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**TABLE SAW STORAGE
& OUTFEED CART**

JUNE 2006

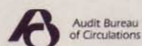
**PLUS
HOME
STORAGE
OAK OTTOMAN**

*With Storage
Built Right In!*

Page 60

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EDITORIAL

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EDITOR'S NOTES



Inviting. I can't think of a better word to describe this deck. With its wide bank of steps, it's as if it had a giant welcome sign hanging from the railing. Perhaps that explains why it's such a popular gathering place for friends and neighbors.

These aren't all just social visits, however. People are curious about the absolutely amazing transformation this deck has undergone. A short time ago, it was a typical "homebuilder's special" tacked onto the back of the house (see the "Before" Photo on page 40). Now it attracts people like bass to a June bug.

Well, it's easy to see what gets people hooked on this deck: the wraparound steps, cedar decking, powder-coated railings, and a pergola complete with privacy screens. Five great-looking projects in all, and all of them are very do-able.

One of the most intriguing things about this deck, however, is what you *don't* see. Underneath these five projects, the original pressure-treated framing of the deck is still intact. Instead of building an entirely new deck (which can be an intimidating job), we added these projects to the existing structure of the old deck.

Using the existing structure of a deck like this has several big advantages over starting from scratch. There's no need to pour new footings or figure out complicated framing, for instance. Plus, it saves money (not to mention space in the landfill). Most importantly, it makes it easy to incorporate one or more of these projects into your existing deck. In short, it's a dream deck that's truly achievable.

Table Saw Review — Another feature article in this issue that you won't want to miss is a tool review of 10" cabinet saws. Our in-depth, under-the-hood coverage of what makes these saws the ultimate tool for many woodworkers begins on page 52.

*Tim*



COVER STORY

Presenting five fantastic projects to make your old deck look like new. In this special section, we'll show you how to remove and replace the decking, plus add a custom railing, pergola, privacy screens, and wraparound steps.

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Don't build a new deck—save time and money by renovating your existing one. This five-project suite gives you the tips, techniques, and plans to make it happen.

60 Stylish Storage Ottoman

With straight-grained oak and a suede cushion, this ottoman is big on style. But what makes it unique are two storage compartments built right in.

66 Adjustable Picture Rail

Forget about fussing with arranging—and then rearranging—pictures on the wall. This simple hanging rail lets you easily adjust them for picture-perfect results.

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Save shop space, keep tools and accessories close at hand, and make cutting large workpieces manageable with this easy-to-build cart for your table saw.



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WORKBENCH ONLINE

Check out WorkbenchMagazine.com for cutting diagrams, downloadable plans, and bonus content from all our issues. From this issue, you'll find:

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Build our simple jig in a few minutes, and you'll be able to rout dead-on accurate, repeatable dadoes in seconds.

STUDENTS WIN BIG WITH

Door Design

A door is a great metaphor for opportunity. But for three architecture students, the connection is more literal.

When opportunity knocks, wouldn't it be cool if it knocked on a door that you designed yourself?

Well, for Brandi Berryman, Amanda Hardaway, and Jonathan Tucker, that's pretty close to what happened.

All three of these architecture students entered the Jeld-Wen Student Door Design Contest. All three won a \$2,000 scholarship for their efforts.

Jeld-Wen invited students from around the nation to submit their designs in the fall of 2005. After receiving entries from students at 44 colleges and universities, a panel of independent experts selected the scholarship winners.

Berryman and Hardaway, both seniors in architecture at the Uni-

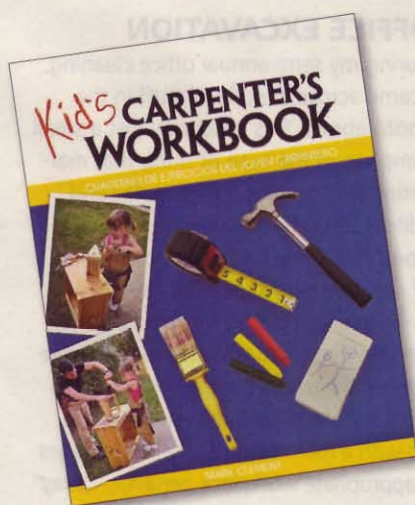


Brandi Berryman's design was intended to convey good luck and was inspired by an image of crossed fingers.

versity of Kentucky, tied for first place. Tucker, an architecture student at the University of Colorado at Boulder, took second-place honors. For more details, visit Jeld-Wen.com.



Amanda Hardaway arranged classic geometric elements in her personal interpretation to create her winning door design.



Build with your kid, and you'll build a better kid. That's the premise behind *Kid's Carpenter's Workbook*.

MARK CLEMENT OFFERS

Carpentry for Kids

Mark Clement is a carpenter, writer, and father. His first novel, *The Carpenter's Notebook*, is written on the premise that the same thoughtful approach used to build a home can be used to "build" a family.

It was during his promotional tour for the novel, he realized there was a need for a second book aimed specifically at his most important audience: kids.

The *Kid's Carpenter's Workbook* offers projects that are perfect for introducing kids from ages 4 to 12 to the basic skills and tools used in carpentry and woodworking.

Clement says he hopes the book will impart more than just technical skill. He hopes it will give kids the confidence to take on more complex life issues with the same deliberate focus and can-do attitude they've learned from building projects with their mom or dad.

The book includes five family-friendly projects with clear step-by-step instructions for kids and parents. It sells for around \$13 at many booksellers.

Visit KidsCarpentersWorkbook.com to find a dealer, and be sure to download the free toolbox project from the book while you're there.

HOUSING AFTER THE HURRICANE

Katrina Cottage

A 300-square-foot cottage wouldn't qualify as a "dream home" for most of us. But for the thousands who remain homeless in the wake of Hurricane Katrina, such a modest home would indeed be a dream come true.

Moving toward the fulfillment of that dream was one order of business for the Mississippi Renewal Fo-

rum, a design summit hosted by the Governor's Commission on Recovery, Rebuilding, and Renewal.

The architects, designers, and planners who attended the summit were challenged to create plans for immediate, affordable housing that would also preserve the character of the area in which it was to be built.

One of the most popular results of the initiative is the Katrina Cottage. This 308-square-foot home was designed by New York architect Marianne Cusato, who took her inspiration from the architecture of the Gulf Coast region.

The hope is that this cottage, and other designs like it, will replace FEMA trailers to provide housing for victims of natural disasters. Acceptance of the plan is still a ways off,



Simple décor and simple dignity in a 300-square-foot Katrina Cottage.



Photos by Sandy Sorlien

This Katrina Cottage prototype was built in Mississippi and then shipped to Florida to be displayed at the International Builder's Show.

WORKBENCH OUT OF THE OFFICE

Top 10 Tools Reception

Of all the trade shows that Workbench attends, the International Builder's Show is the one we look forward to the most. It's arguably the most popular venue for companies to announce new

tools and products, and it's also the best single source of information on residential construction trends.

One of the true highlights for our staff, though, is our annual Top 10 Innovative Tools Reception. This is where we formally recognize the winners of the Top 10 Innovative Tool Awards, which are featured in the February issue of Workbench each year.

It's a great opportunity to congratulate those toolmakers that raised the bar in the previous year. Each company is awarded a trophy and banner to display in their office and trade show booth.

If you missed this year's "Top 10 Innovative Tools" article, be sure to visit WorkbenchMagazine.com for a free downloadable version.



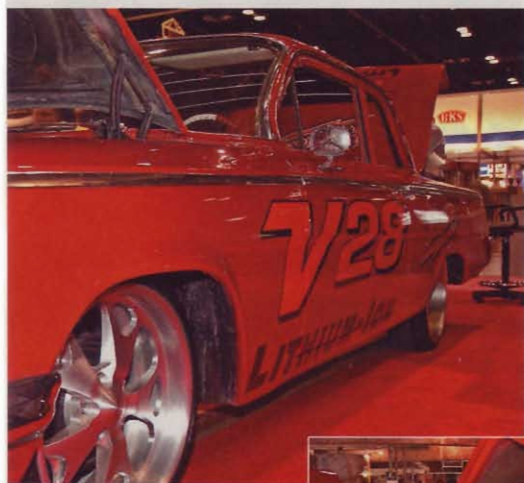
Publisher Don Peschke (left) awards a Top 10 trophy to Festool's Jim Maner.



OFFICE EXCAVATION

During my semi-annual office cleaning, I came across the pile of stuff in the Photo above. This is actually just a small sampling of the type of thing that marketing and promotional people send editors to try to make an impression. Doesn't say much for what they think of our attention span, does it?

Even worse is that we are left to decide what to do with this stuff. Oh, we remove the useful things — travel mugs are a staff favorite. But what are we to do with a foam hammer that encourages inappropriate workplace behavior, "X-ray" specs that don't work (yes, I tried them), and socks too hideous even for an editor to wear? Perhaps we can craft a piece of modern art in time for the next issue.



MILWAUKEE'S V28 Electric Chevy

It's a common dilemma: Do you do the "green thing" and buy one of those new hybrid-electric cars, or do you go for the heavy-metal Detroit dinosaur that made your mouth water when you were a kid? (I tell you, if I had a dime for every time someone asked me to weigh in on that one...)

Well, here's the solution. Just convince Jesse James and the rest of the "Monster Garage" ruffians to retrofit your favorite muscle car with a couple of electric forklift motors and 384 lithium-ion batteries.

It worked for the Milwaukee Electric Tool Company. The 1962 Chevrolet Bel Air shown in the *Photos* is one of the recent projects from the popular cable TV show in which James and his gang take an otherwise-normal car and turn it into something less normal.

It took five days to turn this gas guzzler into a 336-volt, 3,000-amp eco-friendly throwback with some surprising performance numbers. The car did a standing quarter-mile in 14.533 seconds with a top speed of 93.3 miles per hour. No word on how long it travels on a single charge.

For more on the V28 Chevy Bel Air, visit MilwaukeeTool.com. To catch up on "Monster Garage," check out Discovery.com.

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QUICK ROUTER MAINTENANCE ENSURES

Non-Slip Bits

Keep your router collets and bit shanks clean to ensure a good grip on bits.

Q: I've been having trouble lately with router bits slipping in the collet. I use quality bits, and I think I tighten them properly. Could something else be causing them to slip?

Keith Hennessey
Urbandale, IA

A: The first thing to do is make sure the bits are installed and tightened properly. To do that, insert the bit shank as far as it will go into the collet assembly, and then pull it back out about 1/4". Snug down the collet nut by hand, and then tighten it with the router wrenches. A half-turn is usually enough to seat the nut.

If you still have problems with bits slipping, you need to inspect and clean the collet.

Inspect First — Start by checking the collet for cracks or deep scratches in the inside. Also examine the collet nut. If the nut or collet is damaged or shows signs of excessive wear, you'll need to buy new ones from the router manufacturer.

Keep It Clean — If the collet and nut appear okay, chances are they just need a good cleaning. Over time, dust, pitch, and rust can accumulate inside the collet. When you use the router, heat generated by the bit can soften this residue and cause the collet to lose its grip.



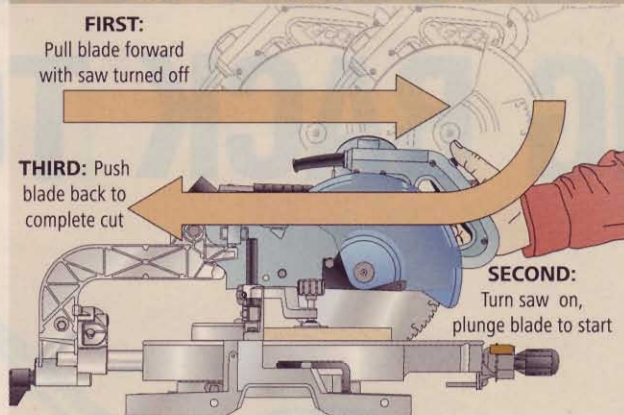
To prevent router bits from slipping, clean the collet with a wire brush to remove pitch and rust. Clean buildup off of bit shanks, as well, using a synthetic steel wool pad.

You can easily clean the buildup using blade and bit cleaner or solvent, along with a wire or nylon brush (above). Clean the inside of the motor shaft, as well. Also clean

the shanks of the bits with a synthetic steel wool pad.

This type of cleaning, by the way, should be done regularly to prevent problems before they occur.

USING A SLIDING MITER SAW



PUSH, DON'T PULL, TO CUT WITH A Sliding Miter Saw

Q: On my radial arm saw, I pull the blade to make a cut. But my sliding miter saw says to push. Why is it different?

Gary Brenniman
Lombard, IL

A: The blades on radial arm saws (RAS) and sliding miter saws (SMS) spin toward you,

so when you pull, the blade may "bite" into the wood. But the RAS has a rigid arm holding the motor, so, at worst, the blade usually just binds.

The motor on a SMS, on the other hand, pivots up and down, so the blade can climb out of the cut and propel itself toward you. Pushing the blade prevents this (Illustration, left).

GOT QUESTIONS? WE HAVE ANSWERS!

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Forums: forums.woodnet.net

Mail: Workbench Q&A, 2200 Grand Ave., Des Moines, IA 50312



Let squeeze-out from polyurethane glue harden completely before trying to remove it. Then scrape it off using a sharp paint scraper. A carbide scraper works especially well.

DEALING WITH SQUEEZE-OUT FROM Polyurethane Glue

Q: I'd heard that polyurethane glue foams up as it cures, but I was surprised by just how much. Do you have any suggestions for controlling the foam? Also, what's the best way to clean it up?

Bernie Latrough
Boston, MA

A: If you're used to using yellow glue, polyurethane takes some getting used to.

The squeeze-out from yellow glue or polyurethane glue makes a mess. But with standard polyurethane, the mess grows because the glue expands as it foams.

To keep this mess under control, start by using less

polyurethane glue than you would with yellow glue.

Another possible option is a new "low-foam" polyurethane glue called Bolder Bond (BolderBond.com).

To test it, I glued up blocks without clamps using equal amounts of low-foam and a "standard" polyurethane glue.

The difference in foaming was significant (*Photos, right*).

With clamps, of course, neither type of polyurethane will spread the joint apart. But using "low-foam" glue should result in less squeeze-out.

To clean up either type of polyurethane glue, wait until the glue dries, then scrape it off (*Photo, left*).

Low-foam Polyurethane Glue



Standard Polyurethane Glue

Gluing without clamps shows the difference between "low-foam" (*top*) and standard polyurethane (*bottom*).

WOULD BE LIKE BLACK AND WHITE TV.



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POSSIBLE CAUSES OF A

Sticky Glue-up

Q: While assembling a project with yellow glue, the glue "clumped" and started to dry before I could get all the pieces together. What might have caused this? Can I thin the glue to make it more workable?

Dave Mayich
Dartmouth, Nova Scotia

It may simply be that you're taking too long to assemble the pieces. Once you spread yellow glue, you have about 10 minutes of "open" time to assemble the parts.

Time — If this is the issue, try to break the project into smaller sub-assemblies.

Glue those up first, and then glue the assemblies together.

You can extend the working time of yellow glue a bit by thinning it with water by no more than 10 percent. This weakens the bond slightly, but not enough to cause problems if the glue is fresh.

Bad Glue — The clumps you describe, though, tell me the glue has gone bad. This happens for several reasons.

Age — Yellow glue has a shelf life of just one to two years. If the glue is older than that, working time and strength are reduced. If age is the problem, throw the glue away and get a new bottle.



The glue-up is when all your hard work on a project comes together. Avoid problems by assembling parts quickly, and making sure you're using "fresh" glue.

Air Curing — Yellow glue cures with exposure to air. If the bottle hasn't been tightly closed, the glue could be partially cured in the bottle.

Freezing — Some types of yellow glue are formulated

to withstand a few freeze/thaw cycles. Others aren't. If the glue has been exposed to freezing temperatures, you should discard it. If your shop is unheated, keep glue in the house, so it won't freeze.

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POCKET-HOLE JIG

Clip-On Dust Hood

No fuss — no dust. Just clip this dust hood to your pocket-hole jig, hook it up to a shop vacuum, and you're good to go.

It's hard to beat a pocket-hole jig for making strong joints quickly and easily. But when I'm drilling a bunch of pocket holes, having to clear the chips slows things down.

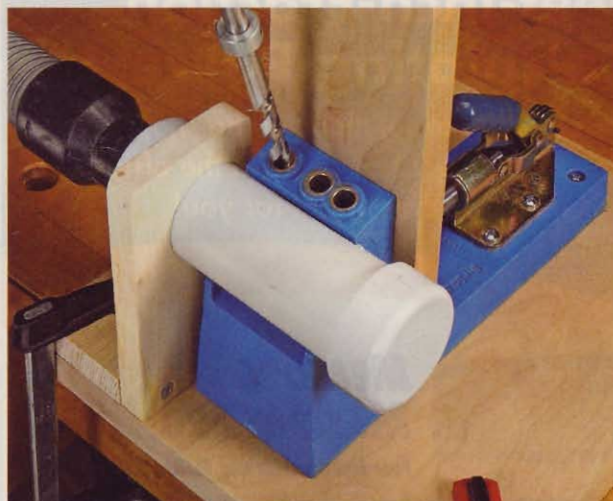
To collect the chips, I made a dust hood that clips onto my pocket-hole jig. It's a short length of PVC pipe with an opening cut into it that fits over the jig (see *Photos above*). Connecting my shop vacuum to the dust hood pulls chips into the opening and out the end of the pipe.

This dust hood is really pretty simple. In addition to

the pipe, it consists of two plastic caps (one with a hole cut in it to accept the vacuum hose) and an L-shaped support with a hole in it that accepts the pipe (see *Dust Hood Assembly*).

The only tricky part about the dust hood is making the opening in the pipe. The size of this opening depends on your jig. Also, to collect chips effectively, you want it to fit snug. To accomplish that, drill corner holes, rough-cut the opening (Figs. 1 and 2), and then file the edges (Fig. 3). I also notched the two lower corners for a better fit.

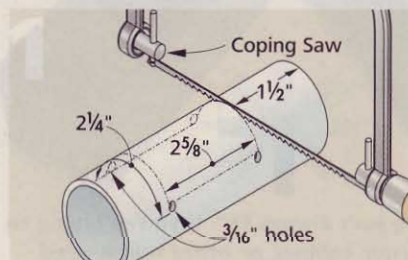
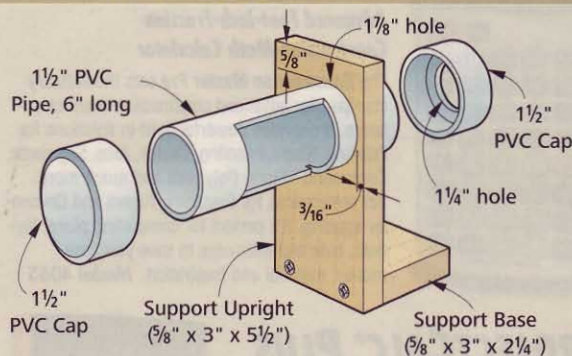
Charles Fuller
Kaukauna, WI



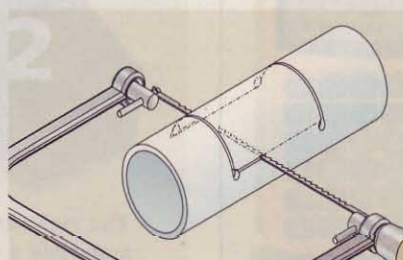
When drilling pocket holes, a vacuum pulls chips through a large opening in a plastic pipe that's sized to fit over the jig.



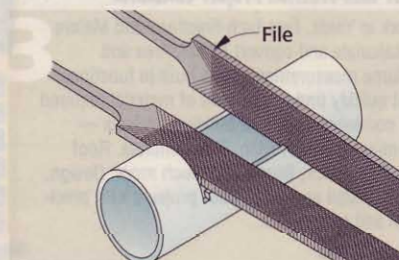
DUST HOOD ASSEMBLY



1] After drilling corner holes, use a coping saw to cut the ends of the opening.



2] Now complete the rough-cut opening by sawing lengthwise down the pipe.



3] Use a file to perfect the fit and to notch the lower corners of the opening.



BEST TIP WINNER!

Charles Fuller wins a new FN16250K-2 pneumatic finish nailer kit, a CAP1516 TrimAir compressor, and a 1/4" Prozhoe — a \$400 value — from Bostitch!

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TIPS & TECHNIQUES

EASY-ON, EASY-OFF

Auxiliary Fence

One thing I like about the extruded aluminum Unifence on my Delta table saw is it can be mounted in two positions. This lets me use either the tall side or the low side of the extrusion to guide a workpiece.

The only downside to this fence is that the unusual shape of the extrusion makes it difficult to attach an auxiliary fence. After doing a bit of experimenting, however, I came up with an auxiliary fence that mounts quickly and easily.

The idea is to position the extrusion in its "low" configuration, so one of its two mounting tracks faces up (*Fence Assembly*). This track accepts a

thin wood strip with two T-bolts installed in it (*End View*). To attach the fence, you simply lower it onto the bolts and tighten a couple of knobs.

The fence consists of a tall vertical face with a groove that accepts a horizontal base. Triangular brackets add rigidity and keep the face square to the base.

As for the mounting strip, chamfer both edges to fit it into the extrusion. Drill holes for the T-slot bolts centered on the width of the strip, and use them to lay out the holes in the fence.

Todd Hines

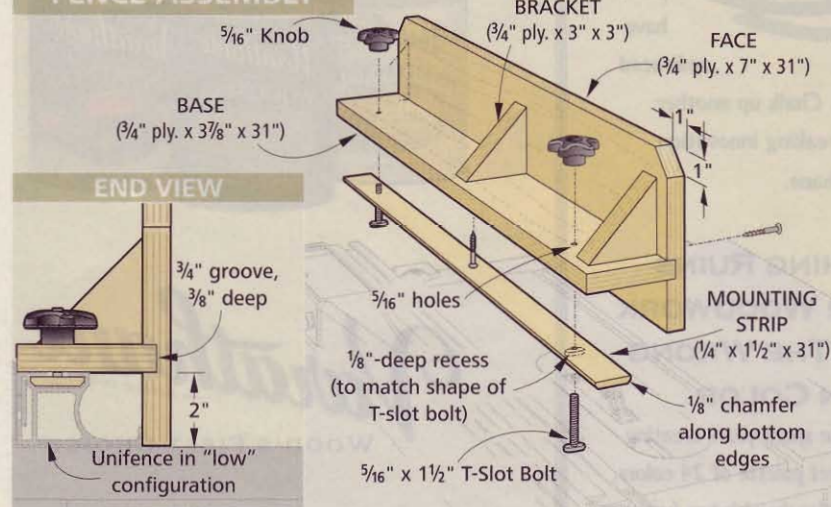
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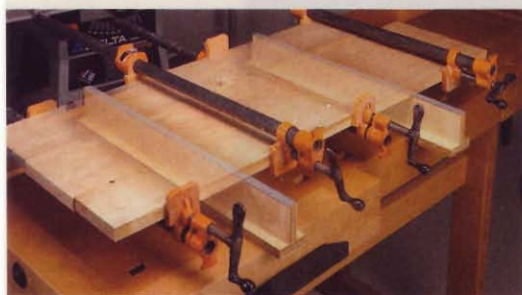


The mounting track in the top of this extruded aluminum Unifence holds a thin wood strip that makes it easy to attach an auxiliary fence.



FENCE ASSEMBLY





When edge-gluing boards to make a solid-wood panel, T-shaped stands elevate the panel and provide clearance for clamps underneath.

T-SHAPED

Glue-up Stands

When edge-gluing boards to make a solid-wood panel, I use a pair of T-shaped stands to elevate the panel above the bench. This makes it easy to position the clamps in an over-and-under arrangement, which keeps the panels flat.

Each stand is made up of two pieces of $\frac{3}{4}$ " ply-

wood that are glued and screwed together. I also added a strip of laminate to the top edge of each stand. This prevents the panels from sticking to the stands and makes it easier to clean glue off them.

*Erick Harloff
Colorado Springs, CO*

QUICK & EASY

Lumber Rack

For lumber storage in my shop, I like to stand boards on end. That makes it easier to sort through the lumber to find the board I want. It also lets me separate boards by wood species.

To keep boards organized (and to prevent them from falling sideways), I made a simple lumber rack from some lengths of black-iron pipe and a few plumbing fittings (*Photo, right*).

I used $\frac{3}{4}$ " pipe for this rack, which is available at most hardware stores. For a small price, you can have the pipe cut to whatever length you want (24" in my case). You'll also want



Pipe and plumbing fittings make a simple lumber rack.

to have threads cut on both ends of each pipe. One end threads into a pipe flange that's screwed to the wall. The other end gets a cap.

*Oscar Rodriguez
Lansing, MI*

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SPACE-SAVING

Storage Rack

Storage for plywood cutoffs and other sheet material is extremely limited in my garage shop. So I built an overhead storage rack that takes advantage of the unused space above the garage door.

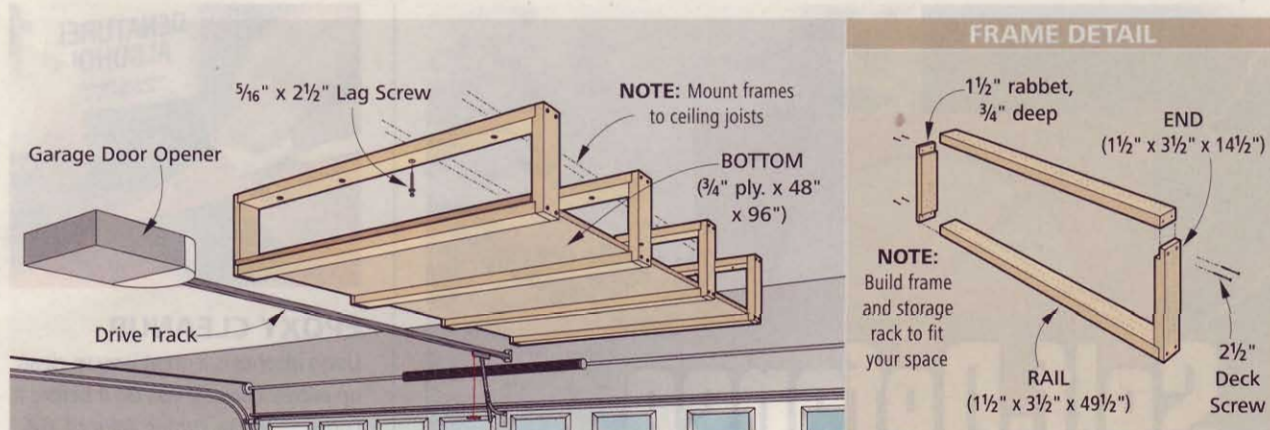
The rack is made up of four 2x4 frames and a $\frac{3}{4}$ " plywood bottom that keeps small cutoffs from falling out (Illustration, below).

Each frame consists of two short ends that are rab-

beted to accept a pair of long rails (Frame Detail). Simply screw the frames together. Then mount them to the ceiling joists with long lag screws. Just be sure the frames clear the garage

door opener and the drive track. Once the frames are installed, slip in the plywood bottom, and nail it in place.

