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WOODWORKING TO IMPROVE YOUR HOME

Install Your Own

Solid Wood Floor

Plus:

- 3 Quick Ways to Dress Up Doors
- Easy-to-Build Entertainment Center
- Lay a Custom Garden Walkway

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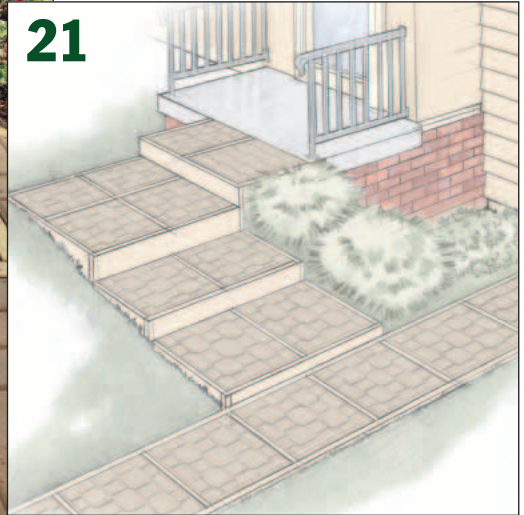
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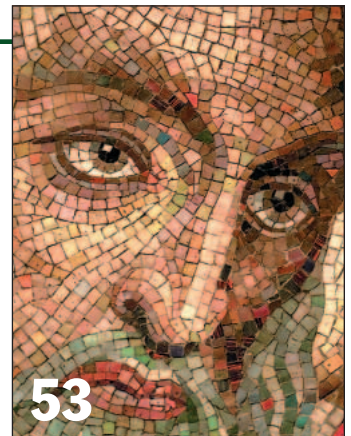
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EDITOR'S NOTES

Have it *your* way. That slogan from a popular fast-food place kept running through my mind as we worked on the projects for this issue. Like a super-sized combo meal, these projects are *all* about options.

The Entertainment Center featured on [page 32](#) is a good example. You can build the cabinet exactly as it's shown. Or if you prefer another style, choose one of the design options above.

In spite of the differences in style, all of the cabinets are quite similar. Each one starts out as a manufactured base cabinet, then the entertainment center is "pieced" together around it.

To change the style, simply select a base cabinet made of maple instead of oak, or use different moldings, or buy arched-panel doors instead of narrow, flat-panel doors. (To find out more about these options, you can visit us at www.WorkbenchMagazine.com)

DRESS UP DOORS. The options for the Entertainment Center are only the beginning. Be sure to take a look at the three different ways to "dress up"

interior doors on [page 40](#). If you have hollow-core passage doors (or bi-fold closet doors) in your home, one of the three styles is sure to be a hit.

GARDEN WALKWAY. We've also included a great Garden Walkway project ([page 16](#)) with such a simple design that it can be modified in dozens of ways. The four options shown on [page 21](#) are just the tip of the iceberg.

NEW FACES. One reason we're able to provide so many options is because our *Workbench* family is growing. Kim Downing has joined us as our new Sr. Illustrator, Robert McCammon will be helping out as Illustrator, and Erich Lage is picking up the responsibilities of Associate Editor.

In addition to their art and writing skills, these guys have over 50 years of woodworking and home improvement experience between them. So we're excited to have them on board.

Tim

PROJECT DESIGNER

We're looking for a Project Designer to research and design woodworking and home improvement projects. For more information, check out our career openings at www.AugustHome.com or send a resume to: Ted Kralicek, 2200 Grand Ave., Des Moines, IA 50312.

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Online: WorkbenchMagazine.com

- Access your account, Check on or make a subscription payment, Change your mailing or e-mail address, Tell us if you've missed an issue, Renew your subscription

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WorkbenchMagazine.com
Free Weekly Woodworking Tip:
WoodworkingTips.com

WORKBENCH™

VOLUME 57

NUMBER 4

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WORKBENCH (ISSN 0043-8057) is published bimonthly (Jan., Mar., May, July, Sept., Nov) by August Home Publishing Company, 2200 Grand Ave., Des Moines, IA 50312.

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Subscription rates: Single copy, \$3.95. One-year subscription (6 issues), \$15.94; two-year sub., \$27.95; three-year sub., \$39.95. Canadian/Intl., add \$10.00 per year. Periodicals postage paid at Des Moines, Iowa, and at additional offices.

"USPS/Perry-Judd's Heartland Division automatable poly!"

Postmaster: Send address changes to *Workbench*,

PO Box 37272, Boone, IA 50037-0272.

Printed in U.S.A.

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Questions & Answers



Thinner shingle sawn on both sides

Hand-split and resawn shake

Shingles & Shakes: What's the Difference?

Q I noticed you used cedar shingles on the “Garden Gazebo” featured in your *May/June 2001 issue*. Are cedar shingles the same as cedar shakes?

Jason Bodicker
Philadelphia, PA

A Although you might hear people talk about wood shingles and wood shakes as the same product, there are a couple of differences worth noting. Where they differ is in their appearance or the profile they create (a result of how they're made) and in the sheathing and underlayment needed when attaching them to a building.

APPEARANCES. Wood shingles have a machined surface on both sides (see photo above), which gives them a smooth, finished appearance. This is because the shingles are sawn from chunks (called bolts) of wood.

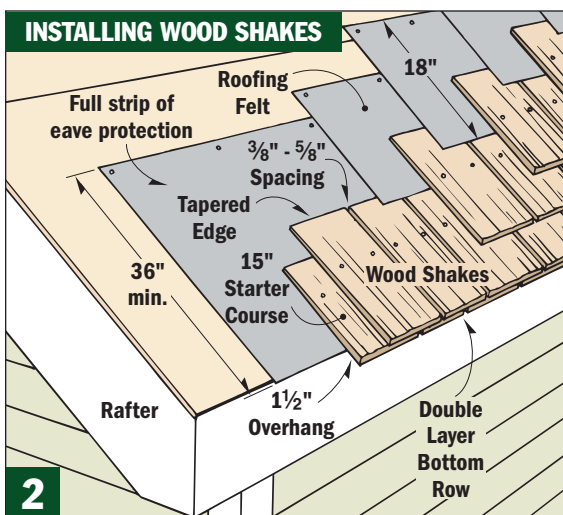
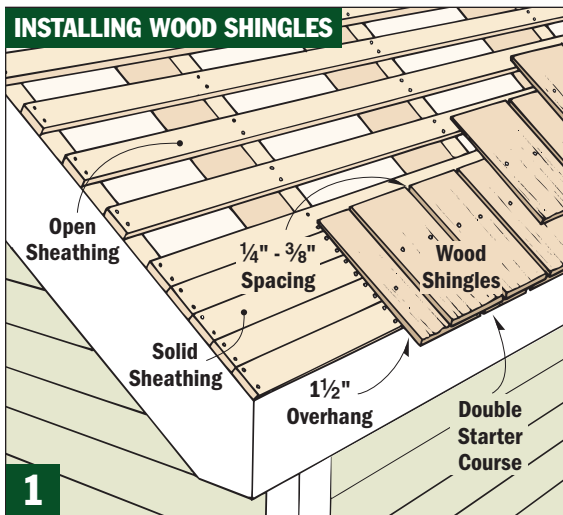
Most wood shakes, on the other hand, are thicker than wood shingles. They also have a rougher, textured surface (see photo). This is a result of shakes being split, not sawed, to thickness. Splitting also produces a more rustic looking profile or appearance.

Shakes are also available in different styles, namely: hand-split, taper-split (tapered), and hand-split and resawn (smooth on one side).

INSTALLING SHINGLES. It's best to apply wood shingles to a roof over open sheathing of 1x4's or 1x6's without an underlayment, as shown in *Figure 1*. Open sheathing allows air to circulate underneath the shingles, which helps prevent rot. Solid sheathing along the lower edge gives the roof a finished look underneath and provides a base for attaching ice-guard membrane (required in some northern regions).

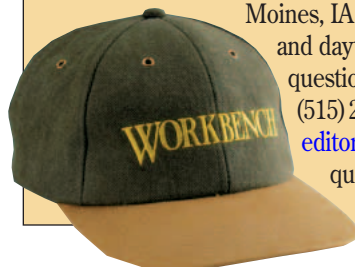
INSTALLING SHAKES. Wood shakes can be applied over either open or solid sheathing depending on where you live. Their rougher texture allows some natural air flow. The use of an underlayment is the big difference between attaching shakes and shingles.

