7 tips to master the Trim Router

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#114 May 2005
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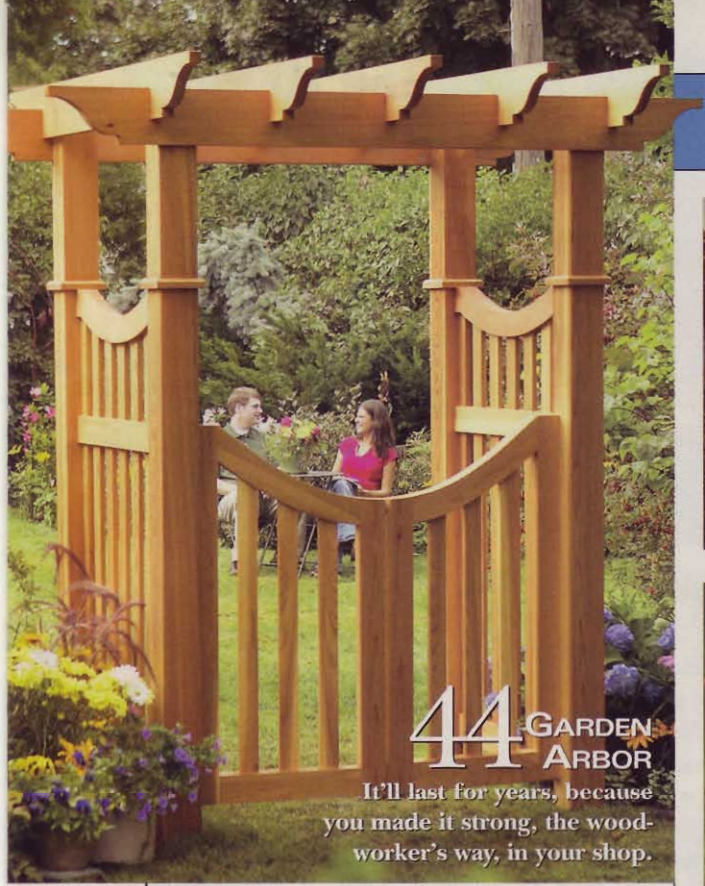

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#114, May 2005

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COVER PHOTO BY RAMON MORENO

American Woodworker

Subscription questions? See page 3.

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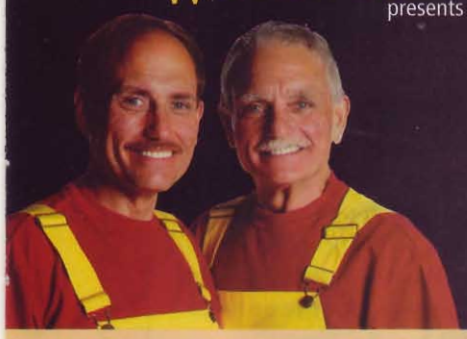


On the House

With the Carey Brothers

We are proud to be associated with the premier woodworking magazine, and we are pleased to offer the following tips:

Tips of the Month

Make Your Own Homemade DADO Saw

If you need to dado-cut a reasonably limited amount of material, it may not make sense to go out and spend between $100 and $300 on a high-quality dado set. Instead, make it easy on yourself and purchase a couple of extra combination blades for your tablesaw. Two at $5 each will do the trick. Then grab a couple of old scratched CDs or DVDs as blade spacers. By sandwiching a CD between each of the three blades (your current blade and the two new ones), you will create a quarter-inch dado that's great for notching drawer side panels or whatever you're working on. Adding blades and/or spacers will widen the cut.

Safety First

Every woodworker knows the importance of using a push-stick when using a tablesaw, and we all know that every once in a while it ends up missing in action. When it does, we're all tempted to pick up a piece of scrap lumber and push with it—even though it has no notch, isn't the right length and maybe is even too small for the task. That's when accidents happen. Why not do yourself a favor—make a trip to your shop right now and make a backup push-stick, drill a hole in the end and hang it on the wall near the saw.

While you're at it, drill a hole in your existing push-stick as well and hang it in a safe spot. Even if you still misplace it, the second one will be hanging on the wall right near you.

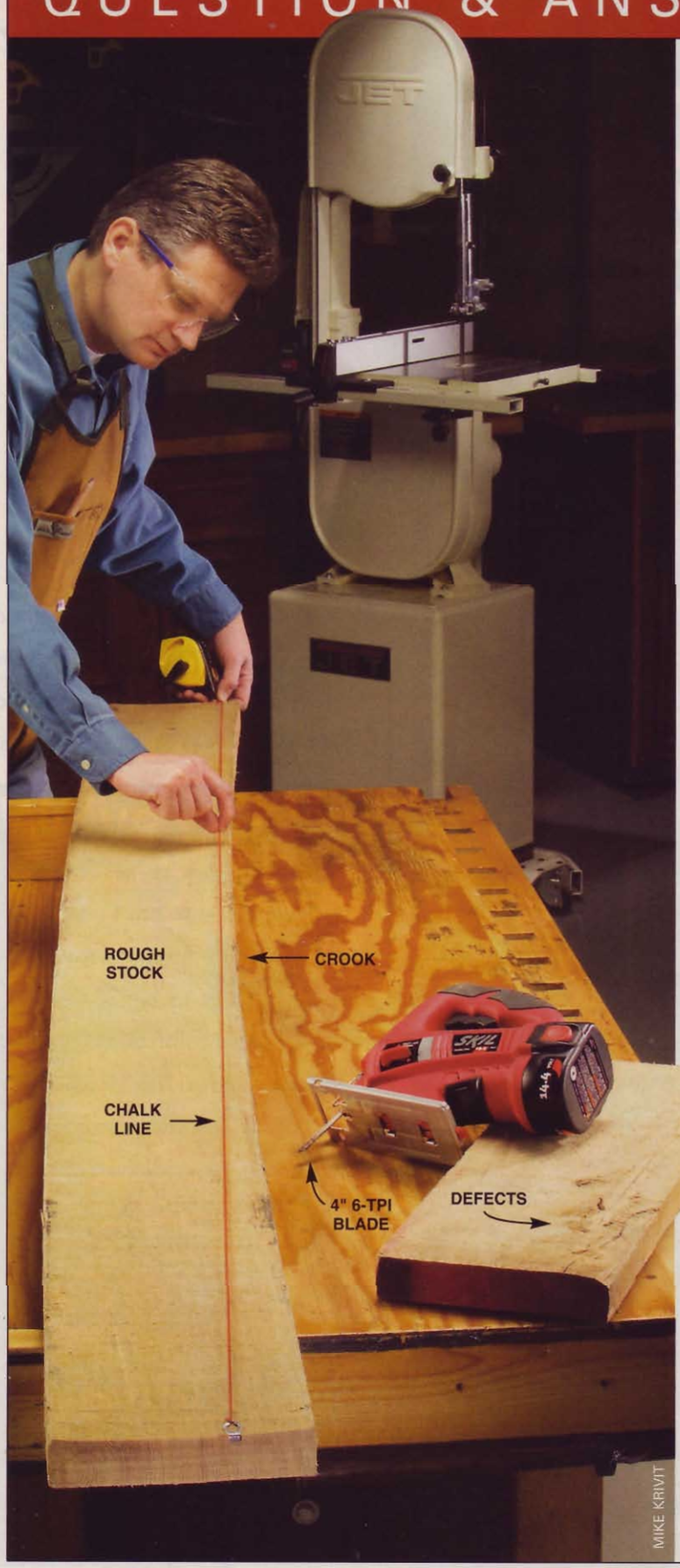
Ask the Carey Brothers a woodworking, home improvement or remodeling question on their live radio broadcast every Saturday from 9:00 a.m. to 1:00 p.m. Eastern Time. Call toll-free at 1-800-737-2474 to ask your question. Visit their website at www.onthehouse.com for recaps of the show and other helpful info.

The Woodworker's Corner

A note from the Publisher of American Woodworker, Jim Schiekofer

Every woodworker understands the importance of using the right equipment for every job, and this includes woodworking accessories and safety products. As leaders in the woodworking field, we have developed a line of American Woodworker merchandise exclusively for our loyal readers. We are excited and proud to offer you official American Woodworker products such as safety goggles and glasses, leather chisel and tool holders, denim shop aprons, stylish American Woodworker denim shirts, and other important accessories for the well-equipped shop. We even have a "junior" shop apron for the junior woodworker in your family. Check out the ad on page 75 of this issue and you'll see the full range of American Woodworker products. As always, our goal is to help you have an enjoyable and safe woodworking experience.

by Dave Munkittrick
and Richard Tendick



Safely Rough-Cut Twisted Lumber

Q I buy my lumber rough, and sometimes I get a very twisted or crooked board. What's a safe way to crosscut and put a straight edge on these awkward boards?

A I use a two-step process for safely prepping severely twisted or crooked stock. First I crosscut the board to the desired length with my jigsaw. Then I cut the straight edge on the bandsaw. Of course, the safest way to crosscut rough stock is with a handsaw. Japanese-style utility pull saws designed for fast cutting are ideal for crosscutting rough stock by hand. My tool of choice, though, is a jigsaw with a 4-in., 6-teeth-per-inch (TPI), rough-cutting blade. It's safe to use, gets through the stock quickly and doesn't wear out my arm.

Ripping a straight edge on twisted stock with a large crook is best done on your bandsaw; it's safe and simple. After crosscutting, I use a carpenter's chalk line to mark the straight edge. I take care to position the line to preserve the best parts of the board with the least waste. The chalk line is easy to follow on a bandsaw. After the straight edge is cut, I'm ready to head to the jointer to face-joint the board and clean up the bandsawn edge.

For boards that are not twisted, you have several other options for crosscutting that will get the job done faster. A circular saw makes quick work of trimming rough stock. Sliding miter saws also have the capacity to cut wide boards, as do radial-arm saws.

If you have a question you'd like answered, send it to us at
Question & Answer, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121 or e-mail to qanda@readersdigest.com.
Sorry, but the volume of mail prevents us from answering each question individually.

EDITOR: DAVE MUNKITTRICK • ART DIRECTION: RICK DUPRE • PHOTOGRAPHY: PATRICK HUNTER, UNLESS NOTED

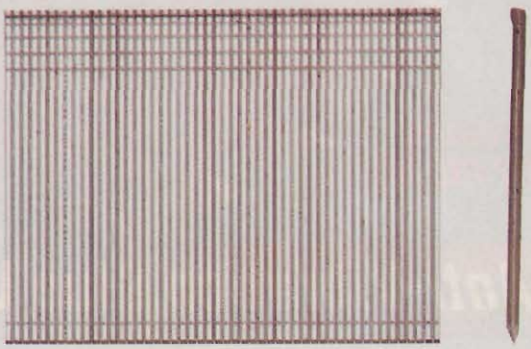
Nail Size Equivalents

Q I see plans calling for 6d nails, but when I want to use my pneumatic nail gun, the nail sizes are in inches. How do I convert from one to the other?

A The *d* in 6d is the symbol for a penny in the English monetary system. Some believe that the use of the term *penny* to describe nail size evolved from the old English custom of selling nails 100 at a time. Thus, 100 small nails might cost 4d while 100 larger nails might cost 8d. Today, the designation refers to the nail's length. The length of pneumatic nails and brads, however, is given in inches. Check the photos below for a quick conversion.

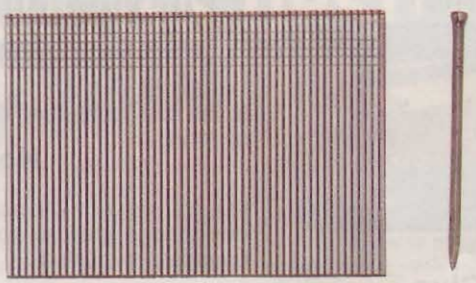
Even though the lengths are equivalent, you'll find a conventional nail is thicker than a pneumatic nail of equal length. The conventional nail needs the extra girth to resist bending under repeated hammer blows. (In my case, they need to be as thick as railroad spikes.)

2-1/2"
16-gauge nails



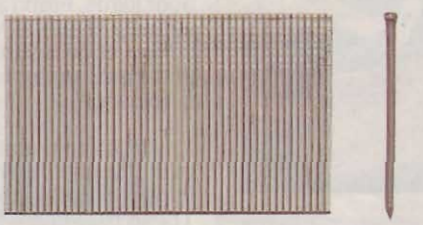
8d

2"
16- or 18-gauge nails



6d

1-1/2"
18-gauge brads



4d

1"
18-gauge brads

2d

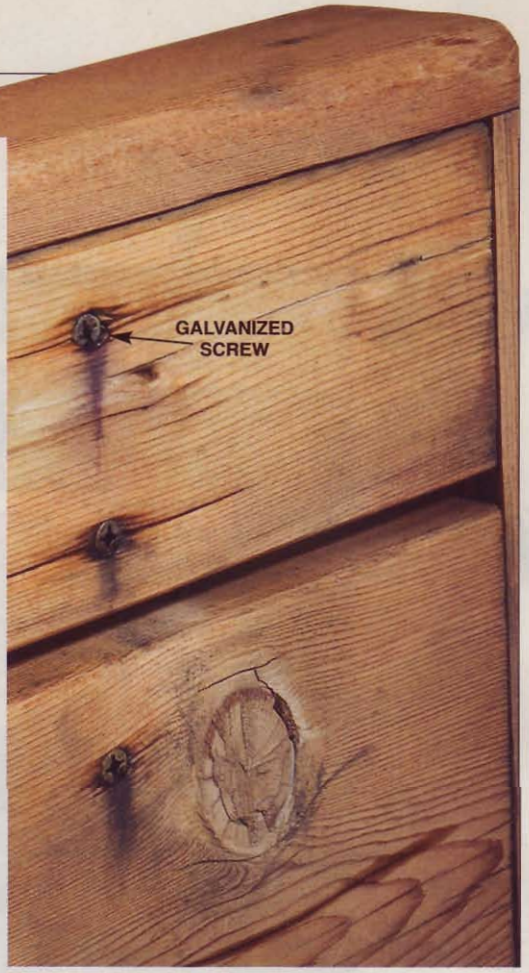
Rusting Screws

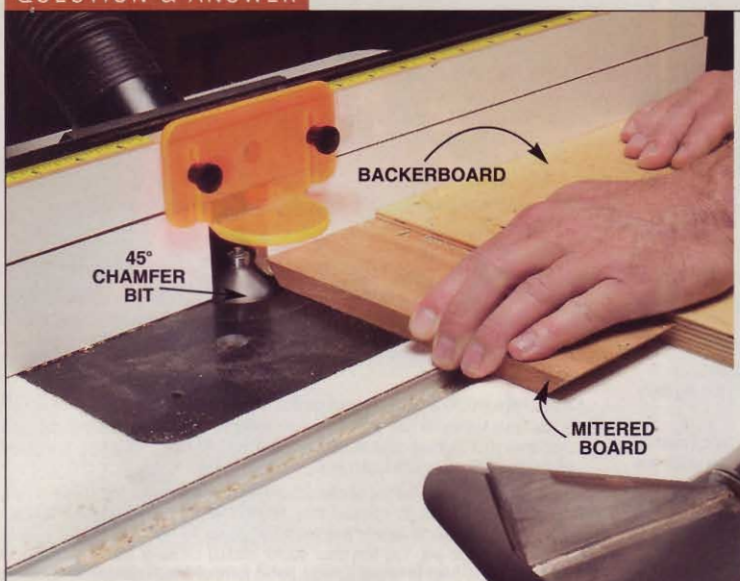
Q I built some outdoor furniture a few years ago. I used galvanized screws and cedar, thinking they would stand up to the elements. The wood has done fine, but from each screw, there's a black stain running down the wood. I thought galvanized screws didn't corrode.

A The best way to prevent this from happening is to use stainless steel screws. Stainless steel screws cost a little more than plated, corrosion-resistant screws. For example, a 100-count box of 2-1/2-in. No. 8 stainless steel screws costs about $3 more than a box of plated screws (see Source, below). Stainless steel is well worth the extra cost.

The galvanized screws you used in your project were most likely damaged during installation. Phillips drive screws are notorious for causing the bit to jump, or cam out, as the screw is driven. This often damages the rust-resistant coating (whether galvanized or epoxy), which exposes the steel to water and oxygen, resulting in corrosion. The iron in the screw reacts with the tannin in the cedar and any environmental moisture to produce those black streaks on your furniture. A stainless steel screw will resist corrosion no matter how mangled it gets.

Source McFeely's, (800) 443-7937, www.mcfeelys.com
No. 8 x 2-1/2-in. 305 stainless steel screws, #0824-FA5, box of 100, $11
No. 8 x 2-1/2-in. No-Co-Rode screws, #0824-FNC, box of 100, $8.





Router Table Miter Joints

Q I plan to build some jewelry boxes with mitered corners, but my contractor's saw does a poor job of cutting miters. Can I use my router table to cut the mitered joints?

A A 45-degree chamfer bit mounted in a router table works great for cutting miters. The size of the chamfer bit you'll need depends on the thickness of the wood you're cutting. Chamfer bits large enough to cut miters on the ends of 3/4-in.-thick boards are available (see Source, left).

Make multiple passes to complete the miters, either slowly increasing the height of the chamfer bit or slowly moving the router table fence back a little at a time. Use a backerboard to help support the workpiece and eliminate blow-out. Be very precise with your adjustments as you near the full mitered cut. The last setting of the fence or bit height should leave a point on the end of the board without shortening the board's length. AW

Source
MLCS
(800) 533-9298
www.mlcswoodworking.com
45-degree chamfer router bit for boards less than 3/4 in. thick, #7677, $28
45-degree chamfer router bit for boards 3/4 to 15/16 in. thick, #7681, $35.

edited by David Olson

CAPTURE TABLESAW DUST

My contractor-style tablesaw spewed sawdust everywhere until I enclosed the base by covering all the openings with 1/4-in. MDF panels. First, I added two aluminum angle rails so the collection box slopes toward the dust port in the back panel. Then I screwed on the MDF panels.

I made two custom-fit panels to cover the open back, one for 45-degree cuts and another for 90-degrees cuts, because those are the most common blade positions I use. These panels rest on the lip at the back of the opening and simply slide in and out of place. I marked them for cutting by measuring around the motor mount and belt guard.

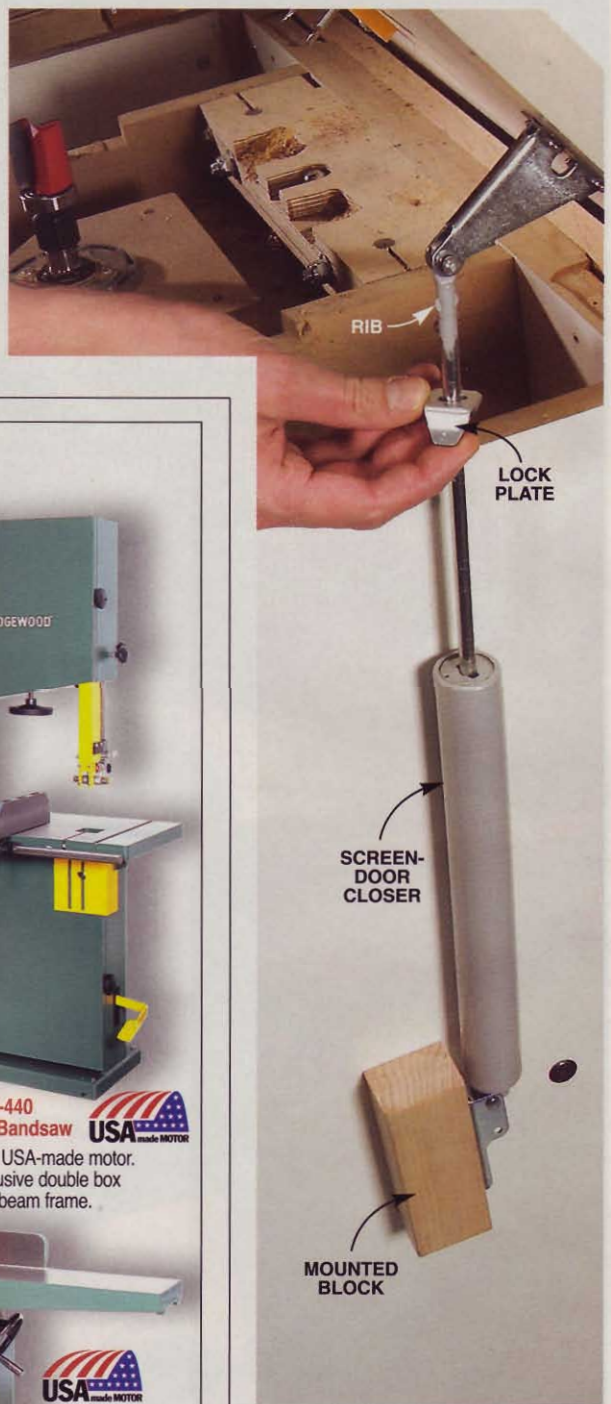
Mark Nagel

EDITOR: TIM JOHNSON • ART DIRECTION: VERN JOHNSON • PHOTOGRAPHY: PATRICK HUNTER

Soft Landing

I installed the AW router lift (AW #106, March 2004, page 38) in my router table. The lift works great, but opening and closing my old table's heavy top made me nervous. To keep it from slamming unexpectedly and smashing my fingers, I installed a medium-duty screen-door closer ($10 at a home center). To lock the top in the open position, I simply drop the lock plate to the cylinder. To close, I lift the top slightly and slide the plate back onto its storage rib. Thanks to the pneumatic self-closing action, the top gently closes itself.

Yaniv Matza



If you have an original Workshop Tip, send it to us with a sketch or photo. If we print it, you'll get $100! Send to **Workshop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121 or e-mail to workshoptips@readersdigest.com.** Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.

Right-Angle Guide for Jointing

Planing the edge of a long board perpendicular to its face is a real challenge. To make the job easier, I built a guide that attaches to the side of my plane with rare earth magnets. Now jointing an edge is much easier. I simply alter my grip to take full advantage of the square-cornered support that the fence offers.

Frank Penicka

Source

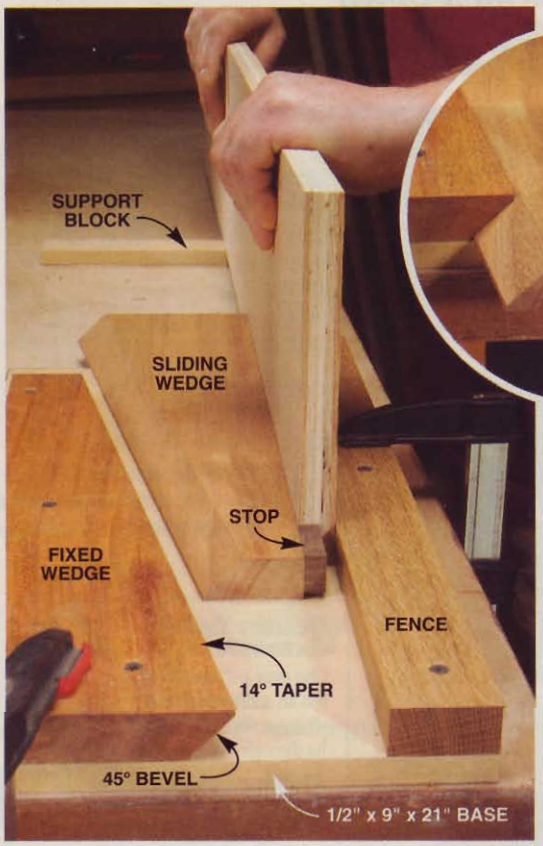
Rockler Woodworking, (800) 279-4441, www.rockler.com
1/2-in.-dia. rare earth magnets, #30810, pack of 10, $7.

The guide consists of four pieces of 1/8-in. MDF glued so one pair of pieces shoulders the sole of the plane (see photo, below). On the sole, this shoulder must extend slightly beyond the blade. The magnets are epoxied into their predrilled holes.

Clothespin Holder

I love having a cutting list close at hand. But hanging on to it when both hands are busy was a problem—until I bought 24 clothespins for $2 at the hardware store. I epoxied the wooden pins in convenient spots around my shop. Now I can easily double-check measurements before cutting my boards too short.

Chas Bridge



Benchtop Board Clamp

My father showed me this "bird's mouth" jig almost 60 years ago. It securely clamps 1/4- to 3-in.-thick boards on edge. It's so useful that I've never bothered to add a vise to my workbench. I've been tempted to mount the jig permanently, but I prefer an uncluttered work surface. Besides, this jig is easy to install and remove.

