find the one nearest you.) You'll be photographed, and each dealer will submit the photo of their best entry (when you're there, try speaking in a Yankee accent to see if you get extra consideration). An independent agency will select five finalists to be judged by a public audience. A winner will be announced in January 1999.

## Antique Tools Hit Cyberspace

The Museum of Antique Woodworking Tools has everything you'd expect in a museum: a curator, exhibits, and even a store. What it doesn't have is a building for you to visit. That's because this museum is located only in cyberspace, on the web at [www.antiquetools.com](http://www.antiquetools.com).

Inside the museum you'll find both permanent and temporary "exhibits" dedicated to a wide variety of tools. You can also communicate with other museum "guests" during lectures and discussions, and in informal chat rooms.

Memberships that include a newsletter are available free of charge.



## Furnace Fixes Due?

Now that heating season is back, Lennox Industries has issued a reminder about four warning signs — unfamiliar sounds from a your furnace, unusual odors, moisture accumulation on the inside of window panes, and headache, nausea, or dizziness caused by carbon monoxide — that could mean your heating system needs a service check.

## Free Holiday Safety Help

Underwriters Laboratories, the nonprofit product testing and certification agency, is once again issuing safety guidelines to help folks get through the holiday season without accidents, fires, and other dangerous incidents. The organizations Operation Decoration campaign includes guidelines for preventing fires from electrical hazards such as damaged or overtaxed cords or tree lights, children's toys, and other items. For information visit UL's web site at [www.ul.com](http://www.ul.com) or call their fax-on-demand hotline at (800) 473-4766.



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Product Information Number 202

## A Cure for Loose Juice

Want to hazard a guess at the dollar value of the electricity wasted in the United States every year? Actually, the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) have done the math for you. The agen-

cies estimate that the cost of electricity lost to waste and to inefficient appliances and equipment exceeds \$1 billion annually. That's billion with a 'b'. (Of course, you can tell that because you're reading this, but it is an amazing amount).

So what do you do if you're an energy-conscious consumer who doesn't know an R-value from a family value? A BTU from a BLT? Well, for starters you can look for a new label on any energy-related products you intend to buy — everything from televisions, VCR's, and computers to furnaces, windows, and insulation.

The Energy Star program, a cooperative effort that includes federal regulatory agencies and manufacturers from a wide variety of industries, will help remove the confusion that comes from having to understand technical specifications related to different products.

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Instead of relying on consumers to translate the numbers, the EPA and DOE have set minimum efficiency requirements for appliances and other household products. These requirements are up to 50% more stringent than existing minimum federal standards, and products that meet them will carry the Energy Star label. So whether the purchase you're making is an air conditioner, a clothes washer, or a fax machine, you can look for a single indicator of energy efficiency without taking a crash course in physics or electrical engineering.

Currently the program involves about 25 product categories and over 1,000 manufacturers. The estimated number of Energy Star-labeled products shipped each year? Fifty million.

For information call 1-888-782-7937 or visit the agency's web site at [www.energystar.gov](http://www.energystar.gov).

## Handy Home Franchise

It's worked for fast food and drive-through oil changes, and now franchise entrepreneurship has made its way into home improvement.

Case Handyman Services, formed in 1992 as a division of a Maryland remodeling company, is betting that homeowners want a "single-source solution" for their home repair and improvement needs. So far the gamble has paid off, with 1997 gross revenues of over \$3 million, and they're taking the program nationwide by offering franchises to contractors.

According to the company, franchising provides better training and marketing opportunities for participants, while ensuring brand-name comfort, better quality control, and a level of professionalism consumers want. Uniformed, trained "handymen" make service calls with scheduled appointments, and are licensed, bonded, insured, and provided with security clearance. Services include carpentry, electrical and plumbing work, painting, roofing, and more.

Franchisees are offered on-site and centralized training programs, marketing training, administrative and computer systems support, and an exclusive territory. Interested? Contact Case Handyman Services at (800) 441-7445.

## A Kitchen's Lifespan

Time to remodel your kitchen? Are the appliances, cabinets, and counters looking tired? Choose your new stuff carefully; it may be around for a long time.

According to the National Association of Home Builders, appliances are about the shortest-lived products we place in our homes, but they'll still last a long time. A refrigerator and stove should be around for 17-20 years on average. Expect your dishwasher, trash compactor, and garbage disposal to last about 10 years.

Other kitchen components vary widely. A plastic laminate countertop: 10-15 years. A well-installed ceramic tile counter can last a lifetime.

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Product Information Number 193



## NAHB Releases Housing Trends Report

The National Association of Homebuilders ([www.nahb.com](http://www.nahb.com)) has again released its *1998 Housing Facts, Figures, and Trends* booklet that tracks all the news that is news about housing in the United States.

Published annually, this booklet is filled with information that's inval-

able for home builders and industry associations, but also of interest to those of us who've been bitten by the home improvement bug.

What amazes me most are the ways characteristics of our homes have changed over the years. Even in 25 years, what we all want has

changed a lot. Statistics comparing 1971 with 1996 show that Americans today are living in bigger homes with more features.

In other interesting trends, the prices of residential building lots continue to skyrocket, more than quadrupling on average in the last 20 years. The smallest price increase was in Kansas City, MO, where a 10,000 sq. ft. lot that sold for \$10,000 in 1975 goes for \$18,750 now, an 87.5% increase. At the other end of the scale, the same size lot in San Jose, CA, went up a whopping 1,279% in that same time, from \$14,500 to \$200,000!

As our houses age, more of us are remodeling as well. The median age for a home is 28 years, and in 1997, Americans spent over \$121 billion to improve, maintain, and repair the places we call home.

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Product Information Number 184



Category	1971	1996
Central Air Conditioning	36%	81%
2½ or more baths	15%	49%
One or more fireplaces	36%	62%
Garage for 2 or more cars	39%	78%
No garage or carport	26%	13%
Four or more bedrooms	24%	31%
Single story	73%	49%
Two or more stories	17%	47%
1,200 sq. ft. or less	36%	9%
2,400 sq. ft. or more	9%	30%

(Percentage of homes with stated features)

Average Square feet      1,520    2,120



# Floor Refinishing

*Anyone who's spent much time remodeling a home knows that the messes come as regular as rain. They're as much a part of the process as budget overruns and sore backs. In fact, I'd almost bet the word "remodel" has a Latin root that means something*

like "a voluntary modification of one's dwelling during which money and labor are exchanged for large amounts of debris."

Of course, in most cases those messes are replaced eventually by new woodwork, fixtures, wall coverings, and other goodies to make your home livable again and looking spiffy. In the meantime, though, chaos takes its toll, and few things will suffer as much as your floors. If the flooring is carpet or vinyl and due for replacement anyway, you can just dish out the dirt and install new material when

the rest of the job is done. A wood floor is different. Not only is it more expensive to replace, it may have character you couldn't duplicate with new flooring.

Fortunately, traditional wood flooring can be renewed many times, and it's a job most homeowners can pull off successfully. The demolition work we did on the *Workbench* house provided us with a great opportunity to refinish the oak floors and walk you through the process step by step.

Our floor wasn't badly damaged, but it had suffered plenty of stains and scratches from normal wear and tear and from the traffic of all of our work boots. The few projects still pending wouldn't undo our work, so before we installed new trim we tackled the floor.

## Tooling Up

Getting a wood floor refinished in a reasonable amount of time takes some very specialized equipment, but thankfully you don't have to own any of it. You'll need an assortment of hand tools, but almost any local rental center can provide the machines (**Figure 1**).

The size of the floor and the amount of material you're removing will determine the appropriate equipment for the job. In most situations,





1

Requirements for floor refinishing include scrapers and other common hand tools. You can rent the heavy artillery (a drum or belt sander and an edging sander) for about \$75.

you'll need a large walk-behind sander for open sections of floor, and an edging sander for areas along the walls.

The large belt sander we used (**Figure 2**) is one of several types of machines designed for floor sanding (see *Through Thick and Thin* for other sander options). It works on the same principle as the portable belt sander you might have in your shop, but it deserves a lot more respect. I hear pet names for these machines — the Locomotive, True Grit Express, or my personal favorite, The Beast — that convey the power they have. (I always think rental centers that provide these sanders should post a “You must be at least this tall . . .” warning sign like the ones you see on amusement park rides.) Suffice it to say they are capable of removing large amounts of material and can gouge wood floors very quickly if not properly handled. Even with a medium belt (about 60-80 grit), these sanders will remove the old finish, stain, and some surface wood in just one pass (**Figure 3**).

Expect to pay about \$45-\$60 per day to rent a floor sander. Abrasive belts or papers cost about \$4 each.

Before you start any work on the floor, remove a piece of trim in the room so you can check the flooring thickness. Often you'll have plenty of flooring material to work

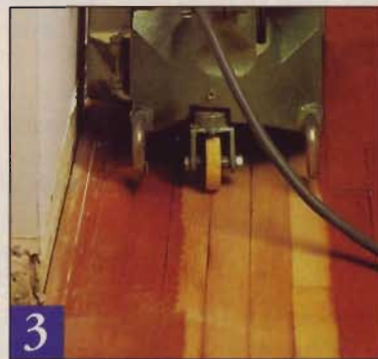
with, but you don't want to sand away more wood than is necessary to get a clean flat surface.

The *Workbench* house was nearly empty when we refinshed the floors, so we didn't have to mask off the other spaces much. Normally you'll want to use clear polyethylene sheeting to seal off the adjacent rooms and any exposed ventilation or return air ducts.



2

Belt sanders feature a removable cover that provides access for installing the belt. Most also have automatic belt tracking.

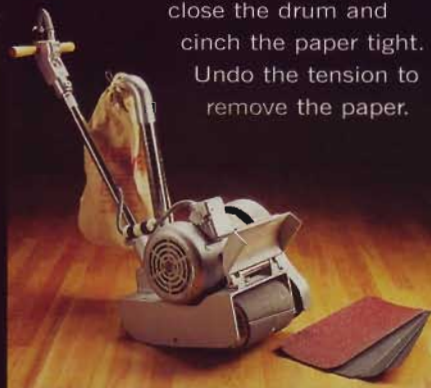


3

A medium or coarse abrasive will often cut through finish and stain in just one pass, but fine sanding should follow.

## Through Thick and Thin: Sander Options

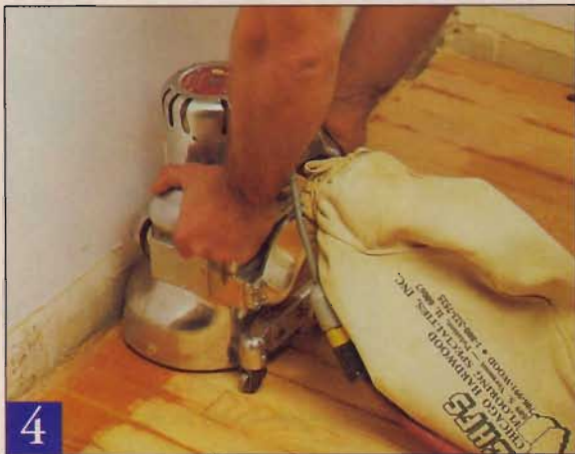
**SPLIT-DRUM SANDER** — Pros who have their own machine often prefer belt sanders, but if you're renting you may end up with a split-drum unit. Unlike twin rollers that track a belt, the rubber-faced drum on these machines accepts flat sheets of abrasive paper. You tuck the ends of the paper into a long slot in the drum, then use a wrench to close the drum and cinch the paper tight. Undo the tension to remove the paper.



**ORBITING PAD SANDER** —

If you're intent on removing only the old finish without disturbing the stain coat below or the wood itself, I'd rent a big pad sander like the one below. Not nearly as aggressive as a drum or belt sander, this type of machine is easier to control, but it's not designed for heavy stock removal. Some paint stores and home centers rent these units. This one is from Flecto/Varathane.





**4** Also rented, the edging sander uses a rotating abrasive disk to remove material along walls, where the belt sander can't reach.



**5** Use a hand scraper or a file to remove old finish in corners and hard-to-reach areas. An orbital finishing sander works great too.

### Unfinished Business

If you're refinishing strip flooring that's still in decent shape, use trisodium phosphate or another degreaser to clean the surface of waxes or oils, let it dry, then run the floor sander parallel with the flooring direction (photo on page 26). Handling floor sanders requires serious muscle, so developing a consistent technique is essential (see *Welcome to the Machine*).

Once you're underway, be sure to schedule enough time to sand the floors and apply a new finish without any lengthy interruptions. Exposed floors invite dirt, damage, and grain-raising from humidity.

You can make your first sanding pass with a medium-grit abrasive (60 or 80 grit), then switch to a finer grit for the next round. I like to work the edges and corners of the floor at the same pace, so after I do

the first "field" sanding I use the edge sander with a similar grit disk (Figure 4). This tool allows you access to the sections of floor along each wall where the belt or drum sander won't reach. Coarse grit papers will leave deep scratches in these areas, so again I stay with a medium abrasive and just work the spot a little longer.

Then it's round two with the belt sander, this time with a finer grit (120 to 150) abrasive. I also make another pass with the edger.

Because it's a disk sander, the edger can't get all the way into the inside corners of a room. A hand scraper will clean up those areas (Figure 5). If the old finish and stain are stubborn, I'd recommend using a square-pad finishing sander to do the grunt work.

The final sanding requires some different equipment. Your objective now is not stock removal but cleaning up scratches, swirl marks, and other evidence left behind by the heavier machines. Flecto's Squar Buff™ large pad sander works well for a light finish pass like this, but you can also rent a standard floor polishing machine and install a fine (120+ grit) abrasive (Figure 6). Again, the round disk won't get into inside corners, so those areas will have to be sanded by hand or with a handheld finishing sander. When you're done, vacuum the room thoroughly to remove the dust.

## Welcome to the Machine: 5 Handling Tips

**1)** The one fundamental never-to-be-ignored rule when using a floor sander is KEEP IT MOVING. Anytime the belt or drum is spinning against the floor, you should be walking the sander along at a uniform pace. Stall and you'll create a washboard surface full of troughs and ridges.

**2)** Enter and exit gracefully. Ease the sanding head onto the floor as you start each pass, then lift it just as gradually at the end of each pass.

**3)** If the sander pulls strongly to one side (most go to the right), work your way across the room in the opposite direction. This keeps tension between you and the sander's tendency to drift or pull away, allowing better control.

**4)** Working with the wood's grain direction is another rule of floor sanding, but sometimes it pays to break it (see illustration). Badly cupped strip



Cupped strip flooring can take a heavy diagonal cut, but use a lighter touch on patterned floors.

flooring, for example, should be sanded diagonally for the first two passes. This removes ridges and high spots, leveling the surface quickly. Likewise, patterned floors with multiple grain orientation respond better to diagonal sanding, but with finer abrasives.

**5)** Change abrasive belts and disks as soon as they're clogged. Otherwise they'll burn or glaze the wood surface.

## Seeing to the Details

Like so many other remodeling jobs that require a lot of prep work, floor refinishing rewards patience. You know the wood is going to look great with a new finish, but being too eager will get you into trouble. Be methodical and give each step in the process its due. When the job's done, you can slide across the floor in your socks all you want.

Among the details likely to give you trouble are scratches you've missed during your cleanup sanding, and any remaining dust that will soak up finish and create small burrs on the surface. To avoid the first, use a consistent pattern with the floor polisher, then conduct a simple test after you vacuum. Wet a small area of the floor with mineral spirits. Deep scratches, especially any that run across the grain of the wood, will show up immediately. The mineral spirits will evaporate quickly, and it won't raise the wood grain or leave residue to interfere with the adhesion of the finish.

Obviously it's impractical to swab mineral spirits over the whole floor to check for problems — that's why consistent and thorough sanding is important. One effective technique, though, is to get down on the floor and look across it with light from a window coming toward you. If some areas aren't sanded properly, you'll notice they reflect light dif-

ferently and need to be wet-tested with mineral spirits.


Vacuum again after any additional sanding, and use a tack cloth (a piece of treated cheesecloth, sold at paint and hardware stores) to wipe down the floor and pick up dust the vacuum missed.

## The Cover-Up

It's time for the moment of truth. If you've done a thorough job of sanding and cleaning the floor, staining and/or finishing should be straightforward. (For detailed information on choosing a finish appropriate for wood flooring, see *Wood Floor Finishes* on the next page.)

The material(s) you're applying will to some extent dictate the tools and procedure you'll use. We went straight to our clear finish, an oil-modified polyurethane. A full-strength coat went on first, spread with a pad applicator (**Figure 7**).

For a solvent-based finish like the one we used, a drying period of 24 hours is recommended before sanding and recoating. Waterborne finishes can get a second coat in as little as two or three hours.

Complete curing of most finishes takes several days, so wait as long as you can before opening the floor to furniture and heavy traffic. 



## 12 Tips From The Pros

- Sand with progressively finer abrasives, from 60 grit to 150 grit.
- Vacuum the sanding dust, then wipe the floor with a tack cloth.
- Don't use a sanding sealer. The zinc stearate in these products leaves a waxy residue on the floor.
- If you apply an oil-base stain first, allow *at least* 24 hrs. drying time.
- Mix cans of finish (all same type and gloss) into a large pail for consistency.
- Stir satin and semi-gloss finishes regularly to distribute flattening agent.
- No rollers! (They create air bubbles.)
- Apply finish with a paint pad, and don't overwork the material. These products are designed for self-leveling.
- Keep a wet edge to avoid lap marks, and work in the grain direction.
- Allow first coat to dry thoroughly, then fine-sand to remove dust or nibs.
- No steel wool. It reacts with the acids in wood and with waterborne coatings.
- Vacuum and tack-cloth between coats.



**6** A floor polishing machine, fitted with a fine-grit abrasive screen, does a nice job cleaning up heavy scratches from the belt sander.



**7** A paint pad or lamb's wool applicator works best for applying the finish. Never use a paint roller for this — it agitates the finish and creates air bubbles.

# Wood Floor Finishes

*There's a lot to be said for the satisfaction and great-looking results you can get refinishing a wood floor, but it's the rare and lucky D-I-Y'er who makes it all the way through the job without*

earning a headache or two. If the drone from the sander doesn't get to you, or maybe the solvent fumes, you still have to survive The Ordeal. This is the part of the project where you must choose — and choose wisely — the finish you're going to apply.

Sure, it sounds easy. First-timers usually approach this task with all the misplaced confidence of Goliath dismissing David as just another kid with a slingshot. The savvy folk (and you are savvy, aren't you?) know better.

Actually, you don't have to be a chemist to pick out a floor finish that works. You do, however, need to grasp some of the basics of how finishes perform and why. Once you wade past the paints and stains and other assorted coatings on the shelf, you'll be staring at an array of finishes more diverse than the menu options at an L.A. capucino bar. Lacquer, shellac, wipe-on oil finish, varnish, polyurethane, waterborne coatings — all of them might be appropriate for wood, but the application methods can vary widely, and not all the products have the properties you want in a floor finish. Here's a look at some differences — large and small.



## Sampling the Solvents

Part of the confusion about finish types stems from the use of the term "varnish" as a catch-all for any film finish. Traditionally, it meant a natural resin (from fossilized pine sap) blended with linseed oil and dissolved in mineral spirits. Today it's not so simple.

Most of us are familiar with the traditional solvent-based finishes, those that contain mineral spirits, lacquer thinner, or similar compounds as carriers. (I'll get to the specifics of waterborne finishes later.) Solvent-based finishes share one basic trait — the resin/carrier mix is a true solution, with the resin solids dissolved down to a molecular level. They differ widely, though, in the type of resins and solvents used. This creates very different working and performance properties.

Shellac and lacquer, for example, are evaporative finishes that take on solid form once their solvent — denatured alcohol, acetone, or lacquer thinner — evaporates. The molecules nest together as a solid film, but with a very weak chemical bond. When you reintroduce the solvent, the film will revert from a solid to a liquid. These finishes dry too quickly for use on large surfaces, but more important, they have poor resistance to abrasive wear, heat, alcohol, and water. This weakness is the trade-off for the quick curing. The bonds form rapidly because they're not very complicated — that also makes them easy to separate.

Now let's look at the solvent-based finishes that are more appropriate for floors — alkyd and polyurethane varnishes. These finishes are designated by resin type, but are always blends of some sort (see *Varnishes: What's in the Mix?*).

Categorized as reactive finishes, varnishes undergo a two-stage curing process. Initially, they simply dry as their solvent (mineral spirits) evaporates. Then things start to get interesting. When the resin



molecules aren't separated by the solvent, they react with oxygen and with one another, forming complex interwoven strands, or polymers. (Picture a hot game of Twister in a centipede colony.) This behavior, known in industry jargon as "cross-linking," is exactly what you want in a floor finish. The strong chemical bonds create a surface that resists abrasion, heat, water, alcohol, and other chemicals. Additional layers of finish won't



Wipe-on oil finishes are easy to apply (discard rags in water) but don't provide the protection of a varnish. Top with a coat of paste wax.

fuse chemically with the previous one, though, so you must roughen the surface to provide a mechanical bond for the new layer.

## Varnishes: What's in the Mix?

Just like a good soup, varnishes have recipes. Their resins, once derived from pine trees but now produced synthetically, are mixed with processed vegetable oils and "cooked." Tung oil and linseed oil, both traditional ingredients, are still blended into some varnishes and can be used to tailor their properties, say for more flexibility or a harder surface. A solution of metallic driers (formerly lead, now cobalt and other metals) is added to speed the curing process, which occurs as the varnish molecules react with oxygen.



## Waterborne Finishes

of a respirator. (Adequate ventilation is a must when using any solvent-based finish.)

As I mentioned earlier, varnishes appropriate for use on wood floors combine different types of resins, and that's confusing. Most contain some polyurethane, the priciest and best-performing resin, but with proprietary formulas closely guarded and no law requiring manufacturers to disclose just how much of each resin type is used, labels can mislead. (To understand some key differences between alkyds and polyurethanes, see *Polyurethanes: What Are You Paying For?*)

One reliable clue: Product names and/or application instructions that focus on flooring instead of general wood finishing will have properties better suited to a floor's demands.

### Waterborne Finishes

Got milk? If so, you're already familiar with some of the basic chemistry of waterborne coatings. Like that fine beverage provided by our bovine friends, waterborne finishes consist of solid particles suspended — not dissolved — in water. The technical term is "dispersion."

The big surprise is the particles are actually tiny droplets of solvent-based finish, each one with cured resin molecules contained inside.



Special applicators, like Fabulon's T-bar system, help with waterborne finishes.