Jerry Bottenfield
Oskaloosa, IA



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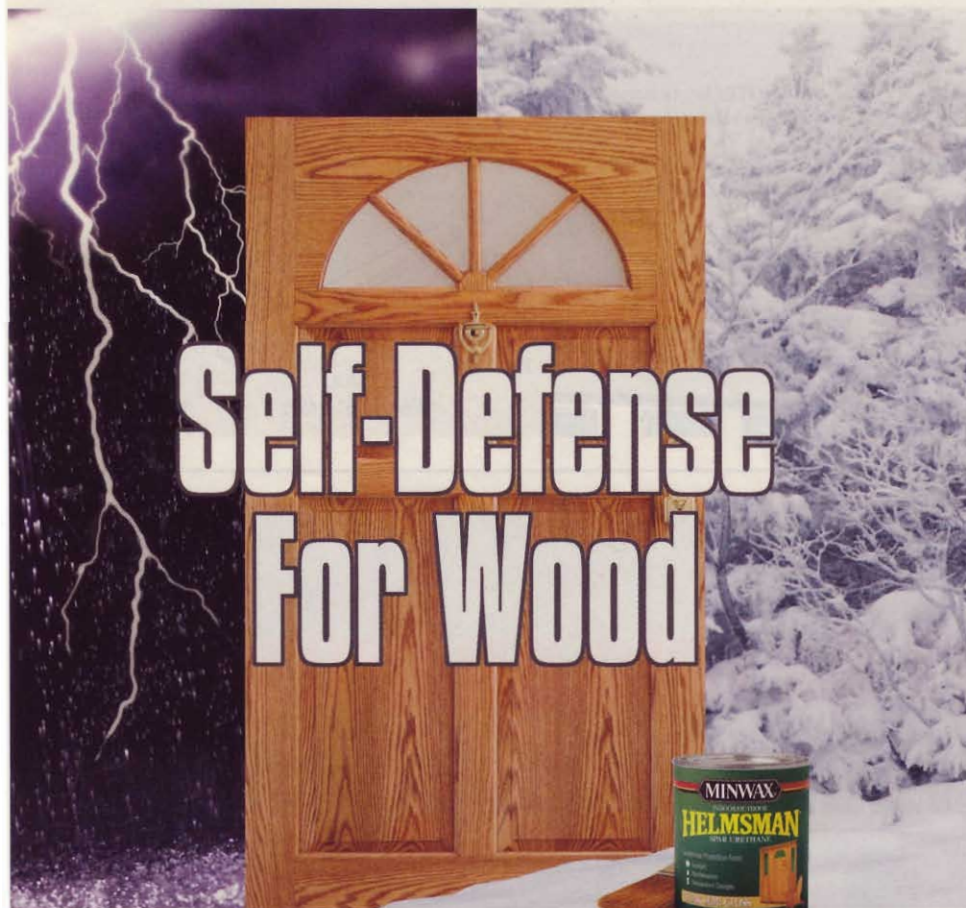
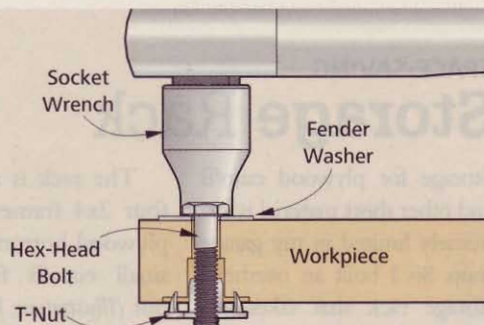
A Better Way to Install T-nuts

If you tap a T-nut in with a hammer, it often goes in crooked. So I use a socket wrench and a hex-head bolt to *draw* the T-nut into place. This way, it goes in straight.

To use this method, start by slipping a Fender washer over the

bolt to distribute pressure evenly. Hand-tighten the bolt until the T-nut begins to bite. Then use the socket wrench to seat the T-nut.

Steve Hendrickson
Oregon, WI



Self-Defense For Wood



For long-lasting protection against the elements, use Helmsman® Spar Urethane.

Harsh weather conditions are always on the attack. So arm your wood with the superior protection of Minwax® Helmsman® Spar Urethane. It's a tough, clear finish formulated to beautify and protect wood. Special ultraviolet absorbers defend against fading. And special oils allow Helmsman® to expand and contract to avoid cracking and chipping that occurs with seasonal temperature changes. From winter blizzards to torrential downpours to scorching summer sun, make sure your wood fights back—with the protection of Helmsman® Spar Urethane.



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Product Information Number 192



EPOXY CLEANUP

Using alcohol is a great way to clean up excess epoxy, if you do it before it cures. —Louise Turner, Atlanta, GA



"FIXING" CHALKLINES

A smudged chalkline is worthless. So I "fix" the line with hairspray. —Timothy Zeis, New Haven, CT



SIMPLE SCRAPER RACK

A plywood block with a saw kerf in the top edge makes a handy scraper rack. —R.B. Himes, Vienna, OH

GET THE LOOK OF WOOD BY

Staining Fiberglass

The newest fiberglass doors feature more realistic-looking "wood grain" than ever. And they can be stained to look just like wood.

Q: I've seen fiberglass doors at the home center that claim they can be stained to look just like wood. I'm a bit skeptical. Does this really work?

Stan Krieg
Tacoma, WA

A: Many fiberglass doors can be stained, and some of the newest offerings from door manufacturers have such realistic grain patterns that they look like real wood once stain is applied (Photo, above right).

Applying the stain, though, is different than on a wood door. That's because fiberglass doesn't absorb stain like wood, so you need to use a slightly different technique to stain it.

Start by coating the door with stain using a foam brush

(Fig. 1). You may be used to applying stain with a rag. But since the stain doesn't soak into the fiberglass surface, the brush is better at laying down an even coat.

After brushing on the stain, however, a rag still comes in handy for removing any excess stain. Here, you'll want to lightly dab the rag with stain first (Fig. 2), and use light to medium pressure when wiping the rag across the surface. This way, you won't wipe off too much stain (Fig. 3).

As you can see in Figures 1 and 2 below, you only want to work one area at a time. On a panel door, brush and wipe the panels first, and then the rails and stiles. This prevents stain from drying on one area

of the door before you can wipe it smooth. Follow this progression until one entire side of the door is stained.

The next step is the most critical, and that is "dry brushing" the stain with a natural-bristle brush (Fig. 4). To do this, lightly brush the door, holding the brush at a 45° angle to the surface. This smooths out the stain. Stay with the "grain" to maintain what appears to be the joint line between the rails and stiles. Also, dab the brush on a rag from time to time to keep it dry.

Once you're satisfied with the look of the door, let it dry for at least a day. Then follow up with two thin coats of varnish. (I used an exterior water-based polyurethane finish.)

This fiberglass door from Masonite's Barrington line has embossed wood grain that looks absolutely real once you apply stain. A kit is available with all the supplies you need for staining and finishing (Masonite.com).



1] Starting with the panels, use a foam brush to apply stain. Choose a thick, heavily pigmented stain (like Zar).



2] Before you remove excess stain, dab a rag with the stain. This prevents the rag from removing too much stain.



3] Now apply light to medium pressure as you remove the excess stain. Wipe the rag back and forth with the grain.



4] After staining one side of the door, use a "dry brush" to brush with the grain until the stain is smooth and even.

QUICK FINISH FIX:

Steaming out Dents

Q: A chest I made from Douglas fir got a nasty dent when I was moving it. Is there any way to fix it?

Doug Allansly
St. Paul, MN

A: I had the same problem with a cedar deck a few years ago. After I built it, I found a number of dents around nail heads. But a year later, the dents had disappeared. It seemed that nature (in other words, heat and moisture) had pulled out the dents.

You actually can recreate this effect in your shop. By moistening and steaming a

dent, you can literally "pull" it out, so it's flush with the surrounding wood. This trick works on both finished and unfinished pieces.

To steam out a dent, saturate the dent with water, and let it soak in for a minute (Fig. 1). Next, moisten a rag, and lay it flat over the dent. Set an iron on its highest setting, and press it onto the rag for just a few seconds (Fig. 2). This creates steam, which expands the wood fibers to remove the dent.

To finish up, sand lightly where the dent used to be, and apply a coat of finish.



1] Use an eye dropper to saturate the dent with water.



2] Apply an iron to a damp cloth to steam out the dent.

Take Your Woodworking to the Next Level

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DELTA DRILL PRESS

Adds a New Tilt

A forward-tilting table and machined miter slots mean this new drill press has versatility to match its capacity.

Chalk up Delta as the first toolmaker to recognize that woodworkers don't want to keep getting by with a drill press made for machinists.

The table on Delta's new model 17-950L 16½" drill press is proof-positive that the company gets it (*Photo, right*). First of all, the table tilts forward as well as side-to-side, so it offers much better

control and more versatility than standard tables. And in a clear nod to us woodworkers, the table now has two miter slots machined right into the surface. That means many of the accessories that we use with a table saw or router table can be adapted to this drill press.

Additionally, the table has loads of clamping surface around the perimeter, so you can secure workpieces and still have both hands free.

Of course, no new tool is complete these days without

a laser guide, so the drill press has that, as well.

The Delta 17-950L is available in stores now. Prices start at \$399. Visit DeltaMachinery.com or call 800-223-7278 for more information.



The Delta's large table tilts 45° forward, as well as 90° to either side.



Delta's new 17-950L drill press features a work light, 12 speeds, and nearly 4" of quill travel.

18-VOLT POWERHOUSE

Spiral Saw

The new RZ18V RotoZip by Bosch is the first cordless spiral saw that easily keeps up with its corded counterparts.

Powered by Bosch's 2.4 amp-hour 18-volt Bluecore batteries, this powerful new spiral saw easily cuts through drywall, wood, tile, and countertops (*Photo, right*).



Expect to pay about \$170 for the complete kit shown in the *Photo*, below left. For more information, visit RotoZip.com or call 877-768-6947.



With 18 volts of power, the RZ18V cuts many materials with ease.

Milwaukee Pneumatics

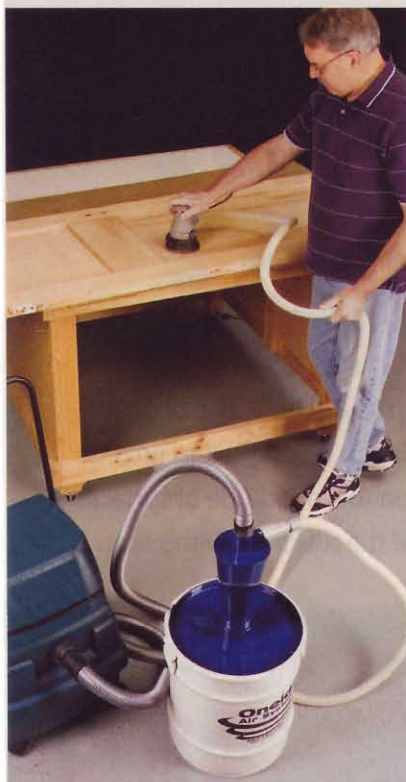
Milwaukee Tools recently expanded their offerings to include a full line of pneumatic nailers. The line includes two framing nailers, one roofing nailer, two finish nailers, a brad nailer, and a narrow-crown stapler. A full complement of nails and fasteners to fit each model is also part of the launch.

All of the tools are covered by Milwaukee's five-year limited warranty.

Visit MilwaukeeTool.com or call 800-729-3878 for more information.



Milwaukee nailers feature magnesium housings, tool-free depth-of-drive adjustments, and self-cleaning air filters.



Oneida's Dust Deputy lets you sand up to 100 times longer before your vacuum filter needs cleaning.

BUST DUST WITH

Oneida's Dust Deputy

If you've ever thought of cyclonic dust collectors as being only for shops and budgets much larger than your own, you're in good company. But Oneida now offers two cyclonic collectors that should easily fit into the smallest shops and tightest budgets.

First is the Dust Deputy (Photo, left). This package includes a seam-welded cyclone and a 10-gallon drum, along with all the connection hardware. All you need to supply is a shop vacuum and two hoses.

Simply connect the Dust Deputy inline between whatever power tool you're using and the shop vacuum, and go to work. As the dust passes through the Dust Deputy, the cyclonic action causes all but the finest dust to collect

in the bin. That means a relatively tiny amount of dust is actually making it to your shop vacuum. Oneida claims you'll be able to wait 50 to 100 times longer between filter cleanings because of the efficiency of the cyclone.

The Dust Deputy sells for about \$200.

If you'd like a solution that's more economical yet, then consider the Basic Cyclone (Illustration, right).

This kit works just like the Dust Deputy, but in this case you need to make a plywood top to tie the cyclone to a bucket (which you also supply). The hardware to connect the top to the bucket is included.

This version sells for just under \$100 and offers the same efficiency as the pricier version. The only real



difference is that the bucket will need to be emptied a little more frequently.

For more information, visit Oneida-Air.com or call 800-732-4065.

PORTABLE POWER

Metabo Jobsite Saw

Metabo's new TS250 jobsite table saw is a powerful, smooth-running saw with some great features.

First off, the TS250 has the largest table of any jobsite saw (25½" x 30"), which means it can handle rips and crosscuts in large stock more readily than smaller competitors.

The Metabo also boasts a 15-amp motor with soft start and electronic speed control for smooth start-ups

and consistent power. Additionally, the motor is mounted on two solid posts that dampen vibration throughout the cut.

We found the Metabo TS250 to be an extremely capable saw that was mostly a pleasure to work with.

Our only complaint about this table saw is that remov-

ing the blade guard is overly complicated.

The saw sells for around \$600 with a stand and for slightly less without it.

For more information on the TS250 jobsite table saw, or any of the rest of Metabo's full line of power tools, visit MetaboUSA.com or call 800-638-2264.



STRAW KEEPER

Someone has finally outsmarted the wily straw. No small feat, considering these things have been escaping from WD-40 cans for over 50 years.

But now the Hold-It company offers these nifty little straw keepers that easily shackle any straw to any aerosol can.

A set of two Hold-Its sells for \$1. Visit Hold-It.net or call 281-440-1655 for more information.



Deck Redo

Start with your old, tired deck. Add one, or all five, of these easy-to-build projects. Enjoy your great-looking outdoor retreat.

This deck wasn't very pretty to begin with. And it wasn't getting any better with age. We revived it with new deck boards and a handsome railing, plus a pergola, privacy screens, and a dramatic stairway that unites the deck and yard (*above*).





DECK REDO: THE BIG PICTURE

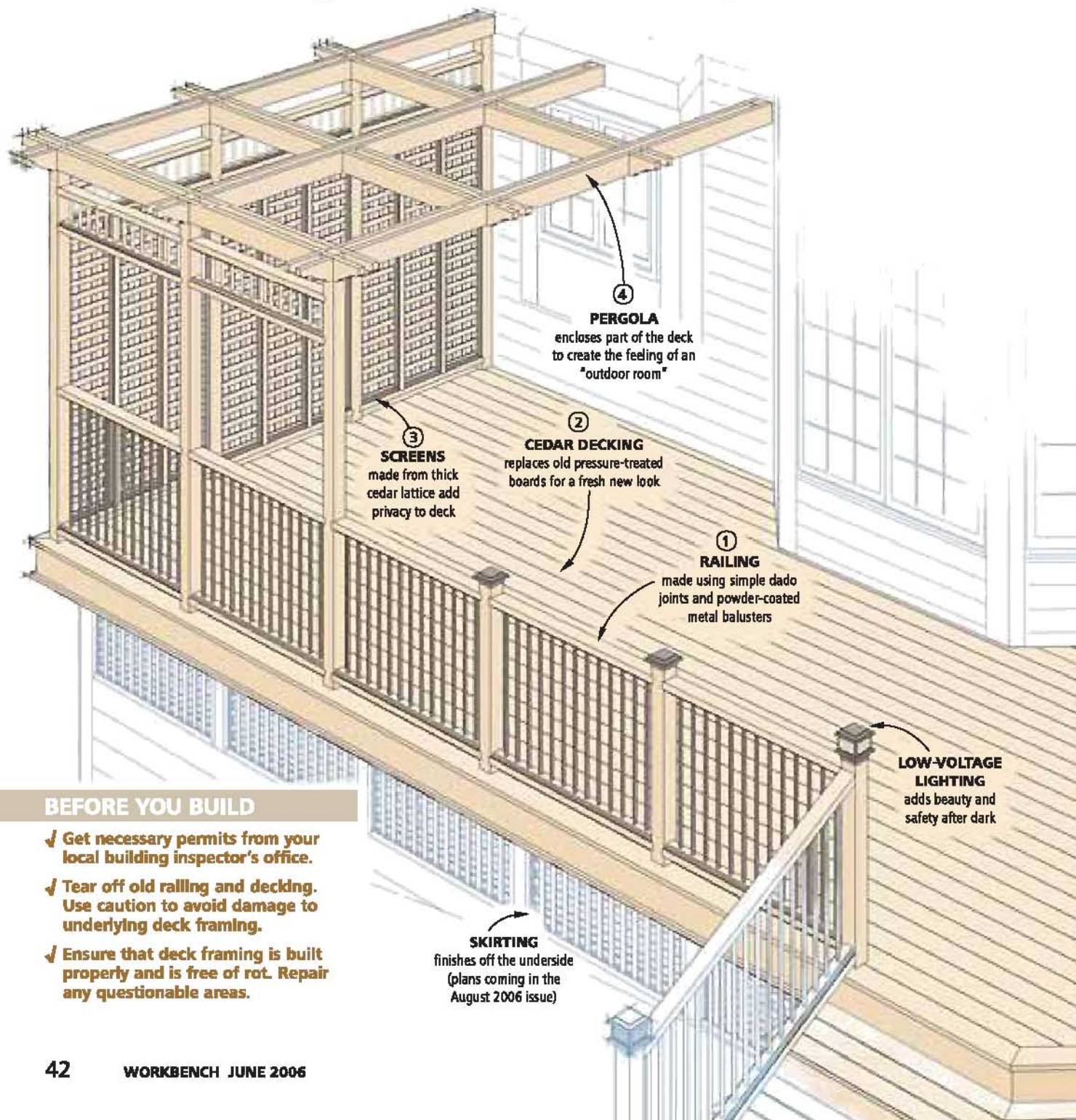
If your house came equipped with a deck, you've probably noticed a couple of things. First, it looks almost, if not *exactly*, like all your neighbors' decks. That's because most homebuilders tack on decks in a hurry, using the same design over and over again.

Second, if the deck is more than a few years old, it probably looks a bit "tired." The wood has turned a dingy

gray/brown, and some of the boards have learned how to do the twist.

You've probably wished that you could at least make your deck look better. You may even have dreamed of having a stylish deck like the one in the *Photo* on pages 40 and 41. But you figured that would mean tearing out your current deck and starting from scratch. And that would be a real hassle.

Well, we have some great news. You can make your deck more distinctive *without rebuilding*. As long as the underlying structure is solid, which it more than likely is, you can just tear off the ugly "skin" and save the existing "bones" as a base for one or all of these five great-looking projects (*Illustration, below*). All you need are basic wood-working tools and skills.



④
PERGOLA
encloses part of the deck
to create the feeling of an
"outdoor room"

③
SCREENS
made from thick
cedar lattice add
privacy to deck

②
CEDAR DECKING
replaces old pressure-treated
boards for a fresh new look

①
RAILING
made using simple dado
joints and powder-coated
metal balusters

**LOW-VOLTAGE
LIGHTING**
adds beauty and
safety after dark

SKIRTING
finishes off the underside
(plans coming in the
August 2006 issue)

BEFORE YOU BUILD

- ✓ Get necessary permits from your local building inspector's office.
- ✓ Tear off old railing and decking. Use caution to avoid damage to underlying deck framing.
- ✓ Ensure that deck framing is built properly and is free of rot. Repair any questionable areas.

5 EASY DECK PROJECTS

Looking at the *Illustration* below, you may think that redoing your deck is a big project. But if you look closely, you can see that we've broken it down into five individual projects that we'll show you in the next few pages and in the August 2006 issue of *Workbench*.

Posts & Railings (page 44) — We kick things off with a new railing system. It's built super-sturdy for safety, and features unique metal balusters that are available in colors to complement your home (see page 48). We even help you add built-in lighting.

New Decking (page 46) — To replace the worn-out decking that gets torn off (*Before You Build*, page 42), we'll show you how to install cedar decking.

It looks great, and it offers other benefits (*below*). The decking gets installed with "hidden" fasteners that eliminate the visible screws for even better looks.

Privacy Screens (page 49) — At one end of the deck, we add a bit of privacy with easy-to-build lattice "screens."

Pergola (page 50) — To top it off, we'll show you how to build a pergola that really gives the feeling of an "out-door room" at one end of the deck.

Steps (August 2006) — In the next issue of *Workbench*, we'll teach you everything you need to know about planning and building a set of dramatic wraparound steps. They tie the deck and yard together to make both more functional and beautiful.

Why Cedar?

You have many choices available in today's market for deck products, from pressure-treated pine to composites. So, why did we choose Western red cedar?

- For starters, cedar has a beautiful color and subtle, straight grain.
- Cedar is also naturally resistant to decay without the use of chemicals.
- Properly maintained, a cedar deck can last 40 years or more.



- Cedar is environmentally friendly, too. It comes from managed forests and is biodegradable.
 - Finally, cedar is lightweight but stable, and it cuts like a dream.
- To learn more about cedar, visit the Western Red Cedar Lumber Association at WRCLA.org

A NEW ANGLE

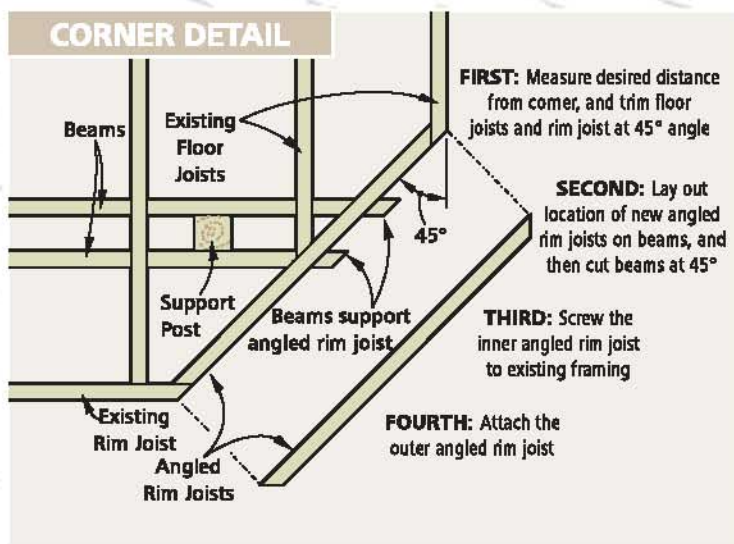
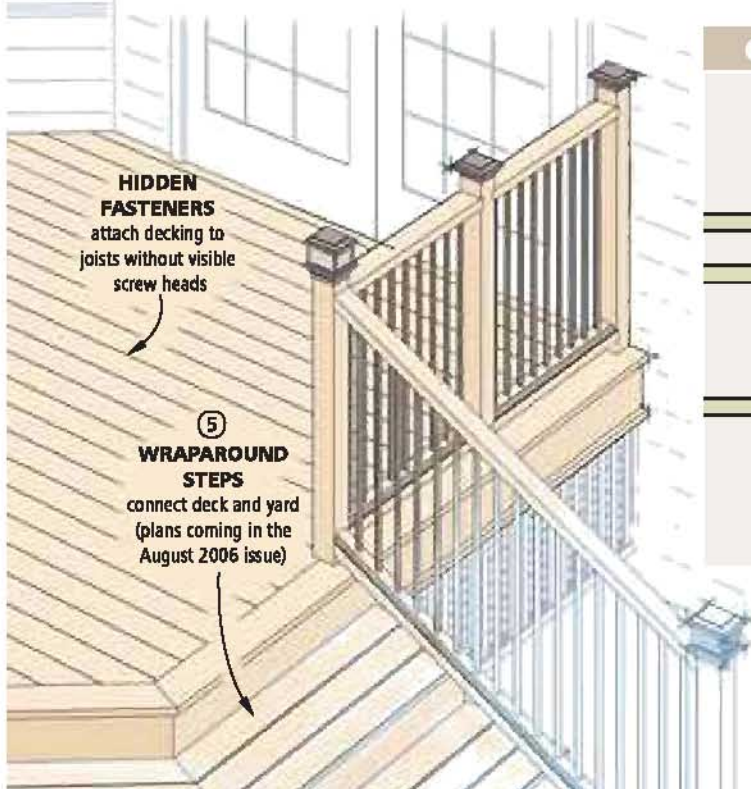
If you compared the "before" and "after" *Photos* on page 40, you may be wondering how we made the angled corner at the top of the steps. It's easy, as long as your deck's construction can accommodate it.

To find out, take a look at the floor joists, the beams they sit on, and the deck support posts (*Corner Detail, below*). Usually, floor joists extend beyond the beams, and the posts are positioned a couple of feet from the end of the beams. If your deck is built this way, then you can cut the corner at an angle.

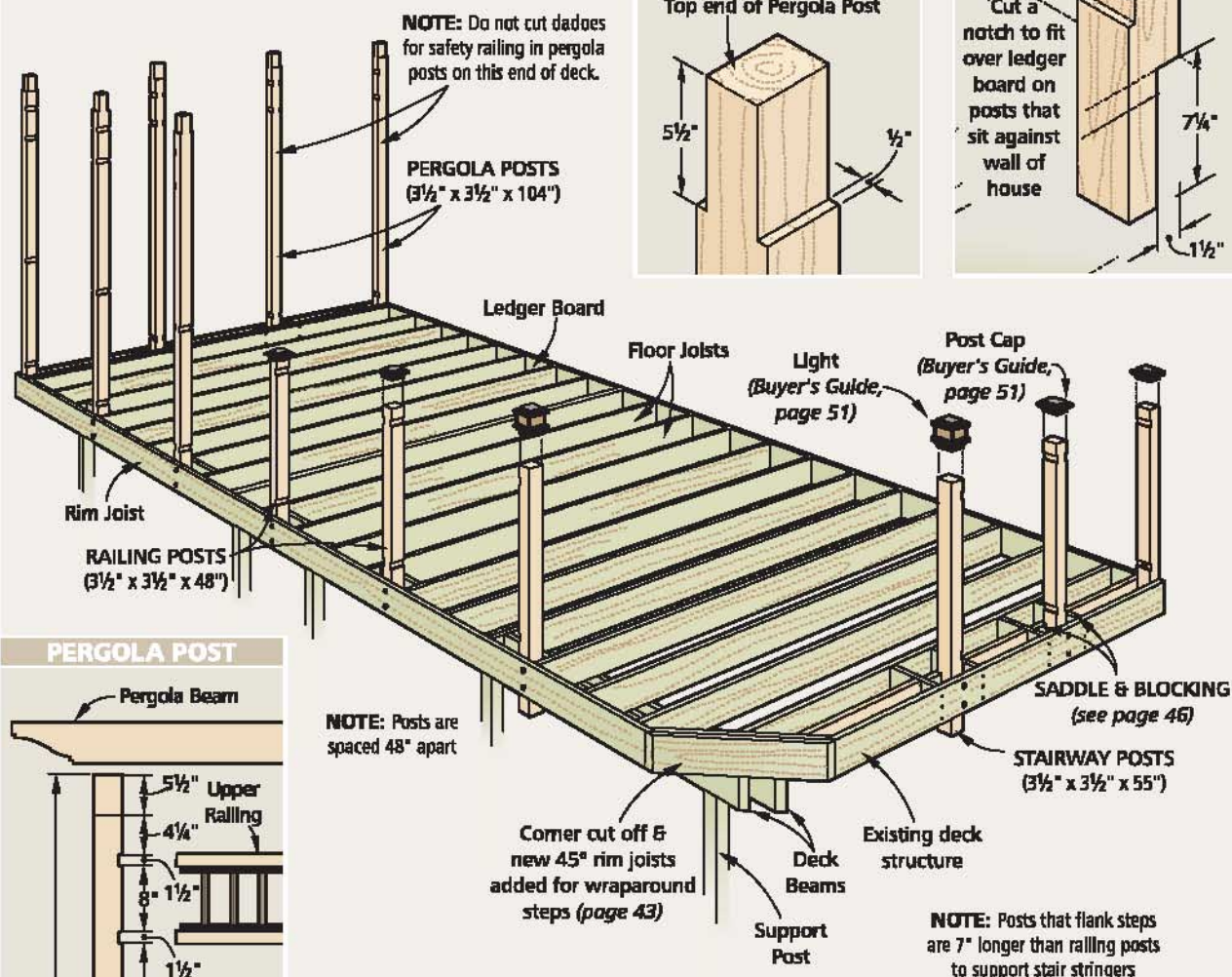
To do it, first determine how much you want to remove. (We measured in 24" each way from the corner.) Then cut and rebuild the deck framing as shown below.



After cutting off the the corner, screw on two 2x8s to form the 45° angle and reconnect the joists.



POST OVERVIEW



BEGIN BY BUILDING THE POSTS

The first parts to build for this deck revival are the posts. That's because every other part of this project either fits around or gets attached to them. You can see that there are two types of posts (*Post Overview, above*). The posts are easy to build. But before doing that, it helps to understand the details of their construction.