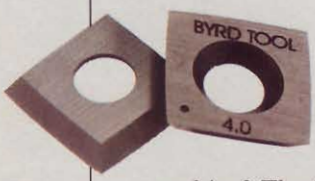
To hold a board for planing or edge banding, simply engage one end on the sliding wedge (see photo at left). Slide the board and wedge forward until they lock between the fixed wedge and the fence (see photo inset). Support the back end of the board with a block the same thickness as the base.

I cut both wedges from a single board on the tablesaw, using a tapering jig and the blade tilted 45 degrees. I mounted the fence on the base and glued a stop on the sliding wedge. I positioned the two wedges by using a 3/4-in.-thick spacer between the sliding wedge and the fence. Then I fastened the fixed wedge to the base. AW

Darwyn Briggs

THE WELL-EQUIPPED

Carbide-Insert Jointer Knives

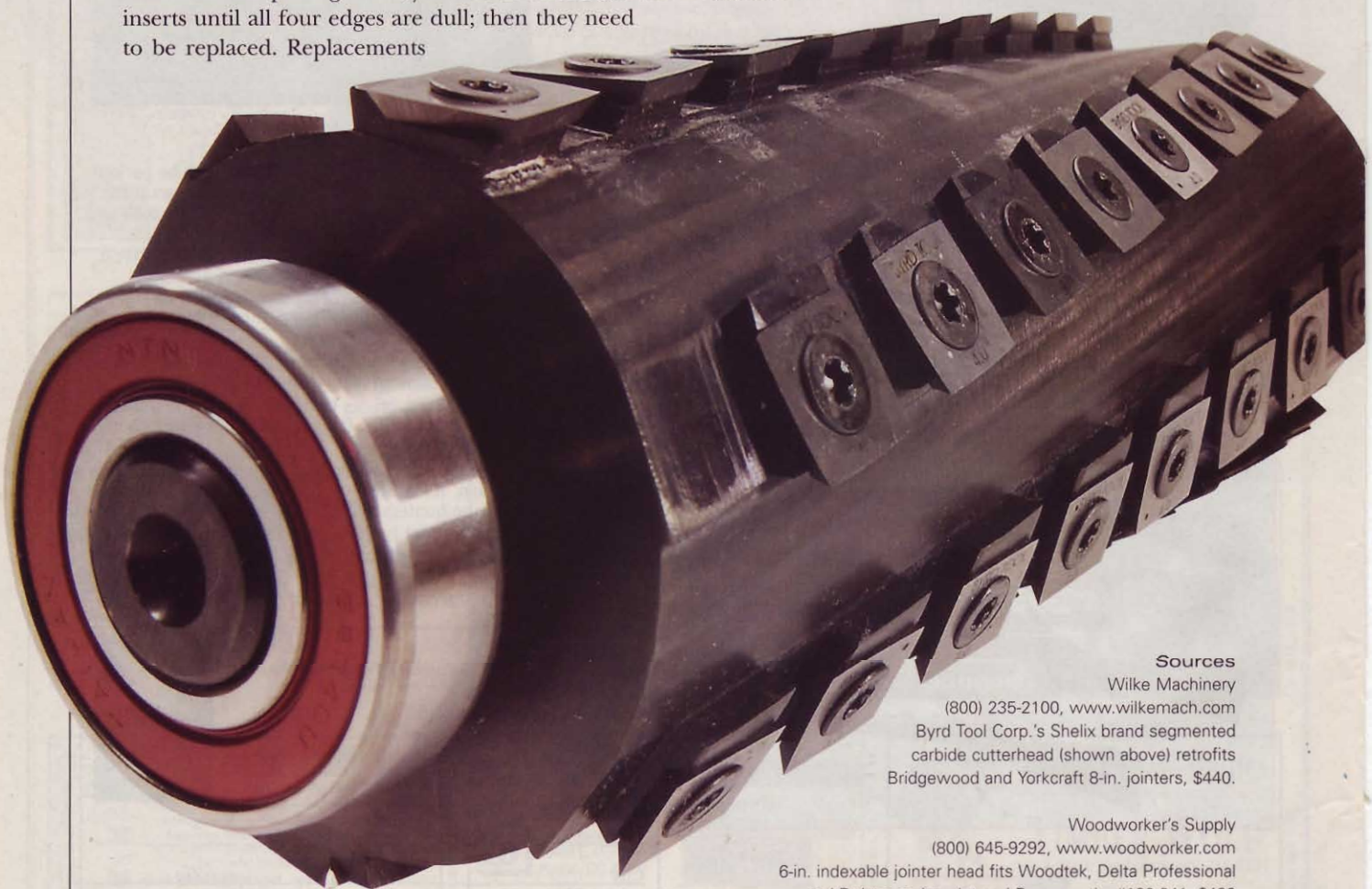


How much is it worth to you to make changing jointer knives incredibly easy? What if your jointer knives also stayed sharp longer? Would you pay $300 to $400 more for the machine? That's the price of the latest in jointer technology: carbide-insert cutterheads.

These odd-looking cutterheads are available for a handful of 6-in. and 8-in. jointers. Unlike a conventional, straight, tool-steel knife, these cutterheads consist of a series of solid carbide inserts. Each insert has four cutting edges. The edges are marked so you can keep track of which ones you've already used. The inserts in each row overlap the inserts in the previous row in a helical or chevron pattern to provide a continuous cutting edge.

Each insert is individually fastened to the cutterhead. Instead of sharpening them, you unbolt and rotate the inserts until all four edges are dull; then they need to be replaced. Replacements cost about $2.50 per insert, or $100 to $200 for the entire head. But remember, you will get four fresh edges. And replacing the inserts is as easy as setting them into the indexed opening and tightening a bolt. Done!

We're doing a review of 8-in. jointers for an upcoming issue. Our initial tests on these cutterheads show that they cut as well as conventional knives and run more quietly. Making a cut does seem to require more feed pressure and horsepower than with a conventional knife. As for longevity, you've got to believe these carbide inserts will far outlast conventional knives—just as your carbide router bits last longer than steel bits. And you can joint manufactured materials, such as melamine. A couple of manufacturers offer cutterheads that can be retrofit in their machines (see Sources, below).



Sources

Wilke Machinery
(800) 235-2100, www.wilkemach.com
Byrd Tool Corp.'s Shelix brand segmented carbide cutterhead (shown above) retrofits Bridgewood and Yorkcraft 8-in. jointers, $440.

Woodworker's Supply
(800) 645-9292, www.woodworker.com
6-in. indexable jointer head fits Woodtek, Delta Professional and Deluxe series, Jet and Powermatic, #120-041, $400
8-in. indexable jointer head fits Woodtek only, #120-044, $500.

SHOP

New Tools, Supplies and Materials

by George Vondriska

28-Volt Cordless Tools

Milwaukee's newest battery, the V28, is a 28-volt lithium-ion battery that powers a drill, circular saw, reciprocating saw, hammer drill, even a handheld bandsaw (used for cutting pipe). "What!" you say, "28-volt? It's gotta weigh a ton." Here's the good news: The V28 battery weighs less than a typical 18-volt NiCd or NiMH. And, according to the folks at Milwaukee, the V28 is more powerful and has up to twice the run time. In addition, lithium-ion batteries don't fade. Either they run the tool or they don't; the power doesn't gradually drop off. A "fuel gauge" on the battery indicates how much juice is left. Lithium-ion batteries also have a lower self-discharge rate, so a fully charged lithium-driven tool that sits idle for a month will have more power left in it than a comparable NiCd or NiMH would. *The new batteries are not compatible with Milwaukee tools currently* powered by NiCd batteries.

PHOTO: MANUFACTURER

Source
Milwaukee Tools
(800) 729-3878
www.milwaukeetool.com
V28 Lithium-ion battery, #4811-2830, $233.

New Multi-Base Router

You gotta love multi-base routers. They give you so much bang for the buck. From handheld to router-table use, these are versatile machines. Hitachi's new KM12VC kit, $190, is the latest entry into the multi-base router field. It has features, and a price, comparable to those of other multi-base routers. And with Hitachi's redesign of its tools, this is one cool-lookin' machine.

The KM12VC has a 2-1/4-hp (11-amp) electronic variable-speed motor (8,000 to 24,000 rpm) that can be swapped—tool free—from base to base. Included are 1/4-in. and 1/2-in. collets and seven template guides in commonly used sizes.

Depth of cut in the fixed base is controlled by winding the motor in and out of the base. This is the least desirable style of depth control, but it's made easier on the Hitachi router by a two-stage locking lever. The first stage applies a gentle squeeze to the motor and takes any slop out of the system. This allows small adjustments to be made and held. The second stage rigidly locks the motor in place.

PHOTO: MANUFACTURER

Source
Hitachi Power Tools
(800) 829-4752
www.hitachi-powertools.com
Multi-base router, #KM12VC, $190.

The plunge base has a three-position turret and stop rod for controlling the depth of cut. The pointer on the stop rod is slightly difficult to read compared to those on other multi-base routers.

EDITOR: RANDY JOHNSON • ART DIRECTION: RICK DUPRE • PHOTOGRAPHY: PATRICK HUNTER, UNLESS NOTED

Simplified Drawer-Slide Installation

A mistake in positioning drawer slides inside a cabinet can ruin your day. Misplace the slide by even a smidgen and the drawer will be crooked in the opening. Kreg Tool can help you go straight with its new Universal Drawer Slide Mounting Tool. For $30, it makes putting in slides as easy as putting on your shoes.

The mounting tool, which works great on both face-frame and frameless cabinets, provides a ledge that the slide rests on while you drive in the screws. Magnets on the mounting tool grab and hold the slide so it doesn't slip out of position. With magnets on both sides, one mounting tool works for both sides of the cabinet.

Simply rest the mounting tool on a rail, or position it on the case side, clamp it in place and you're ready to drive screws through the slide. The mounting tool, which can be used with side and undermount slides, is compatible with hardware from a number of manufacturers, including Alfit, Amerock, Blum, Hafele, Hettich and Liberty.

After the case component is in, you can use new Kreg Drawer Mounting Brackets, $10, to set the drawer box. They work like shelf supports, projecting from the front of the cabinet and holding the drawer in place while you drive the screws.

There are other devices on the market for mounting drawer slides but, unlike many of them, the Kreg product is not specific to only one slide manufacturer.

Source
Kreg Tool Co.
(800) 447-8638
www.kregtool.com
Universal Drawer Slide Mounting Tool, $30
Drawer Mounting Brackets, $10.

Easier Tablesaw Blade Changes

One of my worst woodworking injuries happened on a tablesaw—with the power off. My hand slipped while I was changing a blade and I ran my finger into a tooth. Ouch! The new Saw-Jaw prevents such an accident, because it encircles and locks onto the perimeter of a 10-in. saw blade, acting like a big wrench. The large handle gives you plenty to hold on to, so you'll never need to jamb a piece of wood against a blade again.

When installing a new blade, you grip it with the Saw-Jaw first. Then you thread the Saw-Jaw and blade through the table and onto the arbor.

Now if only I could come up with a good way to guarantee never losing an arbor nut in the sawdust pile again....

Source
Higol L.C.
(800) 729-9366, www.saw-jaw.com
Saw-Jaw, $17.

Micro-Adjust Wheel Gauge

A wheel gauge produces a fine, crisp line that is easy to see and adds accuracy to your work. They can, however, be fussy to adjust. For $26, you can easily dial in precise dimensions with the new Micro-Adjust Marking Gauge from Lee Valley.

Here's how it works. First, slide the head into an approximate position. Tighten the collet and use the micro-adjust knob to fine-tune the head into its final position. With its fine threads, one full turn of the micro-adjust knob moves the head a mere 1/32-in. Once the head is positioned, it can be locked in place with the thumbscrew. A ruled model with 1/16-in. graduations on the rod is also available, $33.

The Micro-Adjust Wheel Gauge is an evolution of Lee Valley's standard wheel gauge. At only $4 more, it's worth every cent. Lee Valley's micro-adjust gauge is slightly more cumbersome to adjust single-handedly than its competitor, Glen Drake Tool Works' Tite Mark, $79.

AW

Source
Lee Valley
(800) 871-8158
www.leevalley.com
Micro-Adjust Marking Gauge, #05N35.10, $26.

by Randy Johnson

7 trim router tips

Multiple bases make this compact router extremely versatile.

Laminate trim routers are amazing little machines. Their light weight and compact size make them exceptionally easy to use. Although they are designed primarily for trimming plastic laminate (p-lam), they also work great for light-duty wood routing.

Trim router motors range from 3.8 to 7.5 amps and run at speeds as high as 30,000 rpm. Add a base and the trim router weighs between 3 and 4-1/2 lbs. All models use only a 1/4-in. collet. You can buy a variety of bases and accessories (see Sources, page 34). Prices range from $80 for just the router with a standard base to $250 for a kit with several accessories.

Understanding what each of these accessories is capable of doing is the secret behind getting the most from your trim router. These accessories make the trim router very precise.

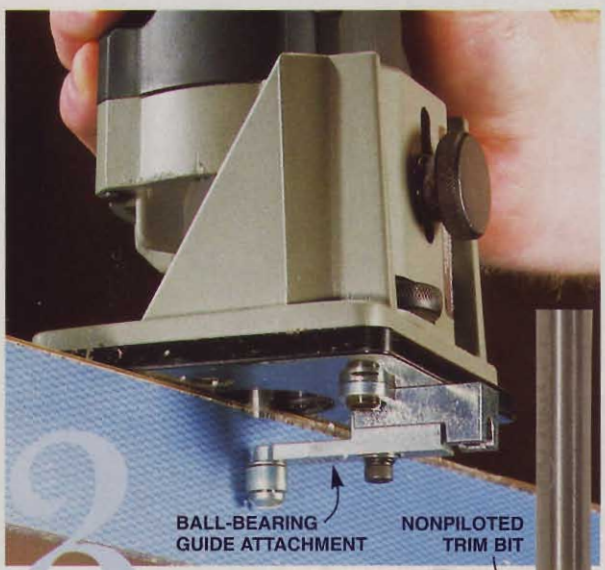
ART DIRECTION AND PHOTOGRAPHY: PATRICK HUNTER

1 Protect the Plastic Laminate

Apply a lubricant, such as wax, soap or Trim Ease (a commercial product available from p-lam and trim bit distributors), to the plastic laminate's face when you use self-piloting bits. The lubricant protects the p-lam from burning or marring. Self–piloting bits are available in flush-trim or bevel-trim profiles. The flush trim (shown here) is used when you want to leave a flat, square corner. Its single cutting flute makes it fast-cutting. A solid carbide self-piloting trim bit costs $8 to $10, which is about half of what a ball-bearing-guided trimming bit costs.

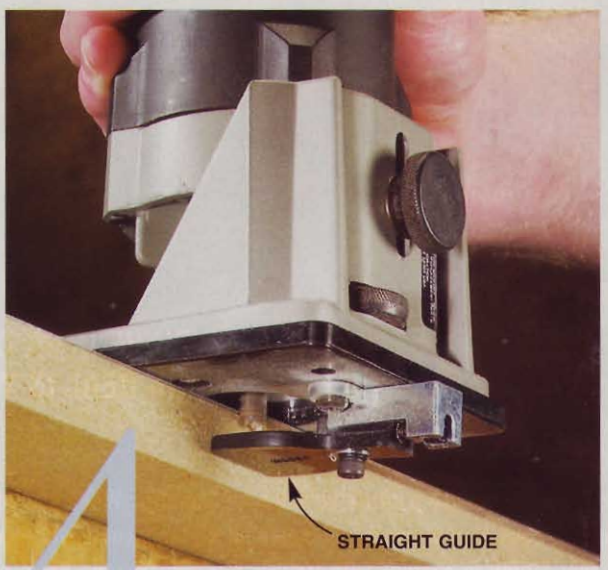
2 Ball Bearings Reduce Marring

Ball-bearing-guided bits greatly reduce the risk of marring and can be used without a lubricant. The bearings do wear out, so you should replace them as soon as they show signs that they're not spinning freely. It's also important to keep them clean of built-up glue. Ball-bearing-guided trim bits are available in either a flush-trim or bevel-trim profile. The bevel profile (shown here) is used when you want to ease the edge to make it friendlier to the touch and reduce its chance of chipping when bumped. Ball-bearing-guided trim bits cost $12 to $24 each.



3 Mar-Proof Routing

Use a ball-bearing guide attachment when you want to totally eliminate the chance of marring the finished surface or when you want to leave an overhang on the part that you are trimming. A nonpiloted trim bit is used with this guide. The bit is a combination flush and bevel cut. You can trim straight or curved surfaces with this setup.



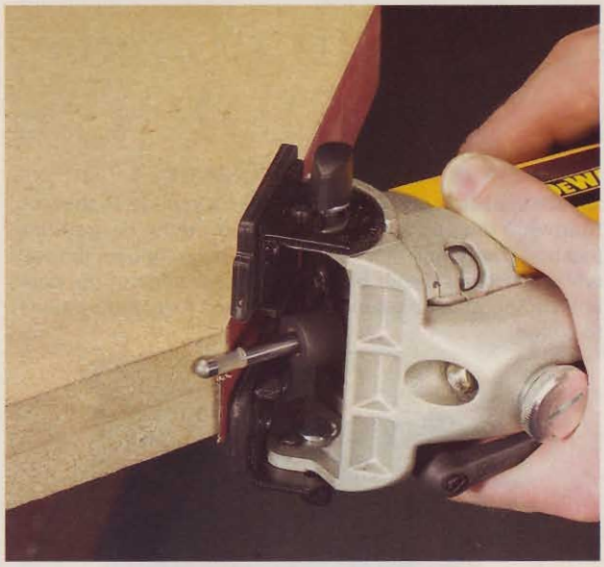
4 Get a Super-Straight Cut

Use a straight guide when trimming against the substrate material. The straight guide bridges the small voids or gaps common in particleboard and plywood. The result is a straighter edge on the p-lam. This is important when another p-lam piece will be laminated to this edge. Straight edge guides do not work on curves or close in inside corners. A regular straight bit works fine with the straight guide.

5

Move Close into Corners

Use the tilt base when you rout inside corners on countertops and inside cabinets. The router must be kept perpendicular to the edge of the p-lam or an uneven trim will occur. You can use either a self-piloting bit or a ball-bearing-guided bit with this base.



Trim Odd Angles with Ease

An odd angle, such as the outside corner of an angled countertop, requires no special jigging when you use the tilt base. First, adjust the base to match the corner's angle and trim the first piece of p-lam edging. Then apply the second piece and trim it using the same setup.

The tilt base replaces the regular base on the trim router and can be angled from 45 to 135 degrees.

6

Use It for Wood, Too

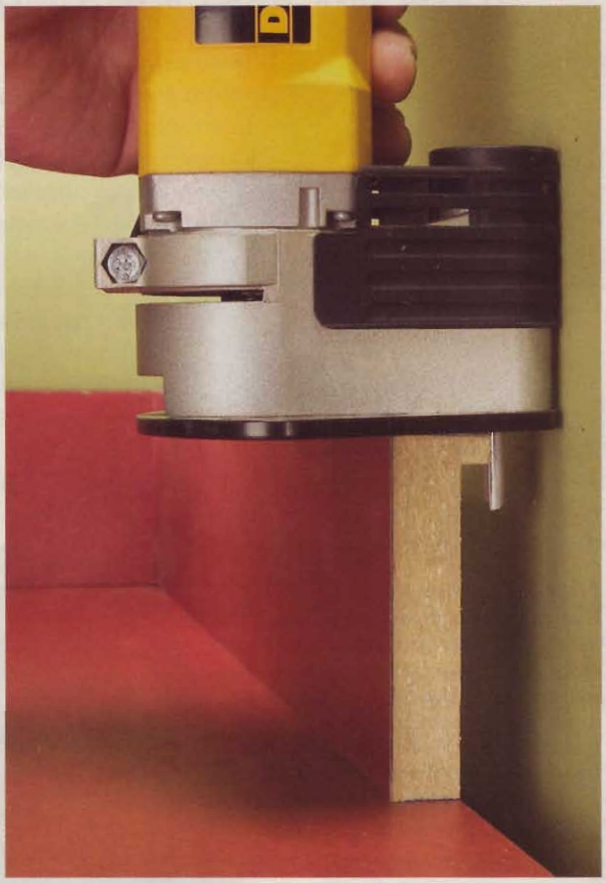
A trim router is also great for light-duty wood routing, because it's compact and lightweight. It can easily handle a small profile bit for edge trimming or even a small straight bit for shallow grooving. It's a handy router and worth having around the shop, even if you never do any p-lam work. You can even get oversize bases for some trim routers. The oversize base provides more stability when working on large surfaces.

The oversize base that comes with Ryobi's trim router has two handles. This provides you with the same two-handed control you get with a midsize router.

Scribing is Almost Automatic

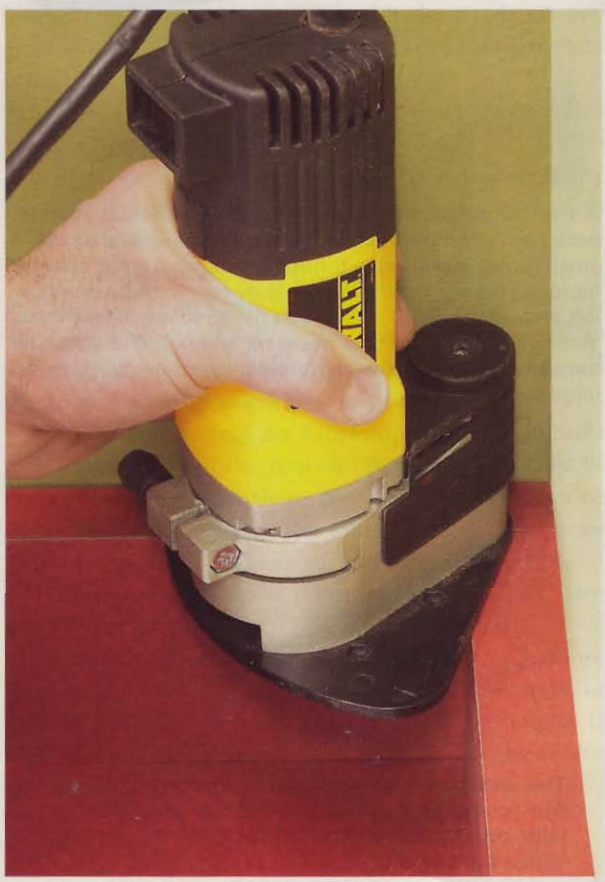
An offset base is great for scribing a backsplash to the wall. Start with the backsplash 3/4 in. out from the desired final location. The small end of the offset base follows the wall while a straight router bit trims the back edge of the backsplash. The offset base can also be used to scribe a cabinet to a wall.

The offset base uses a small belt to drive the offset router shaft. The wedge-shaped base plate enables you to get up close along walls.



Easy Trimming in Tight Quarters

Trimming in tight areas and close to a wall is no problem with an offset base. In the photo at right, it's being used to put the final bevel trim on a backsplash. The angled end of the base allows moving in close at inside corners.



Sources

Bosch
(877) 267-2499
www.boschtools.com
5.7-amp laminate router with straight base, #PR10E, $100
5.7-amp laminate router kit, includes straight, offset and tilt bases, #PR10EINK, $200.

Freud
(800) 334-4107
www.freudtools.com
6.6-amp laminate router with straight base, #FT750T, $100
7.5-amp laminate router kit, includes straight, tilt and two-handled plunge bases, #FT1000EK, $140.

PorterCable
(800) 321-9443
www.portercable.com
5.6-amp laminate router with straight base, #7310, $115
5.6-amp laminate router kit, includes straight, offset and tilt bases, #97311, $230.

Ryobi
(800) 525-2579
www.ryobitools.com
4.5-amp laminate router with straight and two-handled oversize bases, TR45K, $80.

DeWalt
(800) 433-9258
www.dewalt.com
5.6-amp laminate router with straight base, #DW670, $110
5.6-amp laminate router kit, includes additional bases, #DW673K, $180.

Craftsman
(800) 377-7414
www.sears.com
3.8-amp laminate router with straight base, #27512, $100.

Makita
(800) 462-5482
www.makita.com
4.4-amp laminate router with straight base, #3707FC, $150
4.4-amp laminate router with tilt base, #3708FC, $160.

by Richard Tendick

PRECISION SQUARES

How to use our favorite setup tools

Every woodworker falls in love with some favorite tools now and then. I count on my faithful set of precision squares every day, from milling the first rough board to installing the last brass hinge. They're the solid foundation of every successful project.

When I was a young woodworker, though, my first affair with an attractive square ended in bittersweet disappointment. This tool was a real beauty. It had a rosewood handle inlaid with brass and a blued steel blade.