Most common reactive finishes cure by oxidation; others require the addition of a chemical catalyst. These "conversion finishes" provide awesome strength and durability (bowling lanes and gymnasium floors are typical applications), but don't set your heart on this type for a D-I-Y project. The specialized equipment needed to apply them is expensive, and the fumes are toxic enough to require the use

## Polyurethanes: What Are You Paying For?

Like alkyd varnishes, polyurethanes begin life as blends of vegetable oil acids that are heated and refined, but they also include key components — isocyanates — that enhance the curing reaction for more aggressive cross-linking of the resin molecules. The result is a tougher, faster-drying finish, but used alone these resins aren't all good news. The heavy-bodied toughness makes for poorer penetration and self-leveling properties, adding rigidity that doesn't accommodate wood movement well.

Alkyd resins, on the other hand, cure more slowly, flow better, and provide

better adhesion to the surface. You can get a higher gloss out of them, but they're darker than polyurethanes and don't stand up as well to traffic.

Manufacturers blend the two types to get the properties (and price) they want in a finish. Some label it "oil-modified polyurethane," while others don't bother to make the distinction. If the label isn't clear — and most of them don't get very specific — lower cost and longer drying time (over 6 hours) are usually reliable indicators of lower polyurethane content.






Synthetic bristle (nylon or polyester) brushes are most compatible with waterborne finishes, though they'll work with solvent-based coatings as well. Brushes with natural bristle (right) are for solvent-based finishes only.

The resins can be the same type used in solvent-based finishes, such as acrylic (a petroleum-derived resin) or polyurethane — in fact, often they are a blend of these two. This chemistry makes waterborne coatings a sort of hybrid category.

The resin molecules inside each particle are cross-linked, but the particles themselves are not. They simply settle together into a solid film as the water evaporates. Because acrylic and polyurethane are both hard, durable resins, the film withstands mechanical wear from scuffs and abrasions, but with no chemical link between the droplets the finish has poor resistance to heat, solvents, acids, and other chemicals. Still, if you wanted just one property in a floor finish, scratch resistance would be it.

Waterborne finishes have other virtues as well. Solvent fumes are almost nonexistent, cleaning up requires just soap and water, and there's no fire hazard. Dry time is short, but you use more coats.

There are aesthetic considerations also. A waterborne finish won't give you the warm amber tone that a solvent-based varnish adds. For a contemporary look on a new maple floor, that might be ideal. You can use a stain first for color if you want, but keep in mind that waterborne coatings are more sensitive to bonding problems on previously finished surfaces, especially wax residue.

So it turns out the choice isn't that tough. Waterborne finishes and solvent-based polyurethanes both perform well — once you decide which trade-offs fit your needs. 

## SOURCES

• Absolute/Last'n Last	(800) 221-8010
• Behlen's	(800) 545-0047
• Behr	(800) 854-0133
• Cabot	(800) 877-8246
• Deft	(800) 544-3338
• Fabulon	(800) 289-7728
• Flecto/Varathane	(800) 635-3286
• General Paint & Mfg.	(800) 621-6025
• Minwax	(800) 825-8856
• Olympic	(800) 441-9695
• Parks	(800) 225-8543
• Performance Coatings	(800) 736-6346
• Schulte	(800) 325-8010
• Sherwin-Williams	(800) 474-3794
• Star-Bronze/Zip-Guard	(800) 321-9870
• UGL/Zar	(800) 845-5227
• Valspar/McCloskey	(800) 767-2532
• Woodcote/FloorEver	(800) 843-7666

## Floor Finishes: The Fundamentals

### Solvent-based


- Alkyd and/or polyurethane resins dissolved in mineral spirits
- Molecules cross-link for good wear and chemical resistance
- Amber tone; darkens with age
- Ventilation critical
- Temperature-sensitive curing
- Apply with lamb's wool or paint pad
- Multiple (2-3) thin coats; sand and vacuum between coats
- Flammable solvents (volatile organic compounds)
- Recoat in 4-18 hrs.

### Waterborne

- Acrylic and polyurethane resin droplets suspended in water
- Droplets coalesce, provide good wear resistance but poor chemical bonds
- Clear/milky tone; non-yellowing
- Ventilation recommended
- Humidity-sensitive curing
- Apply with pad or similar applicator
- Multiple (3-4) thin coats; sand and vacuum between coats
- Noncombustible (soap and water cleanup)
- Recoat in 1-4 hrs.







# Craftsman-Style Modular Bookcase

*Almost every project I undertake goes through twists and turns, usually becoming something slightly different than I originally intended. Nine times out of ten that's a good thing. The results*

*become more thoughtful, practical, and longer-lasting.*

*This time I started out thinking of a built-in bookcase, and I ended*

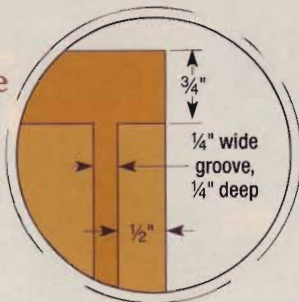
*up with a very versatile modular storage system that serves as a bookcase and entertainment center. It's easy to build and, depending on the material you choose, can look like high-end furniture for the living room or everyday clutter*

*collectors suitable for the laundry, garage, or kid's rooms.*

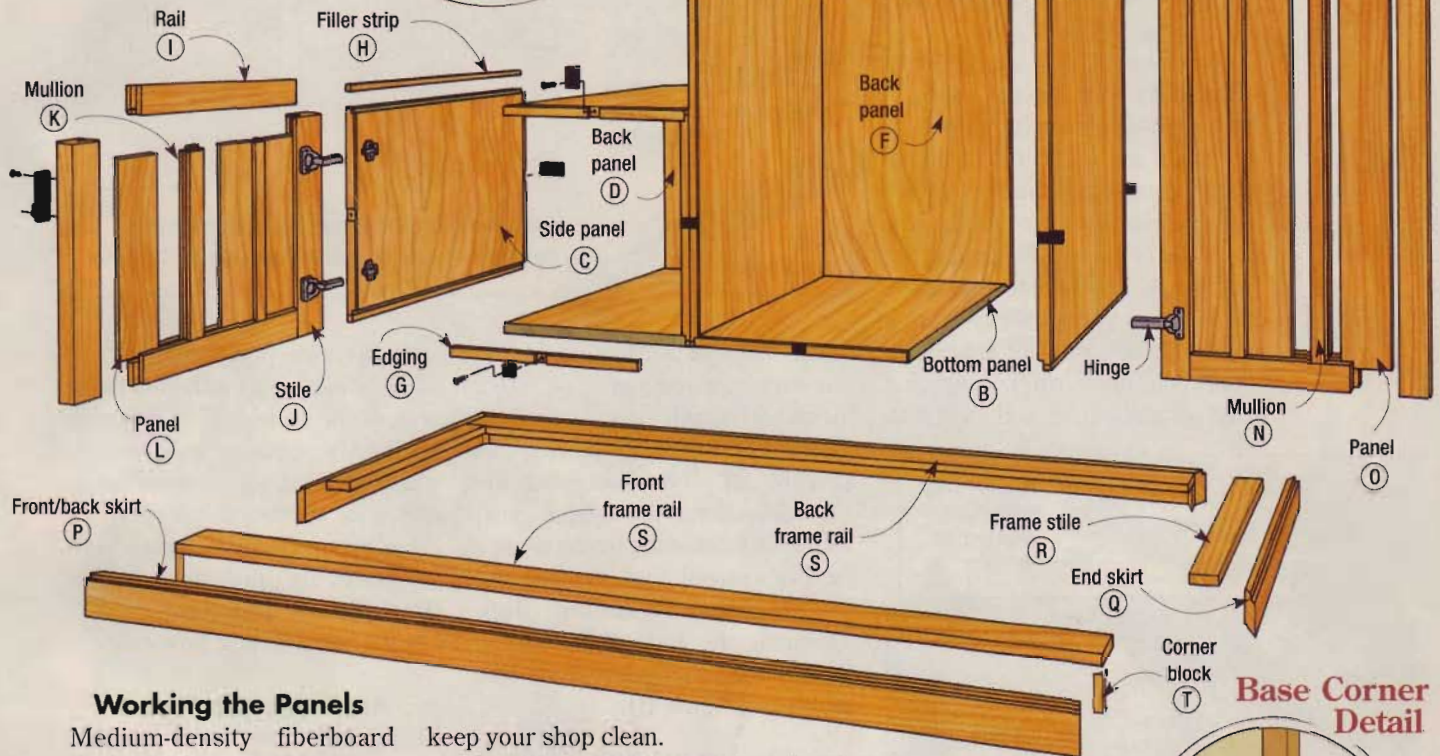
*The system is made up of two box sizes — square and 2x-square. You can make as many boxes as you need, and arrange them in different configurations.*

# Bookcase Construction View

## Back Groove Detail



NOTE: All box panels are MDF, door panels are plywood.



## Working the Panels

Medium-density fiberboard (MDF) is the material I prefer for this project. It's stable, machines easily, and is priced below most other furniture-quality sheet goods.

On the down side, MDF is heavy and the sawdust it generates can be obnoxious, so be sure to wear a dust mask and

keep your shop clean.

Cherry-veneered MDF is a perfect choice for a classic furniture look (**Bookcase Construction View**). And plain MDF that's painted or covered with plastic laminate is ideal for toy boxes or utility storage, as shown at right.

Get underway by cutting

the box panels, which will vary depending on the number and sizes of the boxes you plan to build. For clarity, mark the length and width of the small panels — these dimensions are so similar they're easy to mix up.

## Materials List

### Boxes:

A (1) Top Panel	$\frac{3}{4}$ " x $17\frac{1}{2}$ " x $17\frac{1}{4}$ "
B (1) Bottom Panel	$\frac{3}{4}$ " x $17\frac{1}{2}$ " x $17\frac{1}{4}$ "
C (2) Sm. Side Panel	$\frac{3}{4}$ " x $17\frac{1}{2}$ " x $17\frac{1}{4}$ "
D (1) Sm. Box Back	$\frac{1}{4}$ " x $17\frac{1}{4}$ " x $17\frac{1}{4}$ "
E (2) Lg. Side Panels	$\frac{3}{4}$ " x $17\frac{1}{2}$ " x $35\frac{1}{4}$ "
F (1) Lg. Box Back	$\frac{1}{4}$ " x $17\frac{1}{2}$ " x $35\frac{1}{4}$ "
G (8) Edging	$\frac{1}{4}$ " x $\frac{3}{4}$ " x $18$ "/36"
H (4) Filler Strips	$\frac{3}{8}$ " x $\frac{3}{8}$ " x $18$ "

### Hardware:

(1) Door Handle	$1\frac{3}{8}$ " x $4\frac{3}{4}$ " Bronze
(2) Door Hinges	Blum 125° full-overlay
(8) Brass Bands	$\frac{1}{16}$ " x $\frac{3}{4}$ " x $1\frac{1}{2}$ "
(8) Screws	#8 x $1\frac{1}{4}$ " Fh brass

### Doors:

I (2) Door Rails	$\frac{3}{4}$ " x 2" x $14\frac{3}{8}$ "
J (2) Sm. Door Stiles	$\frac{3}{4}$ " x 2" x $17\frac{7}{8}$ "
K (2) Sm. Door Mullions	$\frac{3}{4}$ " x 1" x $14\frac{3}{8}$ "
L (3) Sm. Door Panels	$\frac{1}{4}$ " x $4\frac{3}{8}$ " x $14\frac{3}{8}$ "
M (2) Lg. Door Stiles	$\frac{3}{4}$ " x 2" x $35\frac{7}{8}$ "
N (2) Lg. Door Mullions	$\frac{3}{4}$ " x 1" x $32\frac{3}{8}$ "
O (3) Lg. Door Panels	$\frac{1}{4}$ " x $4\frac{3}{8}$ " x $32\frac{3}{8}$ "

### Base:

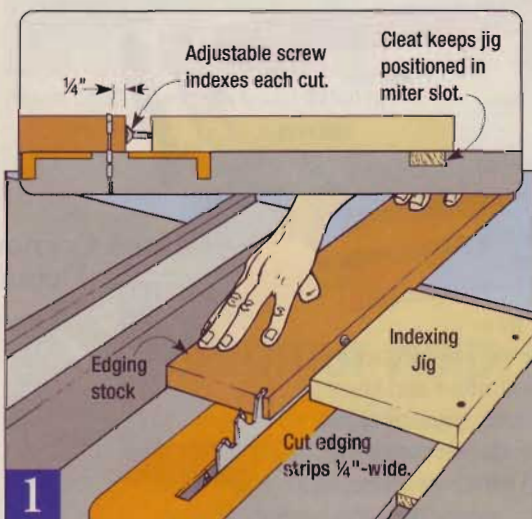
P (2) Front/Back Skirts	$\frac{3}{4}$ " x 3" x 72"
Q (2) End Skirts	$\frac{3}{4}$ " x 3" x $18\frac{3}{4}$ "
R (2) Frame Stiles	$\frac{3}{4}$ " x $1\frac{1}{2}$ " x $14\frac{1}{4}$ "
S (2) Frame Rails	$\frac{3}{4}$ " x $1\frac{1}{2}$ " x $70\frac{1}{2}$ "
T (4) Corner Blocks	$\frac{3}{4}$ " x $\frac{3}{4}$ " x $2\frac{1}{4}$ "



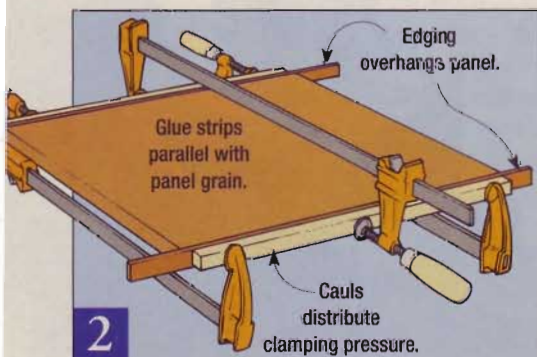
## Edging for Looks

For a first-class appearance, covering the front and rear edges of each panel is a must. But ripping stock conventionally for this edging is risky since thin strips can easily bind between the fence and blade to create a dangerous kickback situation.

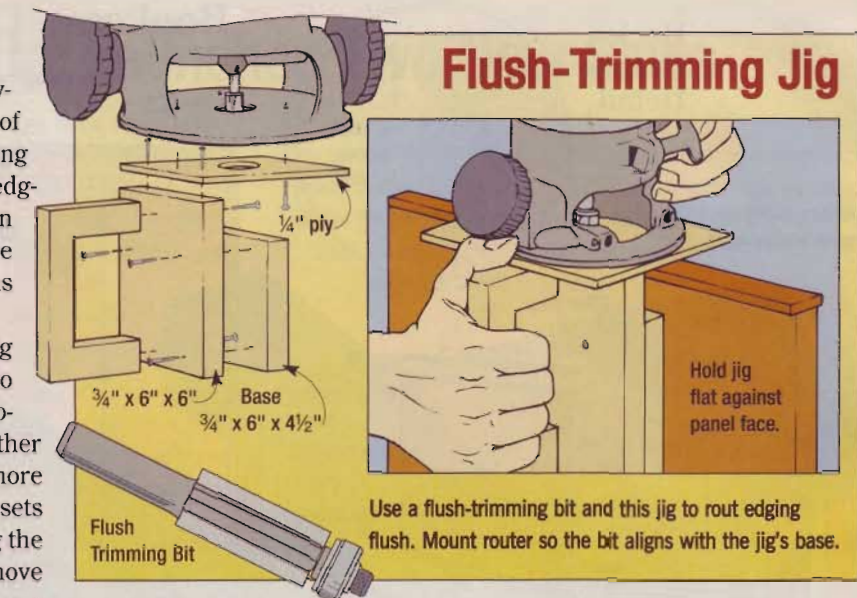
The solution is a simple jig (Figure 1). Now, I'm not one to favor a lot of jigs, but in this project you'll see a bunch that either make an operation safer or more accurate. In this case the jig sets the width of the cut (for ripping the edging). All you have to do is move the fence as you rip strips from a board. By the way, for this jig to work you must rip boards that have parallel edges, and stick with



1 Rip extra-long  $\frac{3}{4}$ "-thick stock to make the edging strips. Before each pass, readjust the fence to butt the workpiece against the guide screw on the indexing jig.



2 Glue the edging to the front and back edges of each panel. Uniform clamp pressure helps hide joints between the MDF and hardwood.



stock that's at least  $\frac{3}{4}$ " wide — any narrower and you again face a kickback hazard.

Glue the strips to the panel edges (Figure 2). Then later, after the glue dries, rout the edging flush with both faces of the panels using a jig I've created that steadies the router (Flush-Trimming Jig). Trimming the ends of the edging flush to the panel is best done on a table saw (Figure 3).

## Machining Joints

Accurately mitering wide panels is difficult enough, but clamping the joints together can spark fits a professional athlete could envy. So, to save what little sanity I have left, I opted to use rabbet joints at the box corners (Figure 4). They're easy to cut and their clamping requirements are reasonable.

## Flush-Trimming Jig



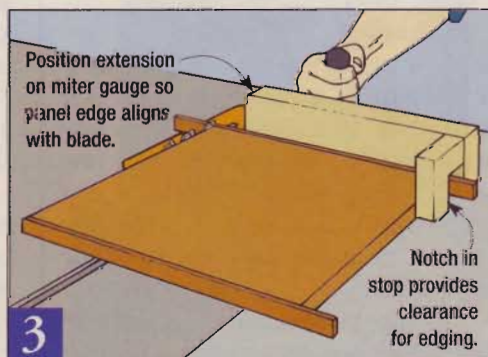
Use a flush-trimming bit and this jig to rout edging flush. Mount router so the bit aligns with the jig's base.

You'll notice, however, that these rabbets aren't cut for the full thickness of the panels. This creates a lip when two panels come together, which, if filled with a wood strip, makes for an attractive corner.

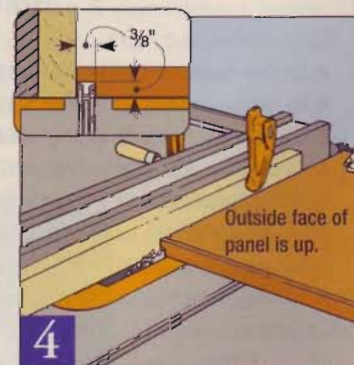
Following the rabbet cuts, plow grooves in the panels for the backs (Back Groove Detail on page 35). Cut the backs to size now, too.

## Assemble the Boxes

Gluing the rabbet joints together may be straightforward, but keeping each box perfectly square during the glue-up isn't. That's why — you guessed it — I fashioned two more jigs (A Square Glue-Up). Even with the jigs, though, you should pace yourself by working on one box at a time. Be sure to install the back as you assemble each box.



3 Use a miter gauge extension to trim the edging flush with each panel. A notched stop block holds the panel in place and accommodates the overhanging edging.

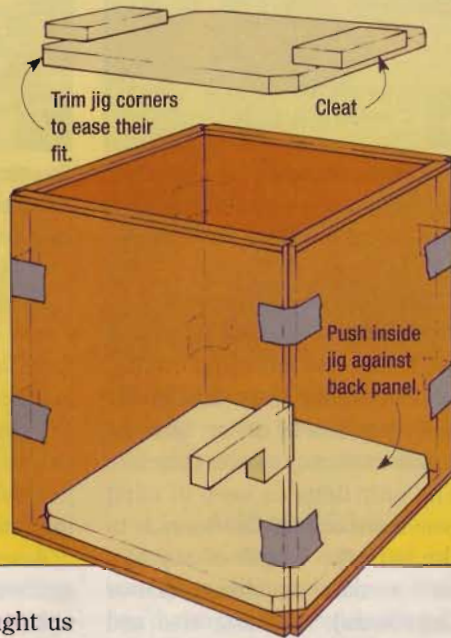


4 Place each side panel on the saw table, inside face down, and rabbet the top and bottom edges.

## A Square Glue-Up

Keeping the box assemblies square is easy if you have these two jigs. They're just plywood cut to the interior dimensions of the small box. Putting a crude handle on one square, and two overhanging cleats on the other, makes them complete.

Once you have a box assembly held together temporarily with tape, slip the jigs into position and add clamps. For the large boxes, insert the handled jig against the bottom panel, and have one edge of the other jig butted against the top panel.



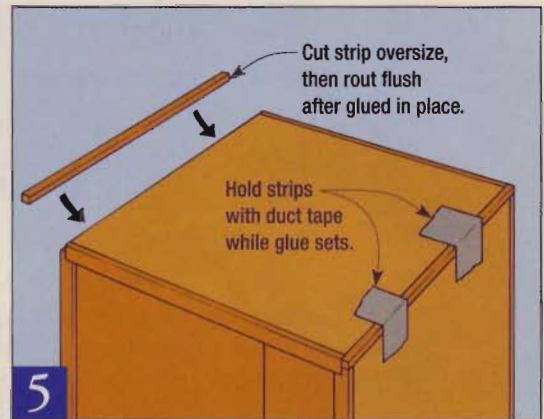
Modern science has brought us many things, and high on my list is duct tape, which is perfect for holding a box together temporarily. After the glue-up jigs are in place, though, add clamps to the assembly.

While the glue cures, go back to your table saw and indexing jig and rip  $\frac{1}{2}$ "-thick stock slightly oversize for the filler strips. Glue the strips into the lips at the box corners (Figure 5). Then trim the strips flush with the panel surfaces using your router and the flush-trim jig.

### Bring on the Brass

One challenge with this project was finding an attractive way to tie the boxes together. Through trial and error I settled on  $\frac{3}{4}$ "-wide brass bands, which fit in dados routed into all edges, both front and back, of each box.

The key to successfully joining the boxes is to have the dados align precisely from one box to the next. Here again, a simple



Rabbit joints that simplify box construction also leave edges of the MDF panels visible. Fill them with hardwood strips.

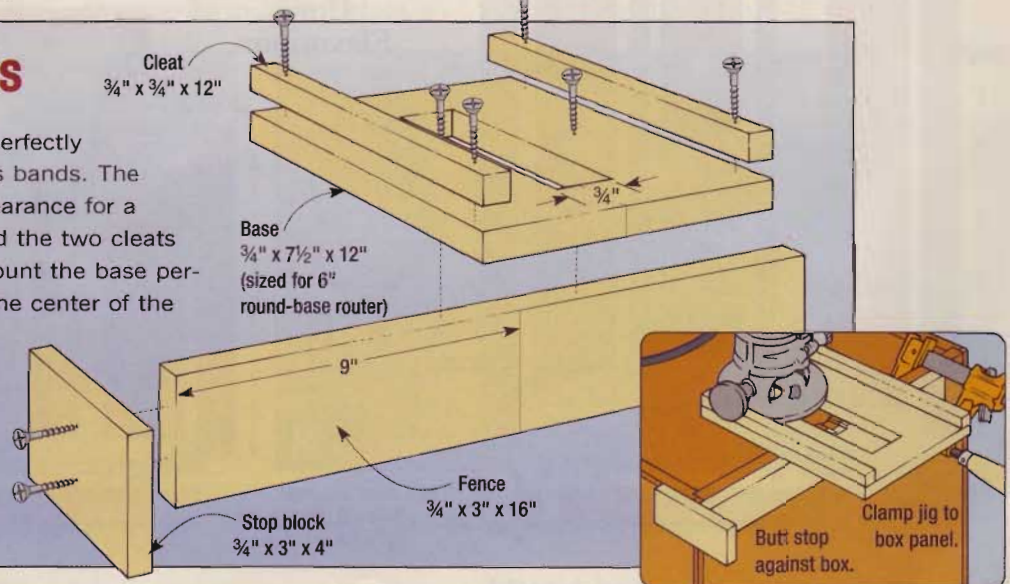
jig makes it possible (**Dead-on Dados**). Take your time making the jig since its accuracy is the linchpin to all that follows — at least where this project is concerned.

