Router Bit Buying Tips

5 TERRIFIC PROJECTS FOR YOUR HOME AND SHOP

WORKBENCH®

THE ORIGINAL HOME WOODWORKING AND IMPROVEMENT MAGAZINE

build a
Router Storage cabinet

outfitting your shop —
Router Bits

making a grand
Home entrance

- quick and easy trellis
- brick-covered front porch
- the right way to install a storm door

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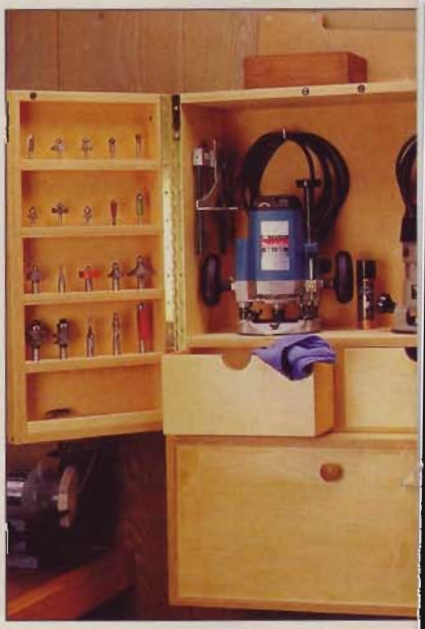

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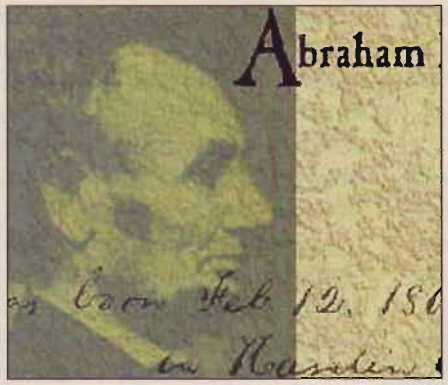

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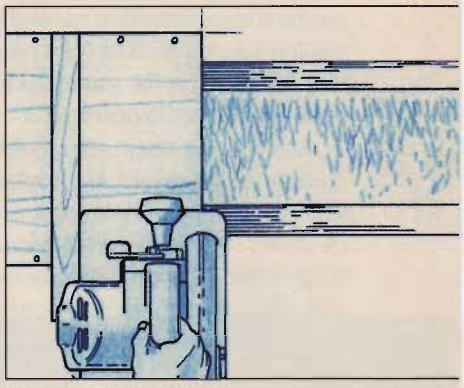

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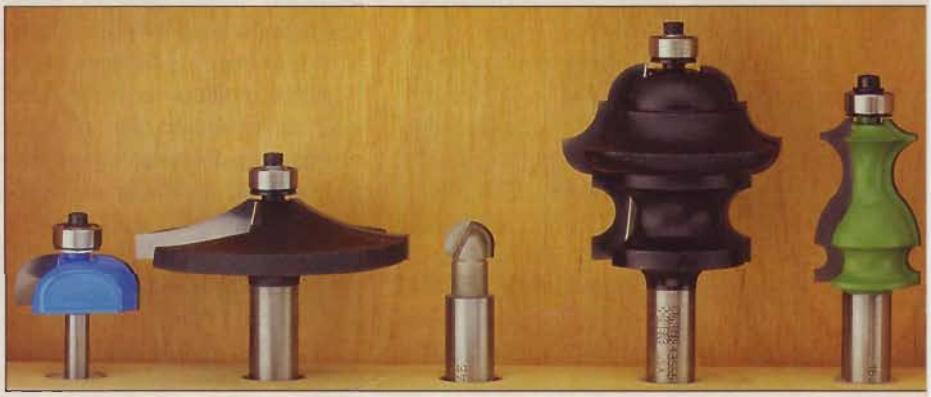

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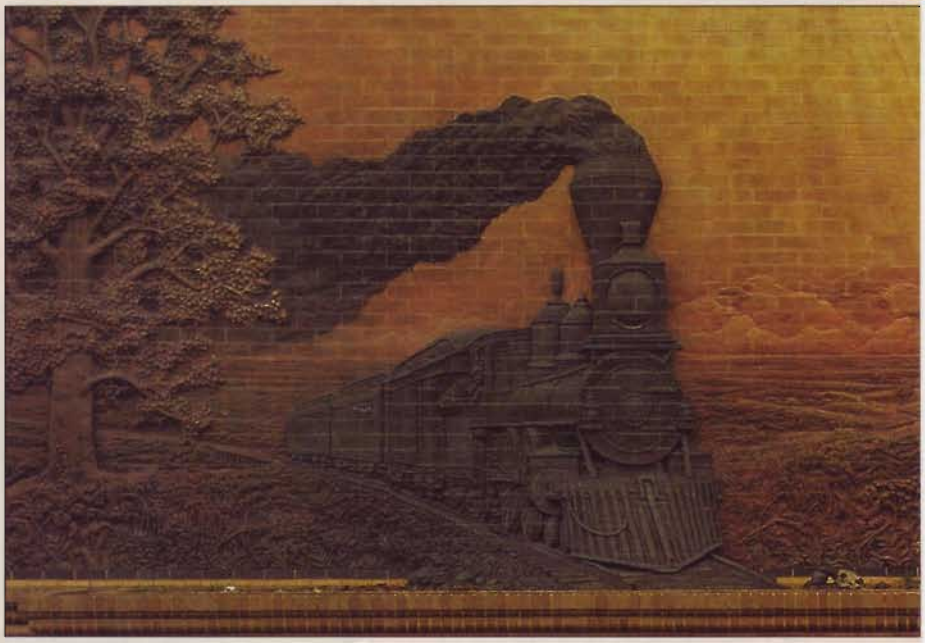

More than just bricks and mortar make up *A Mason's Relief*, page 72.

Time-tested

Several readers have written over the past few months asking me to describe the tools I own so that they might use this information for guidance as they outfit their woodshops.

As I thought about their questions I realized how conservative my answers will appear. I've had most of my tools for years, and none of the stationary tools came into my hands before cutting their teeth on someone else's woodworking projects. To say I have a magnetic attraction is correct, as long as you're talking about heavy cast iron machinery that predates my first pair of velour bell bottoms (don't worry, I swear I won't wear them ever again).

Some woodworkers tend to run out and buy the latest newfangled gadget, or replace tools that work for "hot" models with more features. I'm not one of them. I stick with the tools I know as if I'd said "I do" when they first crossed my shop's threshold.

So whenever I'm asked about tools I offer the same semi-sage advice — buy the best tool you can afford, but remember that a good tool is more than efficiency; it must complement a way of working wood that no one else can wholly imitate or understand. There's no doubt that good tools make it more likely that you'll do good work, but good work is more a result of caring, skilled hands than anything else.

Tools for a Lifetime

I prefer simplicity, and the Rock of Gibraltar in my shop is an uncomplicated 60's-era Delta Unisaw. Like an old family station wagon, this machine won't quit even when you wish it would so you can get something new. Its $1\frac{1}{2}$ hp motor is the size of a 4 gallon pail and weighs in at about 100 lbs. Still, that monster came at a good price — free. A hospital was closing down its woodshop and wanted someone to haul the beast away. I agreed to do the job, then moved it the same day before they could change their minds.

My Boice-Crane band saw must be at least 45 years old, and it's not much lighter than the Unisaw. It has a throat capacity of 15", and a $\frac{3}{4}$-hp direct-drive motor that stops at nothing. A stout, short-bed 6" jointer bearing the Rockwell brand, an old Yates lathe and Delta drill press round out my shop's big guns.

My list of portable power tools continues the theme. I have one of the original portable planer models that came onto the market over ten years ago — the Ryobi AP10. Despite its outdated technology, it still does a decent job. I own a $\frac{3}{8}$" drill that is one of the most time-tested designs on the market, an early model $\frac{3}{8}$" cordless drill, a Makita plunge router with the square base (which hasn't been available for a long time) and a Stanley fixed base router (I've never known anyone else with one of these). Rounding out my tool arsenal is a biscuit joiner, a well-used screw gun, a recip saw, a jig saw, a worm-drive circular saw, and a few odds and ends in the sanding category.

And then I could describe my hand tools, which I have the most affection for — the guys around here love to kid me about my chisel collection — but I think you probably get the idea.

Good tools from reputable manufacturers should last a lifetime. My assortment proves that. But the results are always in your hands. Remember, it's a poor craftsman who blames his tools.

Chris

Correction

George Ellis noticed a small discrepancy while building the *Stack-Up Storage* project in our April, 1998 issue. The Plywood Cutting Diagram on page 39 shows four of part F, and eight of part G, while the Parts Key calls for six of each. The Parts Key is correct.

Thanks George!

WORKBENCH

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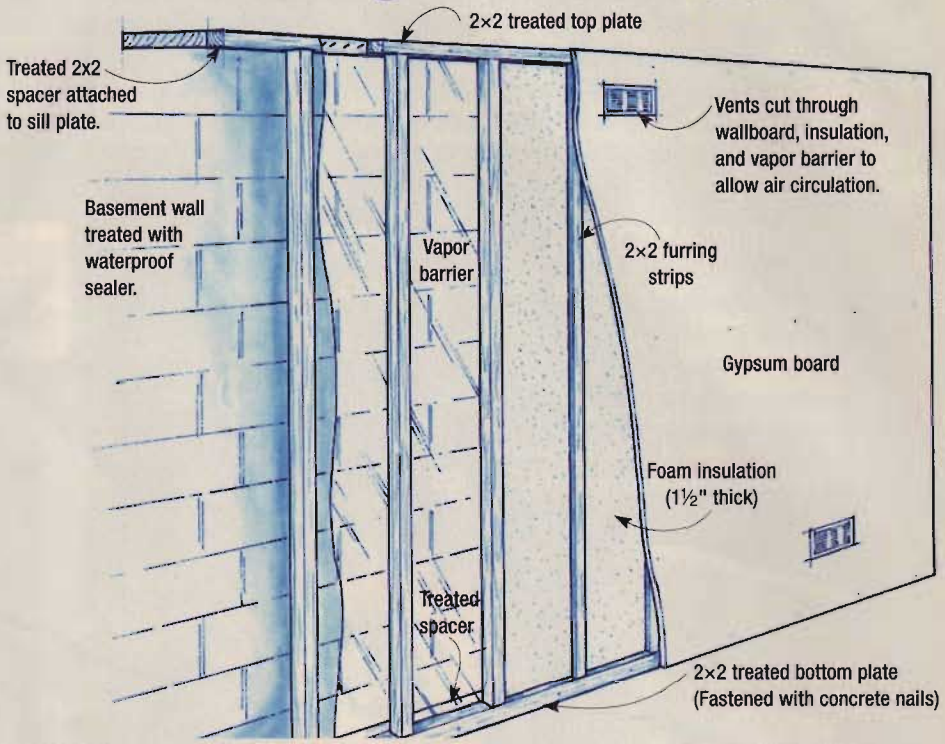
Questions & Answers

Wire Brush and Sealer Fixes Peeling Basement Walls

Q *I'm finishing off my basement and have taken care of external drainage problems. However, the waterproof coating on the walls had peeled in spots and the walls show some signs of effluorescence. Do I need to strip the walls or is there a product I can apply before I fur and finish the walls?*

Steven Cook
Lexington, KY



A Effluorescence — deposits of mineral salts that leach out when water seeps through the walls — presents the biggest problem. According to Richard Barako at UGL (a manufacturer of basement waterproofing products) the salt crystals create enough pressure to break the bond between the masonry wall and the waterproofer, causing the peeling. Because the source of the salts still exists in the soil or the masonry itself, you can't eliminate it, but your drainage work is bound to reduce the effluorescence significantly.

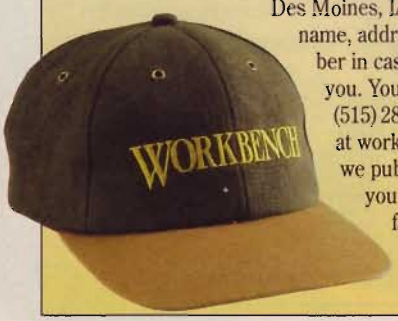
Begin by wire brushing the walls to remove any loose paint and salt deposits. Then apply a couple of coats of clear masonry sealer. The thin sealer penetrates the masonry deeper than a waterproofer and helps form a continuous barrier. Then you can follow-up with a waterproof paint product.

When you attach the furring strips, don't nail directly into the masonry wall — you don't want to poke a bunch of holes in the water barrier you just spent time and money to create. Instead, nail spacers to the sill plate and the floor to leave a 1-2" gap between the masonry wall and the furring strips. This allows air to circulate so moisture that permeates the wall can evaporate.

According to Barako, most sealers and waterproofers are designed to allow water vapor to pass through. For added protection, install vents through the finished wall to allow air to circulate and let the moisture evaporate.

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



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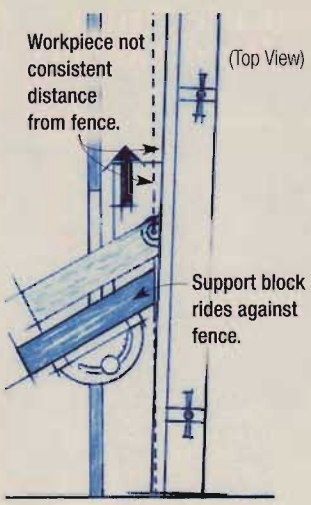
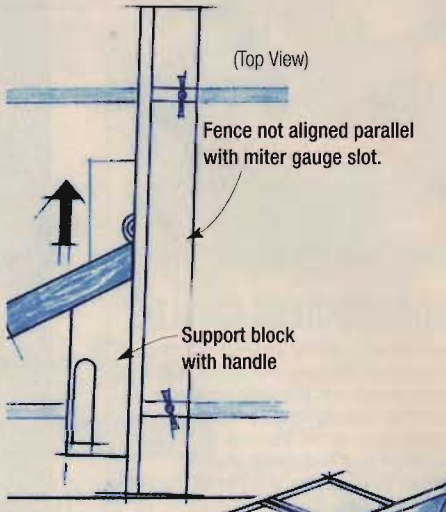
Router Table Miter Gauge "Omission" was Planned

Q *I really liked the Portable Router Table featured in the February issue. However, I wondered why you didn't include a miter gauge slot, but extended the fence slots?*

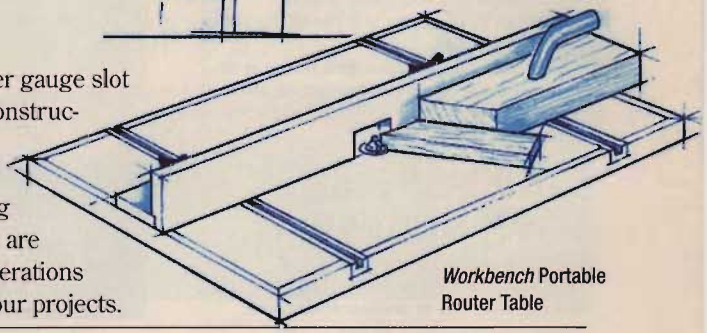
Richard Merriss
Green Bay, WI





A It wasn't an oversight. We intentionally left the miter gauge slot out of the design. Here's why. Using a miter gauge requires that the fence be aligned perfectly parallel to the slot. It's much simpler to just align the fence with the bit and place a large support block behind the workpiece to hold it at the correct angle. The block rides against the fence and keeps the workpiece aligned. At the same time, the block helps reduce tear-out.

We felt that extending the T-slots the full table width provided more functionality for attaching hold-downs and featherboards. Leaving the miter gauge slot out also simplified the construction and reduced the amount of specialty hardware needed. Saving readers time and money are always important considerations when we design any of our projects.



Workbench Portable Router Table

Changes in Grain Direction Cause Cherry Blotches

Q *I'm building furniture in cherry and have had pieces where the oil finish turns out dull and flat. What causes this and what type of finish should I use to avoid the problem?*

Earl Smith
Crothersville, IN

A Cherry makes beautiful furniture, but finishing it can present problems, including the blotching you describe. The dull areas you describe probably contain swirly grain which doesn't accept penetrating oil finish or stain evenly.

Try applying a wash coat of thinned shellac followed with a gel stain, but use a lighter shade than you ultimately want, since cherry will still darken with age. You can also build up several coats of dark shellac and let the cherry darken on it own by placing in a sunny spot.

Hardboard Varies by Type, Name

Q *In many of your projects, you use "hardboard." I've been told to use masonite or paneling. Could you tell me what I'm supposed to use?*

Erik Stortzum
Mattoon, IL

A Hardboard, sometimes referred to as high-density fiberboard (HDF), consists of finely chopped wood fibers that are formed under heat and pressure into sheets. Depending on the process used, one or both sides may be smooth. One-side-smooth hardboard usually has a grid pattern on the back of the sheet left from where the wet material was spread onto a screen to allow water and steam to escape during processing. To make two-sides-smooth, manufacturers extract most of the water first, then press the material between two rollers.

Treated or tempered hardboard has a baked, oil-impregnated surface that makes it denser, darker, and more expensive than untreated hardboard.

While the name gets used generically, Masonite is a brand-name of hardboard products, and the company specializes in home siding. You can also buy hardboard paneling in a number of finishes including coatings for chalkboard and markerboard.

Unless we specify otherwise, we use two-sides-smooth, tempered hardboard, particularly on shop projects and work surfaces. We find that it stands up well to wear and tear, machines easily, and in most cases doesn't require finish.

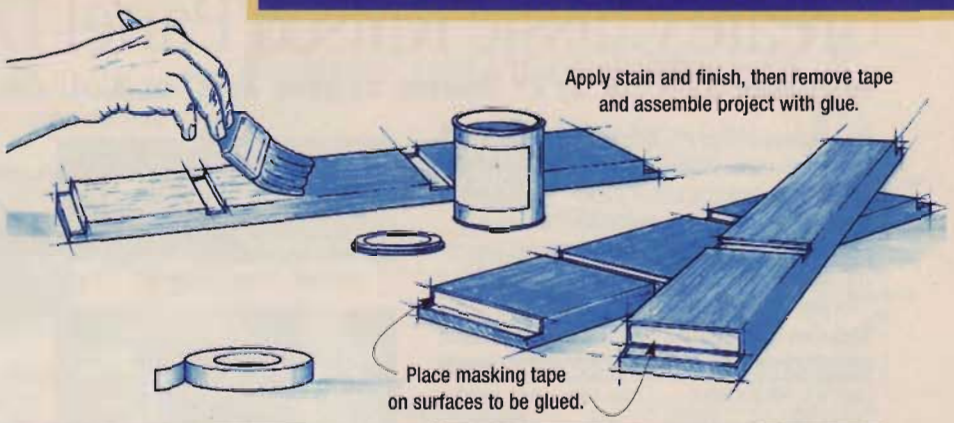
Masking Tape Allows Prefinishing

Q *I've built a number of projects with small compartments, such as rolltop desks and knick-knack shelves. It would be much easier to stain and finish the parts before assembly, but don't I need to glue bare wood to bare wood?*

Jerry Kinser
Davenport, IA

A Most glues need to be applied to bare wood in order to create a strong bond. The glue penetrates the surface, interlocking with the wood to create a chemical bond. Stains and finishes prevent the glue from bonding.

However, that doesn't rule out prefinishing inaccessible areas, such as the pidgeon holes in a rolltop desk. Carefully mask off the mating faces of the joint to be glued, then apply your stain or finish. When you remove the tape, scrape out any finish that may have seeped onto the joint area, then glue the project together as you normally would.



Source on Antique Tools

Q *I recently inherited an antique Fay & Egan jointer and an Oliver table saw. Where can I find out more about these and other brands of antique woodworking machinery?*

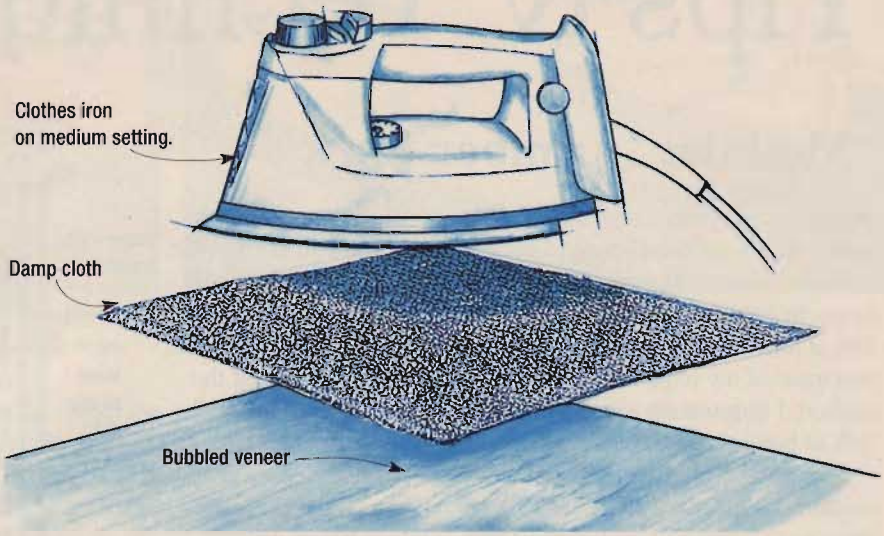
Ashley Phoenix
Leesville, OH

A Dana Batory's book, *Vintage Woodworking Machinery: An Illustrated Guide to Four Manufacturers* (1997, Astragal Press), provides a historical look at machines produced by Fay & Egan, Defiance, Oliver, and Yates-American. The book describes how to determine the age and value of these machines, and even how to move some of these heavy monsters.

Bubbled Veneer Requires Heat and Care to Repair

Q *The veneer on an antique gaming table I recently bought is raised in one spot and chipped along the edges. I'd like to repair the chipped spots using matching veneer from the table's base, but I've tried removing it with heat and water and it won't budge. Any suggestions?*

Charles Wanager
Decatur, IL



A Given the age of the table you describe (circa 1890), chances are good that it was originally assembled using hide glue. Made from protein extracted from animal hides, bone, and tissue, this glue forms strong bonds, but dissolves under moisture and heat.

Repair the bubbled veneer by applying moist heat to the area using a damp cloth and a clothes iron. While the area is still hot, clamp a block of wood over the bubble or weight it down. If the bubble has cracked open, heat it with the iron, and use a wire or pick to scrape out any dirt or old glue. Work some white glue into the slit, lay wax paper over the area, and clamp a wood block in place.

Your plan to take veneer from a less conspicuous spot makes good sense. I'd try using the iron again. But if heat and water won't loosen the glue bond, it may be an indication that someone has previously repaired the veneered area using a synthetic resin-based glue. If that's the case, you'll have to find matching veneer elsewhere.

Tips & Techniques

"Modular" Lumber Rack

When I moved into a new place last year, I didn't get the chance to build elaborate lumber storage. I had a few hours to get several hundred board feet of lumber off the garage floor, and most of my tools were still packed. I dug out my miter saw and a drill to build these "modular" racks.

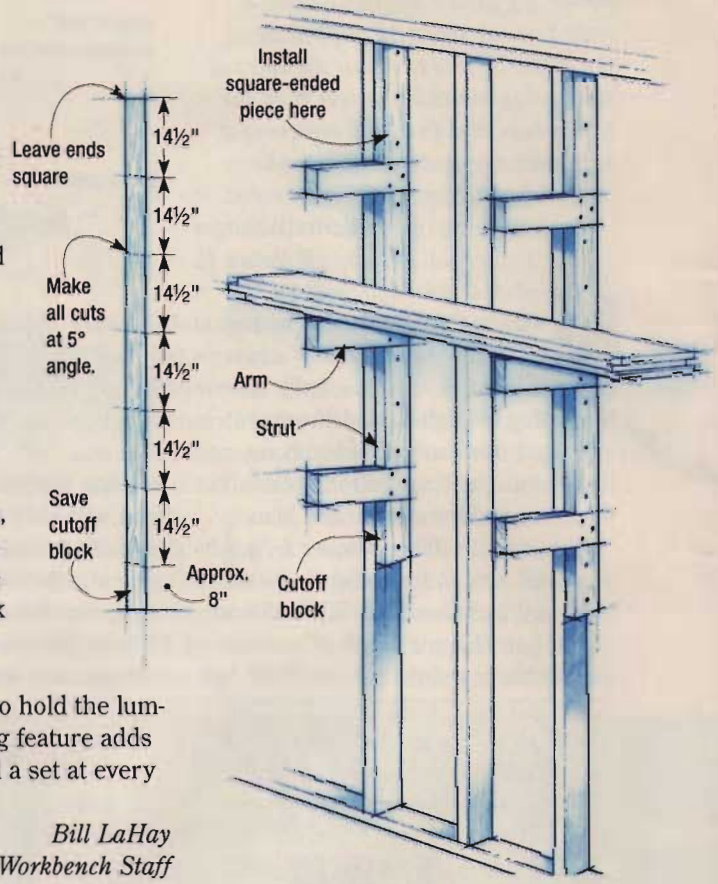
By cutting a number of identical sections of 2x4 stock and screwing them to the exposed wall studs, I had two racks installed in under an hour.

The system is dirt simple. Measure 14½" from one end of an 8-ft. 2x4 and crosscut it at a 5° angle, then cut five more sections the same length, each with two 5° angled (parallel) ends. Save the short cutoff block at the end.

Now take three of the double-angled sections (for arms) and drill a few 3/16" pilot holes at one end. Then drill a single row of holes in the other pieces, including the cutoff block. These will be the vertical struts.

Take that first end section you cut and set it against a stud, with its short edge toward you and the square end butted up against the underside of the wall plate. Secure it with a few 2½" deck screws, then fasten an arm in place below it. Next comes another strut, then an arm, and so on, each new piece providing support for the one above. The cutoff block supports the last arm. The 5° end-cuts keep the arms canted back to hold the lumber, and the self-locking feature adds a lot of strength. Install a set at every other stud.

Bill LaHay
Workbench Staff



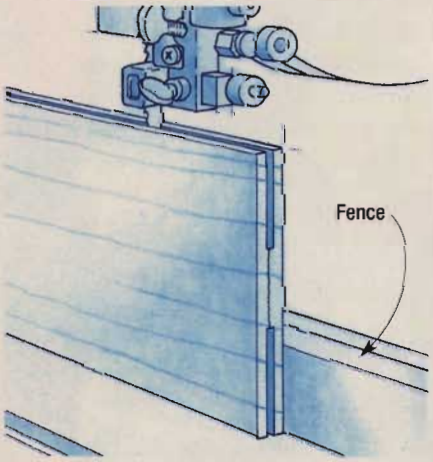
Two-Step Resawing

When I resaw lumber on my band saw, I have trouble with blade wander. The widest blade I can get locally is 3/8", and sometimes the maximum tension on it is still too light to keep the cut straight. I end up wasting half the board because it gets cut too thin.

I solved the problem by running the material over my table saw on both edges, then using the band saw to cut through the center. The table saw leaves a wider kerf, but its straighter cut means fewer planer passes to surface the boards.

Robert Elliott
Cleveland, TN

(Editor's note: For safety and accuracy, use a thin-kerf ripping blade and a series of progressively deeper cuts on the table saw. This helps prevent kickback.)

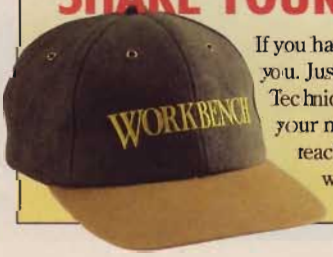


Tape Holds Plugs

Here's an upgrade for your tip on cutting wood plugs free with a band saw (April 1998 *Workbench*). Before I go to the band saw, I put a piece of 3/4"-wide masking tape over the cut plugs. That way the plugs don't fall out as I'm cutting. Afterward, I just remove the tape with the plugs stuck in a nice, neat row, ready to be used as needed — and they don't roll off the bench.