As I gained experience, however, I realized my parts weren't truly square. I blamed everything but the tool itself. One day I compared it to a friend's square. He was a fussy machinist, so his square was true. Mine was way off! My tool was too inaccurate for critical work but too beautiful to throw away.

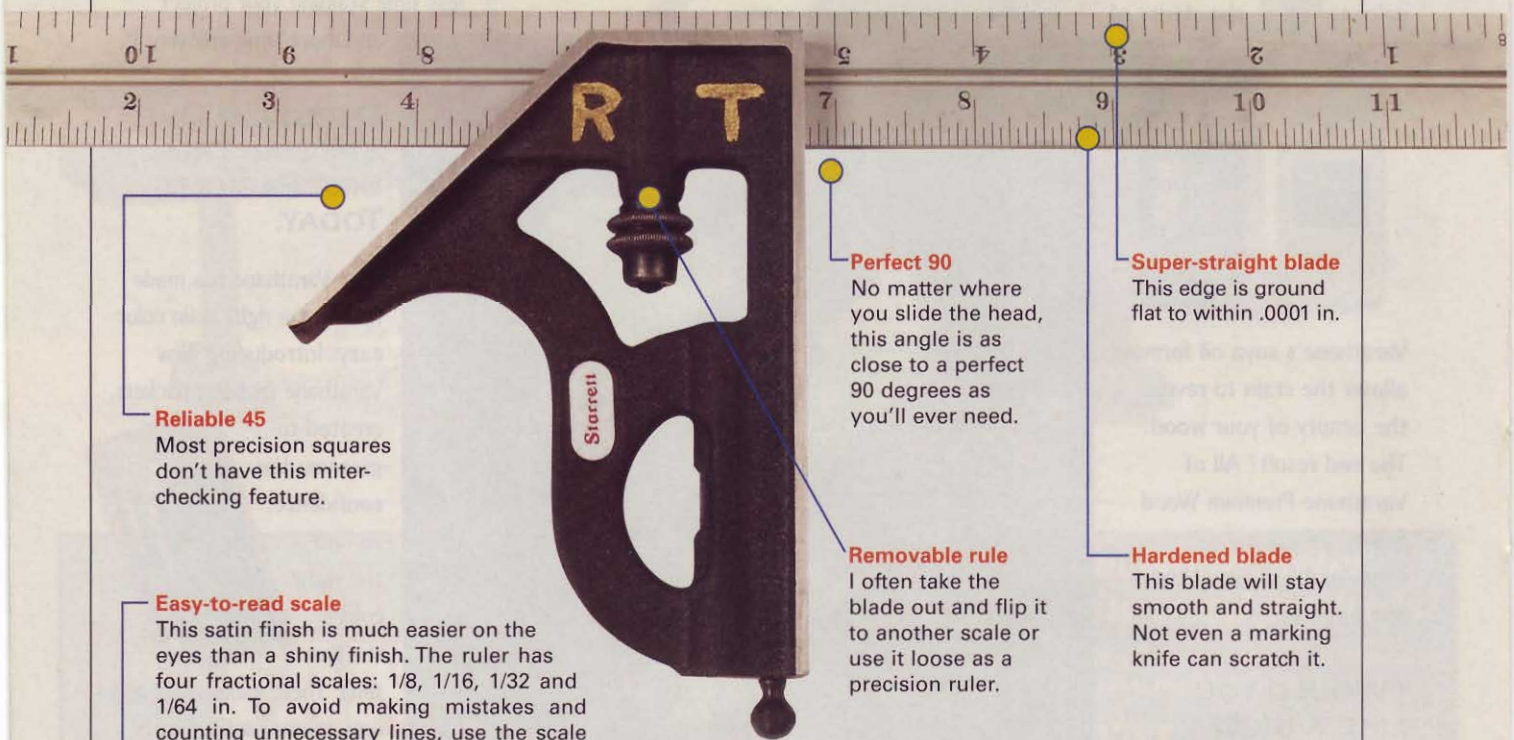
My pal clued me in to the best features of a good square, how to test it and how to use it—hard-earned knowledge I'll now share with you.

EDITOR: TOM CASPAR • ART DIRECTION: RICK DUPRE • PHOTOGRAPHY: THIS PAGE, MIKE KRIVIT; OTHERS BY PATRICK HUNTER

A Classic Precision Square

The most reliable and useful precision square in my shop is a Starrett 12-in. combination square ($64, see Sources, below). Many other finicky woodworkers have told me that they, too, treasure one of these tools. I put my initials on my square and keep it safe in its own special drawer compartment.

Many combination squares aren't very accurate, but this one is made to extremely precise tolerances and is individually checked before it leaves the factory. A good 12-in. square, like this one, should be no more than .002 in. out of square at the end of the blade (for comparison, a piece of paper is about .003 in. thick). Look for a published tolerance this small when you shop for any type of precision square.



Reliable 45
Most precision squares don't have this miter-checking feature.

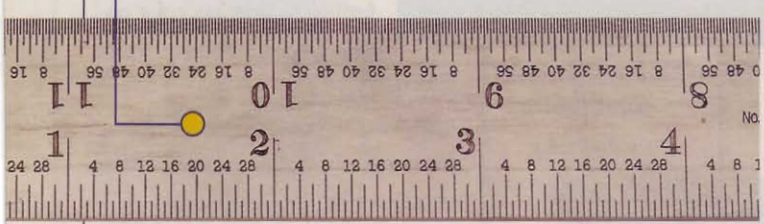
Easy-to-read scale
This satin finish is much easier on the eyes than a shiny finish. The ruler has four fractional scales: 1/8, 1/16, 1/32 and 1/64 in. To avoid making mistakes and counting unnecessary lines, use the scale with the same fraction you're measuring.

Perfect 90
No matter where you slide the head, this angle is as close to a perfect 90 degrees as you'll ever need.

Removable rule
I often take the blade out and flip it to another scale or use it loose as a precision ruler.

Super-straight blade
This edge is ground flat to within .0001 in.

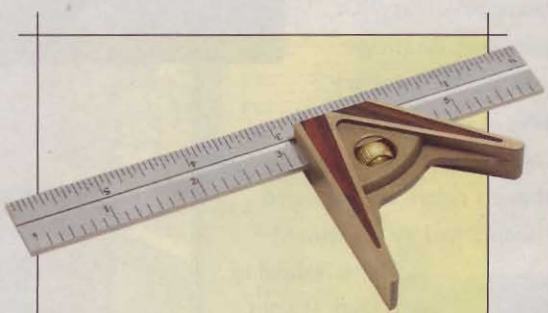
Hardened blade
This blade will stay smooth and straight. Not even a marking knife can scratch it.



Sources

MSC
(800) 645-7270, www.mscdirect.com
Starrett 12-in. combination square, #86400637, $64
Machinist's square, 4-in. blade, #06508048, $10
6-in. blade, #06508063, $12
12-in. blade, #06508121, $33
Double square, 4-in. blade, #06504674, $30.

Bridge City Tools
(800) 253-3332, www.bridgecitytools.com
CS-6 6-in. combination square, #1101-125E, $84.

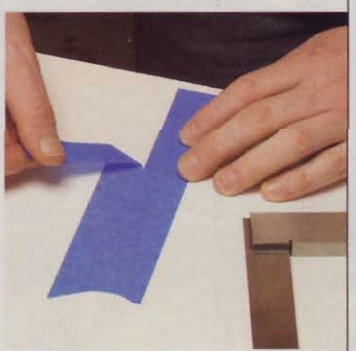


A 6-in. precision combination square is very convenient to carry in an apron pocket. This silicon brass and rosewood jewel is made by Bridge City Tools (see Sources, left).

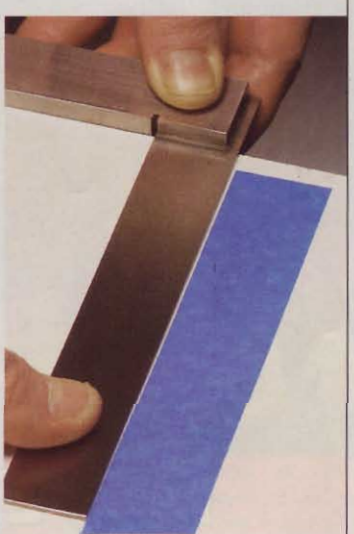
How Square Is Your Square?

No matter how fancy a square looks, when it comes to accuracy, I've got to see it to believe it. Inexpensive models, like a 12-in. fixed-blade machinist's square ($32, see Sources, page 38), should *always* be tested. Here's a new variation on an old method of testing any square.

1 **Cut a line** down the middle of a piece of tape attached to a melamine board. The bottom edge of the board must be absolutely straight. Check the board's edge against the top of your tablesaw.



2 **Peel off** the right-hand side of the tape. The contrast between the blue tape and bright white melamine makes the precisely cut edge easy to see.

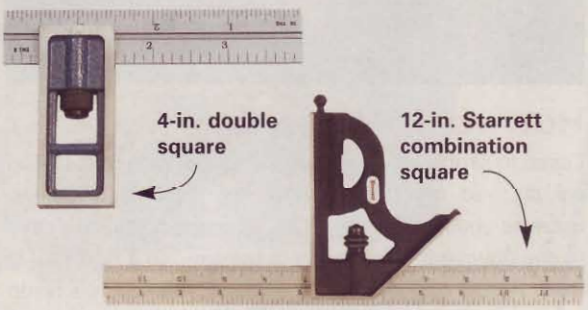


3 **Flip the square** and butt it against the tape. They should match perfectly. A gap at top or bottom shows you twice the amount that the square is in error.

Two First-Rate Squares for Precision Setups

I always set up my machines with one of two kinds of precision squares. For the tablesaw, I pull out my 12-in. Starrett combination for its long stock and adjustable blade.

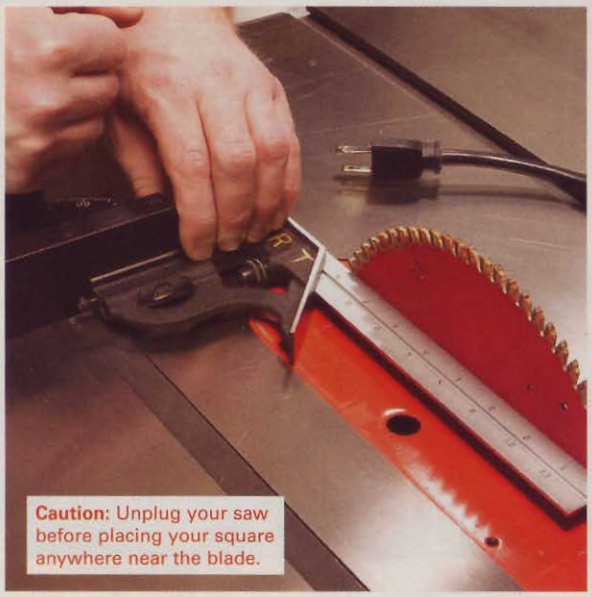
For the bandsaw, jointer and nearly everything else, I turn to a pocket-size 4-in. double square ($30, see Sources, page 38). Its blade slides just like a combination square, so I can use it for layout work, too. A 4-in. machinist's square is a less expensive substitute.




Caution: Unplug your jointer before placing your square anywhere near the blade.

How to Square a Jointer Fence

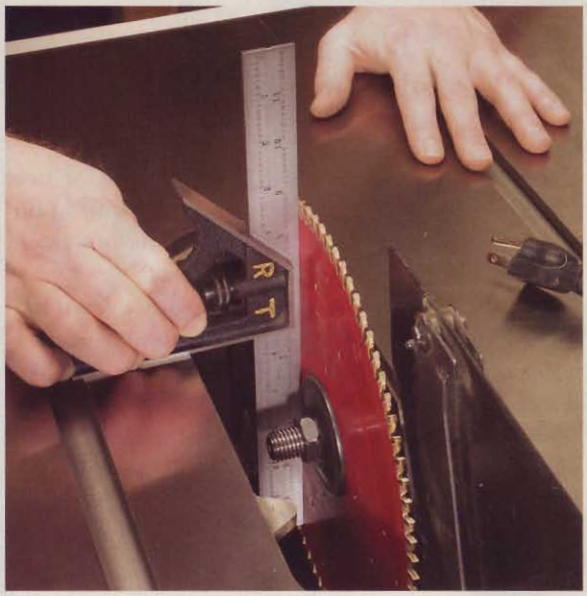
I've never really trusted the 90-degree stop on my jointer's fence. Every time I tighten the lock-down bolt, the fence shifts position. Lots of other jointers have this problem, too. The only solution is to begin with the fence slightly out of square and stop tightening at the point that the fence actually is square.



Caution: Unplug your saw before placing your square anywhere near the blade.

How to Square a Miter Gauge

Do you rely on the positive stops on your miter gauge? I don't. To accurately adjust my gauge, I hold the large square against the gauge's bare face, raise the saw blade full height, place the square's blade between two saw teeth and extend it almost the full width of the saw blade.



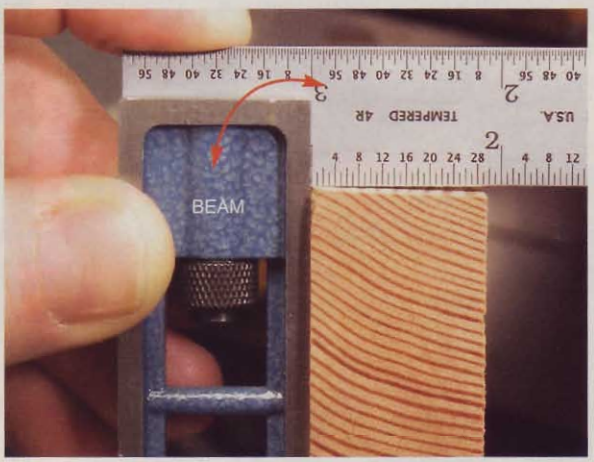
How to Square a Saw Blade

I used to simply stand my square on the table, but a good pal showed me this method. It's twice as accurate, because you're checking twice as much blade. You have to see down into the bowels of the saw, so a flashlight is really handy. As with the miter gauge, the square's blade runs between the saw's teeth.

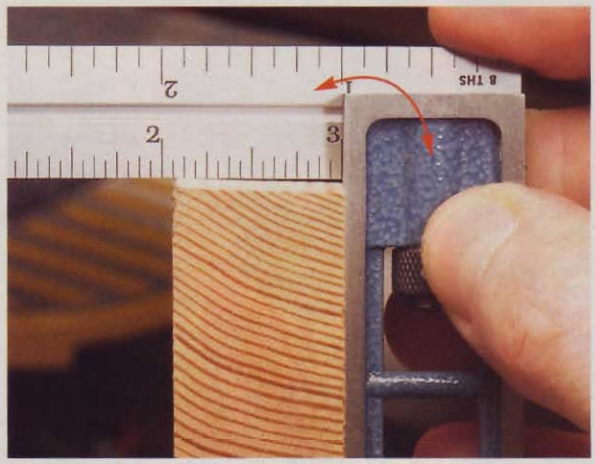
How To Check an Edge for Square

Accurately setting up your machines is only half the battle. The acid test comes when you actually test the boards themselves. I always use my 12-in. square for checking boards that I've crosscut on the tablesaw. For checking a jointed edge, I pull out a smaller square.

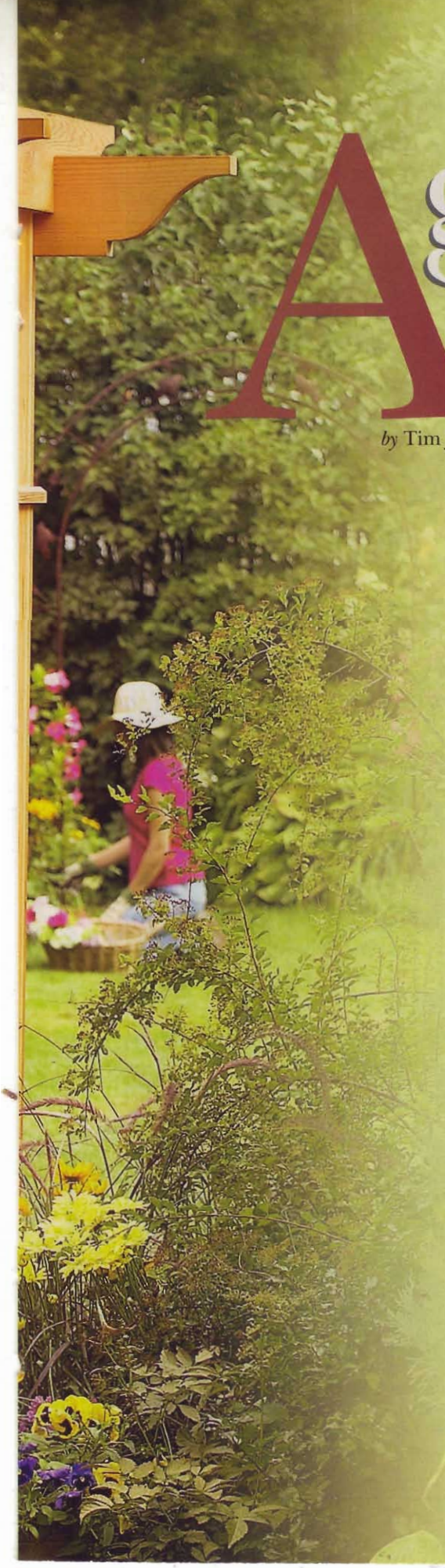
The easiest method is to look for light between the square's blade and a jointed edge. Sometimes this isn't practical, though. It's hard to hold a long or heavy board so that there's a good light source behind the square. I really can't trust what I can barely see, so I rely on a feel test with a small, lightweight square that's easy to balance.



1 **Firmly rest** the square's beam against the board's left face. Lower the blade to the jointed edge. When it contacts the edge, try to rock the square. It should nest perfectly. If it doesn't, you'll know the left side is high.



2 **Rock the square** on the other side of the board. Now, you can tell whether the right side is high. I always check both sides before I'm satisfied that my boards are perfectly square. *AW*



garden ARBOR

by Tim Johnson

An elegant structure with super-strong joinery

Here's a project *that's guaranteed to add* romance to your garden: an inviting gateway that promises beauty and tranquility to all who pass through.

Building this arbor is a big undertaking, because of its complex design and grand scale, but it isn't a difficult project. All the parts go together with simple joinery and basic tools.

The arbor's components are modular. You build them in your workshop and then assemble the arbor on site. The posts will stay straight because they're glued-together hollow boxes. These lightweight posts are much easier to lift and maneuver than solid posts. You'll create sturdy structures with strong joints by stacking and gluing pieces in layers. You'll fashion attractive curves and stylish ogees. Best of all, when you've found the perfect spot, I'll show you step by step how to install your arbor there.

You can build this arbor in No. 3 cedar for about $500. Omitting the gates saves $100. I built the Cadillac version you see here using D-grade cedar, which has very few knots. D-grade cedar is expensive and usually isn't available at home centers. I had to go to a full-service lumberyard to find it, and I spent nearly $1,100.

Knots are common in No. 3 cedar, so using it will make the arbor look more rustic. Knots also make No. 3 cedar harder to work with, so select boards with the fewest knots.

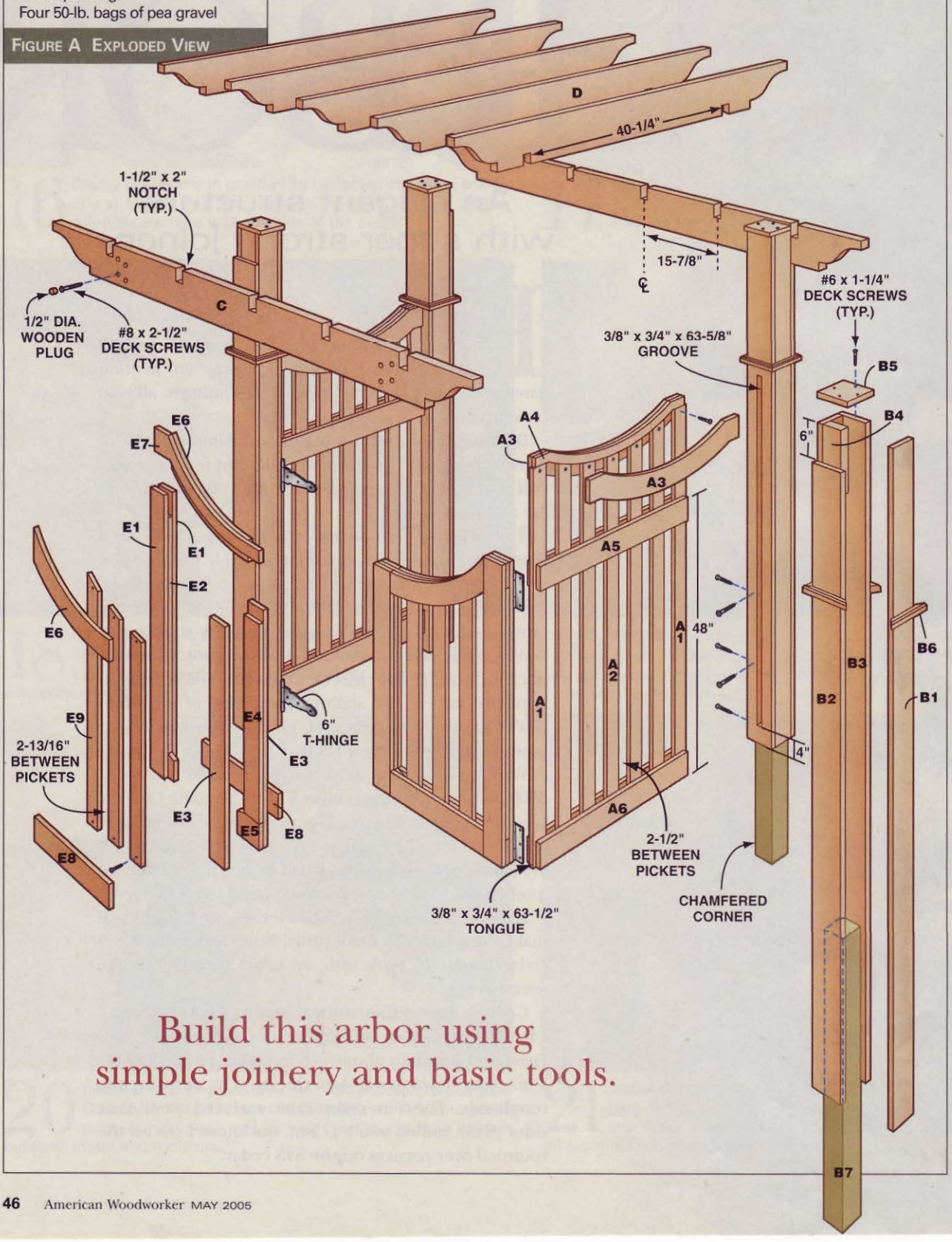
Cedar is sold as dimensional lumber (1x4, 1x6, etc.). I bought rough 1-in. stock. It comes with one side surfaced and is usually about 7/8 in. thick. I milled all my 1-in. cedar down to a 3/4-in. thickness by surfacing the rough side. The 2-in. cedar came surfaced on all four sides (S4S), milled to a 1-1/2-in. thickness. I cut off the rounded-over corners on the S4S cedar.

Project Requirements at a Glance

Materials:
108 ft. of 1x4 cedar
216 ft. of 1x6 cedar
18 ft. of 1x8 cedar
46 ft. of 2x8 cedar
10 ft. of 1x10 cedar
Two 12-ft. 4x4 treated timbers
Waterproof glue
Four 50-lb. bags of pea gravel

Tools:
Bandsaw
Tablesaw
Planer
Jointer
Plunge router with edge guide
3/4-in. straight bit
Jigsaw
Circular saw
Brad nailer
Belt sander
Drill
Six 4-ft.-capacity pipe clamps
Adjustable clamps
Flat 4 x 8-ft. assembly table
2-ft. and 4-ft. levels
Hardware: Four 6-in. T-hinges
Total cost: $1,140

Figure A Exploded View



Build this arbor using simple joinery and basic tools.

ART DIRECTION: DAVID SIMPSON & RICK DUPRE • PHOTOGRAPHY: EXTERIOR PHOTOS, SHAWN NIELSON; INTERIOR PHOTOS, RAMON MORENO • ILLUSTRATION: FRANK ROHRBACH

Build the Side Panels

The side panels (A, Fig. A, page 46) are three-layer sandwiches, with vertical pickets (A1 and A2) held between horizontal rails (A3 through A6). Assembly is easy because the pieces are simply stacked, glued and screwed. The top rail is three layers thick. Its inside rail covers the tops of the pickets to protect the end grain. The other rails are fastened to the outside, so moisture can drain between the pickets. Glue these panels together on a flat surface, so they aren't twisted. Use waterproof glue.