Once you have the jig in hand, mount a  $\frac{3}{4}$ "-dia. straight bit in your router, and set the cutting depth to equal the thickness of a brass band plus the thickness of the jig base. Take care, this is another linchpin.

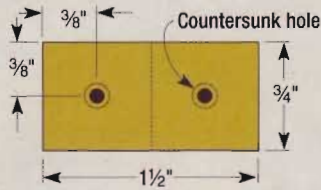
Now butt the jig's stop block against one front corner of a small box, clamp the fence, and rout the dado. Work around the box, repeating this process on all four panels. Do the same thing to the back of the box, and to the other boxes. On the large box sides you must rout two dados, so index the jig from the top panel for one dado, and the bottom panel for the other.

## Dead-on Dados

This jig allows you to rout perfectly aligned dados for the brass bands. The slot in the base provides clearance for a  $\frac{3}{4}$ "-diameter straight bit, and the two cleats guarantee a straight cut. Mount the base perpendicular to the fence so the center of the slot is 9" from the fence's end. Adding a stop block to that end of the fence will register the jig for every dado position. When routing the dados, be sure to clamp the jig to the box.

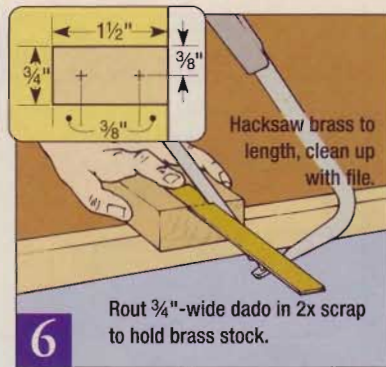


## Band Detail

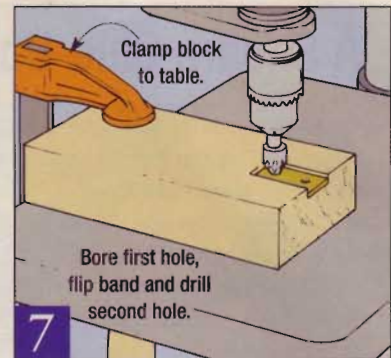


Wherever boxes meet you'll want to install a brass band to fill the dadoes and strengthen the cabinet overall (**Band Detail**). I used half-length bands on edges that don't mate with another box.

Being a soft metal, brass is easy to cut with a hacksaw, and a shop-made fixture helps keep the lengths consistent (**Figure 6**). The fixture is also ideal for drilling the screw holes, although there's no need for a pilot hole here — the countersink bit will poke through (**Figure 7**).



**6** Rout  $\frac{3}{4}$ "-wide dado in 2x scrap to hold brass stock. Make a brass stock cutting guide by routing a  $1\frac{1}{2}$ "-long groove in a piece of scrap 2x (square the end of the dado with a chisel).



**7** Countersink holes in the brass bands for #6 screws. Drill one hole, then turn the band around and drill the second hole.

## Doors Are Optional

In my opinion, doors add interest to these boxes, and more importantly, they conceal any mess inside. My cabinet has lots of doors, but you can make as many as you prefer.

The only thing to keep in mind as you cut stock for the doors is to make sure the length of any like pieces remain consistent (**Door Elevations**). Anything else and you'll have a reckoning when it comes to the assembly.

It's also important to keep the front face of all the stock pressed against the table saw fence when you machine grooves in the mullions, rails, and stiles (**Figure 8**). This will ensure consistency in the position of the grooves.

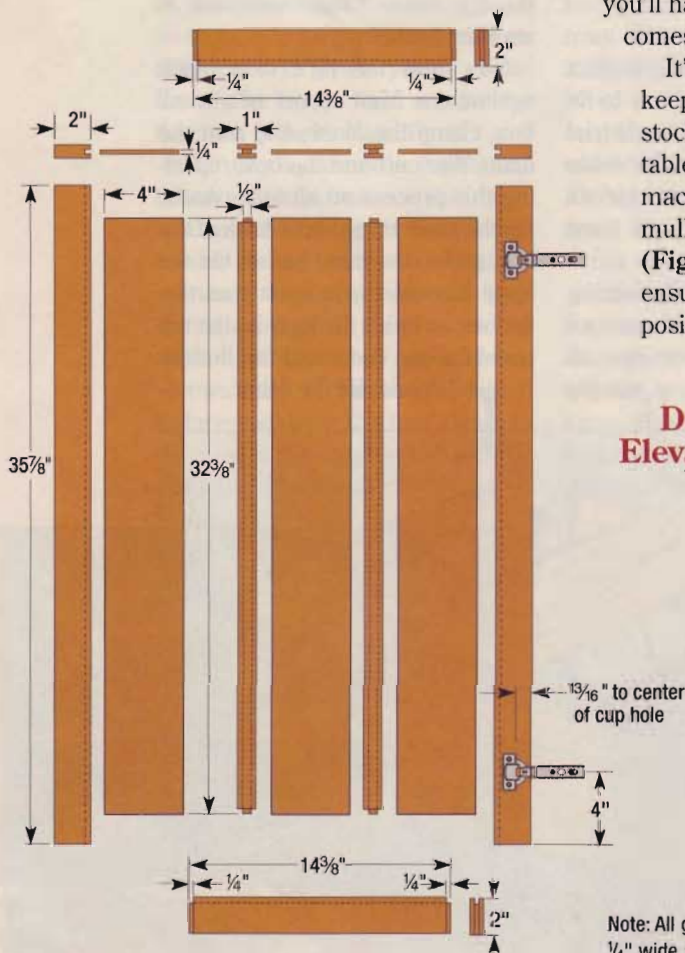
At the risk of sounding like a nag, I have one more reminder: Always form a test tenon in stock that's identical to the project material (**Figure 9**). Fiddling around with a saw set up before cutting into project material is akin to the old saying, "measure twice, cut once."

Assemble the doors, but before tightening the clamps check each one for square (**Figure 10**).

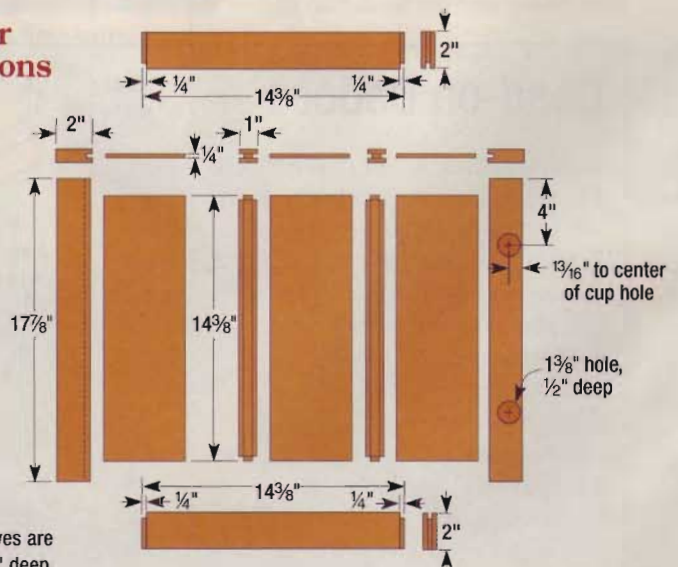
## European Hinges

You haven't lived as a woodworker until you try European-style hinges. They're easy to install, allow lots of adjustment, and keep the visual lines of a cabinet clean.

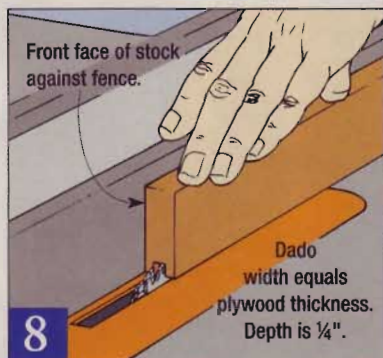
The one extraordinary thing they do require is a 35mm drill bit (**Figure 11**). You can order inexpensive bits in this size, or equiva-



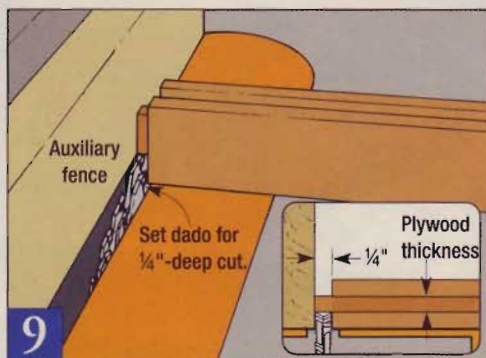
## Door Elevations



Note: All grooves are  $\frac{1}{4}$ " wide  $\times$   $\frac{1}{4}$ " deep.



Set your dado blade's width to match the thickness of the plywood door panels, then cut grooves in the frame pieces.



Machine stub tenons on the door rails and mullions. Try a test tenon first. You'll have a good fit when the tenon goes in a groove with just slight resistance.



Spread glue in all the door frame grooves and on the tenons, then assemble the panels and mullions, and add the rails and stiles.

lent 1<sup>3</sup>/<sub>8</sub>"-dia. bits, from Woodcraft (1-800-225-1153). Any large bit like this requires a drill press or drilling jig to maintain control.

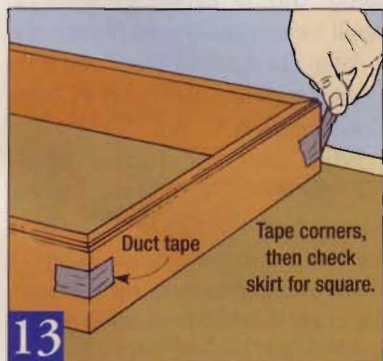
Drilling accurate mounting plate pilot holes is easy with a shopmade positioning guide (Figure 12).

### A Solid Base

The base for this cabinet does two things — it gives the project a furniture look, and it raises the bottom boxes off the floor so the doors swing without interference. (If you choose to go without a base, put rubber stick-on feet underneath the boxes to create some clearance.)

After building the boxes, you'll find the base a refreshing break. Rip extra-long stock to width for the skirt. Next, cut a 1/4" x 1/4" rabbet in the top edges of your skirt stock using a dado blade. Then miter the pieces to final length.

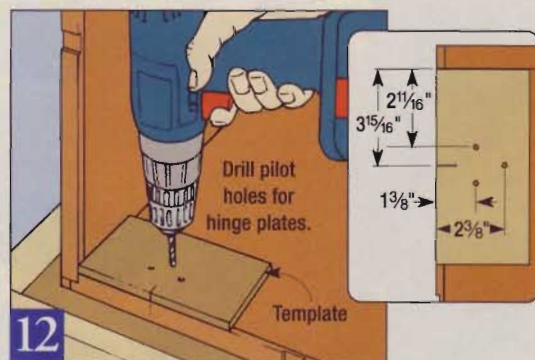
Since my longest clamps wouldn't span the skirt's length, duct tape once again came to the rescue



Glue-up the skirt on a level surface to keep it from racking and to align the miters.



Drill cup holes for the hinges using a drill press and a 35mm-dia. (or 1<sup>3</sup>/<sub>8</sub>"-dia.) bit.



Make a hardboard template for drilling holes for the hinge mounting plates.

(Figure 13). Taping the mitered corners gave the skirt enough rigidity that I could glue the frame pieces inside. Adding corner blocks created an even stronger assembly.

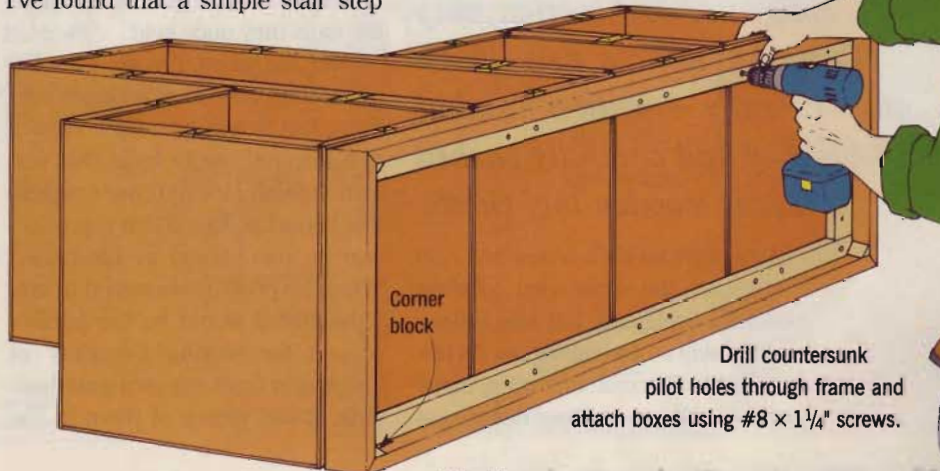
### Stack 'Em Up

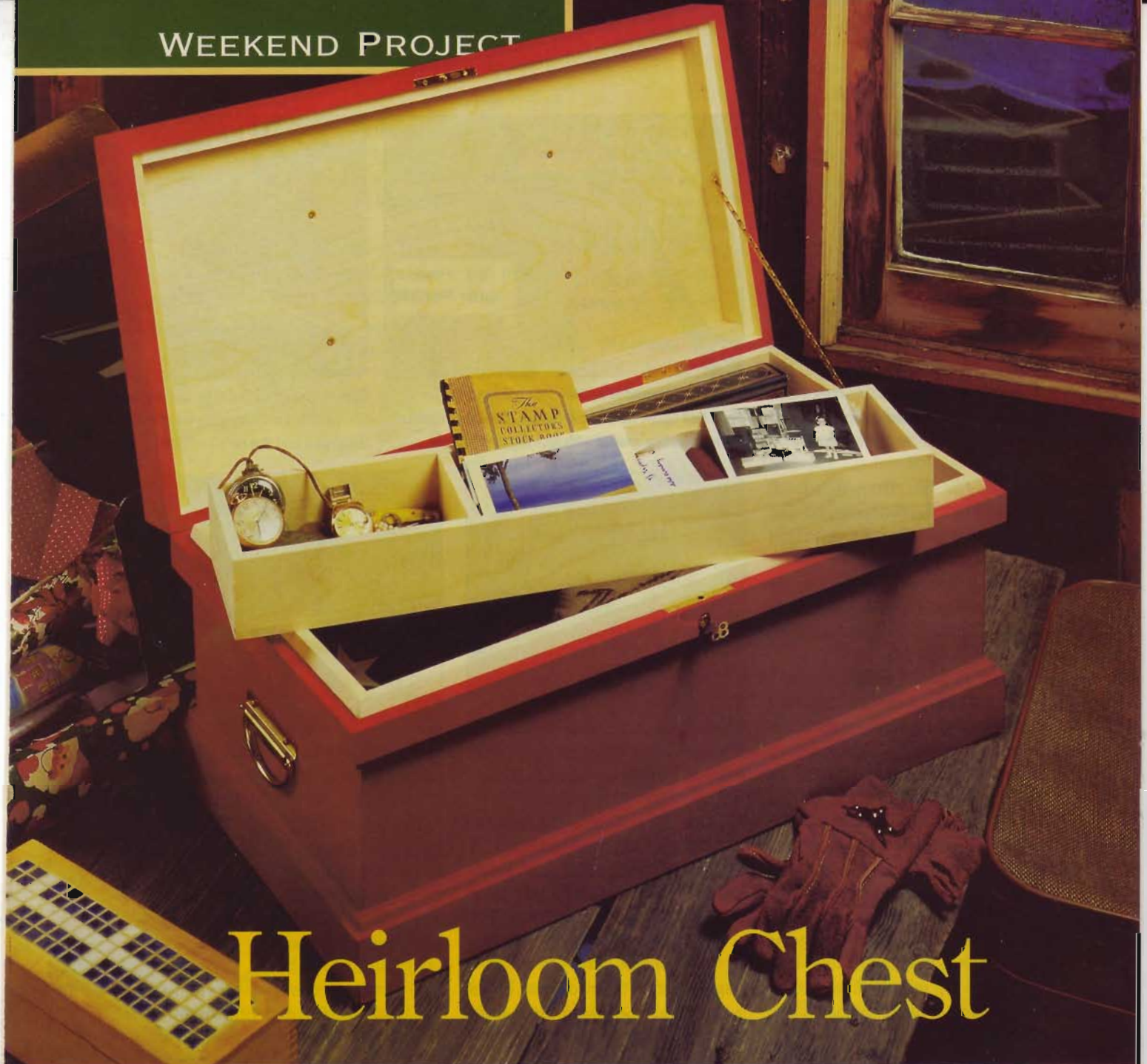
I applied stain to my cabinet boxes to give the cherry an aged look, then brushed on several coats of an oil-base varnish.

Settling on a cabinet configuration is really in your court, although I've found that a simple stair step

offers an eye-pleasing arrangement. Once you've decided, lay the lowest row of boxes on their backs to install the bands and secure the base (below). Stacking the rest of the boxes and mounting the doors goes quickly after that.

If your experience is anything like mine, you'll have your modular cabinet filled in no time. It's only then that you'll realize you should have built one for every room in the house.





# Heirloom Chest

*When European craftsmen emigrated to America, they planned to build a new life — quite literally — with a handful of tools they had carefully packed in sturdy wooden tool chests.*

These custom-built boxes not only protected the tools vital to their owner's livelihood, but also reflected his skill as a woodworker. As testament to this craftsmanship, many of these chests survived decades of

use to become heirlooms more valuable to future generations than the tools they once held.

Over the years, I've seen a number of these chests at antiques auctions, but it was actually a replica that inspired me to build this version. Adolph Peschke, our resident tool historian, based that reproduction on one owned by his father. When he proudly showed it to me, I thought it would be the perfect project for storing a variety of keepsakes from my own grandparents. It has plenty of room in the

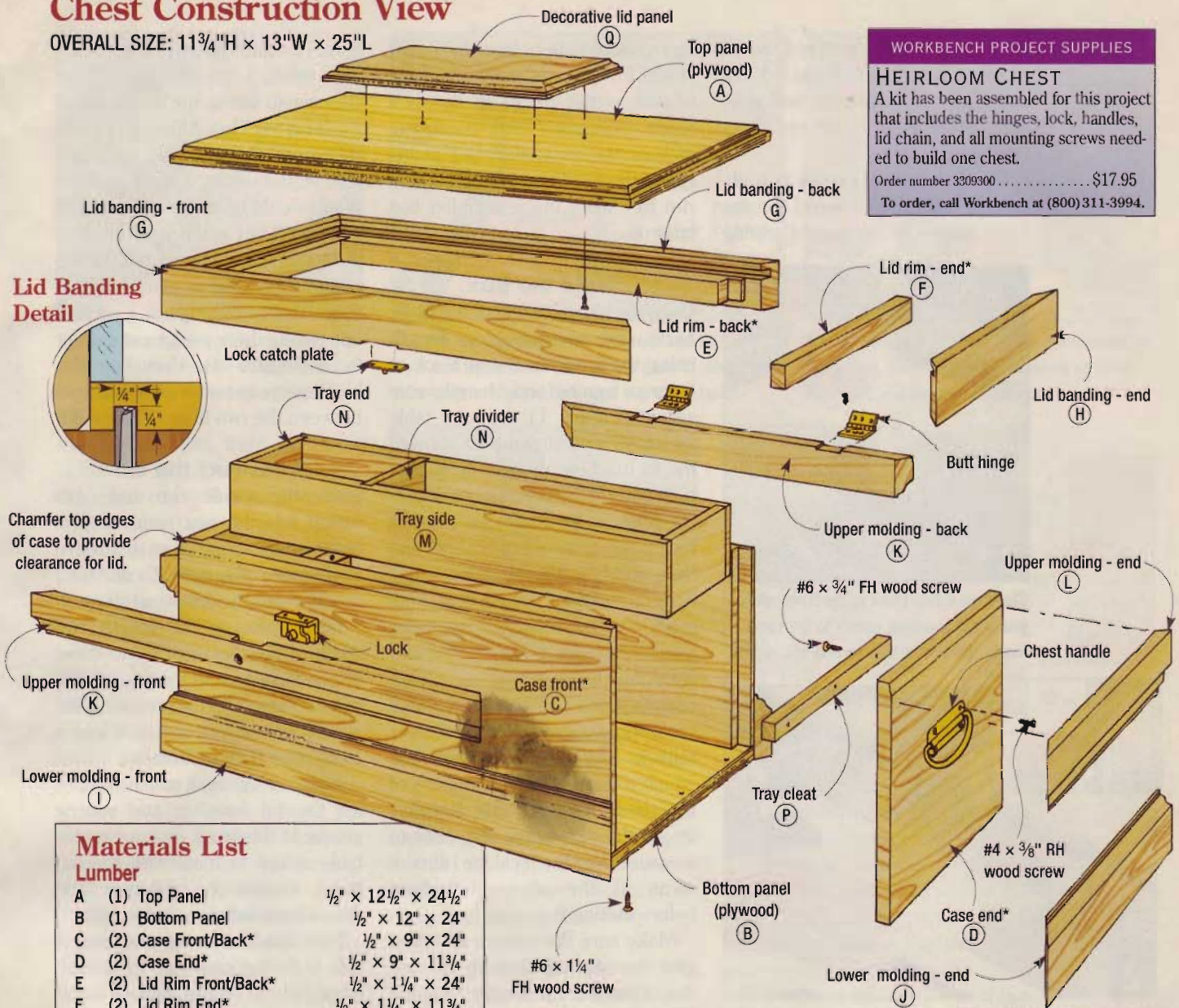
bottom for larger items, while the lift-out tray is handy for holding small treasures. The lid fits snugly to keep out dust, and the lock provides a measure of security (**Chest Construction View**).

While my reproduction maintains the look of the original, I made a few design changes to take advantage of modern materials. An Old World craftsman would have built the chest entirely from solid wood, but I used 1/2"-thick birch plywood for the top and bottom (**Chest Details**). This simplified the con-

# Chest Construction View

OVERALL SIZE: 11<sup>3</sup>/<sub>4</sub>"H x 13"W x 25"L

**WORKBENCH PROJECT SUPPLIES**  
**HEIRLOOM CHEST**  
 A kit has been assembled for this project that includes the hinges, lock, handles, lid chain, and all mounting screws needed to build one chest.  
 Order number 3309300 ..... \$17.95  
 To order, call Workbench at (800) 311-3994.