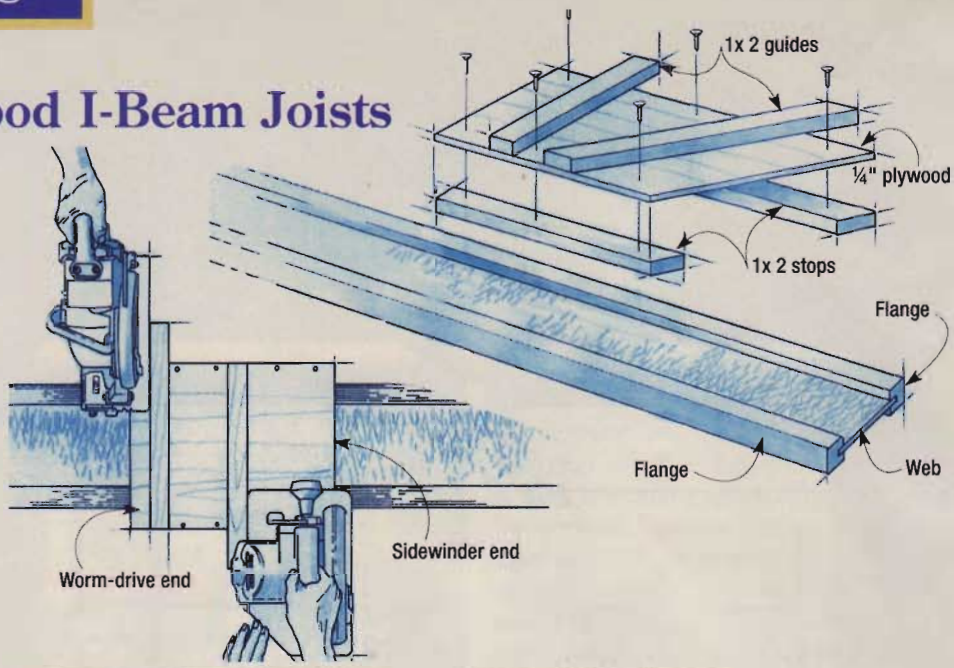
John Long
Maytown, PA

SHARE YOUR TIPS, JIGS, AND IDEAS



If you have a unique way of doing something, we'd like to hear from you. Just write down your tip and mail it to *Workbench* Tips and Techniques, 2200 Grand Ave., Des Moines, IA 50312. Please include your name, address and daytime phone number in case we need to reach you. If you like, Fax us at (515) 283-2003, or e-mail us at workbench@workbenchmag.com. We'll pay you $50-$150 and send you a *Workbench* cap if we publish your tip.

Crosscut Jig for Wood I-Beam Joists



Recently I helped a buddy frame a house floor deck using wood I-beam joists. The "I"-shape of the joists made it awkward to cut them to length with a portable circular saw, so I devised a simple cutoff jig that keeps the saw base riding level over both the web and flanges.

The base of the jig is a 12 1/4"-wide by 16"-long piece of 1/4" plywood, fitted with 1x2 stops glued and nailed parallel to each other along the two long edges. The stops are fastened to the underside of the plywood so the platform will fit snugly on top of a joist.

Another board, or set of boards, gets fastened to the top of the plywood and acts as a guide fence for the saw base. We were making square cuts but using two different saws with different blade offsets, so we used both ends of the jig — one for each saw. I glued and nailed lengths of 1x2 stock perpendicular to the bottom runners, then made the trimming cuts with each saw. I marked each end of the jig for which saw made the cut.

When we got to the roof framing later, I made a similar jig for the angled rafter ends. If you want, you can combine both square and angled guides in one jig. Aligning either kind of cut on your stock is easy, because the trimmed ends of the jig automatically indicate the blade location.

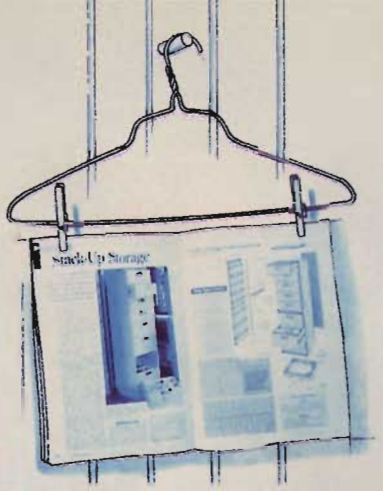
Vern D. Frykland
Willingboro, NJ

Hang Your Plans for Easy Viewing

I found a way to keep workshop plans from cluttering up my workbench or getting stuff spilled on them, but still have them convenient to use.

First, clip two clothespins to the crossbar of a wire clothes hanger. (These should be the spring-type pins that open when you squeeze the ends, not the split-fork ones.) Then clip the plans, or a magazine opened to the project article you're reading, to the hanger. A hook or nail in the wall or ceiling does the rest.

James Dickey
Iowa City, IA

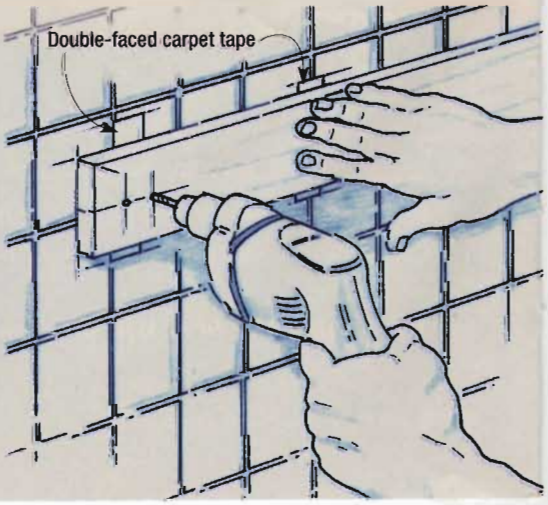


Stick-on Template for Drilling Tile

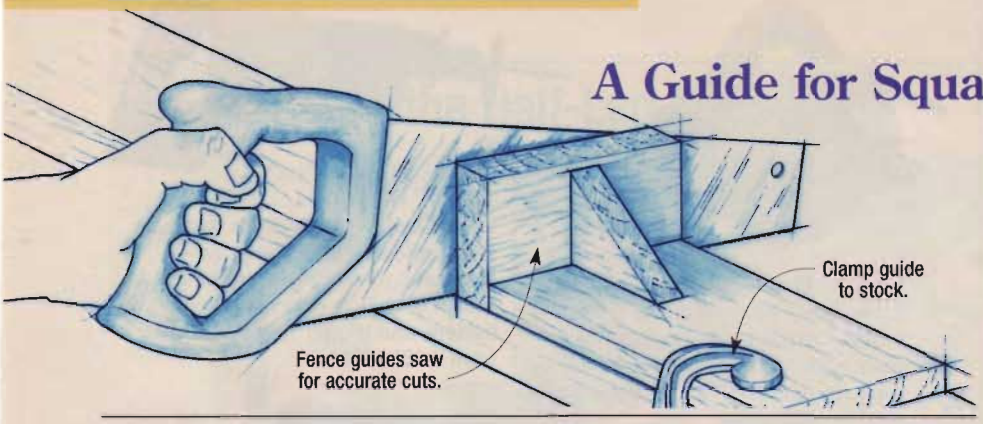
Recently I had to drill holes through the ceramic tile of a tub surround to install a safety grab bar. I marked the tile, but the carbide-tipped masonry drill bit just skated around aimlessly on the hard surface whenever I tried to start the hole. My usual solution, dimpling the workpiece with a center punch, would've shattered the tile.

I reverted to a woodworking trick — using a drilled template for hardware installation — but added a twist that let me ensure accurate placement on the tile surface. I set the grab bar on a scrap length of $^3/_4$" plywood, then marked the mounting hole locations and drilled them on the drill press. Next, I put double-faced carpet tape on the back of this template and stuck it to the ceramic tile wall. Then it was a simple matter of drilling through the guide holes with a masonry bit. (Size the drill bit for the screw anchors, not the screws, and try to avoid chewing up the template holes as you drill.)

Robert Settich
Des Moines, IA



A Guide for Square Handsaw Cutting



The idea behind this tip comes from the fact that I use a hand saw occasionally, yet not often enough to become proficient at making making highly accurate cuts. Consequently, I allow myself a "cheater."

My cheater is made from two pieces of 3/4"-thick stock about 4"-wide that I glued together at a 90° angle. This forms a base I can clamp to the workpiece, and a fence to guide the saw blade.

While I know I could just use a try square or something as a reference, the wider surface of the wood fence makes it easier to keep my saw blade aligned both vertically and side-to-side. I made one "cheater" to guide me through 90° cuts and another for 45° miters.

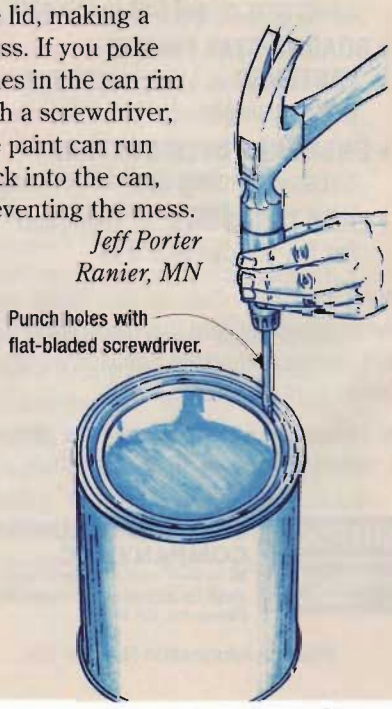
Don DiPiero
Girard, OH

(Editor's Note: Adding a triangular gusset between the guide's base and fence helps to strengthen the glue joint and keep the fence aligned.)

Can Splatter Cure

When you pour paint out of a can, some paint always runs back into the rim of the can. When replacing the lid this paint can squirt out from under the lid, making a mess. If you poke holes in the can rim with a screwdriver, the paint can run back into the can, preventing the mess.

Jeff Porter
Ranier, MN



News and Events

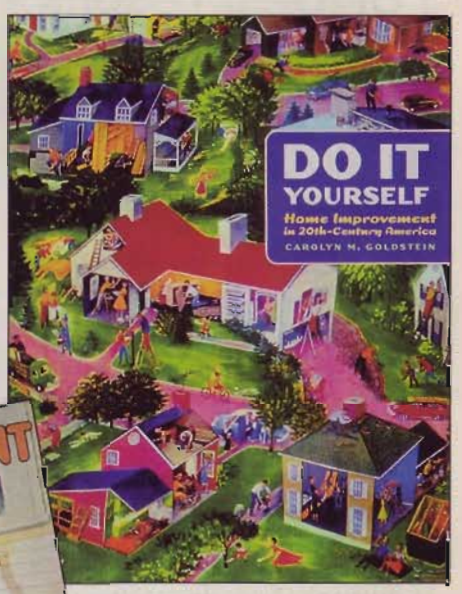
If You DIY, this Book's for You!

So you say you're a do-it-yourself dynamo? A lean, mean, project-planning, deck-building, window-fixing, kitchen-remodeling machine? That plumbing and electrical fixtures tremble when you reach for your toolbox? That calling you merely "handy" is an understatement punishable by law in 27 states *and* Puerto Rico?

Well, relax and get ready to enjoy the limelight. The National Building Museum in Washington, D.C., thinks you're an American phenomenon, or at least part of one. Together with the Princeton Architectural Press, the museum just published a 109-page book featuring the history of home fixing in these United States.

Do It Yourself: Home Improvement in 20th-Century America chronicles the aesthetic, economic, and cultural trends in home remodeling across the country, especially during the years following World War II. Topics range from historic preservation to the influence of industry media and advertising efforts, and the role of women in home repair — all presented with a diverse mix of illustrations and images designed to reveal and explore the "American obsession with home improvement."

Authored by technology historian and National Building Museum curator Carolyn M. Goldstein, the $17.95 book can be purchased through Chronicle Books at (800) 722-6657, or through bookstores across the country.



Print ads and how-to pamphlets (left) both created and reflected 20th-century Americans' appetite for home improvement. A new book from the National Buildling Museum (above) tells the story.

Minnesota Guild Plans 1998 Show

The Minnesota Woodworkers Guild will host its sixteenth annual Northern Woods Exhibition this year on Oct. 15-18, at the Southdale Center in Edina, MN. The juried event showcases members' work and brings viewers and buyers in for a close look at some of the best amateur and professional woodworking going on in the Midwest. Call (612) 544-7278 for more info.

Some of the pieces featured in the 1997 event are shown at left. Clockwise from top left, they are Ross Peterson's *Stuff Storage Cabinet* (winner of the Judges' Award), Richard Gotz's *Shaker Sewing Table* (Top Drawer Award), Dwight Speh's *Wooden Gear Clock*, Craig Lossing's *Suspended Vessel* (Best Turning), and Steve Tomashek's *Miniature Animals* (Best Carving). Nice work, guys!

These Trees Have Historic Roots

Most people plant tree seedlings with an eye toward the future, hoping for a harvestable commodity or a shade-maker to enhance their home or property. There are some trees, however, that you can plant for their past.

American Forests, the nation's oldest nonprofit citizens' conservation group, is augmenting its Global ReLeaf 2000 and other reforestation programs with one that will provide a continuing legacy for our country's most historically significant trees.

The Battery Swamp white oak, which headquartered a Union general during the Civil War battle at Gettysburg, PA, is among the historic trees providing descendants you can plant.

The *Famous & Historic Trees* program, founded in 1976, offers seedlings that are the direct genetic descendants of noteworthy trees from across America. Among the original specimens are trees from important Revolutionary War and Civil War sites, George Washington's Mount Vernon estate, Abraham Lincoln's birthplace, Thoreau's Walden Woods, and the homes of famous American women, authors, artists, inventors, and other notables — over 2,500 trees in all, with a seedling inventory of 150-200 different types to choose from at any given time.

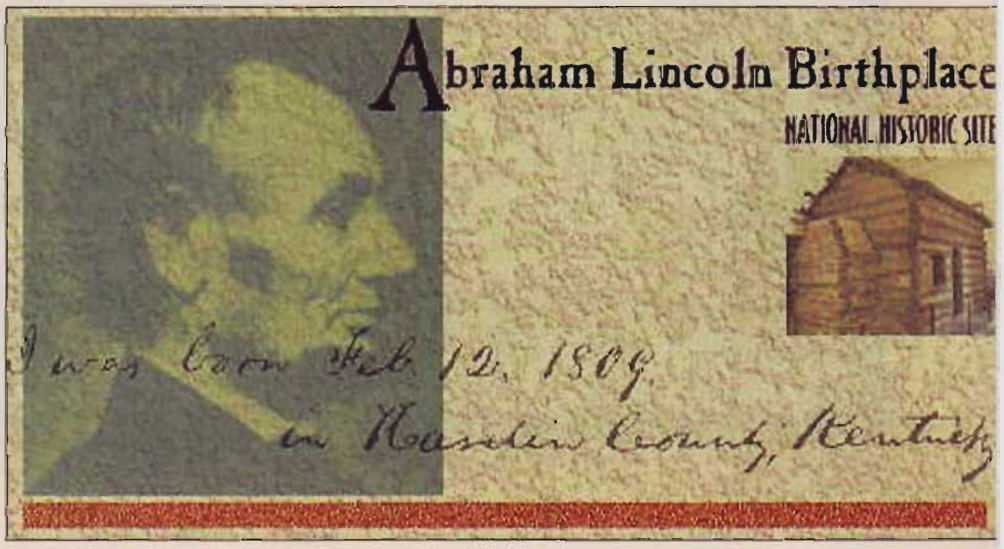
Each seedling is provided with a complete planting kit that also includes a protective growing tube, a support stake, a fertilizer tablet, a bird safety net, planting instructions, and a certificate of authenticity that explains the tree's lineage and historical significance. The age and size of the seedlings vary with species (one to two years is average, and maximum height is 4 ft.), but all sell for $35 each plus $8 shipping. Other items offered include gift certificates, cast terra cotta bricks displaying the tree name and origin, and classroom seed kits for up to 35 students. A lifetime replacement guarantee is free with each seedling in case any fail to survive (you pay shipping charges only). To order a tree or request a catalog, you can contact American Forests at (800) 320-8733.

Build Some History!

If you're a woodworker with any experience building small-scale architectural models, American Forests has another project you'll want to know about. Periodically the original "ancestor" trees in the *Famous & Historic Trees* program are lost to old age, storms, or sadly, vandalism. When that happens, the wood from the tree is used to create artifacts of historic value, some of which are sold to support other AF programs.

Among the recent losses is a basswood tree from Abraham Lincoln's Springfield, IL home. Some of the wood has been earmarked for a scale-model replica of Lincoln's birthplace, a small log cabin in Hodgenville, KY, to be donated to the permanent collection of the Smithsonian Institution Museum in Washington, D.C. Here's the good part — the organization is looking for a woodworker to volunteer to build it. The ideal candidate should have experience in detailed small-scale woodworking, photographs to show previous work, and will be required to build a sample cabin for approval by American Forests. With help from the National Park Service, drawings and other information about the original cabin's details will be provided to the builder.

If you're interested, write to American Forests, Attn: Lincoln Cabin Project, 8701 Old Kings Road, Jacksonville, FL 32219. No telephone inquiries please!



N.H. Craftsmen's Fair Turns 65

Sixty-five isn't old if you're a tree, but if you're an annual crafts fair it makes you the granddaddy of them all, at least in the United States. This summer the League of New Hampshire Craftsmen's Fair hits that golden age, and the sponsors are expanding the events roster to include more on-site demonstrations, interactive workshops, and instructional opportunities for adults and children.

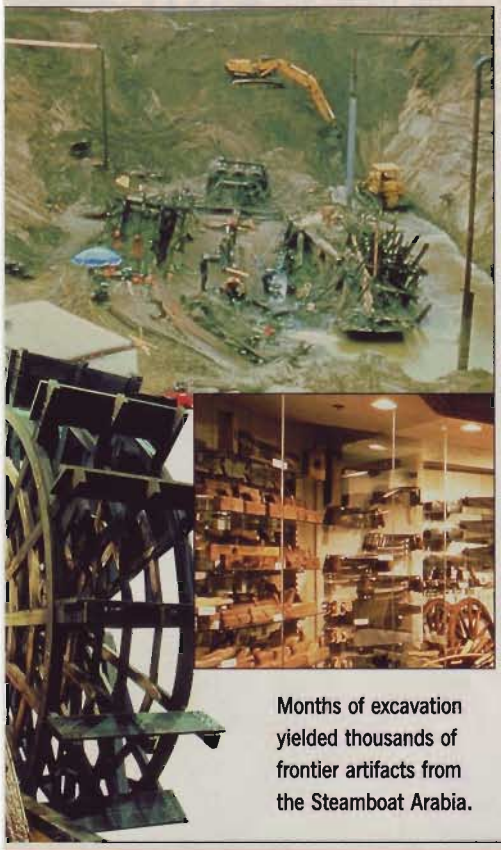
Over 40,000 people attend the fair to meet hundreds of artisans and see work done in wood, glass, clay, leather, metal, textiles, and other media. The event will be held in the Dartmouth/Lake Sunapee region on Aug. 1-9. Call the League office at (603) 224-3375 for details.

Free Safety Info

Lawn mower injuries, falls from extension and step ladders, and accidents involving outdoor power equipment send nearly half a million Americans to hospital emergency rooms each year. The high numbers reflect the commonplace nature of these items, but also an attitude of complacency fostered by their familiarity to most of us.

The folks at Underwriters Laboratories (source of the familiar UL symbol for product safety) want to help you get through the season injury-free. As part of their "Spring Into Safety" campaign, they've compiled three sets of basic safety guidelines for using ladders, lawn mowers, and other outdoor tools and equipment.

You can receive any or all of the free one-page safety guides by calling Underwriters Laboratories' fax-on-demand line at (800) 473-4766, or by visiting the UL web site at www.ul.com.



Months of excavation yielded thousands of frontier artifacts from the Steamboat Arabia.

Steamboat Museum Highlights

Maybe it was the vessel's name — Arabia — that destined it for a home in sand rather than water. Whatever the reason, when this Missouri River steamboat hit a snag and sank in September of 1856, she didn't stay in the river for long. But the boat didn't actually move. The river did.

In the days before it was confined by the U.S. Army Corps of Engineers, the Missouri River was constantly shifting and changing course, and sunken boats were often buried in sand and silt as the water found a new direction. The Arabia was one of these vessels. It sank with a valuable 200-ton cargo load, then was buried in what later became a farmer's field.

Recovery attempts were made in 1877, 1897, and 1974, but the high water table and other site difficulties foiled all three excavation teams. The buried treasure proved irresistible, however, and in 1987 a Kansas City salvage firm tried again and made it.

The recovered cargo, half of which is still in storage awaiting cleaning and preservation, included barrels of whiskey and cognac, eyeglasses, jewelry, and everyday items such as tools, handmade window panes, buttons, hardware, and glass bottles with still-edible fruits and vegetables preserved inside. Thousands of artifacts are already on display at the Steamboat Arabia Museum, a 30,000-sq. ft. facility built to showcase the recovered items and replicas of the ship's deck and 28-ft. paddle wheel. On site, a working preservation lab continues to prepare the remaining 100 tons of cargo for display, a task expected to take another 25 years.

Located in Kansas City, the museum is open year-round. Call (816) 471-4030, or visit online at www.1856.com.

A Grand Entrance

The entryway to a home should say "Welcome, good to see you, come on in." Unfortunately about the only thing the front porch at the Workbench *house said was "wipe your feet." In an attempt to* beautify the concrete porch, the home's previous owner covered it with indoor/outdoor carpeting. Sure it kept people from tracking dirt in, but the green Astroturf look didn't convey much hospitality.

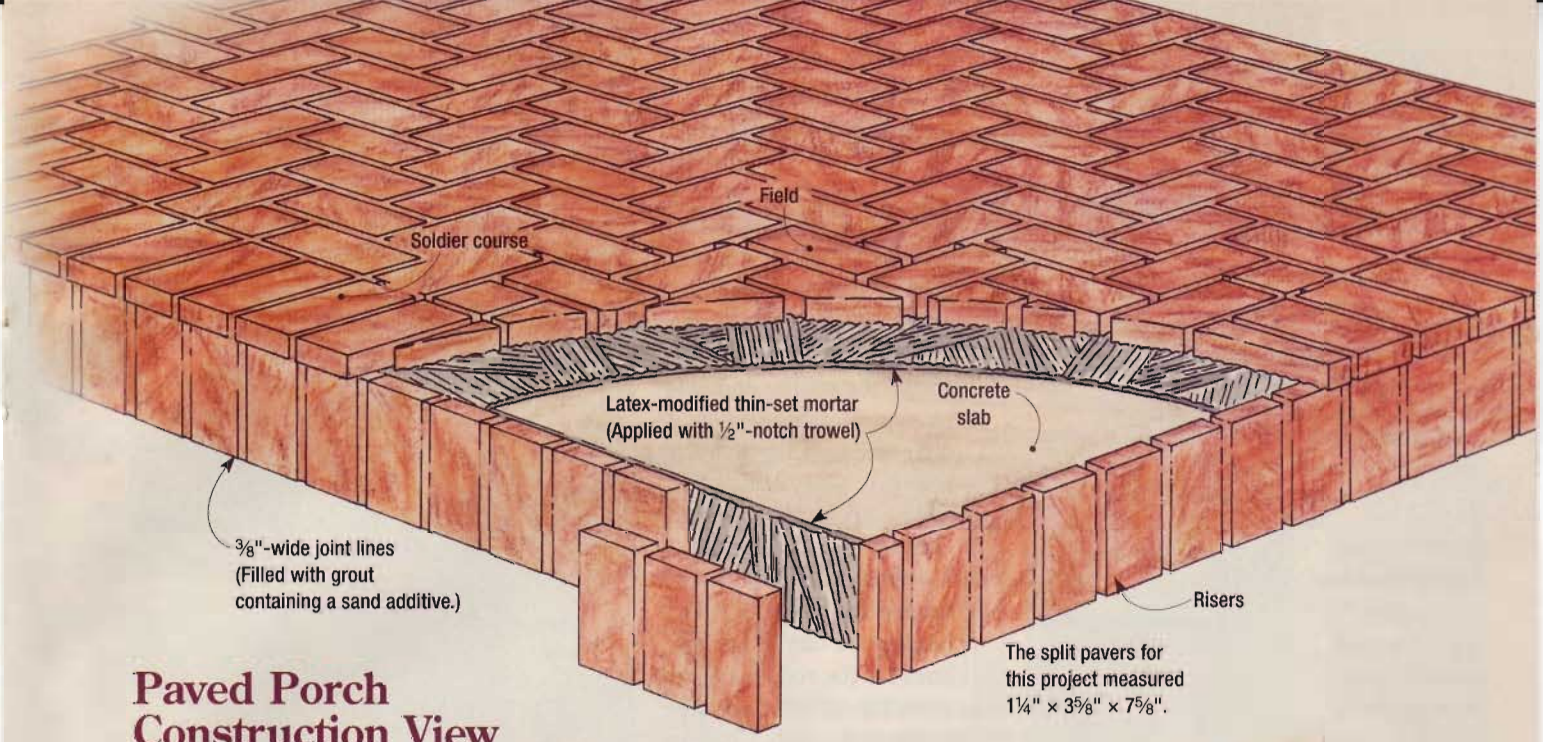
This was a shame because the porch had potential. It wraps around the home's stone chimney, and has plenty of space for garden furniture. Its view of the neighborhood makes the porch a great place to spend summer evenings sipping iced tea. Plus, the home's new siding, rejuvenated deck, and beautiful pergola made the porch look tacky.

To bring the porch up to par, we removed the carpet and replaced it with "split" paving bricks. They look like regular brick pavers, but are about half as thick.

Laying split pavers is much like setting tile, requiring skills within a do-it-yourselfer's range. To get tips from a seasoned pro, though, we called on Lyle Hale, the same mason who helped us build the faux stone fireplace inside the house (see the February 1998 *Workbench*).

After tearing up the old carpet, his first task was to give the concrete a good cleaning to ensure the mortar bonded well **(Figure 1)**.

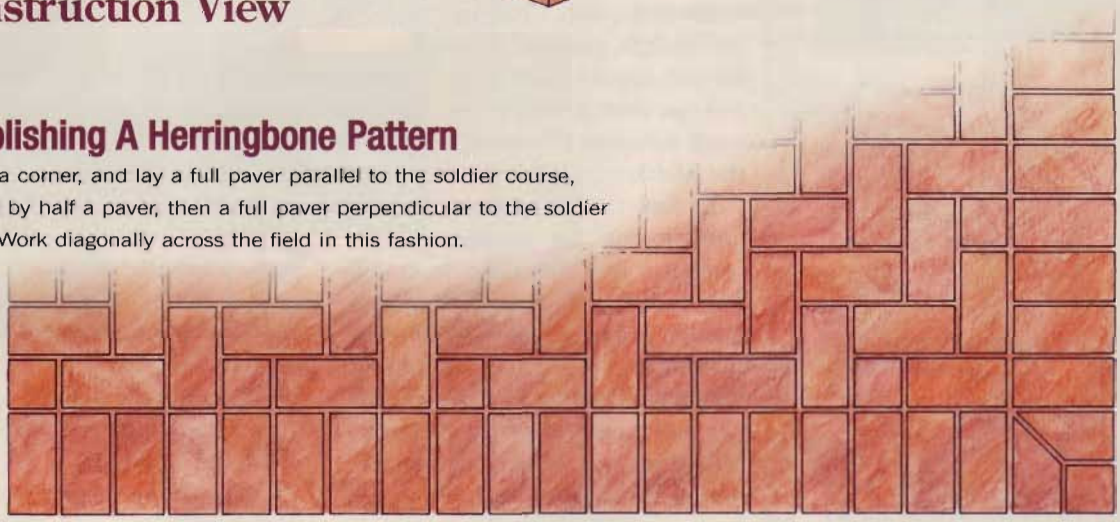
Scrape off loose materials then scrub the concrete with soapy water and a brush, leaving a clean surface for the mortar.



Paved Porch Construction View

Establishing A Herringbone Pattern

Start in a corner, and lay a full paver parallel to the soldier course, followed by half a paver, then a full paver perpendicular to the soldier course. Work diagonally across the field in this fashion.