To install shakes, start by applying a 36" (or wider) strip of 30-pound roofing felt for eave protection. Then use an 18"-wide strip between the upper portion of each course of shakes, as shown in *Figure 2*. This is especially important in severe climates where driving snow and rain can penetrate the textured shakes.



SHARE YOUR QUESTIONS!

If you have a question about woodworking or home improvement, write it down and mail it to WORKBENCH Q&A, 2200 Grand Ave., Des Moines, IA 50312. Please include your name, address and daytime phone number in case we have any questions for you. You can also reach us via Fax at (515) 283-2003 or by E-mail message at editor@workbenchmag.com. If we publish your question, we'll send you one of our handsome and fashionable *Workbench* caps.



Repairing Bubbles on a Veneered Surface

Q I have an old piece of furniture with a veneered surface that's coming loose. The problem is "bubbles" about the size of quarters are starting to appear. What's the best way to deal with these?

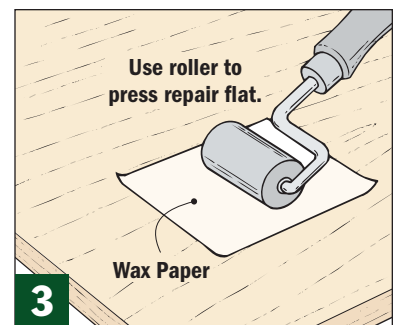
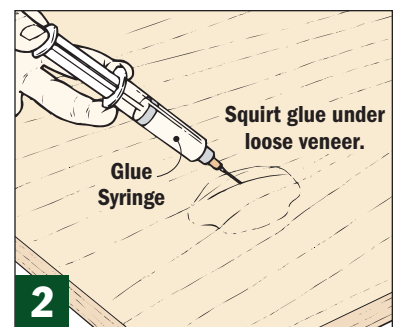
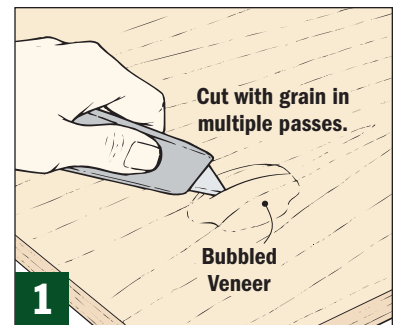
Dale Duncan
Green Bay, WI

A Loose veneer usually is a result of poor contact between the veneer and the substrate. The adhesive may have simply dried out, causing the veneer to lift. If the veneer is dry or brittle, start by lightly dampening the repair area to soften it. This will help keep the veneer from cracking further.

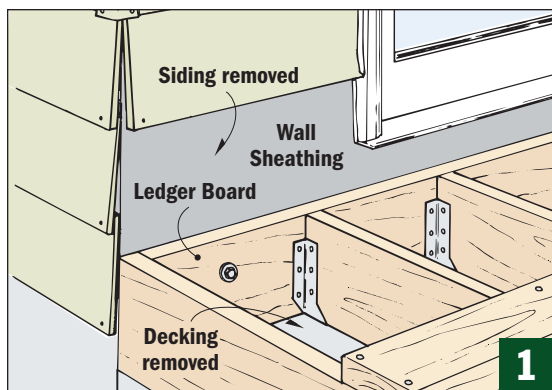
Then carefully cut a single split in the bubble with a utility knife, as shown in *Figure 1*. It's best to score the bubble several times to make the cut in multiple passes.

Now you can work some glue underneath the loose veneer. When working with veneers, I like to use hide glue. It forms a strong bond and dissolves with moisture and heat if you ever need to make repairs again. To apply the glue, use a needle-tipped syringe inserted into the repair area (*Fig. 2*).

Finally, press the veneer flat onto the substrate with a laminate roller (*Fig. 3*). A piece of wax paper will keep the roller from sticking to the veneer. You can use some heavy books or clamp a wood block over the repair while the glue dries.

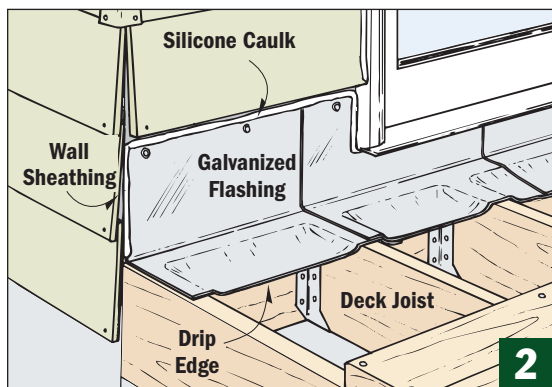


Adding Flashing to an Existing Deck



Q There isn't any flashing between my deck and house, and I'm concerned about water seeping behind the ledger board and causing rot inside the wall. How can I fix this problem without having to tear the whole deck apart?

Toni Hansen
Omaha, NE

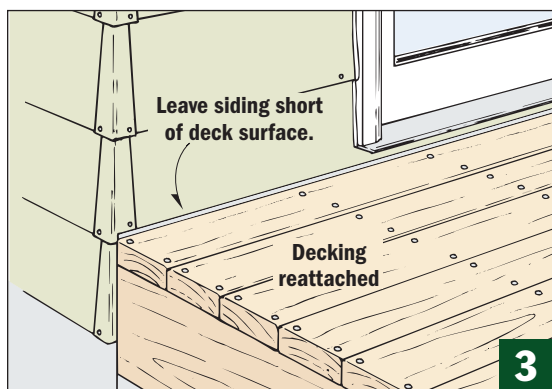


A It's possible to add flashing to your deck, but first you'll have to pull up the first few deck boards and remove the bottom row of siding, as shown in Figure 1. This will expose the wall sheathing and ledger board.

ADDING THE FLASHING

With the decking and siding out of the way, you're ready to retrofit the deck with strips of flashing. Start at one end of the deck and cut a 12"-long strip of 7"-wide galvanized flashing to span the ledger opening. It's easier to work with shorter strips and allow for a 3" overlap between sections.

Next, bend the strip lengthwise 4" from the edge. After spreading a bead of silicone caulk along the top edge of the ledger board, press the long leg of the flashing against the house and nail it to the wall sheathing (Fig. 2).



To prevent water from sitting directly on top of the joists, the flashing can be bent into a drip edge. To do this, use a wood block and a hammer. You don't have to pound very hard when doing this. Even a slight edge will help direct water away.

PROTECTING AGAINST WATER

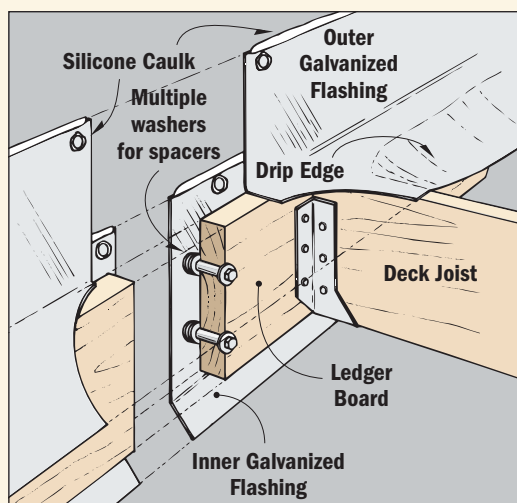
Before you reattach the siding, apply a bead of silicone caulk along the seam of the flashing underneath the door sills. It's a good idea to apply caulking around all of the fasteners, too.

Once you've sealed everything, all that's left is to reattach the first couple deck boards. You'll also need to fit the siding that was removed back into place. It goes overtop the flashing, as shown in Figure 3.

This procedure works well to add flashing to an existing deck. But whenever possible — especially if you're building a new deck — I also recommend you use some type of spacer to set the ledger board away from the house a bit. This will allow the ledger board to dry out if necessary.

The box below shows how to attach a new deck and flashing to the side of a house.