## Materials List

### Lumber

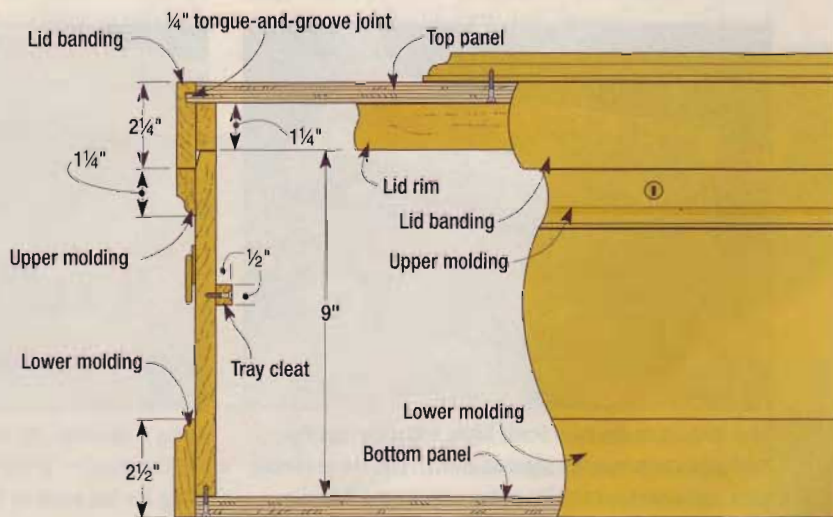
A	(1) Top Panel	1/2" x 12 1/2" x 24 1/2"
B	(1) Bottom Panel	1/2" x 12" x 24"
C	(2) Case Front/Back*	1/2" x 9" x 24"
D	(2) Case End*	1/2" x 9" x 11 3/4"
E	(2) Lid Rim Front/Back*	1/2" x 1 1/4" x 24"
F	(2) Lid Rim End*	1/2" x 1 1/4" x 11 3/4"
G	(2) Lid Banding Front/Back	1/2" x 2 1/4" x 25"
H	(2) Lid Banding End	1/2" x 2 1/4" x 13"
I	(2) Lower Molding Front/Back	1/2" x 2 1/2" x 25"
J	(2) Lower Molding End	1/2" x 2 1/2" x 13"
K	(2) Upper Molding Front/Back	1/2" x 1 1/2" x 25"
L	(2) Upper Molding End	1/2" x 1 1/2" x 13"
M	(2) Tray Sides	1/2" x 2 5/8" x 23"
N	(3) Tray End/Divider	1/2" x 2 5/8" x 4 5/8"
O	(1) Tray Bottom	1/2" x 5" x 23"
P	(2) Tray Cleat	1/2" x 1/2" x 11"
Q	(1) Decorative Lid Panel	1/2" x 6" x 12"

### Hardware

- (2) 2" x 1" brass butt hinges with screws
- (1) Chest lock with key
- (2) 3 1/2" brass-plated chest handles
- (1) 12" brass chain (for lid support)
- (16) #6 x 1 1/2" wood screws
- (10) #6 x 3/4" wood screws
- (10) #4 x 3/8" roundhead wood screws
- (4) #2 x 3/8" flathead wood screws

\*Case and lid rim are assembled as one piece from oversized stock. The lid rim is ripped free from the case after assembly.

## Chest Details



NOTE: All parts are soft maple unless otherwise noted.



struction and minimized wood movement stresses in the lid. It's not likely my chest lid will ever split, as so many of the old chest lids have.

Other than that, I stuck to tradition by using solid wood for the other panels in the project, gluing

up oversize panels from narrower stock. For ease of machining and to ensure that the lid fits tightly, I made each panel wide enough to include the case wall and inside rim of the lid. Then I ripped the lid rim free from the assembled box later on.

### Build the Box

Once the glue dried, I cut the front, back, and end panels to length using the fence as a stop block to keep each pair of panel lengths consistent (Figure 1). A router table and a  $\frac{1}{2}$ "-dia. straight bit allowed me to machine rabbets quickly at both ends of the front and back panels (Figure 2). Rabbeted corners make for a stronger connection than using a butt joint, and they leave a minimal amount of end-grain exposed. (Also, in case you're wondering, they're easier to cut and assemble than miters.)

Even if you cut with a surgeon's care, the depth and width of your rabbets may vary from this plan, which will affect the dimensions of the chest. Knowing this, I always dry-fit the case sides and ends to measure for the real-life dimensions of the plywood bottom before cutting it to size.

Make sure the bottom fits, then glue the case together. By turning the clamped assembly upside down, I was able to glue and screw the bottom into place (Figure 3). This helps square up the assembly.

As I mentioned earlier, when the glue dried, I cut the top  $1\frac{1}{4}$ " off the case to use as the inside rim of the lid (Pro Tip). Although I knew this method would give me a perfect lid-to-case fit, I soon realized the fit would be so tight that the lid wouldn't shut when it pivoted on the hinges. So I chamfered the top edge of the case to provide clearance. Using a compass, I scribed lines along the top edges and outer faces (Figure 4). Then I used a block plane to remove the material between the two lines (Figure 5).

### Construct the Lid

Since the inside rim and case match exactly, you want to preserve their shape even if they're slightly out-of-square. To do this I recommend the following steps.

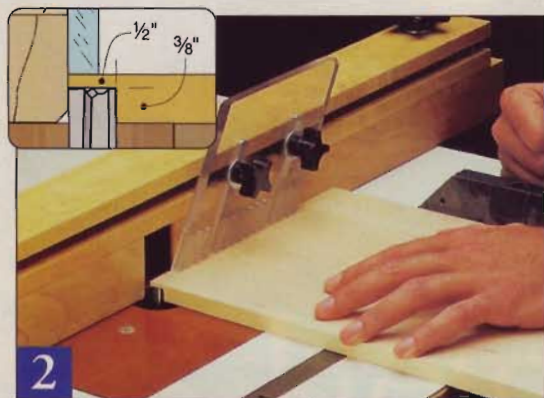
First, measure the length and width of the rim, add  $\frac{1}{2}$ " to these dimensions, and cut the top panel to match. Then form the tongue on the panel's edges with a router and a straight bit (Chest Details).

Next, rip  $\frac{1}{2}$ "-thick maple to width for the lid banding and rout a groove in this stock (using a router table setup) to mate with the top panel. Routing the groove a little deep allows fudge room for fitting.

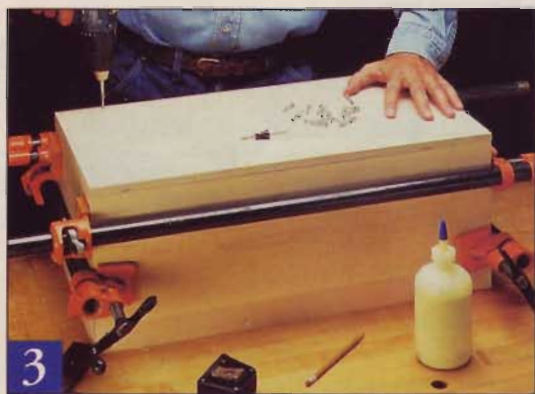
Now mark lines on the underside of the top panel  $\frac{1}{4}$ " from each edge. Set the lid rim in place along the lines, taking care not to distort the rim's shape. Use double-face tape to hold the lid rim in position.



1 Clamping a stop block to the fence allows you to cut matching panels to the same length. Be sure to trim an end square first.



2 Rabbet the ends of the front and back panels using a  $\frac{1}{2}$ "-dia. straight bit. To ease the strain on the bit, make multiple passes, cutting the rabbet slightly deeper with each pass.



3 Glue and clamp the case front, back, and ends together, then glue and screw the plywood bottom into the assembly. Later, separate the top  $1\frac{1}{4}$ " of the case for the lid's rim.



4 Using a compass, lay out the margins of the chamfers —  $\frac{1}{2}$ "-high  $\times$   $\frac{1}{4}$ "-deep — along the top edges of the case.



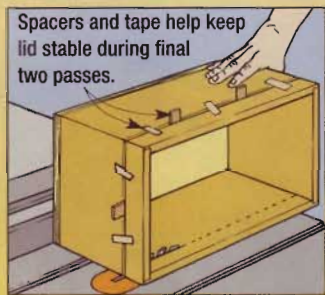
5 Form the chamfers with a block plane by removing the stock between the layout lines — go easy at the rabbeted corners.

## PRO TIP

### Cutting the Case

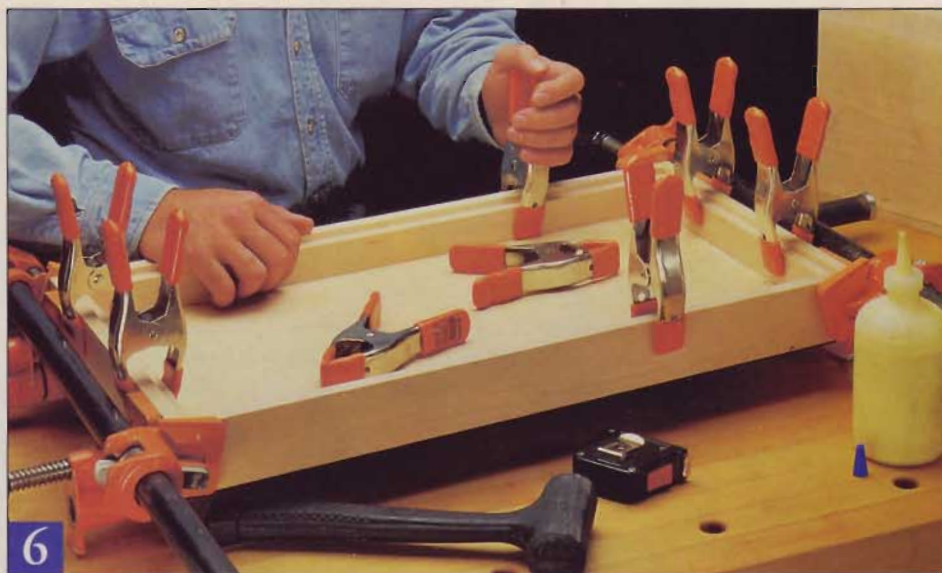
When you separate the lid rim from the case, set your fence the proper distance and cut two adjacent faces. Then slip  $\frac{1}{8}$ "-thick spacers in the saw kerfs, and stick tape across the kerfs, to keep the lid rim stable during the final two passes.

Spacers and tape help keep lid stable during final two passes.



Now you can fit the lid banding. Starting with the front piece, miter one end of the banding at  $45^\circ$  and fit it to the panel. Mark the piece for length, miter this end, then clamp it back in position.

For the next piece cut a  $45^\circ$  miter to mate with the front banding. If the joint isn't tight, adjust the saw and recut the miter. Once the joint's tight, mark the length of this piece and cut a  $45^\circ$  miter. Working around the lid in this fashion will yield four tight fitting joints. The only thing left is to glue and clamp the assembly (Figure 6).



Use double-face tape to hold the lid rim in place on the top panel, then fit the mitered lid banding around the lid rim and top panel one piece at a time. Clamp the banding in place as you complete the fitting of each piece. When all the pieces fit, glue and clamp the banding to both the top panel and the rim.

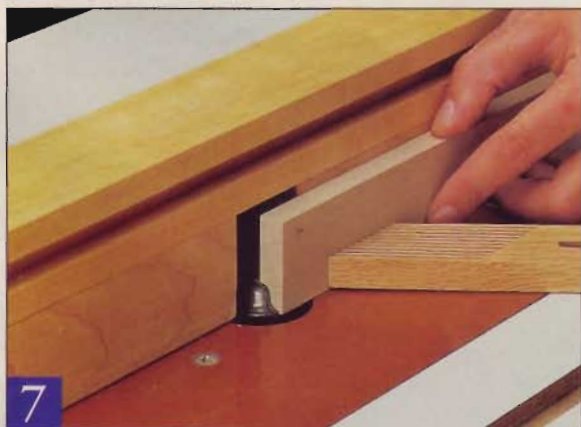
### Add the Trim

Right now all you have is a plain box. Nice, but probably not what you'd consider an heirloom piece. What puts this project into that category are the moldings. I chose a classic Roman ogee profile (Figure 7). And as long as I had the router set up with this bit, I also routed the edges of the decorative raised panel — the one for on top of the lid.

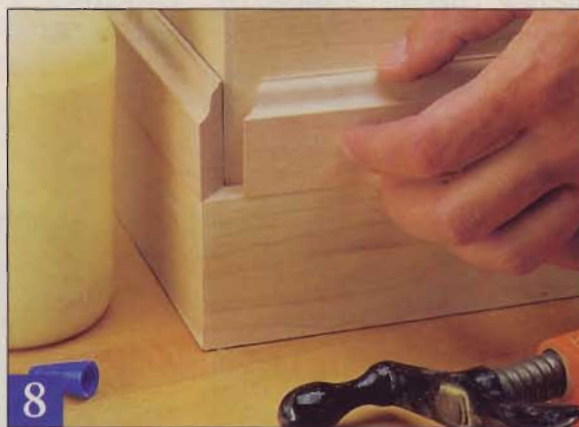
Fitting molding to the case follows the same procedure described for banding the top panel. Miter the lower front trim molding to length first, then work your way around the box. Once all the pieces fit, glue and clamp the molding in place.

Whether you install the upper molding now or later depends on the lock mechanism you choose. The lock I picked (no pun intended) mounts in the front piece of upper molding, making it impossible to install this molding before forming the mortise and installing the lock (see *Five Steps to Installing the Lock Hardware* on the next page).

When you do get around to fitting the upper molding, you'll find it helpful to turn the case upside down — with the lid in place. This way the lid can act as a ledge upon which to rest the molding (Figure 8). Begin by fitting the front piece, then work your way around the case.



With your molding stock on edge, rout with a Roman ogee bit. A featherboard helps hold the stock tightly against the fence.



Turn the case and lid upside down to fit the upper molding. You may need to leave the front molding off to install the lock.

## Five Steps to Installing the Lock Hardware

A locked chest certainly won't turn back a determined thief, but it can stop a curious child. I used a basic half-mortise lock for my heirloom chest. After marking out the lock's location on the upper molding, the installation was simple, although a bit fussy. Fortunately, most of the work on the mortise gets covered up.



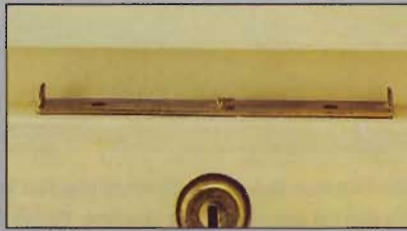
**Step 1:** Drill a 1/2"-dia. hole for the key barrel. Drill from the front to avoid visible tearout.



**Step 2:** Mark out the mortise location, then use a Forstner bit to remove most of the waste.



**Step 3:** Use a chisel to square the mortise to the layout lines and clean up the bottom.



**Step 4:** With the lock installed, close the lid on the catch plate to mark its location.



**Step 5:** Carefully form a shallow mortise in the lid banding for the catch plate.


### Finishing Up

Fit the hinges by clamping the lid to the case. Mark the hinge locations, and form the mortises (**Figure 9**). When you're done, install the hinges and mount the lid chain (**Chain Detail**).

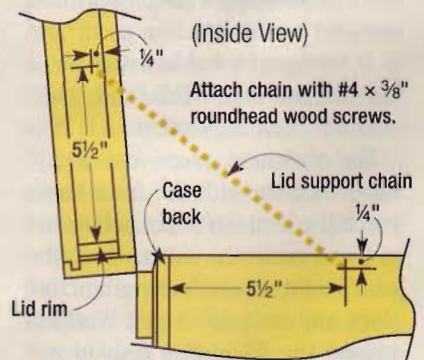
The tray features the same rabbeted construction as the case. Machine the rabbets, as well as the divider dados, on the router table.

I used double-face tape to hold the raised panel in position while I drilled pilot holes and drove screws from inside the lid panel. Before installing the tray cleats in the case, I thoroughly sanded the chest inside and out.

For a rustic look, I brushed-on a coat of flat paint (I used Holly Berry Red Simulated Milk Paint from Olde Century Colors, 1-800-222-3092). I left the inside unfinished — the original chest had a couple of coats of linseed oil, which made the contents smell like the finish. A brass handle centered on each end of the chest wraps up the project.

I know my chest won't collect all the dings and scars that came from daily use of the originals, but it will still acquire more character as it ages, like the time-worn keepsakes it protects. 

### Chain Detail



9

Clamp the lid to the case so the banding is flush with the upper molding. Then lay out and chisel the hinge mortises.



# '98 Tool Show Highlights

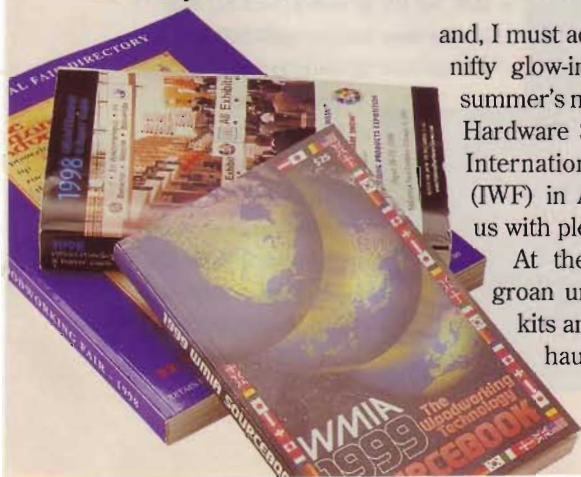


*Every year the Workbench editors make the trek to several major industry trade shows, scouting the booths for the best new tools and building products*

and, I must admit, free candy and those nifty glow-in-the-dark key fobs. This summer's main events — the National Hardware Show in Chicago and the International Woodworking Fair (IWF) in Atlanta — again provided us with plenty of news to report.

At the end of each show we groan under an armload of press kits and catalogs, but this year's haul also included a hefty

sampling of ambitious product claims, a sort of hyper-hype. Some of the more zealous marketing reps scout the aisle traffic for press badges, then corral you to explain how his or her company invented gravity. I'll bet I heard at least fifty billion exaggerations!!! But hey, no hard feelings. That's their job, just like it's our job — nay, our sworn duty — to wade through that stuff and find out if it's all booster rocket and no payload. I'm happy to say there's still a lot of innovation to interest our readers. Here are some examples.



# Hitachi Revs Up: Launches Two New Saws

■ Hitachi has always been a curious player in the power tool market, launching innovations like its hugely popular 8½" sliding compound miter saw, then running middle-of-the-pack in basic categories such as drills or routers. This year's introductions suggest the big green machine is once again intent on getting the attention of serious woodworkers.

Unveiled at the hardware show was another industry first — a pivot-arm ("chop") miter saw that bevels both right and left for compound angle cuts. A motor

mounted above the blade yields the clearance required for leaning the saw 45° in either direction, and the belt drive keeps power delivery quiet. At under \$300, it's an affordable alternative to the few (and pricier) dual compound sliders out there.

Check out the 18-volt cordless saw, too — a 6½" blade and a built-in light!



Hitachi C6DC 18-volt saw (about \$250)

Hitachi-Koki U.S.A.  
(800) 546-1666



## Hammer Help

■ Sometimes the shortest route to a destination is a detour. Several hammer manufacturers have figured this out and designed heads that hold a nail sideways, so you can start it one-handed, then turn the hammer straight and drive it home.

This solution is fine — unless you have a favorite hammer you don't want to give up. We found another answer — the Nail Starter from Speare Tools. It retrofits your hammer with a metal clip and spring assembly that pinches a nail shank so

you don't have to hold it. Handy, and it sells for under \$3. Call Speare at (414) 245-1614.

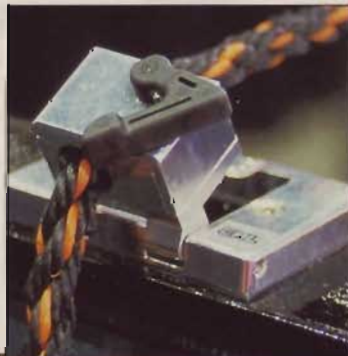


## Self-Locking Tie-Down System

■ More proof that good things come in small packages, here's help for all the knot-impaired among us — self-cinching tie-downs for securing lumber and cargo.

Cal-Grip tie-downs feature a knurled, spring-loaded cam that automatically holds the rope's tension as you pull it taut, but lets go with a quick flip of a release lever. Load range is 500-800 lbs. on rope from ⅛" to ½" in diameter,

depending on model. Mounting adapters fit round or flat surfaces, plus there's a nice stake pocket version for pickup trucks. Retail is \$20-\$30 a pair. Valley Forge Technology, San Jose, CA (888) 259-9898.



## User-friendly Measuring

■ On tools that get constant use, small improvements can make a big difference. We saw several welcome changes to layout tools this year, including a growing line of CenterPoint Tools from Baklund-Hellar. Steel bench rules



have been added to the company's lineup, with the same dual-scale blades for calculating the center of a dimension. Simply find the mark you need on one edge of the rule, then locate it among the half-scale increments on the other edge. The new 12" and 24" flat steel rules each sell for under \$10. Call (800) 540-6604.

Improved ergonomics keep appearing in new Stanley tools, including three new Maxi-Steel tape rules with cushion grips — priced at \$8 to \$16. Call The Stanley Works at (800) 782-6539.



## Bosch Refines the Router

■ I know all they do is spin a cutter around really fast, but routers have subtle differences, even personalities, that can make you love them or hate them. If good details do it for you, get ready for a torrid romance with Bosch's new 1617EVS. A 2-hp motor packed into a compact magnesium housing and base, electronically controlled variable speed, a quick-change guide template system, and two, count 'em, two depth-adjustment features — one that lets you dial in fine adjustments — ideal for use in a router table. It's quiet, powerful, and fitted with lacquered and polished maple handles. Enough to make a grown man cry. Or at least drool. Retail cost will land near the \$200 mark.

Bosch apparently had other mad engineers afoot, busy developing the 1640VS Finecut Saw (\$100). Designed for finish cuts in trim, picture frames, molding, and joinery, its interchangeable reciprocating blade does offset flush cuts and, with help from an optional fixture, precision miters and cutoffs. Call S-B Power Tools at (800) 301-8255.



## New Powermatic Contractor's Saw

■ It's still the little brother, but the contractor's table saw in Powermatic's Artisan line is growing up to be more like its heavy-weight sibling, the Model 66 cabinet saw. Changes to the Model 64 include a switch to a left-tilt blade, solid cast-iron extension wings, a 1½-hp motor with three-belt drive, and the Accu-Fence system. Look for an \$800 price tag.