Post Length — The most notable difference between the two types of posts is their lengths. There are long pergola posts and shorter railing posts. All of the railing posts are the same length, with two exceptions. The two railing posts that flank the stairs extend 7" below the deck framing to support the stringers of the deck steps. If you're not building steps, you won't need these longer stairway posts.

Dadoes for Railings — As you can see in *Pergola Posts* and *Railing Posts* at left, there are actually two types of railings that wrap around the deck: the lower "safety" railing that offers protection against falling, as well as a decorative upper railing that sits just below the pergola.

Wherever one of these railings abuts a post, that face of the post gets a pair of dadoes to receive the 2x4 rails at the top and bottom of the railing. Those dadoes lock the railings to the posts, and make the railings easy to install.

At one end of the deck, though, we replaced the conventional safety railings with screens made from heavy-duty lattice. Because of that, only dadoes for the bottom rail are needed. All of the pergola posts will get pairs of dadoes to receive the decorative upper rail, though.

Notches — All the pergola posts need notches at the top, too (*Pergola Notch, page 44*). Those notches provide a place to attach the beams and rafters of the pergola.

Notches are also necessary at the bottom end of the two posts that sit against the wall of the house. That way, those two posts can fit over the ledger board that attaches the deck framing to the house (*Ledger Notch, page 44*).

Lay out the Posts — Now that you know all the details of the posts, you need to figure out how many posts you need. That's determined by the size of your deck and the spacing between the posts. We spaced the posts 48" apart. That's the maximum we'd recommend. Wider spacing requires longer rails that could sag.

By the way, to be sturdy the posts should get attached to the deck framing on at least two surfaces. Usually that's done by mounting the posts where floor joists intersect the rim joist. But that joist spacing may not perfectly match up with where you want the posts. To get around this, we came up with a slick post-mounting system that lets you attach the posts solidly at any point around the deck. We'll get into that on page 46.

Build the Posts — Okay, you finally know everything you need to know in order to build the posts. That means after you determine post spacing, you can count up how many railing posts and pergola posts you'll need. Then cut the posts to length.

Add Dadoes & Notches — Now it's time to cut all those dadoes and



Wiring the Lights

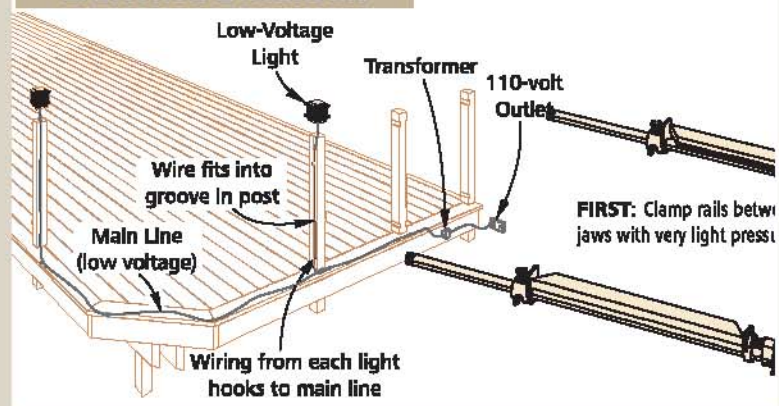
Adding lighting to the deck posts makes sense for a number of reasons. First of all, post lights cast a warm light that just looks great. Plus, that light makes your deck more functional in the evening. Lighting also makes steps safer after dark. In fact, some building codes now require steps to be lit.

We chose low-voltage fixtures that are easy to hook up. But we didn't want wires visible running up the posts.

Our solution was to cut a groove in one face of each post that gets a light. Then, we glued in filler strips cut from scrap cedar (*Lighting Diagram, below*). This creates a wiring chase through the post (*Photo, left*).

To hook everything up, we fed wires from the lights down through these chases, and then connected them to a main line that runs under the deck. That line ties all the lights to a transformer.

LIGHTING DIAGRAM



notches in the posts. You may think you'll never be able to keep straight which posts get cut in what locations. But we have an easy way.

Just lean each post against the deck in its approximate mounting position. Then lay out the dadoes and notches on the appropriate faces of each post. Before moving the posts, label each one and the deck frame with a corresponding number or letter. That

way, you can mount each post in the correct place again later.

That done, you can cut the dadoes and notches. We came up with a few tips and a jig to make this easier. They're shown on pages 88 and 89.

Bring on the Light — If you want to add lights to any of the posts, as we did around the stairs, then you'll need one more machining operation on these posts (*Wiring the Lights, above*).



The posts that sit against the wall get bolted in (above). The others mount in dadoed "saddles" (below).



INSTALL THE POSTS

You're almost ready to attach the posts. But you need to do two things first.

Stain Before Installation — For one, it's a good idea to pre-stain all the posts. You'll be able to do a better job and make less of a mess.

Saddle Up — Next, you need to make and install the "saddles" that lock the posts in place (*Photo, below left*). The saddles are made from 2x8 pressure-treated lumber, and each has a dado that captures the post (*Post Mounting*). How the saddles get attached depends on their location.

Along the front of the deck, attaching the saddles is easy. They just fit between floor joists (*Front Post Detail*). To make these saddles, measure between the floor joists at each post location. Then cut the saddles to fit.

Next, working with one saddle at a time, clamp the post that goes with it to the deck frame, making sure the post is plumb. Hold the saddle against it, and then mark along both edges of the post to lay out the dado that the post fits into. Then cut the dado.

Next, clamp the post and saddle in position, and then screw the saddle to the floor joists. Don't worry about

mounting the post yet. Just go ahead and complete the rest of the saddles along the front of the deck.

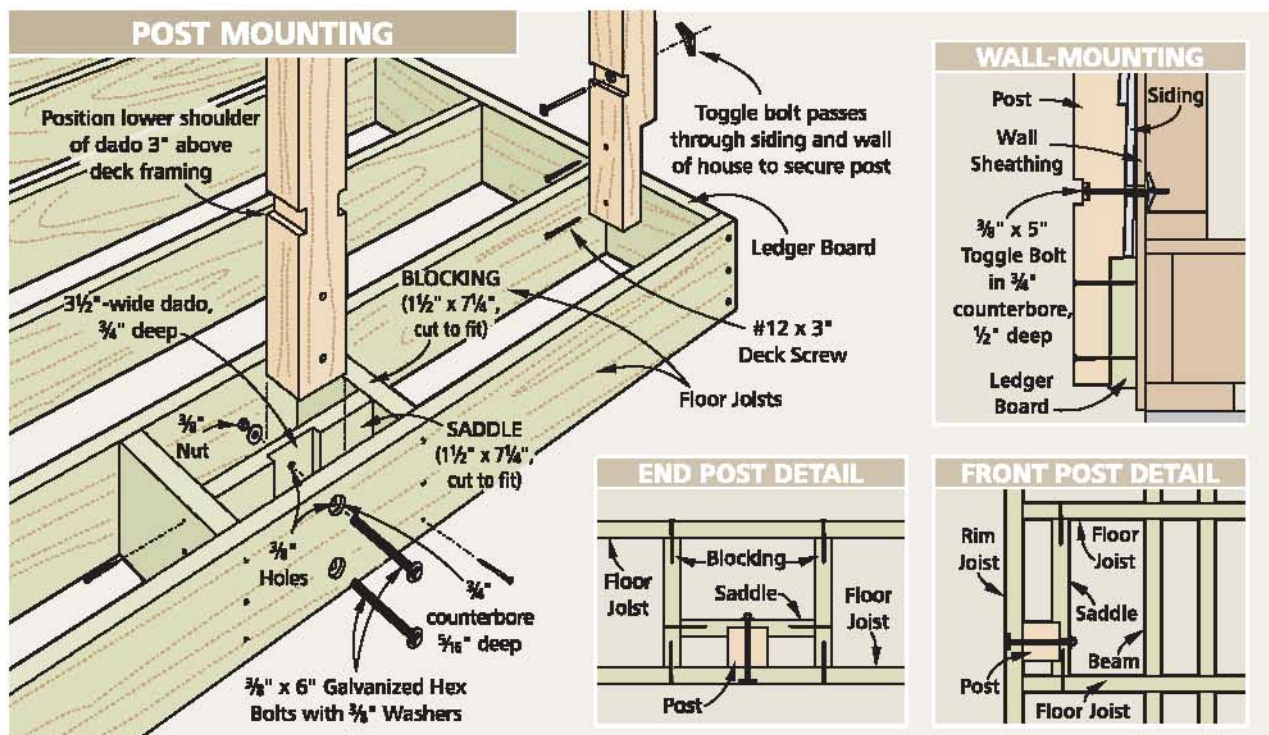
Next, move to the ends of the deck. Because there's nothing to attach these saddles to, you need to add blocking for each saddle (*End Post Detail*). Then screw the saddle to the blocking.

Attach the Posts — With all the saddles in place, it's time to mount the posts. Start by clamping the two outside corner posts in place so the bottom dado in each post sits 3" above the deck framing. Stretch a level line between the posts and align the string with one shoulder of these bottom dados. Then adjust one post until the dados sit at the same level.

Now clamp the remaining posts in place, aligning them with the string as well. This ensures that the railings will be level, even if the deck is slightly off.

Once the posts are aligned, drill through the deck framing, post, and saddle using a long drill bit. Finally, bolt the posts in place for good.

The two posts that sit against the wall of the house are attached a bit differently. They get secured to the wall with toggle bolts (*Wall-Mounting*).



LAY DOWN THE DECKING

The next step, and one that really starts to breathe new life into the deck, is installing the cedar decking.

Decking Details — One of the distinctive details of the decking is a band that wraps around the perimeter of the deck (*Decking Installation*). It “frames” the deck and hides the ends of the other deck boards. The band overhangs the outside of the deck framing, and it’s complemented by a matching band under the deck (*Deck Band & Fascia*). A fascia of 1x8 cedar covers the existing deck framing.

Hidden Fasteners — We attached the rest of the decking with a “hidden fastener” system (*right*). That way, your eye is drawn to the beautiful decking, rather than to rows of visible screw heads.

Bring On the Band — Installation starts with the deck band. As you can see below, the band gets notched to fit around the posts. Those notches are sized so the band overhangs the deck framing by 1½". You’ll also need to miter the ends of the deck band at the outer corners (22½° at the angled

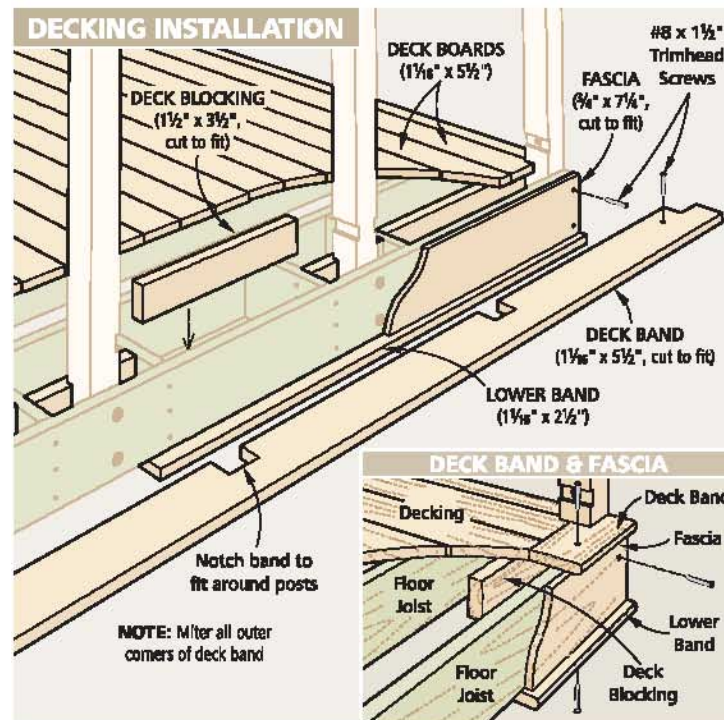
corners, 45° at the square corners). Attaching the band does require driving screws through it and into the deck framing. Here, we used stainless steel trimhead screws. They have a small-diameter head, which makes them almost unnoticeable.

After that, you can attach the fascia and lower band. This band is made simply by ripping deck boards in half.

Before you can install the rest of the decking, you’ll need to screw more blocking to the deck framing. This blocking, cut from scrap 2x4 cedar stock, provides a place to attach the ends of the decking.

That done, you can install the decking, as shown at right. Where boards butt end-to-end, cut them to meet over a joist. Also, with the fastener system we used, you’ll run out of room to drive the deck boards onto the fasteners as you get near the house. We simply attached these last few boards with trimhead screws.

Roll on a Finish — Once all the decking is down, roll on a couple coats of deck stain to protect it.



Fasten the Decking



The Tiger Claw deck fasteners we used have metal tabs that grab into the edges of the decking to hold it in place.



1] Position a fastener over a joist, and then tap it into the deck board using a heavy mallet and the installation block.



2] Secure the fastener by driving a screw through it and into the joist. Repeat the process at every floor joist.



3] Lay the next deck board in place, then pound it into the fastener's other tabs. Use a scrap to protect the decking.



The balusters get mounted between the rails (above). Pocket holes in the rails accept mounting screws (below).



RAILS & SCREENS COME NEXT

When it came to building the railings, they had to provide a sturdy protective barrier, of course. But we wanted them to be distinctive, too. We accomplished that and kept construction simple at the same time by using powder-coated aluminum balusters (*Photo, left, and Box, below*).

Another distinctive feature comes from the upper decorative railings that span between the pergola posts. These short railings are made exactly like the taller railings.

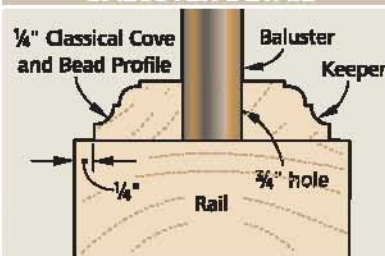
Screens Add Privacy — At one end of the deck, we added privacy screens between the pergola posts instead of a railing (*Privacy Screens, page 49*). They provide a measure of privacy from a nearby patio. Made from heavy-duty cedar lattice, they're plenty sturdy as a substitute for the railing. We'll get to building the screens shortly. But first, it's time to make the railings.

Ready the Rails — Building the upper and lower railings couldn't be much easier. As you can see in *Rails & Balusters*, each consists of a pair of 2x4

rails that fit into the dadoes in the posts. A baluster assembly fits between the rails. It's simply made by inserting the aluminum balusters into keeper strips.

To get started, cut all the 2x4 rails to length to fit between the dadoes in the posts. Before installing them, though, you'll need to pay special attention to the rails that fit around the privacy screens at one end of the deck. Look at *Privacy Screens* on page 49, and you'll see that the screens are supported at the bottom by a rail that sits just above the decking. At the top end, it's the upper railing that supports the screens. Two vertical supports divide the openings between the pergola posts and create narrow openings for the screens. These supports fit into dadoes in the rails, which you'll need to cut now.

BALUSTER DETAIL



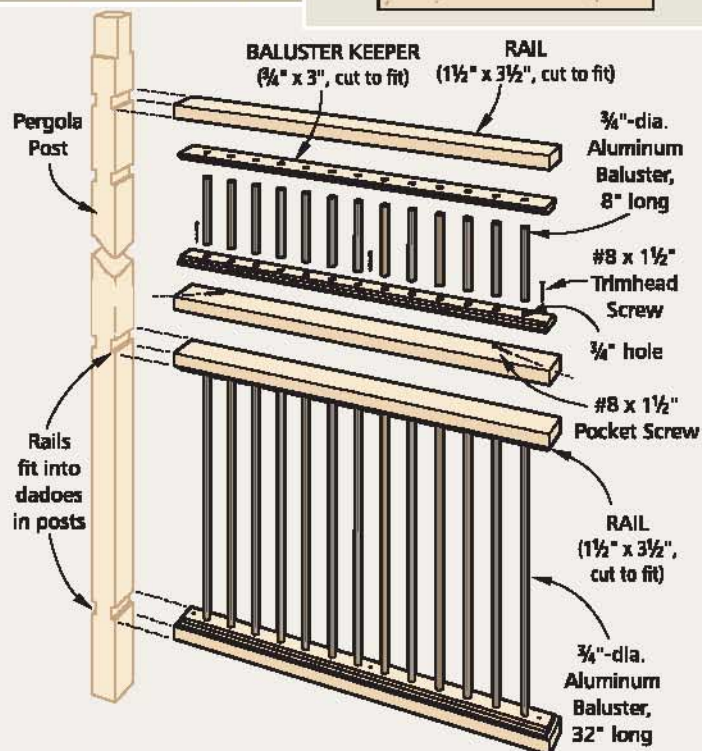
Bring in the Balusters

Instead of making wood balusters for our railings, we chose powder-coated aluminum balusters (*Sources, page 51*). They're available in a variety of colors to match the stain color of your deck or the paint color of your home.

On our deck, we mounted them in holes drilled in the baluster keeper strips. But the manufacturer also offers connectors (*Photo, below*). If you use pressure-treated lumber, these are a must to prevent corrosion caused by the copper used to treat the wood.



RAILS & BALUSTERS



Install the Rails — Like the posts, you'll want to stain the rails before installation. When the stain dries, slide the rails into position. We attached them with screws driven into pocket holes (*Inset Photo, page 48*). If you don't have a pocket-hole jig, just drive screws in at an angle. Either way, the screws will get covered up by the baluster assemblies.

After the rails are in, cut the vertical supports for the privacy screens. Stain the supports, and then screw them in place.

Baluster Keepers — The keepers that hold the balusters in the upper and lower railings are identical (*Rails & Balusters*). Each pair of keepers has holes that the balusters fit into. Then the assembly just slides into place between the rails (*Photo, page 48*).

Start by cutting the keepers to size from 1x8 cedar. Next, bore the holes for the balusters. Be aware that code dictates the balusters have to be spaced so that a 4"-diameter sphere can't fit between them. To ensure alignment, stack each pair of keepers, and drill the holes in both at the same time.

To complete the keepers, rout a profile along each edge. We used a "classical cove and bead" profile. Then stain the keepers.

Mount the Balusters — Now you can insert the aluminum balusters into the holes in the keepers. Then mount the baluster assemblies, so they are centered on the width of the rails. Fasten them by driving screws into each rail.

In the case of the upper railings, you'll have to cut the aluminum balusters to length before installation. The soft aluminum cuts easily with a pipe cutter or a miter saw.

Make the Screens — Next, move on to the privacy screens. We chose heavy-duty lattice to ensure these screens would provide protection against falling.

Size the Screens — Start by measuring and cutting the lattice screens to fit into their openings. Then, like the other parts of the deck, the screens get stained before installation. But in

this case, we used a darker stain. In fact, we had our stain supplier custom tint the stain to match the "rust" color of the aluminum balusters.

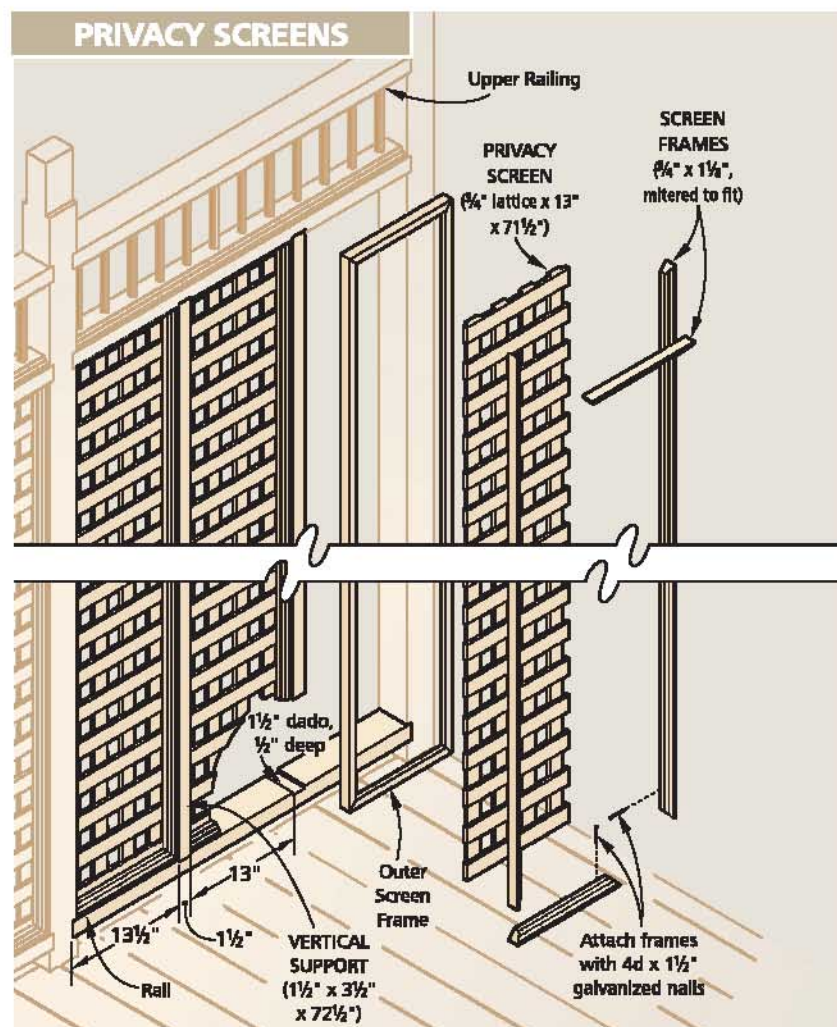
Frame the Screens — The screens are centered on the thickness of the posts and are held in place by inner and outer frames similar to the baluster keepers. The easiest way to make these frames is to start out with oversize blanks. Just rip long pieces of cedar 1x6 to 2½" wide. Next, rout a profile on both edges to match the keeper strips.

Now rip these frame blanks in half, and then stain them to match the posts. After the stain dries, miter the frame blanks to length to fit their openings.

You can now position the outer frame and nail it in place. Slip the screen into place against that frame, and then add the inner frame (*Photo, right*).



Lattice screens fit between the pergola posts to add privacy to the deck. Mitered frames secure the screens.



BUILDING THE PERGOLA

By now, you know that this deck is filled with unique and interesting features. But one of the most distinctive has to be the pergola that sits atop one end. Not only does it add a large measure of style to the deck, it creates the feeling of an outdoor room.

At first glance, the pergola's beams and rafters appear to be made from massive timbers that would be difficult

to machine and install, let alone find in the necessary lengths. But on closer inspection, you'll see that each of these beams and rafters is really two 2x6s with a gap in between. The visual effect is deceiving, but there's no deceit in the simplicity of this design.

Take a look at *Step-By-Step Installation* on page 51, and you'll see that the entire pergola is really quite simple. Its parts are made in sections that fit together with sturdy dado joints. And all but four of the decorative rafter tails are just screwed on after being cut to shape. Sure, it takes some planning, and you'll want to recruit a friend to help you lift all the pieces into place. But we've made the construction downright easy considering the dramatic results.

Start With a Beam — The first part to make is the two-piece beam that runs along the front of the deck (*Beam & Rafter Parts*). Determine its length by measuring from outside edge to outside edge of the posts it spans. Then add 18" to account for the decorative tails that get cut into the ends, and cut two cedar 2x6s to that length.

Now you need to cut those decorative tails on the ends of each beam piece. To make it easier to cut these four tails, as well as the 14 short rafter

tails that match them, to exact shape, you'll want to make a pattern. You can use the *Rafter Tail Detail*, or go online to print out a full-size version at our website: WorkbenchMagazine.com.

Now use the paper pattern to make a sturdy template from 1/4" hardboard. Then trace around that template to transfer the pattern onto each beam piece. Cut out the shape with a jig saw, and then sand it smooth.

While you're at it, this is a good time to go ahead and make the rafter tails. For those, start with short pieces of cedar 2x6. Trace the shape onto each workpiece, and then cut the tails to shape with a jig saw (*Photo, below left*). Then sand these tails to final shape.

That done, it's time to complete and install the pergola parts following the sequence shown in *Step-By-Step Installation* on page 51.

Dado and Mount the Beam — Get started by routing dadoes in the beam to receive the rafters that span between the beam and the house. To make this easier, I routed the dadoes using a variation of the same jig that sped the process of making the post dadoes. The jig is made in exactly the same way. The cleats are just moved farther apart to fit over the 2x6s used for the beams and rafters.

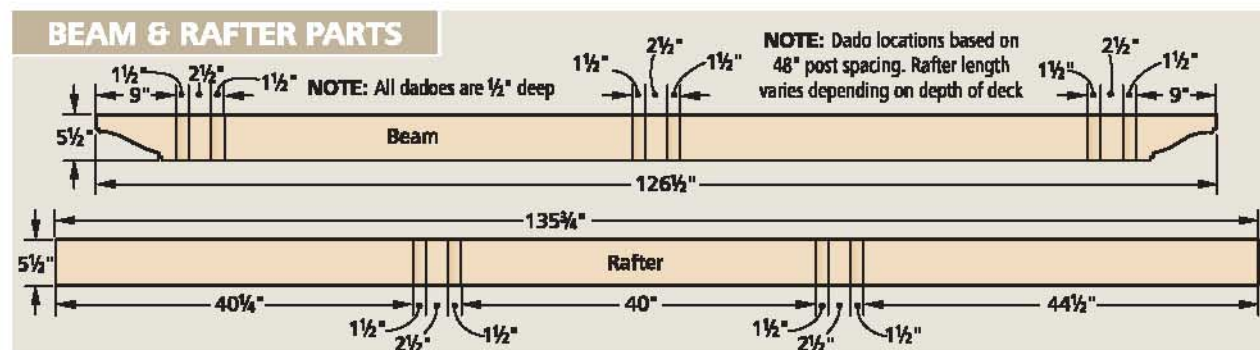
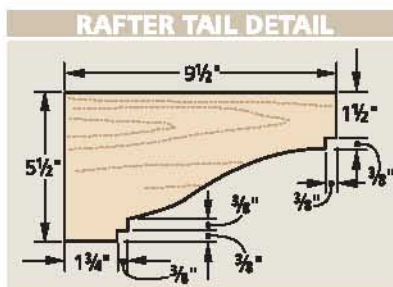
Note that the space between the dadoes gets centered on the width of each pergola post (*Mounting Detail*).

After cutting the dadoes, stain the beam pieces. Then screw the inner half of the beam to the posts.

Ready the Rafters — Now you can cut the remaining rafters to length to fit between the beam and the house.



The decorative tails on the pergola make it look like the beams and rafters are notched to fit together (*above*). But the tails are simply cut to shape (*below*), and then attached.



Then the rafters get dadoes to receive crossmembers that tie them together.

To locate these dadoes, use the inner half of the rafter that sits atop the pergola posts at the end of the deck. Lay out the dadoes so the space between them is centered on the posts, and then transfer the marks to the remaining rafter pieces.

With that done, you can determine the correct length for the crossmembers that fit between the rafters. Now cut the crossmembers to length.

Once again, you'll want to stain all the pergola parts before continuing with installation.

While the stain dries, you can make the last two parts required for this project. Those are two mounting blocks that get secured to the wall and provide mounting points for the rafters.

Cap It Off — Now you can wrap up this deck revival by installing the rest of the rafters, the decorative tails, and the outer section of the beam. You'll find this process is easy if you follow the sequence at right. 