Establish a Pattern

Once we selected a paver color (we used Flashed Manganese pavers manufactured by Yankee Hill Brick and Tile (402) 477-6663, supplied by Glen-Gery Brick (610) 374-4011), our next challenge was to determine what pattern we'd lay them in. Options with pavers are limited only by your imagination, but there are a few time-tested patterns that are relatively easy to lay and look great (see *Pattern Possibilities* on page 37).

Ledger boards position the riser bricks flush with the porch surface, and hold them in place while the mortar sets.

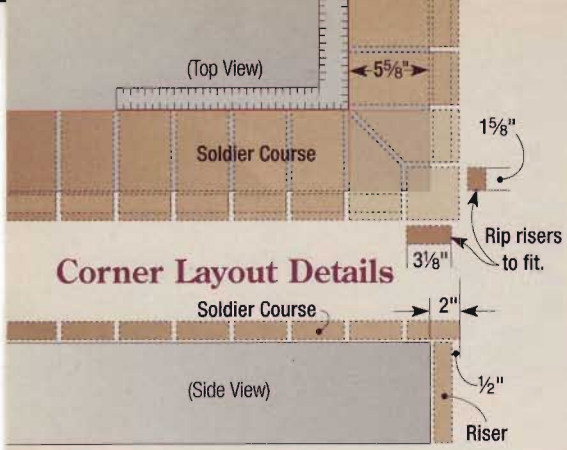
With split pavers, which don't have quite the strength of standard pavers, a solid underlayment, such as concrete, is essential.

Selecting the appropriate size paver is important as well. Full 4"-wide by 8"-long versions are meant to be butted together with no grout lines between. For grouted joints, such as we used, pick 3⅝"-wide by 7⅝"-long pavers and leave ⅜" gaps between them for grout. This still yields a 2:1 length-to-width ratio.

We used a herringbone pattern for the field, framed by a border, or soldier course, along the front and side of the slab. The soldier course overhangs the riser pavers that cover the edge of the slab **(Paved Porch Construction View)**.

To prepare for laying the pavers, we temporarily staked a level ledger board into the ground around the concrete slab to hold the risers in place **(Figure 2)**.

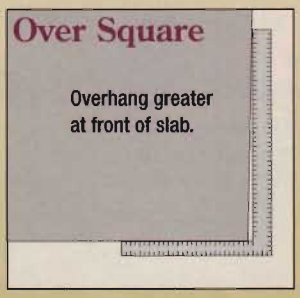
With the ledger secured, we had to determine where to start laying the pavers. Just like when laying tile, starting with the most prominent focal point and working toward the least visible areas works best. On our porch, the most prominent point was the front outside corner.

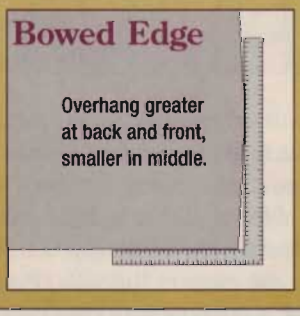


Sizing-up the Slab

An out-of-square slab will affect how far the soldier course overhangs the risers. Small variations can be ignored, but you'll have to adjust the position of the soldier course for a reasonable average overhang on any edges that aren't straight or square.

- Over Square: *Move soldier course* toward edge of slab.
- Under Square: Move soldier course away from edge of slab.
- Bowed Edge: Position soldier course for best average overhang.





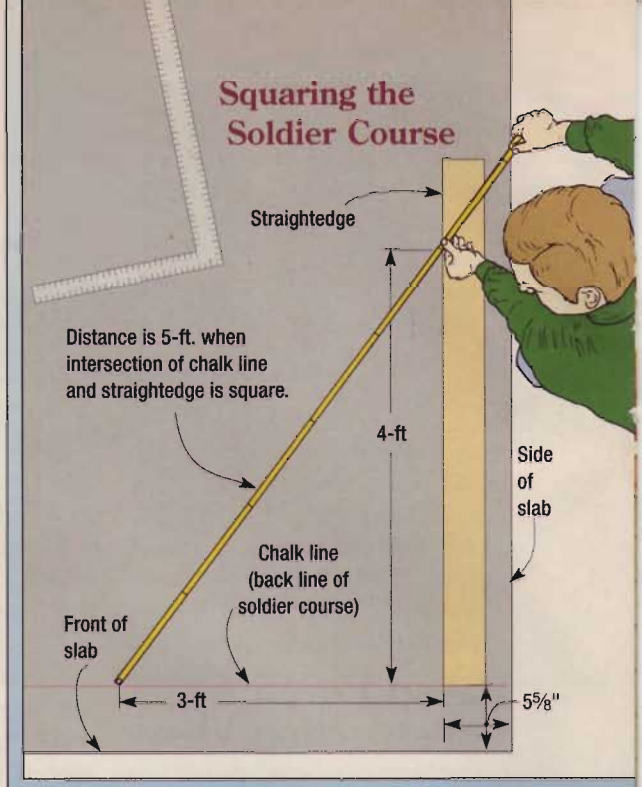
Head for the Border

We laid out the soldier course starting at the outside corner **(Corner Layout Details)**. Not only is this the porch's most visible feature, the corner is the key to lining up the rest of the soldier and field pavers. If this corner is out-of-square, the spacing between the field pavers will be off.

If you're lucky enough to have a slab that's perfectly square and parallel to the house, you can snap chalk lines for the soldier course near the front and side edges of the slab. Chances are, though, that you'll find the slab out-of-square. Still, you can work around most small variances **(Sizing-up the Slab)**.

To find the best layout location for the soldier course, I first measured from the front of the house to the front edge of the slab in several places. At the point furthest from the house, I measured back from the edge 5⅝" (the length of a paver minus the desired 2" overhang), and snapped a chalk line parallel with the house to establish the back line of the soldier course **(Squaring the Soldier Course)**.

Once this first back line is marked, use a long straightedge and tape measure to lay out a second chalk line square to the first line near the side edge of the slab.



Mark a minor point on the chalk line 5⅝" from the side of the slab. Next, mark a major point 3 ft. away. Align a straightedge with the minor point and measure 4 ft along the side of the slab and mark another major point. The distance between the major points equals 5 ft. when the corner is square.

After snapping the chalk lines you can dry-fit the first two soldier pavers. Align a framing square with the chalk lines and butt the back edge of each paver to it **(Figure 3)**. Offset the pavers from the corner to leave space for grout.

To fill in the corner, I mitered two pavers at 45° and crosscut another in half **(Figure 4)**. Cutting the pavers was easy using a rented wet-cutting tile saw (top of facing page). I strongly recommend getting your hands on one of these workhorses if you have many pavers to cut.

Align a framing square with the chalk layout lines and position the first two pavers in the soldier course. Set the pavers against the square, but offset each ⅜" from its corner to leave space for grout.

Miter two pavers at 45° and cut another one in half to fill the corner. Set the risers on the ledger board so they align with the soldier course pavers. You'll have to rip the risers that meet at the corner.

Ready to Set

Once you've got the corner pavers cut and dry-fitted, the most difficult part of the job is done. Now you can mix the mortar and start setting the pavers.

We used latex-modified thin-set mortar to adhere the pavers to the slab. The powdered mortar comes in 50-lb. bags, and can be mixed with water. But for better bonding and flexibility in a variety of outdoor conditions, we mixed the mortar with latex additive instead of water. Mortar and latex additive are available at home centers.

I mixed the mortar and latex in a 5-gallon bucket using a mixing paddle chucked in a heavy-duty 1/2" drill. A workable batch turned out to be one bag of mortar blended with about 2 gal. of latex. That was all I could easily mix in the bucket without making a mess, and it made enough mortar to cover 50-75 sq. ft. Don't get carried away blending the mortar — mixing at over 300 rpm or for too long introduces excess air into the mortar, inhibiting curing. (If you don't have a heavy-duty drill, mix smaller batches by hand.)

Use a trowel with 1/2" notches to spread mortar onto the corner of the slab, taking care to avoid covering the chalk lines. Next, set the risers in place **(Figure 5)**. Then set the mitered corner pavers so they're aligned with the chalk lines **(Figure 6)**.

Continue setting the soldier course, working each way from the corner and leaving a 3/8" space between each paver for grout **(Figure 7)**. You can buy tile setting spacers that you place between the pavers to ensure proper spacing.

In the Field

After setting the soldier course, you can begin laying field pavers. One nice feature of the herringbone pattern is that if you get any uneven spacing between pavers, it's less obvious since there aren't any long, straight joint lines.

Although the herringbone pattern looks complex, it's reasonably simple to lay out once you establish the pattern (see *Establishing a Herringbone Pattern* on page 33).

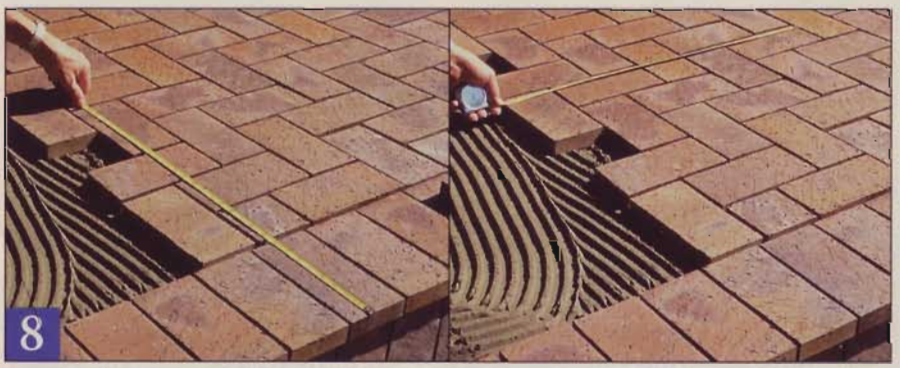
Start laying the field pavers in the corner of the soldier course, and work out from there in a diagonal pattern. Trowel mortar onto the slab as you go, working within an area you can reach while kneeling (about 3 sq. ft.). Stop occasionally and check that your joint lines are straight **(Figure 8)**.

Along the soldier course I had to crosscut some pavers in half to fill in the pattern. I also had to cut pavers to fill in some odd-size spaces where the porch meets the house. Again, using the tile saw made quick work of these steps.

Trowel mortar onto the corner of the slab, covering just the area where you'll set the first corner pavers. Set the riser pavers first with taps from a rubber mallet.

Spread mortar on the top end of each riser, stopping about 3/8" from the front faces. Then set the corner pavers in place.

Working each way from the corner, set the riser and soldier pavers. Watch the chalk lines to keep things square, and check the surface with a straightedge.



As you work across the field, measure occasionally to make sure your grout lines are straight. Check from the front edge of the soldier course and from the side. Using 3/8" tile spacers makes it easier to keep consistent gaps between the pavers. You can realign pavers until the mortar starts setting.

Lyle applies a coat of exterior masonry sealer to the pavers before grouting. This prevents stains caused by grout and water.

Work grout between the pavers with a float. Then tilt the float to 45° and scrape diagonally across the pavers to remove the excess.

On this job I was really grateful for the tile saw when it came time to cut the small pieces to fit in around the chimney. The tile saw was best suited for cutting straight lines, though, which made it difficult to follow the contours of the rough stone. I just cut each paver to sit about 3/8" away from the stone, and left the gaps to fill in with grout later.

After a full day of carrying pavers and bending over hundreds of times, Lyle and I were both tired. I was glad, at least, that I'd chosen split pavers instead of full-size pavers. At half the thickness, split pavers are also half the weight.

Conveniently, this job gave us an excuse to knock off, as the mortar needed to cure overnight before we'd be able to safely walk on the pavers to spread grout.

Seal, then Grout

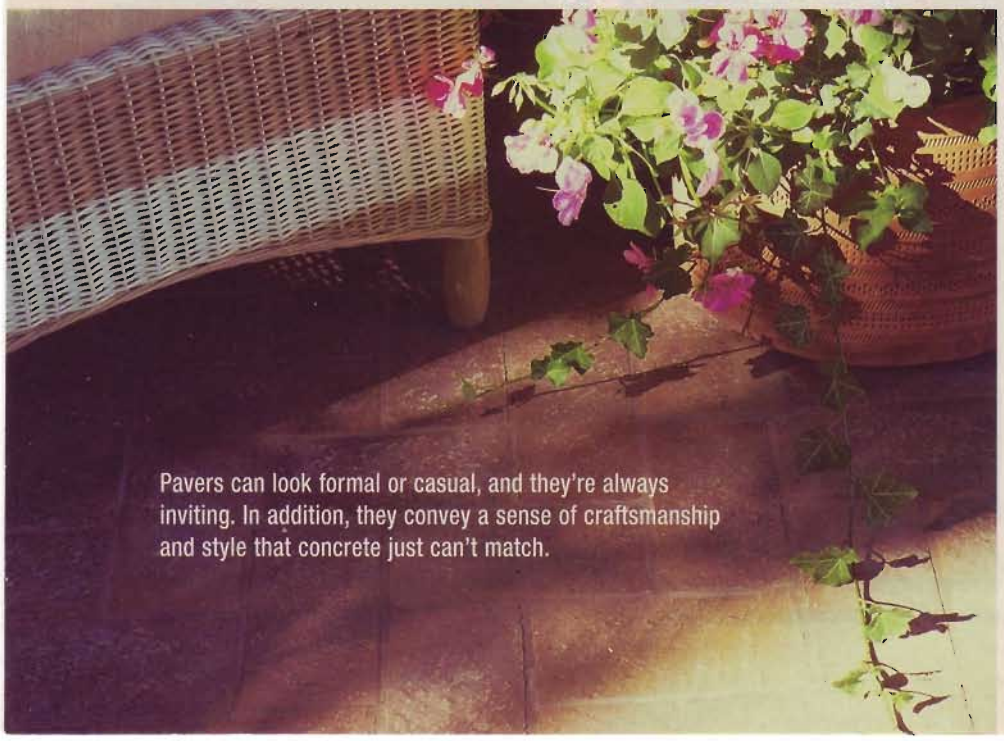
I arrived at the *Workbench* house the next morning, ready to strap on my knee pads and start spreading grout. I was surprised to see Lyle already at work, but not grouting the porch. This was another time having a pro on the job paid off. He reminded me that the pavers were porous and could get stained if they soaked up the grout mix and water. So he'd arrived early to spread a coat of sealer on all the pavers, using a roller and extension handle to save his back **(Figure 9)**. He'd also decided the exposed edges of the soldier course pavers were a bit too sharp. So he'd taken time to grind off the sharp edges before applying the sealer.

While the sealer dried, I mixed the grout. Because of the wide spaces between the pavers, we used grout with sand added, and I mixed it with latex additive, just as we did the mortar. Sand gives the grout more body to fill in the gaps, and the latex helps it bond with the pavers, just as it helped the mortar bond better with the concrete.

Again, the technique for grouting the pavers was similar to how I'd grouted tile. Scoop a small pile of grout onto the pavers. Then use a grout float — which looks like a masonry trowel with a padded sole — to work the grout into the gaps between pavers **(Figure 10)**. Hold the float fairly flat to the pavers and move it diagonally over the surface, forcing the grout in until you're sure the gaps are completely filled.

Once you've filled a few square feet, tilt the float and drag it over the pavers to scrape off the excess grout. Again move the float diagonally to the joint lines to prevent catching the float on an edge and pulling grout out of the joints.

When you've got most of the grout scraped away, wipe off the pavers using a sponge dampened with clean water **(Figure 11)**. In addition to removing excess grout, this process helps press the grout



Pavers can look formal or casual, and they're always inviting. In addition, they convey a sense of craftsmanship and style that concrete just can't match.

between the pavers and smooth it out. Rinse and wring out the sponge often, and always work diagonally to the grout lines.

As the grout cures, a haze will appear over the pavers, so you'll need to wipe the surface several more times to get rid of it. Start with fresh water each time.

On the risers, space is limited, so working the trowel and sponge diagonally is tough. Just do the best you can to pack grout into the gaps and shape it with the sponge.

After letting the grout cure for 48 hours, I rolled on another coat of sealer over the whole surface to protect the grout.

It's hard to believe how much difference the revitalized porch made. What had been an eyesore is now one of the home's most handsome features. These days, when guests arrive at the *Workbench* house, they're greeted by an entryway that looks both elegant and inviting, drawing them to the door and really saying "Welcome."

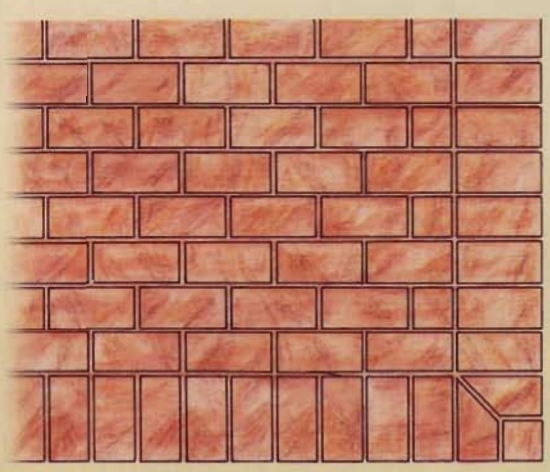
Use a damp sponge to wipe excess grout off the pavers, and to shape the grout in the joints. Rinse and wring out the sponge often. Repeat as the grout dries to remove haze.

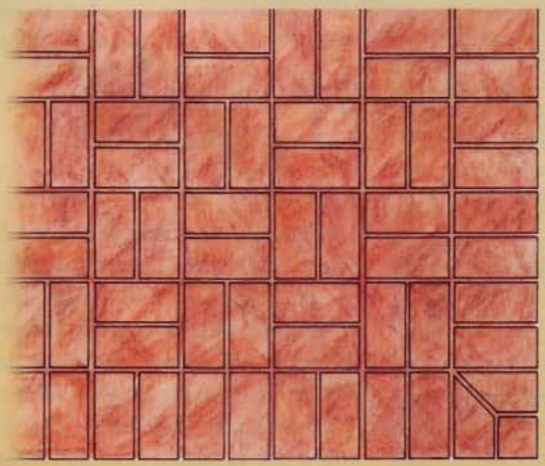
Pattern Possibilities

If you've got a sidewalk, patio, or porch you'd like to dress up, split-brick pavers are a great choice for an attractive, durable surface. Split pavers don't have the load-bearing capabilities of standard pavers, and need a rigid base such as concrete. Like standard pavers, though, split pavers can be laid in a variety of patterns to achieve different looks.

Running Bond

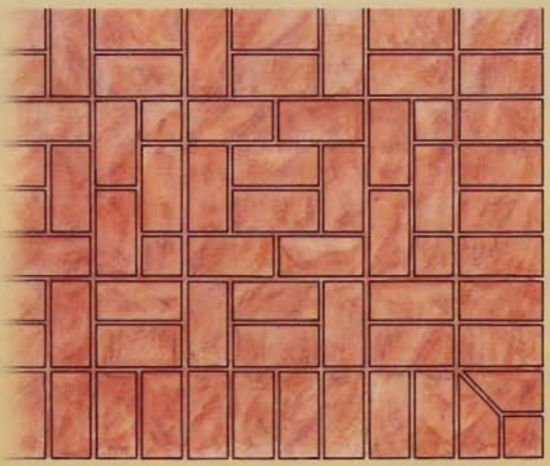
Pavers laid end-to-end in parallel rows make up a running bond pattern. Joints in adjacent rows are offset by half a paver. Run the rows parallel with the direction of travel or the longest edge.





Double Basketweave

The double basketweave pattern pairs pavers into square blocks. Each pair is set at a right angle to its adjacent pairs, with no offset. Travel is in either direction.



Boxed Double Basketweave

The boxed basketweave uses eight pavers to form a larger square. Again, each square in each row is rotated 90° from its adjacent square. Direction of travel doesn't matter.

Sun-filtering Pergola

Most decks are long on sun and short on shade. Many jut out from the house with little to ease the transition between indoor and outdoor spaces. The deck at the Workbench *house was no* exception. For much of the day, you couldn't find a shady spot.

After considering a variety of alternatives, we settled on a pergola design that gives us an ideal blend of shade and light. Building the pergola where the deck meets the house on two sides creates a cool retreat, and it provides welcome relief from the harsh morning sunlight coming through the east-facing master bedroom window.

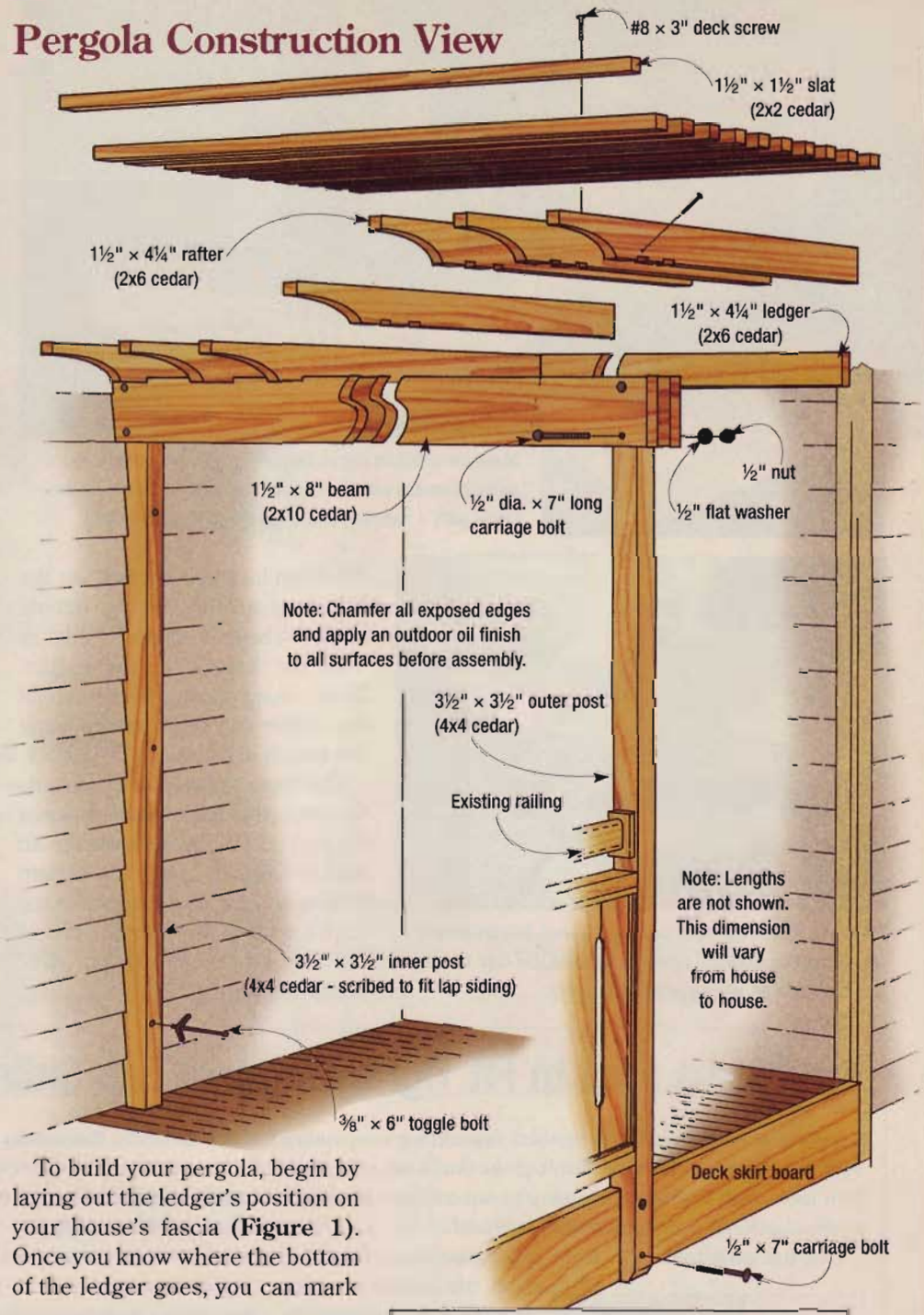
We built the pergola out of cedar to match the deck railing we installed last summer (see the August 1997 issue of *Workbench*). The simple construction required only a portable circular saw, router, jig saw, a drill, and a few hand tools. A table saw makes ripping the slats easier, but isn't essential.

Made for the Shade

Structurally, our pergola connects to the house and the deck **(Pergola Construction View)**. But your deck or back yard may present a situation better served by a freestanding structure. You can adapt our project's post and beam construction to support both ends of the rafters, excavating post holes or using footings and deck hardware to hold the posts in place.

We gave the rafter tails a simple curved shape that matches the deck railing design.

Pergola Construction View

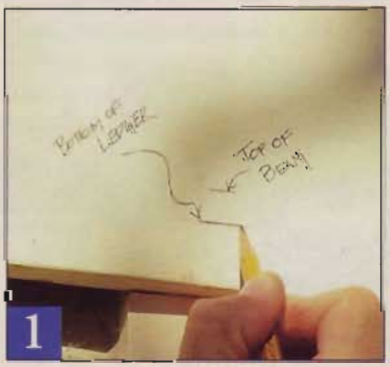


Laying Things Out

Most add-on construction starts by attaching an over-long ledger board to the house, then working out from there. This time, however, I altered the routine a little.

While I did begin by laying out the ledger's position, I didn't attach the ledger until later. I found that by installing the beams first, and spacing the rafter positions along them, I could easily determine the correct length for the ledger. In addition, this allowed me to cut the ledger safely on the ground. Unwittingly, I also realized another benefit: I could drive the ledger mounting screws in areas that would be covered by the rafters — a detail that enhances the pergola's overall craftsmanship.

To build your pergola, begin by laying out the ledger's position on your house's fascia **(Figure 1)**. Once you know where the bottom of the ledger goes, you can mark



Mark the position of the bottom of the ledger on the fascia, then place a mark for the top edge of the beams ½" higher.

What You'll Need

Lumber

(2) 4x4 cedar posts, approx. 9 ft. long
(2) 2x10 cedar beams to span between posts
(17) 2x6 cedar for rafters and ledger
(11) 2x2 cedar for slats

Hardware

(6) ½" dia. × 7" long carriage bolts, washers, and nuts
(3) 100 count boxes of #8 × 3" deck screws
(2) lbs. of 10d galvanized casement nails
(3) ⅜" dia. × 6" long toggle bolts

Make the shoulder cut of the half-lap joint first, then make a series of passes with the circular saw (above). Break off the waste with a hammer, and chisel the joint smooth (left).

Once you install the outer post, use a level to transfer the beam location from the fascia to the post. Be sure to mark this elevation on all four sides of the post.

the beam location. To allow for the 1/2" deep notches in the rafters, mark the beam location 1/2" higher than the bottom of the ledger. Then, using a long level, extend the ledger and beam marks along the length of the fascia.

The outer post of our pergola supports the beams and replaces the end post of the deck railing. To anchor this post, I cut a half-lap into its bottom end, then bolted it to the deck's skirt board. The shoulder of the half-lap resting on the skirt board creates a sturdy foundation.

To figure out how long the outer post needs to be, measure from the beam mark on the fascia to the deck surface. Then add to this number the width of the skirt board (9 1/2" in my case) plus an extra foot to allow plenty to spare for trimming.

Cut your post to length, then lay out a half-lap so it fits the skirt board (1 1/2" deep × 9 1/2" long in my case). Cutting the half-lap is easy with a circular saw and a chisel **(Figure 2)**. For my post I also cut dadoes to support the deck railing. Since cedar sawdust can irritate your lungs and skin, I suggest that you wear a dust mask and do all the machining outside.

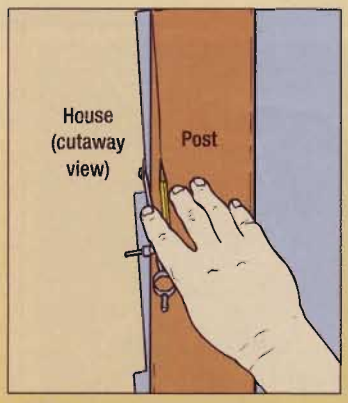
Here's another tip: Brush an outdoor oil finish onto your post now, and do this to each piece before it's installed. It's much easier and more thorough to do it before the pieces are assembled.