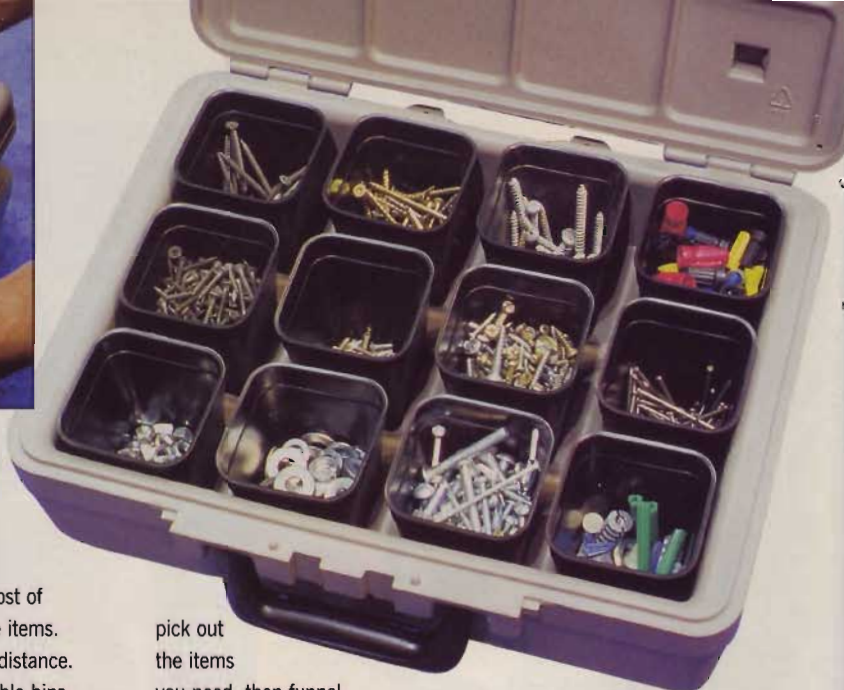
Powermatic is taking aim at the small shop market with other tools as well, including a 10" benchtop table saw, a 1-hp dust collector, and a 12½" portable planer (left). Call (800) 248-0144.





## Power-Chute Puts Lid On Parts Mess

■ Bins for organizing hardware are nothing new, but most of them help only with storage, not with actually using the items. Here is a remodeler's homespun solution that goes the distance. The Power-Chute Organizer (\$34.95) sports 12 removable bins for storing small items, but it's the molded lid that makes the difference. The recessed lid doubles as a sorting tray that lets you



pick out the items you need, then funnel the leftovers into the cup through a chute at the back. Fast. Clever. Call PlastiCreations International at (816)525-0353.



## Finally, Something That Sucks!

■ It's all well and good if nature abhors a vacuum, but most small-shop woodworkers would be hard pressed to live without one. If yours is underappreciated, here's something to make you fall in love all over again. (Incidentally, that's just an expression. A modest affection is all anyone should ever feel for a workshop appliance.)

The something to celebrate is the Mini Mach Vacuum Bed from Carter Products. Powered by a standard shop vacuum (not included), this 12" x 18" device uses suction to anchor itself and provide clamp-free holding for workpieces from 4 in. to 4 ft. square. Twelve spring-loaded ball valves nest among a cushioned grid that creates an air lock hold when a workpiece is pressed onto the bed. Every valve contacted by the workpiece opens automatically, securing work for routing, sanding, and other tasks. A release valve cuts off pressure when you're done. Suggested retail is \$149. Call (616)451-2928.

## Laser Tools Get Closer to Home

■ Two goodies for all you high-tech home improvers: Stanley's Type 1 torpedo laser level (below) mounts to a camera tripod and projects a beam accurately to 70 ft.

Momentum Laser's new Auto Cross laser (right) also fits a camera tripod and is pendulum-mounted inside its housing. It self-levels (up to 7°) and projects a cross-hair pattern to 100 ft.



Stanley Type 1  
(about \$100)  
(800) 782-6539



Momentum Laser's  
Auto Cross (\$150)  
(408) 327-0888



## True Grid

■ What do you get for the kitchen that has everything? Hafele America is offering these high-end lattice panels in maple, beech, and red oak (cherry on the way) for use as accents in upscale cabinetry and furniture. Each wood strip is radius-edged, sanded, and triple-laminated into a ready-to-finish panel. Beautiful, but pricey at \$300 (ouch!) for a piece approximately 24" x 48". Call (800)423-3531.

## Sharp and Sassy

■ Can something be beautiful and scary at the same time? Of course. (Remember Sharon Stone in *Basic Instinct*?) Well, here's another example: the Firestone Belt Axe from McGowan Mfg. Co. An investment-cast stainless steel head, sporting a glass bead satin finish and a mirror edge, is fitted to a sensuously curved handle of laminated Finnish birch. Balance and craftsmanship are first-rate. Priced at \$150 with sheath. Call (320)587-2222.



## A Cure for Doorknob Damage



■ If the door stop got installed too late or didn't protect the wall, an optimist might patch the drywall and hope for the best. Here's a nod to reality (the likelihood of another doorknob assault). For \$6, you can get the KnobNest, a molded plastic housing that provides a trimmed recess in the wall for that belligerent doorknob. A self-adhesive gasket helps you mark and cut the drywall for a quick fix. Wall Tool & Tape Corp., Ozone, NY (718)641-6813.

## Makita Cordless Climbs to 18V

■ The competition in cordless continues to heat up. Makita, which has a long history with cordless tools and has offered a small cordless trim saw for years, goesos their offering this year with an 18-volt lineup. It includes a 6½" circular saw and a ½" drill/driver. They're priced well above the company's lighter-duty 4.8- and 7.2-volt tools, but these new offerings have better components and features, not to mention enough power to twist your underwear into a bunch. Like the 18-volt tool introduced by rival Hitachi, the 6½" saw can cut through 2x framing lumber at 45° — a nice feature for serious carpenters and a first for cordless circ saws. Look for retail cost near \$289 for the saw kit (with one battery), same for the drill kit (with two batteries). For more information, call Makita at (800)462-5482.



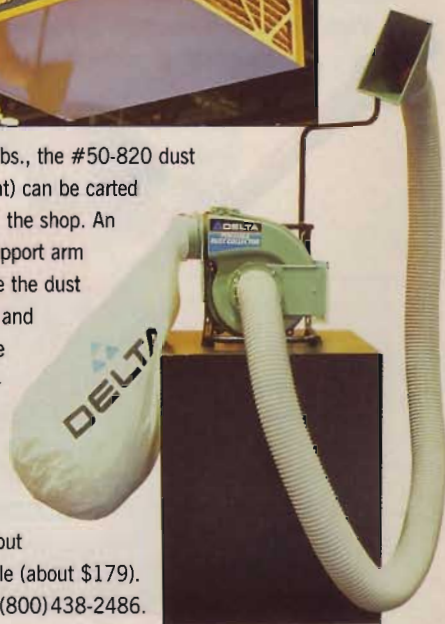
## Delta Does Dust Duty

■ Delta International Machinery has had plenty of dust collection solutions for professional shops, but this year it's introducing more help for the home shop woodworker — a ceiling-mount air cleaner and a ½-hp dust collector that's designed for instant portability.

The air cleaner (\$249 retail) features tool-free access to its pleated prefilter and second-stage 3-pocket bag filter.



At only 39 lbs., the #50-820 dust collector (right) can be carted easily around the shop. An adjustable support arm lets you place the dust hood quickly and directly at the source of discharge. As an alternative to a duct system it's effective but still affordable (about \$179). Call Delta at (800)438-2486.





## One Fein Tool

■ We've seen a lot of innovations in cordless tools over the past decade, but here's a twist we never anticipated — a drill with your choice of battery positions. Fein's new ABS 12-2 drill accepts its battery pack below the handle, like a conventional T-handle drill, but also on the back end of its motor housing. Each position offers a different balance and clearance equation, so you can tailor it to the application and access you have. (A plastic cap protects the terminals on the unused end.)

Features of the system include a 1/2" key-less chuck, a rare-earth magnet motor, two 12-volt battery packs, a one-hour charger, and a steel carrying case. A retail cost of \$250 is steep for a cordless drill, but this is an industrial-quality German tool. Call (800)441-9878.



## Tormek Tames the Skew



■ The Tormek sharpening system relies on a simple formula for success — couple a speed-controlled motor to a large water-cooled grinding wheel and a honing wheel, then use a series of tool holders to make it efficient and versatile — enough to sharpen chisels, turning gouges, scissors, axes, even planer knives. The latest goodie designed for the system is a skew-grinding jig that lets you vary bevel and skew angle for turning chisels, and even grind a radius edge for better control. Cost is about \$50. Call (800)586-7635.

## Smart Fans

■ Honeywell is bringing its climate control technology to ceiling fans with an industry first — automatic function with a built-in thermostat. Program the wall device for temperature conditions, and it operates the fan for you! (\$149-\$199). Call (800)332-1110 for more info.



## Meter/Mix Dispenser Ends Gas Pains



■ If you were inspired by the chainsaw review in our last issue and have invested in one to call your own, you may already be familiar with the ritual of mixing gas and oil for a two-stroke engine. Here's a great idea that takes the math — and the uncertainty — out of getting the gas/oil ratio right where it's supposed to be.

The EZ 2-Cyclor couples a one-gallon gasoline tank with a quart-size compartment for two-stroke oil, complete with a built-in dial and pump for dispensing the oil into the gas. Simply select the ratio you need, and the pump meters the amount of oil needed for a gallon of gas. No guess, no mess.

Expect a retail cost of about \$30 and availability in early 1999. Made by CCI Products of New Hudson, MI (248)486-6901.

## Keyed Gate Latch

■ Conventional gate latches allow padlocking for added security, but they block even authorized access from the outside of the gate, tempting us to do without the lock completely.

One of the best hardware solutions we saw in Chicago offers a fix for this. The Lokk-Latch system from D&D Technologies combines a gravity-latch mechanism with a built-in lock cylinder. It can be left unlocked for pushbutton opening, operated with a key, or with

the external access kit, operated from the street side of the gate. With mounts available for wood, metal, vinyl, and masonry, the complete system sells for \$34.99. The individual components also sell separately, as do matching hinges. Call (800) 716-0888.



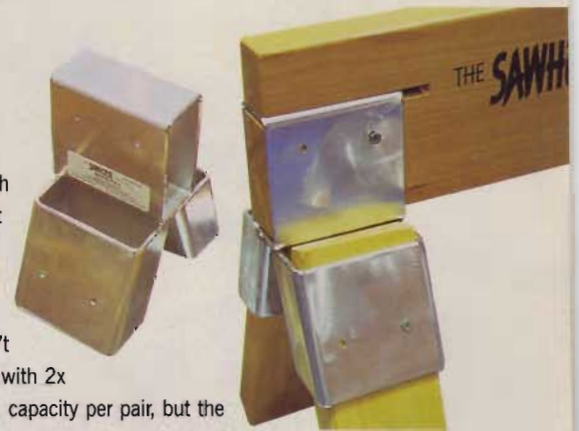
## Fan Support

■ Want to install a ceiling fan or chandelier safely without adding to the framing above? Reiker Enterprises offers a line of heavy-duty mounting brackets for remodeling retrofits or new construction. Prices range from \$3 to \$20. Very easy to install.



## Make A Horse With Real Beef

■ Strong. Simple. Gets the job done without much fuss. Sounds like a character sketch for a Clint Eastwood western, but it's an apt description for the design of these sawhorse brackets. Made of three sections of aluminum tubing welded together, the compact brackets allow but don't require fasteners, and they can be quickly fitted with 2x lumber at a job site. They're rated at 1,000 lbs. capacity per pair, but the manufacturer has conducted successful stress tests done at much higher loads. Cost is \$59.95 per set of four (shipping incl.). Contact The Sawhorse Connection at (800) 320-0003.



## Vermont American Sets the Table for You

■ You're probably used to seeing the Vermont American name on small accessories such as drill bits and saw blades. In Chicago, these tools were sharing space with a larger sibling — a new router table. None of this table's features are brand new to the industry, but they're grouped well here and at a very competitive price. The cast aluminum top is fitted with two steel extensions, providing roughly 550 sq. in. of support surface.

The universal mounting plate (with a healthy 14" clearance below) accepts any router, and a shaper-style fence allows offset routing and jointing. Finally, a master switch

controls the router motor and a shop vacuum simultaneously, and a dust collection hood is standard. A nice package for \$129 retail. Call VA at (800) 742-3869.





# Rolling Tool Box

*The saying goes, he who dies with the most tools wins! If that's true, we'd better get cracking because my auto mechanic is leading the field by a wide margin. What really hurts is that he has them organized in cabinets with more*

drawers than Fruit of the Loom, allowing each set of tools to have its own compartment! It's enough to make a woodworker weep.

Frankly, I couldn't take it any

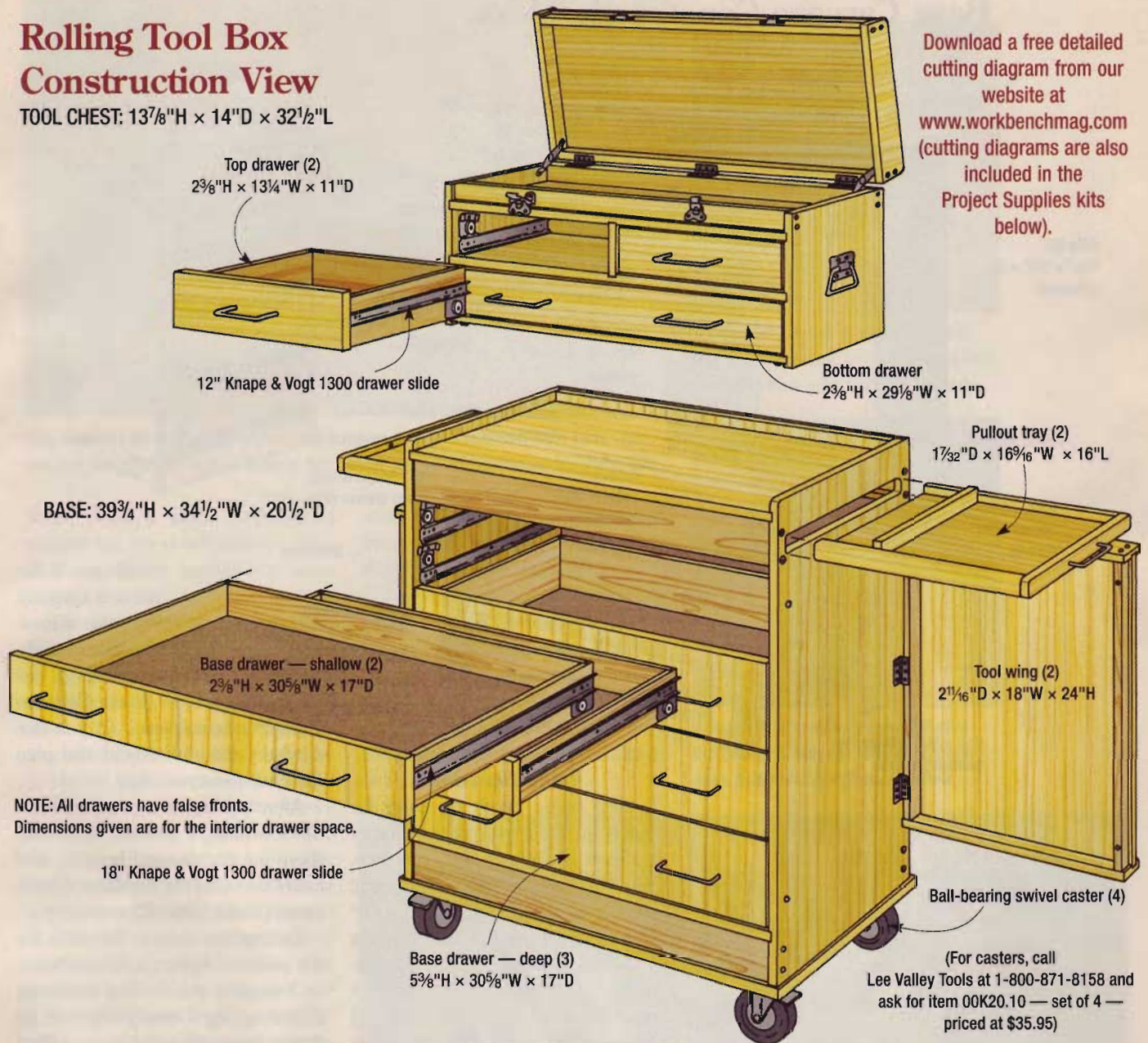
longer. So I built a rolling tool cabinet that rivals any run-of-the-mill metal version you'll find in a store. Packing a whopping 12,725 cubic inches of drawer space, it has a

separate mechanic's-style tool box that sits on the rolling base unit. There are pull-out work trays on either side — perfect for changing a router bit or setting a tool you don't want to put away just yet — and a pair of swing-out wings that give ready access to my most often-used tools. Even fully loaded, this cabinet maneuvers easily on four ball-bearing swivel casters.

# Rolling Tool Box Construction View

TOOL CHEST: 13<sup>7</sup>/<sub>8</sub>"H x 14"D x 32<sup>1</sup>/<sub>2</sub>"L

Download a free detailed cutting diagram from our website at [www.workbenchmag.com](http://www.workbenchmag.com) (cutting diagrams are also included in the Project Supplies kits below).



NOTE: All drawers have false fronts. Dimensions given are for the interior drawer space.

(For casters, call Lee Valley Tools at 1-800-871-8158 and ask for item 00K20.10 — set of 4 — priced at \$35.95)

## What You'll Need

### Lumber

- (3) 60" x 60" sheet of 18mm (1<sup>1</sup>/<sub>16</sub>" ) Baltic Birch plywood
- (1) 4 ft. x 8 ft. sheet of 1/4" tempered hardboard
- (1) 4 ft. x 4 ft. sheet of 1/4" tempered hardboard
- 48 lin. ft. of 1/2" x 7" maple
- 8 lin. ft. of 1/2" x 7 1/2" maple
- 3 lin. ft. of 3/4" x 6" maple

### Hardware

- (5) Pair of 18" Knape & Vogt 1300 drawer slides
- (3) Pair of 12" Knape & Vogt 1300 drawer slides

- (16) 119mm x 28mm steel drawer pulls
- (32) 4mm x 25mm machine screws
- (7) 2" x 1<sup>9</sup>/<sub>16</sub>" butt hinges
- (2) Zinc-plated rotary latches with keepers
- (2) Heavy-duty nickel-plated handles
- (2) Lid stays
- (28) #6 x 2" flathead sheet-metal screws
- (28) #6 nickel-plated finish washers
- (32) #8 x 1" flathead sheet-metal screws
- (28) #8 x 2" flathead sheet-metal screws
- (16) #8 nickel-plated finish washers
- (12) #6 x 1/2" flathead sheet-metal screws
- (8) #10 x 5/8" panhead sheet-metal screws
- (4) Ball-bearing swivel casters

## WORKBENCH PROJECT SUPPLIES

### BASE

A kit has been assembled for this project that includes the drawer slides, drawer pulls, hinges, finish washers, and all mounting screws needed to build the base cabinet, along with a cutting diagram (casters not included).

Order number 3309200 ..... \$124.95

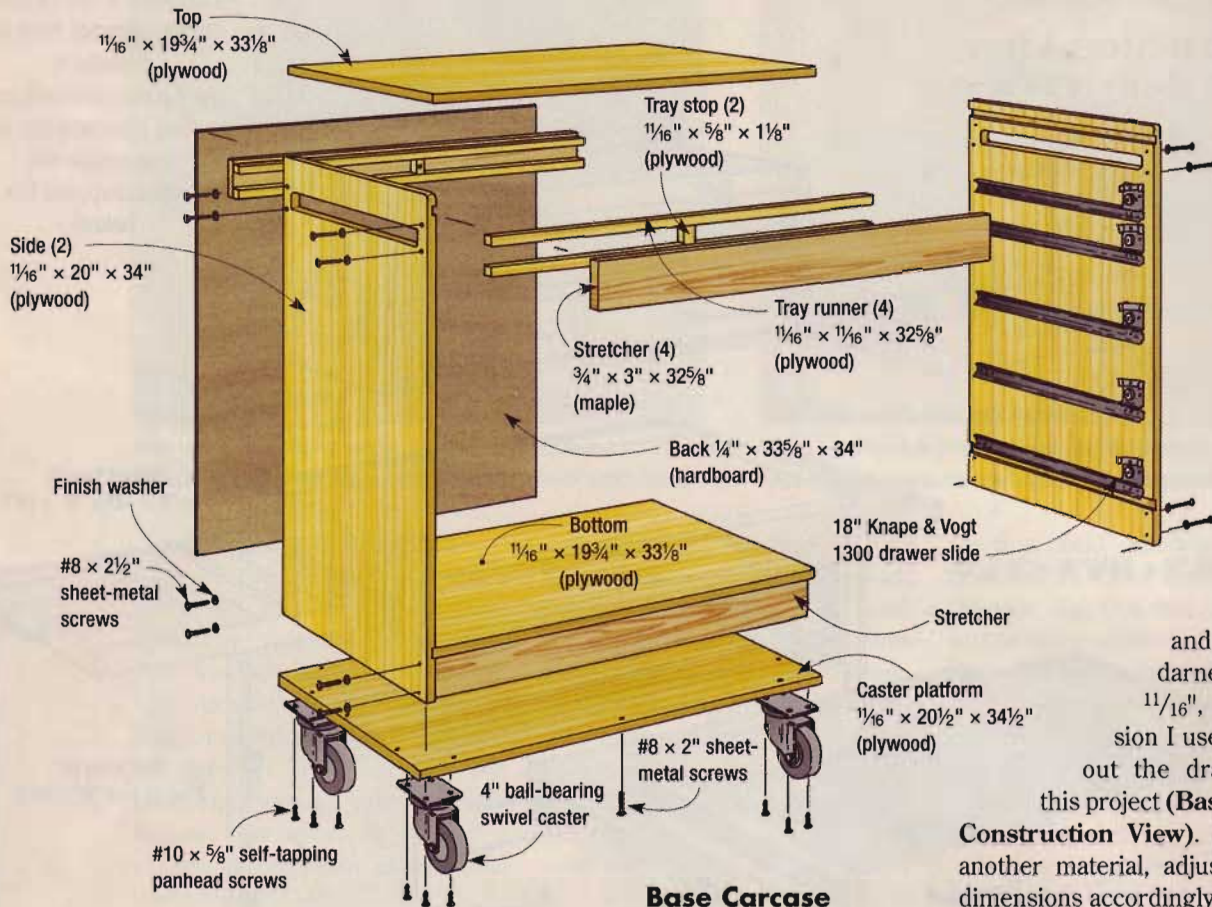
### TOOL CHEST

A kit has been assembled for this project that includes the drawer slides, drawer pulls, hinges, rotary latches, lid supports, handles, finish washers, and all mounting screws needed to build the tool chest, along with a cutting diagram.