—Written by David Stone, project designed by Kent Welsh, illustrated by Erich Lage

Buyer's Guide

DECKING FASTENERS

Tiger Claw Hidden Deck Fasteners
Model #TC-2
800-928-4437
TigerClaw.com

BALUSTERS

Deckorators, Inc.
32" Classic Balusters, Rust Color
800-332-5724
www.Deckorators.com

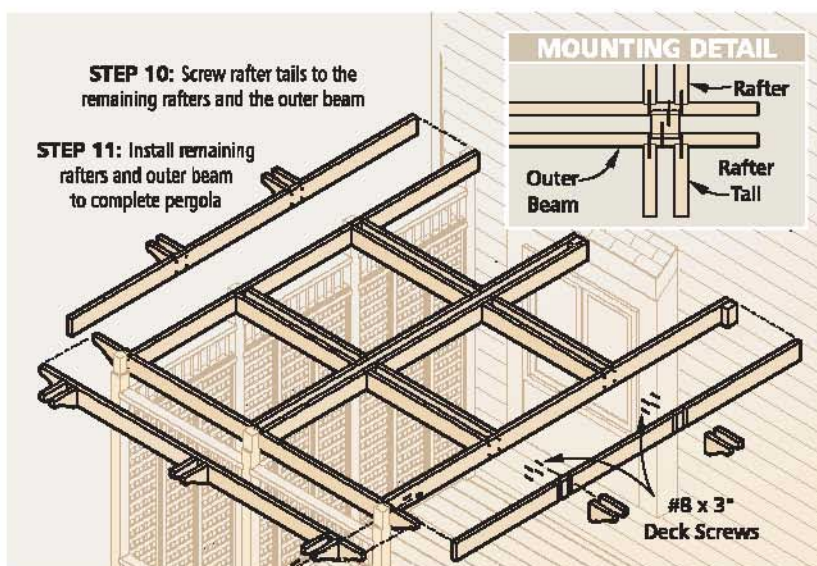
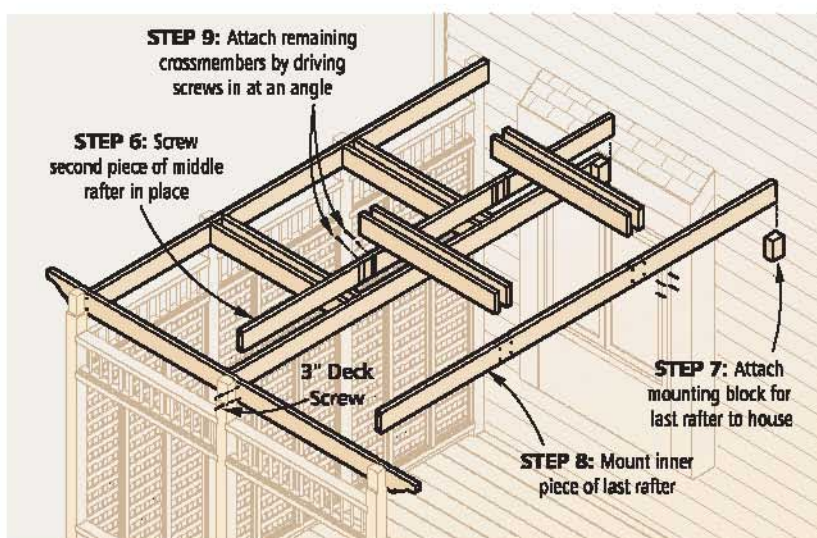
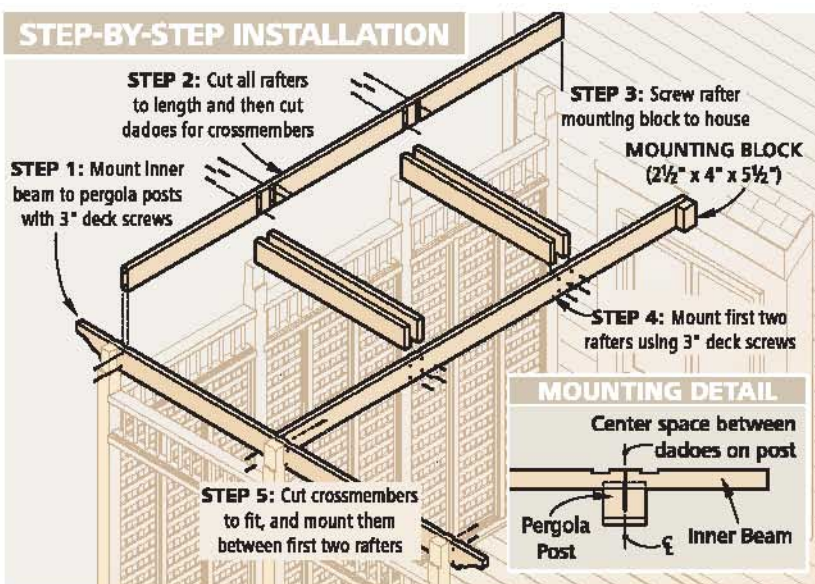
LOW-VOLTAGE LIGHTS

Home Tops, Inc.
Model #DLA6048, Black
800-262-5482
www.HomeTops.com

POST CAPS

Home Tops, Inc.
Model #PCA5038, Black
800-262-5482
www.HomeTops.com

STEP-BY-STEP INSTALLATION



Pattern at 100%

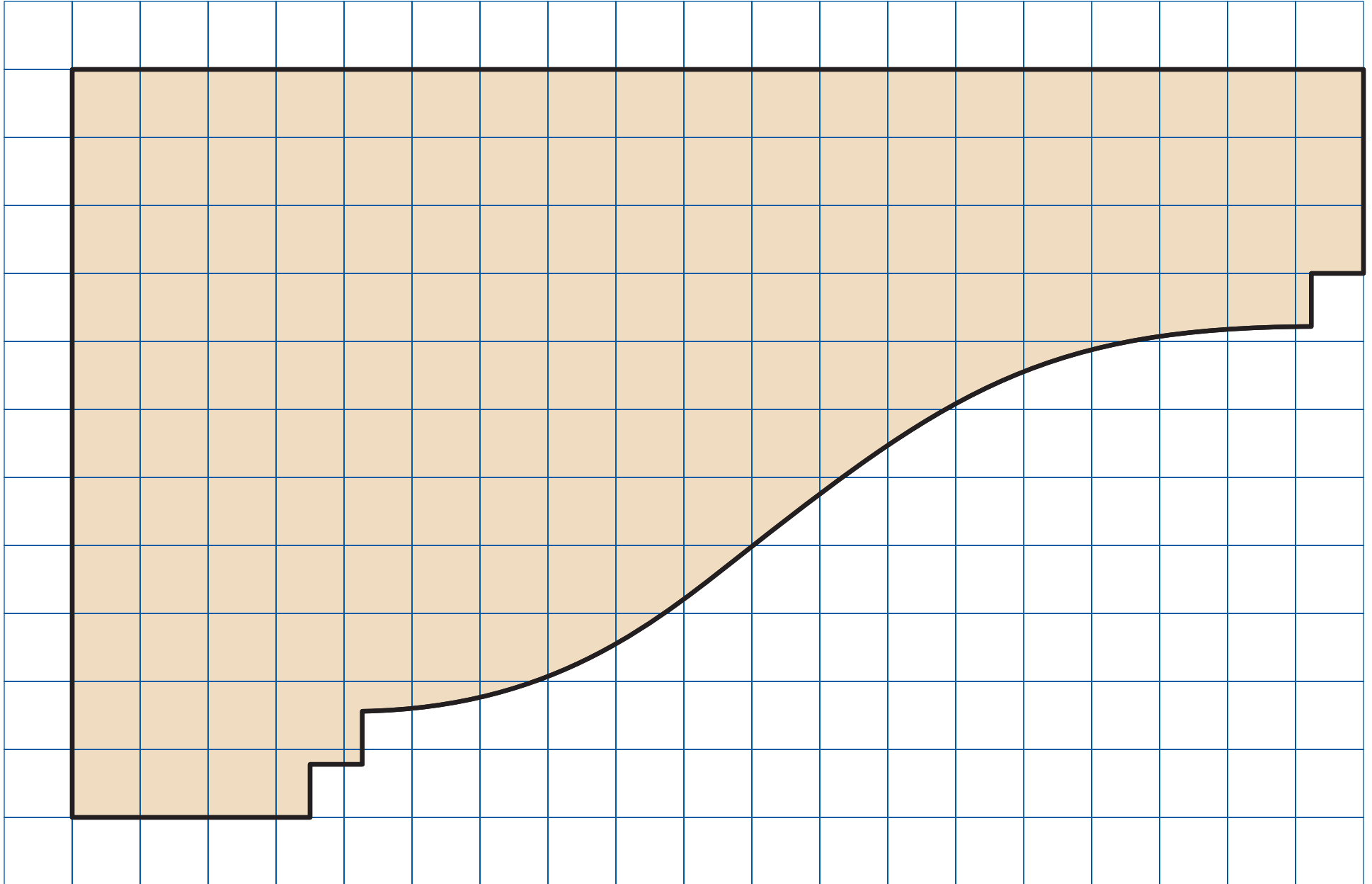


TABLE SAW SHOOTOUT!

10 CABINET SAWS REVIEWED



There was a time when any meaningful discussion about which cabinet-style table saw one should buy was limited largely to comparing the relative merits of the Powermatic 66 to the Delta Unisaw. It's not that these were the *only* cabinet saws available. It's just that the standard set by these two saws was so high that all other entries in the category automatically assumed "also-ran" status.

But in light of the recent influx of new and seemingly impressive cabinet saws, we wondered whether this conventional wisdom held up. Do these old guard saws still represent the pinnacle of table saw quality, or do the newcomers have something more to offer? Only one way to find out.

We rounded up ten saws for a side-by-side comparison. Included in this test are the iconic Delta Unisaw and Powermatic 66, along with models from Bridgewood, Craftsman, General, General International, Grizzly, Jet, SawStop, and a second model from Powermatic.

All of the saws are powered by 230-volt, single-phase, 3-horsepower motors and have left-tilting blades. We also equipped each saw with a T-square-style fence.

Our testing revealed some encouraging similarities, along with some meaningful differences. We've organized those based on whether they are "Above the Table" or "Below the Table." And we've also catalogued some unique qualities we discovered about some of the saws as "Random Hits & Misses."

ABOVE THE TABLE

The first measures we took of these saws were encouraging, as we found each tool to be well within acceptable tolerances for arbor runout, table flatness, and parallelism of the miter slots.

But as testing progressed, the distinctions in these saws became more apparent. Those differences center around the rip fences, miter gauges, and the guard and splitter assemblies.

Rip Fence — The rip fence, more than any other feature of a table saw, will influence how satisfied you are with your saw, and by extension, how satisfied you are with the *results* from your saw.

For flawless results, a rip fence must lock parallel to the blade and square to the saw table. It must also slide smoothly along its entire range of adjustment and have little or no deflection under moderate sideways pressure.

These have long been the strengths attributed to T-square-style fences (invented and popularized by Biesemeyer).

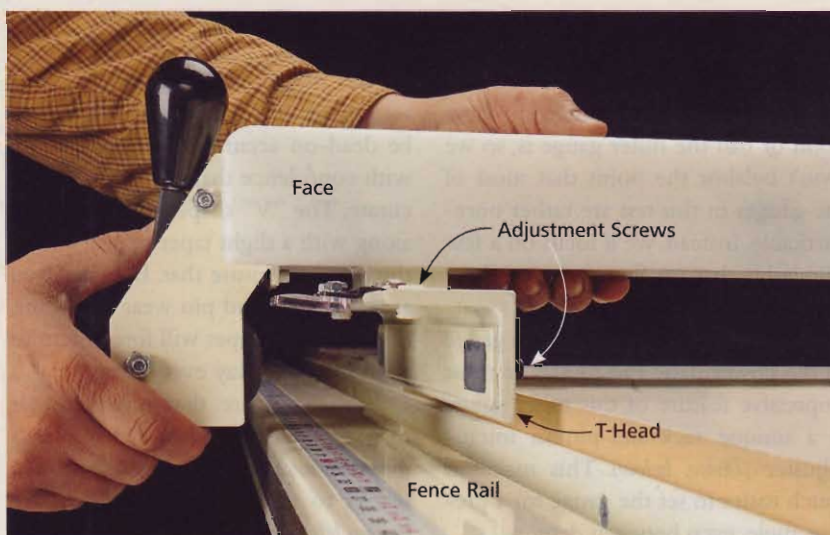
The good news is that most of these fences deliver mightily on all of those scores. It was the couple of exceptions, however, that highlighted some important differences in the fences for us.

For instance, if a fence isn't parallel, square, and smooth to operate, is there anything you can do about it?

If the problem is parallelism, yes. All of these fences can be easily brought into alignment by simply adjusting two screws in the vertical face of the T-head (*Photo, above right*).

If a fence is out of square, well, that's a different story. Here again, some fences have adjustment screws, this time on the horizontal face of the T-head, that let you true up the fence if it's tipped one way or the other. The SawStop, Jet, Craftsman, and Bridgewood fences can all be adjusted this way.

As for every other fence in the test, the only remedy should they be out of square is to carefully shim the faces into alignment. Fortunately, only the Powermatic PM2000 required any adjustment, and the fix here actually turned out to be removing shims that had been installed at the factory. Go figure.



The best versions of these T-square fences have adjustment screws that let you easily tune the fences to be square to the saw table and parallel to the blade.

A similar divide exists among these fences when it comes to setting the faces for ideal clearance above the saw table. This small amount of clearance is important to make the fence easy to slide — too little clearance, and the faces will drag on the top. Too much clearance, and you run the risk of thin stock sliding underneath the faces.

The Biesemeyer fence on the Delta and its closest copies on the General and General International saws rely on precise installation of the fence rail to ensure the proper fence elevation. They even come with a hardboard template to help you attach the rail at the perfect height. This has been a workable solution for many years, but it has its limitations.

Specifically, the narrow range of adjustment offered by the pre-drilled holes in the rail and cast-iron table doesn't always allow you to compensate for a rail that isn't perfectly straight (and none are).

A better solution is the adjustable fence faces on the SawStop, Bridgewood, Jet, Craftsman, and both Powermatic saws (*Photo, right*). These allow you to position the faces to clear any high points in the extension table and ensure smooth operation.

In the end, we divided these fences as Biesemeyers (which includes the authentic Biesemeyer on the Delta and the



By loosening screws inside the body of the fence, the faces on the Jet fence can be adjusted for clearance.

near-copies on the General and General International saws), better-than-Biesemeyers (this group includes Jet, SawStop, Bridgewood, and both Powermatic saws), and the wanna-Biesemeyers (this would be Craftsman and Grizzly).

The Biesemeyers are good. The better-than-Biesemeyers are, well, better. And the wanna-Biesemeyers lack the fine-tuning and smooth operation that we were looking for.

ABOVE THE TABLE

Deciding which cabinet saw you will purchase won't likely hinge on how good or bad the miter gauge is, so we won't belabor the point that most of the gauges in this test are rather unremarkable. Instead, we'll focus on a few highlights that we found among these miter gauges.

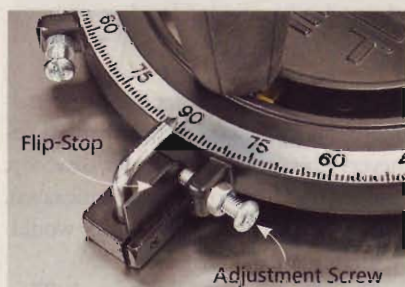
The best example is the miter gauge of the Powermatic PM2000. The most impressive feature of this miter gauge is a unique rack-and-pinion microadjuster (*Photo, below*). This makes it much easier to set the gauge for a precise angle, even between detents.

And speaking of detents, this is another strong point on this miter gauge. The detents are actually V-shaped grooves that are cast into the base of the gauge. A spring-loaded pin automatically engages the detents at 90°, 30°, and 45°.



Rack & Pinion Microadjuster

The PM2000 gauge has a knob that overrides the detents and engages the rack-and-pinion microadjuster.



The tendency of the flip-stops on most miter gauges to flex can throw off the accuracy by 1/2° or more.

We measured each of the preset detent angles and found them to be dead-on accurate. And we can say with confidence that they will *stay* accurate. The "V" shape of the detents, along with a slight taper on the end of the pin, will ensure that. Because even as the detents and pin wear over time, their tapered shapes will force them to align the same way every time.

Now compare that microadjuster to a typical miter gauge that uses a flip-stop for the detent and adjustment screws to fine-tune the angle (*Photo, bottom left*). These flip-stops are notoriously flimsy, and the adjustment screws will eventually loosen and require you to recalibrate the miter gauge.

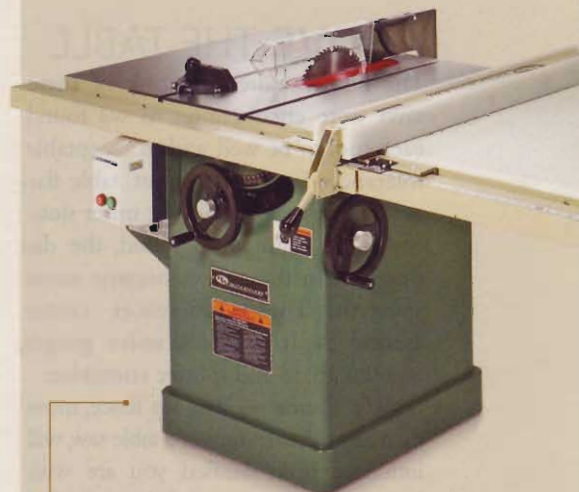
An interesting compromise between a flimsy flip-stop and Powermatic's pin-and-groove design can be found on the SawStop miter gauge. This miter gauge uses a sturdy pin as the stop, but combines that with adjustable screws for the detents. So while the pin is less likely than a flip-stop to flex, you'll still need to readjust the screws occasionally.

Looking once more at the Powermatic PM2000 miter gauge, we also want to point out the aluminum auxiliary face that comes as standard equipment. Right off the bat, this offers better stock support than standard gauges. And because there are T-tracks milled into the fence, it also offers a means for attaching accessories like hold-downs and stop blocks.

But even this miter gauge isn't perfect. Its one weakness is that the



SawStop's detent stop is less flexible than a flip-stop, but the detent screws still need occasional fine-tuning.



BRIDGEWOOD BW-10LTS

Virtues

Heavy-gauge, all-steel cabinet; Smooth-running; No measurable arbor runout; Excellent fence.

Vices

Lightweight arbor nut and washer; Motor cover latch is a nuisance.

Verdict

This saw offers exceptional quality at an attractive price. Get to know this brand, and you'll be glad you did.

www.WilkeMachinery.com
717-764-5000



CRAFTSMAN 228050

Virtues

All-steel cabinet; Onboard storage for fence and miter gauge; Tool box to store wrenches, arbors, etc.

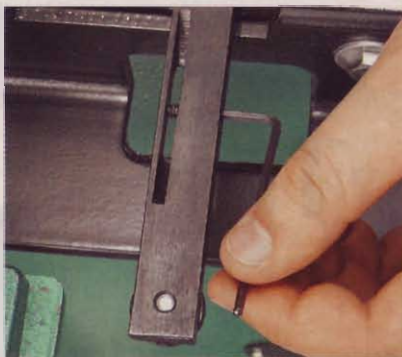
Vices

Different arbors for standard saw blade/dado blade; Below-average fence.

Verdict

The performance is acceptable, but other frustrations make this saw less desirable.

www.Craftsman.com
800-349-4358



Adjustment screws in the bar of the Grizzly miter gauge let you custom-fit the gauge to the miter slots.

bar wiggles just slightly in the miter slot. It really is the tiniest wiggle, but it could've been easily remedied with one of the tensioning features that we found on other miter gauges.

One example of a bar that can be fine-tuned to fit the miter slots is on the Grizzly miter gauge (Photo, above). The miter gauges of the SawStop and General International have similar fine-tuning features on their miter gauges.

Guards & Splitters — You may be tempted to skip this section because you figure you'll just pitch the blade guard as soon as you unpack it. In the past, I wouldn't have blamed you.

But there is some good news here. After years of hearing us groan about the flimsy, bolt-on blade guards that are more hindrance than help, a couple manufacturers have responded with guards and splitters that you'll actually want to use.

Especially noteworthy are the blade guards on the Powermatic PM2000 and

the SawStop. Both of these saws have quick-release levers, so mounting and removing the guards is fast and tool-free.

And both saws offer their own version of a riving knife. A riving knife, for those unfamiliar with it, is similar to a conventional splitter: Its principle purpose is to keep the saw kerf from closing, causing the board to pinch the blade and kick back. But there are two fundamental differences between a riving knife and a typical splitter. First, a riving knife can be used *without* having the complete guard installed. Second, the riving knife moves up and down with the blade.

A true riving knife, like the one found on the SawStop (Photo, below left), can be used in many situations where a guard and splitter cannot, such as narrow cuts when the guard would interfere with the fence, or when making non-through cuts like rabbets or dadoes.

The Powermatic PM2000 riving knife can also be used for narrow cuts but won't work for non-through cuts because the top of the knife extends beyond the top of the blade. So while it's a worthwhile feature, this version does have that one limiting factor.

One more notable feature that we found on a couple of these saws is a two-piece blade guard with covers that move independently of each other (Photo, below right). These are especially nice when you're ripping thin pieces since it keeps the outboard side of the blade covered. And since you're only lifting half the guard, it offers less feed resistance. The Powermatic 66 and PM2000 each have a variation of this design.



SawStop's riving knife moves with the blade, prevents binding, and can be used when conventional splitters can't.



A two-piece blade guard on the PM2000 keeps the blade covered when ripping thin pieces.



DELTA 36-L31

Virtues Genuine Biesemeyer fence; Onboard storage for fence, miter gauge, and wrenches.

Vices Fence was tricky to fine-tune; Plastic motor cover; Some noticeable vibration.

Verdict Still an excellent saw, but no longer the top of the heap.

www.DeltaMachinery.com
800-223-7278



GENERAL 650-T50

Virtues Exceptional finish on saw table; Table is dead flat; All-steel cabinet.

Vices Poor operator's manual; Throat plate fits poorly; Blade guard operation is poor.

Verdict A very solid saw in terms of performance, but a few operational weaknesses.

www.General.ca
514-326-1161

BELOW THE TABLE

The prevailing wisdom about drive belts on table saws is “more is better.” The logic goes that more belts means a better transfer of power. But according to Barry Schwaiger of WMH Tool Group, it’s not as simple as that. He asserts that the *type* of belt — more than the number — will determine the efficiency of power transfer. More importantly, though, different belt types generate different amounts of vibration. And it’s vibration that most directly impacts how smoothly a saw will cut.

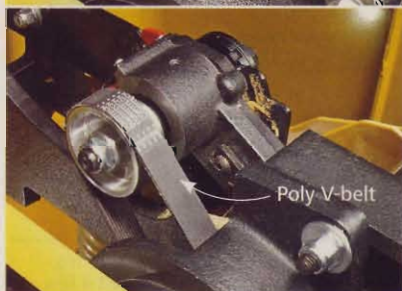
We specifically asked for Barry’s input on this because he works for WMH Tool Group, which is the parent company of Jet and Powermatic. And between those two brands, WMH represents the full spectrum of belt configurations in this test: one belt on the PM2000, two on the 66, and three on the Jet. So we knew he’d give each type a fair shake.



V-belts



Wedge Belts



Poly V-belt

Better belts allow manufacturers to use fewer belts to transfer power more efficiently.

To summarize Barry’s explanation, there are three types of belts used for table saw drivetrains: V-belts, wedge belts, and Poly-V-belts (*Photos, below left*).

The least efficient of those is the V-belt, which is typically used in three-belt drivetrains. Part of the inefficiency here comes from the fact that it’s virtually impossible to get three V-belts of identical length. The manufacturing tolerances for these belts just aren’t that stringent. That means that the shortest belt carries the biggest load while the other two slip to varying degrees. Over time, the short belt will stretch some and more closely match the longer belts, but the more a belt stretches, the more it vibrates, so it’s not a great trade-off.

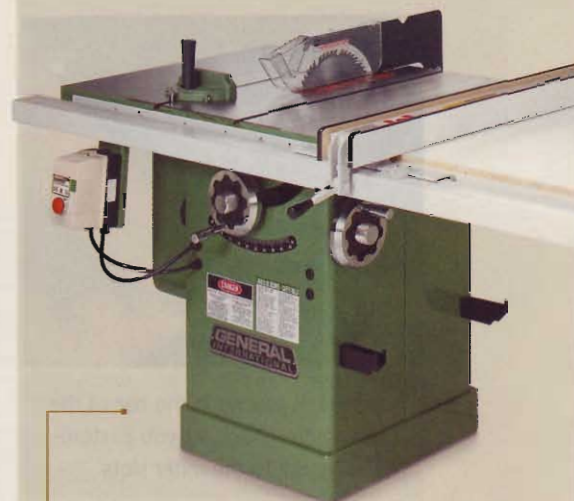
The next belt type is the wedge belt. Two of these are used to drive the Powermatic 66. The slimmer profile and scalloped underside of these belts mean that they benefit from less slipping, less stretch, and less vibration than V-belts.

Third is the Poly-V-belt. And in this case, “poly” means “many.” As in there are actually several small V’s in the underside of this belt. That creates an enormous amount of contact between the belt and pulleys, which minimizes both slipping and vibration.

So based on all of that, there should be a noticeable difference in the vibration of these saws, and, consequently, how smoothly they cut. And there was.

As it turned out, our testing supported Barry’s explanation. The PM2000 and SawStop (Poly-V-belt drives) vibrate the least and cut the smoothest. And the Powermatic 66, which is driven with two wedge belts, did vibrate just a little bit less and cut just a little more cleanly than V-belt-driven saws.

Trunnion Assemblies — The underpinnings of every table saw are often referred to generically as “trunnions.” But if you break down this collection of parts into their individual pieces, the group is typically comprised of a front and rear trunnion (which are the pivot points that allow the blade to tilt), a front and rear trunnion bracket (which connect this entire assembly to the



GENERAL INTL. 50-260

Virtues All-steel cabinet; Adjustable miter-gauge bar; Onboard fence storage.

Vices Poor dust collection; Slightly more vibration than other saws.

Verdict This is a well-built saw with a nice Biesemeyer-style fence.

www.General.ca
514-326-1161



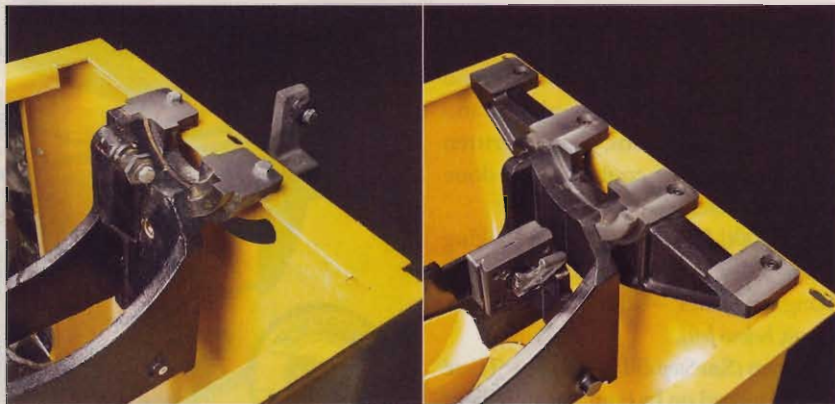
GRIZZLY G1023L

Virtues Very attractive price; Adjustable miter-gauge bar; Large, solid cast-iron adjustment wheels.

Vices More vibration than most saws; Fence has a tendency to rack.

Verdict At this price, this saw is an affordable way to step up to cabinet saw power with relatively few compromises.

www.GrizzlyIndustrial.com
570-546-9663



Comparing the sub-structure of the two Powermatic saws (model 66 on the left, PM2000 on the right) shows that the cast-iron components can differ quite a bit, though neither one seems to offer a decided advantage.

cabinet), a yoke (which connects the front and rear trunnion and also provides the pivot point for adjusting the blade height), and an arbor bracket (which houses a pulley and the blade arbor). Manufacturers tout the fact that these parts are all made of cast iron, and with good reason. The mass of these parts is one of the reasons that cabinet saws run more smoothly and maintain their accuracy better than lesser models that use aluminum and even plastic components.

However, despite some dramatic differences in the size of these assemblies (Photos, above), we didn't find that any particular design stood out as superior in terms of dampening vibration. For example, the Powermatic 66 has the most compact assembly in this group, but it didn't vibrate any more than some saws with much larger assemblies.

One difference that we did find while inspecting the saws' inner workings was the shape of the gears that drive the angle and elevation of the blade. Gears with concave teeth provided much smoother adjustments than those with flat teeth. This was especially evident when the saws were adjusted to their stopping points. The flat gears would often stick in this position and would require an extra bit of muscle to get them moving back the other direction. No such problem with the concave type. So score extra points for SawStop and both Powermatic saws for their concave gears.

Dust Control — Only two saws truly impressed us with their dust

control: The Powermatic PM2000 and the SawStop. Both of these saws have shrouds around the blade to grab dust right at the source (Photo, below). As a result, only the smallest amount of dust collects inside the cabinets of these saws, and the amount of dust that gets airborne is noticeably less.