ATTACHING AND FLASHING NEW DECKS



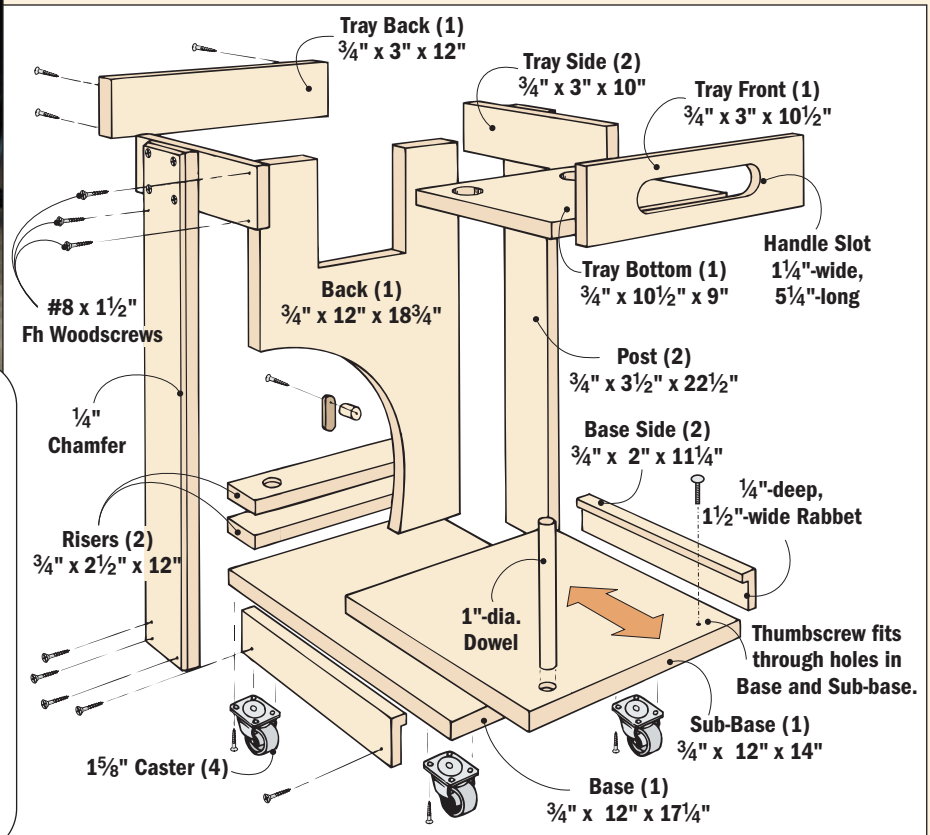
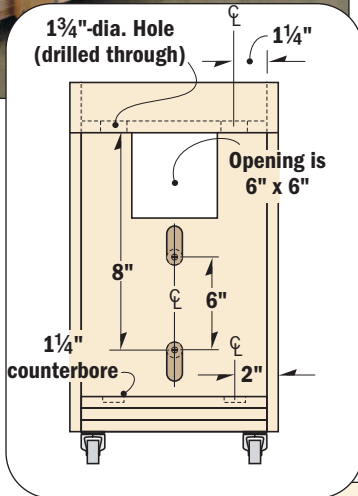
Anytime you have a beam such as a ledger board pressed tightly against a house, there's a good chance it will trap moisture and encourage rot. To guard against this when building a new deck, you should create a gap for air to circulate so the board can dry out. Inserting three or four galvanized washers between the ledger board and flashing does the trick.

To further defend against water, I'll use two layers of flashing. The outer layer can again be tucked underneath the bottom row of siding and bent slightly. Extend the inside layer below the ledger board and bend the lip out over the siding underneath the deck. This way any water that gets behind the ledger board will run away from the house before it reaches the siding.

As a final precaution against potential water damage, apply caulking around any seams and holes.

Tips & Techniques

FEATURED TIP



Shop-Built Cart Adds Full-Size Features to Small Vacs

Having limited shop space means making compromises when choosing tools. Take shop vacuums for instance. The big models have a lot of convenient features like on-board tool storage, a built-in cord reel, and large handles. The downside is, those large vacuums take up a lot of space.

Recently, though, we heard from Ken Winter, who built a special cart to add full-size features to his five-gallon shop vacuum.

Using Ken's design as a starting point, we came up with our own cart, pictured above. The cart is built entirely from 3/4"-thick plywood and has several useful features.

For instance, it's mounted on swivel casters to make it easy to pull around. Also, the shop vacuum itself is attached to a sub-base that slides on and off the cart for easy emptying. The sub-base is held in place with a thumbscrew. There's also a piece of 1"-dia. dowel glued into the sub-base that acts as a nozzle holder.

On the back of the cart, there's a hole large enough to reach through for turning the vacuum on and off. The power cord feeds through this hole also and wraps around turn-buttons that are made with 1"-dia. dowels and hardwood tabs.

On the top of the cart is a

storage tray. The storage tray is supported by two posts and has a built-in handle. The handle is made by drilling 1 1/4"-dia. holes. There are also holes drilled in the tray bottom to hold hose extensions. Those holes line up with two smaller-diameter counterbores in the top riser. Depending on the size of your extensions, the hole size and the need for risers may be different than ours.

Workbench congratulates Ken Winter for submitting this issue's Featured Tip. In recognition of his tip, Ken will receive \$250 worth of tools from The Stanley Works.

STANLEY

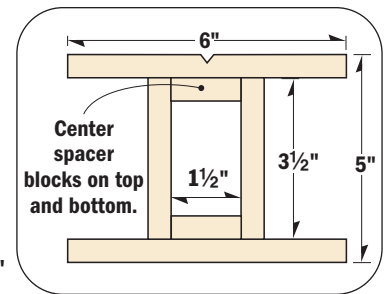
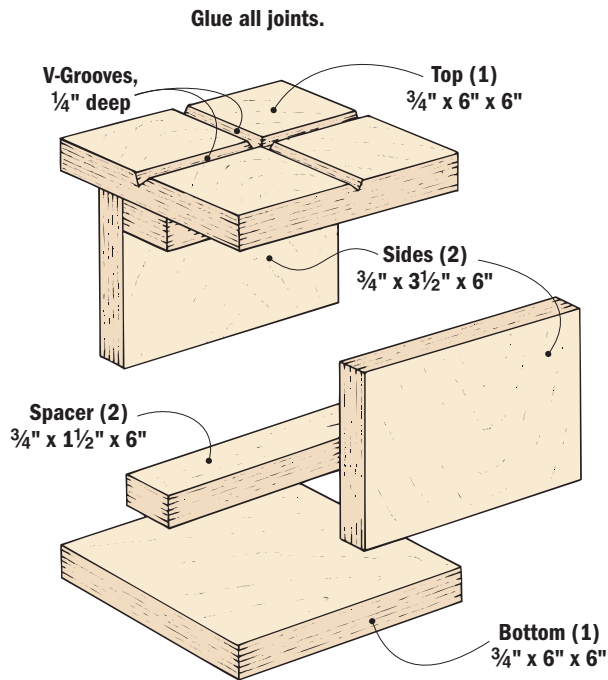
I-Beam Drill Press Accessory

Holding small pieces on the drill press is always tricky. Their size doesn't give you much to hold on to, and most clamps won't reach far enough to be any help. It can even be dangerous if the drill bit grabs the workpiece and spins it out of your hand.

To solve this problem, I constructed a small I-beam that clamps to the table. With the beam fastened to the drill press table, I clamp the workpiece to the top surface of the I-beam.

The I-beam is made entirely of plywood. Its "I" shape provides support and clamping clearance for the workpiece on the upper surface. The lower surface allows the beam to be clamped to the drill press table. For extra control, rout V-grooves in the top to help hold round stock.