1. Cut all the pieces to width.

2. Cut the rails and the two outer pickets to length, with the ends squarely cut.

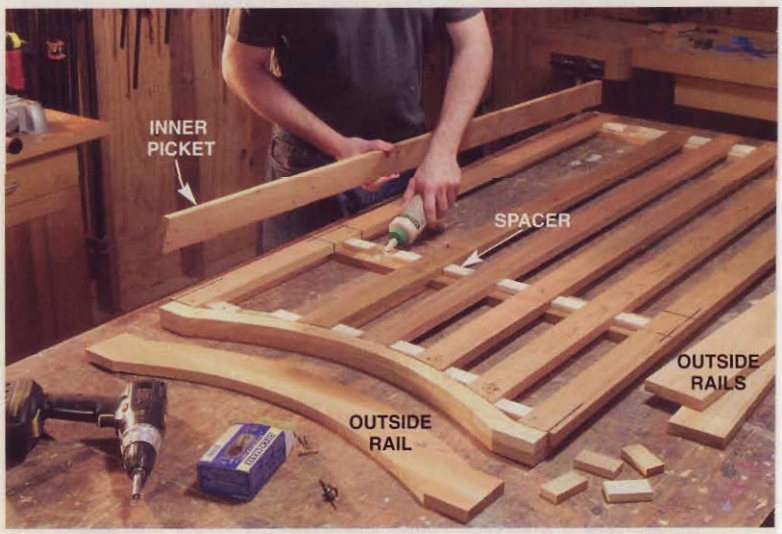
3. Make patterns for the curved profiles in the top rails (Fig. B, below) by swinging arcs on 1/4-in.-thick scrap stock and bandsawing. Use the patterns and reference points A and B to transfer the arcs to the top rail blanks (A3 and A4). Then saw out the rails.

4. Glue and screw the inside top rail to one of the outside rails. Make sure the ends align and the glue joint is tight. Remove any squeezed-out glue.

5. Tack the frame together (Photo 1). The two outer pickets protrude beyond the rails by 3/8 in. to form tongues (Detail 1, page 53). Draw layout lines on these pickets to indicate the ends of the rails. Lay the pickets on the top and bottom rails. Butt the pickets against the inside top rail and align the other ends with the bottom edge of the bottom rail. Apply glue and tack the corners.

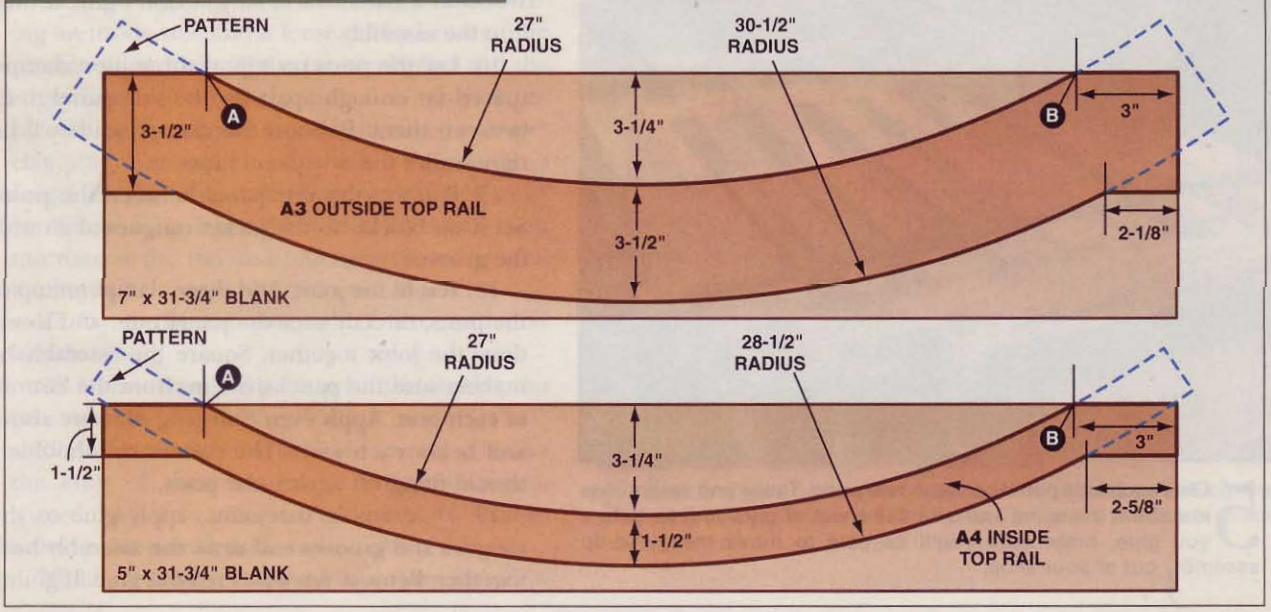
6. Square the frame and then screw it together with 1-1/4-in. deck screws. Drill countersunk pilot holes first, so the screws don't split the wood. Work fast, so you finish before the glue sets up.

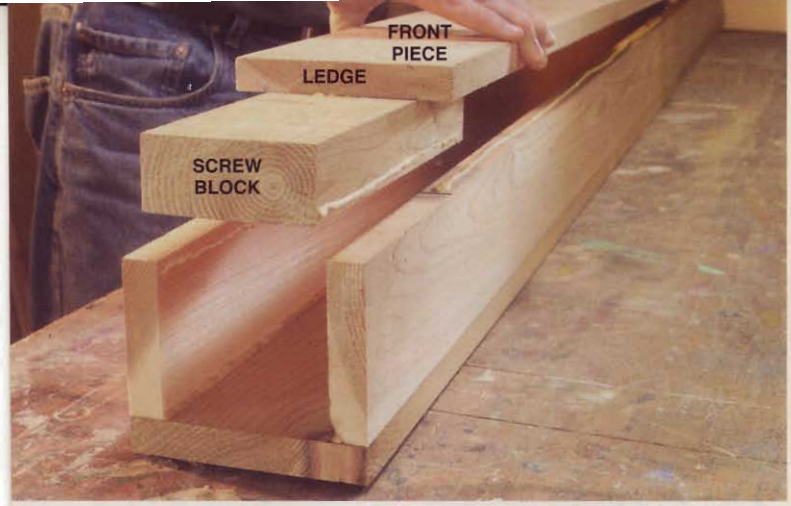
1 **The side panels** are layered like a sandwich. Lay the outer pickets in position on top of the rails to make the frame. Apply glue and tack the pieces together with a pin nail in each corner. Square the frame by adjusting it until both diagonal measurements are the same. Then screw the stiles to the rails.



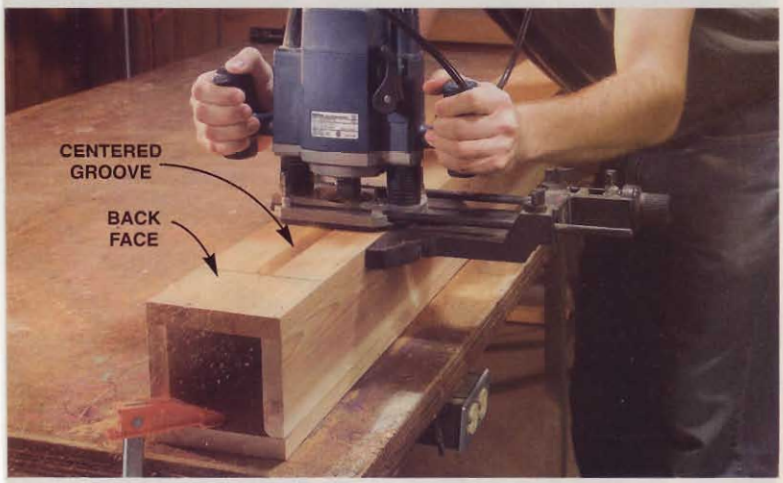
2 **Position the inner pickets,** using spacers, and then fasten them with glue and screws through predrilled holes. Remove the spacers and complete the side panel by gluing and clamping the outside rails.

Figure B Layout for Side Panel Top Rails





3 **The posts** are built as hollow boxes. They weigh a lot less than solid timbers and are more stable. The front piece is shorter, creating a ledge to support the arbor's horizontal beams. The attached screw block anchors the beam's mounting screws.



4 **Rout a groove** on each post's back face, sized to fit the protruding pickets on the side panels. Tongue-and-groove joints secure the side panels to the posts.

5 **Glue each side panel** between two posts. These end assemblies are about the same size as a 4x8 sheet of plywood, so before you glue, make sure you'll be able to move the glued-up assembly out of your shop.

7. Use your layout lines to attach one middle rail to the bottom side of the frame. Make sure its ends align with the top and bottom rails.

8. Install the inner pickets, using 2-1/2-in.-wide spacers (Photo 2). Cut the pickets to length as you go. Fasten them with glue and screws in predrilled holes.

9. Glue and clamp the remaining top, middle and bottom outside rails. Make sure the ends align.

10. Smooth the curve on the top rails using a belt sander or a sanding drum chucked in a drill.

Build the Posts

The posts (B) are hollow, made from four pieces that are simply butted, glued and clamped (Photo 3).

11. Cut the post pieces (B1 through B3) to width and length. The sides are narrower, so butting them between the front and back pieces creates a square post.

12. Glue and clamp the sides to the back piece. Remove any squeezed-out glue.

13. Glue and screw a block (B4) to the back side of the front piece.

14. Glue and clamp the front piece to complete the post; make sure the bottom edges are flush. Remove any squeezed-out glue.

15. Rout a stopped groove in the back of each post, centered and sized to fit the side panel's picket tongues (Photo 4). Square the bottom end of each groove 4 in. from the post's bottom edge.

Glue Up the End Assemblies

Each side panel mounts between two posts with tongue-and-groove joints (Photo 5). These end assemblies are large, so enlist a friend to help. Work on a flat surface, so you don't glue a twist into the assembly.

16. Lay the posts on top of three pipe clamps, spaced far enough apart for the side panel to fit between them. Position the clamps so they'll be right under the side panel rails.

17. Position the side panel between the posts. Set it on blocks, so the picket tongues align with the grooves.

18. Test-fit the joint. Add three clamps on top of the posts, directly over the panel rails, and slowly draw the joint together. Square the assembly by making sure the panel sits 4 in. from the bottom of each post. Apply even clamping pressure above and below each joint. The panel's rail shoulders should fit tightly against the posts.

19. Disassemble the joints, apply glue to the tongues and grooves and draw the assembly back together. Remove any squeezed-out glue. If gluing

both tongue-and-groove joints at once is too nerve-wracking, glue one joint at a time.

Make the Beams and Rafters

The beams and rafters (C and D) lock together with half-lap joints. The notches have to be located precisely, so the assembled beams and rafters will fit properly around the posts at the top of the arbor.

20. Cut the beams and rafters to width and length.

21. Clamp the two beams together and lay out the two outer notches (Detail 2, page 53). Make sure the ends of the beams are flush. Otherwise, the notches won't line up correctly. Lay out the inner notches. They're evenly spaced between the outer notches.

22. Cut the notches using a circular saw, with the blade set to cut to the bottom of the notch (Photo 6). Use a chisel to clear the waste and smooth the bottom of the notches (Photo 7).

23. Gang the five rafters together and cut the notches in them the same way. The rafters have only two notches; they're 40-1/4 in. apart.

24. Make a pattern (Detail 2) and mark the ogee profiles on the beams and rafters. On the beams, the notches are at the top; on the rafters, the notches go at the bottom. Saw out the profiles (Photo 8).

Build the Gates

The gates (E) are layered, just like the side panels, but they go together differently and feature robust mortise-and-tenon joints.

25. Cut the hinge and latch stile components (E1 through E4) to length and width. Cut the loose tenons (E5) to size, too. The last 1-1/2 in. of their top edges slope 1 in. to shed moisture.

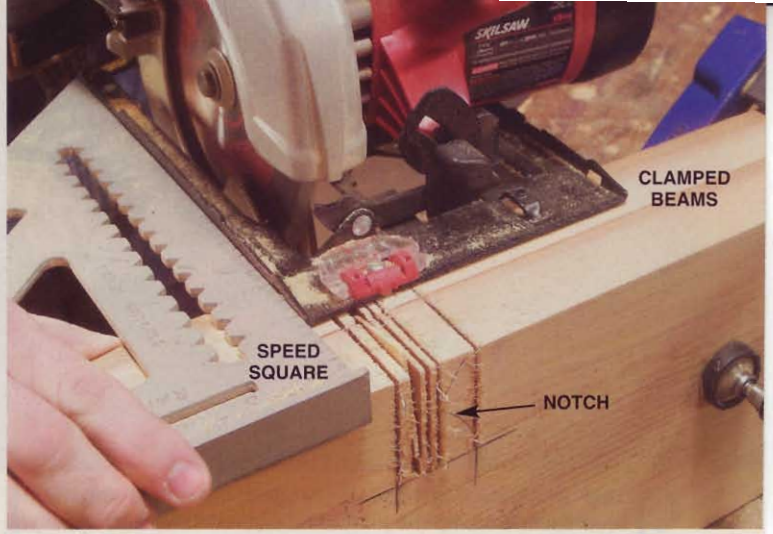
26. Glue the hinge and latch stiles by sandwiching an inside stile and a loose tenon between the outside stiles. Keep all the pieces aligned and the edges flush when you clamp. It helps to tack the pieces in place as you stack them together. After clamping, remove the squeezed-out glue—don't forget the bottom of the mortises. After gluing, you'll have three-layer stiles with flush edges, open mortises at the top and tenons protruding from the bottom.

27. Cut the bottom gate rails (E8) to width and length.

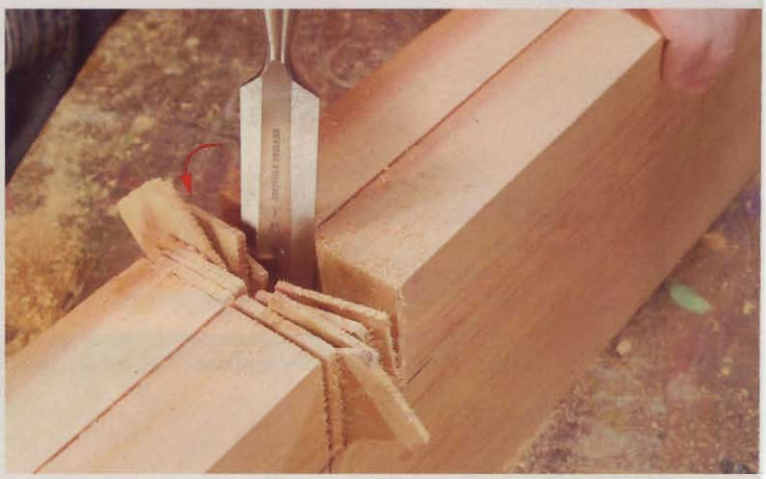
28. Make an arched pattern for the outside top gate rails (E6, Fig. C, page 50).

29. Cut blanks for the outside top gate rails. Cut the ends of these blanks at 70-degree angles, spaced 18-3/4 in. These angled top rail blanks must be the same length as the bottom rails.

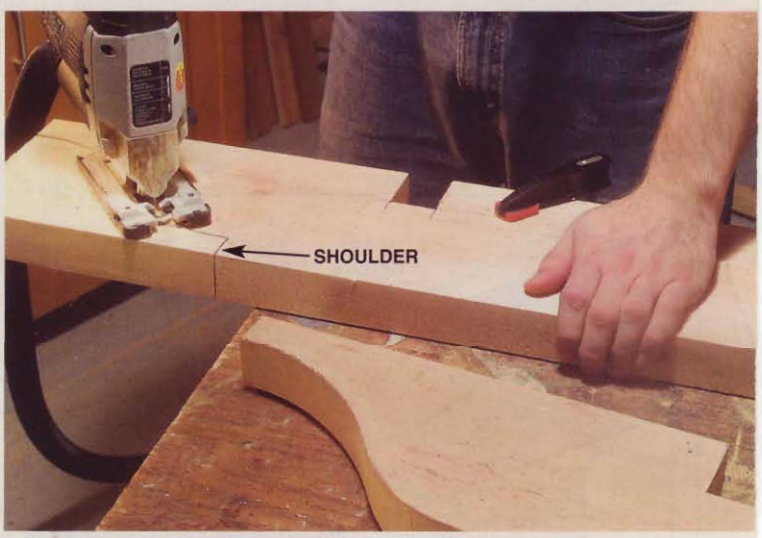
30. Use reference points A and B on Fig. C to



6 **Cut notches** in the beams and rafters. Clamping the pieces together allows you to cut perfectly aligned notches. Use a speed square to make straight cuts. Establish the shoulders first. Then make cuts in the middle until only thin pieces remain.



7 **Clear the waste** by twisting a chisel against the thin pieces. These pieces break out easily because of their short grain. After you've removed the waste, clean up the bottoms of the notches with your chisel.

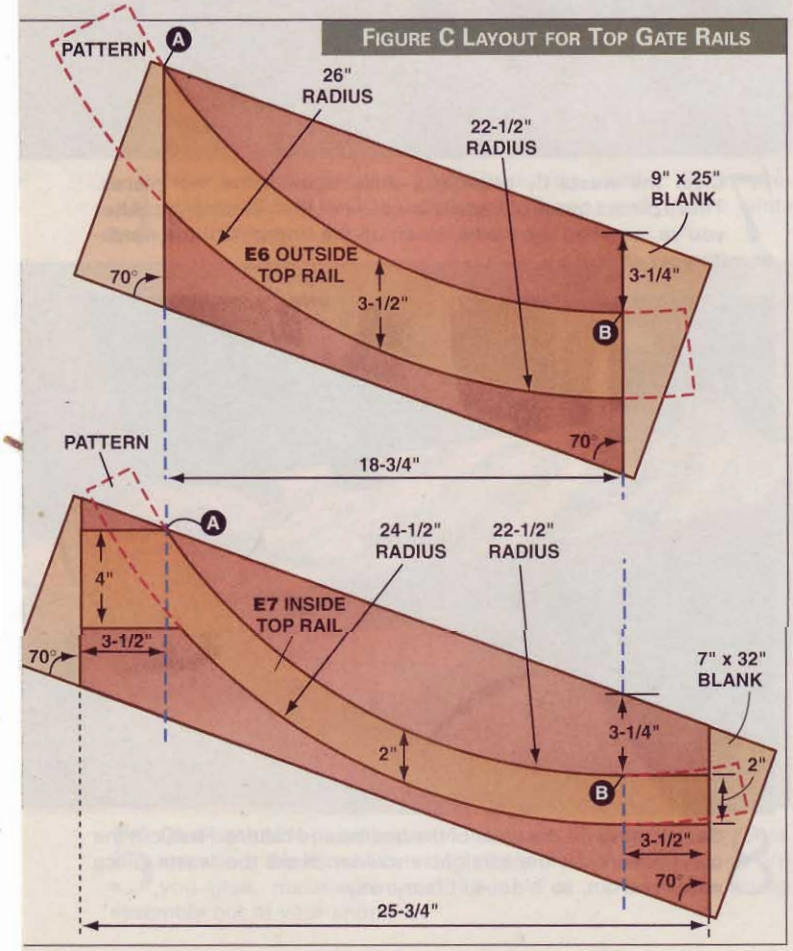


8 **Saw profiles** on the ends of the beams and rafters. First, cut the curve. Then cut the straight shoulder. Hold the waste piece while you cut, so it doesn't tear away.

9 **Glue the gate** together. Apply glue, assemble the frame, square it and clamp the joints. The layered stiles and upper rail are glued together prior to assembly. After you install the pickets, glue and clamp the remaining top and bottom rails.

10 **Anchor the arbor** with treated 4x4s fastened inside the posts. This construction method assures long life, because treated lumber lasts much longer underground than cedar.

FIGURE C LAYOUT FOR TOP GATE RAILS



position your pattern on the blank. Transfer the arches and cut out the rail.

31. Make an arched pattern and cut the blank for the inside top gate rail (E7, Fig. C, below). This rail extends beyond the outside top rails to create the tenons. Cut the ends of this blank at 70 degrees, spaced 25-3/4 in. This rail is as long as the gate is wide.

32. Use reference points A and B on Fig. C to position your pattern and transfer the arches. Establish the two tenons by extending lines at 90-degree angles from the edges. Cut out the inside top rail.

33. Glue the inside top rail to one of the outside rails.

34. Glue the gate frames together (Photo 9). Clamp one bottom rail between the stiles, under the protruding tenons. Apply glue inside the mortises at the top of the stiles and to the tenons on the two-layer top rail. Install the top rail. Make sure the gate is square. Clamp the mortise-and-tenon joints at the top and glue and screw the tenons to the bottom rail.

35. Install the pickets (E9), using spacers, and fasten them with glue and screws. Then glue and clamp the remaining top and bottom rails.

36. Seal the exposed end grain on the tops of the gates with epoxy or thinned waterproof glue.

INSTALL THE ARBOR

37. Install the anchor posts (Photo 10). Treated timbers are never straight. So that they'll seat flush inside the hollow posts, joint adjacent faces of each 4x4 to create a flat, square corner. Rout a clearance chamfer to avoid hardened glue inside the post. Slide the 4x4 halfway into the hollow post, leaving 36 in. exposed, and fasten it to the inside corner with 2-1/2-in. deck screws on both sides (Detail 3, page 53). For longest life, orient the 4x4s so the "factory" ends go in the ground and the ends you've sawn go inside the posts.

38. Determine the arbor's position in your garden and dig 8-in.-dia. x 40-in.-deep holes for the posts. First, drive a stake to mark the center of each hole. Establish the holes by spading down about 6 in. on all four sides of the stake. Then go to town with a post-hole digger. Using a level, determine the ground's slope and mark the hole that sits at the highest grade.

39. Install the first end assembly (Photo 11). Plumb the post that goes in the hole at the highest grade (Photo 12). Starting with this post assures that all four posts will be above grade. When the first post is staked in position, level the assembly front to back (Photo 13). Then plumb the second post.

40. Use this staked assembly to install the other end assembly level, plumb and square (Photos 14 and 15).

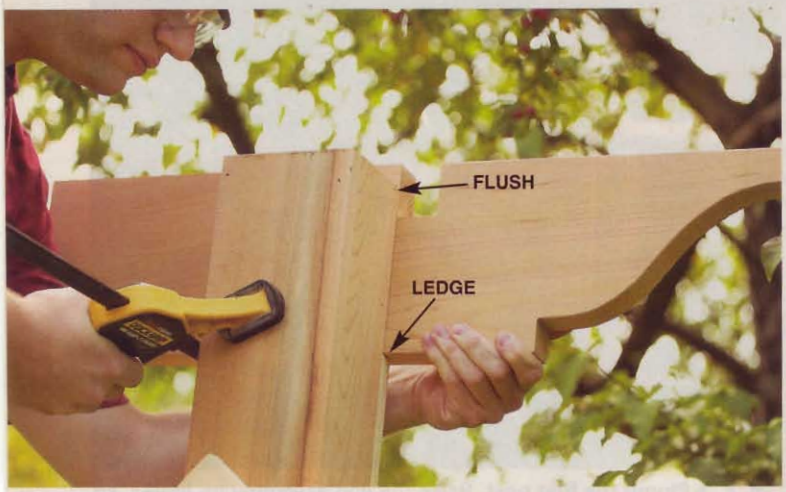
11 **Slip one end assembly** into the holes you've dug. Even though this assembly is huge, it's easy to maneuver, because it doesn't weigh much and isn't top-heavy.

13 **Level the assembly** with shims. Then plumb the second post and stake it in position, using a second diagonal brace. With this end assembly plum, level and staked, you're ready to install the other one.

14 **Install** the second end assembly on blocks and level it with the first, side to side and front to back. You'll need two levels, a pair of long, straight boards and more shims.

12 **Plumb the first post.** Raise the end assembly on blocks, so the bottom edges of the cedar rest a couple inches above the ground. Stake the post in position, using a level and a diagonal brace.

15 **Plumb** the second end assembly by fastening it to the first with braces top and bottom, each cut to match the arbor's width. Measure the diagonals and make adjustments until the base is square. Then install a diagonal brace to keep it there.



16 **Clamp the beams** in position by replacing the upper braces one at a time. Rest the beam on the posts' built-in ledges. Align the notches with the side of the posts.