Order number 3309100 ..... \$79.95

To order, call Workbench at (800) 311-3994

## Base Carcase Construction View



and you'll be darned close to  $1\frac{1}{16}$ ", the dimension I used throughout the drawings for this project (**Base Carcase Construction View**). (If you use another material, adjust the plan dimensions accordingly.)

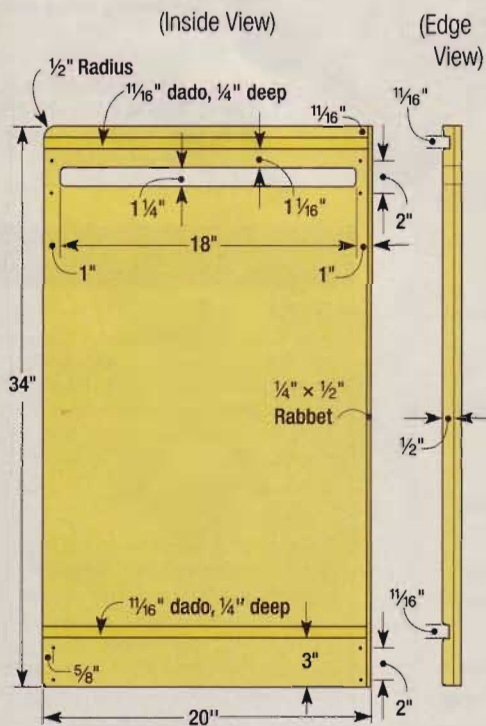
### Base Carcase

I used Baltic Birch plywood for much of this project, primarily because it's sturdy and void-free. Since it's manufactured in metric thicknesses and sold in 60" x 60" sheets, you'll need to switch gears a little from working with conventional sheet goods. The nearest equivalent of  $\frac{3}{4}$ "-thick plywood (most of which actually measures  $\frac{23}{32}$ "), is 18mm Baltic Birch. Convert that thickness to inches

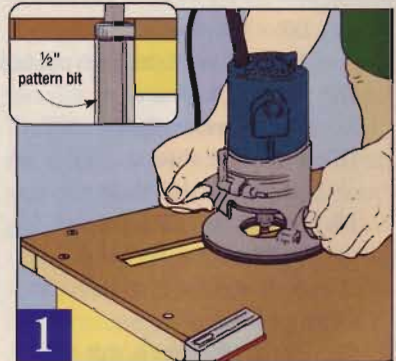
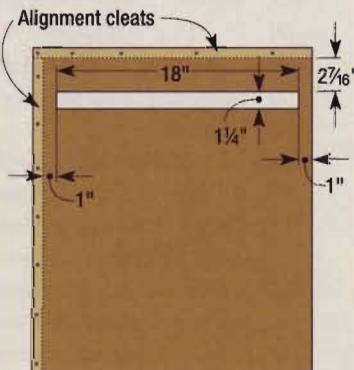
After cutting side panels to size for the base, I plowed dados in them for the top and bottom, and cut rabbets for the hardboard back panel (**Base Side Elevations**).

Cutting the slots in the sides for the pull-out trays calls for precision, so I suggest you build a router jig (**Slotting Jig Detail**). Use the jig first to layout the slots. Then drill an access hole in the middle of each layout and saw out the bulk of the

### Base Side Elevations



### Slotting Jig Detail



1 Fit the side panel against the jig alignment cleats. Smooth the edges of the roughed-out slot using a  $\frac{1}{2}$ " pattern cutting bit.

## Drawer Slide Locations

waste with a jig saw (stay about  $\frac{1}{16}$ " inside the lines). Then use the jig again to rout the slots (**Figure 1**).

Without glue, clamp the carcass together once you have the stretchers cut to size. To help square the assembly I temporarily installed the back panel. If everything checks out, drill pilot holes where the sides meet the stretchers and drive in some screws.

While I had the carcass assembled, I made marks for installing the tray runners (*Installing the Tray Runners*). To install the runners, I had to take the carcass apart. Screws and glue hold the runners in position on the stretchers. Make sure the distance between each pair of runners is constant or the trays will bind.

Allow plenty of time for the glue on the runners to set before you clean off any squeezeout. Then permanently assemble the carcass with glue and screws. (Again, you can use the back panel to help square the carcass assembly.)

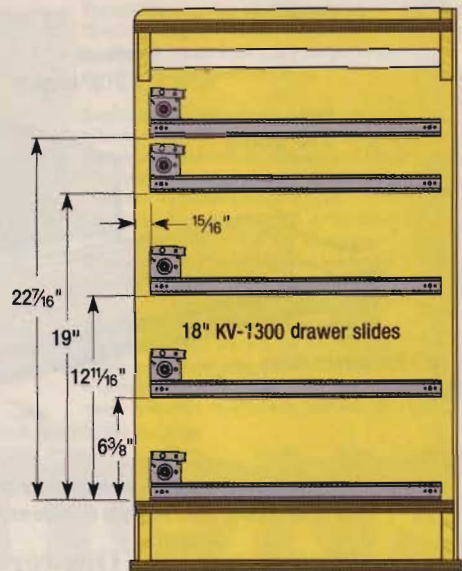
After you assemble the carcass, install the caster platform. Make sure you drive these screws so they won't interfere with the caster mounting screws.

Before adding the casters, I backed out the screws holding the sides to the stretchers so I could sand the carcass and apply two coats of an oil-varnish finish. Then I reinstalled the screws with finish washers and mounted the casters.

### Install the Drawer Slides

I designed the drawers with false fronts to simplify mounting the drawer slides and fitting the drawers. Once the drawer positions are fixed, you can easily adjust the fronts to maintain even spacing.

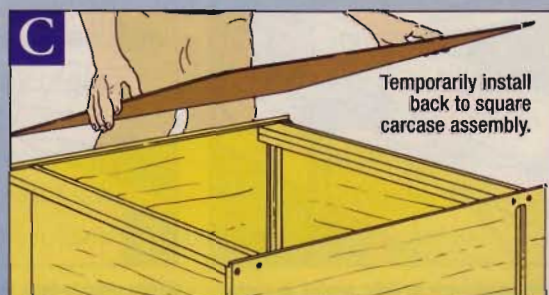
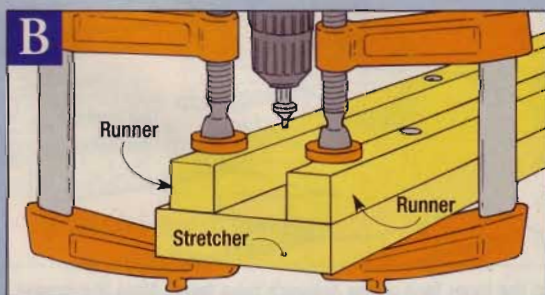
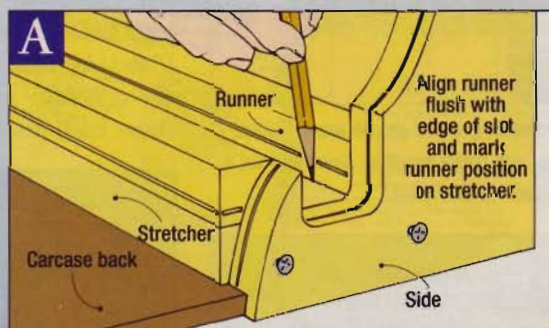
Over the years I've learned a thing or two about installing drawers, including an easy way to position the drawer slides. I just rip a piece of scrap plywood narrower than the width of the carcass (about 18" in this case), then cut it to length to match the height of the highest slide position (**Drawer Slide Locations**). By clamping this guide to a side panel, you can rest the slide on its top edge. Align the front of the slide for the proper setback —  $\frac{15}{16}$ " in this case — and screw it down (**Figure 2**). Trim the guide to match each slide position, working from the top of the carcass to the bottom.



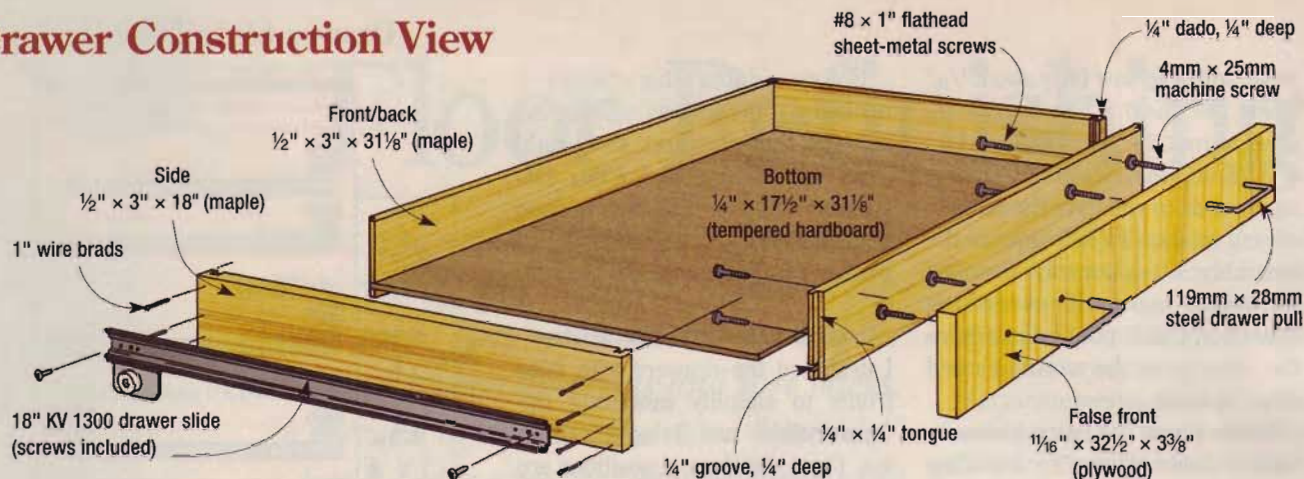
**2** Rest a drawer slide atop the guide and drive the screws. Trim the guide to install each pair of slides.

## Installing the Tray Runners

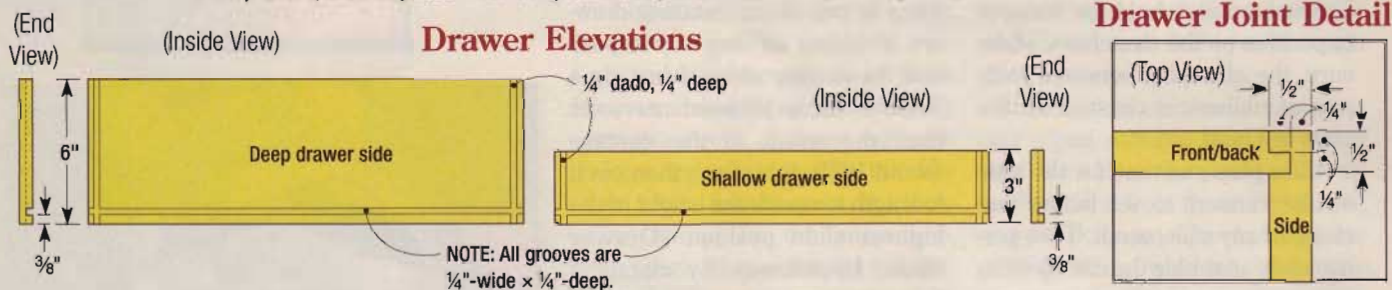
**(Step A)** With the carcass dry-assembled, including the back, align the runners with the edge of the slots and mark their position on the stretchers. **(Step B)** Disassemble the carcass to glue, clamp, and screw the runners in place. **(Step C)** Then glue and screw the carcass together again, temporarily installing the back to square the assembly.



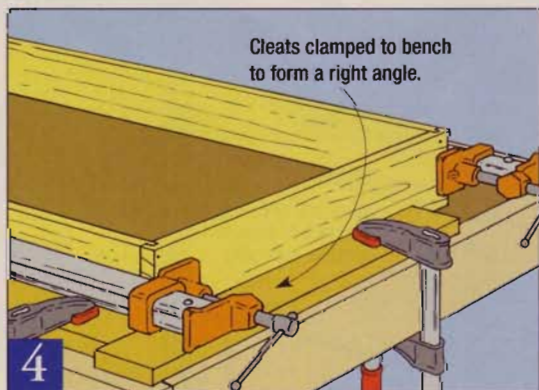
# Drawer Construction View



NOTE: Drawer construction is identical for all drawers. Shallow drawer is shown. For deep drawer, make all parts 6" wide except false front, which measures  $\frac{1}{16}'' \times 32\frac{1}{2}'' \times 6\frac{1}{4}''$ .



Glue the tongue-and-groove drawer sides, fronts, and backs together. Drive and set a few brads in each joint.



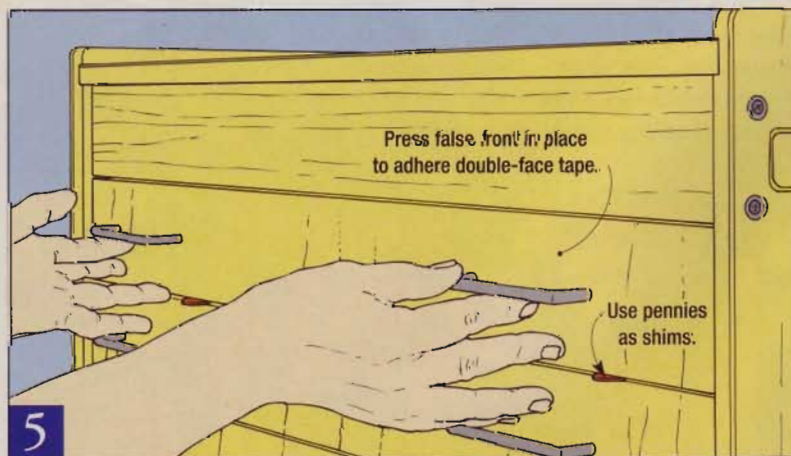
Fasten two cleats to your workbench at right angles to each other. Clamping the drawers to the cleats squares them up.

**Build the Drawers**

Though they come in two heights, all five drawers in the base unit are the same width and depth (**Drawer Construction View**). Keep in mind that the width is determined in part by the drawer slide hardware. The Knap & Vogt 1300 slides I used require drawers 1" to  $1\frac{1}{16}''$  narrower than the cabinet opening, with  $\frac{1}{4}''$  clearance above each drawer box.

Join the soft maple drawer fronts, backs, and sides with tongue-and-groove joints, and fit the hardboard bottoms in grooves (**Drawer Elevations and Drawer Joint Detail**).

Apply glue to the tongue-and-groove joints, as well as the grooves for the bottoms, and assemble each drawer. For insurance, I drove a few brads into the joints (**Figure 3**).



Apply double-face tape to the inner face of the drawer's false front. Align the drawer front using pennies to shim the drawer front  $\frac{1}{16}''$  off the drawer below and the sides.

Before the glue begins to set, check each drawer for square and clamp the joints tight (**Figure 4**). It may not seem important, but having square drawers is essential, both for the fit of the drawers in the carcass and for the smooth operation of the slides.

### Add the Drawer Fronts

Once the drawers are assembled, mount the drawer sections of the slides to them (*Drawer Slide Installation Made Easy*) and cut the drawer fronts to size. I planned ahead and cut all the fronts from a single sheet of Baltic Birch to get a continuous grain pattern from drawer to drawer — not critical, but a nice touch that tells everyone a craftsman made this project.

Apply finish to the fronts and install the drawer pulls. I suggest you counterbore the screw heads so they won't interfere when you mount the fronts to the drawers (**Drawer Elevations**).

Now, starting with the bottom drawer, put the drawers in the carcass and add the fronts. I like to use double-face tape to position the front once each drawer is installed (**Figure 5**). Temporarily clamping the front in place will firmly adhere the front to the drawer, and because the tape is thin and hidden from view, I just leave it in place.

When the front's position is set, pull the drawer out and drill pilot holes to permanently mount the front with screws.

Follow this routine for all the drawers except the top one, which is where you may have to make an adjustment to compensate for any cumulative effects of the drawer front installation. In my case, I had to trim the top edge of the top drawer front just a hair to create a uniform  $\frac{1}{16}$ " gap.

Once you adjust the top drawer front's size, sand the edge and apply the finish. Then you can complete the installation like you did for the rest of the drawers.

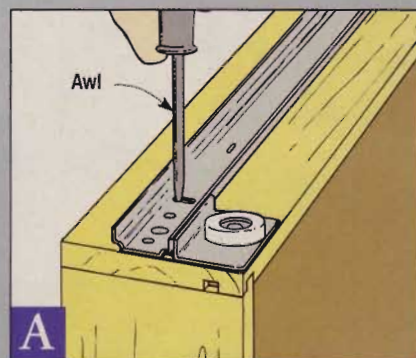
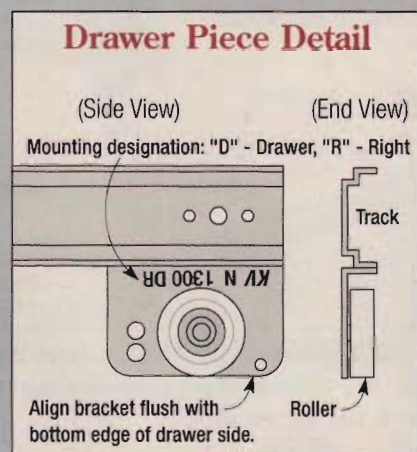
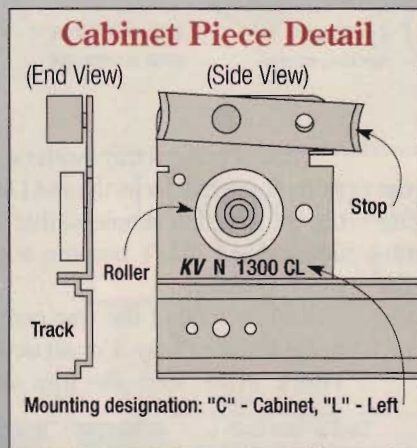
## Drawer Slide Installation Made Easy

Drawer slides, including the Knape & Vogt 1300 series slides I used in this project, are typically sold like shoes — in pairs. Close inspection will reveal which slide is placed on the left and right sides.

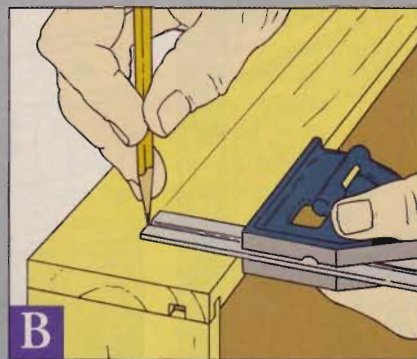
Most slides also consist of two pieces — one that attaches to the carcass and one that fastens to the drawer. As shown in the Details below, some manufacturers also mark the pieces to distinguish the drawer and cabinet pieces.

Typically the cabinet piece has a roller mounted above the track. You mount the cabinet portion of the slides first, placing the end with the roller toward the front of the cabinet opening. The drawer portion of the slide has the roller mounted below the track. This end mounts near the back and flush with the bottom edge of each drawer.

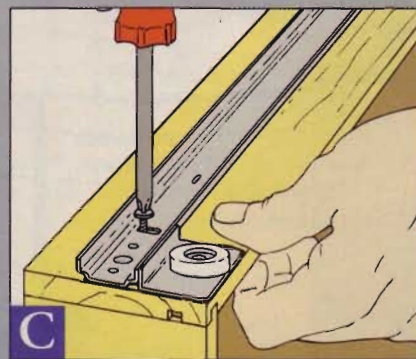
Mount the drawer portion of the slide by aligning the roller end with the back of the drawer and marking the mounting hole centered on the track (**Figure A**). To level the slide, I set a combination square to my mark, then transferred the screw location along the drawer's length (**Figure B**). A minimum of three screws are necessary to mount the slide (**Figure C**).



**A** Align the bracket flush with the back and bottom edge of the drawer. Mark the mounting screw hole location centered on the slide track.



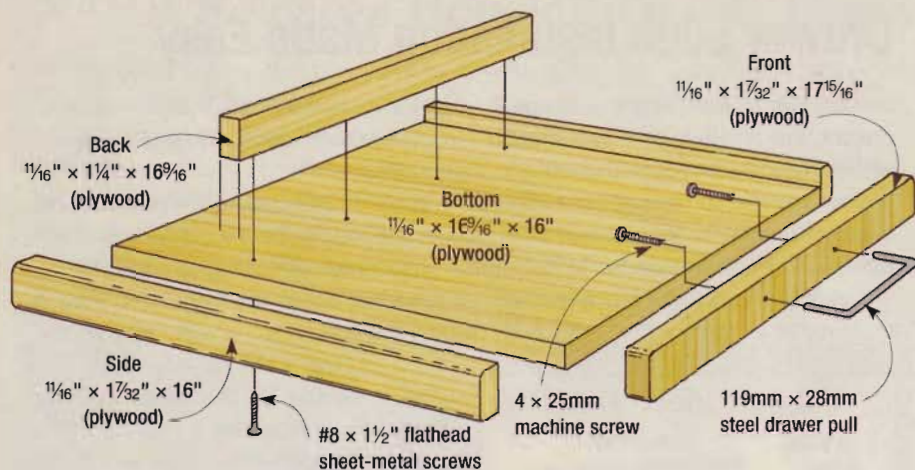
**B** Adjust a combination square to the awl mark you just made, then mark the mounting hole locations along the length of the drawer side.



**C** Align the slide's mounting holes on the line to ensure the slide is mounted level. Drive at least three screws to hold the slide in place.



## Tray Construction View



### Time for the Trays

Besides the small spot on top of the base, I wanted areas for changing drill bits or setting small parts without fearing they'd roll off — in my shop, small items that fall to the floor are usually gone for good, hopelessly lost in sawdust.

A pair of pull-out trays with raised sides fit the bill perfectly, and I kept the construction simple so that this little add-on didn't become a nuisance to make.

Start by cutting the tray components to size (**Tray Construction View**). Make sure the tray sides

slide easily between the runners in the base and, while you're at it, put the tray sides and bottom together and make sure they match the width of the tray openings.

Provided everything fits, glue the tray sides to the bottoms.

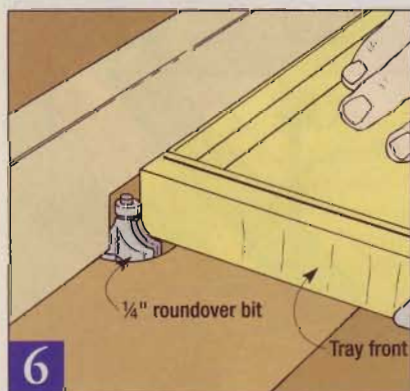
Next, drill counterbored pilot holes in the tray fronts for the drawer pulls (like you did earlier with the drawers). Mount the pulls, then glue a front to each tray assembly.