Position your post on the skirt board, check it for plumb, then drill holes and bolt the assembly together. Next, transfer the beam mark from the fascia to the post **(Figure 3)**. If your level won't span the distance, use a long, straight-edged board with your level placed on it.

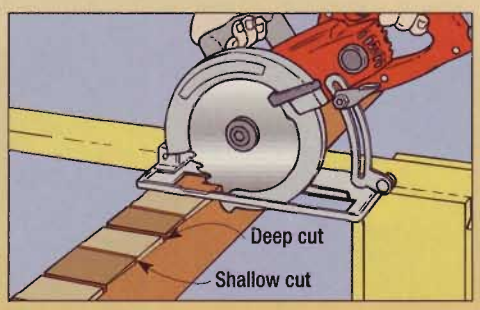
Scribing a Post to Fit Tightly Against Lap Siding

Scribing a 4x4 post to fit against lap siding may seem over-the-top, but the end result gives you a no-gap, custom look. And it's relatively easy to accomplish with just a circular saw, a handsaw and a chisel.

Cut the post to length to fit snugly between the deck and the house's soffit. Set the post against the siding, and use a compass to trace the siding profile onto the post. Next, following the scribed outline, use a square to draw lines indicating the bottom edge of each piece of siding. Be sure to draw the lines on the surface of the post that will face the house. Make a saw cut at each line (the depth should match the thickness of the siding). Then cut a 1/8"-deep kerf midway between the deep cuts. Chisel the shallow waste to that kerf, and remove the rest with a handsaw.



Scribe the siding pattern onto the post, then use a square to mark the deep cut lines across the face of the post.



Make one set of cuts to the full depth of your siding. Then adjust the saw and make 1/8" deep cuts midway between each pair of deep cuts.

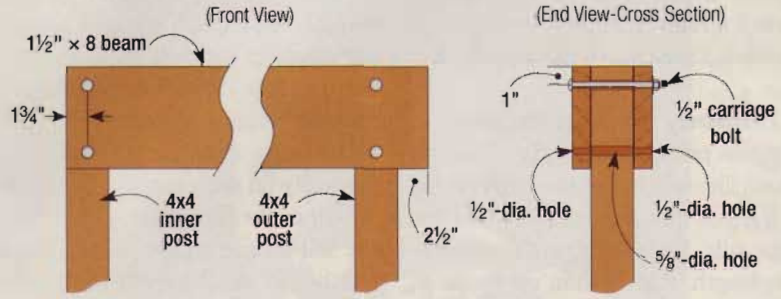
Chisel out the shallow portion of each relief to the 1/8" deep kerf. This creates a ledge on which to align your hand saw for removing the rest of the waste.

Drill counterbored holes in the post, followed by through-holes in the post and siding. Next, install the toggle bolts.

Scribe the siding profile onto an 8"-wide piece of cardboard. Cut this template to shape and use it to transfer the siding profile onto the end of each beam.

Cut the ends of the beams to the siding profile using a jig saw. Apply outdoor oil finish to the freshly cut end grain.

Beam Mounting Details



Install the Inner Post

I considered using metal joist hangers to support the ends of the beams where they connect to the house, but decided that for appearance sake, the beams need a post here to match the outer ends.

Rather than let this inner post rest only on the deck, I wanted it fastened to the wall to keep the beam from shifting away from the house. For a clean fit, I scribed the post to the siding (see *Scribing a Post*).

After scribing the post for the siding I held it in position and drilled counterbored pilot holes for some beefy toggle bolts. Tightening the bolts in the anchors really snugged the post to the house **(Figure 4)**. Next, I transferred the location of the beams' top edges from the fascia board to this post like I did earlier on the outer post.

Mount the Beams

I began preparing the beams for their installation by scribing one end of each piece to fit against the siding. Rather than raise the boards into position for this, I taped a piece of cardboard to the inner post, then scribed the siding profile onto the cardboard. After trimming the cardboard to shape with a scissors, I traced the profile onto the end of each beam and cut them to shape **(Figures 5 and 6)**.

Going into this project, I was concerned about mounting the beams to the posts, because it involves hoisting two long, heavy boards. But by carefully laying out the mounting bolt holes in both the posts and beams, and allowing for minor adjustments, I was able to minimize the amount of lifting.

Lay out the mounting bolt holes on the scribed end of the beams **(Beam Mounting Details)**. Then measure the distance from the center of the inner post to the center of the outer post. Use this distance to lay out the mounting bolt holes on the outer end of the beams. Complete this step by drilling the ½"-diameter holes **(Figure 7)**.

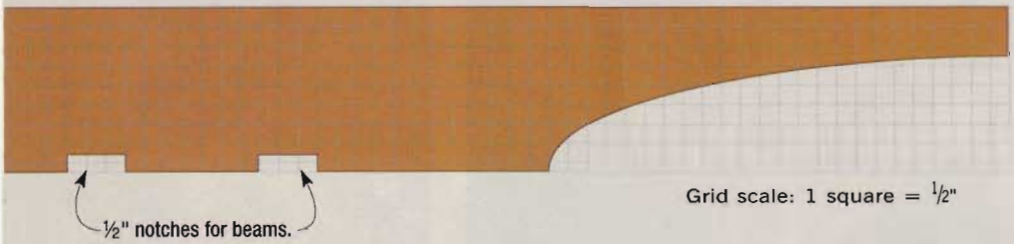
Next, lay out and drill the holes in the posts for the bolts **(Figure 8)**. Using a ⅝"-dia. bit allows enough play for installing the bolts.

Carefully mark the location of the mounting holes on both ends of the beams. Then use a brad-point bit to drill ½"-dia. holes through the beams.

Drill ⅝" holes through the posts. When the tip of the spade bit protrudes, finish drilling from the opposite side. Eyeball your alignment so the bit stays on course.

Attaching the beams to the posts one end at a time made the assembly process much more manageable. To do this, I inserted a bolt through the lower hole at the outer end of one beam, raised the beam into position and slid the bolt through the outer post. Then I slipped the other beam onto the bolt, and spun on a washer and nut. I repeated the process at the inner post.

Rafter Pattern



With the beams hoisted into position, tighten the carriage bolts that hold the beam assembly to the post.

Clamp the rafters together and gang-cut the notches with several passes of a circular saw. Chisel out the waste.

Clamp the rafter tail template in place and rout the rafter blank to shape with a flush-trim bit. Cleats on the template prevent the stock from shifting.

A few firm go-arounds with my box wrench secured the carriage bolts and the beam assembly **(Figure 9)**.

Finish up this phase of the project by cutting the tops of the posts flush with the tops of the beams. I used a hand saw, letting the blade rest on the beams as I made the cut.

Ready for the Rafters

At this point, the pergola still didn't look like much, but the rafters soon changed that. Before I could shape the tails, I needed to cut the rafters to length. Rather than cut them all to finished length, I left them 1" long so I could custom fit each one to accommodate minor variations in distance between the house and the beam assembly. (Any discrepancies here could get amplified when the gridwork of slats goes on.) Since the outermost rafter gets nailed to the end of the ledger instead of its face, I cut it 1½" longer than the rest.

As I mentioned earlier, each rafter has a pair of notches that fit over the two beams **(Rafter Pattern)**. To make sure these notches align perfectly from rafter to rafter, I gang-cut them with a procedure similar to the one I used to cut the half-lap in the outer post **(Figure 10)**. I aligned the tail ends of the rafters and clamped them together, then marked the location of the notches. Next, I used a framing square for accuracy to guide my circular saw while cutting one edge of a notch layout. With my saw blade set to cut ½" deep, I made this pass, then I shifted the square over to cut the other side of the notch. I then made several passes between the first two and cleared the waste with a chisel.

Repeating this sequence for the second notch completed the step.

Duplicating the elliptical tail shape on 16 rafters presented a greater challenge, but I simplified things by using a template and a flush- trim router bit. (For ideas on other shapes, see *Rafter Tail Pattern Options* on page 44.)

First, I laid out the ellipse on a piece of oversized ½" plywood **(Rafter Pattern)**. I cut this pattern roughly to shape, then used a sanding drum in my drill press to sand the template to final shape. Next, I screwed a fence on each side of the template to align the profile automatically on each rafter.

Using the template, I marked the tail profile on the rafters, then cut the tails to shape with a jig saw, staying about ⅛" outside the line. Then I clamped the template to each rafter and routed the tail to final shape **(Figure 11)**. Routing a chamfer on the exposed edges of the rafters wrapped up the machining.

Installing the Rafters

Starting at the inner post, I marked a centerline for each rafter every 12" along the top of the beam assembly. Once I had the outermost rafter location marked, I measured the distance between the fascia and the beam assembly, and trimmed this rafter to length. Next, using a framing square to position the rafter, I toenailed it to the fascia, first from the bottom to hold it in place, then from each side. Pre-drilling pays dividends here (see the **Pro Tip** at right) before toenailing the rafter to the beams **(Figure 12)**.

With this rafter installed I measured for the ledger board's exact length. Once it was cut, a neighbor held one end of the ledger in position while I screwed the other end to the fascia **(Figure 13)**. I placed the remaining screws so they would be covered by the rafters.

Toenail the rafters to the beams, driving two galvanized casement nails at each rafter notch location (see the Pro Tip below). To prevent racking put one nail in from the left side of the rafter and one from the right.

Once the outermost rafter was in place, I cut the ledger to length. With some help, I screwed the ledger to the fascia, locating the screws so they would be covered by the ends of the rafters.

When I got ready to install the next rafter, I happened to sight down the beam assembly and found that it bowed toward the house slightly. A stringline stretched between the outermost rafter and the inner post confirmed my eyeball appraisal.

Remedying the situation called for installing every third rafter, carefully fitting and trimming them to length so they pushed the beams into alignment with the stringline **(Figure 14)**. Each rafter was toenailed to the ledger **(Figure 15)**. Installing the remaining rafters moved along quickly.

PRO TIP

Predrilling ensures success

Toenailing, especially in a brittle wood like cedar, can cause your stock to split. But you can minimize splitting by drilling pilot holes. For our 10d galvanized casement nails, we drilled 3/16" pilot holes at an angle.

Adding the Slats

As tempting as it sounded to sit back on the deck and enjoy my progress so far, I decided to keep plugging away to wrap up the project. Besides, the slats are what really create the shade.

Trying to find 2x2 lumber 18 ft. long is like searching for the Holy Grail, so I ripped 10-ft. long pieces from relatively clear 2x10 lumber. I tried to rip these as straight as possible, but still planned on dealing with some warping and twisting.

First, I trued one edge of each 2x10 by snapping a chalkline and shaving to the line with a hand plane. Using this edge as a guide, I ripped the slats using my circular saw equipped with an edge guide. Then I chamfered the edges of the slats as I'd done previously on the rafters, posts, and the beams.

The slats won't span the pergola's entire length, but to make the them appear continuous from below, place all butting ends directly over a rafter.

Begin installing the slats by measuring out 6 3/4" from the ledger at the first and last rafters, then snap a chalkline between these points. (Even though the slats are 6" on center, this extra 3/4" on the initial measurement allows you to align the edge of the slat with the mark instead of trying to position it blindly over a centerline.) Mark the remaining slat locations every 6".

I found it best to install the slat nearest the ledger first, then work my way outward. The 6" × 12" grid openings make for close quarters. Staying to the open side gave me plenty of elbow room to drive the

Installing intermediate rafters establishes uniform distance between the beam assembly and ledger. The stringline along the top edge of the outer beam provides alignment.

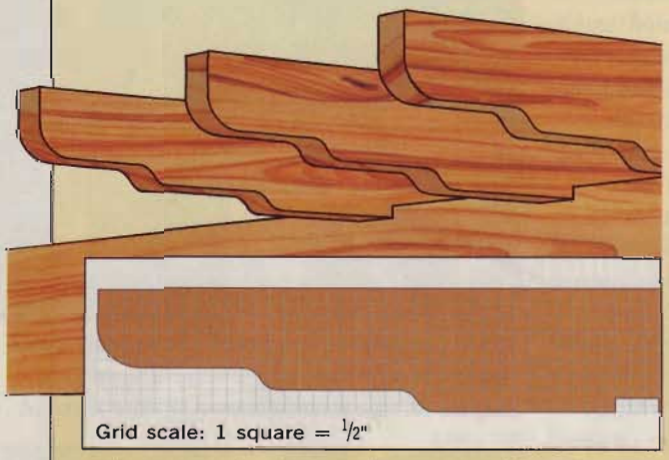
Toenail the rafters to the ledger, nailing them from the bottom first — this holds the rafter in proper alignment. Then toenail through the rafter from both sides, offsetting the nails.

screws **(Figure 16)**. Start at the outer end of each slat, and work your way way toward the house. Be sure to adjust the slat's alignment at each rafter.

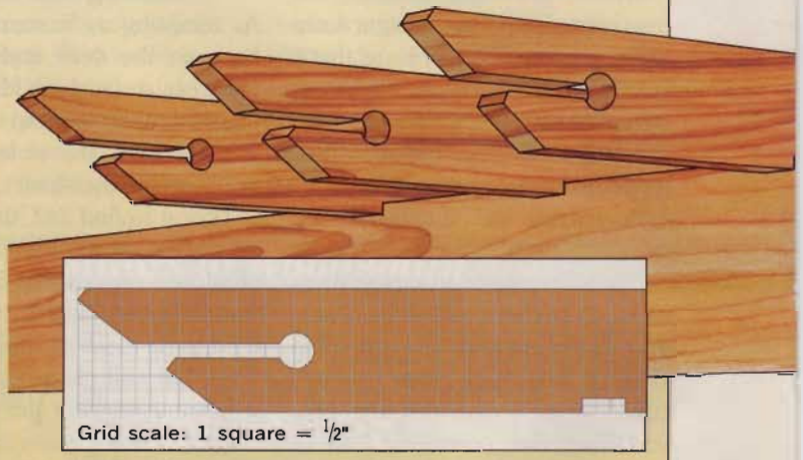
Two drained cordless drill battery packs and 187 screws later, I was done and ready to trade my step ladder for a deck chair. As I sat back, I tried to decide what kinds of plants and vines would add to the pergola's beauty, and in time provide even more shade. That phase of the project will only grow better with time.

Attach the slats to the rafters with 3" deck screws. Position the slats so end-to-end joints are butted tightly together and fall directly on top of the rafters.

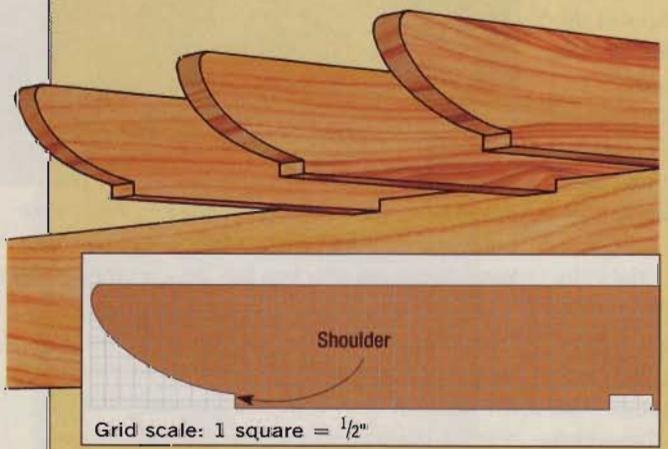
Rafter Tail Pattern Options



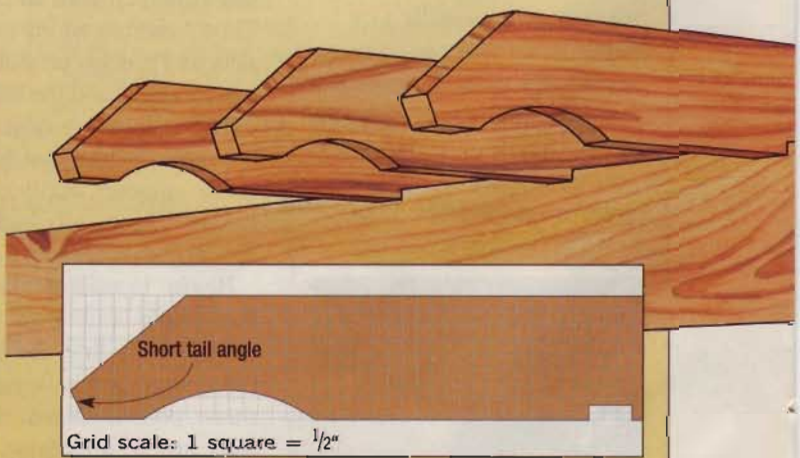
This classic cloud-lift design is based loosely on Craftsman-style construction typical of bungalows. This design lends itself to shaping using a template and flush-trim router bit.



Art deco influences appear in this version. The hole relieves the likelihood of splitting as does back-beveling the pointed ends. Changes in humidity may cause the ends to move out of alignment.



Gracefully curving upward, this design also has classic lines. The shoulder could be created with a gang-cutting set-up and the curve could be routed using a template and flush-trim bit.



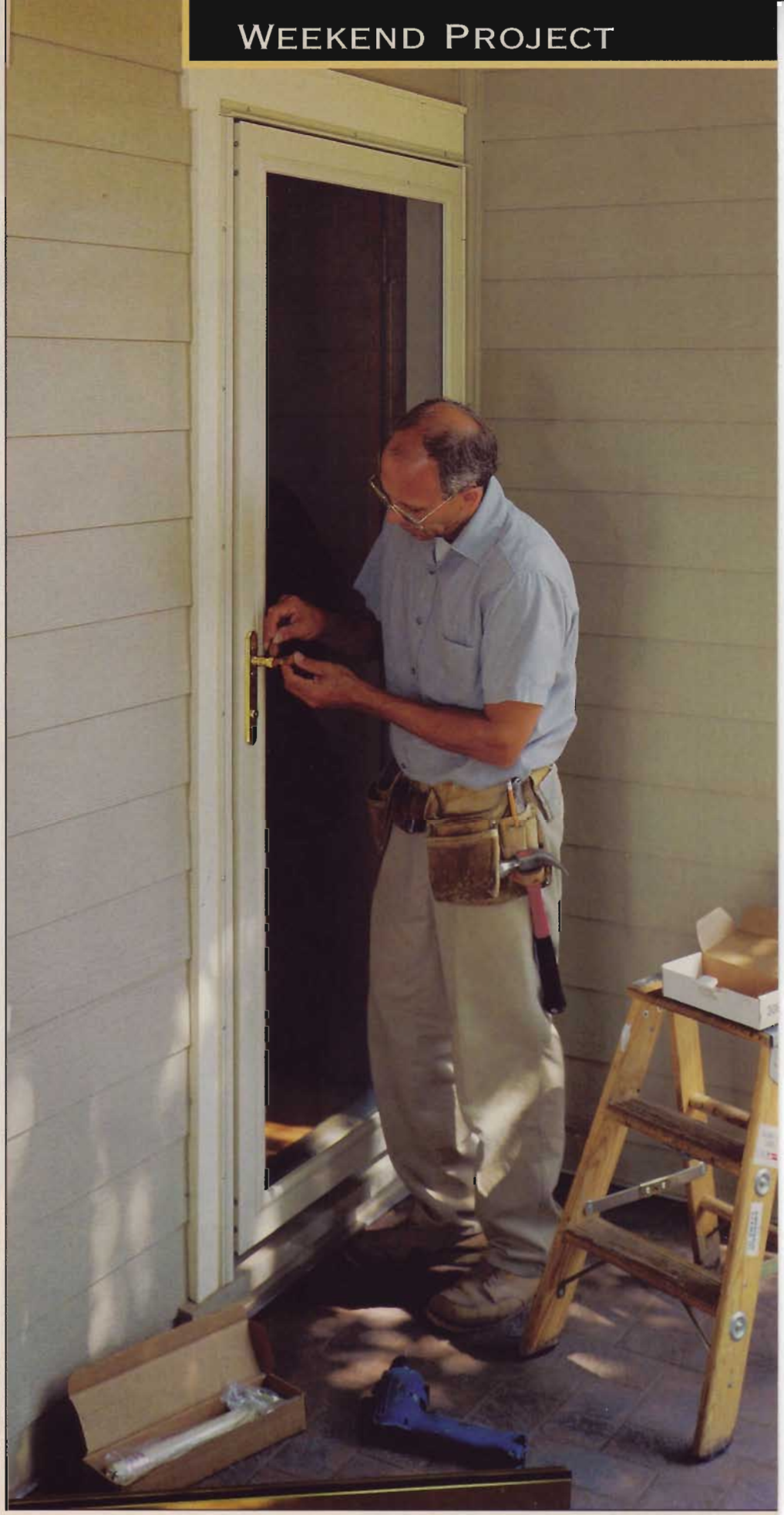
Combining downward sloping angles and a concave curve, this design has a more Gothic look. The short tail angle could be gang cut. The other angle and curve have to be cut individually.

Install a Storm Door

Covering the plain concrete stoop with new brick was only one part of our front porch makeover at the Workbench *house. The old storm door was battered,* bent, and leaked more air than the Mir space station. The revamped entryway called for a classy-looking, full-length glass panel that shows off the entry door behind it and gives a more unobstructed view of the front yard.

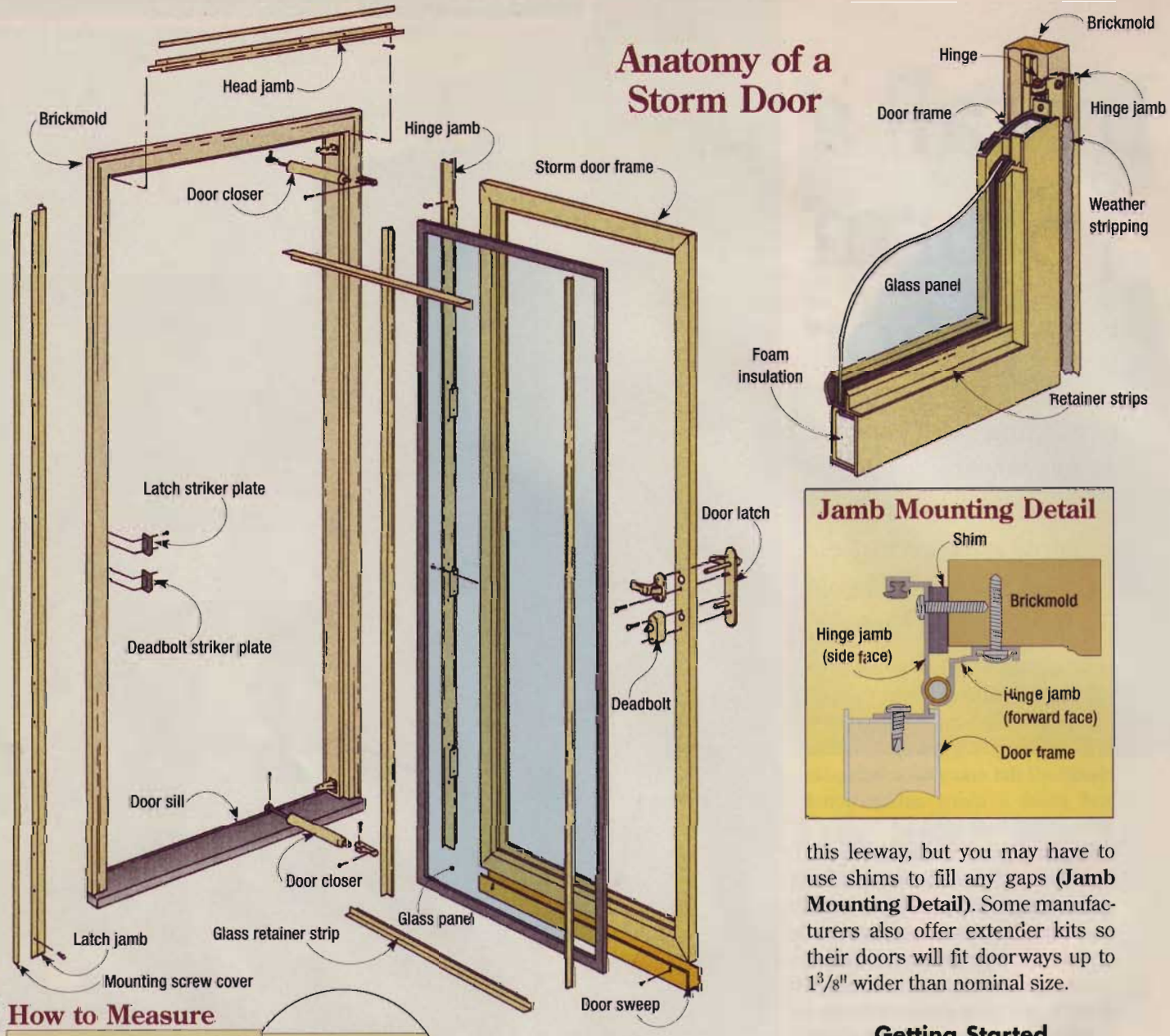
Beyond good looks, however, the door still needed to provide protection from the elements. It had to seal tightly against cold drafts and have some insulation value. I also wanted one with a scratch- and ding-resistant finish.

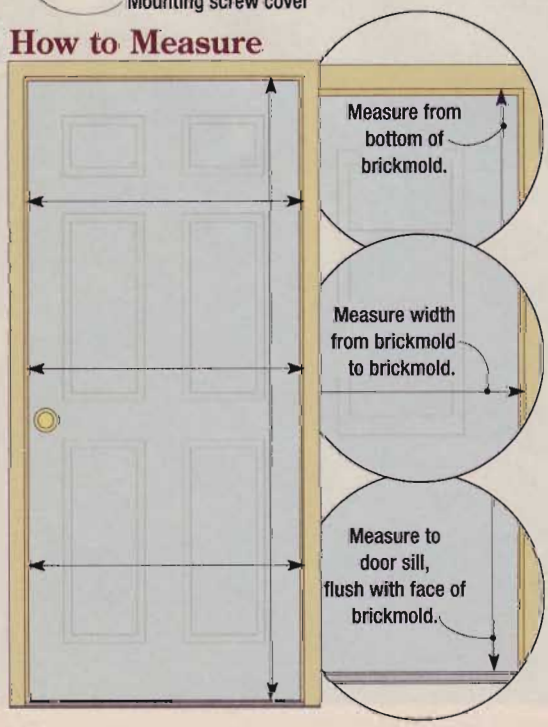
After shopping around, I chose an Emco Forever® Maxxview door. Its heavy-duty aluminum frame is rigid, foam-filled, and has a baked enamel finish. And as the door's name implies, it comes with a limited replacement warranty for as long as you own the home where it's installed. Then again, at a cost of roughly $280, you'd expect it to last a long time.



Sizing Things Up

Compared to many home repair projects, replacing a storm door is a simple, straightforward process that requires only basic tools. Most door manufacturers provide thorough, step-by-step instructions that lead you through the





process. But I can give you some tips that will make the project go smoothly, starting with how to figure out what size door you need.

Confident as I was about what I needed, I still double-checked the doorway measurements before making my purchase **(How to Measure)**. Where you take the measurements — and the squareness of the doorway — will have a big impact on how the door fits.

You'll find that storm doors come in nominal sizes — usually 30", 32", or 36" wide — but are designed to fit doorways 1/4" to 3/8" narrower or wider. Wide flanges on the outer face of the jamb pieces give you this leeway, but you may have to use shims to fill any gaps **(Jamb Mounting Detail)**. Some manufacturers also offer extender kits so their doors will fit doorways up to 1 3/8" wider than nominal size.

Getting Started

Since parts of this project required an extra pair of hands, I called on project developer Ken Munkel to help me out. A home remodeling veteran who's installed dozens of storm doors, Ken had some tricks that made the installation even easier than expected.

After unpacking the door, we laid it across a pair of sawhorses, removed the retainer strips, and set the glass safely aside **(Anatomy of a Storm Door)**. This not only keeps the glass out of harm's way, it makes the door significantly lighter and easier to handle.