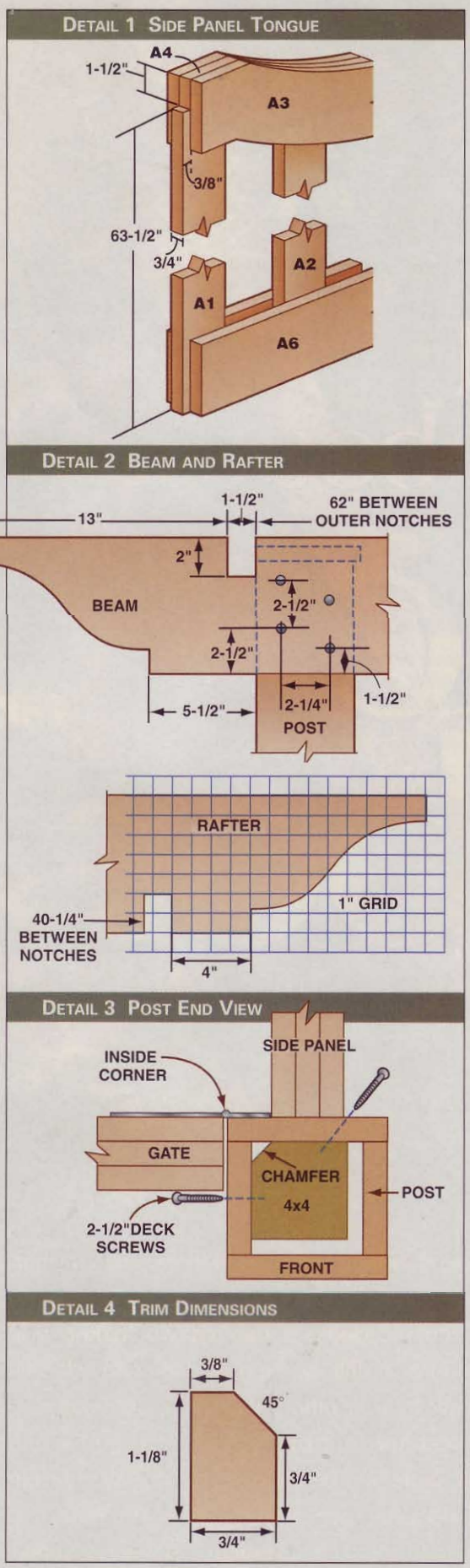
17 **Install the outside rafters.** Supported by the half-lap joints, they nest against the sides of the posts. Install the inside rafters last.

18 **Cap the posts** to cover the end grain. Form a weather-tight seal with silicone caulk. Fasten the caps with screws. Left unprotected, end grain wicks moisture, which accelerates decay.

19 **Fill the post holes** with pea gravel. It's much easier to use than concrete and less messy. Tamp the gravel around the posts to securely anchor the structure.

20 **Install trim** with galvanized pin nails and waterproof glue. Countersink the nails and fill the holes with exterior-grade putty, so you don't end up with black stains from contact between metal and moisture.

21 **Install the gates.** Clamp them flush with the back faces of the posts, using shims at all four hinge locations to establish even gaps all around. Then screw on the hinges.



41. Install the beams and rafters (Photos 16 and 17). Fasten them to the posts with screws and plugs.

42. Screw on the post caps after sealing the joints with silicone caulk (B5, Photo 18).

43. Fill and tamp the post holes (Photo 19).

44. Make and install the post trim (Photo 20).

45. Install the gates (Photo 21). Make sure the gap between the gates is large enough, at least 1/4-in., so they swing freely. Install a latch to close the gates. I used a large hook and eye screw combination mounted on the back of the gates for appearance. To hold the gates open, I installed a second hook to one side panel and a second eye screw to the other.

46. If you want to maintain the look of the fresh cedar, apply a finish. I used Penofin's Western Red Cedar exterior stain. You should plan to recoat any exterior finish biennially. Without finish, the cedar will weather to gray within one or two seasons. AW

CUTTING LIST — Overall Dimensions: 91"W x 69-1/4"D x 96"H *(footprint: 41-3/4" x 62")*

Part	Name	Number	Stock	Final dimension
A	Side panel	2		2-1/4" x 32-1/2" x 65"
A1	Outer pickets	4	1x4	3/4" x 2-1/2" x 63-1/2"
A2	Inner pickets	10	1x4	3/4" x 2-1/2" x 63"*
A3	Outside top rail	4	1x8	3/4" x 6-3/4" x 31-3/4"
A4	Inside top rail	2	1x6	3/4" x 4-3/4" x 31-3/4"
A5	Middle rail	4	1x6	3/4" x 3-1/2" x 31-3/4"
A6	Bottom rail	4	1x6	3/4" x 4" x 31-3/4"
B	Post	4		5" x 5" x 92"
B1	Side	8	1x6	3/4" x 3-1/2" x 92"
B2	Front	4	1x6	3/4" x 5" x 86"
B3	Back	4	1x6	3/4" x 5" x 92"
B4	Screw block	4	2x8	1-1/2" x 3-1/2" x 10"
B5	Cap	4	1x6	3/4" x 4-1/2" x 5-1/4"
B6	Trim	16	1x4	3/4" x 1-1/8" x 6-1/2"
B7	Anchor	4	4x4**	3-1/4" x 3-1/4" x 72"
C	Beam	2	2x8	1-1/2" x 7" x 91"
D	Rafter	5	2x8	1-1/2" x 7" x 69-1/4"
E	Gate	2		2-1/4" x 25-3/4" x 48"
E1	Outside hinge stile	4	1x6	3/4" x 3-1/2" x 48"
E2	Inside hinge stile	2	1x6	3/4" x 3-1/2" x 40"
E3	Outside latch stile	4	1x6	3/4" x 3-1/2" x 38"
E4	Inside latch stile	2	1x6	3/4" x 3-1/2" x 32"
E5	Loose tenon	4	1x6	3/4" x 4" x 5"
E6	Outside top gate rail	4	1x10	3/4" x 8" x 18-3/4"
E7	Inside top gate rail	2	1x8	3/4" x 7" x 25-3/4"
E8	Bottom gate rail	4	1x6	3/4" x 4" x 18-3/4"
E9	Gate pickets	6	1x4	3/4" x 2-1/2" x 42"*

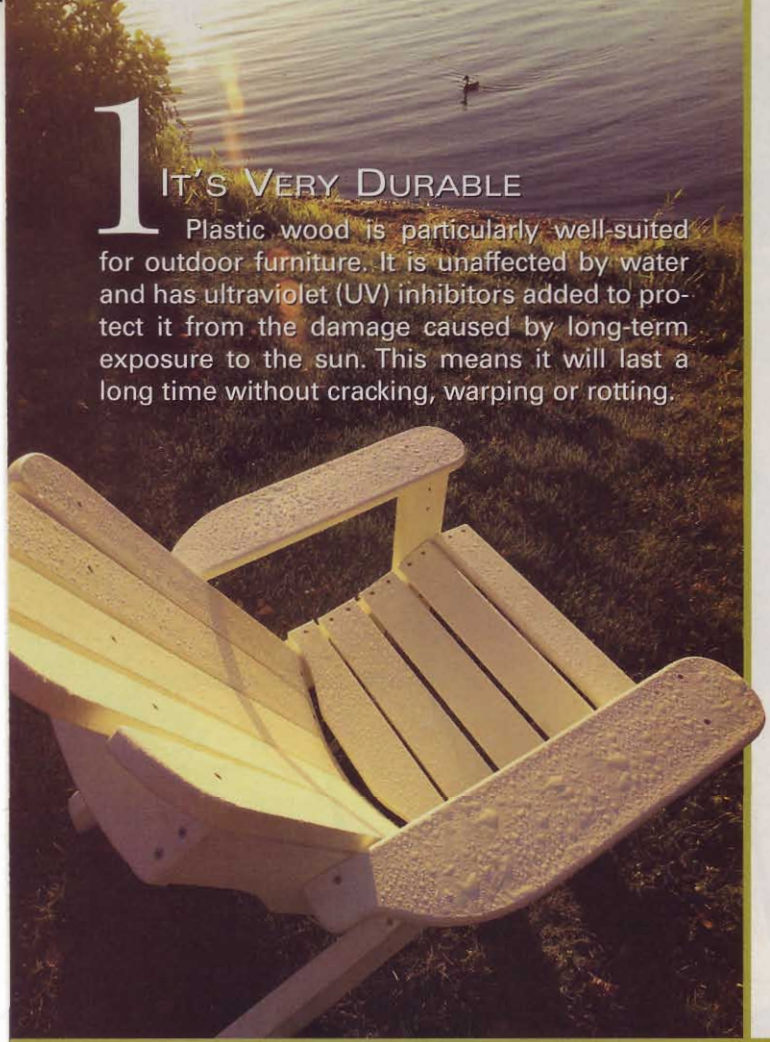
**cut to length **treated*

10 things you need to know about Plastic Lumber

by Brad Holden

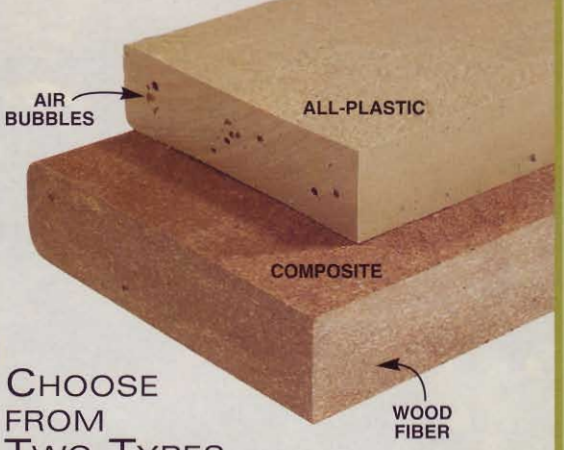
No, we haven't changed our name to *American Plasticworker.* I love wood, with all its beautiful textures, figures and smells. But I also enjoy experimenting with different materials. So I decided to try some of the plastic lumber available at my local home center. It costs $3 to $6 per bd. ft.—considerably more expensive than treated pine, which costs about $2 per bd. ft. at my lumberyard. Plastic wood also holds little of the beauty and romance of real wood, but its big advantages are durability and the fact that it requires no finishing and little maintenance other than an occasional rinse with the garden hose. I also like the idea that many brands are made from recycled materials that would otherwise end up in a landfill. Some manufacturers sell only the plastic boards; others also sell plastic wood furniture and furniture kits (see Chart, page 59, and Source, page 60). Of course, you can also design and build your own plastic lumber furniture, but you need to consider several things when you do.

EDITOR: RANDY JOHNSON • ART DIRECTION: KERN JOHNSON • PHOTOGRAPHY: EXTERIOR PHOTOS, BILL ZUEHLKE; OTHERS, PATRICK HUNTER



1 It's Very Durable

Plastic wood is particularly well-suited for outdoor furniture. It is unaffected by water and has ultraviolet (UV) inhibitors added to protect it from the damage caused by long-term exposure to the sun. This means it will last a long time without cracking, warping or rotting.



2 Choose From Two Types

Two primary types of plastic lumber are available. One is all plastic. The other is a composite made of plastic and wood fiber. Some of the plastic that goes into this lumber is new, but most comes from recycled milk jugs, pop bottles, grocery bags and similar waste plastic. The manufacturers of the composite-plastic lumber add ground-up waste wood. This makes the lumber stiffer than the all-plastic type.

You may find flecks of other colored plastic on the inside of some all-plastic boards. This is due to the recycled nature of the material. Also, when you cut the all-plastic material, you will notice air bubbles of varying sizes in the core of some boards. One board may have no bubbles, but another may have many.

3 Lots of Colors and Sizes Are Available

Plastic lumber comes in a wide assortment of colors and sizes. The selection varies among brands (see Chart, page 59). Composite plastic lumber comes mainly in subdued earth tones; the all-plastic products come in a range of bold colors. Both types offer sizes comparable to construction lumber. You will find, for example, 1x, 2x and 5/4 boards, even 4x4 and 6x6 posts. Most manufacturers offer lengths up to 16 ft. And 4 x 8-ft. sheet stock is also available in 1/4-in. or greater thicknesses.

4 Caution: It Can Sag

All-plastic lumber bends easily under weight. The wood fibers make the composite-plastic lumber stiffer, but not as stiff as the real stuff. Adequate support is important when you're building with all-plastic or composite lumber. Most manufacturers recommend 16 in. as the maximum span for 5/4-thick material when you use it as decking material. Because of its flexibility, plastic lumber should never be used in a structural application, such as joists or a supporting wall. High summer temperatures can also cause sagging. When using plastic lumber to build outdoor furniture, you should plan to beef up your design to avoid flexing or sagging; you may have to experiment a bit.

5 It's Heavy

At 4 to 5 lbs. per bd. ft., plastic wood is heavier than oak. Here are some numbers for comparison:

Cedar	1.5 lbs./bd. ft.
Pine	2 lbs./bd. ft.
Treated pine	3 lbs./bd. ft.
Oak	3.8 lbs./bd. ft.
All-plastic lumber	4 lbs./bd. ft.
Composite-plastic lumber	5.3 lbs./bd. ft.

6 Texture Provides Traction

The majority of plastic lumber is manufactured with some kind of texture on at least one side. Some types have wood grain; others have a random pattern. These textures offer visual appeal and provide traction for decking use. A number of the manufacturers make a board that has a "flip side," with wood grain on one side and a smoother pattern on the other. These textures are only on the surface, so if you don't like either face, you can plane them off. I find this a big plus when building furniture. It gives you design options: textured, smooth or planed.

An Adirondack chair made from recycled plastic lumber keeps approximately 400 milk jugs from going into a landfill.

7 It's Fun To Bend

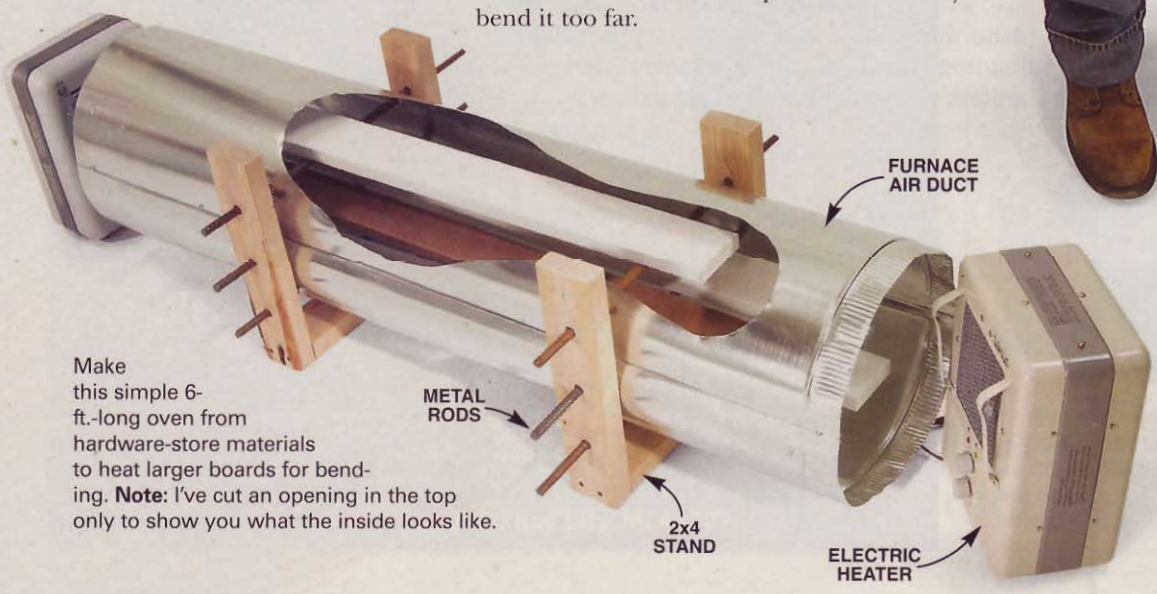
I had a lot of fun bending plastic lumber. The all-plastic material in particular is unbelievably bendable when heated. Because of this, it works very well for decorative projects, such as a garden trellis (see photo, below left).

One really cool method is to use a heat gun on the all-plastic stuff and bend or twist it as you would wrought iron. Using a form, you can create some pretty intricate shapes. Obviously, the smaller the stock, the sharper the bend you can make. You have to thoroughly heat the material until the surface starts to bubble slightly and look almost liquid for it to become really pliable. Also, leave the bent piece in the form until it has completely cooled or it will spring back. This heat gun technique doesn't work on the composite lumber, though, because the wood fiber starts to burn before the part becomes bendable.

Bending thin strips of plastic lumber is very easy. With a heat gun, a bending jig and a little creativity, you can open up a world of possibilities.

To bend larger boards (photo at right), you can make an inexpensive heating oven (see bottom photo). The plastic lumber needs to be heated to 125 degrees to its core, which can take an hour or two. You can then bend the board around a form until it's cool. Plastic lumber will spring back when you take it off the form, so you should do some experimenting first and bend it to a tighter radius than you want. The composite lumber is not as bendable as the all-plastic lumber and will break like particleboard if you bend it too far.

This bent 1x4 all-plastic board was heated in the oven, bent by hand around a form and then clamped in place to cool. It sprang back about 50 percent when I took it out of the form.



Make this simple 6-ft.-long oven from hardware-store materials to heat larger boards for bending. **Note:** I've cut an opening in the top only to show you what the inside looks like.

8 Where To Buy It

Brand	Board sizes	Colors available	Flip-side texture	Kits	Contact
All-plastic lumber					
American Ecoboard	5/4, 2x, 3x, 4x, 6x	8	Yes	Yes	(540) 667-5191, www.americanecoboard.com
Foreverdeck	Many	12+	Yes	Yes	(610) 277-3900, www.plasticlumberyard.com
PlasticLumber	1x, 2x, 3x, 4x	14	Yes	Yes	(330) 762-8989, www.plasticlumber.com
Select Lumber	5/4 to 10x10	11	No	Yes	(800) 721-9037, www.plasticboards.com
Taylor's	Many	10	No	Yes	(877) 939-6072, www.taylorsplasticlumber.com
Composite lumber					
Evergrain	1x, 2x	4	No	No	(800) 405-0546, www.evergrain.com
Timbertech	5/4, 2x	3	Yes	No	(800) 307-7780, www.timbertech.com
Trex	1x to 4x6	5	Yes	No	(800) 289-8739, www.trex.com
Veranda	5/4x6, 2x2	3	Yes	No	(608) 326-0900, www.verandadeck.com
Weatherbest	5/4, 2x	3	Yes	Yes	(888) 820-0325, www.weatherbest.com

9 Work It as Easily as Wood

You can plane it, saw it—you name it. Plastic lumber can be cut and shaped using ordinary woodworking tools. I tried some common hand tools—hand planes, chisels, saws—and found little difference from using them on wood. OK, hand-planing a piece of plastic does seem inherently weird, but it works quite well and there's no grain direction to worry about. Using hand tools on the composite lumber was slightly more difficult than using them on all-plastic pieces.

Plastic lumber machines great with power tools. It's just as easy as wood! Power tools zip right through it. When routing, you will get clean, crisp edges and no splintering. It's comparable to working with pine or poplar. It is more abrasive than wood, though, so use carbide tools. I found dust collection to be very important. It's needed not only to collect the dust but also the plastic shavings, which tend to pick up a static charge and stick to everything, including clothes. To get all the shavings off, I had to vacuum my clothes.

Screwing and bolting are the preferred fastening methods. Gluing is generally not recommended, because no available glues stick very well to this type of plastic. I had some success with epoxy, but the test joints I tried still broke more easily than a similar wood joint. Epoxy might be useful in some situations, but you should still secure the joint with screws or bolts if it will be exposed to any stress. Screws can be driven without predrilling, but the material tends to pucker around the head and may crack when screwed near the edge. Predrilling and countersinking remove the risk of cracking and will produce a cleaner look around the head. Stainless steel or coated deck screws are the best choices for outdoor use.

10 It's Great for the Patio

This bench may not end up in an art museum, but it'll be great on the patio by the barbecue. All the parts are composite-plastic lumber. I beefed up the design by using all 5/4 materials and adding the center leg for extra support.

I avoided visible fasteners on the top and apron by pocket-screwing from underneath. AW

Source
Taylor's Recycled Plastic Products Inc.
(877) 939-6072
www.taylorsplasticlumber.com
White Adironack chair (shown on page 55), $185.

CYPRESS CHEST

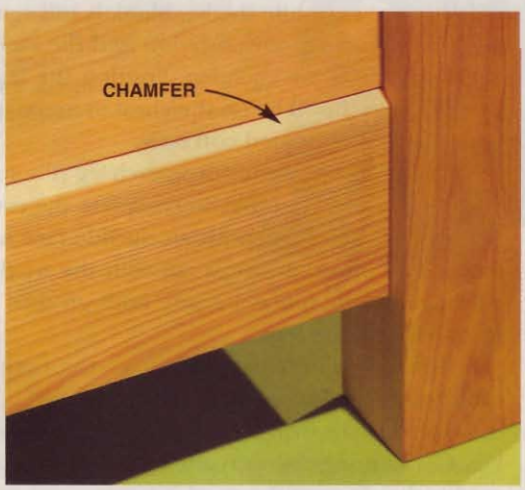
by Dave Munkittrick

ART DIRECTION: RICK DUPRE • PHOTOGRAPHY: PAGES 62–63, RAMON MORENO; OTHERS, PATRICK HUNTER • ILLUSTRATION: FRANK ROHRBACH

Built To Last In the Great Outdoors

I designed this chest to keep out both the elements and unwelcome animals.

The top sheds rainfall because the lid has a broad overhang and its hinge creates a gentle slope.



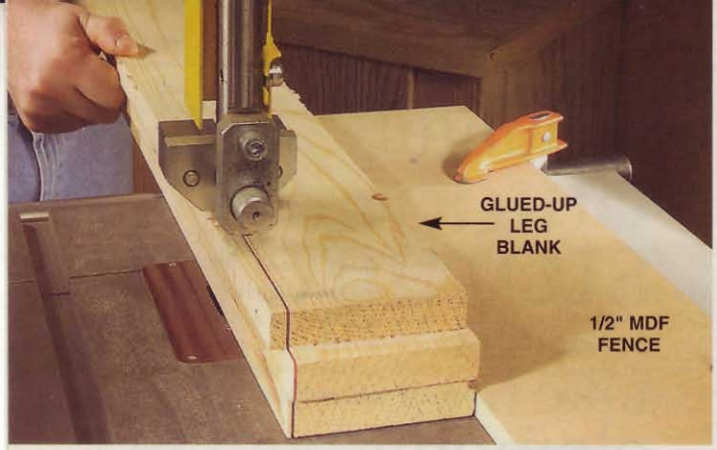
A chamfered bottom rail prevents rainwater from pooling and eventually causing decay.

A deck-like bottom with gaps between the boards allows air to circulate to prevent mold or mildew. A galvanized metal screen called hardware cloth is mounted under the decking to keep unwanted critters out.

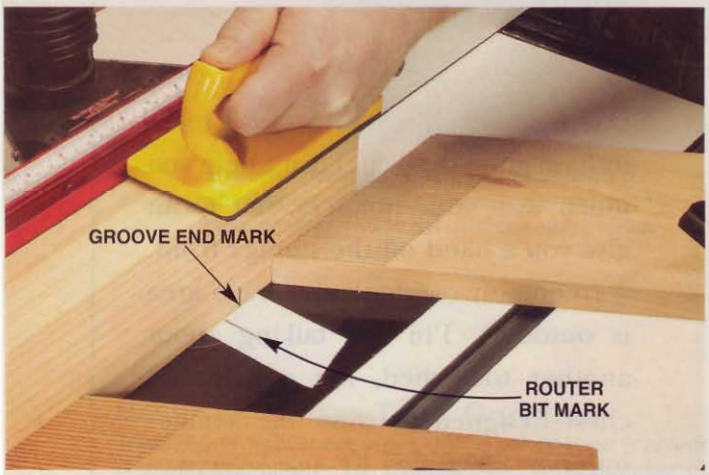
beautiful outdoor storage made to take the elements

Storage is like money; we never seem to have enough. Well, I can't help you much with your finances, but I can give you a hand on the storage front. A frequently overlooked storage area is outdoors. I'm not talking about another tool shed, but a beautiful chest designed to store the smaller outdoor amenities we use everyday, such as cushions for deck furniture, pool toys or even gardening supplies. This elegant chest is a real eye-catcher with ample storage designed to keep the contents dry and clean.