*Adolph Peschke
Des Moines, IA*



Homemade PVC Wrench Eases the Reach

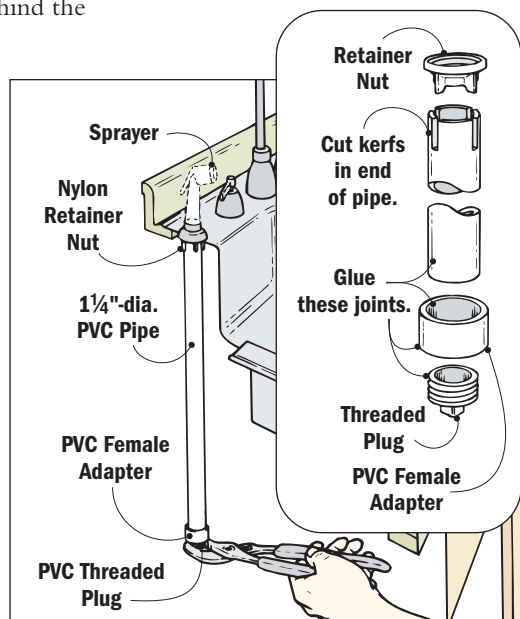
I recently replaced a sprayer attachment to my kitchen sink. It was an easy job right up until it came time to tighten the plastic retainer nut underneath the sink. The nut only needs to be hand tight, according to the instructions. But the instructions failed to mention how I was supposed to get my hand around the pipes and all the way up behind the sink. There was no room for channel locks, and a basin wrench doesn't fit that kind of nut.

I eventually came up with a wrench design of my own that I made from a length of PVC pipe. Using the nut as a guide, I cut kerfs in the end of the pipe that lined up with the "wings" on the nut. I cut the kerfs with a hacksaw then snapped them out with a pair of pliers.

On the other end of the pipe, I glued on a female adapter and a threaded plug. That way I

could use a wrench or channel locks for a little extra "snug." To twist the nut on, I set it into the slots in the end of the pipe and used the "wrench" to reach behind the sink. I had a helper hold the sprayer-base from above while tightening the nut.

*Richard Kane
Troy, MI*



Share Your Tips, Jigs, and Ideas

Do you have a unique way of doing something? Just write down your tip and mail it to:

Workbench Tips & Techniques
2200 Grand Ave.
Des Moines, IA 50312.

Please include your name, address, and daytime phone number.

If you prefer, e-mail us at:
Editor@Workbenchmag.com

You'll receive \$75-\$200 and a *Workbench* hat if we publish your tip. Also, The Stanley Works will award \$250 in Stanley Tools for the Featured Tip in each issue.

For a free woodworking tip every week via e-mail, go to WoodworkingTips.com.



New Leverage for an Old Solution

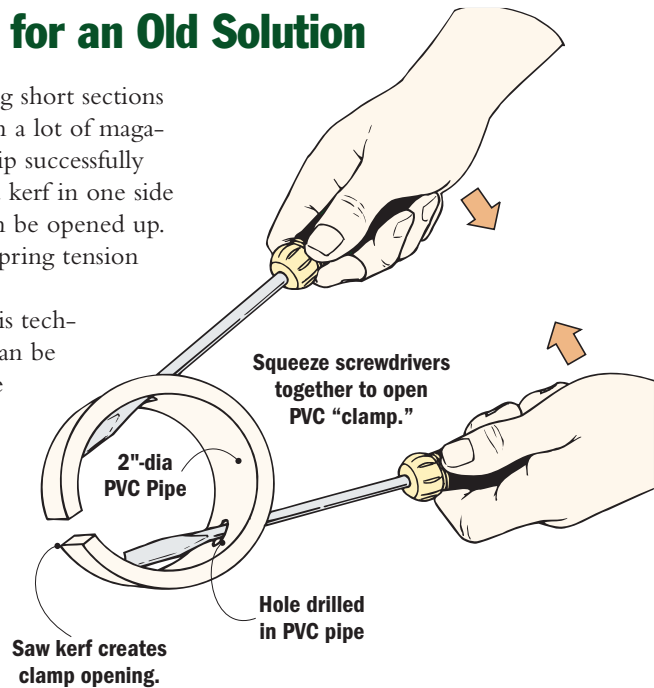
I've seen the idea of using short sections of PVC pipe as clamps in a lot of magazines, and I've used the tip successfully many times. By cutting a kerf in one side of the pipe section, it can be opened up. Then the pipe's natural spring tension makes it a decent clamp.

One problem with this technique though, is that it can be difficult to open the pipe very far by hand.

I solved this problem in my shop recently by drilling holes in the pipe and using screwdrivers as handles to pry the "clamps" open.

These clamps work especially well for laminating pieces of plywood together.

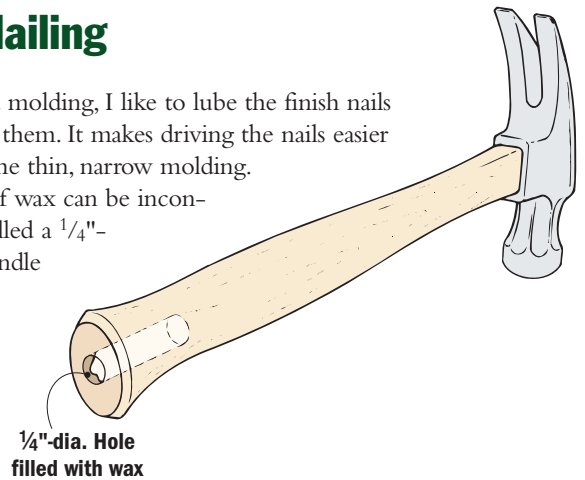
*Hank Miller
Gappney, SC*



Slick Finish Nailing

Whenever I install wood molding, I like to lube the finish nails with wax before driving them. It makes driving the nails easier and eliminates splitting the thin, narrow molding. Carrying around a can of wax can be inconvenient, though. So I drilled a $\frac{1}{4}$ "-dia. hole in the wood handle of my hammer. Then I pressed wax into the hole. Now the wax is always close at hand when I need it.

*Mike Donovan
Des Moines, IA*



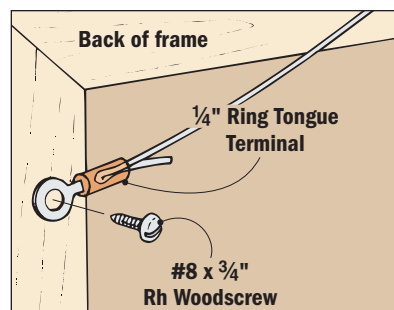
Electrical Connector That Handles a Load

I do a lot of picture framing, and one of the challenges I've had to overcome is the bulkiness of most frame hangers.

Typical hangers stick out from the frame a bit and keep the picture from lying flat against the wall. Others require you to loop the wire through a connector and then twist it around itself to secure it.

My solution is to use small, loop-style electrical terminals. Double over the wire at the end for a snug fit, then crimp it into the terminal. Then use woodscrews to attach the terminals.

*Omar Showalter
Harrisonburg, VA*





Online Turning Magazine Fills a Need for Lathe Know-How

If a spinning lathe gathers no dust, I have to admit, my lathe gets a bit dusty. It's not that I don't enjoy woodturning. I just don't have as much call to use my lathe as, say, my table saw. That also means I'm not much better at turning than I was when I first got my lathe.

Of course, one difficulty that any inexperienced woodturner faces is where to get good instruction. Let's face it, a lathe isn't as self-explanatory as a lot of other tools. A little help from experienced woodworkers is a must for new turners.

Lucky for me, I came across a Web site recently that aims to help turners of all experience levels. It's called *Woodturns Online Magazine* (www.Woodturns.com). This monthly e-zine launched in March of this year and is devoted entirely to turning wood.

One unusual element of this online magazine is that it requires a paid subscription (\$15 a year at the time I signed up). Once your subscription is activated (it takes a couple days), you'll get a notice that your password-protected *Woodturns* homepage is ready. Each time a new issue goes up on the Web, a link to the issue will be added to your homepage. You just need to sign in to your homepage then follow the link to the latest issue.

The three issues I've seen so far have a good mix of content. Including an article on getting started in woodturning, to more advanced projects like turning wood fruit.

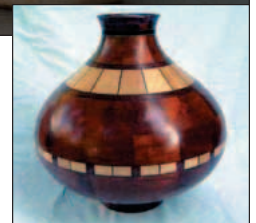
In truth, this is a new magazine without the benefit of experienced writers and editors. But as long as you're not put off by a few typos or

a run-on sentence here and there, you may enjoy that it's written by real woodworkers.

Some of the things I've really enjoyed so far were an article that demonstrated eight ways to mount a workpiece in a lathe (Issue #3, May 2001) and the Artist Showcase that's a regular feature in each issue. Overall, the site includes a nice blend of nuts-and-bolts information and artistic inspiration.