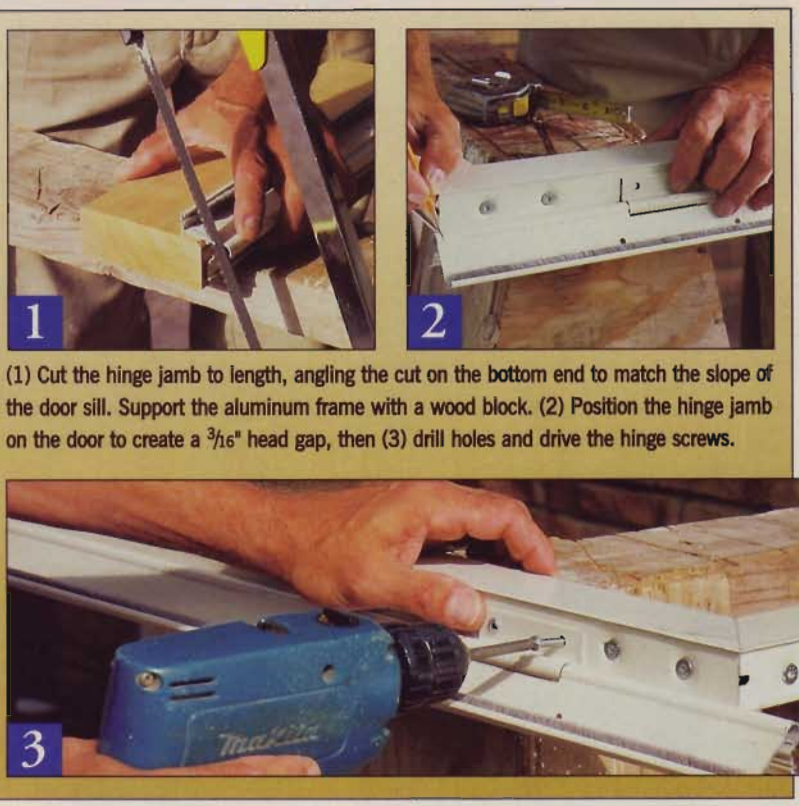
With any storm door, you fit the hinge jamb first, mount the door on the hinges, then reference the posi-

tion of the other jamb pieces to the door. Most doors are designed to hinge on either side, so it's a good idea to stand yours up in the doorway to make sure you have both the door and the hinge jamb properly oriented — put a piece of tape at the top to remind you which end is up.

Because the Emco door I chose has an aluminum frame that's uniformly wide on the top, bottom, and sides, the manufacturer can predrill the lockset holes without limiting the door's flexibility — it still works as either a left- or right-handed door. Other door designs require that you drill the lockset holes only after the door is hinged correctly.

To fit the hinge jamb, Ken first measured the height of the doorway at the hinge side. After subtracting 1/8" to allow for the head jamb, he cut the hinge jamb to length **(Figure 1)**. To keep the aluminum rigid during the cut, back up the jamb with a wood block.

Next, Ken fit the hinge jamb into the channel on the edge of the door, allowing the hinge jamb to extend 3/16" beyond the top of the door **(Figure 2)**. This provides a starting point for setting a uniform gap above the door when you install the head jamb a little later. Once the hinge jamb is positioned, drill 1/8" pilot holes and install the hinge screws **(Figure 3)**.



(1) Cut the hinge jamb to length, angling the cut on the bottom end to match the slope of the door sill. Support the aluminum frame with a wood block. (2) Position the hinge jamb on the door to create a 3/16" head gap, then (3) drill holes and drive the hinge screws.

To adjust the fit and add support, install shims on the back of the hinge jamb between the mounting screw holes.

When the hinge jamb is plumb, install the top front-facing screw. Re-check your level before driving the rest of the screws.

Open the door and drive mounting screws into the side of the hinge jamb. Don't overtighten them — you could bend the jamb.

Hanging the Door

Fitting the storm door into our 36 1/4"-wide doorway required us to shim the gap between the brickmold and the hinge jamb **(Jamb Mounting Detail)**. The shims support the hinge jamb and keep it from bending. Packaged with our door were 1/4"-thick hard rubber shims with self-adhesive backs **(Figure 4)**. If your door doesn't come with shims, use wood strips and attach them to the jamb with double-faced tape.

Even with the glass removed, hanging the door is a two-person job. I held the door in the opening with the hinge jamb resting on the sill and pressed tight against the brickmold. Ken, meanwhile, used a level to make sure the hinge jamb was plumb, then drilled pilot holes into the brickmold for the front facing screws **(Figure 5)**.

With the front facing screws installed, swing the door open, drill pilot holes and drive mounting screws into the side of the hinge jamb **(Figure 6)**. Be careful here not to overtighten the screws — too much pressure could deform the aluminum extrusion, especially if it's unsupported from behind.

Fitting the remaining jamb pieces is best done with the door's glass reinstalled. With the door at its full weight, any deflection will occur *before* you align the head and latch jambs with the door. If you add the glass later, the gaps between the door and jambs may not be uniform.

Position the head jamb above the hinge jamb, establish a uniform 3/16" gap, then mark the mounting hole locations. Drill pilot holes and drive the mounting screws.

Set the latch jamb in place, establish a uniform 3/16" gap, and mark the screw hole locations. Drill pilot holes and install the screws, checking the gap as you work your way down.

Installing the Head Jamb

Unlike the old storm door, this new door has a dripcap built into the head jamb. The dripcap channels rain drops to the side instead of letting them fall straight down. It's a great feature — nobody appreciates cold water unexpectedly dripping down the back of their neck.

To install the head jamb, Ken opened the door and positioned it along the top of the doorway. (The extra 1/8" we trimmed off the hinge jamb earlier created just the right amount of clearance between the pieces.) Holding the head jamb in place, he then closed the door and established a uniform gap between the head jamb and the door (see the **Pro Tip** for an easy way to accomplish this). Ken marked the location of the mounting screw holes, then drilled pilot holes and drove the screws **(Figure 7)**. Adding a bead of silicon caulk along the top edge keeps water out.

Adding the Latch Jamb

Putting the last jamb piece in place gave the doorway a finished look even though the door still lacked the sweep and handle.

Ken measured from the sill to the bottom of the head jamb, then cut the latch jamb to length, once again angling the bottom end to match the slope of the sill. Slipping the latch jamb into place against the brickmold, he adjusted the jamb's position to create a uniform gap. To allow for straightening and for checking the gap, he drilled pilot holes and drove the mounting screws starting at the top of the jamb **(Figure 8)**.

Bolt on the Latch

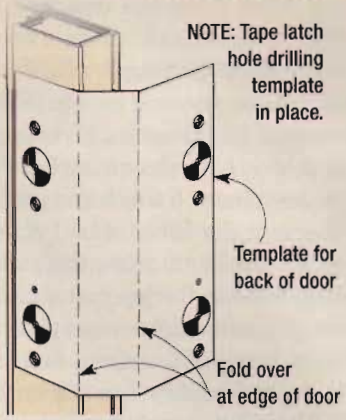
As I mentioned earlier, our Emco door came predrilled for the latch assembly. Other doors may require that you drill the latch holes once the door is mounted.

While drilling means a little extra work, it does allow you to position the latch at the height you want. Typically, storm door manufacturers include a template to position the holes **(Latch Drilling Detail)**. Temporarily taped in place, this template wraps around the edge of the door and provides drilling layouts on both the inside and outside faces. Drilling from both sides ensures proper alignment and prevents tearout. I also suggest you crease the paper template at the fold lines before positioning it against the door. This keeps the folds crisp and allows you to see that the drilling hole locations remain aligned.

Latches vary from door to door, so follow the manufacturer's installation instructions. Our door had a one-piece outer plate that went on first. Inside, separate latch and deadbolt mechanisms were slipped over a square spindle and attached with screws **(Figure 9)**.

Positioning the latch striker plate can be frustrating because

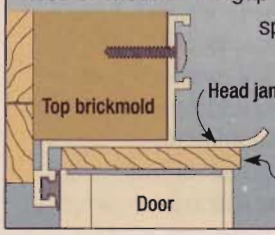
Latch Drilling Detail



PRO TIP

Use Spacer For Uniform Gap

If you're not comfortable measuring when you need to establish uniform spacing (or create a uniform gap), cut a scrap wood spacer the thickness or width of the gap you need. Inserting the spacer between the pieces is much quicker and more accurate than trying to measure the spacing.



With the mounting holes drilled, install the latch and deadbolt assemblies. Snug up the screws to hold them in place.

Close the door to align the striker plates for the latch and deadbolt. Mark the jamb, then you can open the door to install them.

Carefully slide the sweep onto the bottom of the door to prevent scratching the finish. Adjust the sweep to fit snugly against the sill, then drill pilot holes and drive screws to hold the sweep place.

Mark the position of the closer mounting bracket on the interior face of the door. Then use a square to transfer the bracket alignment to the side face of the door jamb.

Drill pilot holes and mount the brackets to the door and jamb. Install the closer and adjust its closing tension.

there's not much room for your fingers between the jamb and the latch. Hold the door closed and slide the striker plate behind the latch, using needle-nose pliers to get a better grip. Hold the plate against the door jamb, mark its position and drill pilot holes for the screws. Then attach the plate. The striker plate has angled adjustment slots to help you get the door to close tightly against the stops.

Repeat these steps to install the deadbolt striker plate if your door is so equipped **(Figure 10)**.

Finishing Up

Storm doors have adjustable sweeps to seal the bottom against the sill. Ken fit the U-shaped sweep over the bottom of the door carefully to avoid scratching the finish. With the door closed, he adjusted the sweep until the weather stripping fit snugly against the door sill.

Next, he drilled pilot holes centered in the slots located on the inside face of the sweep, then screwed it to the door **(Figure 11)**. The slots let you re-adjust the sweep later to accommodate seasonal fluctuations in the height of the sill.

Placement of the closer hardware is more critical. To anchor the mounting screws, most doors are reinforced at the hardware mounting locations. Just like the template for positioning the latch, manufacturers include a pattern to ensure that the screws fall within the reinforced area. Also, if the mounting brackets aren't aligned, the closer may bind.

Once Ken had the position of the closer bracket screws marked on the door, he used a square to transfer the marks to the door jamb **(Figure 12)**. Centering the closer hardware on the line, he marked the mounting holes, then drilled pilot holes and installed the closer **(Figure 13)**. A second closer went in at the top of the door.

SOURCES

- Capitol Windows & Doors
  (717) 362-8196
- Cole Sewell Corp.
  (800) 328-6596
- Croft Metals, Inc.
  (601) 684-6121
- Emco Specialties
  (800) 933-3626
- Gapco
  (800) 333-0111
- Larson Mfg.
  (800) 352-3360

Plastic strips snapped into place to cover the jamb mounting screws and the latch edge of the door give the complete package a clean, finished look. A squirt of window cleaner and a rag took care of a few greasy finger smudges, leaving a crystal clear view of the brick covered porch and the yard beyond.

Later, while sitting on the porch, I got the thumbs-up sign from a neighbor passing by, which was just positive confirmation of what I already knew — that we now had one great looking entryway.

Tailored Trellis

I think there's a common fear that all home improvement projects take weeks to complete and require cash in quantities only a winning lottery ticket or a bank heist can provide.

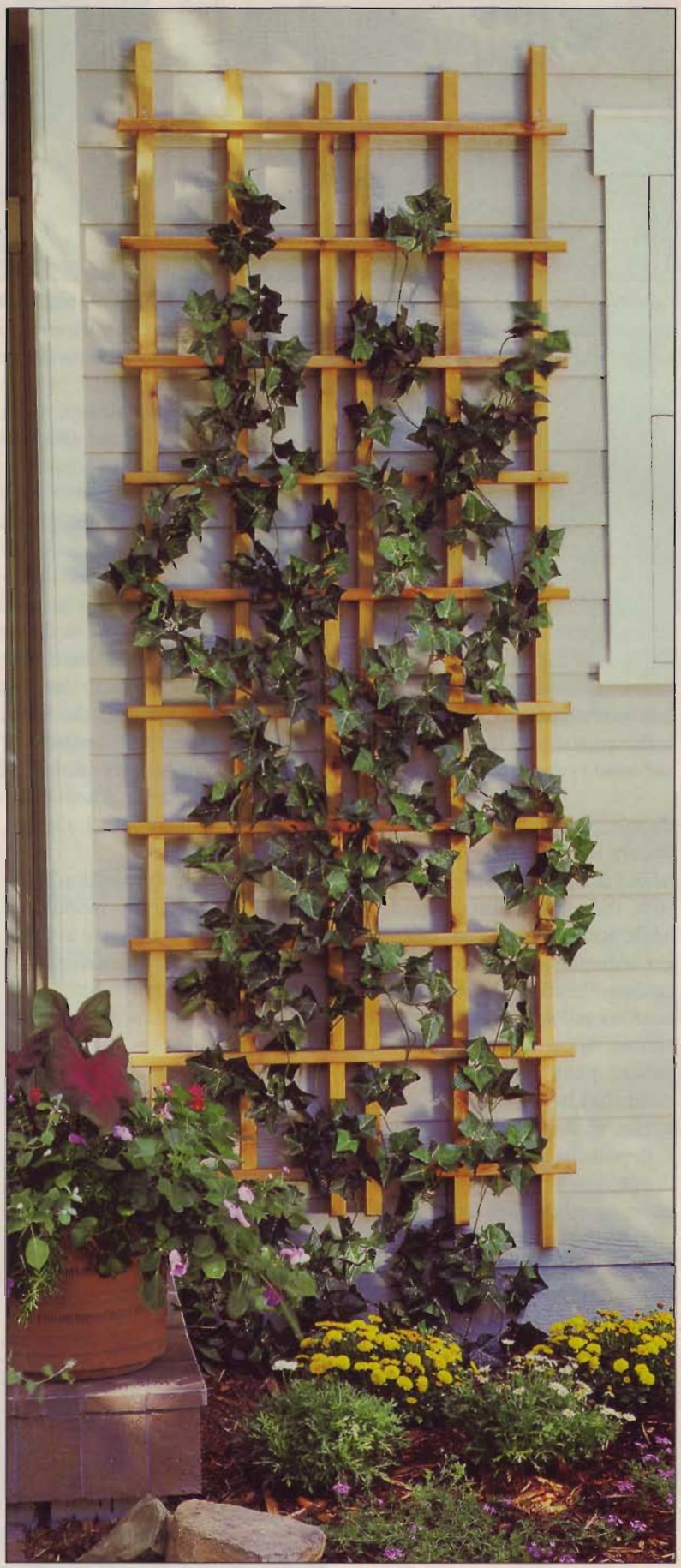
Admittedly, many of them do call for a major commitment of time and funds. But over the years, I've found a lot of ways to spruce up homes with weekend projects that don't cost a fortune.

This trellis is a good example. Along the walkway to the front door of the *Workbench* house, I wanted to add more color and interest. New siding had already improved the overall appearance of the house, yet this area still begged for something more.

So while considering the problem one Saturday afternoon, I came up with a simple idea. By that evening I had designed and built this trellis to fit between the kitchen window and the corner trim near the front porch. With a little figuring you can easily alter the lengths of the pieces, tailoring the trellis to fit just about any wall on your home.

Now, to allay the fear I mentioned earlier, let me tell you that I built this trellis with just a table saw, router, and drill. And it didn't cost much — I got away from the lumberyard spending less than $25.

As you can see, the design calls for only a few feet of 2x cedar lumber **(Trellis Construction View)**. I suggest you avoid using wood with a lot of knots, or cut around any knots bigger than a dime to get your trellis pieces. Since the trellis



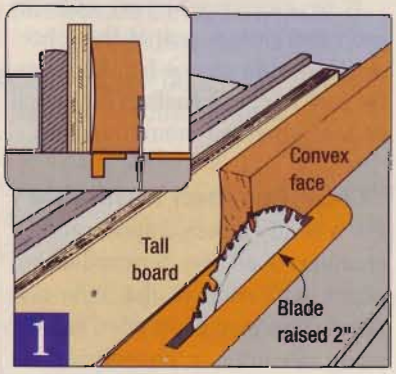
pieces are rather narrow, any large or loose knots could weaken the material substantially. In my opinion, knots detract from the look of this project anyway.

Preparing the Rail Stock

Before diving into the construction process, I gave a lot of thought to the half-lap joinery. The question on my mind was, "Should I cut the half-laps in the rails or posts?" I decided to cut them in the rails since I knew I could handle the shorter material more easily during the machining steps. I also figured that cutting the half-lap dadoes in 2x4's first, and then ripping the 2x4's into the rails, made for a safe, efficient method.

To begin, I cut five pieces of 2x4 to a length of 36" for making the rails. I chose 2x stock that was as straight and flat as I could find. With short stock like this, getting straight edges is pretty easy. However, I still ended up with boards that were slightly cupped. Removing the cup to get perfectly flat stock wasn't difficult though, even without a jointer or planer.

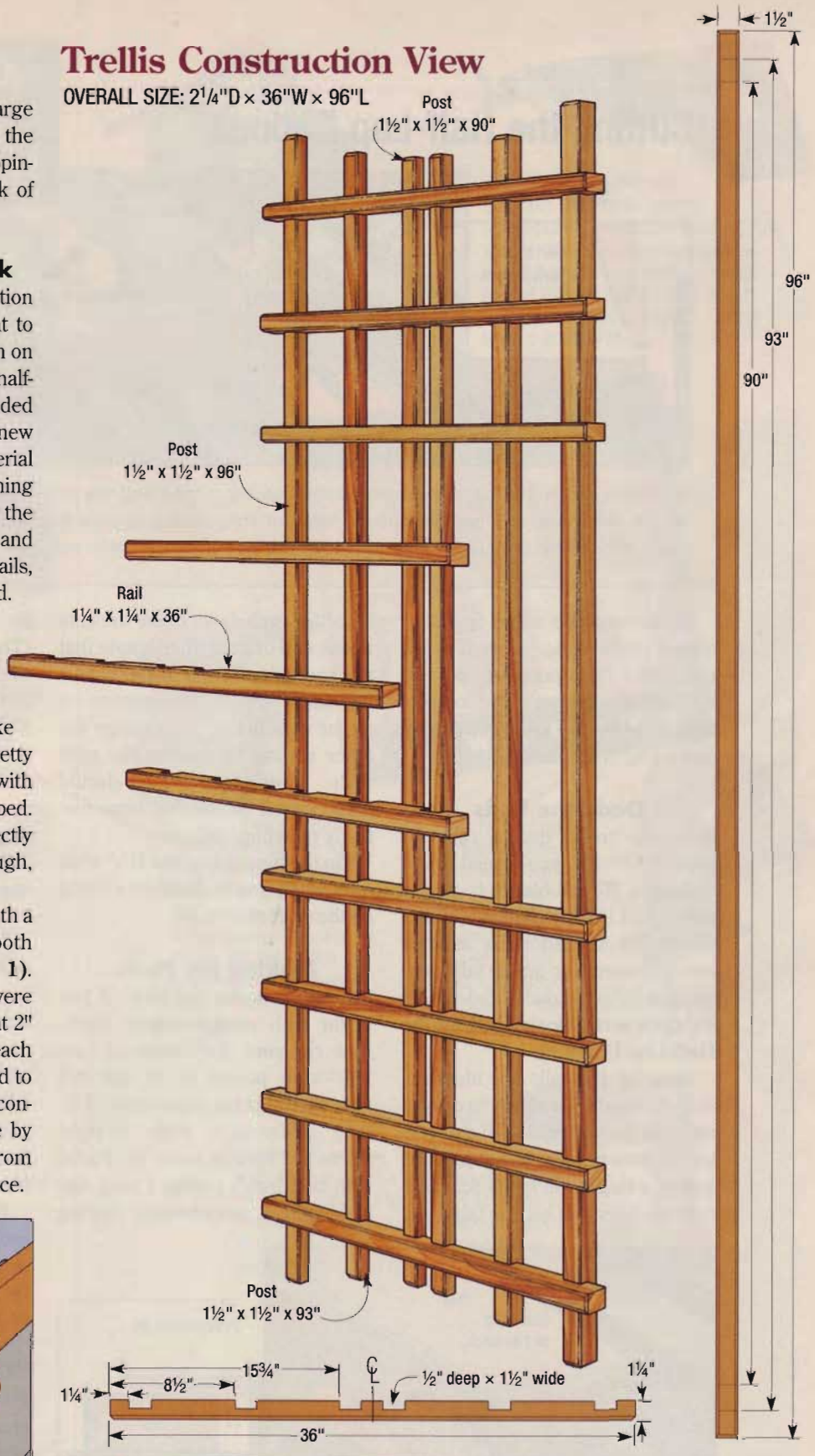
I used a table saw equipped with a combination blade to trim both faces of the 2x4's flat **(Figure 1)**. Just like you would do if you were resawing, set the blade height at 2" and trim the convex face of each board first. Attaching a tall board to your rip fence keeps the 2x4's consistently parallel with the blade by preventing the cupped face from riding over the top of the rip fence.



Set the 2x4 on edge for the first pass, then flip the board to the other edge and make a second pass to trim the surface flat.

Trellis Construction View

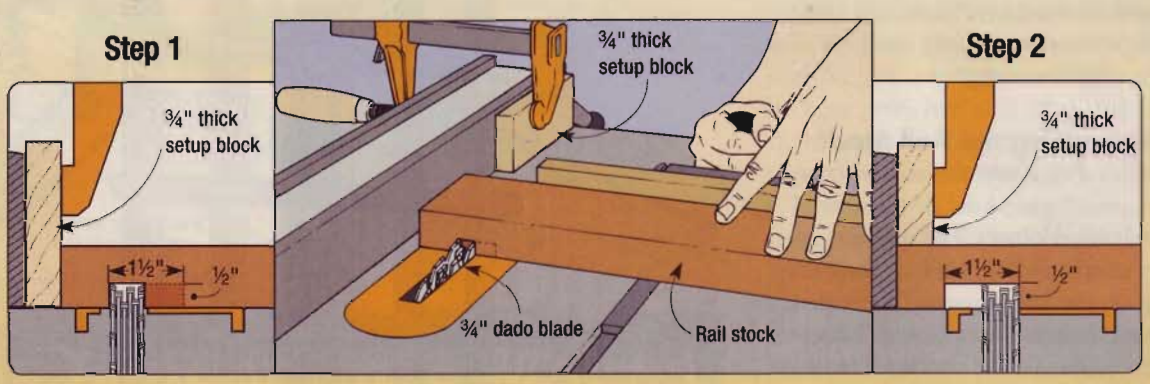
OVERALL SIZE: 2¼"D × 36"W × 96"L



What You'll Need

Lumber	Hardware
(5) Cedar 2x4's, 3 ft.-long	(60) #8 × 2" flat-head deck screws
(2) Cedar 2x6's, 8 ft.-long	(6) #8 × 3" flat-head deck screws

Cutting the Half-Lap Dadoes



With the stock butted against the setup block, adjust the fence to align the outside edge of the dado layout with the blade **(Step 1)**. Make the cut, then butt the stock against the fence (in front of the setup block), and make the second cut **(Step 2)**. Follow these steps for each set of dado locations.

Performing this same operation on the concave face of each board completes the operation. To end up with stock that's the correct thickness for the rails, set the rip fence 1¼" from the blade.

Dado the Rails

Since the trellis design calls for posts 1½"-wide, you'll need to cut dadoes in the rail blanks to fit this dimension (for the half-lap joints). Cutting these dadoes is another two-step operation on the table saw using a ¾"-wide dado blade and a ¾"-thick setup block **(Cutting the Half-Lap Dadoes)**.

Since all the rails are identical, and the dado locations are symmetrical on either side of the centerline, you need to layout just one half of a single rail blank for a reference. After you set the table saw fence for each dado, make the cuts in one end of a rail, then rotate that rail end-for-end and cut the opposing dado. Repeat this process on all the rails before you change the fence setting for cutting the next dado. This procedure should result in rail blanks that have perfectly matching dadoes.

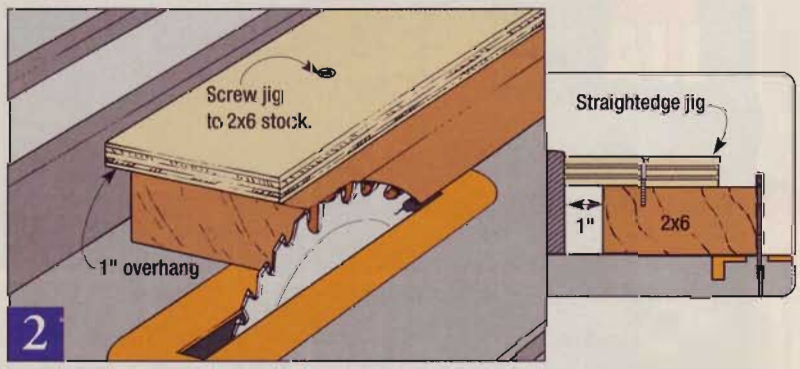
Rip the blanks into the 1¼"-wide rails when you're finished cutting all the dadoes.

Making the Posts

It's easy to make the posts if you begin with straight-edged stock. Just rip your 2x6 material into 1½"-wide pieces to fit the rail dadoes. But in my experience, 8 ft.-long 2x6's with truly straight edges are hard to come by. Faced with that harsh reality, I long ago fashioned a straightedge ripping jig that solves the problem. (Though, to call this a jig is an overstatement — it's simply a piece of ¾"-thick plywood ripped 6"-wide.) Actually, I have several of these jigs in different lengths to use on short and long stock. The one I used for this operation is 8-ft. long. I should add, however, that this jig isn't really appropriate for use on warped or twisted stock — it can't remove the defect.

I screw the plywood jig to the wood I need to rip, letting the jig overhang the back edge of the stock about an inch **(Figure 2)**. I recommend turning the best face of the 2x6 down, so the screw holes don't show on the completed pieces. From here, adjust the rip fence to line up the board with the blade, then rip the edge straight.

With the straightened edge of each 2x6 riding against the fence, rip 1½"-wide pieces for the posts. Be sure to check their fit in the rail dadoes, then cut them to length.



Screw the plywood jig to the back of your 2x6 stock, then set the fence so you can rip the edge of the board straight. A straightened edge makes subsequent rips more accurate.

Chamfer, then Assemble

For a neatly finished appearance, I chamfered all the forward-facing edges and ends of the rails and posts. This step proceeded rapidly using a router, a chamfering bit with a bearing, and the most basic router table you can imagine **(Basic Router Table)**.

The router table I used is an 18"-square piece of plywood with a 1½"-dia. hole drilled through the middle for the router bit. I removed the router's baseplate and screwed the base housing to the underside of the plywood (centered on the hole). Once the table is clamped to a bench or a pair of sturdy sawhorses, I just chuck a bit in the router and slip it back in the housing.

If you don't have a router table you can rout the pieces freehand, but clamping and unclamping so many parts to a bench is a pain. I suspect if you try this basic version, you'll be building a genuine router table as your next project (see the *Portable Router Table* in the April 1998 issue of *Workbench*).

Chamfer the front edges and ends of the rails and posts, then apply an exterior grade oil finish to the cedar. This is easy to do now, before assembling the project.

Once the finish dries, begin the assembly steps with the top rail and the posts. Measure the projection of each post before you drill a countersunk pilot hole and drive a screw at each joint **(Trellis Assembly Detail)**.

Positioning the rest of the rails is easy once you cut yourself a piece of scrap plywood to use as a layout template **(Figure 3)**. Set the template against the top rail, position the next rail, then drill the pilot holes and drive the screws. Use the template in this manner to install the rest of the rails.