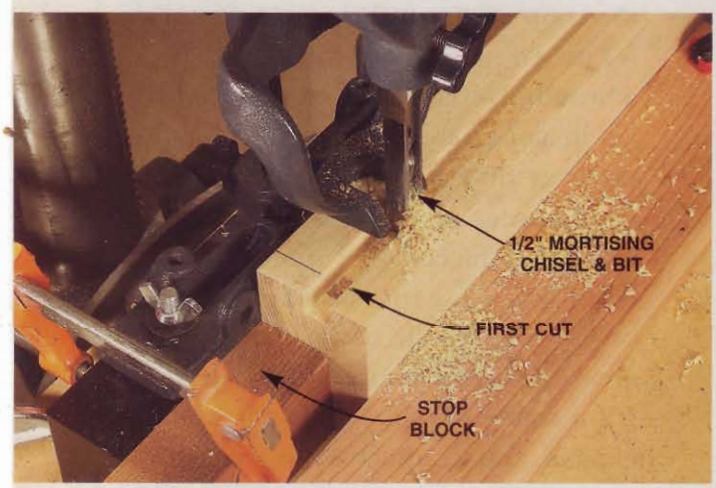
I used cypress to build this chest. It's a beautiful, cream-colored wood similar in appearance to a light-colored cedar or fir. Cypress is about 50 percent harder than clear cedar but about half the cost (see Sources, page 68). Cypress is a rot-resistant member of the pine family native to swampy areas in the Southern United States. It's a stable wood, meaning it won't expand and contract a lot with the seasons. Cypress also machines well and takes any finish.



1 This entire project, even its stout legs, is built with rot-resistant cypress, a lightweight, weatherproof wood. To make the leg blanks, glue three pieces together and cut the stack on the bandsaw. Guide the cut with a 1/2-in.-tall fence that will contact only the bottom board.



2 Rout stopped grooves on the legs to house the panels and the rail's tenons. The grooves are too long to use a stop block. Instead, mark where the groove ends on the edge of the leg. Make another mark on the router table across from the front of the bit. When the two marks meet, stop the router and remove the leg.



3 Cut the mortises on the drill press with a mortising attachment and a 1/2-in. chisel and bit. The groove guides the chisel so you don't get slightly staggered holes. A stop block ensures each mortise is the same distance from the end.

Build the Legs and Rails

If your lumber is kiln-dried and your chest will be kept outdoors, I recommend stacking your lumber in a covered area outside for several weeks before you build. Kiln-dried cypress will have around 8 percent moisture content; you can expect it to stabilize around 12 percent after it's been outside.

1. Sort your wood and select the best-looking pieces for the lid (A) and front panel (B). Rough-cut your stock according to the Cutting List (see page 68), but leave everything oversize by at least 1/2-in. in length. Parts made from glued-up stock (G through L) should initially be cut an extra 1/2 in. wide.

2. Use a waterproof glue, like Titebond III, to face-glue three pieces of 3/4-in. stock for each leg (G). Glue up two pieces for the rail stock (H through L). Make an extra leg blank and an extra rail to test setups. Mark the best-looking face on each piece.

3. Trim the leg blanks to size after the glue has dried (Photo 1). Don't cut the tapers yet. The grooves and mortises are cut while the leg blank is still square.

4. Lay out the groove location and the taper (Figs. B and C, page 66) on each leg. Position the legs on your bench just as they'll be on the chest to make sure you've got everything oriented correctly.

5. Cut the stopped grooves on each leg (Photo 2; Fig. B). It takes two fence settings to complete the two grooves. The first groove is cut with an outside face against the fence. The other groove is cut with the newly grooved edge against the fence. Be sure both grooves are equally set back on the legs.

6. Use a 1/2-in. chisel to square the corners where each routed groove ends.

7. Head to the drill press to cut the mortises (Photo 3; Fig. C). The mortise is really just a deeper part of the groove that accepts the tenon.

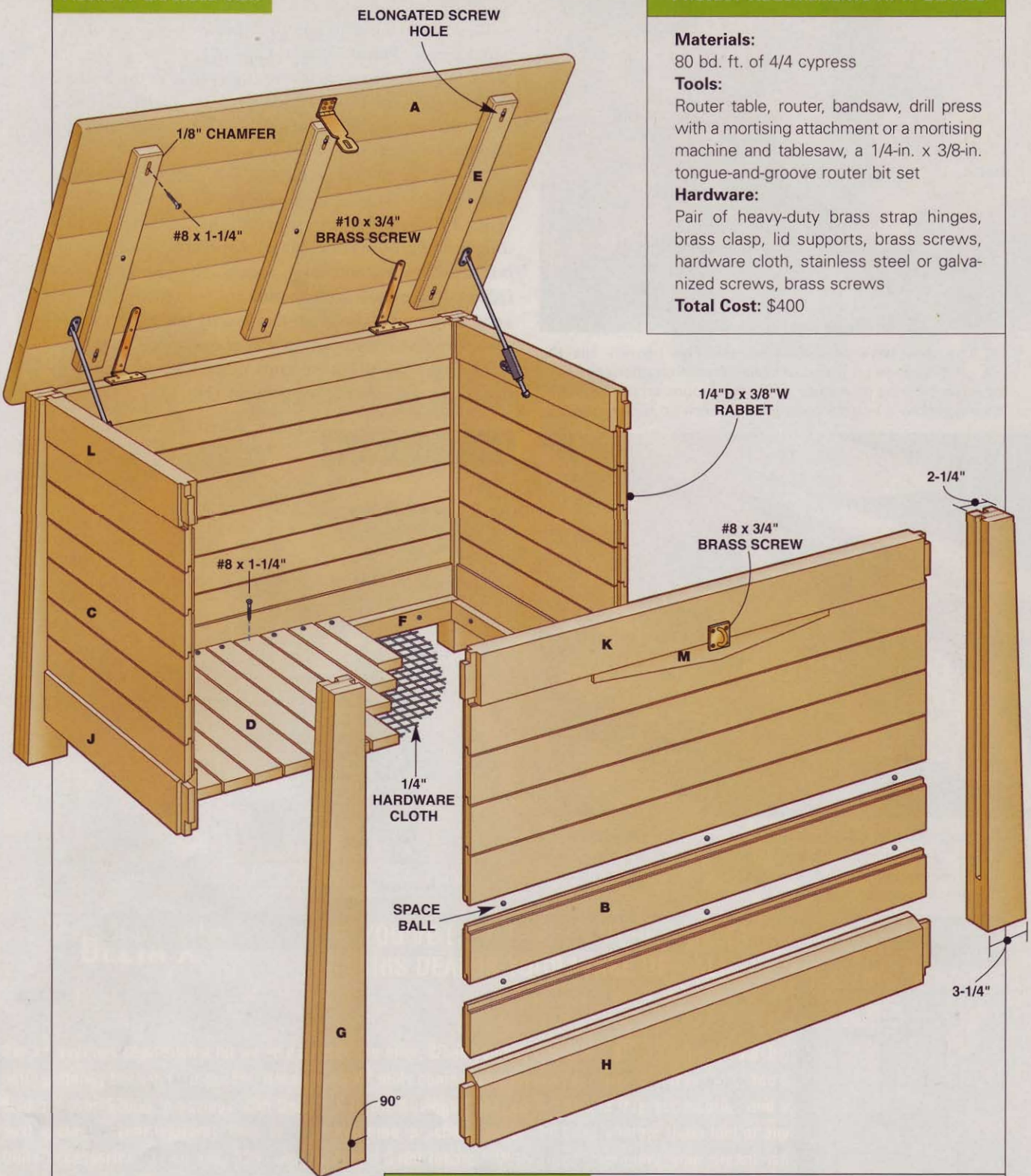
8. To finish machining the legs, cut the taper on the bandsaw. This can easily be done freehand. Use a 1/2-in. or wider blade and follow the line carefully. Sand the sawn surface smooth. **Note:** Save the offcuts to use as clamp pads during assembly.

9. Now that the legs are finished, turn your attention to the rails. Lay out the tenons (Figs. D and E, page 66) on each end and cut them on the tablesaw. Use a test piece to check the fit of the tenons in the leg grooves. Shoot for a snug fit accomplished without a mallet.

10. Lay out and cut the tenon haunches on the bandsaw (Photo 4).

11. Dry-fit all the legs and rails to ensure all goes well at assembly. If a tenon bottoms out in the mortise before the joint is tight, trim 1/16-in. off the tenon length. It's a good practice to put a slight chamfer on the tenon's ends to help it slide into the mortise.

Figure A Exploded View



Project Requirements at a Glance

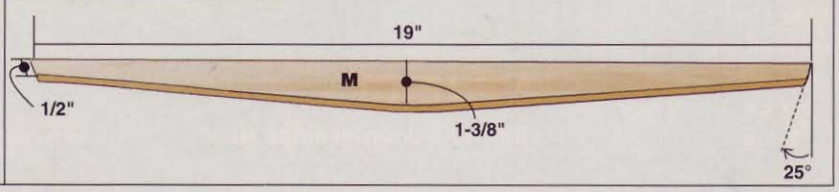
Materials:
80 bd. ft. of 4/4 cypress

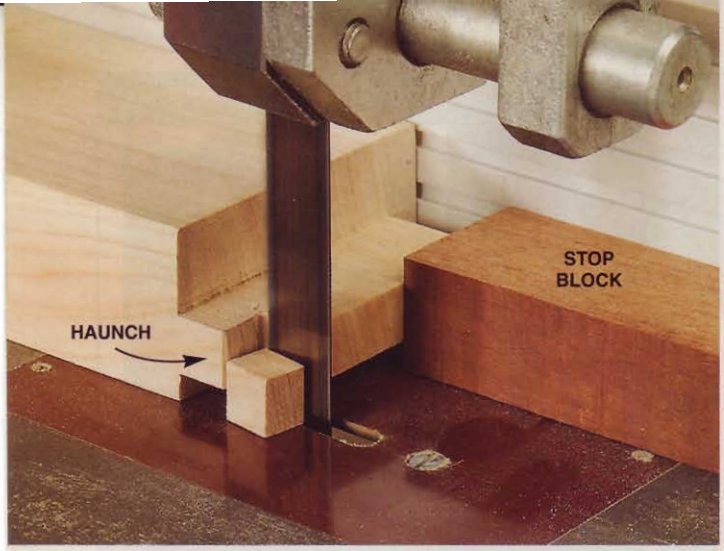
Tools:
Router table, router, bandsaw, drill press with a mortising attachment or a mortising machine and tablesaw, a 1/4-in. x 3/8-in. tongue-and-groove router bit set

Hardware:
Pair of heavy-duty brass strap hinges, brass clasp, lid supports, brass screws, hardware cloth, stainless steel or galvanized screws, brass screws

Total Cost: $400

Detail 1 Clasp Backer





4 **The rails have haunched tenons.** The haunch fills the groove made on the router table and strengthens the joint by increasing the glue surface. Cut the tenons on the tablesaw; then bandsaw a notch to create the haunch on each tenon.

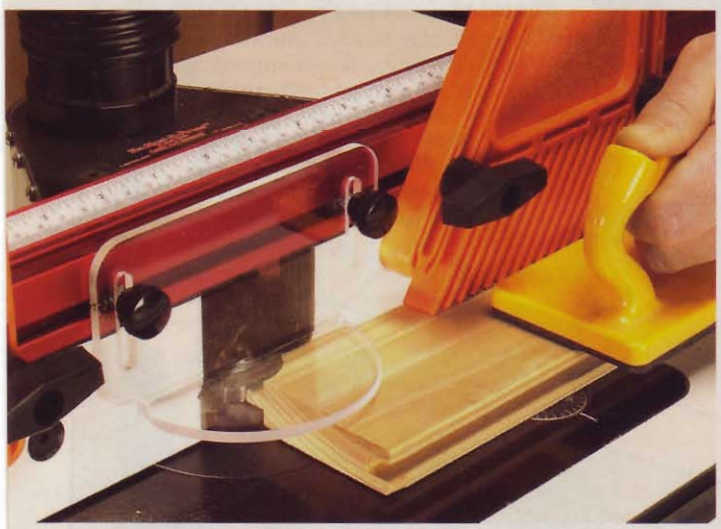
Machine the Panels

12. Machine the tongue-and-groove joints in all the panel pieces (Photo 5; Fig. F, page 67).

13. Don't forget to machine the groove in the bottom of the upper rail (Fig. D) and to put a 30-degree bevel on each bottom panel board where it mates with the 30-degree bevel on the bottom rail (Fig. F).

14. On the tablesaw, shave 1/8 in. off the length of each tongue. This is necessary to make room for the Space Balls (see Sources, page 68) that fit between each tongue-and-groove panel board. Cypress is a stable wood, but it still moves, and these panels are trapped in their frames. Space Balls are like little rubber blueberries that keep an even gap between the boards but allow for seasonal expansion and contraction of the wood.

15. Cut rabbets on the ends of each panel board so they fit snugly into the leg grooves (Fig. F).



5 **Cut the panel boards** with a tongue-and-groove router bit set. Use a chamfer bit to ease the edges where the boards meet. Featherboards keep the stock flat on the table to ensure straight tongues and grooves.

Figure B Leg Groove

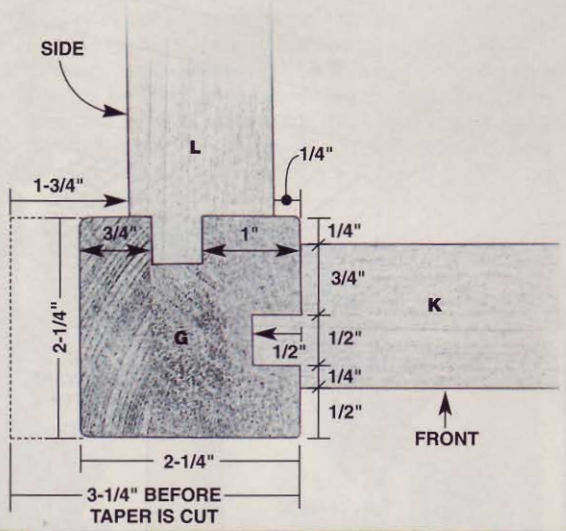


Figure C Mortise & Groove Placement

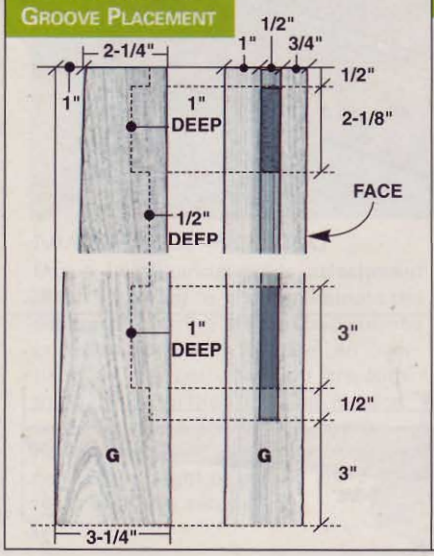


Figure D Top Rail Tenon

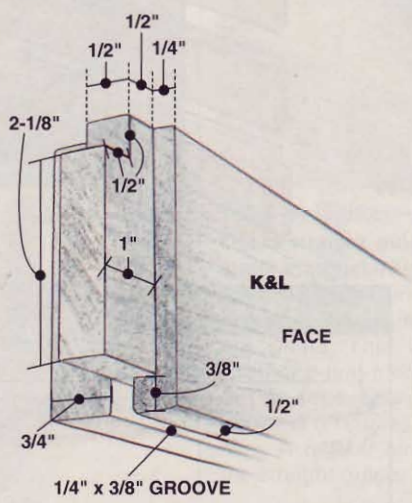
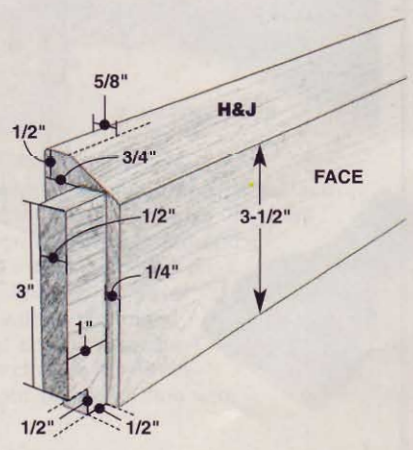


Figure E Bottom Rail Tenon



Assemble the Chest

16. Sand all the box parts through 120 grit.

17. Assemble the two end panels with waterproof glue and clamps (Photo 6).

18. After the two end panels are complete, assemble the rest of the chest in the same fashion. Set both front and back rails and panels into one end panel, add the second end panel and clamp. Be sure to check that your assembly is square.

Build the Lid

19. While the glue dries, edge-glue the boards for the lid. Take care to align each board flush. It's best to glue one board at a time for this operation.

20. Sand the top to 120 grit.

21. Cut the battens (E) and chamfer the outside edges (Fig. A, page 65).

22. Predrill countersunk holes in each batten on the drill press. **Note:** Be sure to elongate the screw holes on the ends of each batten to allow the lid to expand and contract (Fig. A).

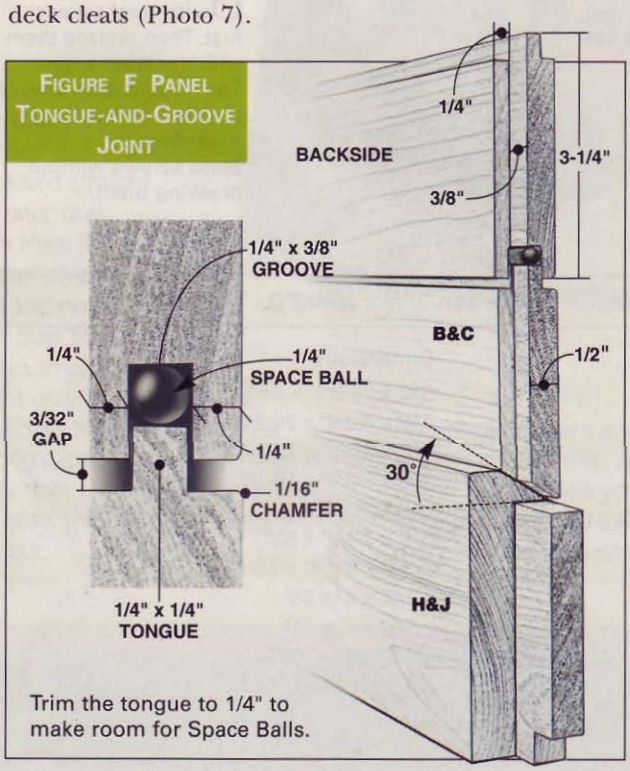
23. Attach the battens to the lid with screws.

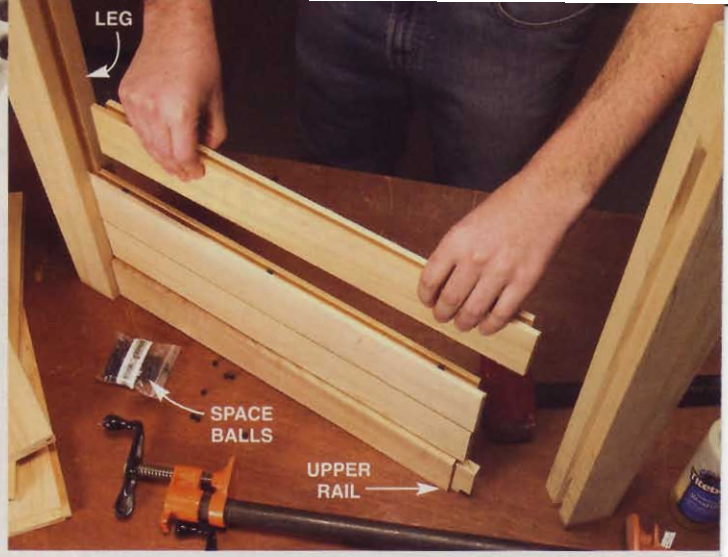
Install the Bottom

24. Cut the hardware cloth and screw it onto the bottom of the deck cleats.

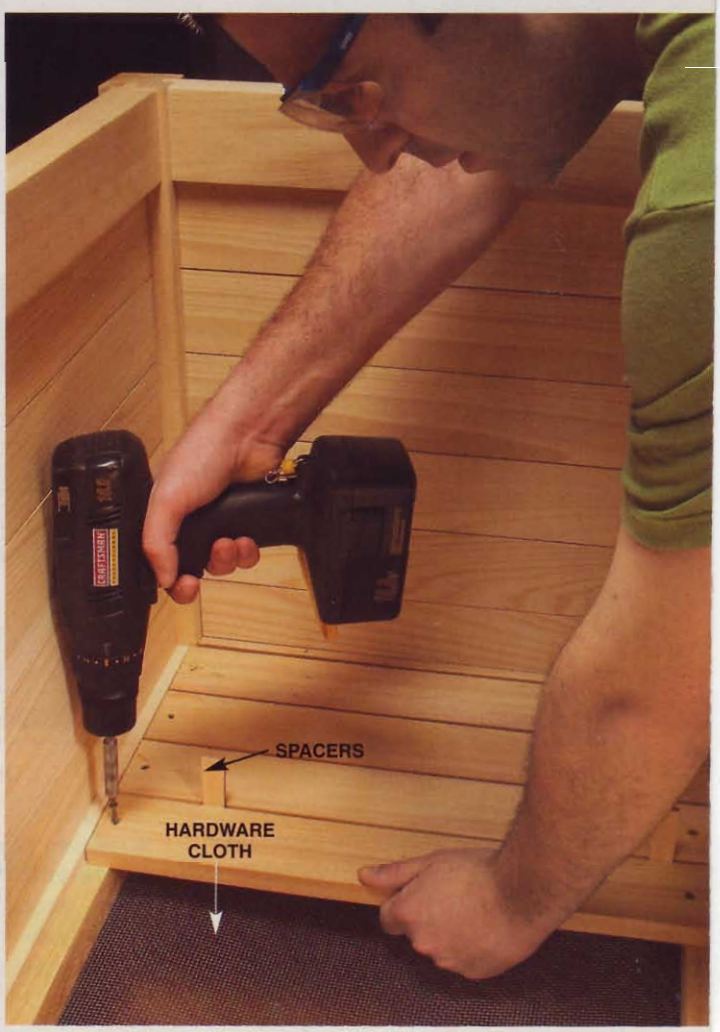
25. Cut the deck cleats (F) and install them with screws along the bottom edge of the bottom rails (Fig. A).

26. Cut the decking (D) to fit. Predrill countersunk holes in the ends of each deck board and attach to the deck cleats (Photo 7).





6 Assemble the chest upside down. Glue the top rail into one leg. Then stack the panel boards adding three or four Space Balls in each groove. Space Balls are little rubber balls that compress and expand to compensate for seasonal wood movement. Slip the bottom rail into the leg, add the second leg and clamp the assembly.



7 Screw down the decking using 1/4-in.-thick spacers to maintain even gaps. Hardware cloth is screwed to the bottom of the deck cleats to keep critters out of your chest, yet allow air circulation.

Add the Hardware

27. Mount the hinges on the chest (Photo 8).

28. Glue the clasp backer (M) to the upper panel board and add the clasp (Fig. A, Detail 1).

29. Position and attach the lid closers.

30. I painted the bottom of each leg with a couple coats of two-part epoxy. This seals the leg ends and keeps them from wicking up any moisture. This is especially important if the chest sits on a concrete or brick patio.

31. You may choose to leave the wood raw. Cypress will age to a beautiful silver-gray color. If you want to preserve the color, look at some of the outdoor finishes designed for decks. Just remember, these finishes require frequent maintenance to keep their good looks. If you plan to put the chest in an enclosed porch, you're free to use your favorite finish. **AW**

8 Mount the hinges with steel screws first. Then replace them with the brass screws. The steel screws pave the way, making it easier to drive the softer brass screws without breaking them.

Sources

Woodworkers Source
(800) 423-2450, www.woodworkerssource.com
80 bd. ft. of 4/4 cypress, $4 per bd. ft., $320.

Lee Valley Tools
(800) 871-8158, www.leevalley.com
Pair of 4 x 8-in. brass T-hinges, #01H14.30, $37
1-1/8 x 4-in. brass safety hasp, #01H15.04, $12
Two pairs of flap stays, #00U06.01, $28.

Mcfeely's
(800) 443-7937, www.mcfeelys.com
Space Balls, 100 pack, #PBS-1000-C, $5
8 x 1-1/4-in. No-Co-Rode flat-head screws, 100 pack, #0812-FNC, $5
8 x 5/8-in. No-Co-Rode self-drilling washer-head screws, #0805-WNC, $5
8 x 3/4-in. brass flat-head screws, 25 pack, #0806-FSW, $2
10 x 3/4-in. brass flat-head screws, 25 pack, #1006-FSW, $2.

MLCS
(800) 533-9298, www.mlcswoodworking.com
One tongue-and-groove assembly, 1/2-in. shank, #7844, $40; 1/4-in. shank, #5544, $40.