By now you've realized that, to fit into the tray slots, the carcass sides must be rounded over (**Figure 6**).

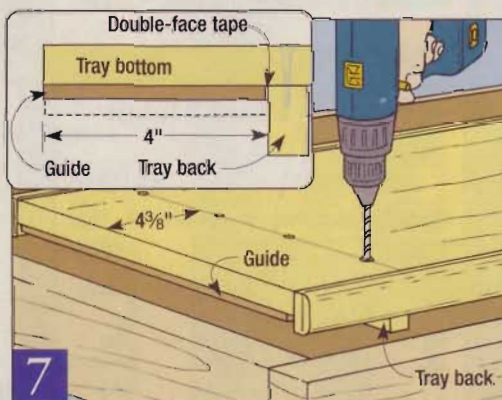
The tray backs serve two functions. They prevent small items from rolling back into the carcass and they act as stops, preventing you from pulling the tray too far out. The catch is, you have to screw each back to its tray when the tray is positioned in the carcass.

This may sound awkward, but a guide helps you position the back to drill countersunk pilot holes before you get to the actual installation (**Figure 7**). Once you have the pilot holes drilled you can slip the trays in the carcass and secure the backs (**Figure 8**).

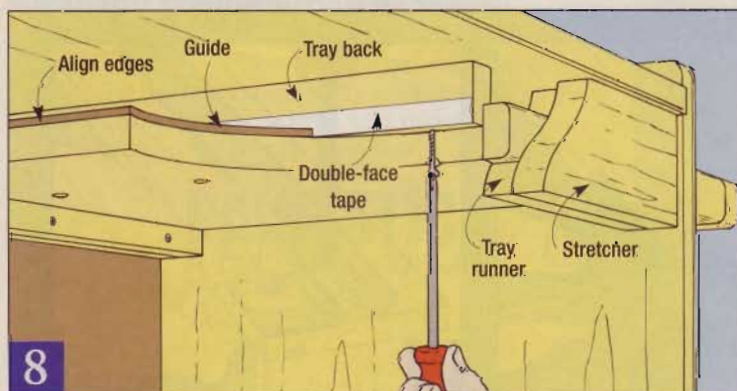
You also need to install stops so that when you push the trays in they stay flush with the carcass surface. Slide the trays closed and mark the runners at the back edge of each tray. Cut stops to fit between the marks, drill pilot holes and screw them in place (**Figure 9**). Finally, add the carcass's back panel.



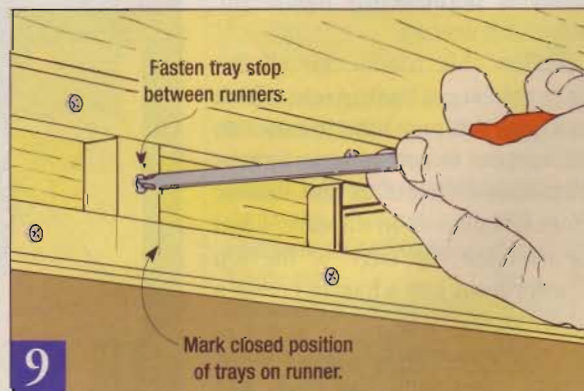
**6** Rout a  $\frac{1}{4}$ " roundover the length of the tray's edges. A backer board placed behind the tray will help prevent tear out.



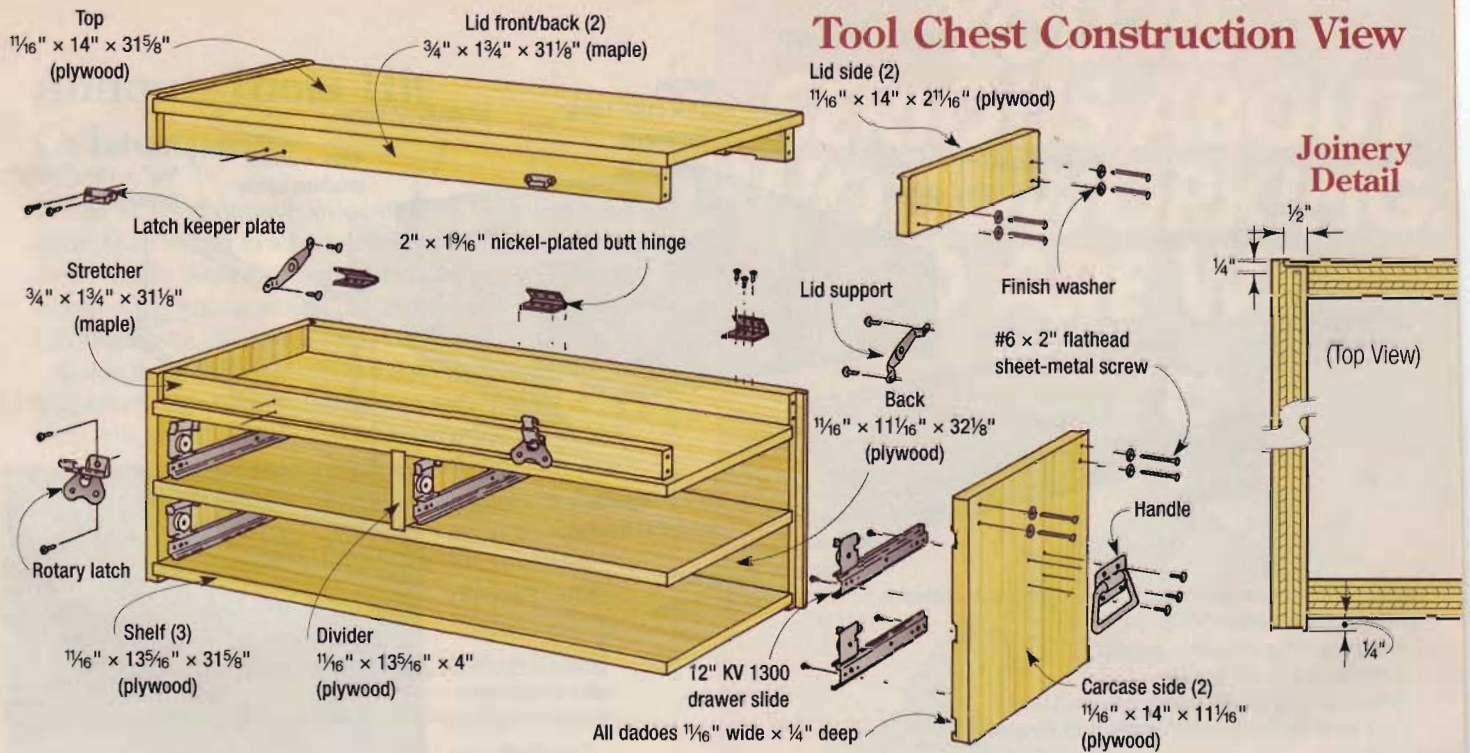
**7** Draw a line  $4\frac{3}{8}$ " from the end of the tray. Attach the tray back to a 4"-wide guide with double-face tape to position it, then drill pilot holes.



**8** Slide the tray into place between the runners. Use the guide to position the tray back over the mounting screw holes. Drive the mounting screws then pry up on the guide with a screwdriver to pop it loose from the back.



**9** Align the tray fronts flush with the carcass sides. Mark the location of the tray ends on the runners. Measure the distance between the marks, cut stop blocks to length, and screw them in.



### Tool Chest Case

The base cabinet provides plenty of storage for power tools and supplies. But I wanted more, so I made a smaller, portable upper chest for storing layout instruments and a few of my more precious hand tools (**Tool Chest Construction View**).

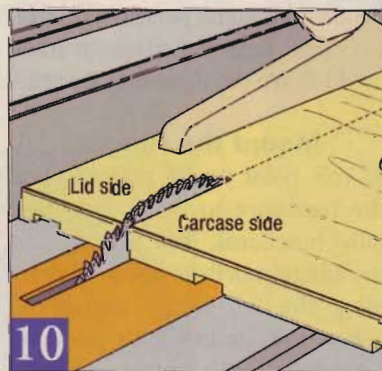
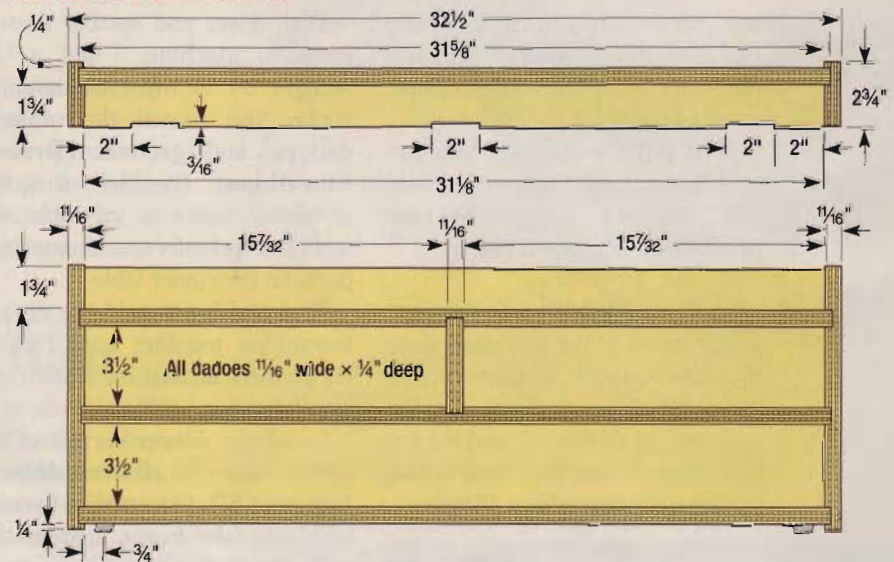
The carcase construction is similar to the base (**Joinery Detail**). I dadoed each set of lid and carcase sides as one piece — increased safety and continuous grain patterns are the worthy results. Afterward, I cut the lid sides free (**Figure 10**).

You also need to dado the middle and top shelves for joining the divider. Center these 1/4"-deep dados on the length of the shelves.

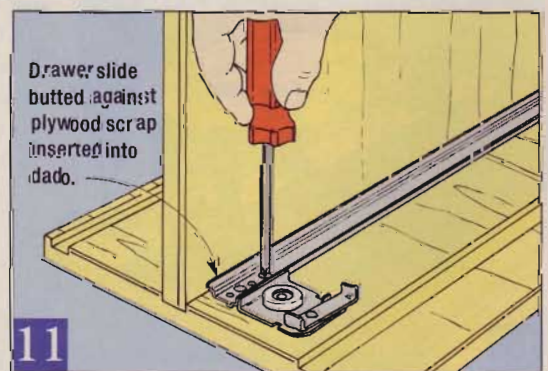
While dry-fitting the upper chest together, I realized I'd never be able to install the drawer slides once the case was assembled. So I put them in now (**Figure 11**), then clamped the chest together. Drill the pilot holes, add glue to the assembly, then screw it back together. Seat the divider completely before adding the back.

I cut solid maple for the lid front and back, and laid out the hinge mortises. An easy way to form these mortises is with your table

### Tool Chest Elevation

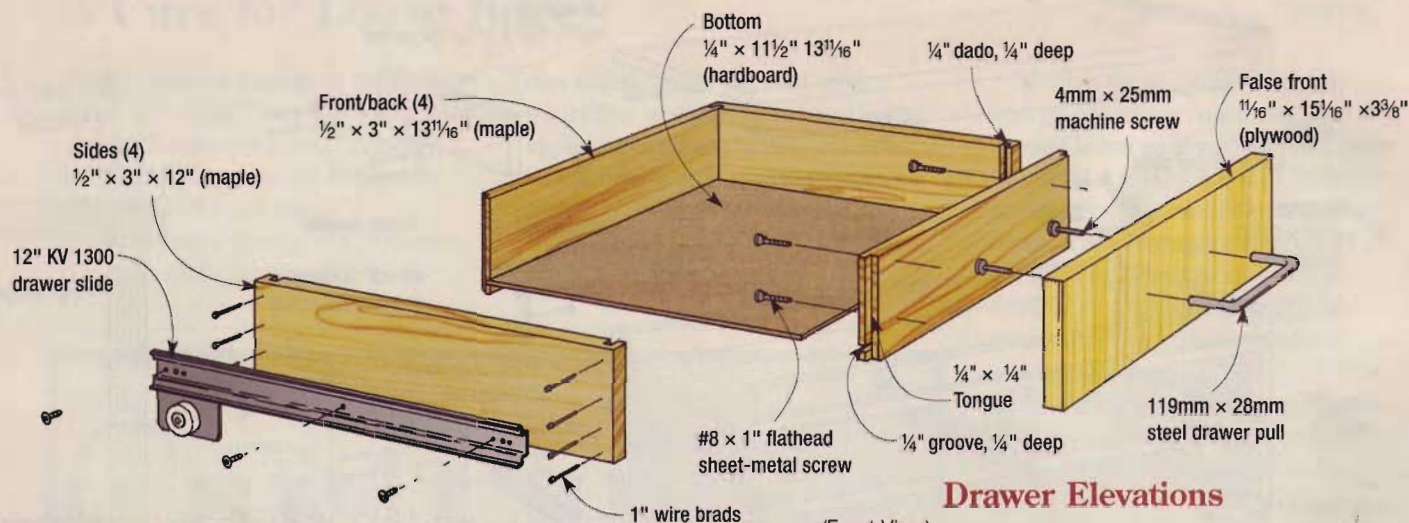


**10** With the dados cut, rip the lid piece free from each side panel blank. Trim the case sides to final size if necessary.



**11** Insert a piece of scrap plywood in the carcase side dados to index the placement of the drawer slides. Use a similar technique to attach the slides to the divider.

## Drawer Construction View



NOTE: Top drawer shown. Bottom drawer construction is identical.

### BOTTOM DRAWER DIMENSIONS:

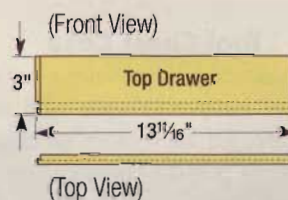
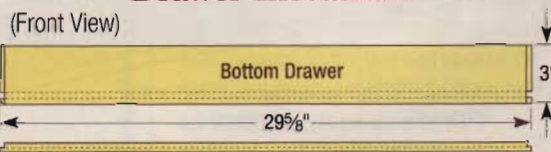
Front/back:  $\frac{1}{2}'' \times 3'' \times 29\frac{5}{8}''$  (maple)

Sides:  $\frac{1}{2}'' \times 3'' \times 12''$  (maple)

Bottom:  $\frac{1}{4}'' \times 11\frac{1}{2}'' \times 29\frac{5}{8}''$  (tempered hardboard)

False front:  $\frac{1}{16}'' \times 31'' \times 3\frac{3}{8}''$  (Baltic Birch plywood)

## Drawer Elevations

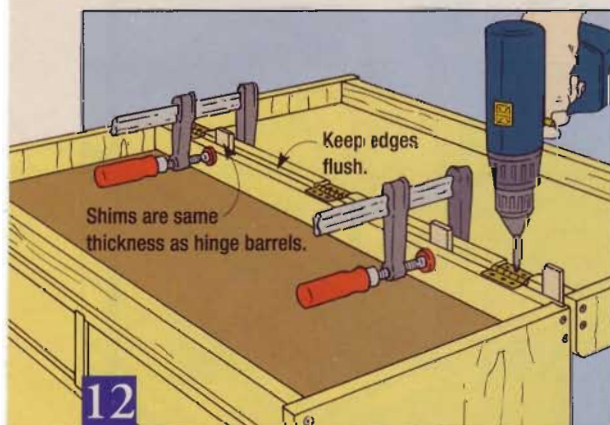


saw. Set the blade to cut  $\frac{3}{16}''$  deep (for both hinge leaves), and use the miter gauge to make multiple passes to remove the waste.

Now, put the chest lid together to drill more pilot holes, then add glue. Later, set it on top of the case to check its alignment and fit.

### Back to Building Drawers

The drawers in the tool chest have the same joinery as those in the base. All three drawers are the same height and depth, and the top two drawers are the same width (**Drawer Construction View**).



Clamp the lid to the chest case, making sure the edges and sides are flush. Insert shims the thickness of the hinge barrels between the case and lid and install the hinges.

With fewer and smaller drawer parts to machine, I put a  $\frac{1}{4}''$  straight bit in my table-mounted router and routed the rabbets, dados, and grooves (**Drawer Elevations**). (Besides, it saved swapping blades in the table saw and I just feel safer machining small parts on the router table.)

Glue and brads held the drawer assemblies together until I could check them against my square and clamp them in position.

Install the drawer portion of the drawer slides on all three drawers (see page 57). Once again, I prefinished the false fronts, installed the pulls, then shimmed the fronts to height with some pennies. Double-face tape held the fronts in place until I drove the mounting screws.

### Mount the Hinges

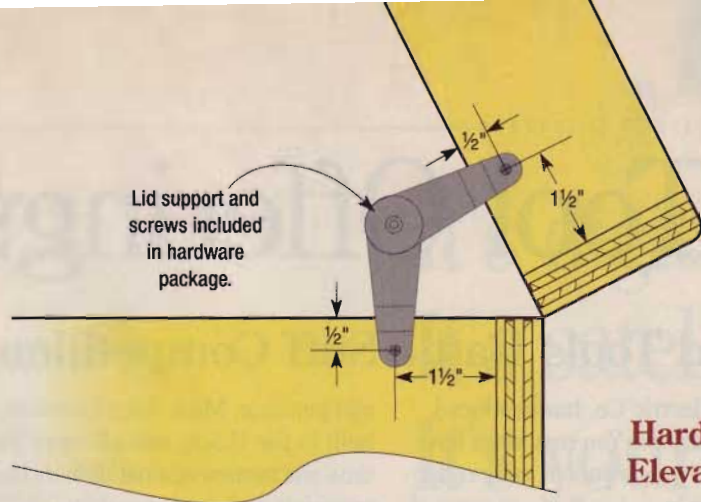
At this point you're ready to add the hardware to make the chest fully functional. You already cut the hinge mortises before assembling the lid, so go ahead and screw the hinges into position. Clamp the lid to the case with the mating edges flush (**Figure 12**). Drive the center screw in each hinge, then carefully unclamp the

lid and swing it closed to check the fit. Adjust the hinges if necessary, and drive the remaining screws.

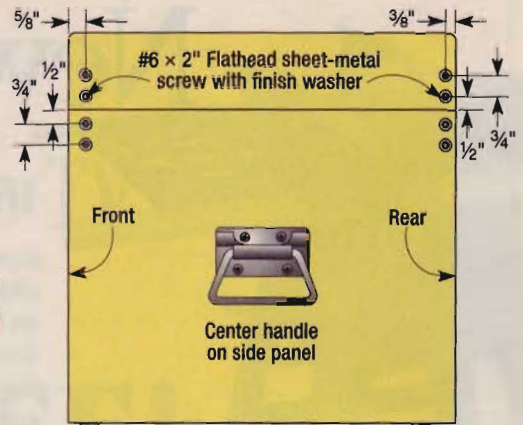
Next, install the lid supports. Snap them into their open position and locate the mounting holes so the spacing from the rear of the case and the rear of the lid are equal (**Hardware Elevations**). Install the screws just snugly so they will allow the supports to rotate around the shank.

Spring-loaded rotary latches hold the lid closed. With the latches assembled in their closed position, mark the hole locations (**Hardware Elevations**). Drill pilot holes for the mounting screws, open the latches to separate the pieces, then install the latches on the case and the keeper plates on the lid.

Finally, I installed the handles. Because the chest will be very heavy when it's filled with tools, I decided to use beefier mounting screws than those that came packaged with the handles.



### Hardware Elevations



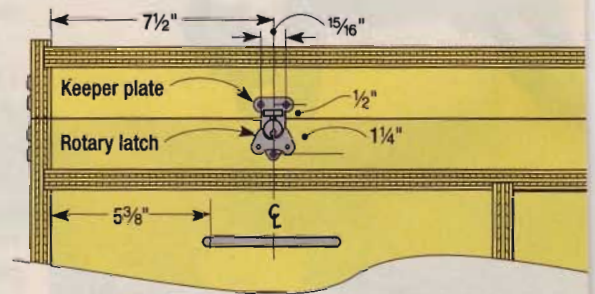
**Wings Add Easy Access**  
Loading up the chest with tools, I discovered that the drawers provided great storage, but there were certain tools I was always hunting for. I decided those often-used tools needed to be easily accessible, so the tool chest sprouted wings.

I built these tool wings similar to the tool chest lid (**Wing Elevation** and **Wing Construction View**).

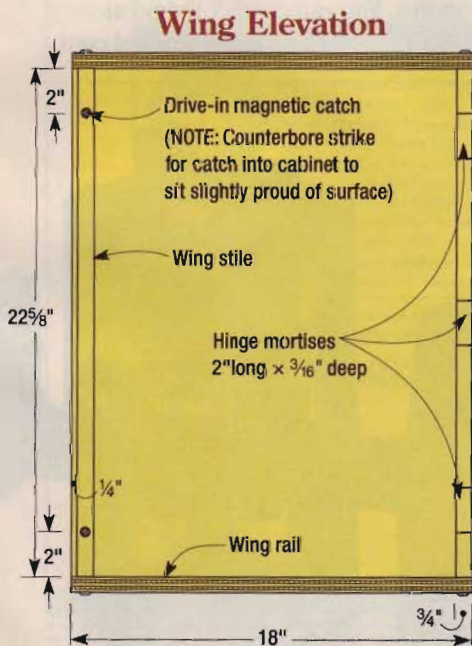
After the finish dried, I placed the wings flat on my bench and tried various arrangements of the tools I wanted to store there. Like assembling a jigsaw puzzle, it took a while to get everything to fit neatly. Once I had a layout, I designed some simple tool retainers for the wings. Pleased with the results, I

crafted some similar tool holders for the tool chest lid.