As to whether *Woodturns* is worth the \$15 annual subscription, they do offer two free issues so you can try before you buy. I'd recommend trying the free issues to see if the e-zine is right for you. Personally, I don't mind paying for the content.

For subscription information and a look at the e-zine, go to www.Woodturns.com.



An alabaster turning by Max Krimmel (above) and this segmented piece

by Tom Dunne (inset) are two examples of the work that is featured in the Artist Showcase in each issue of *Woodturns Online Magazine*.

Hardwood Council CD Has Tips for Finishing Touch and More



The Hardwood Council (www.HardwoodCouncil.com) calls their new informational software “The Finishing Touch.” But there’s much more than finishing know-how contained on this free CD.

First is the species guide that lists the aesthetic qualities, mechanical properties, and popular uses of 21 domestic hardwoods. This is one of my favorite features of The Hardwood Council’s Web site

and it’s even more convenient on CD-ROM. All of the Hardwood Council’s popular Project Tips and Techniques are included on the disc as well. These were previously available only as pamphlets.

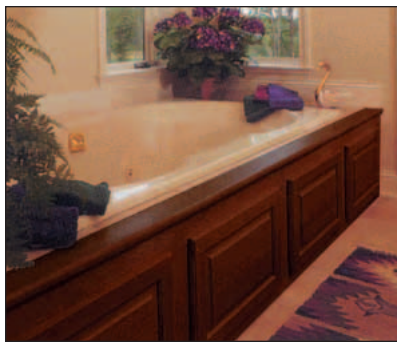
The projects range from installing hardwood flooring over a variety of surfaces, to special finishes like pickling and antiquing. There’s also some good information on installing molding. In particular, a lot of attention is given to figuring out the compound cuts you have to make to fit crown molding around a corner. Other projects include a recessed wall unit and a tub surround.

This software was designed for the professional finisher who needs guidelines for specifying finishes, but there’s a wealth of information in here for the do-it-yourselfer, as well.

The CD can be ordered online at: www.HardwoodCouncil.com

Or by calling or writing:

The Hardwood Council
P.O. Box 525
Oakmont, PA, 15139
(412) 281-4980.



Use “The Finishing Touch” CD-ROM to experiment with different stains on a variety of projects. Pictured here is a bathtub surround in light and dark stains.

Site To Watch

www.BeConstructive.com



This site may be worthwhile someday. I sure

hope so. After all, the entire focus of this site is to promote awareness of wood as a construction material. The people responsible for the site call themselves the Wood Promotion Network and describe their roster as a “newly formed coalition of industry companies and associations.”

When I visited the site, it had little in the way of unique content. Here’s hoping they can deliver on what they promise: “A web site that houses information for professional builders, carpenters and contractors, as well as homebuyers, homeowners, do-it-yourselfers and hobbyists.”

Test Your Hardwood Knowledge

Using information from “The Finishing Touch” CD from the Hardwood Council, we prepared the following list

of popular hardwoods and descriptions. See how many hardwoods you can match to their descriptions.

Match the definitions at right to the terms below. An answer key is provided at the bottom right-hand corner of this page, or you can look the terms up at: www.HardwoodCouncil.com.

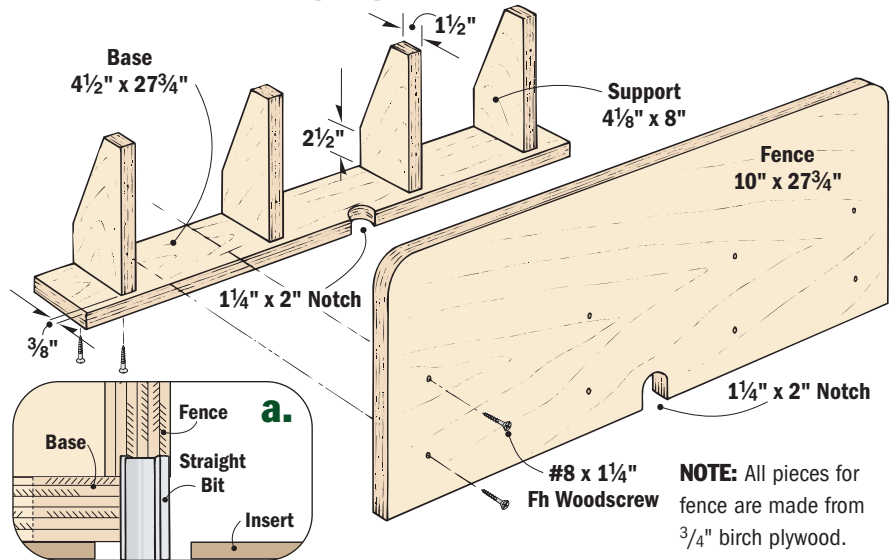
- ___ 1. Poplar
- ___ 2. Cherry
- ___ 3. Hard Maple
- ___ 4. Red Oak
- ___ 5. White Oak
- ___ 6. Black Walnut

- A. The Latin name for this tree, Quercus, means “a fine tree.”
- B. 30 gallons of sap from this tree will yield 1 gallon of syrup.
- C. The roots of this tree release a toxic material which may kill other plants above them.
- D. Used as early as 400 B.C. by the Greeks and Romans for furniture making.
- E. Grows taller than any other U.S. hardwood species.
- F. Impervious to liquids and has been used extensively for ship timbers, barrels, and casks.

Answer Key: 1-E; 2-D; 3-B; 4-A; 5-F; 6-C

In The Shop

Perfect Wood Edging With a Flush Trim Fence



A tall fence with a shallow recess near the bottom is perfect for trimming solid wood edging flush with the surface of a plywood panel.

When building the *Entertainment Center* (page 32), I applied a strip of solid wood edging to the plywood shelves. To completely cover the exposed plies, the edging must be perfectly flush with the ends, top, and bottom of the plywood.

The best way to do that is start with a strip of edging that's *longer* and *wider* (taller) than needed. I cut the edging to length so it extends about $\frac{1}{4}$ " past each end of the shelf. (It's trimmed flush later.) As for width, it should be slightly "proud" of the surface (about $\frac{1}{16}$ "). This forms a lip that's easy to trim flush.

FLUSH-TRIM FENCE

To do this, I use a straight bit and a tall, plywood fence that clamps to the router table (refer to the photo above). In use, the fence supports the shelf and keeps it from tipping as you trim the edging.

Well, that sounds fine. But since the lip on the edging sticks up *above* the surface of the plywood, how do you keep the shelf flat against the fence? The secret is a shallow *recess* in the bottom edge of the fence. This

recess provides clearance for the projecting lip.

The fence is extremely simple to build. Made entirely of $\frac{3}{4}$ " plywood, it consists of a fence piece, a base, and four wedge-shaped supports. Notice that there's a curved notch in the fence and the base to provide clearance for the router bit. Also, to create the recess for the lip, position the fence so it overhangs the base by $\frac{3}{8}$ ". Then, after making sure the fence is square to the base, assemble all the pieces with screws.

To use the fence, simply align it with the cutting edge of the bit (see *Detail a*). Then clamp it in place and trim the edging flush.

TRIM ENDS

All that's left is trim the ends of the edging. A quick way to ensure a square cut is use a table saw and a miter gauge. But there's a problem.

Since the shelf is quite wide, you have to pull the miter gauge fairly far back to support it. This means that the bar of the miter gauge comes almost all the way out of the slot. As a result, the head wobbles, and it's hard to get accurate cuts.

The solution is to turn the miter gauge around (see photo below). This way, the bar of the miter gauge stays in the slot, and the head provides solid support for the shelf as you cut off the ends of the edging.



With the miter gauge turned around, it provides plenty of support for a wide panel. This makes it easy to trim off the ends of the wood edging.

Pattern Routing: The Secret to Cutting Identical Slots

The *Entertainment Center* featured on [page 32](#) has seven large slots that provide access for power cords and cables. To cut these slots quickly and accurately, I used a handheld router and a pattern bit that's guided by a shop-made template.

The template is just a piece of 1/4" hardboard with a slot that matches the size of the cord access slots. You'll want to make the template wide enough to support the

base of the router. (I made mine 6".) And it needs to be long enough so when it's clamped to a workpiece, there's still clearance for the router base. (In my case, that was 24" long.)