The rest of the saws in this test simply have a port on the bottom of the cabinet for attaching a dust-collection hose. The effectiveness varies depending on whether the bottom of the cabinet is flat or sloped. A sloped bottom directs more dust toward the port, where it can be drawn in by the dust collector. The flat-bottom cabinets gather a lot more dust and will require you to clean them out more often.



The shroud and dust hose inside the PM2000 capture dust at the source and direct it straight to the port.



JET JTAS-10XL

Virtues	Excellent, fully-adjustable fence; All-steel cabinet.
Vices	Starts up very abruptly; More vibration than most saws; Miter gauge fits loosely in slots with no adjustment.
Verdict	This is a capable, affordable saw with only a fence to list as its unique strength.

www.JetTools.com
800-274-6848



POWERMATIC 66

Virtues	Smooth-running saw; Outstanding finish on saw table; Above-average fence; Two-piece blade guard.
Vices	Flimsy plastic motor cover; Poor dust control; Throat plate fits poorly.
Verdict	The 66 is still a safe bet for solid performance but lacks the refinements needed to hold the high ground.

www.Powermatic.com
800-274-6848

RANDOM HITS & MISSES

Besides the common features that we compared on these saws, we found several interesting and unique features. Some of these features impressed us as nice touches. Others had us scratching our heads.

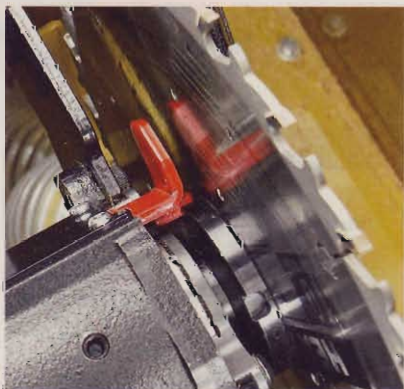
HITS

Craftsman Tool Kit — Craftsman includes a handy aluminum box for storing all the tools and parts needed to adjust and maintain the saw.

SawStop Blade Wrenches — These things are enormous, and we appreciate having our hands that far away from the blade while tightening or loosening the arbor nut (Photo, below).



SawStop earned points for huge wrenches and a great manual. Deduct one point for a walnut throat plate.



Lift the tab and lock the arbor on the Powermatic PM2000. Then use the box-end wrench to remove the nut.

SawStop Manual — Spiral-bound so it opens flat, full-color photos and wonderful illustrations, plainly written and complete. We couldn't have done it better ourselves.

PM2000 Locking Arbor — A locking arbor and a real box-end wrench for changing blades — this could spoil us (Photo, below left).

Starters (SawStop & PM2000) — These can't be turned on by bumping into them and they have enormous "Off" switches. Very safety conscious.

Onboard Accessory Storage (Craftsman, Delta) — A place (other than the floor) for stowing the fence, miter gauge, and wrenches when they're not in use.

SawStop Blade Brake — The safest table saw ever built (see page 59).

MISSES

Craftsman Dual Arbors — How could it possibly seem like a good idea to have to change the arbor every time I change from a regular blade to a dado stack (Photo, below right)?

SawStop Dado Throat Plate — A solid walnut plate. Seriously. Use it right away while it's still flat.

Powermatic 66 and General Throat Plates — Maybe walnut isn't so bad after all. At least you don't need a mallet to get it in and out like you do with these two.

General Operating Manual — It's not really an operating manual at all: It's more a laundry list of part names.



Thanks for the handy tool kit, Craftsman. But we'd prefer not to change arbors to use a dado blade.



POWERMATIC PM2000

Virtues Exceptionally smooth-running; Outstanding dust collection; Locking arbor; Integral casters; Quick-release blade guard; Micro-adjustable miter gauge.

Vices Plastic motor housing.

Verdict Move over 66: Powermatic has a new "Best in Class" cabinet saw.

www.Powermatic.com
800-274-6848



SAWSTOP CB31230

Virtues Exceptionally smooth-running; Excellent dust collection; Genuine riving knife; Best fence in this group; Large blade wrenches; Quick-release blade guard; Innovative blade brake for unparalleled safety.

Vices Walnut throat plate.

Verdict A superior cabinet saw in its own right, made better by the blade brake.

www.SawStop.com
866-729-7867

FINAL CUTS

On the first page of this article, we posed the question, "Do the Delta Uni-saw and Powermatic 66 still represent the pinnacle of quality?" The answer is a reluctant no.

Reluctant because we don't want to give the impression that these saws are "bad." They aren't. It's just that the Powermatic PM2000 and the SawStop are that much better.

And while we are not in the habit of awarding the "Editor's Choice" to more than one tool in a test, we feel that both of these saws are on equal footing in terms of performance while offering their own unique and valuable features.

So what of all the other cabinet saws in this test? Well, they're all quite good. I know that sounds like waffling, but the fact is, if you're considering upgrading from a contractor's saw (or less), any of these saws will provide a lifetime of powerful, smooth, accurate operation.

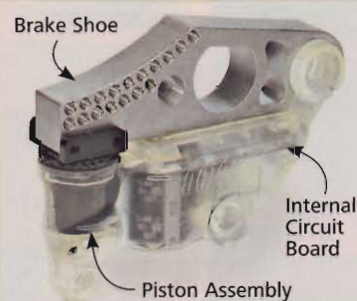
And if you'd like to upgrade without breaking the bank, then we strongly recommend the Grizzly. At just under \$1,000, this saw delivers the power and performance of saws that cost two to three times as much, making it the obvious choice for "Top Value." You may want to earmark some of that savings to upgrade the fence, but even then you'll be well in the black. 

—Written by Bill Link, illustrated by Kurt Schultz

SawStop: Safest Saw Ever?

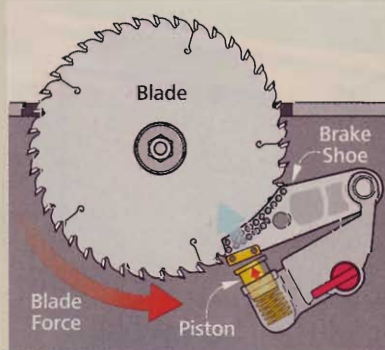
Our goal in comparing the SawStop to every other saw in the category was to determine its worth as a saw, without regard to its innovative blade brake. But we'd be remiss if we didn't address this valuable feature.

The SawStop works by monitoring a low-voltage, high-frequency signal that is induced onto the blade. Whenever that signal is disrupted or reduced (which is anytime a conductive material contacts it), the saw simultaneously fires an aluminum brake pad (*Photo*) into the blade to stop it from spinning, and retracts the blade below the table (*Illustrations, below*). This entire process takes only milliseconds and it can mean the difference between a flesh wound and a severed finger.

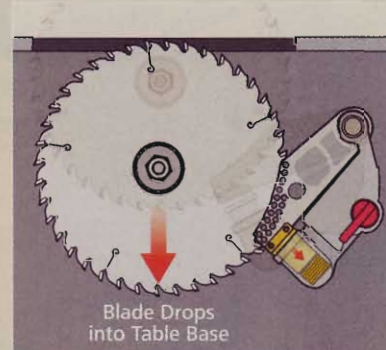


The heart of the SawStop safety system is a replaceable brake shoe that stops the blade instantaneously.

For more complete coverage of the SawStop safety system, including a video that shows the saw in action, check out the "Online Extras" at WorkbenchMagazine.com.



1] Any disruption in the electronic signal causes a piston to fire the aluminum brake shoe into the blade.



2] The momentum of the blade and the sudden stop forces the blade to retract below the table.

TABLE SAW SPECIFICATIONS

Brand	Model	Price	Belts	Max Cut @ 90°	Max Cut @ 45°	Table Size	Table Height	Arbor Speed	Net Weight	Blade Tilt	Blade Included
Bridgewood	BW-10LTS	\$1,550	3 V-belts	3 1/8"	2 1/8"	28" x 41 1/2"	34"	4,200 RPM	473 lbs	Left	No
Craftsman	228050	\$1,300	3 V-belts	3"	2 1/8"	27" x 36 1/2"	34"	4,000 RPM	490 lbs	Left	Yes
Delta	36-L31	\$1,800	3 V-belts	3 1/8"	2 1/8"	27" x 40 1/2"	34"	4,000 RPM	456 lbs	Left	Yes
General	650	\$1,900	2 V-belts	3 1/8"	2 1/8"	28" x 36"	34"	4,000 RPM	495 lbs	Left	No
General Intl.	50-260	\$1,300	3 V-belts	3"	2 1/4"	27" x 39 3/4"	34"	4,250 RPM	409 lbs	Left	No
Grizzly	G1023SL	\$975	3 V-belts	3"	2 1/8"	27 x 40 1/8"	34"	4,200 RPM	467 lbs	Left	No
Jet	JTAS-10XL	\$1,700	3 V-belts	3"	2 1/8"	27" x 40 1/4"	34"	4,200 RPM	468 lbs	Left	No
Powermatic	PM2000	\$2,200	1 Poly-V	3 1/8"	2 1/8"	30 1/8" x 42"	34 1/2"	4,300 RPM	540 lbs	Left	No
Powermatic	66	\$2,300	2 Wedge	3 1/8"	2 1/8"	28" x 37 1/2"	34"	4,000 RPM	490 lbs	Left	Yes
SawStop	CB31230	\$3,300	2 Poly-V	3 1/8"	2 1/4"	30" x 44"	34 1/4"	4,000 RPM	530 lbs	Left	Yes

* All saws have Single-phase, 3HP, 230V motors.



Storage Ottoman

You'd be hard-pressed to find a better blend of form and function than this stylish ottoman: It looks great and has two hidden compartments that add useful storage to any room.

The dictionary definition of an ottoman is "an overstuffed footstool," and most of the time, that description is exactly correct. An ottoman may be a handy place to sit or rest your feet, but it usually doesn't offer much beyond that.

That's not the case with this ottoman, though. Sure, it's a great-looking project that will complement most any living room or family room setting. And it has a comfortable padded cushion for relaxing or resting your feet.

As attractive and comfortable as it is, though, the true value of this ottoman comes from two compartments inside the case. Under the cushion is a shallow tray for throws, remote controls, or magazines. And the front panel hides a large drawer for DVDs or CDs.

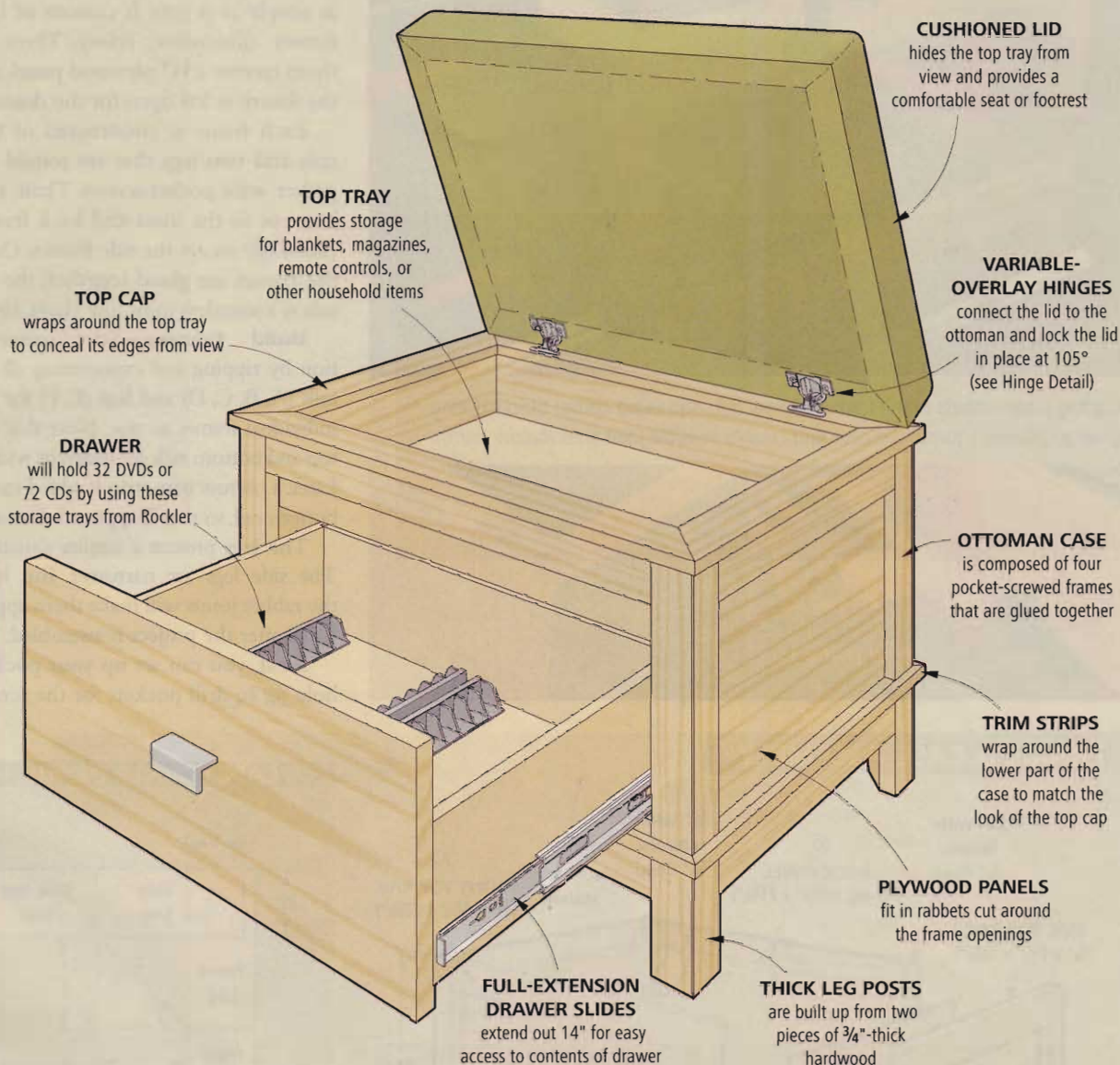
To make this drawer a more effective media storage compartment, you can divide up the space using DVD storage trays (see the *Materials List* on page 65). With two pairs of trays installed side by side, the drawer can hold up to 32 DVDs. Or if you'd prefer to use the drawer to store CDs, you can actually

By adding storage trays, you can put up to 32 DVDs in the ottoman's drawer. The top tray makes a great stowaway for throws, remote controls, or magazines.



CONSTRUCTION DETAILS

Overall Dimensions: 25 1/8" W X 18 1/2" D X 18 1/4" H



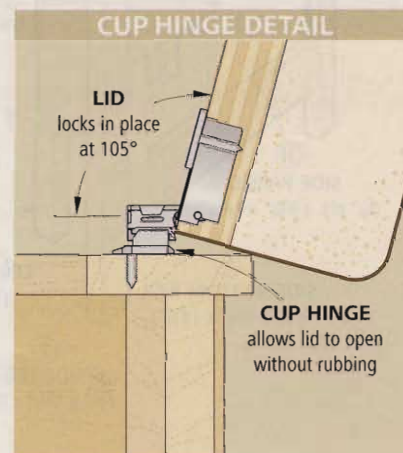
fit three pairs of CD trays in the drawer and create storage for 72 CDs.

The ottoman's exterior showcases straight-grained red oak and riftsawn oak plywood. And a natural oil finish matches the woodwork of the home. (Of course, you can finish it any way you want.)

As for the cushioned lid, it can make or break this project. And while I'd like to think I can handle the woodworking part of this project, I decided the upholstery was best left in the hands of a professional. So after choosing the

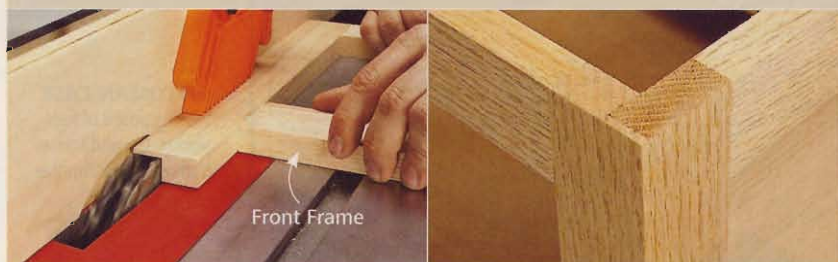
fabric and cutting the plywood lid to size, I sent it to an upholstery shop (more about this on page 64).

Another important detail is how this lid is attached to the ottoman. You'll want to be sure it will open without scraping against the top of the ottoman—and without tipping all the way open. The solution turned out to be these variable-overlay cup hinges. These unique hinges let the lid open without rubbing against the ottoman case, and they lock positively at 105° when open (see Detail at right).





Cutting deep rabbets in the frames (*below left*) and using corner blocks during glue-up (*above*) squares the case and creates invisible joint lines (*below right*).



THE CASE & DRAWER

The case for this ottoman is about as simple as it gets. It consists of four frames (*Illustration, below*). Three of them receive a $\frac{1}{4}$ " plywood panel, and the fourth is left open for the drawer.

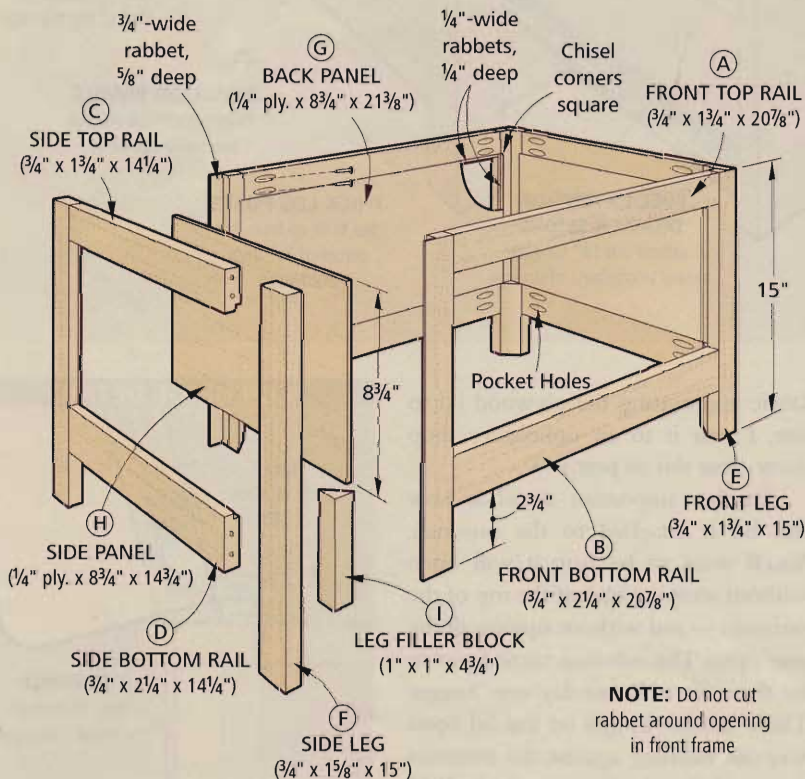
Each frame is constructed of two rails and two legs that are joined together with pocket screws. Then, rabbets cut in the front and back frames (*Inset, left*) accept the side frames. Once the frames are glued together, the result is a seamless joint line (*Inset, right*).

Build Frames—Start construction by ripping and crosscutting all the rails (A, B, C, D) and legs (E, F) for the individual frames to size. Note that the top and bottom rails are different widths. Later, a narrow trim strip is added to the bottom rail, so they'll appear the same.

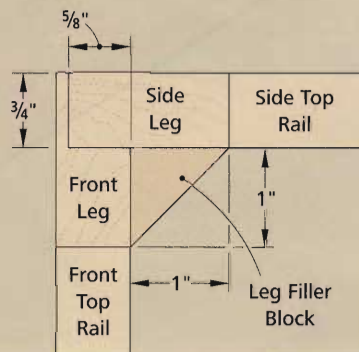
The legs present a similar situation: The side legs are narrower. But here, the rabbet joints will make them appear equal after the project is assembled.

Next, you can set up your pocket-hole jig to drill pockets for the screws

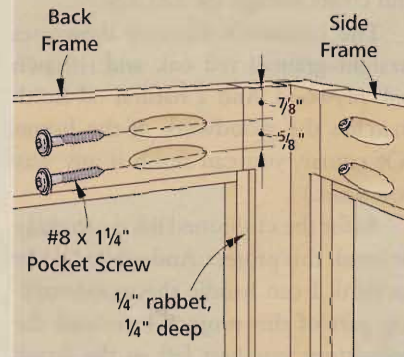
FRAME & CASE ASSEMBLY



CASE CORNER DETAIL



POCKET-HOLE DETAIL



that will connect the rails to the legs. One thing to be aware of here is the location of these pocket holes. I drilled them in the locations shown in the *Pocket-Hole Detail* (below left). This way, when it's time to cut the rabbets for the $\frac{1}{4}$ " plywood panels later, you won't cut into the screws.

Add Panels—As far as those rabbets go, the easiest way to cut them is with a rabbeting bit in a handheld router. Set the depth of cut so the panel will be flush with the inside of the frame. Then rout each rabbet, and chisel the corners square. Now cut the panels (G, H), and glue and clamp them in place.

Assemble the Case—With the frames assembled, all that's left is to cut rabbets in the front and back frames to accept the side frames. It's easiest to cut these rabbets using a dado blade in the table saw, making two progressively deeper passes. For consistent depth, use a featherboard to hold the frame down as it passes over the blade (*far left Inset Photo*, page 62).

Now you can assemble the case with glue and clamps as shown in the *Photo* on page 62. To ensure that the case remains square, clamp L-shaped plywood blocks into the corners (page 90). Then, complete the case by gluing triangular-shaped filler blocks (I) into the void between the two legs (*Case Corner Detail*, left, and page 91).

Filler Strip—With the case assembled, cut and glue a filler strip (J) behind the front top rail (*Drawer Assembly*). Later on, this strip ensures that both the drawer and top tray fit in the case.

Add Drawer—Now you can turn your attention to the drawer. Its front, back (K), and sides (L) are made of $\frac{1}{2}$ " hardwood joined with locking rabbet joints (*Locking Rabbet Detail*). A $\frac{1}{4}$ " plywood bottom panel (M) rests in a groove near the bottom edge of each part.

After cutting the drawer parts to size, cutting the locking rabbet in the mating drawer parts only takes two cuts on the table saw. First, cut kerfs in the sides to accept tongues on the drawer front and back. Second, form the tongues

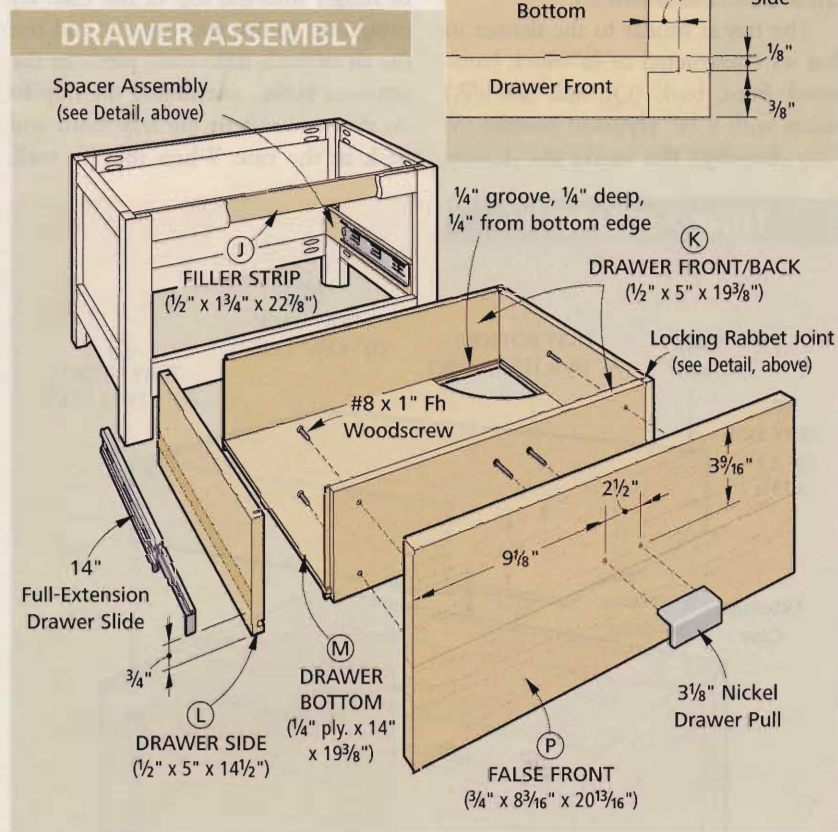
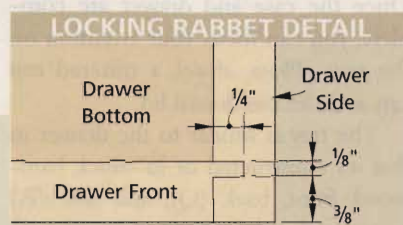
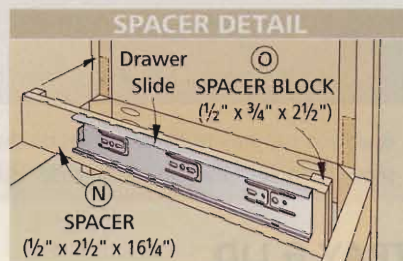
by rabbeting the front and back with a $\frac{1}{4}$ " dado blade. Then you can cut the groove for the drawer bottom in each part by using the same dado blade setup and adjusting the rip fence.

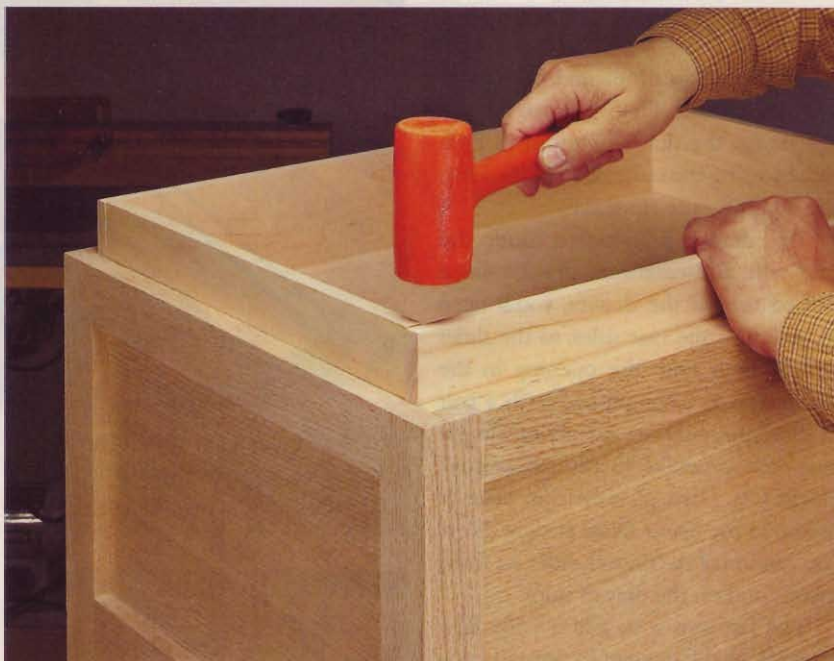
The drawer is mounted inside the case with full-extension drawer slides. But to mount the drawer, you'll need to build out the case sides, so the slides will sit flush with the opening in the frame. This is accomplished with a pair of three-piece spacer assemblies. Simply glue each spacer (N) to a couple of small blocks (O). Then, glue them in place as shown in the *Spacer Detail* at right. Now you can install the drawer slides on these spacers and on the drawer sides.

The last step is to add a wide false front (P) to the drawer. To prevent cupping, edge-glue two boards to create this piece. Once the glue dries, cut it $\frac{1}{16}$ " smaller than the opening to ensure a good fit. The tip shown in the *Photo* above shows how to install the false front with consistent gaps around it. Then, secure it by driving screws through the drawer front and into the false front.



To place the false front in its opening, use dimes as spacers and temporarily attach it with double-sided tape.





Build the top tray to fit snugly inside the case. Use a mallet to lightly tap it into place flush with the top of the case, and then secure it with brads.

TRAY & LID

Once the case and drawer are complete, you can focus your attention on the tray (*Photo, above*), a mitered top cap, and the cushioned lid.