It took me the better part of an afternoon to shuffle and reshuffle the contents of the drawers to best utilize the space, but my tools have never been more organized. In fact, I'm already considering building a similar rolling cabinet with some 10"-deep drawers to handle bigger tools and leave room for future expansion of my tool inventory. Even though my mechanic friend's got a sizeable lead in the "tool race," I think I might still be able to catch him. If all else fails, I figure I've at least got time on my side — he's about 10 years my senior and longevity just happens to run in my family. ▀

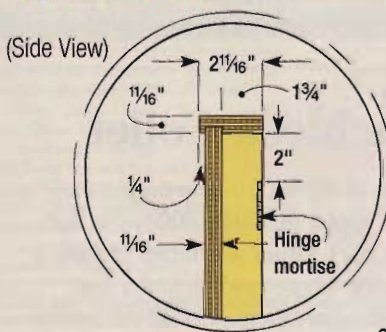


### Wing Construction View

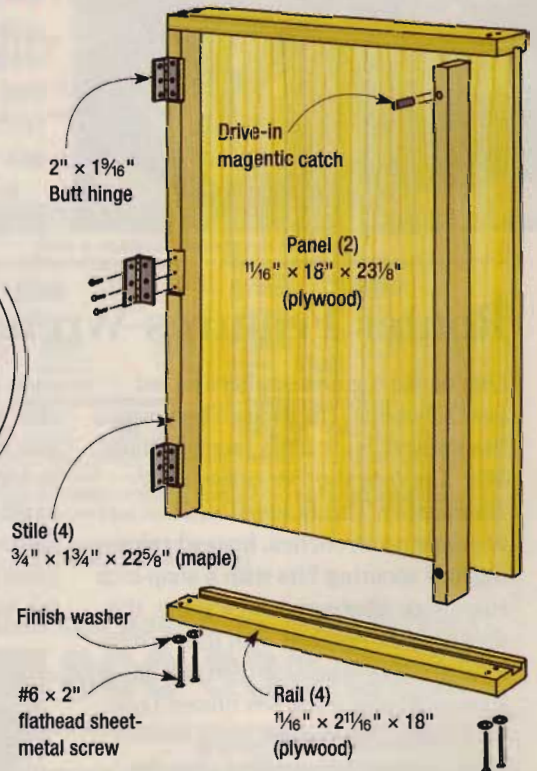
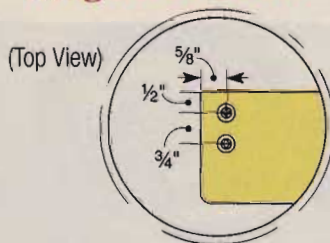


NOTE: Install wings centered on the sides of the base.

### Groove Detail



### Wing Screw Detail



# New Tool Offerings



## Ridgid Tools Battle Stiff Competition

Emerson Electric Co. has produced tools for decades. You may even have an Emerson power tool in your collection without knowing it, since most of Emerson's tools have carried the name of a major American retailer (guess who) rather than the company's own name. Now that's changing. Well, almost.

Indeed, the company is introducing a full line of woodworking tools, plus shop air filters and vacuums. But they still won't sell under the Emerson name. The tools are dubbed Ridgid, a name borrowed from Emerson's respected subsidiary manufacturer of plumbing and pipe fitting tools.

The Ridgid woodworking line contains all the major stationary and benchtop tools. There are two 10" table saws, a jointer, drill press, band saw, scroll saw, lathe, and compound miter saw. Throw in a unique new oscillating sander, shop vacuums, dust collection fittings, and both a portable and a stationary air filter, and you've got a well-rounded lineup.

New designs have earned the company 120 new patents, with 35 more

still pending. Most Ridgid tools are built in the U.S.A., and all carry lifetime warranties against defects in materials and workmanship.

Ridgid's most unique tool is the Oscillating Edge Belt-Spindle Sander. It's similar to other spindle sanders, but allows you to slip off the spindle and replace it with a platen assembly that holds a standard 4" x 24" belt. This assembly also oscillates, making a powerful edge sander. The table tilts up to 45°. All spindles and accessories come with the sander for around \$240.

Induction motors, rip fences with T-slots for adding auxiliary fences, large controls, and a kerf-marking system are all features shared by the table saws. The TS2424 has cast-iron extension wings, a 120/240-volt motor, and a mobile base for around \$650. The TS2412 has steel wings, a 120-volt motor, and a standard base. It sells for under \$500.

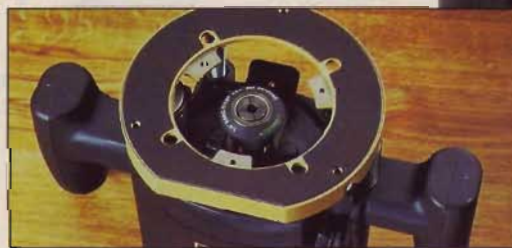
At least initially, Ridgid tools will be sold exclusively through Home Depot stores. You can contact Ridgid at (800) 474-3443, or at [www.ridgid.com](http://www.ridgid.com).

## Router Features Wrenchless Collet

One of the big newsmakers at last year's National Hardware Show was the RouterChuck from Jacobs Chuck Mfg. Co. (see the December 1997 *Workbench*). The RouterChuck requires no wrenches, instead releasing and securing bits with a snap-lock ring. Now after a year of waiting, the first router equipped with this system is available — the Skil 1845:02 Classic Plunge Router from S-B Power Tools.

Because the RouterChuck doesn't have an interchangeable collet, the Classic Plunge Router accepts only 1/4" shank bits. Otherwise, the router has all the features you'd ask for,

such as a 2-hp, 10-amp motor, variable speed (8,000-25,000 rpm), and soft start. Other amenities include a locking trigger switch and a fine depth adjustment. The 1845:02 sells for around \$125. You can contact S-B Power Tools at (800) 301-8255, or on the web at [www.skiltools.com](http://www.skiltools.com).



## A Mouse You May Want In the House

If you wanted to polish a brass lamp, you probably wouldn't reach for an electric sander. More than likely it wouldn't be your tool of choice for scrubbing your bathroom tiles either. A sander, after all, is for sanding. There are other tools to use on your lamps and tile. Of course, if you could combine all these functions into one tool, would you use it? The folks at Black & Decker are betting you will, and have introduced the new Mouse sander/polisher.

The Mouse is an orbiting palm sander with a footprint shaped like a teardrop. The pointed nose can reach into tight spaces, while the larger section of the pad works like a standard palm sander. But the Mouse is designed to do more than sand. Inside the Mouse's carrying case there are pads to perform different tasks. Foam pads

polish and buff. Two different scrubbing pads remove scuffs and rust. And for sanding, there's medium, fine and extra-fine sandpaper. There's also a narrow "finger" pad to reach into really close quarters. All attach with hook-and-loop fasteners to make changing pads easy. All the pads and paper sheets come with extra tips, a nice touch since that's the area bound to wear down first.

The Mouse sells for around \$60, and comes with a plastic case plus 23 acces-

sory pads. You can check out Black & Decker's web site at [www.blackanddecker.com](http://www.blackanddecker.com) or call (800) 544-6986.



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## SpeedMaster Simplifies Blade Changes

The new Lutz 88 SpeedMaster utility knife has a tool-free blade changing system that ranks as one of the best I've seen. Some of these systems are flimsy, but this patent-pending system really works.

To change blades, you simply push a slide on one side of the knife and the two halves of the body pop apart. Swap out the blade, put the knife back together, and push a button to lock the halves together.

All parts of the knife are cast metal. They operate easily, and feel substantial enough to last. Plus, the knife is well made, with a nice heft and feel. The SpeedMaster sells for around \$6. You can call Lutz File & Tool Co. at (513) 271-3300 to find out more.



## IceBits Help Stop Stripped Screws

At first glance, IceBit driver tips from Vermont American look a lot like other driver bits. But get closer and you'll see small ridges on the bits' tips that grab the slots in the screw head, making the bits less prone to twisting out of the head.

According to tests conducted by Vermont American, these "cryogenically hardened" bits can handle up to twice the torque of competitive bits before twisting within the screw. In less scientific tests, I inserted a Phillips IceBit in a magnetic screwdriver, and twisted while pulling up on the screwdriver. The bit consistently came out of the driver before losing its grip on the screw. Using the IceBit in a drill, I drove brass screws into maple and twisted the heads off of several before stripping the slots.

IceBits are available in Phillips, Torx, flat-blade, and square drive models for use with hand screwdrivers or power drivers. They sell for under \$1 each. Call Vermont American at (800) 742-3869.



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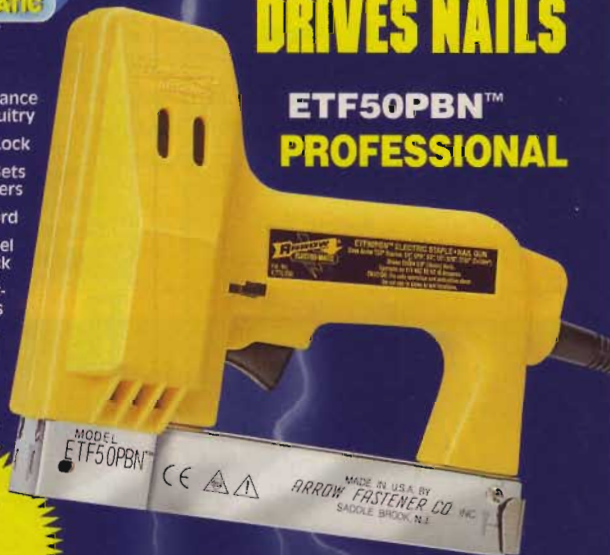
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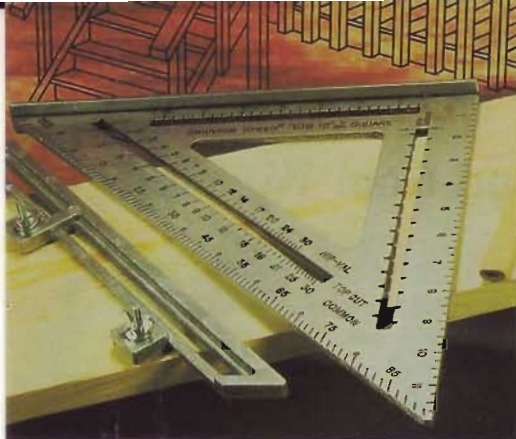
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## Swanson Big 12

Just like the original 6" Speed Square, the Big 12 Speed Square from Swanson Tool Co. has scales that simplify laying out stairs, rafters, roofs, and more. But as the name implies, it's twice the size, making it useful on larger layouts. The aluminum square also has a removable bar for use on out-of-square corners, and it comes with a pocket-sized "Blue Book" for roof and stairway layouts. The Big 12 sells for around \$20. Call Swanson at (800) 291-3471.

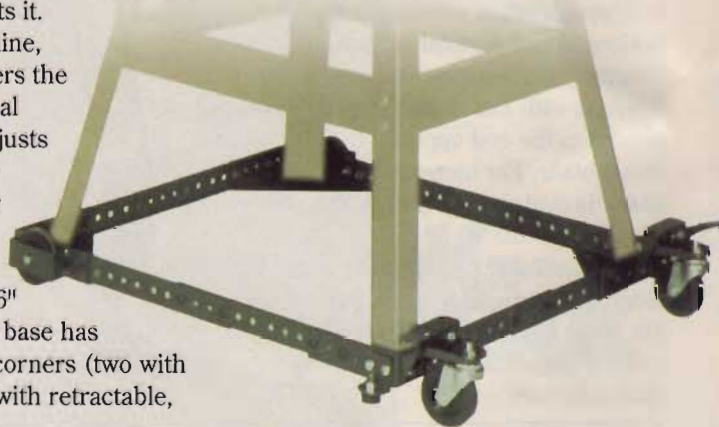
## HTC Unveils Universal Tool Base

My shop is in the garage, so my cars and my tools have to share the same space. Moving the cars to accommodate the tools and machinery is easy, but the converse isn't always true. My table saw, drill press, and router table cabinet all sit on mobile bases, making them simple to move. My old lathe, though, is tough to push around, and there's no off-the-shelf mobile base that fits it.

For cases like mine, HTC Products offers the HTC 2000 Universal Mobile Base. It adjusts to fit machines (or anything weighing 400 lbs. or less) with bases from 12" x 12" to 36" x 36" (or 20" x 52"). The base has four welded steel corners (two with fixed casters, two with retractable,

swivel casters) that bolt to steel stretchers with holes drilled every 1". You combine the 12"- and 18"-long stretchers and bolt the base together at the size you need.

The HTC 2000 Universal Base retails for around \$80, and comes with a lifetime warranty. Additional 18"-long stretchers are available. Call HTC Products at (800) 624-2027.



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Workbench ■ November/December 1998



## An Ergonomic Pry Bar

Apparently no tool, not even the lowly wrecking bar, is immune to ergonomic redesign. Now Village Blacksmith has introduced the Gorilla Bar. The company, a division of Olympia Industrial, re-engineered the tool for greater versatility and increased leverage.

For versatility, the Gorilla Bar has a flat, wide claw that reaches further under workpieces. A claw angle over 90° also allows the bar to reach into areas a traditional prybar can't — a real benefit when working at the junction of a horizontal and vertical surface, or in close quarters. The company claims 50% greater leverage with this design over a conventional bar. On the end opposite the claw is a flat chisel blade. For increased comfort, the shank is oval-shaped (rather than the usual hexagonal).

The Gorilla Bar is available in 24" and 36" lengths for around \$11 and \$18, respectively. For more information you can reach Village Blacksmith at (626) 336-4999.



## Roller Stand from Wolfcraft

Most of you probably work alone in the shop — no problem until you have to wrestle a large workpiece onto the table saw. That's one time when an outfeed support stand is great to have on hand. Stands allow one person to work more safely and easily with heavy or awkward pieces.

A new entry in this market is the Roller Support Stand from Wolfcraft. It has an 11½"-wide roller supported by an all-steel stand, giving it a 130-lb. load capacity. A square post keeps the roller from twisting within the base. Height can be adjusted from 27½" to 43½" to match different machines. When not in use, the Roller Stand folds flat for storage, and weighs under 12 lbs. Retail price is around \$30. Call Wolfcraft at (630) 773-4777 to learn more about the Roller Support Stand.



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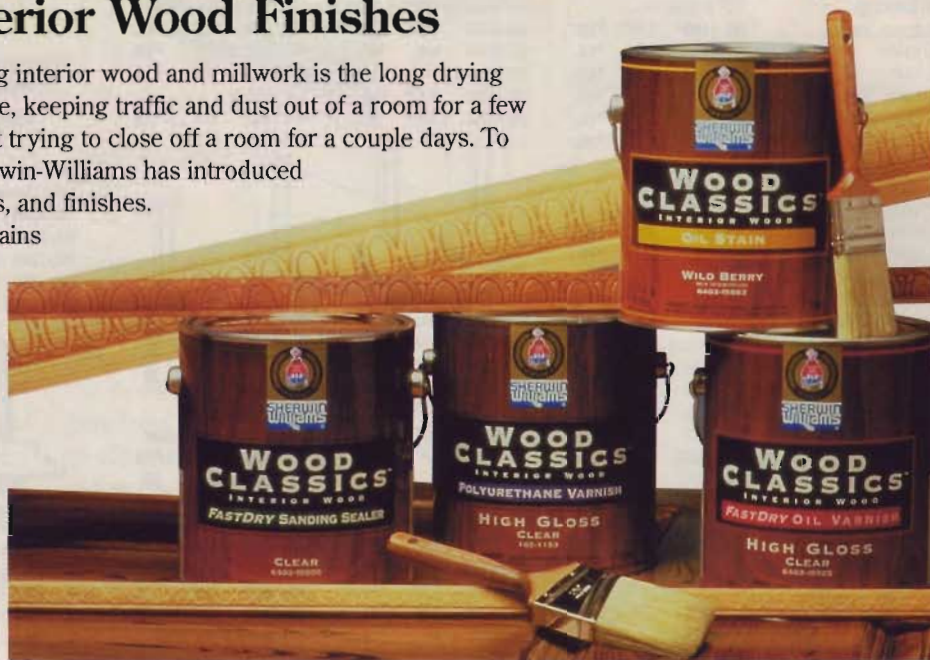
Product Information Number 201

# Products For Your Home

## Quick-Drying Interior Wood Finishes

One of the toughest parts of finishing interior wood and millwork is the long drying time often required. Around my place, keeping traffic and dust out of a room for a few hours is tough enough. Forget about trying to close off a room for a couple days. To speed up the finishing process, Sherwin-Williams has introduced Wood Classics interior stains, sealers, and finishes.

The Wood Classics line includes stains in traditional wood tones and "Fun Stain" colors such as Precious Pink and Provence Blue. All the stains can be recoated in two hours. Fast Dry Oil Varnish gives a traditional amber glow, while Polyurethane Varnish dries more clear, and is suitable for heavy-use areas. Both can be recoated in four hours. All of the products are available in quarts for \$8-\$12, or in gallon cans for \$25-\$32. Call Sherwin-Williams at (800) 474-3794.



## Safety Station Gathers Gear

Two safety necessities for every home are a fire extinguisher and a first aid kit. But manufacturers of these items report that fewer than 40% of American homes have an extinguisher, and only 32% have a first aid kit. The Safety Station combines these items, and other emergency medical necessities, in a compact, wall-mount cabinet.

In addition to a Kidde ABC-rated fire extinguisher (for wood, grease, and electrical fires) and a 100-piece Johnson & Johnson first aid kit, the Safety Station is loaded with bandages, ibuprofen, cortisone cream, and other staple medical supplies.

The station also comes with several reference items designed to offer help in any emergency. One handy item is a video that teaches family members how to handle fire and medical emergencies — watch it *before* an emergency occurs, of course. You can record important family medical information on a chart for easy access to you or medical personnel. The chart also lists emergency phone numbers and quick tips to spur your memory, along with a list of all poison control centers in the country.

Safety Station cabinets fit between wall studs and are available with several door styles, or without a door so you can make or buy one to your liking. A flush-mount unit is also available. Prices range from \$90-\$170, depending on the door style. Contact The Safety Center at (888) 248-1845, or on the web at [www.safetystation.com](http://www.safetystation.com).





## Ratchet Pruner

The Razor-Back pole pruner from Union Tools offers extra power for cutting high limbs. Its patented ratcheting lopper closes in stages to take best mechanical advantage of the long actuating arm. A nylon cord and a 12-ft. telescoping pole allow you to reach high into trees. For large-diameter limbs there's a 14"-long saw blade. Retail price is \$50. Contact Union Tools at (800) 888-4196, or on the web at [www.uniontools.com](http://www.uniontools.com)

## Top Dog for Small Lawns

At first glance, the LawnPup electric lawn mower from Grass Masters looks more like a novelty than a serious lawn care tool. But for people with small yards, and those with a lot of trees and plantings to trim around, this little pup may do just the right tricks.

The LawnPup feeds on electricity (through a cord) to power its 9-amp motor and drive a 13"-long blade. Light weight (23 lbs.), owed to mostly plastic construction and the mower's petite size, makes it easy to maneuver around obstructions that can trip up a conventional mower. I was able to mow right against my elevated planting beds and gardens, almost eliminating the need for hand trimming. A rear grass catcher gathers all the clippings.

Granted, this isn't the tool of choice for mowing an acre lot, and you do have to contend with the cord. But you don't have to hassle with gas, motor maintenance, or storage concerns. James Morris at Grass Masters reports that about 40% of LawnPups are purchased as second mowers. Retail price is around \$150. A smaller 12" model is also available. Call Grass Masters at (888) 810-5050.



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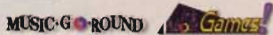
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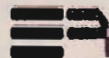
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## Increase Pool Safety With Self-Closing Gate Hinges, Latch

According to the United States Consumer Product Safety Commission (CPSC), more than 300 children under five years of age drown every year in residential swimming pools. Another 2,300 children are treated in emergency rooms for pool-related injuries. That's why the CPSC recommends protecting these high-risk areas with a perimeter fence and a self-closing, self-latching gate.

Tru-Close hinges and the Magna-Latch, both from D&D Technologies, provide a way to automate gate closing and latching. Tru-Close hinges can be installed on most new or existing gates and have adjustable, stainless steel springs that close the gate. Once shut, a permanent magnet in the Magna-Latch draws a metal latch bolt from the gate housing into the receiver housing, locking the gate automatically. A lockable knob mount-

ed high above, out of a child's reach, allows adults to disengage the latch.

Both products meet all national safety standards, including the guidelines of the CPSC. Suggested list price for the Magna-Latch is \$70. Tru-Close Hinge sets are less than \$30. Call D&D Technologies at (800) 716-0888, or Leslie's Pool Mart at (800) 537-7665.



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Product Information Number 194

## Company Rolls Out New Basement Floor Water Shield

When finishing a basement, one of the toughest areas to deal with is the floor. Even in the driest basements, the concrete slab can feel cold and damp — definitely not an ideal surface to underlie a finished floor. A traditional way to get around this has been to raise the finished floor off the slab by laying down a vapor barrier, building a wood subfloor, then laying a finished floor over that. This method works fine, but it's labor intensive and eats up headroom that's already in short supply in most basements.

You can simplify the process and waste less space using a new product from Europe called Delta-FL. This unique underlayment is made of heavy-gauge plastic, and has dimples, or small cups, about 3/8" deep and spaced 1/2" apart, that rest against the concrete. Picture the bottom of

an egg carton, and you've got an idea how Delta-FL looks. This creates an air space beneath the finished floor, eliminating the cold, damp feeling. An added benefit is that the product provides some cushioning.

Laying this subfloor is simple. It's available in 4-ft. x 8-ft. sheets, or in 5-ft. x 65-ft. rolls. You simply lay it over the concrete floor, overlapping the seams to form a seal. Next, put down oriented strand board (OSB) or plywood sheets, and drive masonry fasteners through both layers into the concrete. Then you can lay carpet or any other floor treatment. If you plan to install a laminated wood floor, you can lay it directly over the top of Delta-FL.

According to the manufacturer, Cosella Dörken Products, at about 50 cents per sq. ft. the product costs 40%-50% less than building a wood subfloor, and it can support 6,000 lbs. per sq. ft.

You can contact Cosella Dörken by phone at (888) 433-5824, or check them out on the web at [www.deltams.com](http://www.deltams.com).



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# All Steamed Up

The sheer power of this sawmill is awesome. Every hour, heat from burning wood converts up to 100 gallons of water into steam, driving the massive flywheel of a 60-hp steam engine that spins a huge belt, sending power to the mill. Amazingly, there's almost no sound, other than the song of the blade biting through wood.

Designed in 1891 and built shortly thereafter, this steam-powered mill spent its first 80 years sawing logs at a Midwestern lumber company. When the company shut down, the mill appeared destined for the scrap heap until Bernie Cline rescued it, along with the steam engine and boiler. Now more than a century after the mill was built, Bernie and his band of helpers have reassembled it in Waukee, IA, and keep it churning out smoke, steam, and lumber.

Milling takes at least three people — one to stoke the fire and remove cutoffs, another who controls the steam engine, and a third to guide the rack-and-pinion log sled. Pull a lever, and the mill rips through large trunks with ease. I watched in awe as a huge walnut trunk succumbed to the mighty machine's will, giving up its bounty of boards in two short minutes.

In its second century, the mill's future looks bright. I wouldn't be surprised if it's still steaming along 100 years from now.