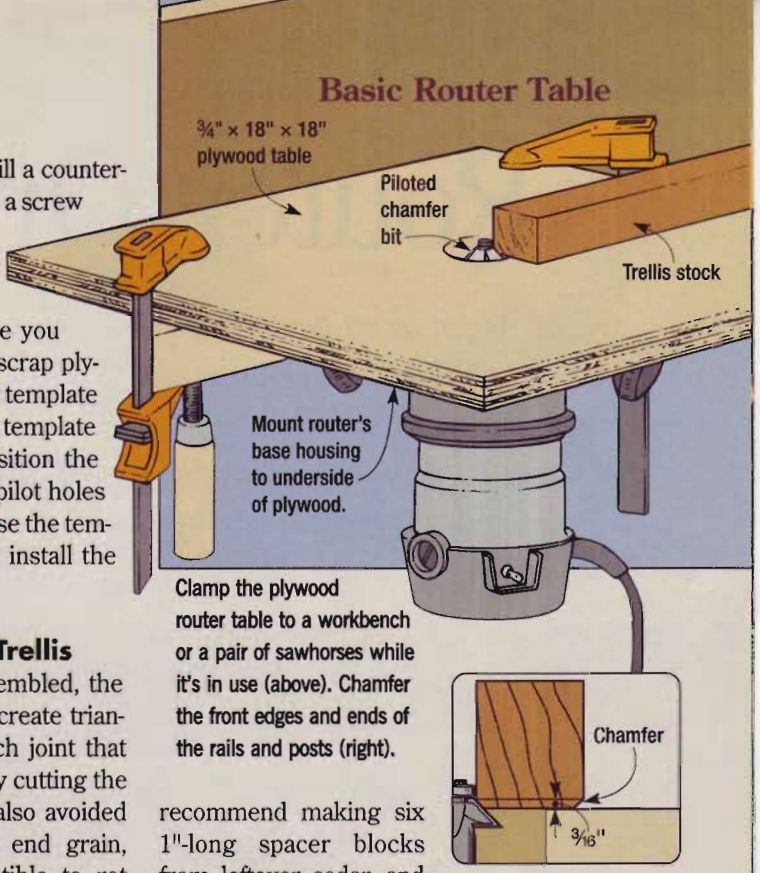
Mounting the Trellis

When the trellis is assembled, the chamfers on the posts create triangle-shaped holes at each joint that allow water to drain. (By cutting the half-laps in the rails, I also avoided having water pool on end grain, which is more susceptible to rot than face grain or edge grain.)

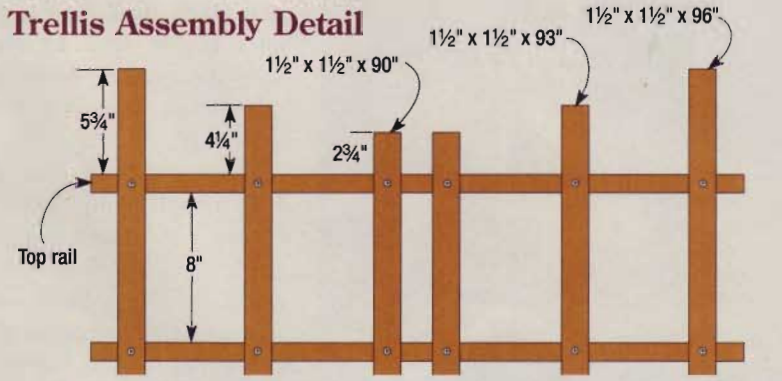
In addition to this precaution, it's essential to provide a little space behind the trellis for drainage and to allow vines to creep through. I recommend making six 1"-long spacer blocks from leftover cedar, and using them to offset the trellis from the house **(Figure 4)**.

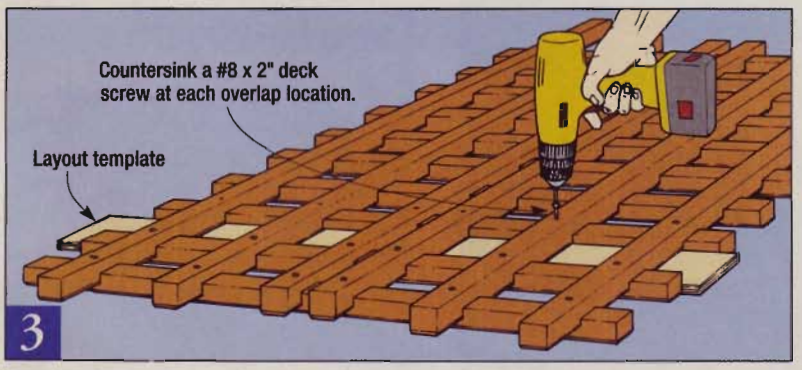
Mounting methods depend on your home's exterior. Since the *Workbench* house has hardboard siding, I drove 3"-long deck screws into counterbored pilot holes to reach the sheathing underneath.

I can't claim the trellis alone rehabilitated the entryway to the *Workbench* house. But once the ivy took over, the whole area had a lot more appeal. Not too shabby a result considering all it took was a few dollars worth of material and one Saturday afternoon.

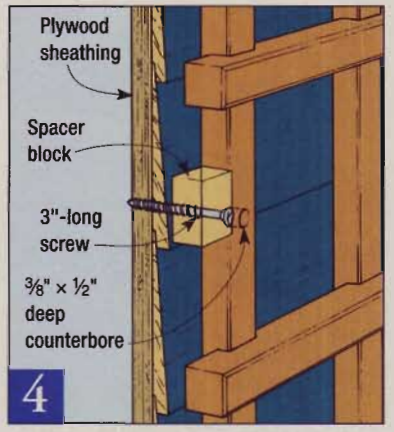


Clamp the plywood router table to a workbench or a pair of sawhorses while it's in use (above). Chamfer the front edges and ends of the rails and posts (right).





Once the top rail is secured to the posts, you can quickly install the other rails after making an 8"-wide layout template from a piece of scrap plywood or hardboard. Drill 5/32" pilot holes with a countersink into each half-lap and drive #8 x 2"-long deck screws.



Drill counterbored pilot holes for mounting the trellis so that the screw heads are less obtrusive on the completed project.

Router Organizer

Of the dozen or so power tools that have taken up permanent residence in my shop, only two get preferential treatment. Both are routers. My various drills, saws, and sanders all do their jobs without fail, and I rely on each one, but none inspires the absurd devotion I can feel for a fire-breathing 2½-hp plunge router.

Confess this to a normal person and they'll make a mental note to sit near someone else next time. But tell a fellow woodworker, and he'll just nod his head and smile.

Whether they're cutting a recess for a precision inlay, shaping the edge of a board, or machining joinery details, routers earn their keep like no other portable power tool.

By itself, though, a router is just power and potential. What makes it sing are specialized cutters, edge guides, jigs, and other accessories. These things give the tool amazing versatility, but in my shop they also tend to get scattered in odd places while I work. I decided to remedy the problem with this dedicated storage cabinet.

Aside from a storage bay for my dovetail jig and a pair of drawers to hold accessories and oversize cutters, this cabinet offers other bonuses. The doors provide room for up to 40 bits, all held in place so the cutting edges don't collide with each other. Also, clearance holes in the shelf let me store the routers standing up without removing or backing off the bit.

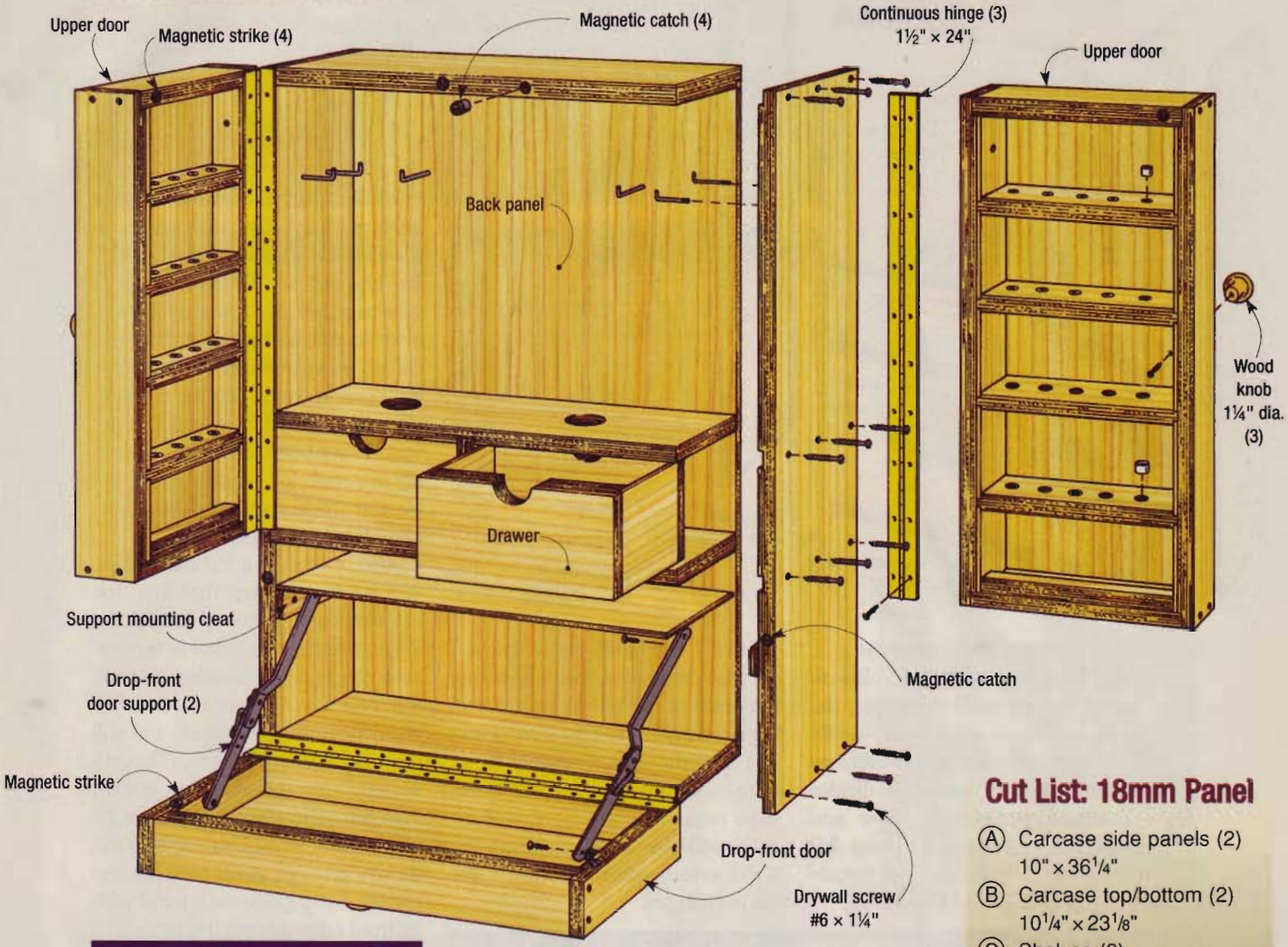
The drop-front lower door, though, is my favorite feature. I use it as a tray to change bits, install an edge guide, or just fine-tune adjustments. My tools don't stray like they used to, and the door frame acts as a rim to keep bits and bearings from rolling off.

Use Strong Materials

I wanted this cabinet to be stout but simple, so I used just two sizes of Baltic Birch plywood for all the components. Most suppliers label these panels as fractional inch sizes (¼" and ¾" for the panels I used), but they're made to metric dimensions (6mm and 18mm thick, respectively). The thicker panel actually checks in at 11/16", so that's what I used to

Router Organizer Construction View

OVERALL SIZE: 36¼"H × 24⅛"W × 13"D



WORKBENCH PROJECT SUPPLIES

ROUTER ORGANIZER

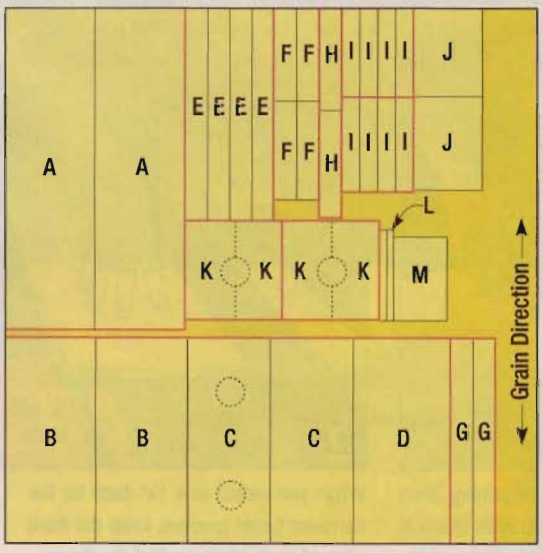
A kit has been assembled for this project that includes the hinges, braces, 50 nylon bit bushings (25 in each size), and all fasteners.

Order number 3305100. . . . . $54.95

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

plan my joinery design **(Router Organizer Construction View)**. Also, it comes in sheets 60" square. I cut the panel into sections (red lines) for batches of various parts **(Plywood Cutting Diagram)**. Most of the joinery details will be easier to machine on these larger pieces, then you can cut the individual parts later (black lines). Make sure your rough sizes allow for the blade kerfs. Each cut will mean a loss of up to ⅛" of material.

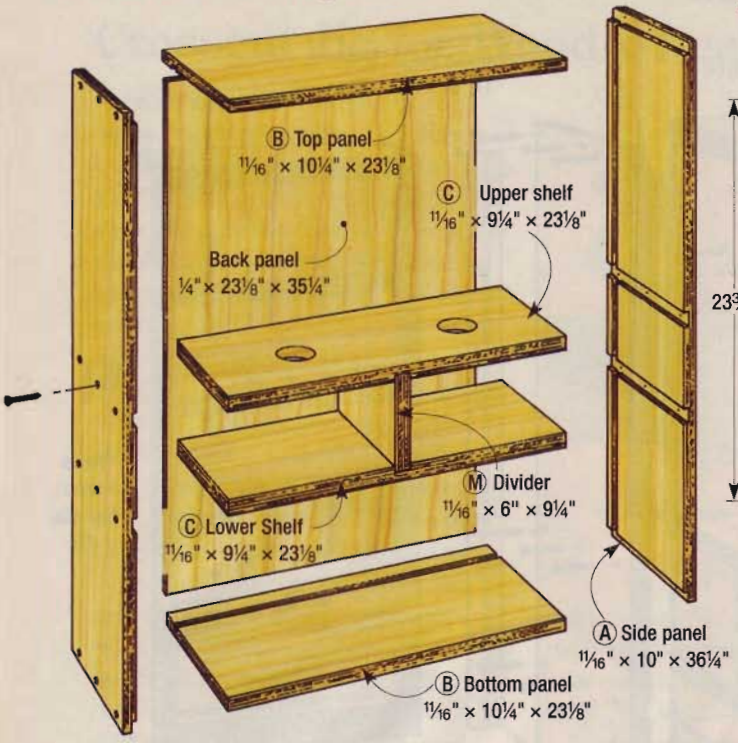
Plywood Cutting Diagram



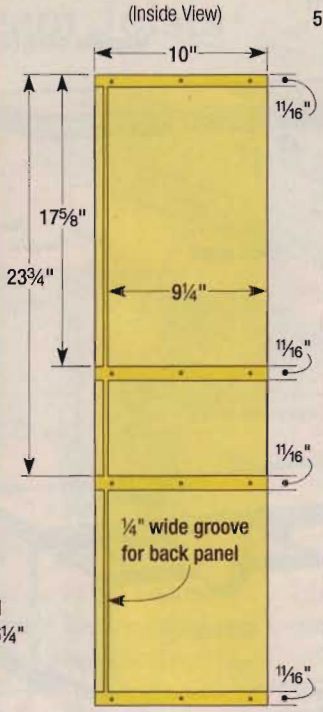
Cut List: 18mm Panel

- Ⓐ Carcase side panels (2) 10" × 36¼"
- Ⓑ Carcase top/bottom (2) 10¼" × 23⅛"
- Ⓒ Shelves (2) 9¼" × 23⅛"
- Ⓓ Drop-front door panel (1) 11" × 23⅛"
- Ⓔ Upper door stiles (4) 2½" × 24⅛"
- Ⓕ Upper door rails (4) 2½" × 11"
- Ⓖ Drop-front door rails (2) 2½" × 23⅛"
- Ⓗ Drop-front door stiles (2) 2½" × 12"
- Ⓘ Door shelf inserts (8) 2" × 10⅝"
- Ⓙ Drawer bottoms (2) 7⅞" × 10⅜"
- Ⓚ Drawer fronts/backs (4) 5⅜" × 10⅞"
- Ⓛ Door shelf lips (2) ¾" × 10"
- Ⓜ Divider (1) 6" × 9¼"

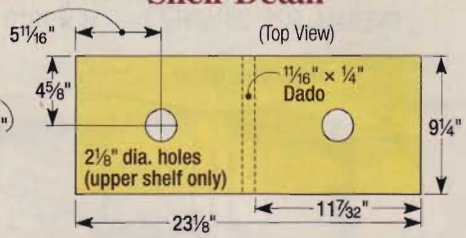
Carcase Assembly View



Side Panel Detail



Shelf Detail



Cutting the Joinery

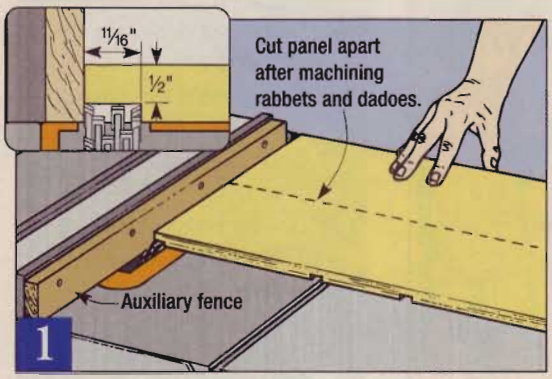
Once I'd shimmed my dado blade to match the plywood thickness, the carcase joinery was simple — rabbet joints at the corners, and dadoes for the shelves and shelf divider **(Carcase Assembly View** and **Side Panel Detail)**. I managed it with just the table saw and a dado blade **(Pro Tip** and **Figure 1)**.

After I machined these joints I got ready to change the dado setup, but realized I might as well cut all the door frame rabbets while I was at it (see the door assembly views pages 58-59). Consolidating these steps required a little labeling work to keep all the parts organized, but it did save me from making a few blade changes.

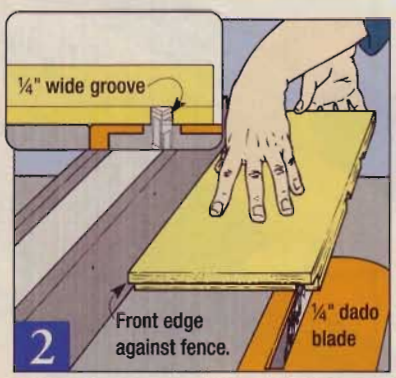
PRO TIP

For odd plywood thicknesses, lose the habit of measuring joint depth.

Plywood thicknesses used to be reliable, but with today's undersize and metric panels the resulting odd fractions create headaches, especially when cutting joints that affect the overall dimensions of a project. Avoid mistakes by designating the thickness of the remaining material, not the joint depth, as your working dimension.



Keep matched parts together for machining the joinery, then cut them apart later. Fine-tune the dado width with shims if necessary, and adjust depth of cut to leave ½" of material.



When you switch to a ¼" dado for the narrower panel grooves, keep the front edge of each piece against the fence.

While I still had the wide dado blade set up, I also cut a groove in the drop-front door rails and stiles for housing an 11/16"-thick panel (see page 59). This door doubles as a work tray, and I didn't think the ¼" plywood I bought for the other door panels would provide the rigid support I wanted. A ½"-thick panel would have been plenty, but to keep my materials list simple I just opted for the thicker plywood I had on hand for the carcase sides.

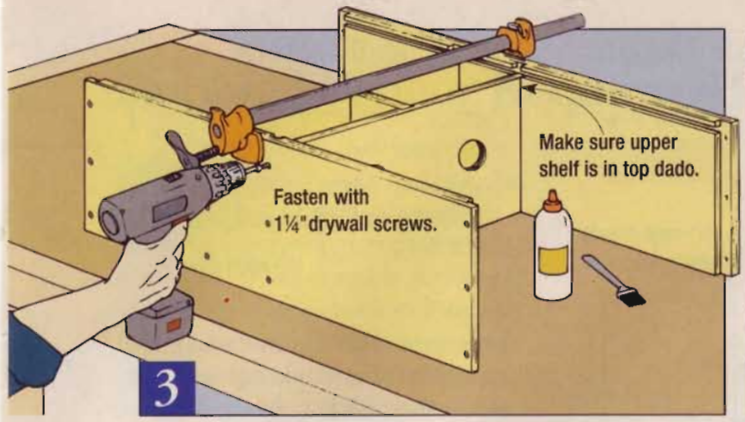
Next, switch to a ¼" dado blade and cut the grooves that hold the cabinet back panel **(Figure 2)**. When you cut this detail in the carcase pieces, keep in mind that the top and bottom panels are ¼" wider than the side panels and will be offset at the rear edge. (This offset simplifies the mounting system I used for the cabinet, a feature I'll explain later.) One fence setting will do the grooves in all four carcase panels, if you guide each panel with its front edge against the fence.

The upper door frame rails and stiles also need a ¼" groove to accept their panels.

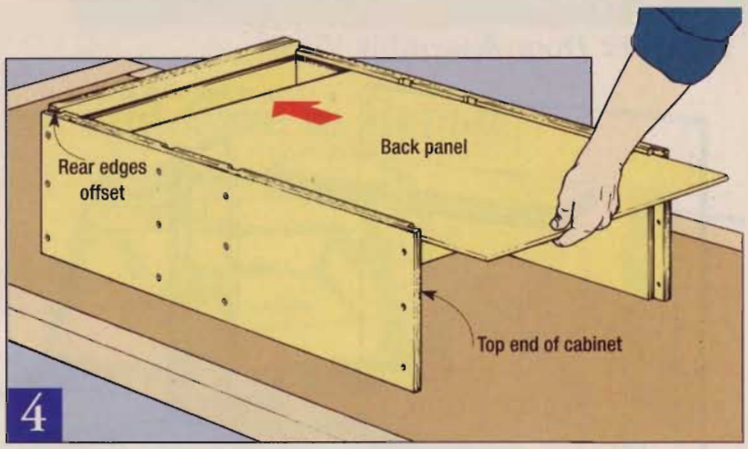
One other detail I added was a pair of holes in the upper shelf to make it easier to store my routers **(Shelf Detail)**. These holes, cut with a 2⅛"-dia. hole saw I'd bought to install a lockset, allow me to set the routers directly on the shelf and leave the cutter settings intact.

Assembling the Carcase

At this point you can assemble the carcase and let the glue set up while you cut some of the remaining parts for the cabinet. I did take one slight detour before reaching for the glue, though. I drilled and countersunk holes in the side panels so I could screw the carcase together. It's faster than putting the



Fit the cabinet's shelves and divider together first, then glue and fasten the carcase side panels. All front edges should be down.



After gluing and fastening the bottom carcase panel to the sides, slide the ¼" back panel in, then add the top carcase panel.

assembly together with clamps, and this is a shop cabinet, so I don't mind having the fasteners show.

Start the assembly by gluing and fitting the vertical divider between the two shelves. Then spread a bead of glue in the dadoes in the side panels, fit the shelf assembly in place, and put a clamp on to steady everything while you're driving the screws **(Figure 3)**.

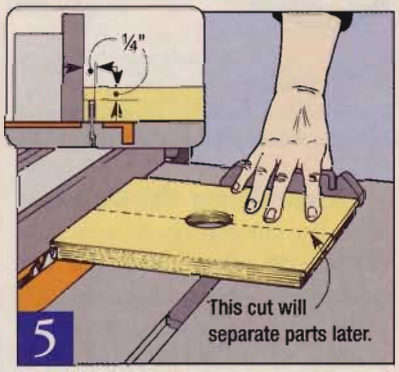
The cabinet's top and bottom panels are next, but don't install both pieces at once or you'll lose access for inserting the back panel into its groove. I glued and screwed the bottom panel in its rabbets, then nudged the assembly square and slid the back panel in from the top end of the cabinet **(Figure 4)**. Then I installed the top panel to close up the carcase.

Building the Drawers

While the glue was setting up in the carcase joints, I went back to the table saw to cut all the parts for the drawers. With only rabbet and butt joints, these assemblies are even simpler to build than the others **(Drawer Assembly View)**. The drawer fronts and backs are identical down to the half-round cutout pulls. This feature isn't intended to make the drawers reversible (although they are). Instead it's to provide clearance in the back for any bits that extend down through the shelf above. I cut these with the same hole saw I used earlier on the shelf, drilling into the center of two larger pieces that I cut in half later.

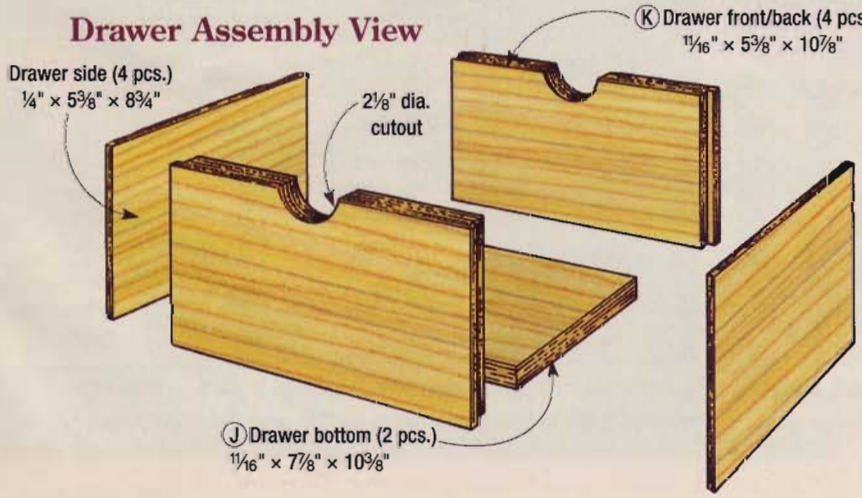
Because the rabbets in the drawer fronts and backs are so shallow (¼"), I didn't bother reinstalling my dado blade. I just set my rip fence so the left side of the blade was cutting at the ¼" mark, set the blade height, and made one pass on each edge to define the shoulders of the rabbets. **(Figure 5)**. Then I just scooted the board away from the fence and made a cleanup pass guided by the miter gauge. With the rabbets done, I cut the face blanks in half.

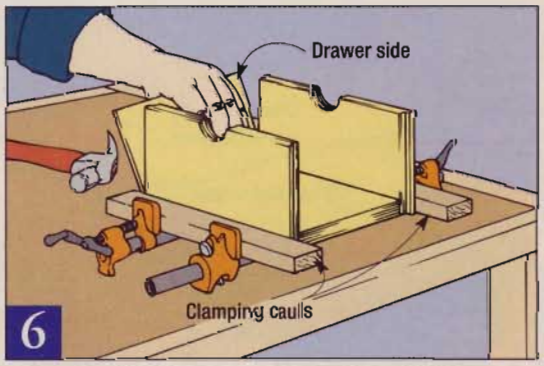
Start the drawer assembly sequence by gluing and clamping the front and back faces to the ends of the drawer bottom. You'll need to use some ¾"-thick clamping cauls to keep the pressure from "folding" the faces inward **(Figure 6)**. Gluing the drawer sides in place will also help keep things aligned. A glued-only joint would likely hold up fine here, but I drove brads into each corner for extra strength.



Cut the drawer rabbets on double-wide blanks, then rip the pieces in half to get a drawer front and back from each one.