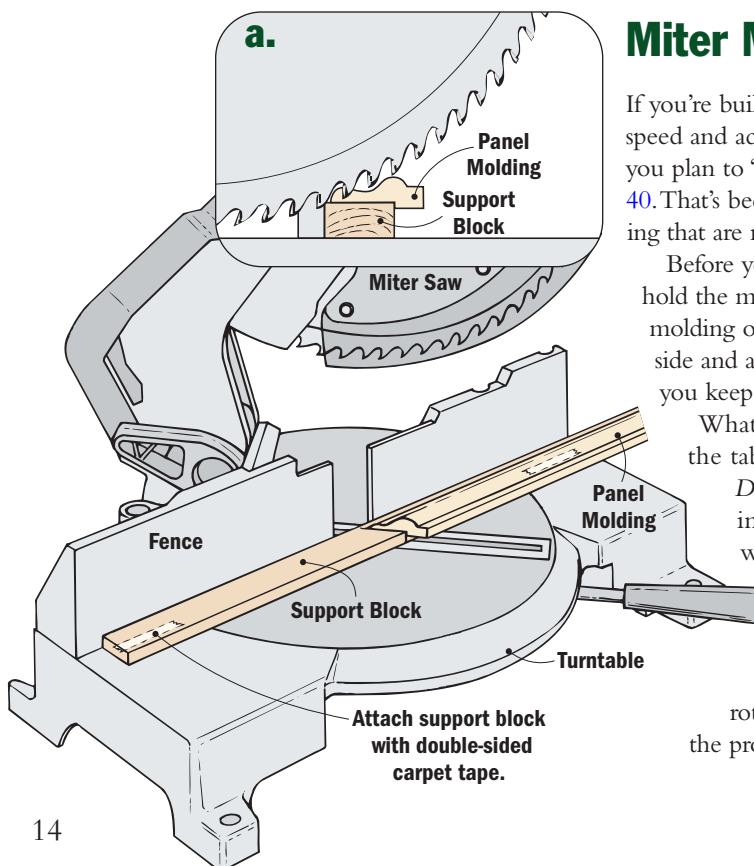
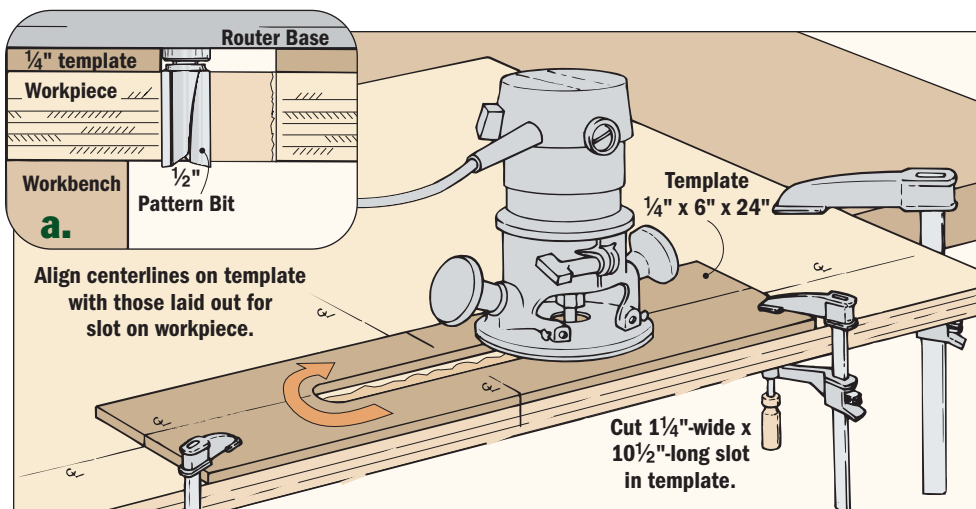
After cutting the template to size, carefully lay out the slot. The idea is to center the slot on the width and length of the template, leaving the centerlines visible. Later, they'll serve as reference lines that make it easy to align the template on the workpiece.

Now it's just a matter of drilling two end holes and roughing out the waste with a jig saw. Then sand (or file) up to the layout lines.

Before using the template, you'll need to lay out the centerlines for the slot on the workpiece. Be sure these lines extend far enough so they don't get covered up by the template. Then rough out the slot in the workpiece. Here again, drill a couple of end holes and remove the bulk of the waste with a jig saw.

Now it's time to remove the remaining waste. This is where the time spent making the template pays off. Just align the centerlines on the template with the layout lines on the workpiece and clamp it in place (see drawing at left). Note: To avoid cutting into the bench, make sure the workpiece hangs over the edge.

Then set the base of the router on the template, flip on the switch, and rout the slot in a clockwise direction. With the bearing of the pattern bit riding against the template, the cutting edge creates a smooth, clean surface.



Miter Moldings Safely and Accurately

If you're building a project with a lot of miter joints, it's hard to beat the speed and accuracy of a power miter saw. It will definitely come in handy if you plan to "dress up" the interior doors of your home, as shown on [page 40](#). That's because all of the door panels are surrounded with strips of molding that are mitered to fit. That's a lot of cutting and fitting.

Before you get started though, there's one thing to consider — how to hold the molding on the miter saw. This is especially true for the panel molding on the traditional door. With a curved, decorative profile on one side and a lip on the other, neither side will sit flat on the saw. So how do you keep the molding from rocking back and forth when making a cut?

What worked well for me is to attach a wood support block to the table of the saw with double-sided tape (see drawing and *Detail a left*). Notice how the lip on the bottom of the molding fits tightly against the corner of the support block. This way, the molding will lie flat when making a cut.

To cut the miters, rotate the turntable 45° to the right and hold the molding firmly against the support block.

Then turn on the saw and lower the spinning blade until it cuts all the way through the molding and support block. After rotating the turntable to the opposite 45° angle setting, just repeat the process for the other end of the molding.

Tips for Cutting Plywood

Cutting a full sheet of plywood down to size can be a challenge. It's big and awkward to handle. And it's hard to get clean, straight cuts.

So when building a project like the *Entertainment Center* (page 32) that has several large plywood panels, how do you cut them to size? The best way I've found is to use a circular saw, a special blade, and a cutting guide.

SAW BLADE. One of the simplest things you can do to improve the quality of cut is to use a saw blade that's designed specifically for cutting plywood. The blade shown at left produces a clean cut with virtually no chipout — even when making cross-grain cuts.

To help reduce chipout, this steel saw blade has 200 tiny, razor-sharp teeth that remove small amounts of material.

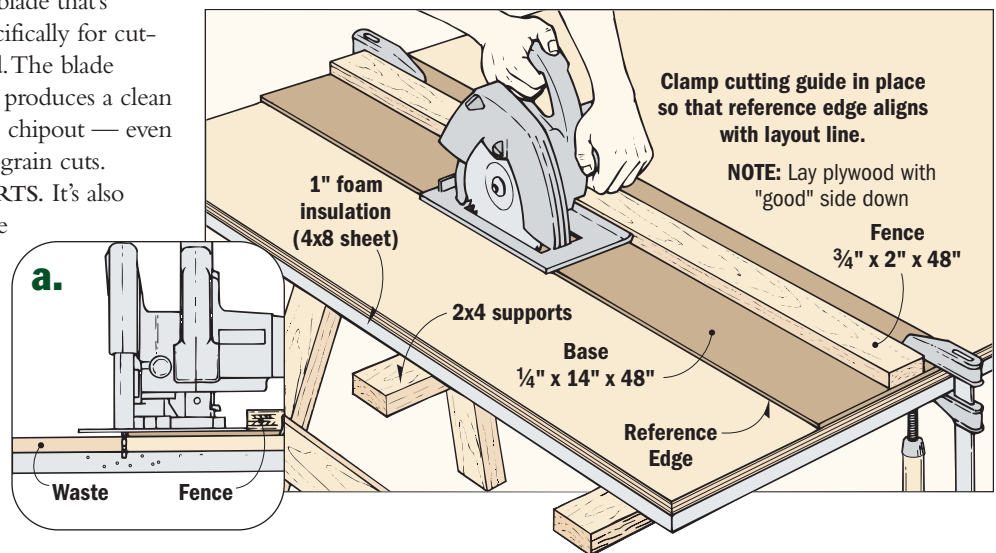
SET UP SUPPORTS. It's also important to provide plenty of support underneath the plywood. Saw-horses, some 2x4's, and a sheet of rigid foam insulation work great.