Cutting List — Overall Dimensions: 29"H x 44-1/2"W x 26-1/2"D

Part	Name	Qty.	Dimensions
A	Lid	1	3/4" x 26-3/4" x 44-3/4"
B	Tongue-and-groove panel	12	3/4" x 3-3/8" x 36-3/4"
C	Tongue-and-groove panel	12	3/4" x 3-3/8" x 19-3/4"
D	Decking	12	3/4" x 2-3/4" x 19-1/2"
E	Lid batten	3	3/4" x 2" x 18"
F	Deck cleat	2	3/4" x 1-1/2" x 60"
G	Leg	4	2-1/4" x 3-1/4" x 28-1/4"
H	Bottom rail front and back	2	1-1/2" x 4" x 38"
J	Bottom rail side	2	1-1/2" x 4" x 21"
K	Top rail front and back	2	1-1/2" x 3" x 38"
L	Top rail side	2	1-1/2" x 3" x 21"
M	Clasp backer	1	1/4" x 1-3/8" x 19"

Mortising on the Drill Press

Simple improvements make a mortising attachment work great.

Two-piece mortising chisels cut square holes. The auger bit fits inside the chisel and protrudes slightly. During operation, the auger drills a round hole and the four-sided chisel squares the corners. Cut side by side, square holes create mortises (see photo, below).

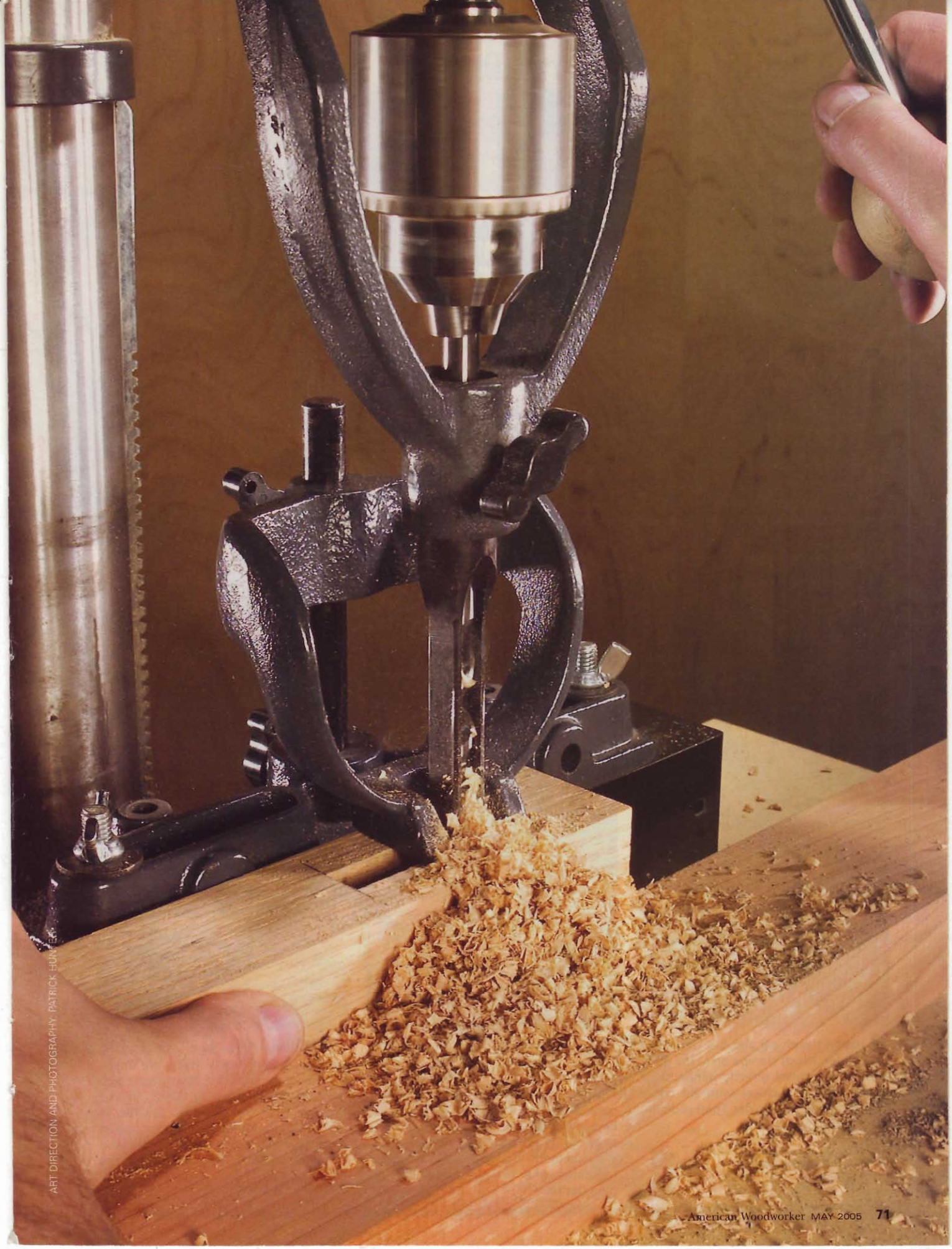
by Tim Johnson

Even though they're sexy, benchtop mortising machines aren't the only power-tool option when it comes to cutting square-shouldered mortises. A drill-press mortising attachment can be just as effective and it costs a lot less: $30 to $80 instead of $200 or more. I'll show you how to tune any out-of–the-box mortising attachment so it's easy to install and a joy to use.

Mortising attachments are available for almost every drill press. Although they vary in appearance, they all have three basic components: a fence, a chisel holder and a hold-down. Upgrading these parts to stabilize the workpiece and operating the drill press at the optimal speed are the keys to success.

I get first-class results with my tuned-up mortising attachment. That means I don't have to store a large, heavy mortiser that I would only use occasionally. On the drill press, I can slow the speed way down, too, so I don't overheat my bits. Drill-press mortising is slower, but it's much more pleasant, a lot quieter and much less nerve-wracking than using a mortiser.

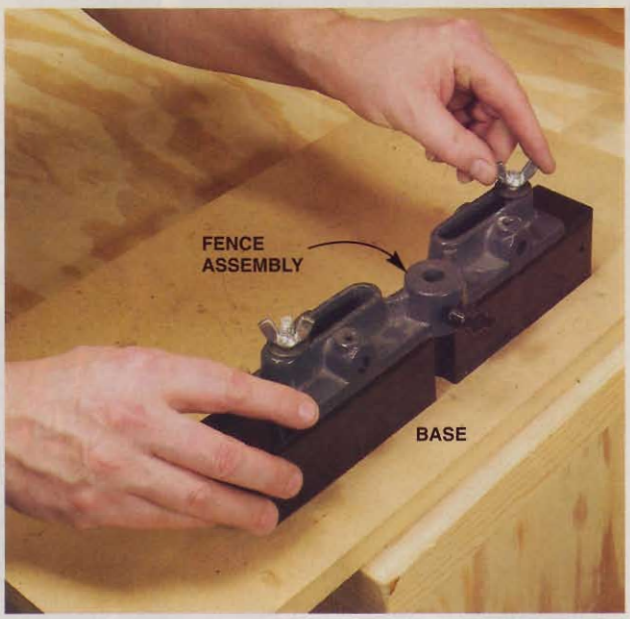
Square mortises require special bits, which can be bought individually or in sets. Bits range in price from $10 to more than $50 apiece. Inexpensive bits usually won't stay sharp as long (see "Start Sharp, Stay Sharp," page 74), but dropping one on the concrete floor won't give you a heart attack, either.



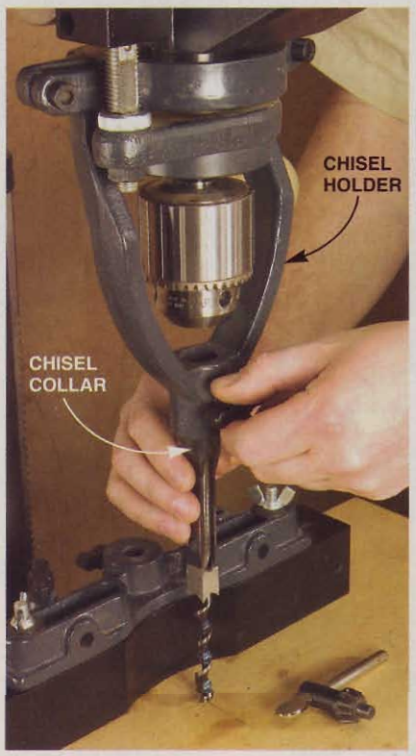
ART DIRECTION AND PHOTOGRAPHY: PATRICK HUNTER

Mortising on the Drill Press

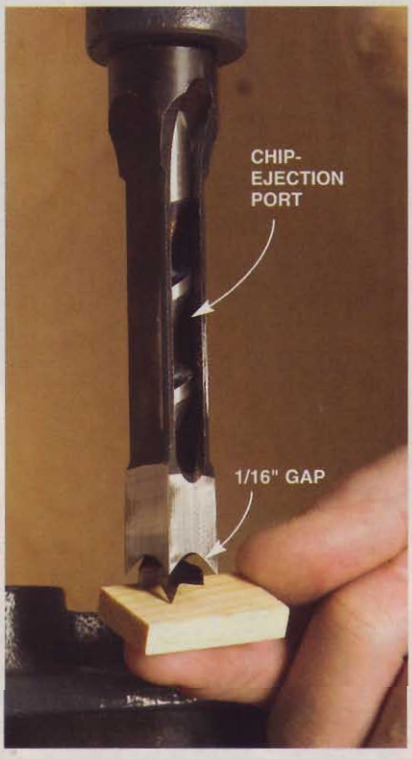
1 Slow down. Mortising chisels work best at slow speeds, between 1,000 rpm and 1,500 rpm, depending on the mortise size and the wood density. Within this range, use trial and error to find the speed that works best.



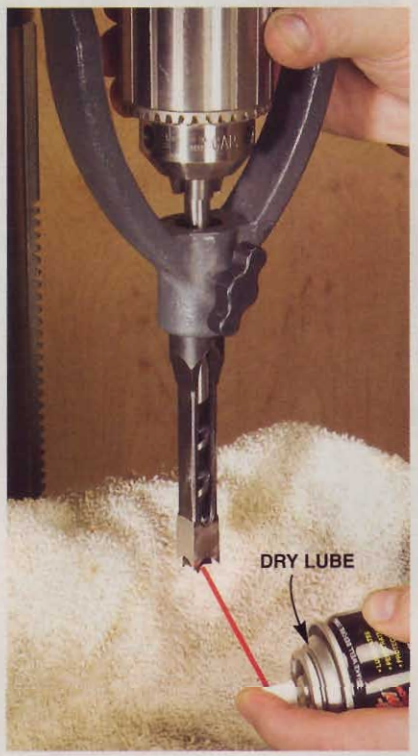
2 Mount the mortising fence on a separate base, rather than fastening it directly to the drill-press table. Then clamp the base to the drill-press table. This setup makes the fence easy to adjust, so positioning the workpiece is a breeze.



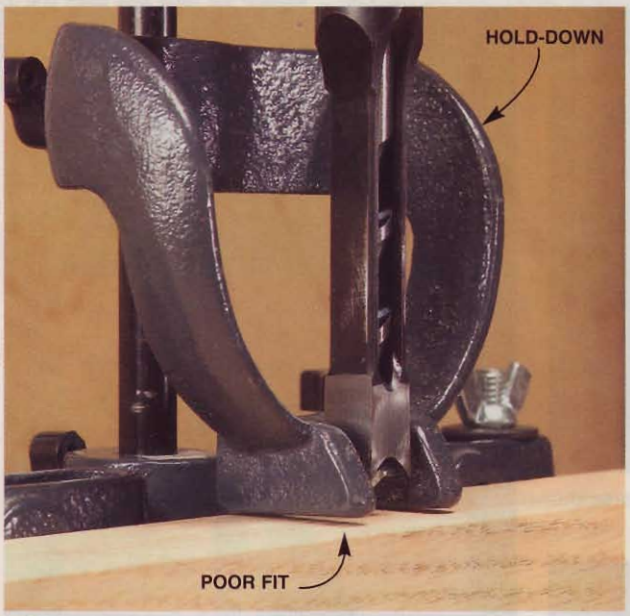
3 Install the chisel and bit. The chisel holder, which clamps on to the quill, centers the chisel directly beneath the chuck. Lock the chisel with its collar tightly against the holder. Then slide the bit into the chuck.



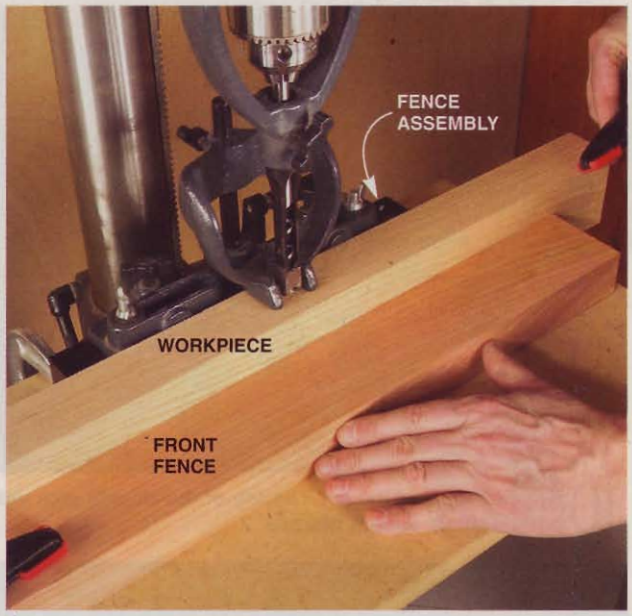
4 Leave a gap. Position the auger bit with its cutting head about 1/16 in. away from the domed inside surface of the hollow chisel. Don't jam these two parts together. This gap is essential, because it allows shavings cut by the auger to be lifted into the hollow chisel and ejected. If the gap is too small or too large, the trapped shavings will bind the bit.



5 Lubricate the auger bit after making sure it spins freely inside the chisel. If the bit squeals when you power up, it isn't centered precisely. Shut off the power, rotate the chisel 90 (or 180 or 270) degrees and retest. If the squeal persists, loosen the chisel holder and rotate it slightly. Then reposition the chisel.

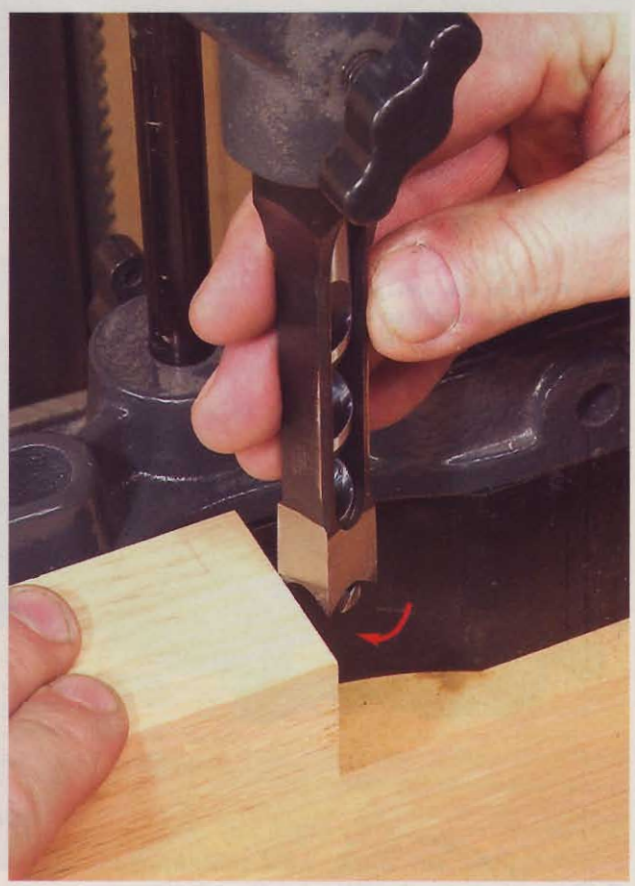


6 Check your hold-down. If it doesn't sit flat on the workpiece, grind or file it until it does. A poorly fitting hold-down won't hold the workpiece firmly enough against the base. While you're mortising, any workpiece movement can bind the bit in the mortise and wreck your setup—or the bit.



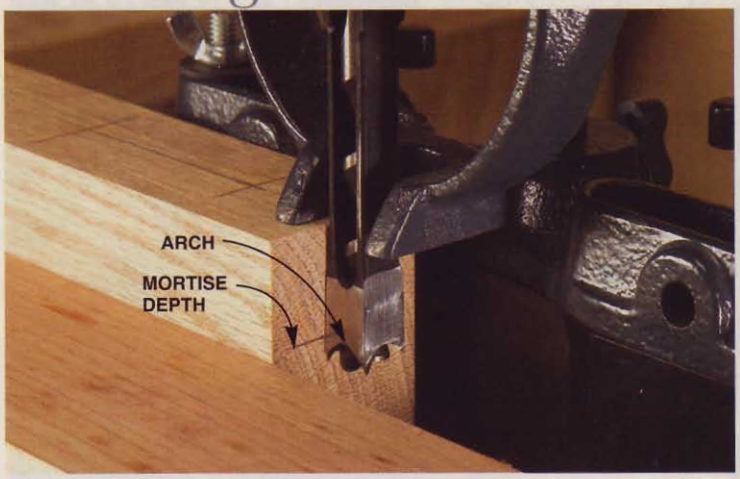
7 Clamp a fence in front of the workpiece to hold it firmly against the fence assembly. Together with the hold-down, this fence captures the workpiece effectively during operation, eliminating any movement. When you reposition the workpiece between cuts, this fence keeps it correctly aligned.

8 Stiffen the table with a brace. On many drill presses, mortising exerts enough downward pressure to flex the table. Like workpiece movement, any table movement will cause trouble. If the table flexes, the chisel will bind in the mortise. A two-part adjustable brace is much easier to install.

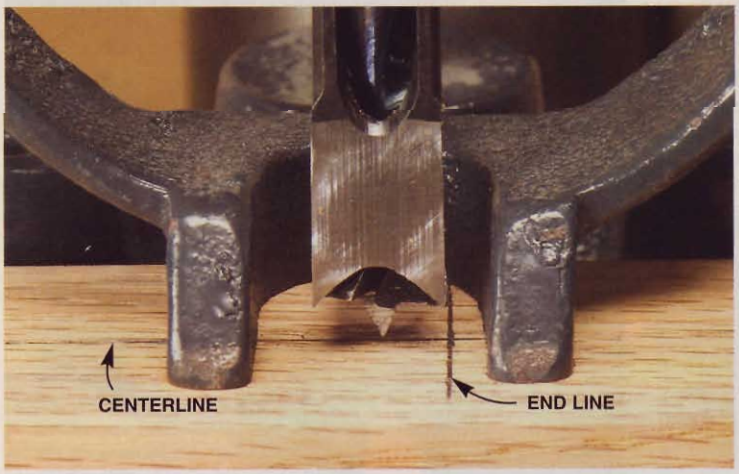


9 Square the chisel. For the mortise shoulders to be parallel, the chisel must be perpendicular to the fence. Loosen the chisel, rotate it flush against the squarely cut end of your workpiece and retighten.

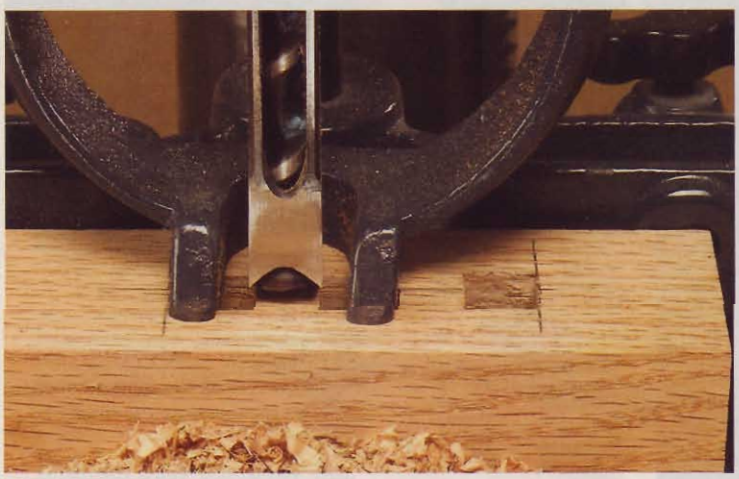
Mortising on the Drill Press



10 **Set** the depth of the cut. The top of the chisel's arch indicates the bottom of the square mortise.



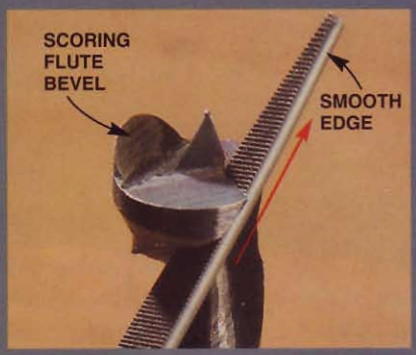
11 **Position** the workpiece for mortising. First, clamp the base and fence assembly so the center point of the auger bit is on the centerline of the mortise. Then slide the workpiece between the fences until the outer edge of the hollow chisel aligns with the mortise end line.



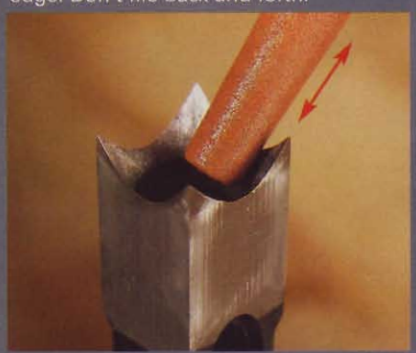
12 **Establish** the ends of the mortise first. Then clear out the middle. Always engage all four sides of the chisel or two opposite sides. Apply steady pressure and advance the cut slowly. Don't push too hard. Match your feed rate to the cutting action of the auger by watching the flow of chips exiting the chisel. Easy—but firmly—does it. AW

Start Sharp, Stay Sharp

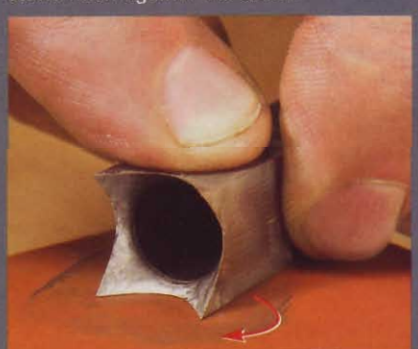
Using hollow chisel mortising bits out of the box is like using chisels straight from the factory. They're sharp enough to work, but not sharp enough to work well. Take a few minutes to tune up your bits and chisels before each use.



Sharpen the bevels of the auger's cutting and scoring flutes using a small auger file. (This one is from Nicholson's file set #42030, about $30.) Its smooth edges won't mar adjacent surfaces during this close work. Hold the file flat on the bevel and move it forward toward the cutting edge. Don't file back and forth.