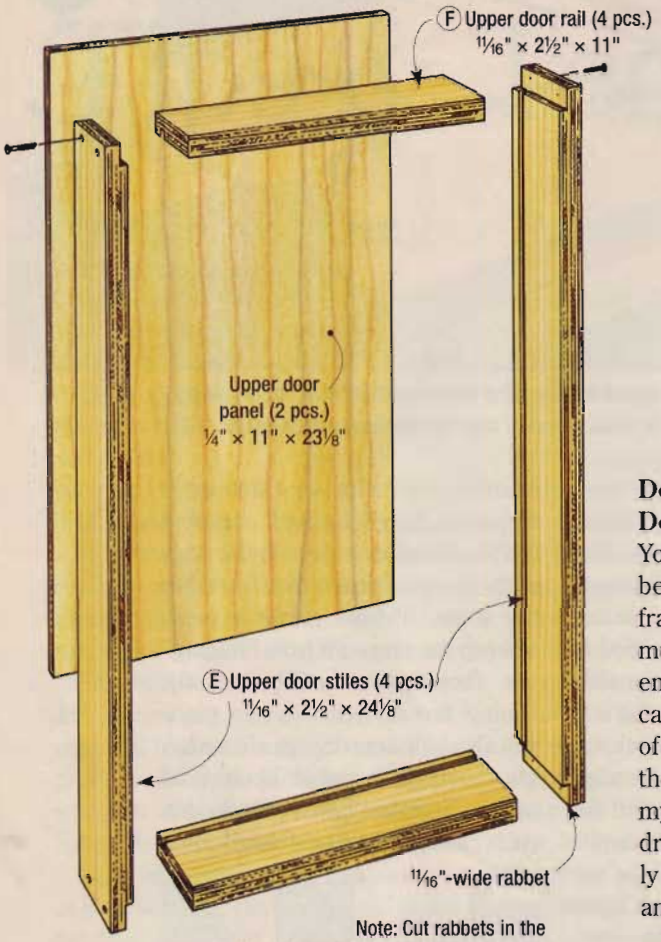
Drawer Assembly View





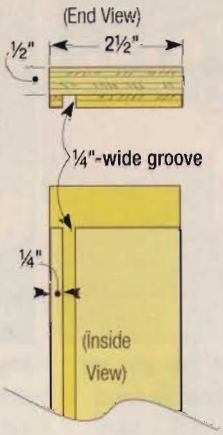
Cauls direct clamping pressure to the bottom of the drawer assembly. Align the front and back first, then glue in the sides. For more strength, I secured the rabbet joint with brads.

Upper Door Assembly View

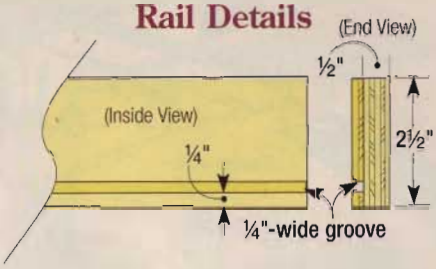


Note: Cut rabbets in the stiles only. On the upper doors, these are the longer frame pieces; on the drop-front door (facing page), the stiles are the short frame pieces.

Stile Details



Rail Details



Assembling the Doors

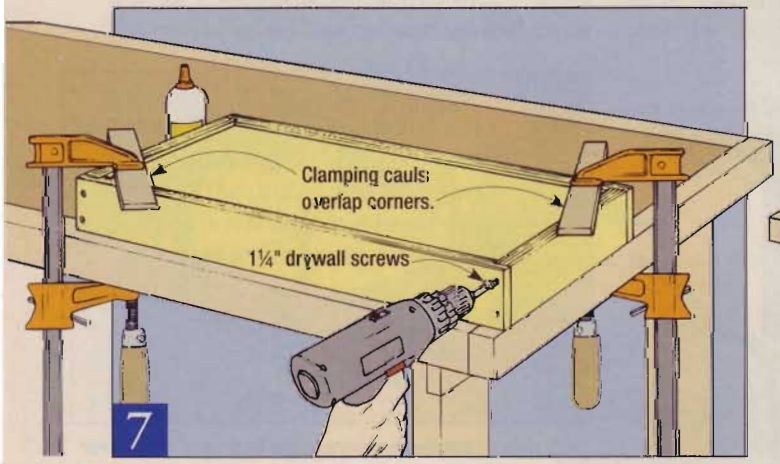
With no integral shelves or fixed dividers to worry about, the door assemblies fit together quickly, with just a captive panel and rabbet joints at the corners **(Upper Door Assembly View, Drop-Front Door Assembly View, Stile Details,** and **Rail Details)**. You have to insert the panel before you close up each frame, and the assemblies must be flat and square to ensure a good fit against the carcase. I glued up one end of each frame, fit the panel, then clamped each door to my workbench **(Figure 7)**. I drove the screws immediately but left the clamps on for an hour while the glue set.

Fitting the Doors

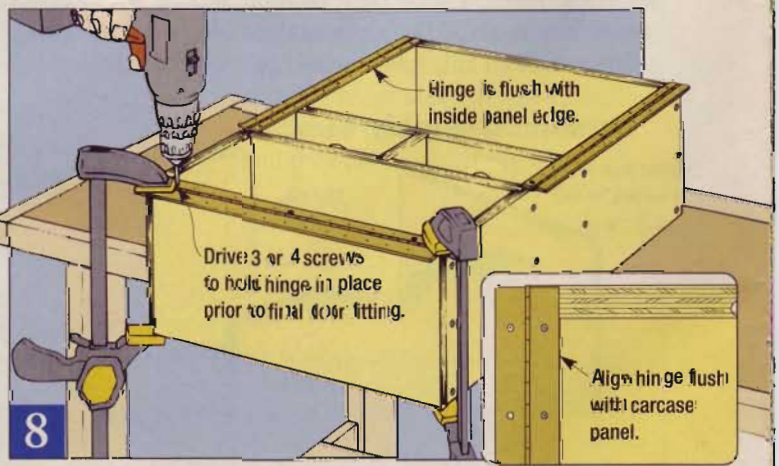
The door designs for this cabinet provide built-in bit storage and a convenient work surface, but these features come at a price — extra weight. To make sure the mounting hardware was up to the strain, I used a 24"-long continuous hinge (sometimes called a piano hinge) to mount each door. These hinges have screw holes spaced every 2", enough to spread a heavy load out across their full length.

Under most circumstances, I'll install hinges on doors first, then the cabinet. But with this design, I fastened the hinges first to the front edges of the cabinet — one on each side and one across the bottom **(Figure 8)**. I clamped one leaf of each hinge to the cabinet (its edge flush with the inside face of the panel), then drove a few screws to hold it in place. (The hinges have no adjustment feature, so I waited until all three doors were aligned before driving all the screws.)

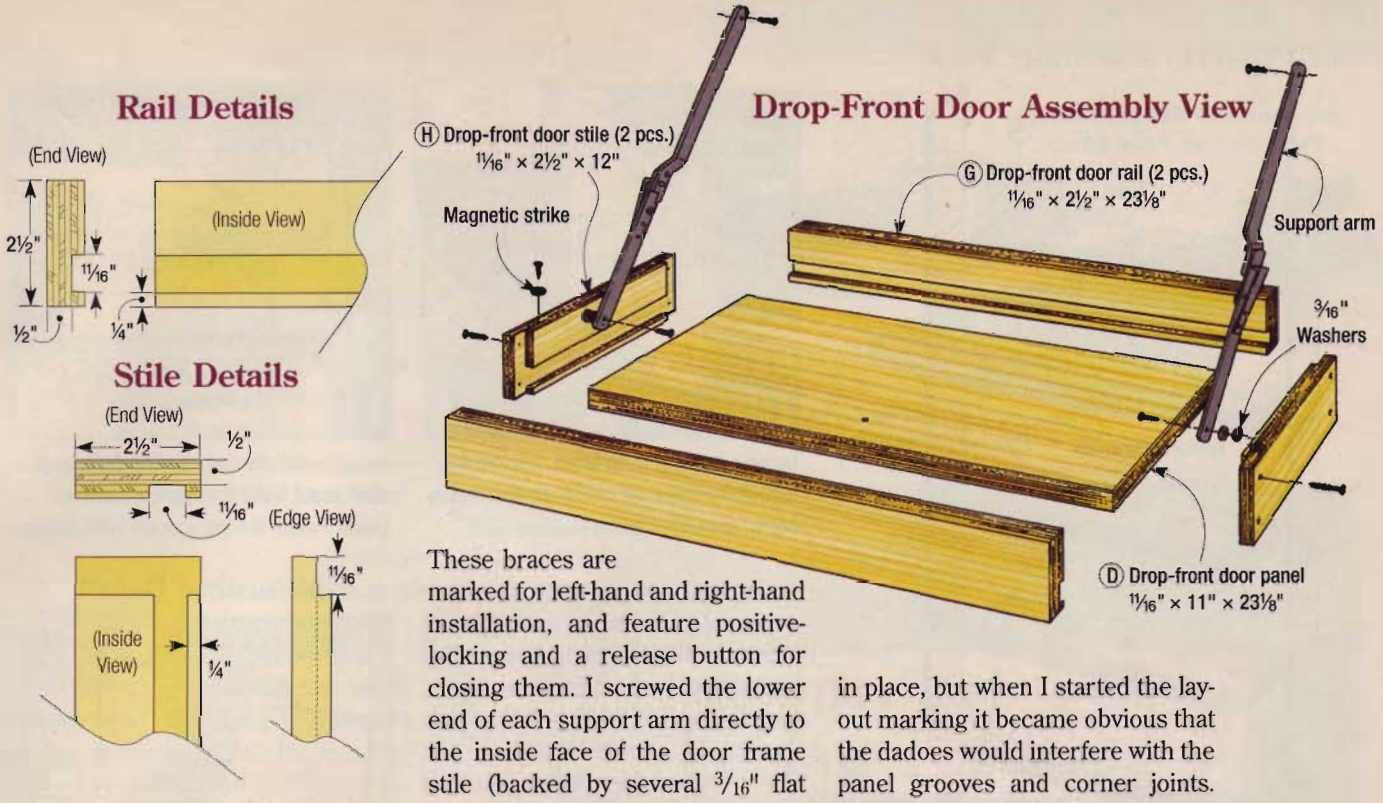
When I was ready to fasten the hinges to the doors, I set the cabinet upright and clamped support blocks on each side, letting the doors rest on them **(Figure 9)**. I used more clamps to hold each hinge to a door edge, and drove only four screws into each door frame — just enough to keep everything connected. After I mounted all the doors, I shut them and checked for a uniform ⅛" gap between, then sent screws through the remaining holes in each hinge.



With one end of each door frame assembled, insert the panel, install the other rail, and clamp the door flat before driving the other screws.



To ensure accurate placement, clamp each hinge in place — flush with the inside edges of the carcase panels — then drive just a few screws.



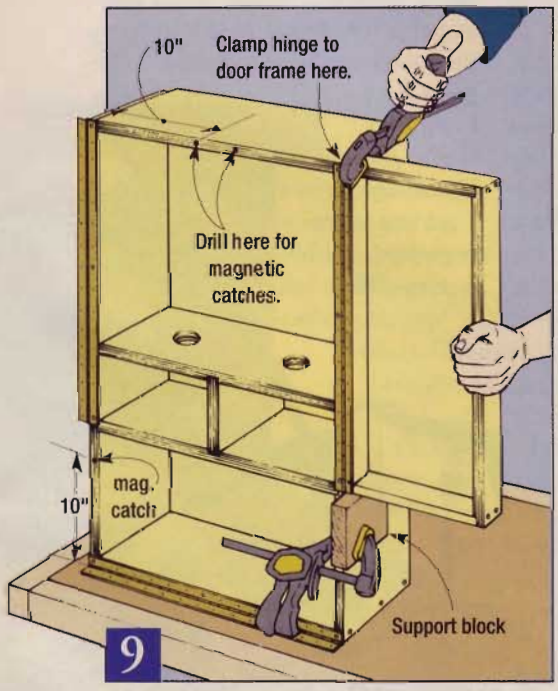
The doors also need some other hardware. I drilled screw holes in the panels to install the pull knobs, and in the cabinet edges so I could press-fit the magnetic catches (see **Figure 9** again).

The drop-front door also requires a pair of hinged support arms. For extra heft here, I ended up using a pair of folding table leg braces from The Stanley Works (#446-1/2-2C). These braces are marked for left-hand and right-hand installation, and feature positive-locking and a release button for closing them. I screwed the lower end of each support arm directly to the inside face of the door frame stile (backed by several 3/16" flat washers), but the offset at the top end requires a double layer of 1/4" plywood to serve as a mounting block on the inside of the carcase panel **(Drop-Front Door Support Detail)**. I opted to run longer pieces and use them as supports for a loose shelf made from scrap plywood. I use this spot to keep router manuals and the instruction booklet for my dovetail jig.

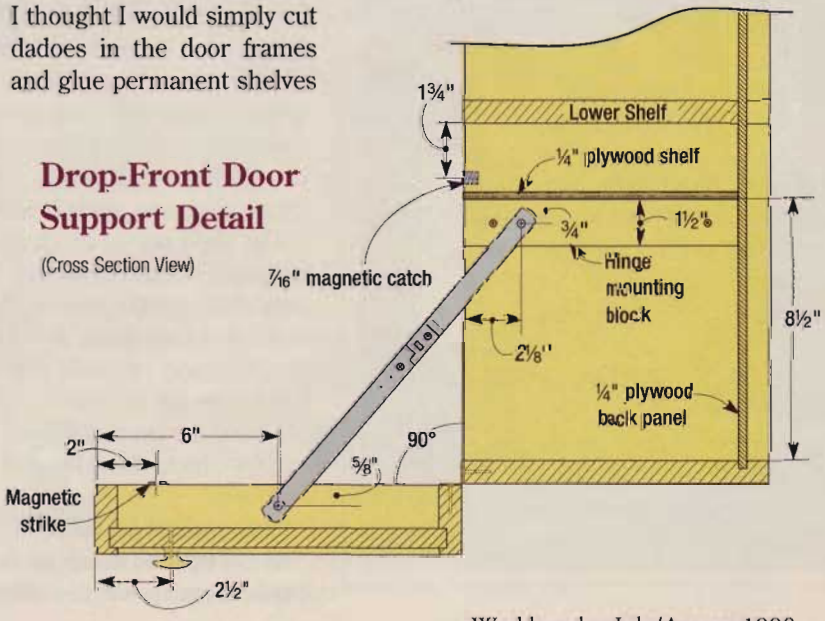
Door Shelf Inserts

Building router bit storage into the upper doors really exploits the usable storage space in this cabinet. At first I thought I would simply cut dadoes in the door frames and glue permanent shelves in place, but when I started the layout marking it became obvious that the dadoes would interfere with the panel grooves and corner joints. Besides, I've found with other projects that over-customized storage gets obsolete in a hurry (anyone remember eight-track tapes?). My router bit inventory has grown a lot over time, and I wanted a storage system that could evolve with it.

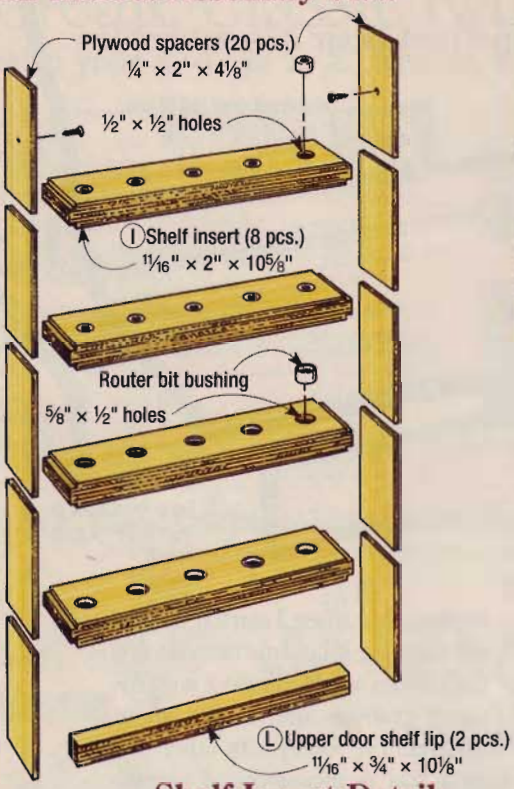
The simplest solution proved to be a series of eight interchangeable shelf inserts, four for each door. The inserts stack inside the door recesses with help from thin plywood spacers, the last pair of which gets screwed in place to secure everything below. I kept all the inserts the same size to streamline the cutting chores.



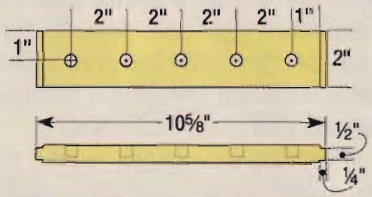
With each upper door resting on a support block, clamp its top end to the hinge before fastening.



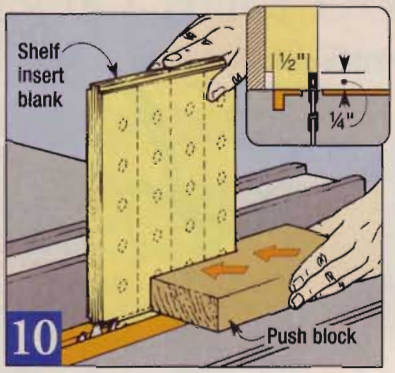
Shelf Inserts Assembly View



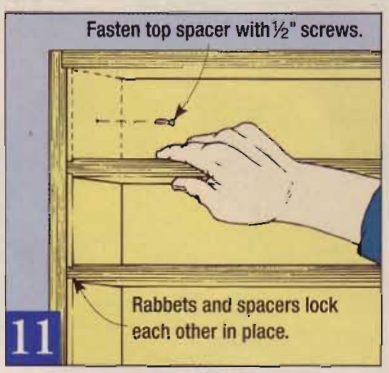
Shelf Insert Details



I cut a pair of shallow rabbets on the ends of each insert **(Shelf Insert Details)**. These create a self-locking feature by holding the vertical spacers captive without fasteners or glue. Just as I did with the joinery details on the carcase sides, I machined these rabbets on larger pieces (two 8½"-wide × 10⅝"-long panels), as shown in **Figure 10**. Then I ripped them to the required size. This process is faster than cutting the joints piecemeal, and it makes the stock easier to handle.



Using a notched push block, cut the end rabbets for the shelf inserts on an oversize blank, then rip it to the required sizes.



As you work your way up the door, each shelf insert locks the spacers below in place. Fasten the top spacers with screws.

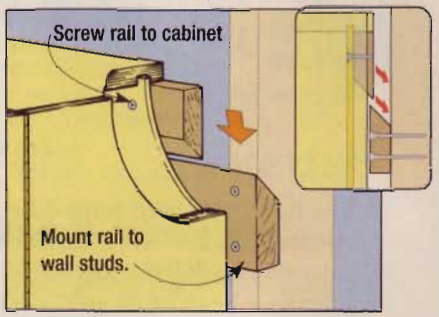
After all the inserts are cut, you can drill holes for the nylon bushings that hold the router bit shanks. These bushings are just plastic sleeves with either a ¼" or ½" bore. They make it easier to get the bits in and out, and you can drill different hole patterns to accommodate the space requirements of your various cutters.

I cut 20 shelf spacers from ¼" plywood and drilled 3/16"-dia. screw holes in the center of four of them — the rest simply press-fit in. After I set the first two spacers at the bottom of each door recess, I glued a narrow strip of 11/16" plywood to the bottom frame rail. This keeps the spacers seated and creates a pocket for storing small items such as extra collets and guide bearings.

The shelf inserts stack in place, locking the spacers as you work your way up **(Figure 11)**. As soon as I had them all fitted, I drove screws to hold the top spacers snugly in place.

I hung the cabinet using a pair of ¾"-thick bevel-edged mounting rails — one screwed to the cabinet back and one to the wall studs **(Mounting Detail)**.

Mounting Detail



Five minutes after the cabinet was on the wall, I had my routers nesting on the upper shelf and both doors filled with router bits. I also added a few screw hooks to hold the router cords up and hang edge guides. I figured that's probably enough. If I get any more organized, it'll be a crime.

Think versatility! Any hobby that requires organized storage can be easier to manage with this cabinet.

What You'll Need

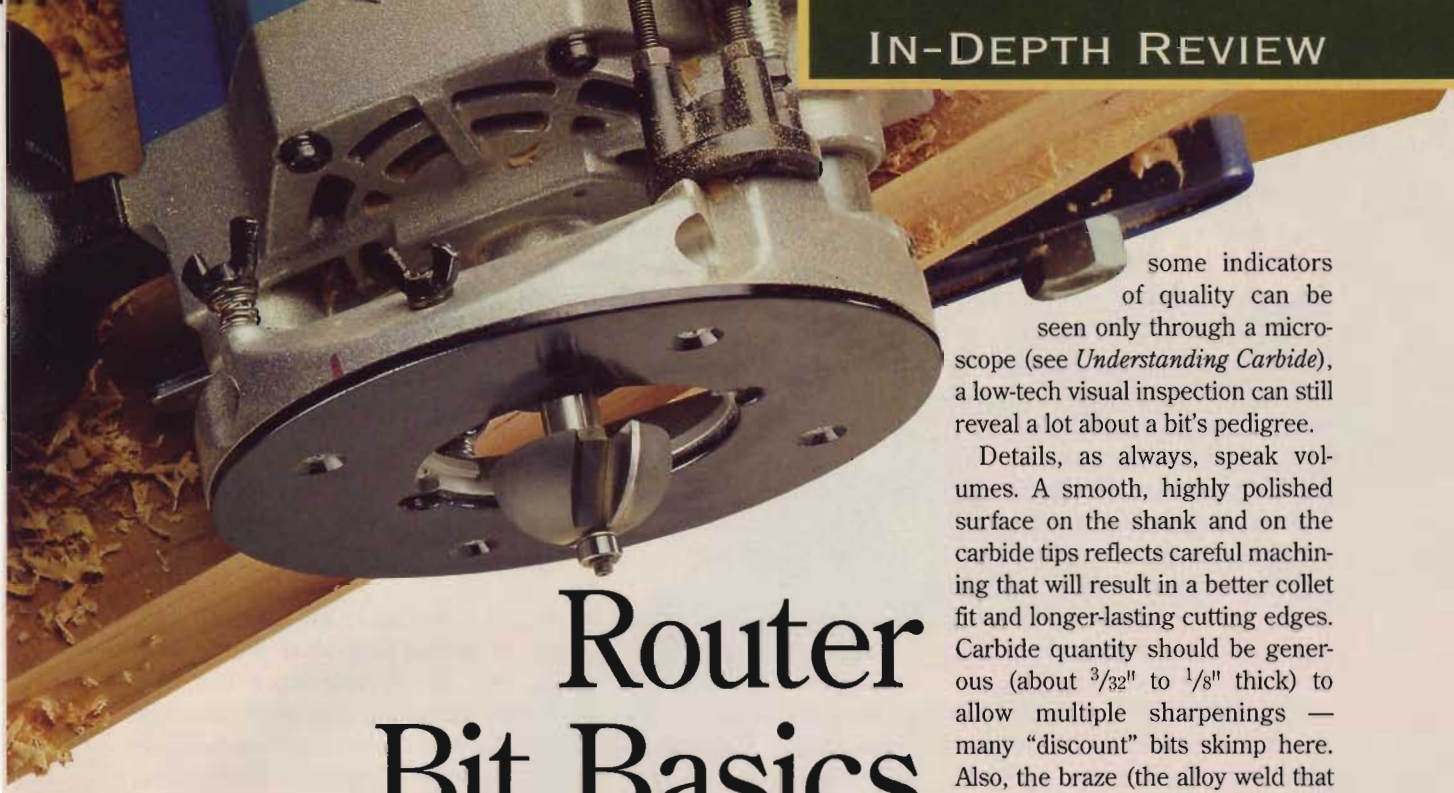
Lumber

(1) sheet 18mm (11/16") × 60" × 60" Baltic Birch plywood or equivalent
(1) sheet 6mm (1/4") × 60" × 60" Baltic Birch plywood or equivalent

Hardware*

(76) #6 × 1/2" flat-head wood screws
(3) 24"L × 1½"W continuous hinges
(1) pr. table leg braces (Stanley 446-1/2-2C)
(48) #6 × 1¼" drywall screws
(8) #10 × 1" pan-head sheet metal screws
(6) 2" L-hooks with screw thread
(8) 3/16" flat washers
(4) 7/16" round magnetic catches
(3) 1¼"-dia. wood knobs
(50) nylon bit bushings (25 ea. ¼" and ½")

*(*Workbench* kit available; see page 55)



Router Bit Basics

Once you get hooked on routers and what you can do with them, you'll find no shortage of other tools designed to put all of that potential to good use. Dovetail jigs, edge guides, router tables — all of these accessories can open up new woodworking techniques for you, but none can lay claim to being the essential router companion. That role belongs to the cutters.

Like saw blades and shaper cutters, router bits are typically made with tool steel bodies and tungsten-carbide cutting tips, but their inherent design difference (a support shank that's perpendicular to the cutting force) and higher operating speeds (up to 25,000 rpm) means they're sometimes subjected to greater stresses. Still, virtually all of the name-brand bits you'll find today are carefully engineered for safety and performance. And while some indicators of quality can be seen only through a microscope (see *Understanding Carbide*), a low-tech visual inspection can still reveal a lot about a bit's pedigree.

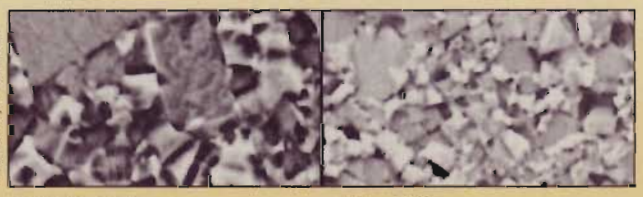
Details, as always, speak volumes. A smooth, highly polished surface on the shank and on the carbide tips reflects careful machining that will result in a better collet fit and longer-lasting cutting edges. Carbide quantity should be generous (about 3/32" to 1/8" thick) to allow multiple sharpenings — many "discount" bits skimp here. Also, the braze (the alloy weld that bonds the carbide tip to the tool body) should be free of voids.

A colored Teflon or oxide coating on the bit body is a nice bonus. Manufacturers rely on them for brand recognition, but the key function is to stem the buildup of wood pitch.

Understanding Carbide: When Bigger Isn't Better

Unlike tool steels, which are forged in a molten state and machined into drill bits and edge tools such as chisels and plane irons, tungsten-carbide is what's known as a sintered metal. It is formed by mixing fine grains of carbon with powdered tungsten, then consolidating the mixture under intense pressure and heat. Developed first for the metalworking industry, carbides also contain cobalt (about 6-10 percent in woodworking grades), which helps bind the carbide particles together and allows the otherwise brittle blank to be brazed (welded) with silver alloy to a tool body.

Carbides don't have the fine crystalline structure of high-speed steel. Their edge-holding capability is a function of their grain size and how well the binder prevents edge-fractures and resists chemical erosion — two of the three culprits responsible for most carbide wear (the other is heat). The best grades are "micrograin," with an average particle size of one micron (a millionth of a meter). Larger grains mean bigger voids and more binder, producing a softer compound and a rough, dull edge as grains break off during use.



Photos Courtesy of: Freud U.S.A.

Coarse grain | Micrograin

Starter Bits

Recognizing cues to a router bit's quality takes some practice, but it's much harder deciding which cutter profiles to buy. Router bits are the *Lay's* potato chip of woodworking tools — nobody can stop with just one. Get used to the idea of spending more money on bits than you will on most any router.

If you're just putting a shop together and haven't figured out exactly what kind of woodworking you'll be doing most, you can get plenty of versatility from a basic starter set of a dozen or so cutters.

Straight bits specialize in cutting dadoes and grooves, but they can also cut other joinery details. I use the 3/8", 1/2", and 3/4" sizes most often. If you work a lot in plywood, try the undersize bits (31/64" and 23/32") designed for those reduced panel thicknesses. Straight bits with guide bearings above or below the cutting flutes will trim an edge flush with a template or guide board — great for curved work or for trimming plastic laminate.

A rabbeting bit makes quick work of milling square ledges along the edges of boards, or around cabinet door frames for a partial overlay fit. Sets with multiple bearing sizes are especially useful, allowing you to change the rabbet width quickly. A chamfer bit, also guided by a bearing, cuts a 45° bevel on a board's edge. Roundover bits turn sharp square edges into soft radiused contours, making them friendlier to the touch. Radius sizes range all the way from 1/8" to 1 1/2", but 3/8" is a good starter bit because it can put a half-round bullnose on 3/4"-thick lumber.

Another suggestion: bit shanks are typically either 1/4" or 1/2" in diameter. For midsize or larger cutters, buy the 1/2"-shank versions.