The tray is similar to the drawer in that it's constructed of $\frac{1}{2}$ "-thick hardwood front, back (Q), and side (R) pieces with a $\frac{1}{4}$ " plywood bottom (S) (*Tray Assembly*). But unlike the drawer,

the parts of the top tray simply butt together. The main reason for these butt joints is that they simplify construction.

The goal here is to get the tray to fit snugly into the top of the case. By using butt joints, you can cut and test the fit of each individual piece in the ottoman before assembling the tray. To do this, cut and fit the tray front and back in the case. When they fit well,

clamp them in place, and then test the fit of the tray sides between them.

Once these parts fit nicely in the top of the ottoman case, cut a groove near the bottom edge of each piece for the tray bottom. Then assemble the tray with glue and brads.

To install the tray, simply lower it into the case, and tap it down until it's flush at the top (*Photo, left*). Then secure the tray by driving short brads through the tray and into the ottoman rails.

Top Cap & Trim Strips—To add a decorative touch near the top and bottom of the ottoman, I installed cap pieces at the top and trim strips below (*Illustration, page 65*).

The top cap (T, U) is made up of $\frac{1}{2}$ "-thick strips of hardwood that are mitered at the corners and attached to the top of the case. To simplify construction, preassemble the top cap with glue and clamps. Then, glue and clamp it in place on top of the case, making sure it overhangs the outside of the case by $\frac{3}{8}$ " all around.

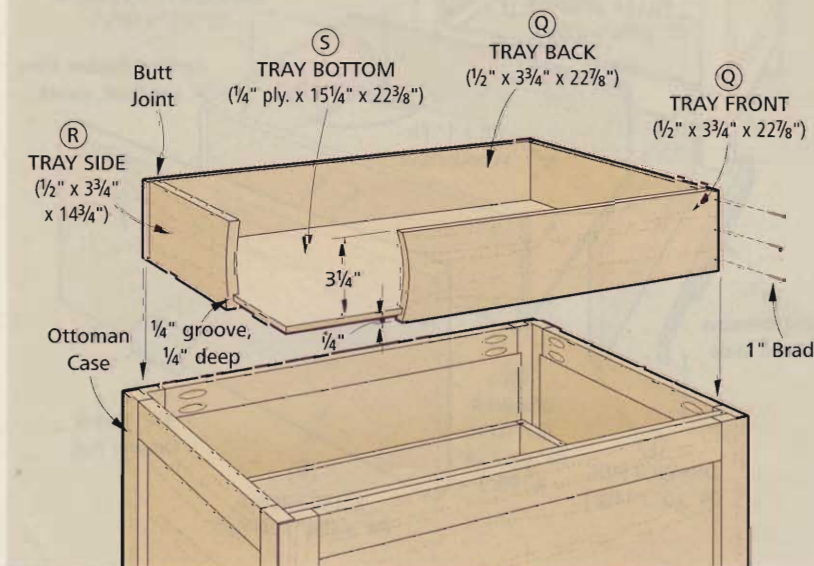
The trim strips (V, W) are also mitered at the corners to wrap around the case (*Trim Strip Detail, page 65*). These strips simply get glued and clamped to the case, flush with the top edges of the bottom rails.

Add the Lid—The last detail of the ottoman is the cushioned lid. The lid (X) starts as a $\frac{3}{4}$ " plywood panel that's cut to size. Before sending the lid out for upholstery, I located and drilled the hinge holes and test-fit the lid above the case. Then, when I got the lid back from the upholsterer, I cut out the fabric covering the cup holes for the hinges with a utility knife.

All that remains is to apply a finish to the case. (I chose a natural oil finish.) Then, install the cup portion of the hinges in the lid, and the mounting plates of the hinges on the top cap (*see Hinge Detail, page 65*). Finally, add nylon chair glides to the underside of the legs, and outfit the drawer with DVD or CD storage hardware if you desire. 

—Written by Wyatt Myers, project designed by Mike Donovan, illustrated by Matt Scott

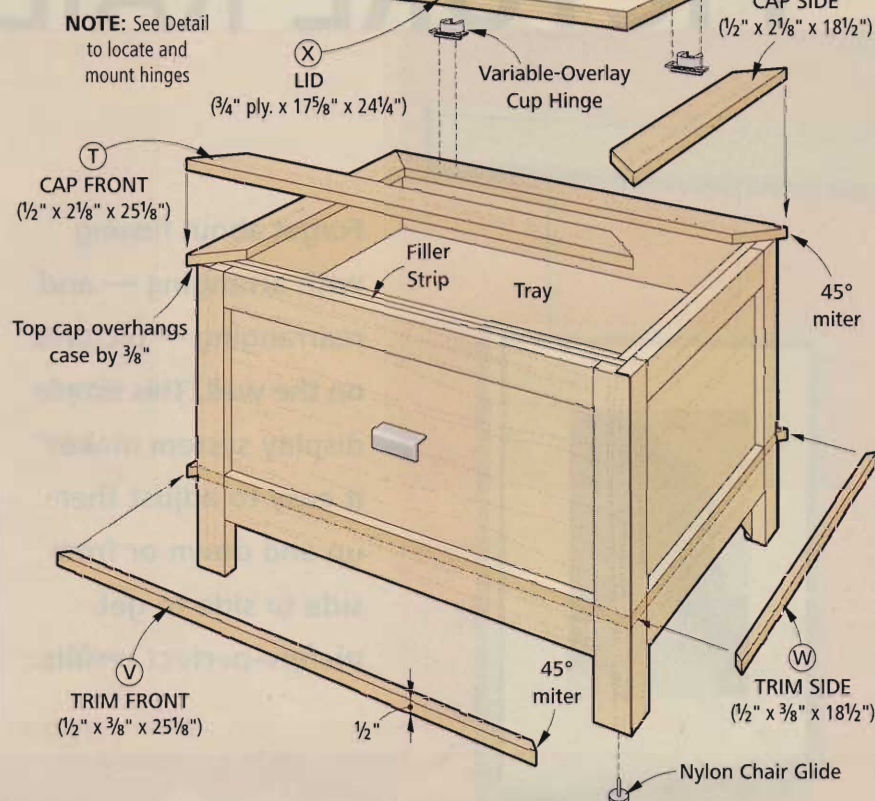
TRAY ASSEMBLY



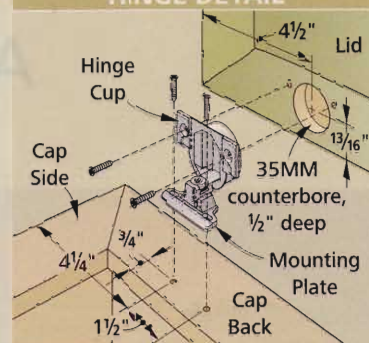
TOP CAP, TRIM, & LID

NOTE: Fabric applied to top and bottom of lid

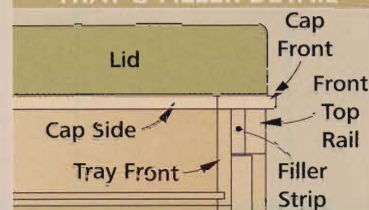
NOTE: Lid professionally upholstered with 2"-thick foam and "micro" suede fabric



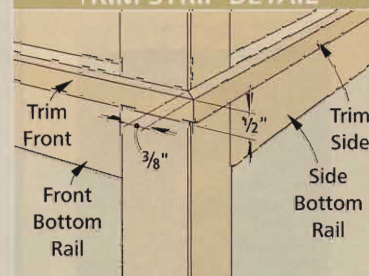
HINGE DETAIL



TRAY & FILLER DETAIL



TRIM STRIP DETAIL



MATERIAL LIST

Part	Qty	Size	Material	
OTTOMAN CASE				
A	FRT./BK. TOP RAIL	2	¾" x 1 ¾" x 20 ⅞"	Red Oak
B	FRT./BK.BTM.RAIL	2	¾" x 2 ¼" x 20 ⅞"	Red Oak
C	SIDE TOP RAILS	2	¾" x 1 ¾" x 14 ¼"	Red Oak
D	SIDE BTM. RAILS	2	¾" x 2 ¼" x 14 ¼"	Red Oak
E	FRONT/BACK LEG	4	¾" x 1 ¾" x 15"	Red Oak
F	SIDE LEGS	4	¾" x 1 ⅝" x 15"	Red Oak
G	BACK PANEL	1	¼" x 8 ¾" x 21 ⅜"	Red Oak Plywood
H	SIDE PANELS	2	¼" x 8 ¾" x 14 ¾"	Red Oak Plywood
I	FILLER BLOCKS	4	1" x 1" x 4 ¾"	Red Oak
J	FILLER STRIP	1	½" x 1 ¾" x 22 ⅞"	Red Oak
DRAWER				
K	FRONT/BACK	2	½" x 5" x 19 ⅜"	Maple
L	SIDES	2	½" x 5" x 14 ½"	Maple
M	BOTTOM	1	¼" x 14" x 19 ⅜"	Maple Plywood
N	SPACERS	2	½" x 2 ½" x 16 ¼"	Maple
O	SPACER BLOCKS	4	½" x ¾" x 2 ½"	Maple
P	FALSE FRONT	1	¾" x 8 ⅜" x 20 ⅜"	Red Oak
TRAY				
Q	FRONT/BACK	2	½" x 3 ¾" x 22 ⅞"	Maple

Part		Qty	Size	Material
R	SIDES	2	½" x 3¾" x 14¾"	Maple
S	TRAY BOTTOM	1	¼" x 15¼" x 22¾"	Maple Plywood
TOP CAP, TRIM, & LID				
T	CAP FRONT/BACK	2	½" x 2⅛" x 25⅛"	Red Oak
U	CAP SIDES	2	½" x 2⅛" x 18½"	Red Oak
V	TRIM FRT./BACK	2	½" x ⅜" x 25⅛"	Red Oak
W	TRIM SIDES	2	½" x ⅜" x 18½"	Red Oak
X	LID	1	¾" x 17⅝" x 24¼"	Balt. Birch Plywood

HARDWARE

- (32) #8 x 1 1/4" Pocket Screws
- (4) Nylon Chair Glides
- (2) Accuride 14" Black Box Drawer Slides (#89674) *
- (1) 3 1/8" Antique Nickel Square Drawer Pull (02W31.32) **
- (4) #8 x 1" Fh Woodscrews
- (20) 1" Brads
- (2) Blum 35MM Variable-Overlay Cup Hinges (#90788) *
- (2) DVD Holder Tracks (#30510) *
- OR
- (3) CD Holder Tracks (#30536) *

* Items available from Rockler (800-279-4441; Rockler.com)

** Item available from Lee Valley (800-871-8158; LeeValley.com)

MATERIALS LIST



Part	Qty	Size	Material	
OTTOMAN CASE				
A	FRT./BK. TOP RAIL	2	¾" x 1¾" x 20⅞"	Red Oak
B	FRT./BK.BTM.RAIL	2	¾" x 2¼" x 20⅞"	Red Oak
C	SIDE TOP RAILS	2	¾" x 1¾" x 14¼"	Red Oak
D	SIDE BTM. RAILS	2	¾" x 2¼" x 14¼"	Red Oak
E	FRONT/BACK LEG	4	¾" x 1¾" x 15"	Red Oak
F	SIDE LEGS	4	¾" x 1⅝" x 15"	Red Oak
G	BACK PANEL	1	¼" x 8¾" x 21⅜"	Red Oak Plywood
H	SIDE PANELS	2	¼" x 8¾" x 14¾"	Red Oak Plywood
I	FILLER BLOCKS	4	1" x 1" x 4¾"	Red Oak
J	FILLER STRIP	1	½" x 1¾" x 22⅞"	Red Oak
DRAWER				
K	FRONT/BACK	2	½" x 5" x 19⅜"	Maple
L	SIDES	2	½" x 5" x 14½"	Maple
M	BOTTOM	1	¼" x 14" x 19⅜"	Maple Plywood
N	SPACERS	2	½" x 2½" x 16¼"	Maple
O	SPACER BLOCKS	4	½" x ¾" x 2½"	Maple
P	FALSE FRONT	1	¾" x 8⅜" x 20⅜"	Red Oak
TRAY				
Q	FRONT/BACK	2	½" x 3¾" x 22⅞"	Maple

Part		Qty	Size	Material
R	SIDES	2	½" x 3¾" x 14¾"	Maple
S	TRAY BOTTOM	1	¼" x 15¼" x 22⅜"	Maple Plywood
TOP CAP, TRIM, & LID				
T	CAP FRONT/BACK	2	½" x 2⅝" x 25⅞"	Red Oak
U	CAP SIDES	2	½" x 2⅝" x 18½"	Red Oak
V	TRIM FRT./BACK	2	½" x ⅜" x 25⅞"	Red Oak
W	TRIM SIDES	2	½" x ⅜" x 18½"	Red Oak
X	LID	1	¾" x 17⅝" x 24¼"	Balt. Birch Plywood

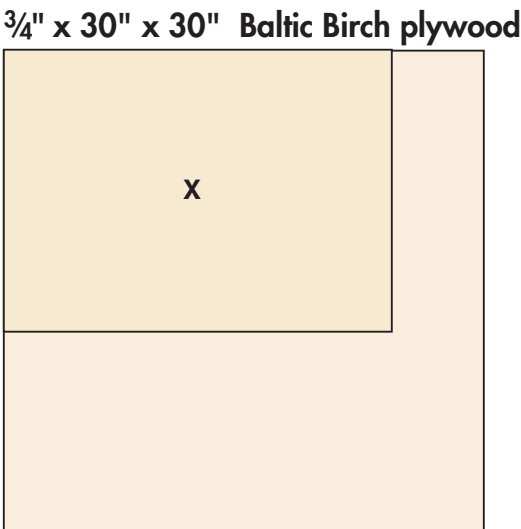
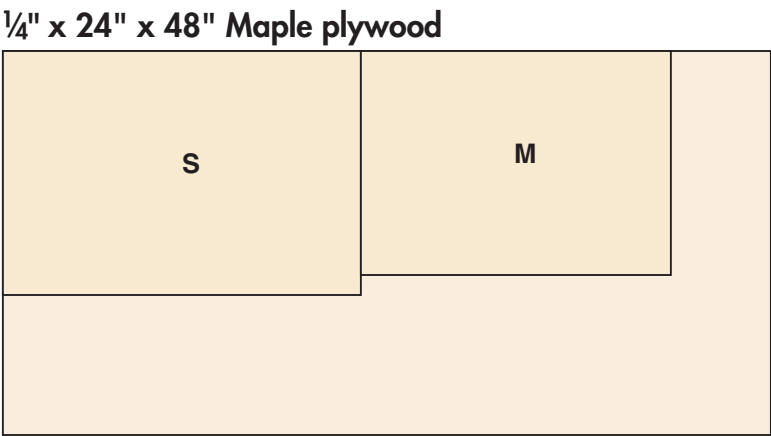
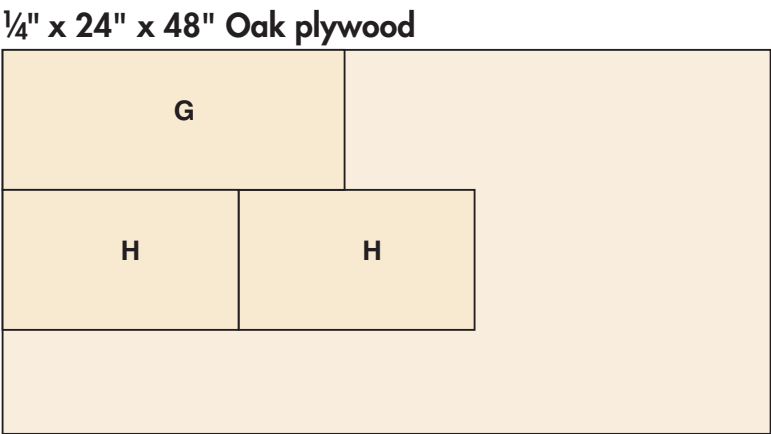
HARDWARE

- (32) #8 x 1¼" Pocket Screws
- (4) Nylon Chair Glides
- (2) Accuride 14" Black Box Drawer Slides (#89674) *
- (1) 3⅞" Antique Nickel Square Drawer Pull (02W31.32) **
- (4) #8 x 1" Fh Woodscrews
- (20) 1" Brads
- (2) Blum 35MM Variable-Overlay Cup Hinges (#90788) *
- (2) DVD Holder Tracks (#30510) *
- OR
- (3) CD Holder Tracks (#30536) *

* Items available from Rockler (800-279-4441; Rockler.com)

** Item available from Lee Valley (800-871-8158; LeeValley.com)

CUTTING DIAGRAM



3/4" x 5" x 96" Oak

A		A		C		C			
E		E		E		E		I	

3/4" x 5" x 96" Oak

F		F		F		F				
B		B			D		D			

3/4" x 5" x 48"Oak

P	P	

1/2" x 4" x 96" Oak

T	U																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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1/2" x 6" x 96" Maple

K	K	L	L	O
				O

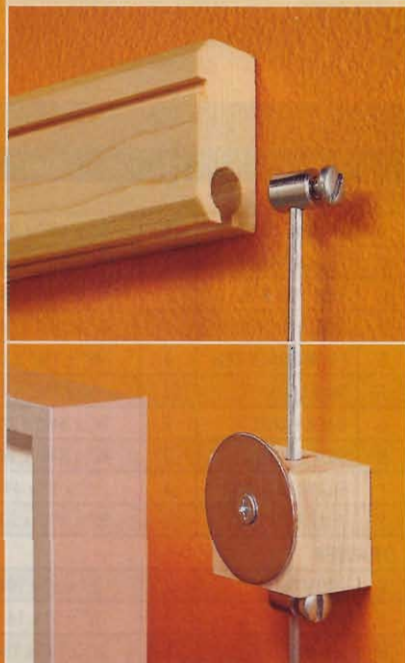
1/2" x 5" x 96" Maple

Q	Q	R	R	

ADJUSTABLE PICTURE RAIL



Forget about fussing with arranging — and rearranging — pictures on the wall. This simple display system makes it easy to adjust them up and down or from side to side to get picture-perfect results.



To hang a picture frame, slip a wire stop fastened to a metal rod into the rail (*Top*). Then hook the frame over the hanger block (*Bottom*).

How many times have your picture-hanging efforts yielded less-than-perfect results? Perhaps there isn't a wall stud right where you want to hang the picture. Or you hang it too high, too low, or off-center, requiring you to hammer in yet another nail and try again.

This picture rail eliminates those problems. As you can see in the *Main Photo*, it's a wall-mounted rail with

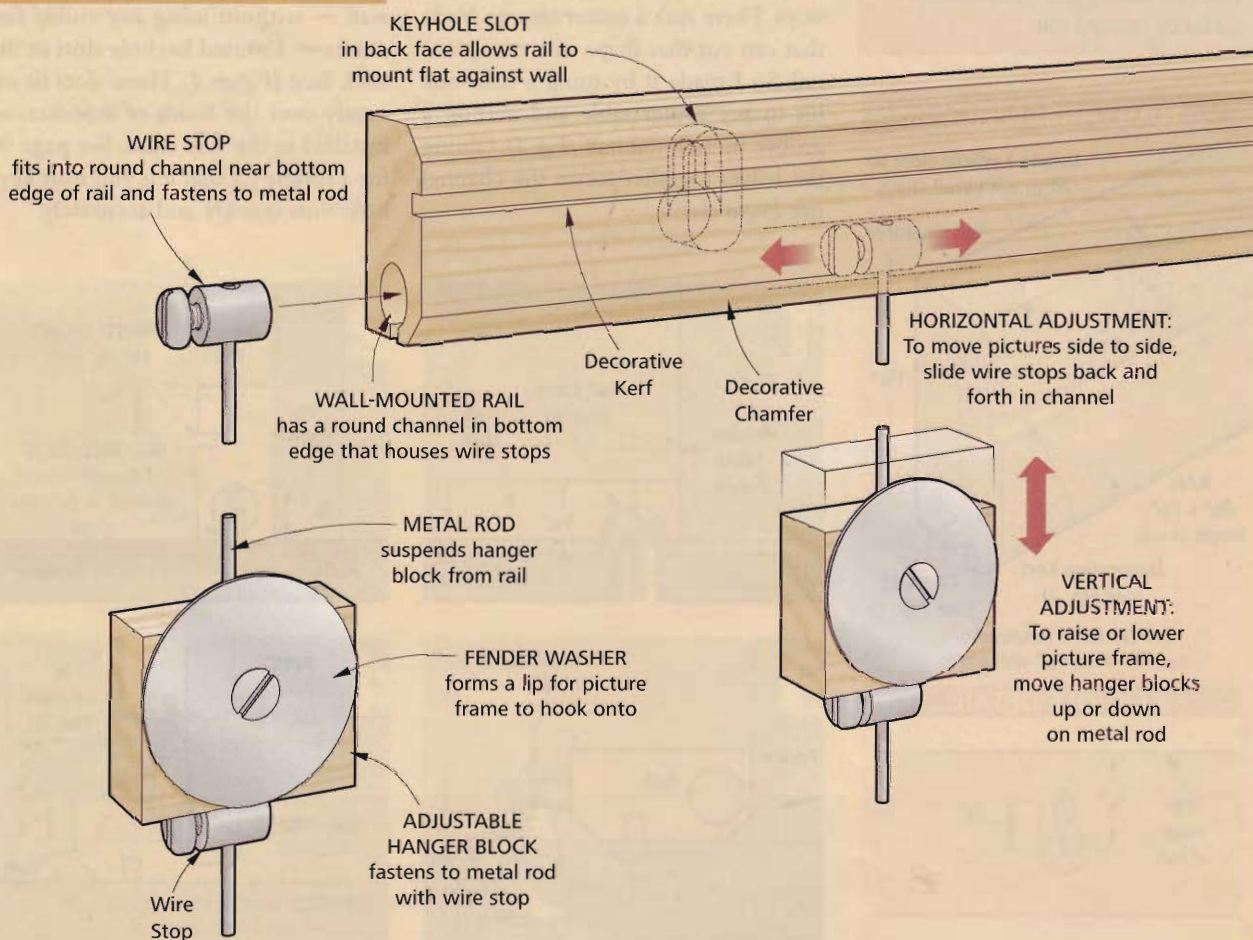
metal rods suspended from it that hold the picture frames. The metal rods become an integral and stylish part of the decor in your room. More importantly, the rods are part of a nifty system that lets you quickly and easily adjust the position of the picture frames.

To understand how this system works, take a look at the *Construction Details* below. Notice that there's a special piece of hardware called a wire stop fastened to the top of each rod.

This wire stop fits into a round channel in the bottom of the rail. Sliding the stop in the channel lets you reposition a picture frame from side to side.

At the bottom of each rod, a second wire stop supports a small wood block with a large washer attached to it. To hang a picture, simply hook the frame over the washer (*Lower Inset Photo*, page 66). To adjust the height of the frame, just loosen the wire stop, and nudge the hanger block up or down.

CONSTRUCTION DETAILS

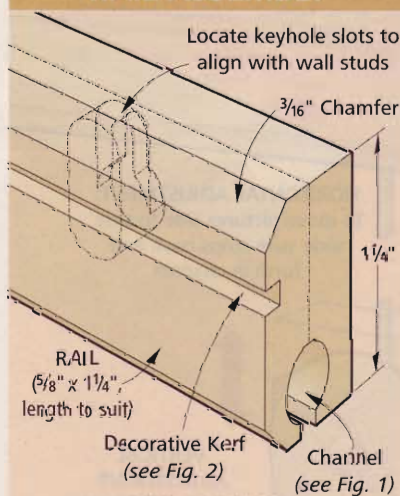


MAKE THE PICTURE RAIL — START TO FINISH IN A DAY



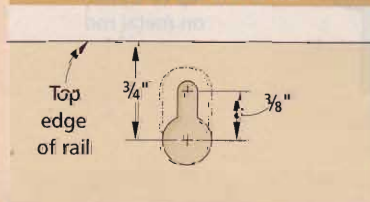
When gluing up the rail, sandwich the halves between two scrap-wood backers. This distributes clamping pressure evenly and guarantees a perfectly straight rail.

RAIL ASSEMBLY



NOTE: Rail is composed of two 5/8"-thick, 1 1/4"-wide pieces

KEYHOLE DETAIL

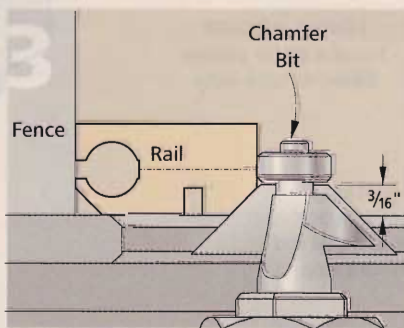
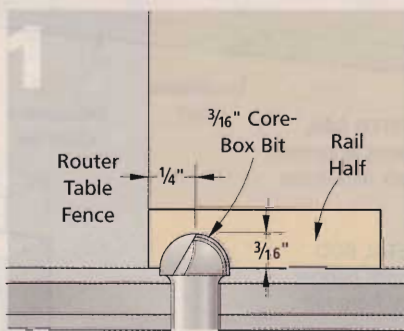


There aren't many projects that you can start and finish in the same day. But you really can build this picture rail, apply the finish, and hang it up — all in a matter of hours.

The first step takes place not in the shop, but in your living room, bedroom, bathroom, kitchen — wherever you want to hang pictures. Take your tape measure with you. You'll need it to figure out how long to make the rail. Perhaps you want a long rail, like the one on page 66, to hang several pictures. Or make a shorter rail if wall space is limited (*Photo, page 69*).

Regardless of its length, the width of the rail is 1 1/4". As for thickness, it's 5/8" thick. In order to get this 5/8"-thick rail, I made it from two 5/16"-thick pieces of hardwood (*Rail Assembly*).

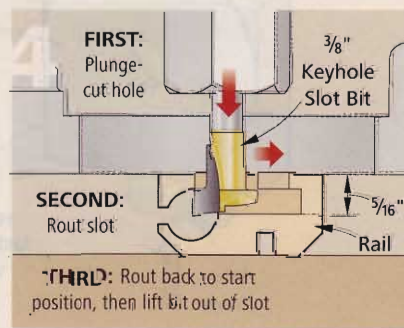
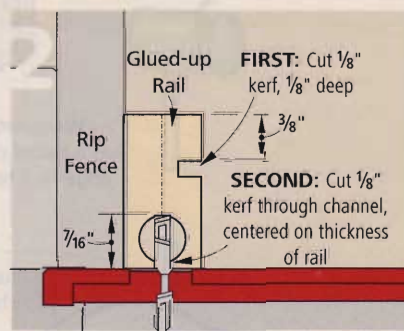
Create a Channel — The reason for making the rail out of two pieces has to do with the round channel in the bottom edge that houses the wire stops. There isn't a router bit or a blade that can cut that shape in a one-piece rail. So I made it by using a core-box bit in my router table and cutting a groove in each rail half (*Fig. 1*). Gluing the halves together forms the channel (*see Photo above*).



At this point, the channel for the wire stops is complete. But the metal rods will still need an opening in the channel so they can extend down from the rail. This opening is made by cutting a saw kerf in the bottom edge of the rail (*Fig. 2*). Raising the blade to just touch the top of the channel removes any dried glue that might have squeezed out.

Decorative Details — While you're at the table saw, it's a good time to add the first of two decorative details to the rail. Start by cutting a shallow kerf in the front face of the rail (*Fig. 2*). Then move to the router table, and rout decorative chamfers on the exposed front edges of the rail (*Fig. 3*).

Get the Hang of It — That takes care of the "show" face of the rail. But the back still needs a little work before you can mount the rail to the wall. To keep the rail flat against the wall — without using any visible fasteners — I routed keyhole slots in the back face (*Figure 4*). These slots fit securely over the heads of woodscrews installed in the wall studs. See page 90 for a simple jig that lets you rout keyhole slots quickly and accurately.



Around the Block — Once the rail is completed, you can turn your attention to the hanger blocks that actually hold the pictures. You'll need to make two hanger blocks for most picture frames. Each one is just a hardwood block with a hole drilled in it for the metal rod to pass through (*Hanger Assembly, right*). A wire stop (just like the stop that fits into the channel in the rail) holds the block on the rod.

To keep the picture frame from slipping off the hanger blocks, I screwed a large Fender washer to each one. Notice that the washer sticks up above the top of the block. This forms a lip that the frame hooks over, holding it securely in place. (For alternate methods of hanging frames, see *Hanging Options* below.)