CUTTING GUIDE. Finally, to ensure accurate cuts, it's important to use a fence to guide the saw. You could clamp a board to the plywood to use as a fence. But positioning it on the workpiece so the cut is made exactly where you want it can be a guessing game. To solve that problem, I use the cutting guide shown below.

The cutting guide consists of two parts: a hardboard base and a wood fence that guides the saw. The edge of the base acts as a reference that indicates the path of the saw blade.

To make a cutting guide, start by gluing and screwing the fence to an extra-wide base. Then trim off the waste to create the reference edge, (*Detail a* below). Note: You may want to make two guides: a 48"-long jig for crosscutting full sheets of plywood and a 96"-long version for ripping.

Now, to ensure an accurate cut, simply align the reference edge with the layout line on the plywood. Then with the base of the saw riding against the fence, the blade cuts precisely along the layout line.



Two Tricks for Getting Tight-Fitting Miters

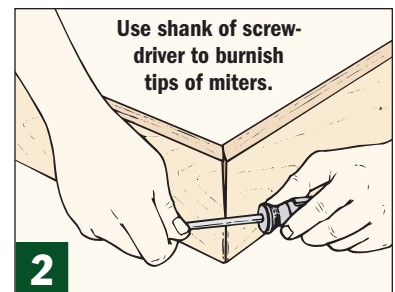
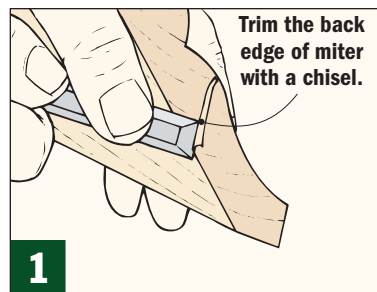
If there's one thing that can try the patience of most woodworkers, it's getting a tight-fitting miter joint. Fortunately, there are a couple of tricks you can use to ensure tight-fitting joints. Both of these techniques should come in handy when working with the mitered moldings on the *Entertainment Center* (page 32) or a different project altogether.

BACK-CUTTING. First of all, if you're trying to fit crown molding to a corner that's not exactly square, you'll probably find a noticeable gap where the two pieces of molding meet. To get rid of this gap, try relieving the back edge of the miter by trimming off a small amount of

material with a chisel (*Fig. 1*). This allows the pieces to fit together tightly along their front edge.

BURNISH THE TIPS. Even after the moldings are installed, a miter joint may "open up" and cause a gap to appear. This is usually caused by

the wood shrinking as it dries out. An easy way to close this gap is to burnish the tips of the miters with the shaft of a screwdriver (*Fig. 2*). Hold the shaft at a 45° angle to the corner and use moderate pressure to "fold" the wood fibers into the gap.





Garden Walkway

Planning to add a walkway or patio? Pre-cast concrete squares and pressure-treated lumber are the stepping stones to success.

Often, one home improvement project leads to another. The Garden Gazebo featured in the [May/June issue](#) of *Workbench* is a perfect example. It turned out to be a great project, but I just wasn't satisfied with the

crushed rock path leading up to it. What I really wanted was a more permanent, inexpensive walkway that could be built quickly and easily.

After checking around a bit, I found just what I needed at the local home center — pre-cast, concrete squares. These “squares” only cost about \$3 each, and they're available in a variety of colors and patterns (We've shown a few samples on [page 17](#)).

To keep the squares aligned, they fit into a large wood frame that forms a grid. (See *Construction View* on [next page](#).) Each opening in the grid has a base of sand that keeps the squares level and prevents them from breaking, as shown at left.

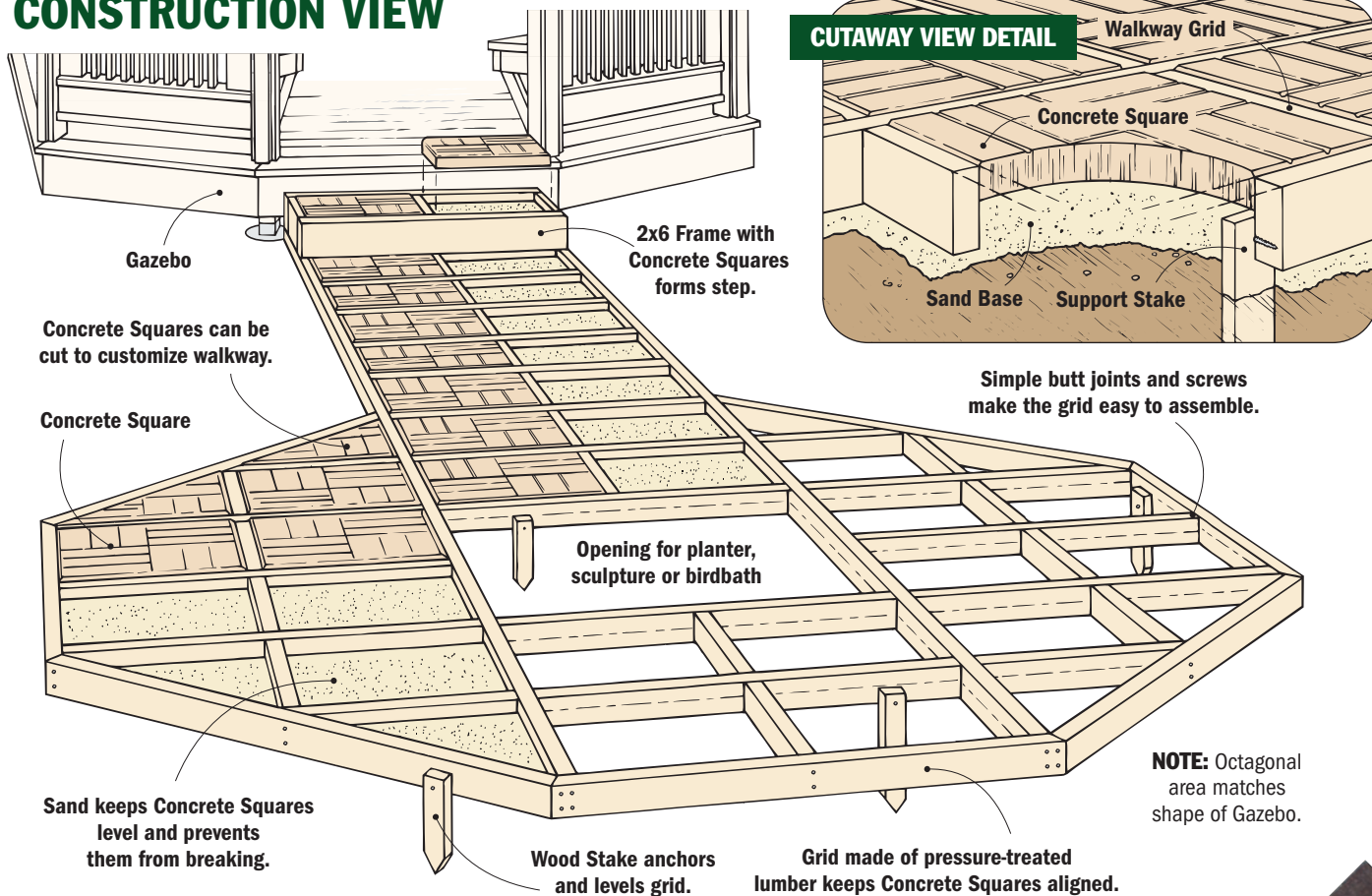
In addition to creating a straight, level walkway, there's another big advantage to the grid. It makes it easy to build whatever shape walkway you want. (Turn to [page 21](#) to check out other design options.)

The grid I built has a long walkway leading to a large octagonal area. Granted, the shape is a bit unusual. But it matches the “footprint” of the gazebo. Incorporating a large opening into this section provided a great place for a planter.

Regardless of the design you select, there's some groundwork involved before you can start building the walkway. The sidebar on [page 17](#) (*Breaking Ground*) provides some useful tips to get you started.



CONSTRUCTION VIEW



BREAKING GROUND

The size and shape of your walkway will most likely be different than the one shown here. But it will still require some basic groundwork.