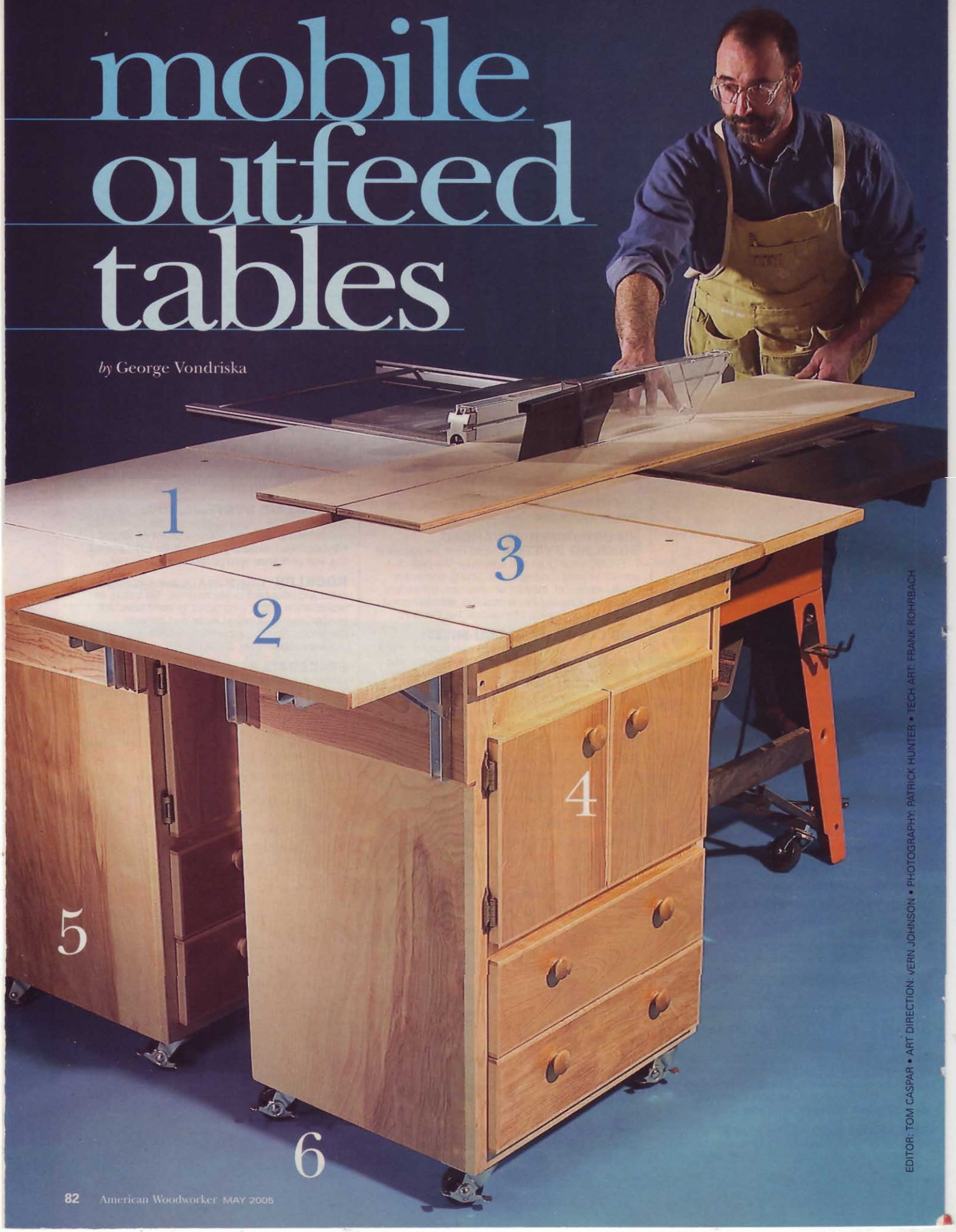
Sharpen the hollow chisel's inside bevels using a round slipstone (about $15 at Woodcraft stores). Work your way from corner to corner while holding the stone flush against the bevel.



Hone the outside faces lightly on a flat stone, using even pressure and a circular motion.

mobile outfeed tables

by George Vondriska



EDITOR: TOM CASPAR • ART DIRECTION: VERN JOHNSON • PHOTOGRAPHY: PATRICK HUNTER • TECH ART: FRANK ROHRBACH

Upgrade your tablesaw and save precious shop space with a pair of outfeed tables.

1 Adjustable Top
Level the top to compensate for an uneven floor by simply turning a screw at each corner.

2 Heavy-Duty Folding Wings
Each wing is supported by super-strong brackets that open at precisely 90 degrees. The wings drop out of the way for compact storage.

3 Melamine Surface
Wood slides effortlessly over this slick material. Dried glue pops right off, too.

4 Dust-Free Storage
There's plenty of room for storing saw blades and other accessories.

5 Make Two
Arrange them in front, to the side or behind your saw.

6 Mobility
Locking casters let you roll the outfeed table wherever you need it.

A tablesaw is a lot safer and easier to use when it's equipped with an outfeed table. Whether you're ripping long boards or crosscutting big sheets of plywood, you really need more support than just the top of your saw.

Lots of folks have a huge outfeed table that sits permanently behind the saw, but that's impractical in my compact shop. I've gone small and mobile instead.

I built two tables, which offer a lot of flexibility. I can butt them right up to the back of my contractor's saw because the folding wings span the saw's motor. When I rip a long board, I can put one table in front of the saw and one behind. When I crosscut a big piece of plywood, I can roll one of the tables to the left side of the saw. When I need more open space around the saw, I fold down the wings and push the tables out of the way.

As a bonus, these tables are great shop carts. They're perfect for wheeling project parts from machine to machine. I also use them for glue-ups and assembly. Sweet!

Customize Your Table's Height

Our dimensions are designed for a saw of standard height: about 34 in. The table adjusts from 33-1/2 to 35-1/4 in. high. This allows you to fine-tune the exact height of the table to match your saw after the table is built. In addition, you can easily tilt the table's top to compensate for an uneven floor. If you need a table with a different range (to include the height of a mobile base, for example), adjust the cabinet and door dimensions.

Build the Case

1. Cut the sides (A), subtop, bottom and shelf (B) and back (C) to size. Cut rabbets for the subtop, bottom and back. Cut dadoes for the shelf. Assemble the case and check it for square.

2. Cut the face frame parts (D, E, F) to size. When assembled, the face frame should be 1/16 in. longer and wider than the case. Use screw pockets to join the face frame rails to the stiles. Position the center rail so its top edge is even with the shelf.

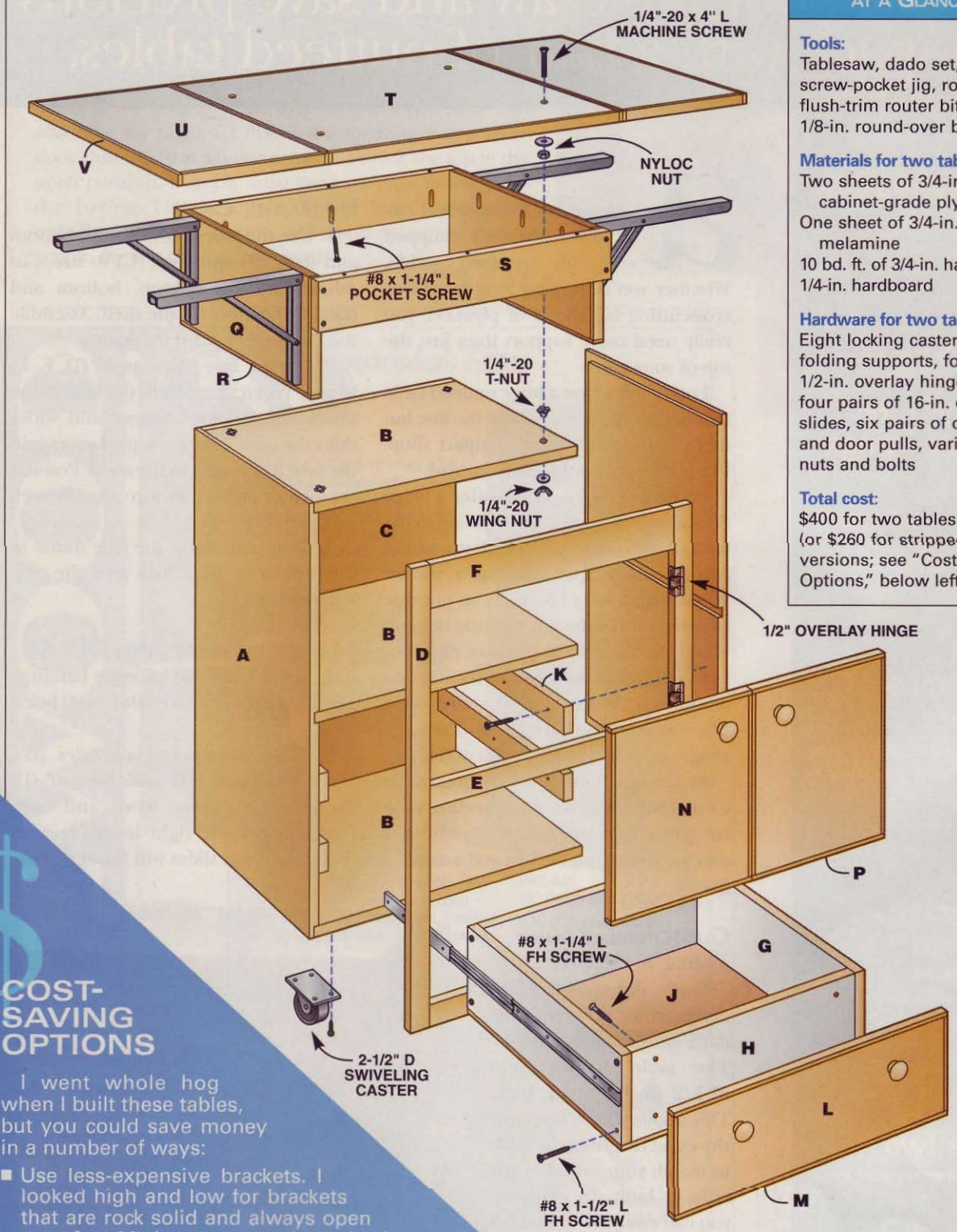
3. Glue and clamp the face frame to the cabinet. Trim it flush after the glue is dry (Photo 1).

Make Drawers and Doors

4. Make a big pile of edge banding. The entire project takes almost 90 lineal feet.

5. Make the drawer box sides (G), front and back (H) and bottom (J). Cutting the drawer front and back pieces to just the right length ensures that the drawer slides will travel without

Figure A Exploded View



Project Requirements at a Glance

Tools:
Tablesaw, dado set, planer, screw-pocket jig, router, flush-trim router bit, 1/8-in. round-over bit

Materials for two tables:
Two sheets of 3/4-in. cabinet-grade plywood
One sheet of 3/4-in. melamine
10 bd. ft. of 3/4-in. hardwood
1/4-in. hardboard

Hardware for two tables:
Eight locking casters, eight folding supports, four 1/2-in. overlay hinges, four pairs of 16-in. drawer slides, six pairs of drawer and door pulls, various nuts and bolts

Total cost:
$400 for two tables (or $260 for stripped-down versions; see "Cost-Saving Options," below left)

COST-SAVING OPTIONS

I went whole hog when I built these tables, but you could save money in a number of ways:

- Use less-expensive brackets. I looked high and low for brackets that are rock solid and always open a perfect 90 degrees to make a dead-flat, rigid work surface. The brackets I found are a bit spendy ($30 a pair), but less expensive ones will work. Savings: $36.
- Use melamine instead of plywood for the base. Skip all the banding and simply round over every edge. Savings: $30.
- Drop the doors and drawers. You won't need hinges and drawer slides. Savings: $47.

Simple face-frame and box joinery makes this project easy to build. Build the face frame slightly oversize, glue it to the cabinet and trim it with a flush-trim bit. This shortcut is a lot easier than trying to build a face frame that exactly fits the size of the cabinet.

Start with oversize panels when you apply edge banding. Glue two pieces of banding on first, making sure they're shy of one edge of the panel. Rip the opposite side. Turn the panel around and rip the other side. Now you've got two perfectly flush edges on which to glue the other edge banding.

binding. To calculate this length, start by measuring the face frame opening. Next, subtract 1 to 1-1/16 in., which is the space needed for two metal slides. Finally, subtract another 1-1/2 in. or, more exactly, the combined thickness of two drawer sides. Assemble the drawers.

6. Make the drawer slide fillers (K). Plane them to be flush with the inside edge of the face frame. Screw and glue the fillers to the case.

7. Cut and edge-band the drawer fronts (L, Photo 2). Drill screw holes for the pulls.

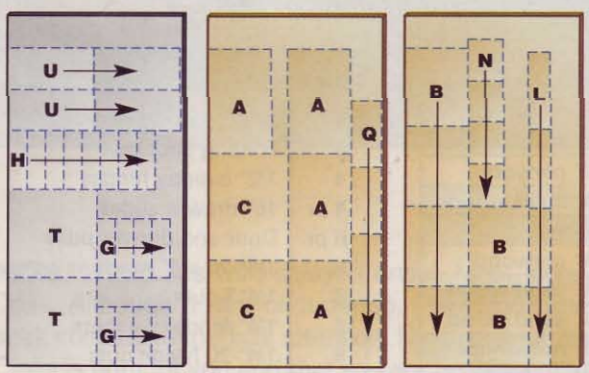
8. Cut and edge-band the doors (N). Check the width of the doors, allowing for the 1/2-in. overlay hinges, edge banding and a 3/32-in. gap between the doors. Drill for and fasten the pulls.

Make the Top

9. Cut the large and small rim rails (Q and S). Edge-band two ends and one side of the large rails. Drill screw pockets into the inside face of the small rails. Glue and screw the small rails to the large rails, flush with the unbanded top edge.

10. Cut and edge-band the melamine top (T) and wings (U).

Figure B Cutting Diagram *(for two tables)*



Sand and Finish

11. Ease all the corners with a 1/8-in. round-over bit. Finish-sand the wooden parts.

12. Apply a finish to all the wooden surfaces.

Assemble the Doors and Drawers

13. Screw the casters to the cabinet bottom. Position and screw the case slide component inside the case and the drawer-box slide component on the drawer box (Photo 3).

14. Slip the drawer boxes into the cabinet and lay the case on its back. Put the hinges on the doors and hang the doors on the face frame.

15. Position the drawer fronts over the drawer boxes, and fasten the fronts to the drawer boxes (Photo 4). Stand the cabinet up.

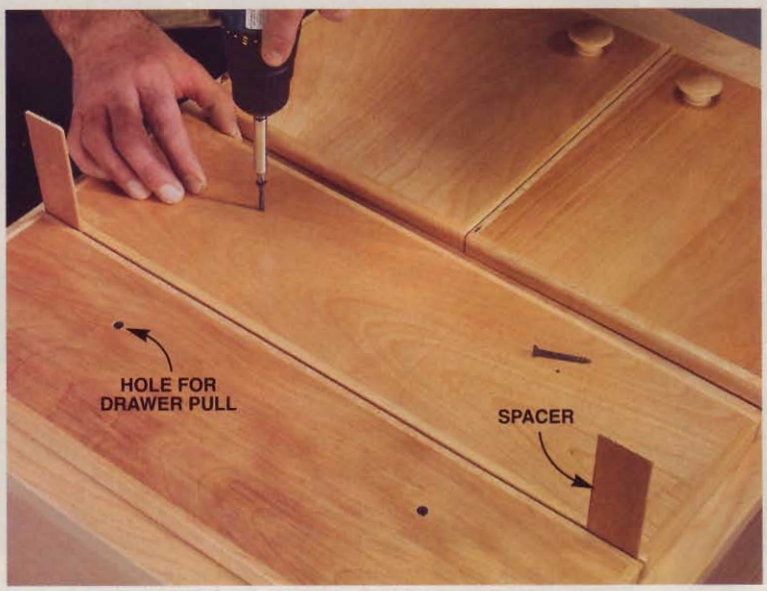
Assemble the Top and Wings

16. Drill and countersink holes for the leveling screws through the main table. Use a drill press to ensure a plumb hole.

17. Center the rim assembly under the melamine table top. Fix the rim assembly to the top by driving screws through the screw pockets.

18. Screw the folding brackets to the bottom of the wings and then to the large rim rails. It's easiest to do this with the table's top assembly upside down on your tablesaw. The tablesaw's flat surface helps align the parts.

Position each drawer slide with a wood spacer. It's a lot easier to use a scrap of plywood than a tape measure to level a slide. Install the top slide first with a wide spacer; then use a narrower one for the bottom slide.



Install the drawer fronts with the cabinet on its back. Drive temporary screws through the pull holes into the drawer boxes underneath. Remove each drawer and permanently screw the box to the drawer front from the inside.

19. Place the top assembly on the cabinet. Insert the four leveling screws and tap each one with a hammer to dimple the subtop. This locates the holes for the T-nuts. Remove the top assembly. Drill and mount the T-nuts in the cabinet.

20. Push the leveling screws through the top and put fender washers and Nyloc nuts on from the underside. (Nyloc nuts are the kind with nylon rings inside them.) The nuts should be snug but not so tight that you can't turn the leveling screw by hand.

21. Set the top assembly on the cabinet. Turn each machine screw until it engages the T-nut. Adjust each screw a little at a time so the top doesn't bind.

22. Position the outfeed tables behind your saw and span a straightedge from the saw to the table top. Level the top to the saw by turning the leveling screws up or down; then lock the screws using the fender washers and wing nuts. The wing nuts allow you to lift the cart by its top without yanking out the T-nuts.

AW

CUTTING LIST *(for two tables)*		Dimensions: 24"D x 48"W x 33-1/2" to 35-1/4"H		
Part	**Name**	**Qty.**	**Dimensions**	**Material**
Case				
A	Side	4	17-1/4" x 29"	3/4" plywood
B	Subtop, bottom and shelf	6	16-1/2" x 21-3/4"	3/4" plywood
C	Back	2	21-3/4" x 29"	3/4" plywood
D	Face frame stile	4	1-1/2" x 29-1/16"	3/4" solid wood
E	Face frame rail	4	1-1/2" x 19-9/16"	3/4" solid wood
F	Face frame top rail	2	3" x 19-9/16"	3/4" solid wood
DRAWERS AND DOORS				
G	Drawer box side	8	5" x 16"	3/4" melamine
H	Drawer box front/back	8	5" x 16-7/8"	3/4" melamine
J	Drawer bottom	4	16" x 18-1/2"	1/4" hardboard
K	Drawer slide filler	8	2-1/2" x 16-1/2"	3/4" solid wood
L	Drawer front	4	5-1/2" x 20"	3/4" plywood
M	Drawer front banding		3/4" x 20'	1/4" solid wood
N	Door	4	9-11/16" x 11-1/2"	3/4" plywood
P	Door banding		3/4" x 16'	1/4" solid wood
TABLE TOP				
Q	Rim rail, large	4	8" x 17-5/8"	3/4" plywood
R	Rim rail banding		3/4" x 10'	1/4" solid wood
S	Rim rail, small	4	3" x 24-1/8"	3/4" solid wood
T	Top	2	23-1/2" x 23-5/8"	3/4" melamine
U	Wing	4	23-1/2" x 11-1/2"	3/4" melamine
V	Top banding		3/4" x 42'	1/4" solid wood

Source

Woodworker's Hardware
(800) 383-0130, www.wwhardware.com
2-1/2-in. locking casters, #JH25 SB, $5 ea.
1/2-in. overlay hinges, #A07550BB, $1.60 a pair
16-in. drawer slides, #KV8400 B16, $11 a pair
Folding L brackets, #KV0206 ZC 12, $15 ea.
2-in. birch pulls, #A00814 WD, $1.50 a pair.

HARDWARE	
8	2-1/2" locking casters
8	Folding supports
4	1/2" overlay hinges
4 pr	16" drawer slides
6 pr.	Door and drawer pulls
8	1/4"-20 x 4" machine screws
8	1/4" T-nuts
16	1/4" fender washers
8	1/4"-20 Nyloc nuts
8	1/4"-20 wing nuts

edited by David Olson

MOBILE CLAMP RACK

Tired of dragging clamps around my shop, I built this rack that brings them right to the job. It takes up only 21 x 32 in. of real estate and can handle 36 adjustable clamps and 12 4-ft. pipe clamps.

I assembled the side frames separately before screwing them together with gussets at the top and a plywood shelf at the bottom. I tapered the ends of the 1x4s at the top to fit. Before installing the 3-in. swivel casters, I glued on plywood pads to reinforce the corner joints.

Each frame consists of 2x4 and 2x6 rails screwed to 1x4 ends. I ripped the 2x6s in half to make the clamp rails. I staggered the top rails so the pipe clamp rail sits higher.

To make the half-round cutouts that hold the pipe clamps, I drilled centered holes in the 2x6 before I ripped it in half.

On the other frame, I cut slots in the rails for adjustable clamps. I cut the slots on my tablesaw, using my dado set and the miter gauge.

Roger Meinen

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EDITOR: TIM JOHNSON • ART DIRECTION: VERN JOHNSON • PHOTOGRAPHY: PATRICK HUNTER

Lathe and Disc Sander Combo

Thanks to my new sanding table, my lathe doubles as a disc sander. I really like this setup, because I can adjust the speed of the disc to the job and the material.

The table is glued to a hollow box that bolts onto the bed just like the tool rest and tailstock. A keyed bottom centers the box on the bed. Bolts extend through the key to mounting plates below. Tightening the bolts draws the plates against the bed bottom. Access to the forward bolt is through a hole in the table. Removing the dust collection port grants access to the back bolt.

I used melamine for the disc, which I mounted to an 8-in.-dia. faceplate. Melamine is flat, and sanding discs adhere to it well, yet are easy to remove. I always lock the table in position within 1/16 in. of the disc for safety. Dust collection with my shop vac works great. The hollow box nuzzles up close to the disc, because it's flush with the front edge of the table.

Ed Shaffer

Perfect Holes for Router-Bit Tray

I decided to organize my router bits by making a tray from a scrap block of wood. But I soon discovered that my 1/2-in. shank bits wouldn't fit into 1/2-in.-dia. holes—the holes needed to be slightly larger. Unfortunately, I didn't have a larger bit.

After learning that a 33/64-in. bit was going to cost $15, I did a bit of head-scratching. It occurred to me that shimming my 1/2-in. bit would make it spin slightly off center, thus creating a larger hole. After experimenting, I settled on folding a piece of notebook paper into six layers and holding it against one of the jaws when I tightened the chuck. This offset worked perfectly for drilling the 1-1/4-in.-deep holes. Now my bits slip in and out easily. **AW**

Richard Tendick

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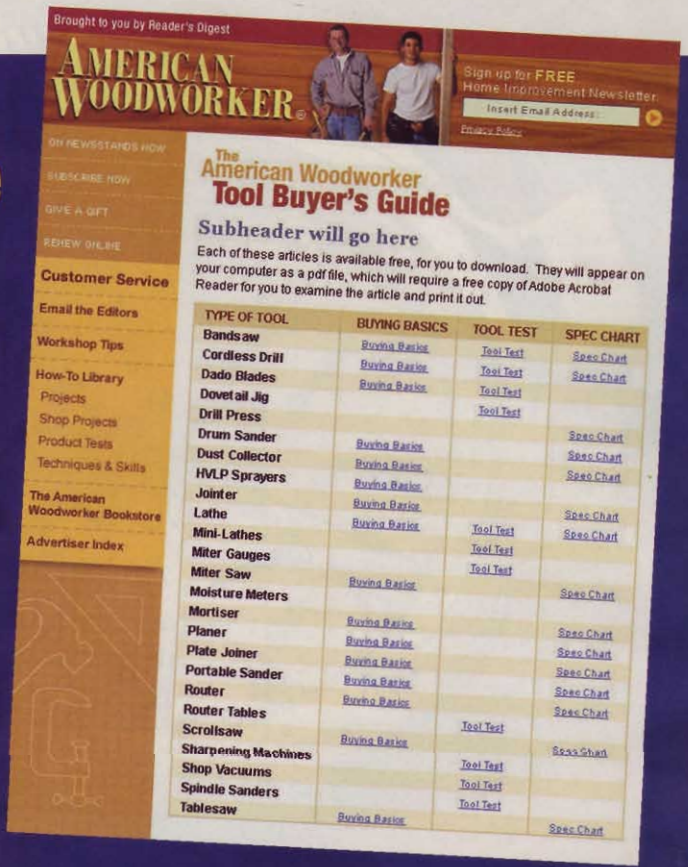

Oops! Crazy Mistakes that Woodworkers Make

edited by Tim Johnson

Lacquered Legs

I work in Southeast Asia and don't have an indoor workshop. Instead I do my woodworking under a shed roof. The threat of malaria is real and constant, so I take precautions by using bug spray to keep the mosquitoes off me. It doesn't take much to work up a real sweat, so I have to reapply the spray several times during the day. After one such reapplication, I realized that my hairy legs didn't quite feel right. It was only then that I noticed how similar my can of bug repellant was to my can of spray lacquer!

Glenn Grubb

If you have a woodworking blunder that you're willing to share, send it to us. You'll receive $100 for each one we print. Send it to **AW Oops!, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121, or e-mail to oops@readersdigest.com.** Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.

Bargain Birdseed Bags Blade

I found a real bargain while shopping for birdseed—a large suet cake that was much cheaper than an equivalent number of smaller cakes. This bargain cake was too big to fit any of our suet baskets, but I figured I could cut it to size with my new bandsaw. I was right—the cake cut like butter. I proudly sawed a custom-size chunk for each suet basket.

Later, when I tried to resaw some wood, the blade hardly cut. The wood just smoked and burned. Standing forlornly amid the smoke, I surmised that something in the suet had completely gummed up the blade, causing excessive friction and heat, which dulled the teeth. Saving $5 on birdseed cost me a $30 bandsaw blade. My only consolation was that for weeks afterward, whenever I used the bandsaw, my shop smelled like freshly baked molasses cookies!

Jay McClellan

ART DIRECTION: VERN JOHNSON • ILLUSTRATION: STEVE BJÖRKMAN