Put It All Together — Now you can start assembling things. Gather up the components: hanger blocks, wire stops, and $\frac{3}{32}$ " spring-steel rod. (This type of rod is available at many hardware stores and hobby shops, and you can get wire stops, part no. 4-219, at mfgsupply.com.)

The rod simply slips through the hanger blocks. And a wire stop is attached at each end by tightening a screw into the stop. To allow the up-

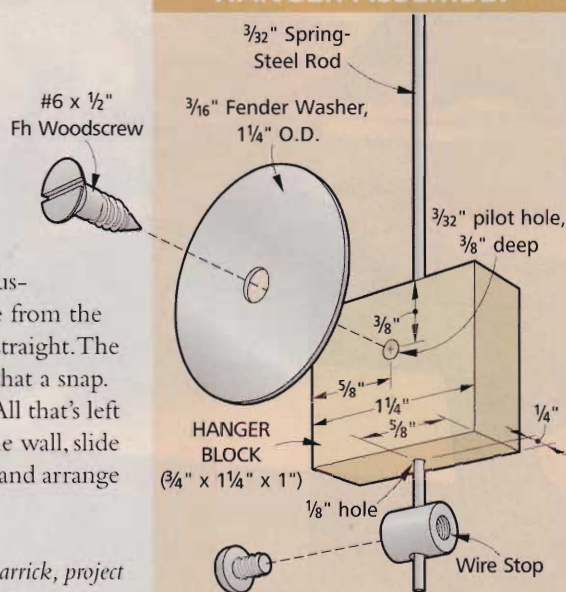
per stop to slide easily in the channel in the rail, just be sure the the rod doesn't extend above that stop.

As you're attaching the stops, note that both hanger blocks for each frame need to be suspended an equal distance from the rail for a picture to hang straight. The tip shown below makes that a snap.

Mount the Rail — All that's left is to mount the rail on the wall, slide in the hanger assemblies, and arrange your pictures.

—Written by Kate Busenbarrick, project designed by Jim Downing, illustrated by Matt Scott

HANGER ASSEMBLY



A metal rule, a cleat, and a couple of clamps ensure accuracy when determining hanger location. With the rule clamped to the benchtop, hook the top wire stop over the cleat, and set the hanger block at the desired length. Clamp it in place while you tighten the bottom wire stop.



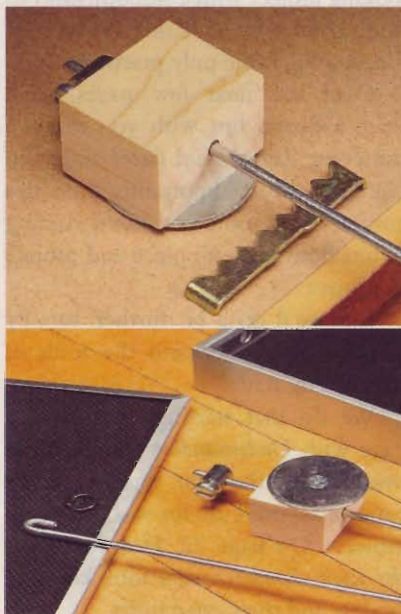
Hanging Options

In addition to its adjustability, this picture rail can also be adapted to work with a number of different types of picture frames and hanging hardware.

For most metal frames, use the "standard" configuration (hanger blocks, Fender washers, and wire stops). The frame simply hooks over the washers.

The same principle applies if you plan to mount a frame using a "sawtooth" picture hanger (*Upper Right Photo*). Just hook the hanger over the washer.

If your frame has a D-shaped ring on the back, you can dispense with the hanger block altogether. All you have to do is bend a loop on the end of the rod (*Lower Right Photo*).



It's easy to customize this picture rail to match any decor, as with this short painted version.



12 TOP TIPS FOR SANDING SUCCESS

You can't make sanding go away, but you can sand faster, with less effort, *and* get better results at the same time. Here's how.

Sanding doesn't rank high on most woodworkers' lists of favorite shop activities. At best, it's a "necessary evil" in the process of completing a woodworking project.

So, if that's the case, you may be wondering why we'd devote space in *Workbench* to an article about a subject that leaves so many so uninspired. The reason is simple: Sanding is a very necessary step in building almost every type of project.

Even with today's powerful tools and super-sharp blades and bits, the machining process still leaves marks on the wood. Plus, no matter how careful you are, your project parts are bound to get a little scratched and shopworn before you can get everything assembled. That means you need to get rid of these

marks if you want to produce a good-looking project with a smooth, lustrous finish. And even if it isn't exciting or fun, sanding is the only practical way.

Over the next few pages, we'll share a dozen tips with you that we use every day to sand faster and with less effort. Most importantly, these tips ensure better, more consistent sanding results from piece to piece and project to project.

But we'll go a bit further, too, by helping you understand the tools of the sanding trade.

We do that starting on the next page with *Understanding Sandpaper*, an overview of the four types of sandpaper that you'll use for woodworking projects. On page 72, *How To Choose the Right Sander* covers four kinds of sanders and their capabilities.

Tip 1:

SAND FIRST, THEN ASSEMBLE

When building a project, cutting the parts and fitting joints takes a lot of time. Sometimes, it seems like the project will never get done. So it's natural to want to get all those parts assembled right away in order to see the results.

This urge to assemble is one you should resist, however, until you have sanded the individual project pieces. Though this may sound more time-consuming, pre-sanding actually saves time and effort in the long run.

For one thing, you can get to all the surfaces of each part. And you won't have to sand into corners or across intersecting grain, which can cause you to scar up one piece as you sand another.

In my shop, pre-sanding is just one more step in project assembly. I first cut parts to size, machine any joinery, and then sand all the parts to final grit.

After sanding, I assemble the project “dry” (without glue). This lets me double-check whether or not all the parts fit correctly. And it satisfies that need to see the project assembled.

Using this routine, the only sanding that’s necessary after final assembly is a quick touch-up pass before finishing.

Tip 2:

STAY ORGANIZED

If there’s a downside to sanding all the parts of a project prior to assembly, it would be keeping everything organized. With a bunch of pieces piled around, it’s all too easy to lose track of which ones have been sanded, and with what grit.

Fortunately, the solution is simple. Just carefully organize all your parts on your worksurface before and after they’re sanded. As the *Photo* on page 70 shows, one of the best ways is to start off with all the parts in a neat stack on one side of the bench. Then, select the sandpaper grit you need to start with (see *Tips 3 and 4*), and begin sanding. Once you’ve sanded a piece, move it to the other side of the bench to start a new stack. When all of the parts have been moved from one stack to the other, you’ll know for sure that you are ready to move on to sanding with the next-finer grit.

This simple organization system can also be very handy if you have to stop working before all the sanding tasks are done. My shop sessions often get interrupted for hours (or even days) at a time. So when I get back to work, I find that I have trouble remembering where I was in the process, and what sanding grit I was using.

This is when I use another simple tip: Lay a sheet of the last sandpaper grit used on each stack. When I return, I’ll know precisely what grit each stack has been sanded through.

Tip 3:

USE THE RIGHT GRITS

Sandpaper is available in many grits from super-coarse 36-grit through ultra-fine 1500-grit. But for sanding bare wood, you can do everything with the grits shown in the *Chart* below.

Many woodworkers think that you should always start sanding with coarse paper. Starting too coarse, though, creates unnecessary work. On surfaced hardwood boards, for example, 80-grit may just make the surface rougher.

A better practice is to start sanding with the finest-grit paper that removes unwanted marks. I often begin with

120-grit. If that isn’t effective, I back down to 100, and then work my way through finer grits (see *Tip 4*).

When working with cabinet-grade plywood, by the way, avoid sanding with paper rougher than 150-grit. You can sand through the thin face veneer in nothing flat using 100- or 120-grit.

Many woodworkers think you have to sand bare wood to a very fine grit before finishing. In truth, 180- or 220-grit leaves a surface plenty smooth for finishing. That’s because you sand between coats. But that’s a different story.

GRIT

80-100

Remove prominent mill marks and deep scratches

120

Starting grit for surfaced woods; can be finish grit if painting

150

Starting grit for cabinet-grade plywood; fine finishing for painted projects; finish grit for outdoor projects

180

Finish grit for projects that get a film-building finish (like varnish)

220

Finish grit for projects that get an oil finish; finish grit for end grain

USE

UNDERSTANDING SANDPAPER

Sandpaper is made by coating a paper or fabric backer with abrasive particles. Those particles act like tiny teeth that “cut” the wood surface.

The particles come in different sizes, called grits. A lower grit number equals a larger particle and larger “cut.”

Particles can be made from different materials that influence cutting ability and durability. Silicon-carbide and aluminum-oxide particles, for example, are “friable,” meaning they fragment to expose fresh cutting edges. Ceramic particles are very hard, so they stay sharp for a long time.

SILICON CARBIDE

- Fast cutting
- Friable
- High durability
- Medium price
- Available in sheets, rolls, discs

GARNET

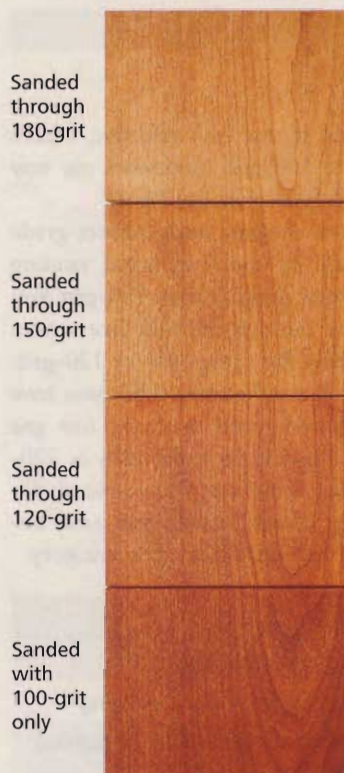
- Slow cutting
- Not friable
- Low durability
- Low price
- Available in sheets

CERAMIC

- High durability
- High price
- Available in coarse grits in belts, discs

ALUMINUM OXIDE

- Medium durability
- Friable
- Medium price
- Available in sheets, rolls, discs



Sanded through 180-grit

Sanded through 150-grit

Sanded through 120-grit

Sanded with 100-grit only

Each section of this board was sanded through the grit shown and then stained to show the effect on color.

Tip 4:

BE CONSISTENT WITH GRITS

We think of sanding as a process of making wood smooth. In reality, sanding is the process of scratching the wood surface. Coarse grits make big scratches, and fine grits make smaller ones. The idea is to make scratches that get progressively smaller until they're not noticeable by sight or touch.

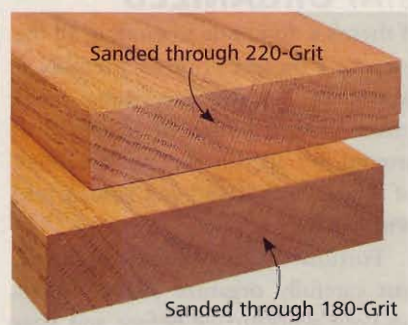
The way to do that is to start with the coarsest grit necessary to remove imperfections (see Tip 3), and then progress through successively finer grits. As you sand, take a close look at the surface, and feel it with your bare hand. When it looks and feels consistent, move on to the next-finer grit.

Don't be tempted to skip over any grits as you sand. You'll just spend more time sanding to remove the scratches left by the coarser paper.

And since the goal is to produce a consistent surface on every piece, you need to make sure to sand all of them with the same final grit. Even

if you can't feel the difference between, say, 150- and 180-grit, you'll see the difference when the project is complete. This is especially true if the project will be stained (Photo, left).

There is one exception to this rule, though. End grain tends to absorb more stain and finish than face or edge grain. This causes the end grain to appear darker. The remedy is to sand exposed end grain with paper one grit finer than you use on the faces and edges (Photo, below).



HOW TO CHOOSE THE RIGHT SANDER



FINISHING SANDER. A finishing sander won't remove mill marks or surface rough stock well, but as the name implies, it's great for final smoothing with fine-grit papers.

BELT SANDER. Heavy and aggressive, a belt sander chews through wood in a hurry. It's great for flattening a panel, but difficult to control. A belt sander will get limited use in most shops.



Most woodworking today is done with power tools, and there's no exception when it comes to sanding. The reason for this is simple: Power sanders vibrate, roll, or spin sandpaper to multiply the number of strokes you can apply in a given amount of time. This lets you sand more without tiring, which will result in smoother, more consistent surfaces.

To get the best results, you need to know which sander best suits the job at hand. Here's a quick look at the three main types of power sanders, plus a few reasons you still need the simplest "power" sander of all: your hands.

Finishing Sander — This sander (above left) has a square, vibrating pad that accepts standard sandpaper sheets cut into quarters. A finishing sander isn't aggressive, but it sands into corners well.

Belt Sander — At the opposite end of the aggression scale is the belt

Tip 5:

CLEAN IN BETWEEN

Most sanders today are equipped with an attachment that pulls dust through holes in the sanding disc and into an attached bag or vacuum port. As a result, sanding doesn't leave clouds of dust in the air or piles of easily visible dust on a workpiece.

But even the best dust collection can't remove all the dust that sanding creates. Just wipe your hand over the surface of a freshly sanded workpiece, and you'll see and feel that dust and even pieces of sandpaper grit get lodged in the pores of the wood.

So before you move on to the next-finer grit, you need to wipe, brush, vacuum, or blow this debris away. This takes a little extra time but allows for more efficient sanding. It also prevents unsightly scratches caused by stray pieces of coarser grit.

And, of course, you should always clean all the sanding dust off before you apply a stain or finish.

Mill marks and other imperfections can be difficult to see on bare wood. Mineral spirits highlights these areas without raising the grain.



Tip 6:

MINERAL SPIRITS HIGHLIGHTS IMPERFECTIONS

Even if you check your progress as you sand, it's easy to miss a scratch, mill mark, or imperfection with your naked eye or bare hand. But apply a coat of stain or finish, and those hard-to-see marks will stand out instantly.

To avoid finding these marks after it's too late to fix them, wipe down workpieces using a rag dampened with mineral spirits. The mineral spirits will reflect light and make problem areas visible (*Photo, above*).

After a few minutes, the mineral spirits will evaporate without leaving residue that will discolor the wood or interfere with finishing. As an added benefit, a mineral-spirits rubdown will help clean off any dust that you might have missed.

To make imperfections even more visible, bend low over one end of the workpiece, and look across its surface while holding a worklight low at the other end.

sander (*below left*). It has rollers that drive a continuous belt. A belt sander is designed for rapid stock removal and not for finesse or final smoothing.

Random-Orbit Sander — A great compromise is the random-orbit sander (*above right*). Its round pad spins rapidly and rotates in an eccentric circle. That leaves a scratch pattern that, while not *truly* random, is very difficult to detect. Outfitted with coarse paper, a random-orbit sander will sand aggressively. With fine paper it produces a beautifully smooth surface. And a random-orbit sander is easy to control, making it the go-to tool for most sanding tasks.

Hand-Sanding — For all the advantages power sanders offer, there are still some tasks best accomplished by hand-sanding (*right*). For curves, contours, or any time that you need a really good feel of what's happening, hand power is still hard to beat.

RANDOM-ORBIT SANDER.

A random-orbit sander represents the state of the sanding art. Typical features include dust collection, variable speed, and a hook-and-loop pad surface that makes switching discs easy.



HAND SANDER. For ultimate control, hand-sanding is still the method of choice. Your hand conforms to contours and can feel the surface as you work.



Tip 7:

BEFORE SANDING, **SCRAPE BURNS AWAY**

Few things are more frustrating than cutting a workpiece to exact size, or routing it with the perfect profile, only to find a nasty burn mark left behind. But occasional burns are inevitable, whether caused by dull bits or blades or by the natural resins found in woods like cherry and maple.

When burns do happen, your first inclination will be to grab a piece of sandpaper and try to remove the burn

by sanding. More frustration follows when you find that sanding doesn't get the job done or ruins a crisp edge.

Instead of sanding, I first reach for a sharp cabinet scraper to quickly cut through the burn (*Photo, above*). On curves and profiles, you can use a curved scraper, a sharp pocket knife, or even the ground-down tip of an old spoon.

After scraping, a little light sanding will quickly smooth the surface.

Tip 8:

ERASE **LAYOUT LINES**

Woodworkers use a lot of different markings on workpieces to lay out joinery and to mark where individual parts should go or how they'll be oriented. Most of us make these marks with a pencil, which means we'll need to remove the marks before the project can be stained or finished.

It might seem natural to reach for a piece of sandpaper and try to remove the marks that way. Surprisingly, this takes a lot more sanding than you'd expect. Plus it's a good way to accidentally scratch up a workpiece by using sandpaper that's too coarse.

Maybe I'm a slow learner, but it took me a long time to learn that the solution for getting rid of pencil marks was right there on the other end of the pencil: the eraser.

Now I make pencil marks very lightly and then erase them after assembly. That usually removes all trace of the marks, and a quick wipe-down gets rid of the eraser residue.

Tip 9:

GO UNPLUGGED **FOR INCREASED CONTROL**

Power sanders take a lot of the work out of sanding, but even the best of them can't handle every situation. Sometimes, your best bet is to turn off and tune in to good old hand-sanding.

Curves & Contours — All power sanders have a fairly rigid pad that's great for flat surfaces but ineffective on curves. And the tighter the radius, the less useful a power sander becomes.

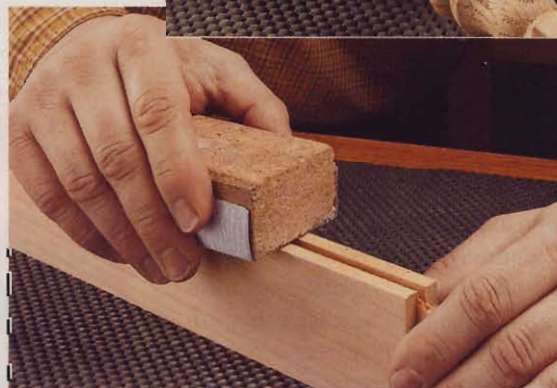
Your fingers and hands can conform to a variety of shapes, though, making them the perfect "pads" for sanding contours. Just wrap sandpaper around your workpiece or cup it in your hand, and you can make quick work of curves (*Photo, top right*).

Narrow Surfaces — When sanding narrow surfaces, such as edges, a power sander can be difficult to control. Even if you can keep it firmly

planted, it's easy to quickly round over the edge before you know it. This is when I prefer to use a cork or hard-rubber sanding block (*Photo, below right*). The block simply provides a flat, rigid surface and allows better control as I sand.

Tight Spots & Touch-Ups — On any project, there may be places a power sander can't reach, but your hand, a block, or a stick outfitted with self-adhesive sandpaper can.

To remove a small scratch, it doesn't make sense to sand the entire surface. By hand, you can easily sand an area smaller than a fingertip.



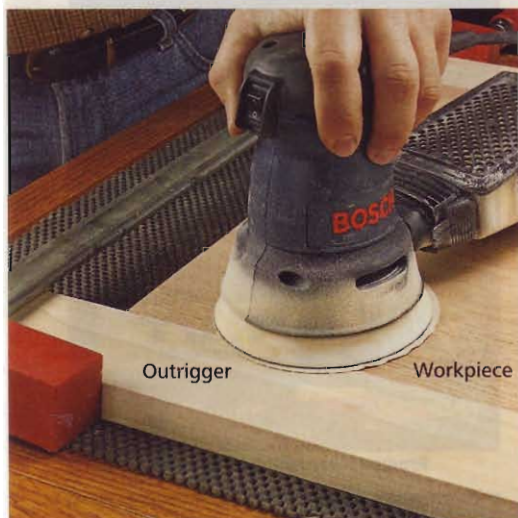
When sanding curves, hand-sanding is still best. A sanding block prevents rounding edges on narrow surfaces.



Tip 10:

USE OUTRIGGERS TO PREVENT ROUNDED EDGES

Early explorers worried that if they sailed to the horizon, they might fall right off the edge of the earth. Allowing your sander to tip off the edge of a workpiece might not cause results quite that disastrous, but it can leave a workpiece with edges that are rounded when you wanted them to be crisp and square.



Clamp "outriggers" made from scrap stock alongside a workpiece, and you can sand confidently up to the edge.

Unfortunately, because most sanders are fairly tall, you're applying more leverage than you'd imagine as you move it. This makes it all too easy to tip the sander without knowing it. The first way to prevent this is to never move more than about a third of the sander's pad beyond the edge as you work.

For even more insurance, clamp "outriggers" alongside the workpiece (*Photo, left*). These can be made from scrap stock, but you should still be a bit selective when making them.

First, make sure you choose stock the same thickness as your workpiece. That way, you won't have to hassle with getting the surfaces flush.

Second, make the outriggers a few inches longer than your workpiece. That keeps the clamps out of the way so you can sand the entire piece.

Though it's not usually a big problem, I try to make outriggers from wood that's no harder than the wood being sanded, so that the outriggers sand easily. I usually use scraps of the same stock, or I use poplar or pine from my scrap bin.

Tip 11:

MOST OF THE TIME, GO WITH THE GRAIN

Almost all of the fibers in wood run lengthwise, and when sanding them, you should move your sandpaper in the same direction, following the grain. If you sand across the grain, you'll tear through the fibers, creating scratches that are much more visible. If you sand a small section of a board each way and then wipe on some mineral spirits (*Tip 6*), you'll see the difference.

As always, there are exceptions to this rule. If you want to remove a lot of stock in a hurry, such as when flattening a panel or surfacing rough stock, then sand across the grain. Once you've achieved the result you want, be sure to

sand with the grain using the same grit paper. Then continue smoothing the workpiece by sanding with the grain.

The other exception comes when using a random-orbit sander. The spinning disc is moving with the grain *and* across it all the time. The random scratch pattern makes the cross-grain scratches difficult to see once you get to 150-grit and beyond. Even so, it's still a good idea to move the sander with the grain as you work.

Some woodworkers still like to make a few final smoothing passes by hand, sanding with the grain, after their final pass with a random-orbit sander.



Tip 12:

SMALL PART STRATEGY

Small pieces present their own sanding challenges. For starters, you can't sand them using a power sander without struggling for control (*see Tip 9*). And even when sanding by hand, it can be almost impossible to keep the small piece from moving around on your workbench as you sand.

The solution is to move the workpiece over the sandpaper instead of moving the sandpaper over the workpiece. To do this, you just need some adhesive-backed sandpaper, or a roll of double-faced tape. Stick the sandpaper to a surface, and then rub the workpiece back and forth over the paper.

Most often, you'll want to sand on a flat surface, such as your benchtop (*Photo, above*) or table saw top. It sounds incredibly simple, but this technique is more versatile than you might imagine. For example, you can also stick sandpaper to curved surfaces to easily sand small contoured workpieces.

However you do it, sand small pieces gently, and check your progress often. It's easy to overdo it and take off too much material in a hurry.

And, if the small part will be visible, be sure to sand it to the same final grit you used on all the larger parts of the project. If any end grain will show, sand it to one grit finer. After all, these small details, just like sanding itself, make a big difference in how the project will look in the end. 



High-output L.E.D. lights in the motor housing of the Ridgid R2930 router offer a better view of the bit. A dust-collection port is included for both the plunge and fixed bases.

RIDGID'S HEAVY-DUTY

Router Combo Kit

Ridgid started by including everything we've come to expect from premium router combination kits and then added their own valuable touches.

The new R2930 router combination kit from Ridgid has all the makings of a serious router kit. It boasts a powerful 2¼-HP motor with electronic variable speed, magnesium bases that are durable while still being lightweight, and microadjustment for accurate setups. It also features through-the-table depth



Use the depth stop rod to get close, and then make the final adjustments using the adjustable stop.

adjustment, which is quickly becoming a standard (*Photo, right*).

From there, Ridgid built a few of their own unique features into this router, making it all the more valuable.

First is a multi-position stop that makes fine-tuning cutting depth as easy as turning a dial. Each quarter-rotation of the stop changes the stop position by 1/32" (*Photo, below*).

Most unique, though, are high-output L.E.D. lights mounted in the bottom of the motor housing to illuminate the routing path (*Photo, above right*).

The performance of the router is just as impressive as its list of features. The handles provide a natural, comfortable grip, the power switch and speed dial are within easy reach, and the plunge action is firm but smooth.

Changing the motor from one base to another does take a little more dexterity than some competitive models since you have to depress the spindle-lock button as you lift the base out. But it becomes an easy trick after you've performed it a few times.



A T-wrench for making through-the-table adjustments is also handy for fine-tuning handheld setups.

The kit includes the motor, both bases, a T-handle wrench for depth adjustments, as well as 1/4" and 1/2" collets and two collet wrenches. All of that stores in a soft-sided contractor bag.

Look for the Ridgid R2930 at Home Depot for about \$199. For more information, visit Ridgid.com or call 800-474-3443. 



FASTER, STRONGER, & LONGER-LASTING

Sanding Discs

Is there more to sanding discs than meets the eye? We took some of the newest discs for a spin to find out.

If you can imagine your random-orbit sander as a car, then the discs are undoubtedly the tires. And just like a car's tires, picking the right discs can have a big impact on the performance of your sander.

A good example of this is the new "premium" sanding discs that you may have seen at the hardware store or

home center lately. The names of these discs vary (Norton 3X, 3M Sandblaster, Mirka Royal Plus, to name a few), but they all make similar claims. That is, they cut faster and last three (or four) times longer than standard aluminum-oxide discs. That, and they typically cost twice as much as standard discs.

So are these discs really high-end tires for your sander ... or are they just old treads with a new name? I took them for a spin to find out.

TO THE TEST:

Premium Sanding Discs

The first thing I wanted to know was if these discs really would last enough longer than a standard disc to make them worth the extra money. So I devised a simple test. I cut a number of pieces out of the same oak board and sanded each one for 20 minutes using a premium disc and a standard aluminum-oxide disc. (I tested Norton, 3M, Mirka, and Bosch.)

Sharper Surfaces—The results of the tests were convincing. For starters, the premium discs stayed sharp a lot longer. This was easy to verify by simply running my hand across both the premium and standard aluminum-oxide discs after I finished sanding.

As it turns out, the reason these discs stay so sharp is they use a combination of heat-treated aluminum-oxide and ceramic particles (*Illustration, right*). The heat treatment

prevents the aluminum-oxide particles from breaking down as quickly, and ceramic barely breaks down at all. It stays much harder than other abrasive particles (*more on this on page 84*).

Less Clogging—I also noticed that the discs didn't clog with dust like standard discs. This is thanks to a zinc-stearate coating. Zinc stearate is a lubricant that creates a slippery surface on the disc, preventing dust particles from packing the surface.

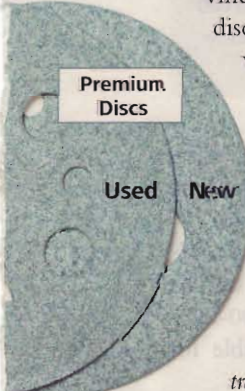
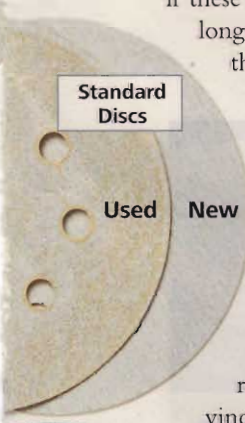
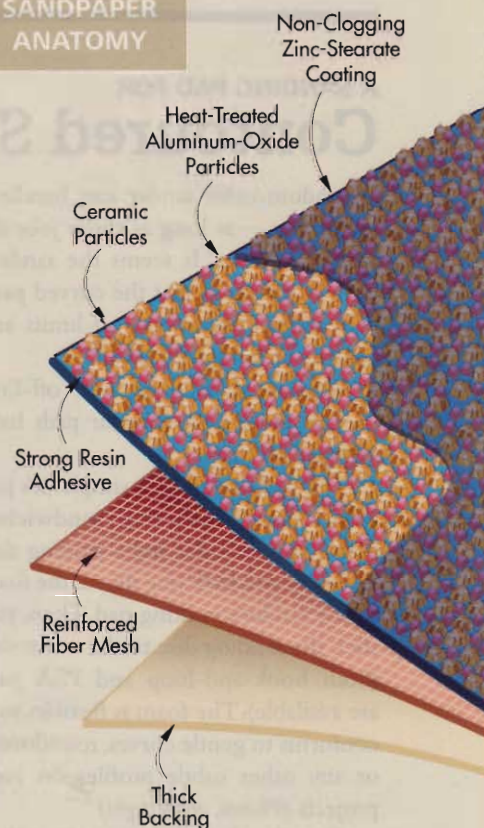
Better Retention—Another interesting thing about the premium discs is that the abrasive particles didn't flake off like they did on the standard discs. This was especially true around the edges. Here, a strong adhesive and fiber-reinforced backing made the difference (*Illustration, right*).