Today's Cutter Designs Are Safer

Once the exception, now the rule, anti-kickback cutter designs (left) have largely replaced the open gullet tool bodies of yesteryear (right). Also called chip-limiting, this bit style restricts the bite of the cutting edge by reducing its exposure, making overfeeding and kickback much less likely. Careful, though — they still aren't any friendlier to flesh.

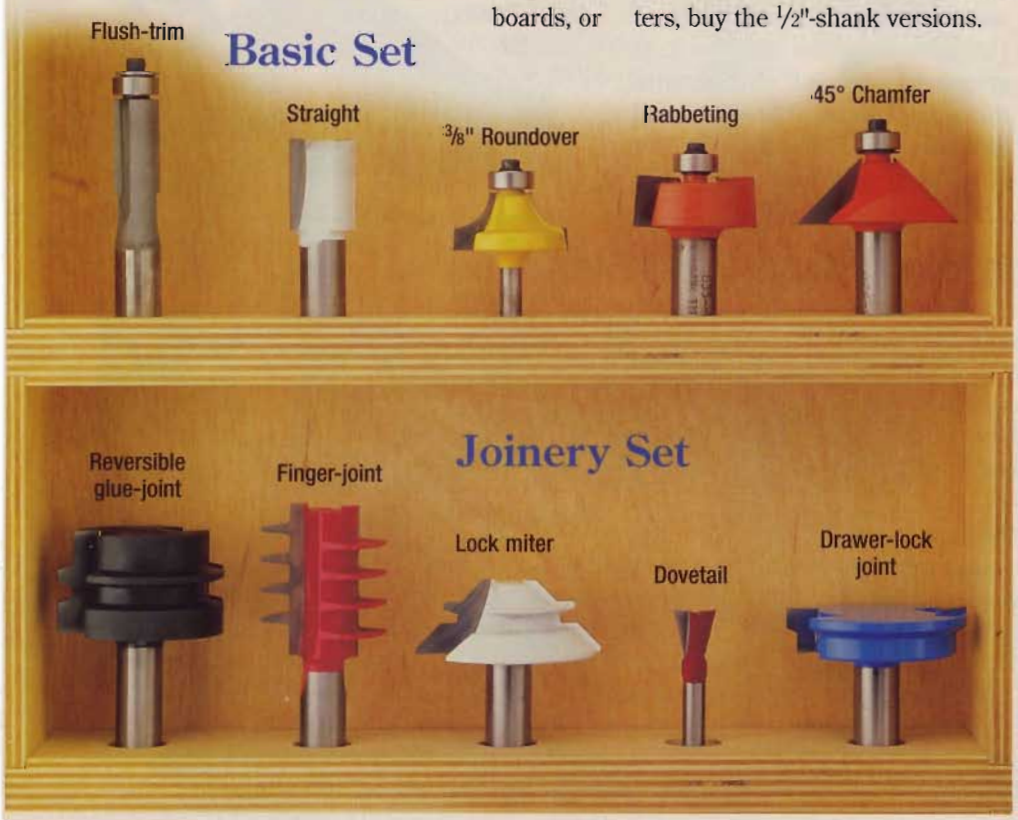
Basic Bit Care

Whatever individual cutters you buy, get carbide-tipped bits, and expect to spend about $150-$200 on a decent starter set. Some vendors still offer high-speed steel cutters, but their edge life is much shorter than carbide. Engineered wood composites, such as plywood and particleboard, contain glue lines and binder resins that are tough on tool edges, and they'll dull a steel cutter before you can say "burn my edges." By the time you figure in the need for constant resharpening, the lower purchase price of a high-speed steel bit is no bargain.

One exception to this rule in my shop is a spiral-flute milling cutter that I use for mortising. The only alternative to high-speed steel here is a very expensive solid carbide bit, but this is a joinery cutter that I don't use on wood composites. The steel edges hold up well in most hardwoods, and resharpening costs less than it does for carbide.

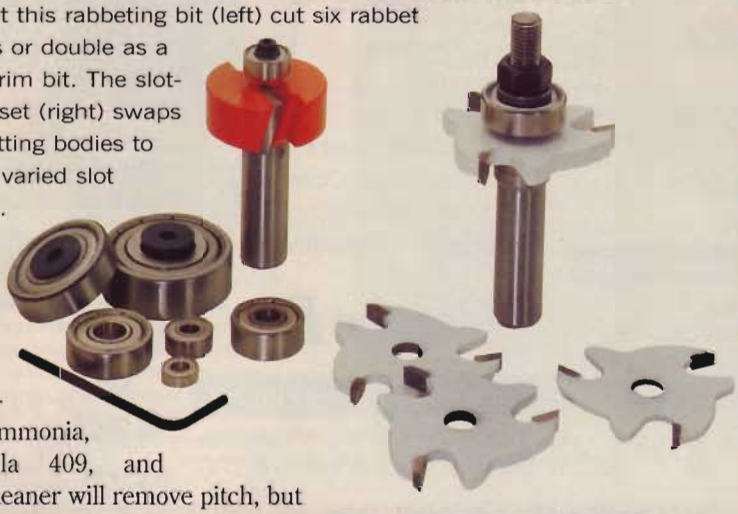
With the relatively recent availability of small diamond sharpening hones, you can tune up some carbide edges in your shop, but I still send mine out to be professionally ground and polished. If you decide to sharpen your bits yourself, dress only the flat face of each cutting flute, never the outside edge.

It's equally important to keep bits clean — the cutting flutes, the bit body, and also any guide bearings. Accumulated wood pitch creates excess heat that will dull cutting edges and burn your workpiece.



"Component" Bits Provide Versatility

Some router bits feature interchangeable components that let them do the work of several cutters. Seven different guide bearings let this rabbeting bit (left) cut six rabbet depths or double as a flush-trim bit. The slot-cutter set (right) swaps the cutting bodies to create varied slot widths.



Household ammonia, Formula 409, and oven cleaner will remove pitch, but I like to use nontoxic products such as Simple Green or some of the new citrus-based cleaners.

Specialty Cutters

For moving beyond the basics, my favorites are specialty profiles for cutting joinery. These bits do fast and precise work, creating self-aligning joints that make glue-up much easier. Examples include a reversible glue joint, a lock miter, a drawer lock joint, a slot cutter set, a dovetail bit, and a finger-joint cutter.

Because joinery cutters usually remove most or all of the board's original edge, nearly all of them are designed for use in a table-mounted router only, and must be used with a guide fence. If you limit yourself to freehand routing, you'll have to live without help from these cutters. I don't think the trade-off is worth it. Even a relatively simple router table (see our portable design in the February 1998 *Workbench*) will let you machine precise joinery quickly and accurately.

With the wide range of router bits now offered, router tables also mimic the role that used to belong exclusively to spindle shapers. Panel-raising bits (like the one shown on page 61) and stile-and-rail cutter sets let you produce custom cabinet doors just like the pros do.

One warning: shapers typically run at only 7,000-12,000 rpm — one-third to half the speed of most routers — because the large cutter diameters create dangerous rim speeds at higher rpm levels. If you want to use a big bit in a router table, the router motor should have a speed reduction feature. Other specialty cutters are more about form than function. Designed to produce decorative details, these include multi-form bits, molding cutters, round-nose and V-groove bits for fluting and bead routing, and many others. Like joinery bits, many of the larger sizes are for router table use only.

SOURCE LIST

Major Router Bit Manufacturers

- Amana Tool Corp. (800) 445-0077
- American Tool/Irwin (800) 866-5740
- Bosch/S-B Power Tool (800) 815-8665
- CMT USA (888) 268-2487
- DeWalt (800) 433-9258
- Eagle America (800) 872-2511
- Freud USA (800) 472-7307
- Grizzly/S-Y (800) 523-4777
- Jesada Tools (800) 531-5559
- MLCS (800) 533-9298
- Ocemco/P.R. Carbide (800) 237-8613
- Oldham/Viper (800) 828-9000
- Porter-Cable Corp. (800) 487-8665
- Vermont American (800) 626-2834
- Whiteside Machine Co. (800) 225-3982

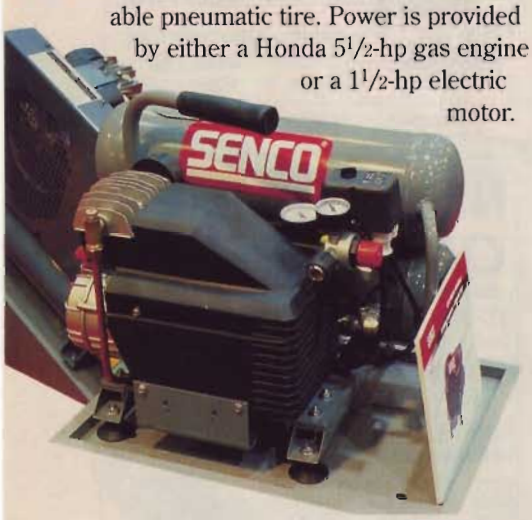
(Note: Colored squares indicate manufacturer's bit color.)

New Tool Offerings

Senco Unveils Air Compressors, AccuSet Nailers

Senco pneumatic nailers and staplers have long been tools of choice among professionals. Now the company has introduced four air compressors designed for contractor-grade performance equal to the standards set by its nailers. The line includes two wheelbarrow-style, large-capacity compressors, and two compact, hand-carry models.

The wheelbarrow compressors, models PC 2011 and PC 2012, share the same 8-gal. capacity, cast iron and aluminum oil-splash pump, and removable pneumatic tire. Power is provided by either a Honda 5 1/2-hp gas engine or a 1 1/2-hp electric motor.



Other features include a belt cover designed to stay tight and quiet, and a strong saddle to hold the tanks, motor, and pump in alignment and reduce vibration. Both weigh about 145 lbs., and carry prices around $790 for the gas model, and $690 for the electric version.

Also new are Senco's 1 1/2-hp hand-carry models. The model PC 2001 has vertically-stacked tanks, a 4 1/2 gal. capacity, and an oil-splash pump. It weighs about 50 lbs. and lists for about $360. The 40-lb. PC 2002 ($350) features an oilless pump (to prevent stains when fastening trim), and has 4 gal. of capacity in its twin horizontal tanks. Call Senco at (800) 543-4596 for more information.

At the other end of the air hose is Senco's new line of nailers and staplers. Incorporating Senco features but sold under the AccuSet name, these tools are aimed at do-it-yourselfers. With prices ranging from around $100 to $160, the line is priced to compete with other entry level guns, and will be sold at home centers. All four tools feature padded handles, epoxy paint coatings, and quick-release fastener magazines.

The A125BN drives brads from 5/8" to 1 1/4" long, and the A200BN handles brads up to 2" long. Accuset staplers drive 1/4"-crown staples from 1/2" long to either 1" long (the A100LS), or 1 1/2" long (model A150LS).

Call Senco/Accuset at (888) 222-8144.

Tempest in a Teapot, or Cyclone in a Bucket?

My shop vacuum spends most of its time under my router table, employed as a dust collector. It works great, but when I need to use the vacuum somewhere else I've got to wrestle it from beneath the table and disconnect the hose from the fence.

I've found a simple solution to this problem with the Dust Separator Lid from Woodstock International. It fits atop a 5-gal. bucket, turning the bucket into a miniature cyclone dust collector. Two ports on the Separator accept 2 1/4"-diameter hose. Their locations cause the air to swirl inside the bucket, like a cyclone. The idea is that larger wood chips fall out of the swirling airflow into the bucket, leaving only fine dust to enter the vacuum.

To test the Separator, I hooked a hose from my router table fence to the first port. I connected my vacuum to the second port and turned it on. After routing profiles on several boards I checked to see where the chips and dust came to rest. The Separator worked well, catching all the large chips and most of the sawdust. The 5-gal. bucket also fits better under the router table, and my vacuum stays empty and available.

The Dust Separator Lid sells for under $25. Call Woodstock at (800) 840-8420.

Small Square has Machinist's Accuracy

The new Precision Square from Veritas looks like a miniature framing square. But don't let its small size fool you — this little square is big-time accurate. That's because the Precision Square is machined to the same tolerances normally found on high-end try-squares and machinists' squares — within .001" of square per inch of length.

The square has measuring scales on both edges of each face, with 1/16" graduations on the 6"-long leg and 1/32" marks on the 3"-long leg. For easy reading, the markings are etched into a non-glare stainless steel body.

With its compact size and flat profile, the Precision Square is perfect for getting accurate measurements in tight places and for squaring small assemblies. It also works well as a precision layout tool. The square sells for $11.95 from Veritas/Lee Valley Tools, (800) 871-8158.

Porter-Cable Rolls Out New Plate Joiner

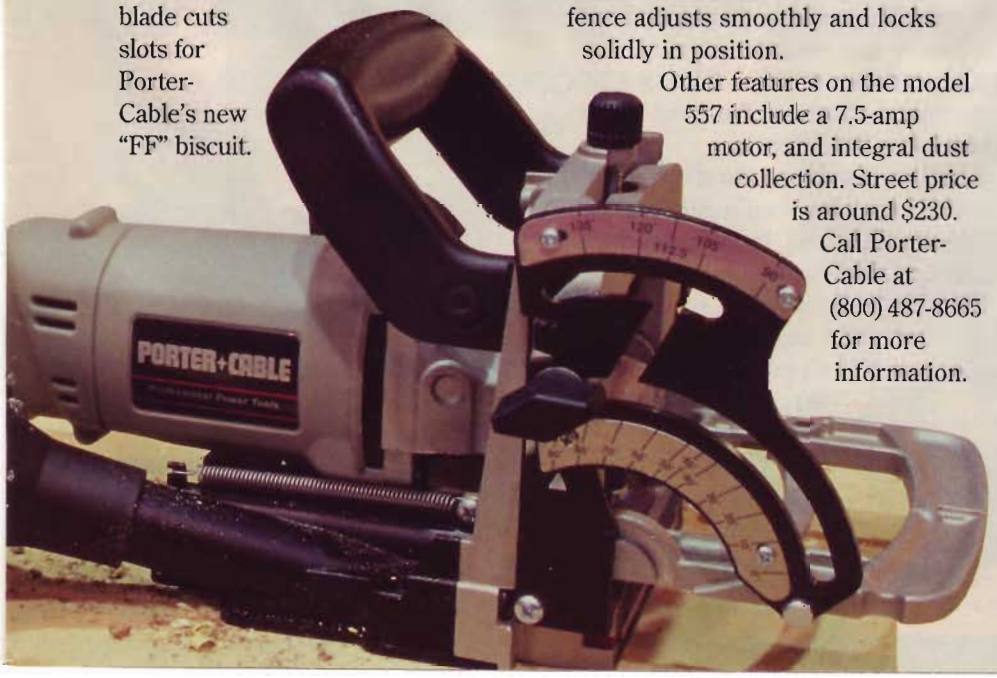
Porter-Cable's new plate joiner offers an array of improvements over the company's previous efforts, plus innovations such as a sophisticated fence, two blade sizes, and well-placed control handles. Although brief, my experience using the tool leads me to believe that it may raise the bar for plate joiners for a while.

The model 557 is the only biscuit joiner on the market that comes with both a standard 4"-diameter blade, and a 2"-diameter blade. This smaller blade cuts slots for Porter-Cable's new "FF" biscuit.

Intended for face frame construction, the FF biscuit can be used with stock as narrow as 1 1/2"-wide. A spacer attached to the fence helps align the blade's cut, ensuring proper placement on narrow stock. The 4" blade cuts slots for #0, #10, and #20 biscuits plus six other sizes.

The 557 has a unique double-gated fence that tilts from 0° to 135°, with a positive stop at 90°. The fence also has a height micro-adjustment and folds flush for surface cuts. The fence adjusts smoothly and locks solidly in position.

Other features on the model 557 include a 7.5-amp motor, and integral dust collection. Street price is around $230. Call Porter-Cable at (800) 487-8665 for more information.



Products For Your Home

Septic System-Safe Garbage Disposal

Using a garbage disposal will clog or contaminate a septic system, right? That's a fear many homeowners have, even though for years disposals have been deemed safe for use with properly sized and maintained septic systems. That may be why of the 27 million-plus homes in the United States with septic systems, only 22% have a garbage disposal.

To put septic system users' minds at ease, In-Sink-Erator, a division of Emerson Electric Co., developed the Septic Disposer, the first garbage disposal designed specifically for use with septic systems.

Each time you use the disposer, it automatically dispenses a metered amount of the company's Bio-Charge liquid enzyme treatment. This introduces over 300 million enzyme-producing organisms that help break down food waste in the disposal. Enzymes also flow into your septic system to help break down other household waste.

Bio-Charge solution containers snap onto the disposer's base, and hold enough solution to last an average family about four months.

The Septic Disposer also features a 1/2-hp induction motor, a corrosion-proof grind chamber with stainless steel blades, and In-Sink-Erator's Quick-Lock mounting system. Suggested retail price for the disposal is $179; enzyme cartridges cost around $9. To find out more, call In-Sink-Erator at (888) 527-1493.

Moen's Filtering Faucet System

With its new PureTouch Filtering Faucet System, Moen Inc. combines several faucet functions into one innovative package. Most noteworthy is the faucet's built-in cartridge that delivers purified water without an add-on filter. The faucet also has a pullout spout that serves triple duty — aerated water flow, spray wand, and filtered water.

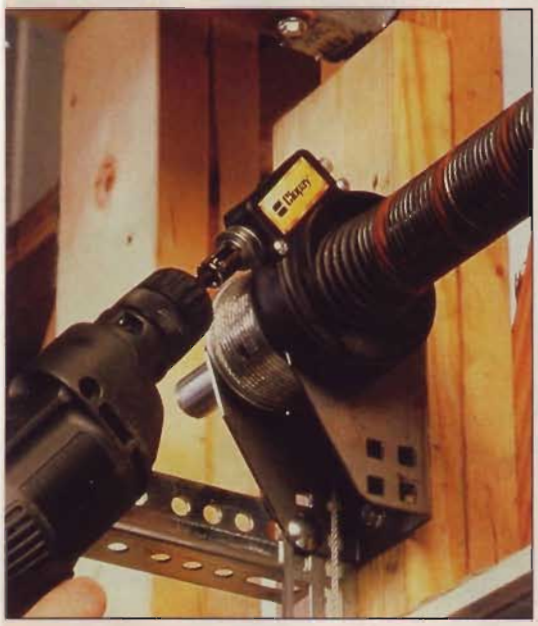
Moen worked with Culligan, a manufacturer of water purification products, to develop the PureTouch filter. It fits inside the faucet's wand, and purifies about 200 gallons of water before needing replacement. Three types of cartridges are available to meet different filtering needs. Changing filters is easy — just remove a cover and snap in a new cartridge. A battery-operated indicator on the spout shows remaining filter capacity.

Rubber buttons on the spout allow you to switch between regular, spray, and filter functions. In filter mode, water is diverted through the cartridge and out a separate spout so purified and unpurified water don't mix. When you shut off the water in any mode, the faucet reverts to normal flow.

PureTouch faucets are available with a white wand and either a white or chrome base. Like other Moen faucets, they also have the company's one-bolt tie-down system that simplifies installation. List price for the faucet is $450, and around $25 for each replacement filter. Call Moen at (800) 289-6636.

Safer Tensioning for Garage Doors

New EZ-Set Spring Systems from Clopay Building Products are designed to make installing garage door springs simpler and safer.



Torsion springs, which are wound to produce tension and help lift the garage door, take time to install, and can be dangerous. Installers insert long steel bars into a fitting and wind the spring a quarter turn at a time. If the bars slip out during the process, the spring unwinds, meaning the process starts over. Or bars can fly out, potentially causing injury.

With the EZ-Set system, manual winding is replaced by a drum that you turn using a power drill and 3/8" socket. A stripe painted along the length of the spring winds around as you increase tension, providing an easy-to-read indicator. Instructions show how many twists are needed.

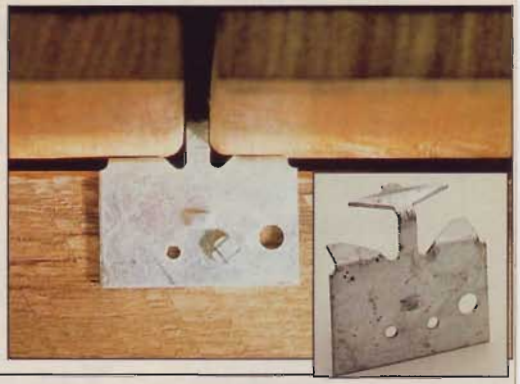
The system for doors with extension springs is similar.

EZ-Set Spring Systems are available on Clopay's Premium Series doors, and cost about $25 more than standard torsion springs. Call (800) 225-6792.

DekFast Fastener

The DekFast, a deck plank fastener from Australia, mounts "down under" the deck planks, allowing you to attach planks to the joists with no fasteners visible from above.

You nail the galvanized metal fasteners over the joist, leaving two protruding spikes that hold adjacent deck planks by their edges. A built-in spacer sets the proper gap. The fasteners sell for around 25 cents each. Call DekFast at (888) 335-3217.



WORKBENCH
THE ORIGINAL HOME WOODWORKING AND IMPROVEMENT MAGAZINE

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Wood Borders Add Style to Floor

Pizzazz Wood Borders from Anderson Hardwood Floors offer new options for livening up hardwood floors. Pizzazz borders are available with either of two geometric patterns in several colors, or in a more artistic pattern called Antique Fruit. The company can also create custom patterns on request.

Made of 1/2"-thick solid maple, the borders are 5"-wide by 39"-long. A spline-and-groove system interlocks them with Anderson floor planks, or you can use other 1/2"-thick, prefinished flooring by routing a matching groove.

Border patterns aren't inlaid in the wood, but applied to the surface as part of the floor finish. They have a commercial wear rating and carry the same warranty as the company's other floors.

Pizzazz borders will be sold only through Anderson Guild Dealers, and retail for around $15 per lineal foot. To find a dealer in your area, or for more information, you can contact Anderson Hardwood Floors at (864) 833-6250.

New Toilet Offers Options

Today's low-flow toilets (1.6-gallons per flush) use substantially less water than older models. Still, there are times when even this smaller amount of water is more than is needed. To further reduce water consumption, Kohler Co. has introduced the San Raphael toilet with Power Lite flush.

The Power Lite's push button allows you to control the flow based on need, delivering the standard 1.6-gal., or a code-minimum 1.1-gal. flush.

Unlike pressure-assisted low-flow toilets that rely on a burst of air to propel water into the bowl, this toilet uses a .2-hp pump. This makes the Power Lite quieter than many pressure-assisted toilets.

The San Rafael toilet also has the lowest overall height on the market at 19", and offers contemporary styling. Retail prices start around $800. For information call Kohler Co. at (800) 456-4537.

Bosch Tools for the Kitchen

At the International Builder's Show in Dallas, we spied a few items that may change what the Bosch nameplate means to many Americans. In addition to power tools and auto parts, the Bosch name may make you think of appliances.

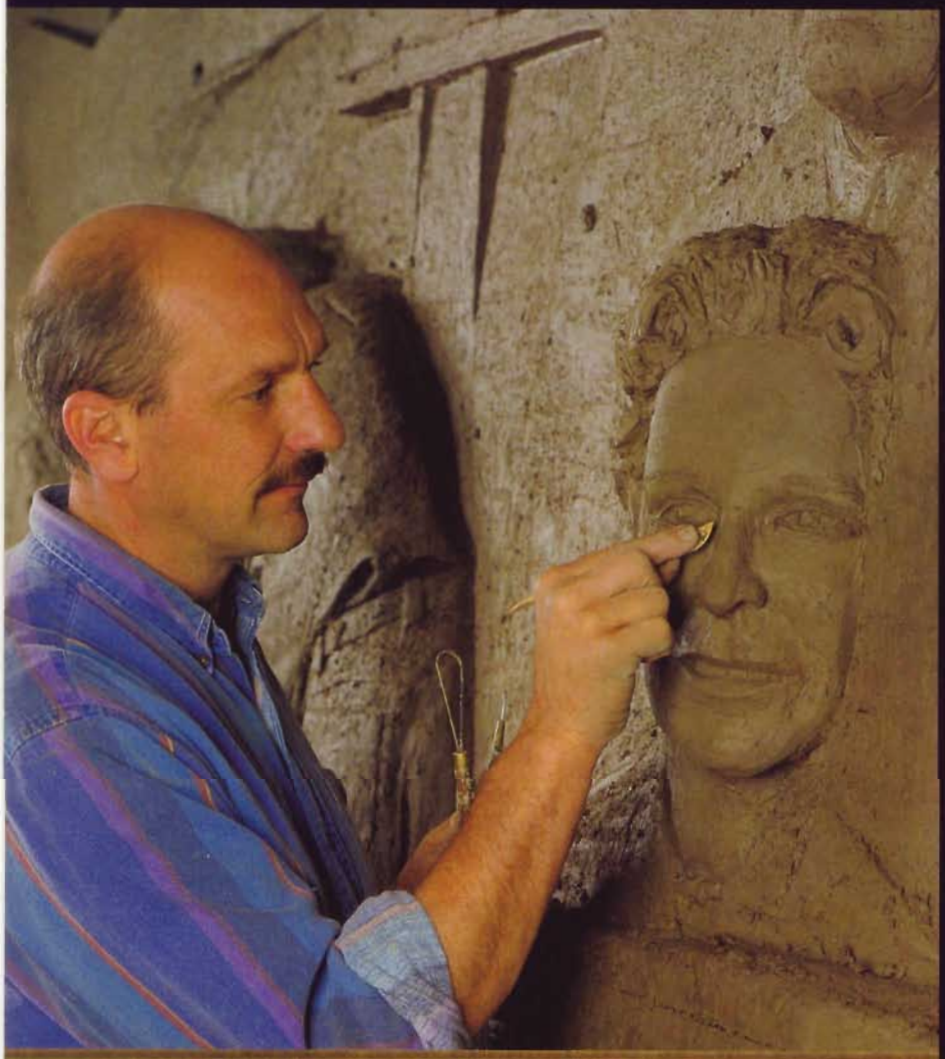
Bosch has manufactured appliances in Europe for years, pioneering such features as ceramic glass cooktops with halogen heating elements. The company offers those cooktops, as well as four- and five-burner gas versions, priced from $700-$1,000. They also offer built-in ovens and dishwashers.

The new dishwasher line features large capacity with space for full-size plates in both the upper and lower racks. Doors accept a variety of panels to match your cabinets. Four models range from $700-$1200.

Bosch single and double built-in ovens are available with standard or convection heating. Their prices run from $1,400-$2,500.

Call (800) 866-2022.

A Mason's Relief



The common image of a bricklayer might be one of a simple laborer with feet of clay, but mason and scrimshaw artist Jay Tschetter isn't content to limit his work to the mundane.

Tschetter's career turned a corner in 1980 when he chanced upon a magazine photo of a brick sculpture. This ancient art is part bricklaying, part mosaic, and part clay sculpture. Using a process largely unchanged in 2,600 years, Tschetter stacks raw bricks onto a giant easel, all carefully arranged in various hues according to a master mural design.

Then he and fellow sculptor Sten Eisentrager start carving, spending days, weeks, or months at their work, keeping the clay pliant with a water spray and sealing it under plastic between carving sessions. Finally, the finished mural is dismantled and the carefully numbered bricks are fired.

On the job site, Tschetter returns to his old trade, laying up the finished wall with an artist's palette of mortars that allows him to match the colors of the bricks. The thin joints are tooled and blended into the relief so the finished wall seems all of a single piece rather than thousands of individual bricks.

Tschetter's first major commission, "Iron Horse Legacy" (shown below), depicts the arrival of the first steam locomotive on the American prairie. The 17-ft. by 40-ft. relief sculpture is the centerpiece of Historic Haymarket in Tschetter's home town of Lincoln, NE. He has also completed a larger brick mural sculpture at the Gateway Arch facility in St. Louis, MO, and has been commissioned for a second work there.

Tschetter can be reached at Brickstone Studios at (402) 488-8033, or online at www.brickstone.com.

Story by Steve Batie; Photography by Fred Kirk