Bottom line? I think the premium discs are worth the extra money. Throughout our testing, they cut faster and stayed usable a lot longer than standard aluminum-oxide discs. And the results speak for themselves (*see the Photos at left*).



Using these "premium" sanding discs is one way to pump up the performance of your random-orbit sander.

PREMIUM SANDPAPER ANATOMY





SANDING TOUGH:

Zirconia Alumina

For tough jobs like sanding metal or rough wood, and for stripping paint or finish, you'll want to give these zirconia-alumina discs a try. Their abrasive particles are ceramic, an extremely hard man-made material (*Photo, above right*).

While aluminum-oxide particles are "friable" (meaning they break down to form new cutting edges), zirconia alumina is so tough that the particles just keep right on cutting without breaking down. The particles are also larger than aluminum-oxide, so they cut more aggressively.

These zirconia-alumina discs are more aggressive than aluminum oxide, so they're great for stripping paint.

I first tried one of these discs on a rough-sawn cherry board. In a matter of seconds, the discs had blasted the surface smooth. And when I switched to an old painted door I've been meaning to strip (*Photo, left*), I wasn't the least bit surprised by how quickly a disc took the door down to bare wood.

These zirconia-alumina 5" discs are available for \$2 apiece through Woodworker's Supply (Woodworker.com; 800-645-9292) in grits ranging from 60 to 120. They are pressure-sensitive adhesive (PSA) discs, so if you have a hook-and-loop sander, you'll need to purchase a PSA replacement pad for around \$20. Klingspor (800-228-0000; WoodworkingShop.com) sells similar discs under the name "AZ-Plus."

A SANDING PAD FOR

Contoured Surfaces

A random-orbit sander can handle a lot of jobs—as long as those jobs are on flat surfaces. It seems the sander's only limitation is that the curved parts of a project are always off-limits and have to be sanded by hand.

That is, these areas *were* off-limits. But these new contour pads have changed all that.

The pad's concept is simple. It's just a thick disc of foam that's sandwiched between the sander and a sanding disc. To use it, you stick one side of the foam to the sander's existing pad. Then, you stick the sanding disc to the other side (both hook-and-loop and PSA pads are available). The foam is flexible, so it conforms to gentle curves, roundovers, or any other subtle profiles on your projects (*Photos, above right*).

One drawback to the pads is they tend to obscure fine details (like elabo-



At last, you can sand curved surfaces with your random-orbit sander.

rate ogees and other profiles), so you may want to stick to hand-sanding for those. They're also a bit too soft to sand flat surfaces, so I'd recommend removing the pad when you're not sanding curved or contoured areas.

Contour pads are available for both 5" and 6" sanders through Woodwork-

er's Supply (Woodworker.com; 800-645-9292). Klingspor's Woodworking Shop sells similar versions with 5-, 6-, and 8-hole patterns for dust-free sanding with most 5" and 6" sanders (WoodworkingShop.com; 800-228-0000). All the pads are available for under \$10.



DOUBLE-DUTY

Table Saw Cart

It's an outfeed support for your table saw, and it's a storage cabinet — all rolled into one smart shop solution.

To help make his shop more efficient, *Workbench* reader Art Outlaw of Evansville, Indiana, built this simple cart for his table saw. The cart serves two purposes. First, it acts as an outfeed support when ripping long boards (Photo, below). Second, the cart

offers storage for table saw accessories, hand tools, and supplies.

One interesting thing about this cart is how it solves the challenge of adding outfeed support to a contractor-style table saw. With this type of saw, the motor hangs off the back, so an outfeed support must take that into account. This cart does that with a large open compartment in back that provides clearance for the motor (*Side Section View*, page 87).



When ripping long boards, the top of this cart provides sturdy outfeed support. Clearance slots for the bar on the miter gauge let you crosscut, as well (*Inset*).

Cart Construction — The first step in building the cart is to cut two sides from $\frac{3}{4}$ " plywood (*Construction View*). The length of the sides is important because it's one of three factors that establish the height of the cart (the casters and the thickness of the top are the other two). The cart should be about $\frac{1}{8}$ " shorter than the saw. Otherwise, a workpiece could catch when it comes off the saw. So, when determining the length (height) of the sides, be sure to take all three factors into account.

After cutting the sides to size, the next step is to cut a dado in each one for the shelf. A dado blade mounted in the table saw makes quick work of this.

You can use this same dado blade setup for the next operation, which is to cut a rabbet in the bottom edge of each side for the bottom of the cart. You will have to reset the rip fence, though.

There's also a rabbet in the back edge of each side to hold a back panel. Notice that this rabbet stops at the dado, which is a tricky cut to make on a table saw. So for safety, cut it on the router table using a $\frac{3}{4}$ " straight bit.

The last operation is to cut a vertical groove to hold a pegboard divider. This groove is also "stopped," so once again, use a straight bit ($\frac{1}{4}$ ") in a table-mounted router. And don't change the setup just yet. You'll use it again to cut a corresponding groove in the shelf.

But first, cut the shelf, bottom, back panel, and divider to size. Then rout the groove for the divider in the shelf.

Assemble the Cart

Assembly is just a matter of gluing and screwing the parts together. The divider and back help square it up. That done, glue on solid-wood edging, and mount the casters.

Add a Top

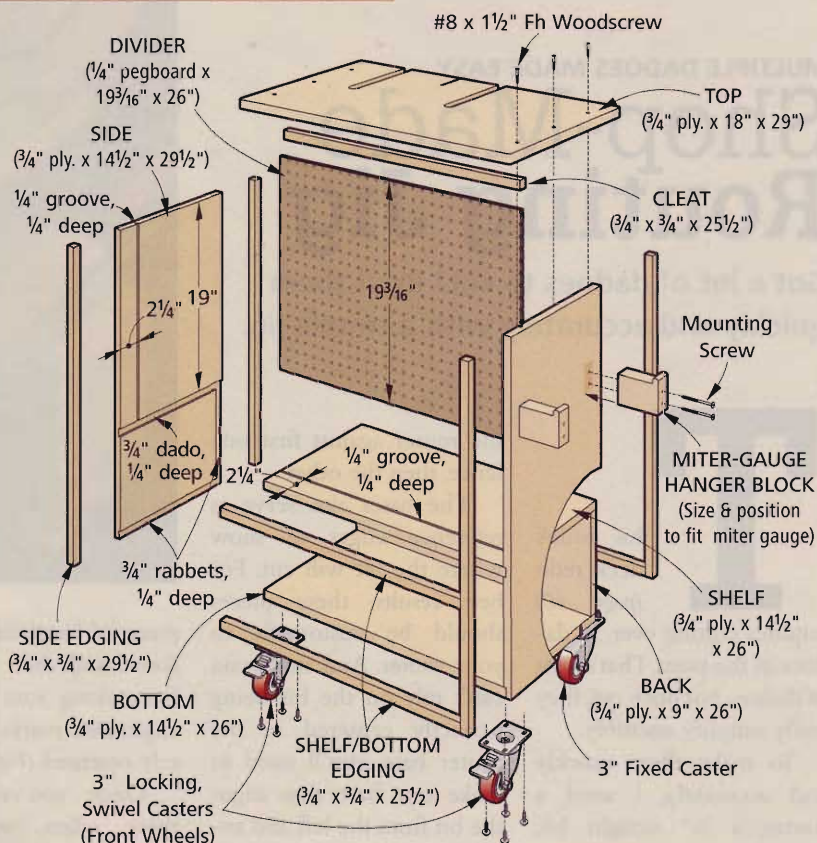
Now it's time to add the top. Cut it to size from $\frac{3}{4}$ " plywood, and screw it to the sides. The top also gets a wood cleat to add rigidity to the divider. Set the cleat against the divider, and fasten it to the top with glue and brads.

Blade Guard Slot — Next, you'll need to cut a clearance slot for the bracket used to mount the blade guard on your table saw. To locate this slot, tilt the saw blade to 45°, and position the cart so the motor just clears the side (*Front View*). Then lock the casters, return the blade to 0°, and mark the location of the guard mounting bracket. Now use a jig saw to cut a wedge-shaped section of material to form the slot (*Slot Detail*). The wedge shape lets you tilt the blade without having the mounting bracket bind against the top.

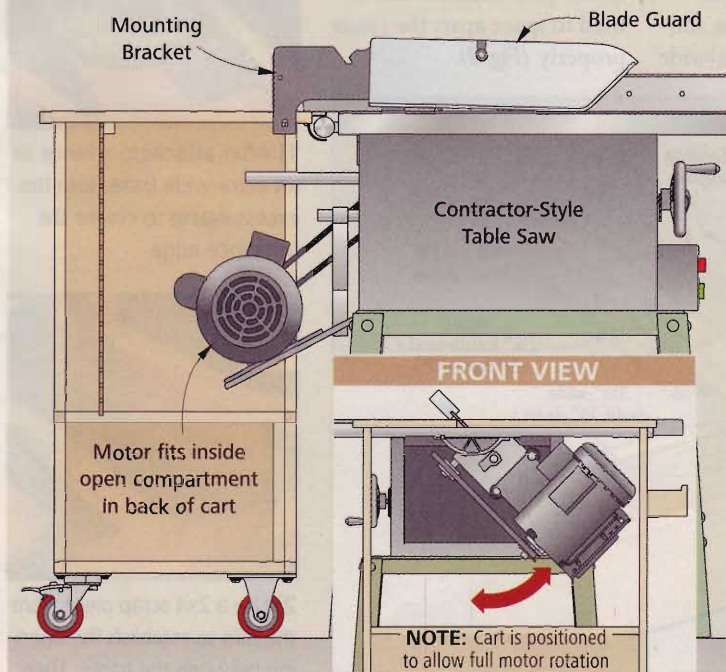
Extend the Bar Slots — All that's left to complete the cart is to cut a couple of wide, shallow dados in the top to provide clearance for the bar on the miter gauge (*Inset Photo, page 86*).

To locate these dados, roll the cart against the saw, fitting the just-cut slot over the mounting bracket. Then transfer the location of the saw's miter gauge slots to the cart top (*Miter-Gauge Slot Extensions*). That done, drill a shallow counterbore to define the end of each dado. Then, using a handheld router guided by a straightedge, rout the dados.

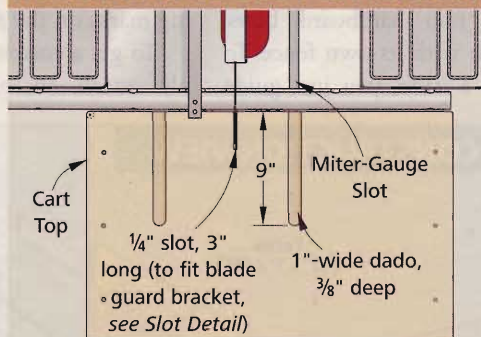
SIDE SECTION VIEW



SIDE SECTION VIEW

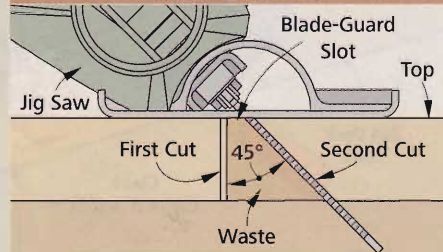


MITER-GAUGE SLOT EXTENSIONS



NOTE: Transfer location of miter-gauge slots on saw table to top of cart

SLOT DETAIL



MULTIPLE DADOES MADE EASY

Shop-Made Routing Jig

Got a lot of dados to cut? Rout them quickly and accurately with a simple jig.

This issue's deck redo (page 40) requires cutting over 50 dados in the posts. That's a lot of dados, but once cut, they really simplify assembly.

To make them quickly and accurately, I used a router, a $\frac{3}{4}$ " straight bit, and this jig (Photo, right). As you can see, the jig has two cleats that straddle the post. Attached to these cleats are two hardboard bases, each with its own fence. To cut a dado, you just guide

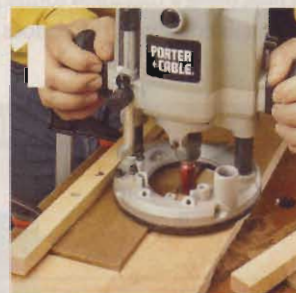
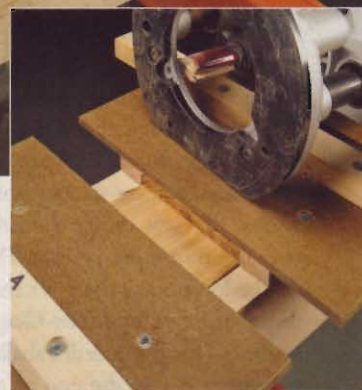
the router against first one fence, then the other.

The bases also serve as reference edges to show where the bit will cut. For best results, these pieces should be custom-fit to your router. And since you can't rely on the bit being perfectly centered in the router base, you'll need to make one base that aligns the bit from the left and another that aligns it from the right. To tell them apart, I mark the sides "A" and "B" and then make corresponding marks on the fences.

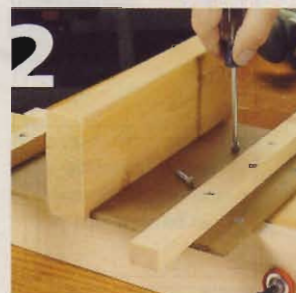
To get a custom fit, simply attach an extra-wide

piece of hardboard to each fence, and then trim it to fit, making sure that your alignment marks are properly oriented (Fig. 1).

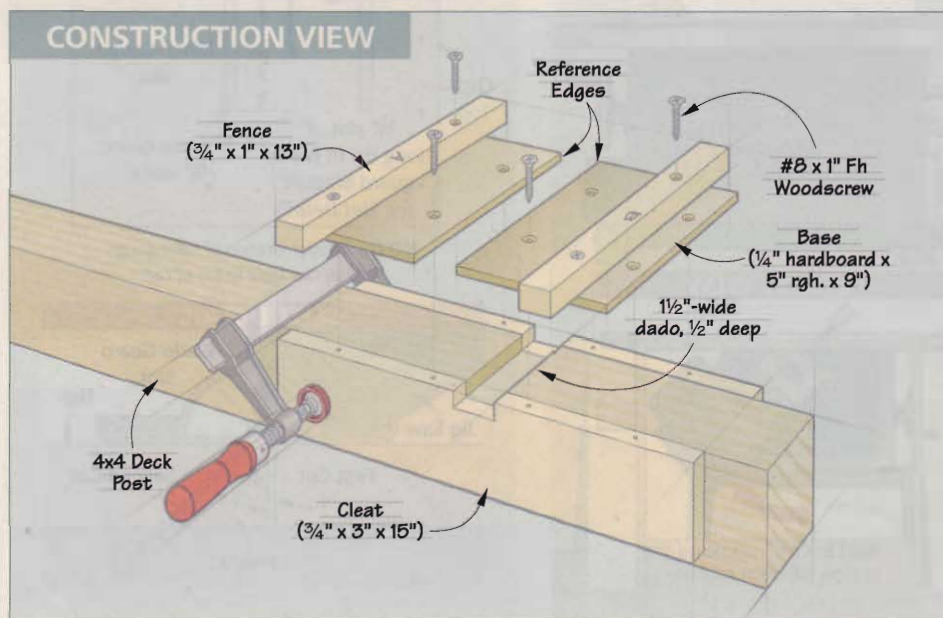
Once you've trimmed these edges, attach the bases to the jig. Here, use a scrap from the rail itself to determine the width of this opening. Also, a scrap of the post material can be used to space apart the cleats properly (Fig. 2).



1] After attaching a fence to an extra-wide base, trim the excess waste to create the reference edge.



2] Use a 2x4 scrap piece from the rails to establish the opening between the bases. Then screw each base to the cleats.



Put the Dado Jig to Work

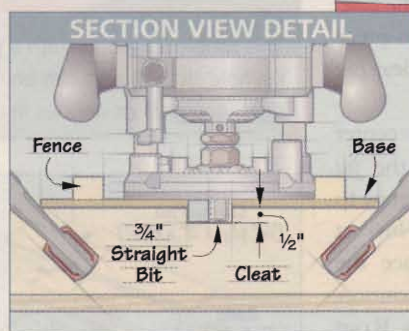
After laying out the dado locations on the posts, you can simply align one reference edge of the jig with the layout line, and clamp the jig securely in place.

Now set your router with the "A" edge against the "A" fence, and set the depth of your router to make the cut ($\frac{1}{2}$ " for these dados, see *Illustration, below right*). Turn on the router, and slide it slowly through the cut, pulling it toward you and pressing firmly against the jig's fence as you rout.

When the router exits the first pass, slide the router against the other fence ("B" to "B"), and push the router back across the post (*Illustration, far right*). The $\frac{3}{4}$ " straight

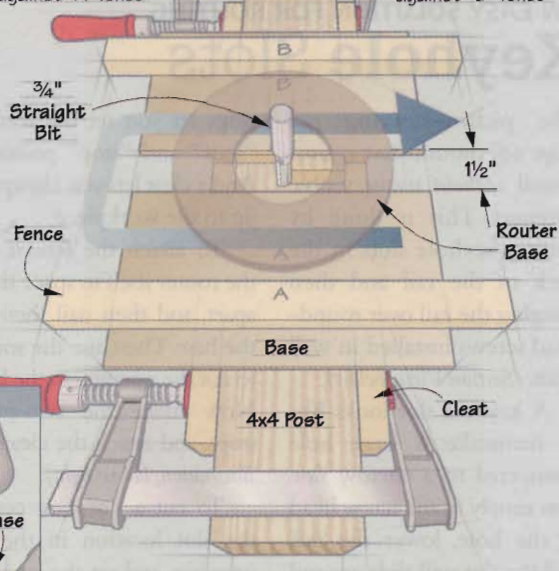
bit will create a $1\frac{1}{2}$ "-wide dado with just two passes.

Note in the *Photo* at left that when you rout the first dado, you will actually rout through the cleats to create notches. These notches not only make it easier to rout all the other dados, but they also can be used as a handy stop for setting the depth of the router bit.



FIRST: Rout one shoulder of dado with "A" side of router against "A" fence

SECOND: Rout second shoulder of dado with "B" side of router against "B" fence



To rout a dado, slide the router across the post with the "A" edge against the "A" fence. Then, rout back with the "B" edge against the "B" fence.

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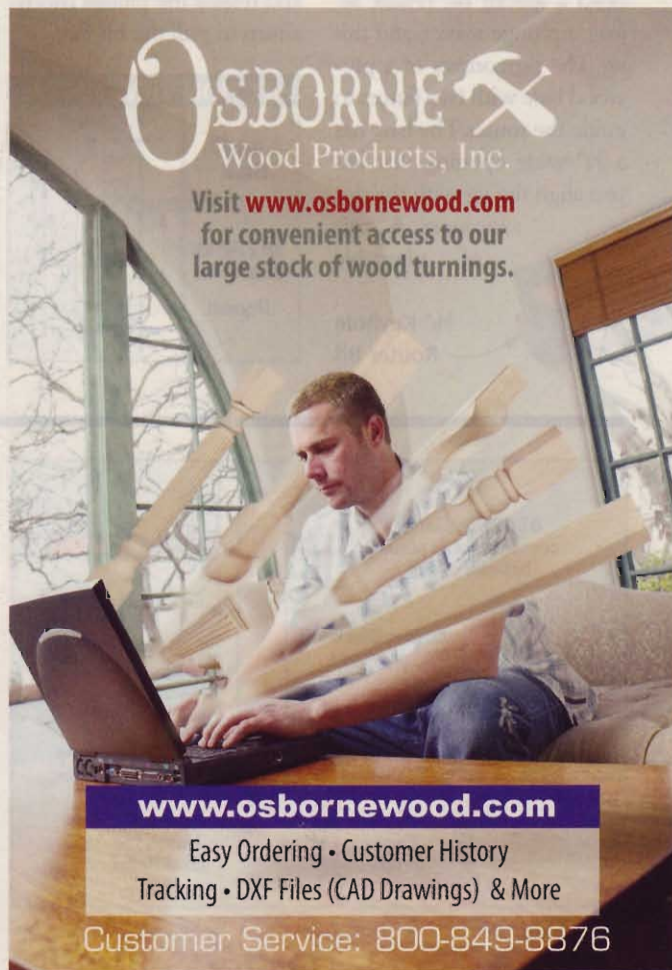
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AN EASY SOLUTION FOR ROUTING Keyhole Slots

The picture-hanging rail (page 66) mounts flat against a wall *without* using visible fasteners. This is done by cutting keyhole slots in the back of the rail and then hanging the rail over round-head screws installed in wall studs (*Section View, below*).

A keyhole slot looks like its namesake: a large hole connected to a narrow slot. You simply fit the screw head in the hole, lower the rail, and the slot will slide around the shank of the screw. A thin lip of material captures the screw head, preventing the rail from falling off.

To cut a keyhole slot, you'll need a special bit (*Photo, below*), a plunge router, and this jig. The jig consists of a plywood base with two fences to guide the router. The base has a $\frac{3}{4}$ "-wide opening that lets you align the jig with the slot location. A pair of adjustable

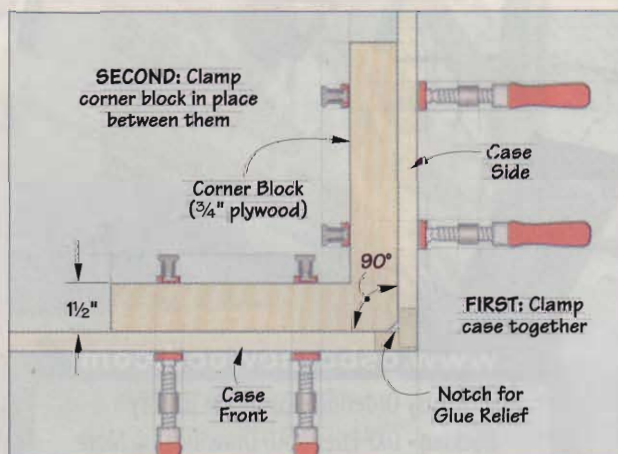
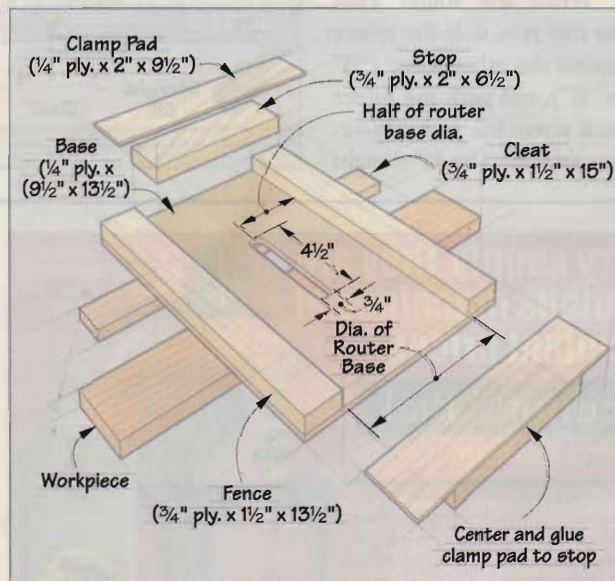
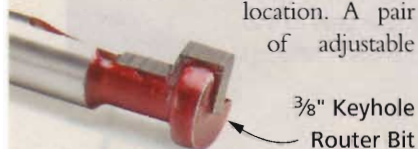
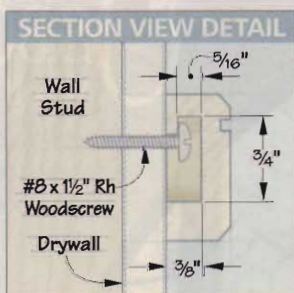
stops let you set the router's "start" and "stop" positions. And a cleat lets you clamp the jig to the workpiece.

To attach the fences, use the router itself to space them apart, and then nail them to the base. Then, use the router to cut the opening in the base. Now make the two-piece stops, and attach the cleat (*see Illustration, below right*).

To cut a slot, first center the slot location in the jig opening, and set the stops to determine its length. Now set the router depth, place the router in the "start" position, and plunge the bit in. Rout to the stop block, rout back, and release the plunge mechanism to pull the bit free.



This simple jig works with a plunge router to make keyhole slots. It also can be used to make other stopped slots, grooves, or dadoes in a workpiece.



USE CORNER BLOCKS TO

Square Up Cabinets

To achieve square corners when gluing up a cabinet, I use these L-shaped corner blocks. The plywood blocks have 90° corners, so when clamped between two parts, they ensure a square joint.

To create a 90° corner on the block, start by cutting out a square on the table saw. Then, use a band saw or

jig saw to complete the "L" shape of the blocks. Also cut a notch for glue relief.

Then, after clamping two case sides together for the glue-up, clamp the corner block in place between them (*see Illustration, left*). Clamping two blocks into opposite corners is all it takes to square up a case.

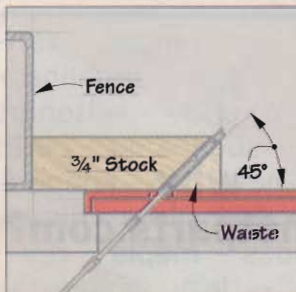
COMPLETE THE COVER-UP WITH

Filler Blocks

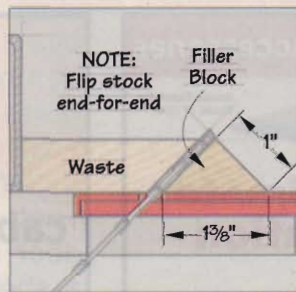
The legs of the storage ottoman (page 60) are formed by gluing two pieces into an "L" shape. This creates the look of a thick post without having to use thick stock.

But the lower inside corner of each leg still shows that it isn't really solid. Our

solution was to fill the corner with a triangular wood block (Photo). You can make the blocks easily using scrap $\frac{3}{4}$ "-thick stock left from the project. Use a long piece that's about 5" wide. Then make two passes on the table saw as shown below.



1] Tilt the blade to 45°, set the rip fence, and rip one edge of the board.



2] Flip the piece end-for-end, reset the fence, and bevel-rip it again to create the block.



Gluing on a triangular block gives the illusion of a thick leg post. When gluing the block in place, pad the outside of the leg, and use light clamp pressure to prevent marring.

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Product Information Number 340

WOODWORKING ON A

Supreme Level

The carver who created this bench began it as a young man, and completed it 40 years later. That, along with the fact the bench looks great 125 years later, proves that craftsmanship is ageless.

In the early 1880s, a young man in his twenties named William Metzger traveled to Des Moines, Iowa, looking for a job. He went in answer to an ad seeking a craftsman to build the bench for the five justices of the Iowa Supreme Court in the new Iowa State Capitol Building. The construction superintendent balked at Metzger's youth but eventually was

convinced to give the job, along with his best stores of mahogany, to Metzger.

Young Metzger toiled to build the beautiful frame-and-panel structure and to carve ten intricate and unique panels to adorn the face of the bench. When it was done, he had earned his commission, as well as the respect of all who came to view the beautiful bench. Then Metzger moved on.

Forty years later, the Iowa Supreme Court was expanded from five justices

to nine. That called for a wider bench. Rather than start anew, the decision was made to widen the original bench. Building managers searched nationwide and, amazingly, located William Metzger living in Illinois.

Again, Metzger put his considerable skills to work, expanding the bench with new frames and new hand-carved panels. The old and new work blended so seamlessly that you'd never know the bench hadn't been built for nine originally.



2006 Looking at this bench today, you can't tell where the original ends and the addition begins.



1880s

The intricate carvings and flawless joinery of the left-hand panel gave this bench a commanding presence.

1920s

To match the right-hand panel seamlessly with its neighbor, the carver crafted it using the same tools and techniques.