Start by making a rough outline of the walkway. To provide room to work, this should be about 6" larger than the overall size of the project. As you can see in the photo at right, I spray painted the layout lines to make them easy to see while removing the sod.

So why bother cutting the sod at all? Why not just lay the walkway right on top? Because over time, the sod will decompose and cause the squares to settle unevenly.

When removing the sod, a gas-powered sod cutter will make short order of what would otherwise be a backbreaking task. (These are available at many rental places.) It also comes in handy for shaving

high spots off the ground. I rented a sod cutter that cuts an 18"-wide swath. It's a heavy machine, and I needed a truck and a ramp to transport it. But it was surprisingly easy to control. And at \$75, it was definitely worth the cost.



After spray painting the outline of the walkway, a gas-powered sod cutter makes quick work of removing the sod.

PRE-CAST SQUARES

PAVER PATTERN ▶

One common type of concrete square has a pattern resembling paving stones that lock in place.

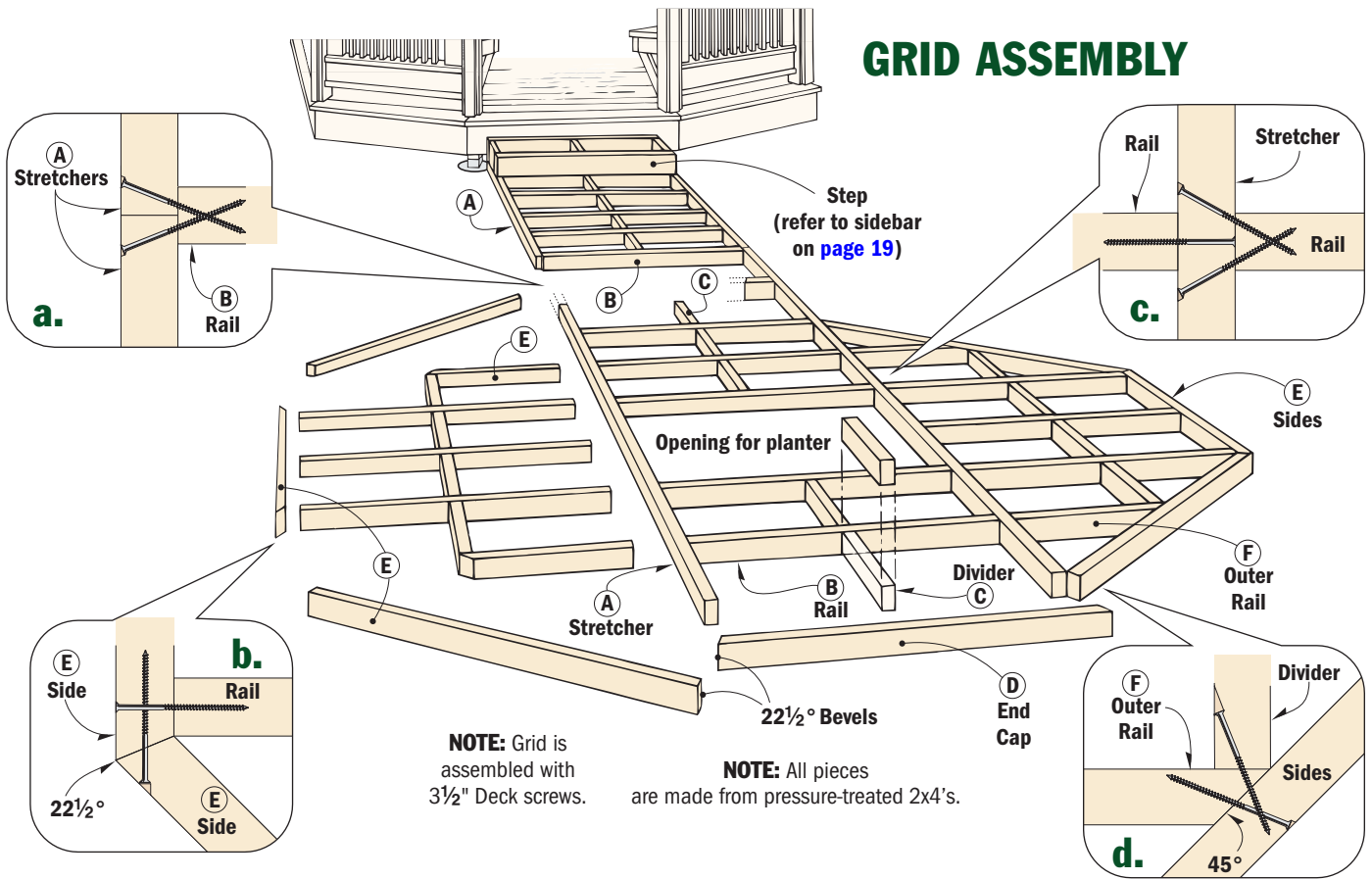
DOUBLE BASKET WEAVE ▶

This red square has the same double basket weave pattern as the tan-colored stones we used for our walkway.

COBBLESTONES ▶

To create the look of an old-fashioned walkway, try using concrete squares with the look of cobblestones.

GRID ASSEMBLY



BUILDING THE GRID

The backbone of this walkway is a wood grid that creates the openings for the concrete squares (*Grid Assembly*). To resist rot, I made the grid from pressure-treated 2x4's. But cedar would also work well.

To simplify construction, it's best to build the grid in the largest sections possible. The largest section in this walkway is a long, ladder-like assembly that runs from the gazebo all the way through the center of the octagonal area. It's made up of four long stretchers (A) connected by a series of rails (B). A set of dividers (C)

that are added later will complete the opening for each concrete square.

SIZE OPENINGS. The thing to keep in mind is the *size* of the openings. For easy installation, they're $\frac{1}{4}$ " larger than the concrete squares in each direction. I used 18"-squares, so I made 18 $\frac{1}{4}$ "-square openings.

To ensure consistent spacing, cut all the "like" rails and dividers at the same time. For accuracy, I used a miter saw with a stop block. As for the stretchers, start with extra-long pieces and then trim them to final length after the rails are added.

INSTALL RAILS. To install the rails, set the first one between the stretchers (flush with the ends) and screw it in place. The rest of the rails should go together quickly. Just remember to space them 18 $\frac{1}{4}$ " apart. What works well is to cut a couple of 18 $\frac{1}{4}$ "-long scrap pieces and use them as spacers to locate the rails (*Fig. 1*). A pipe clamp comes in handy to hold the rail in

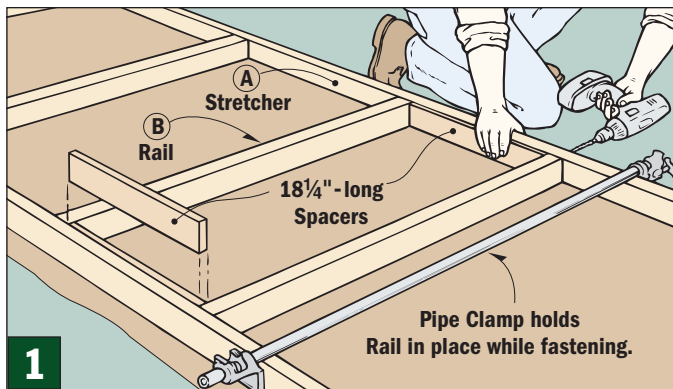
place while driving in the screws.

Depending upon the length of your project, you may have to add on extra stretchers to make a longer walkway. The stretchers are just butted end-to-end and then spliced together (*Detail a*). The goal here is to center the joint line on the thickness of the rail that fits between the two sections of walkway.

This requires cutting the existing stretchers to final length. To determine their length, use the same spacer again and lay out the location of the rail on the stretchers. Then measure $\frac{3}{4}$ " beyond that point (half the thickness of the rail) and trim the stretchers to that length.

Now just clamp the rail between the stretchers and secure it with screws driven in at an angle. Be sure to drill pilot holes for the screws to avoid splitting the stretchers.

After installing the remaining rails, it's tempting to complete the entire grid. But the extra weight would make it quite a bit heavier. It's much easier to position the walkway now, rather than trying to wrestle the entire structure around later.



SQUARE, STRAIGHT, AND LEVEL

When determining the location of the walkway, there are three things to keep in mind — it has to be *square*, *straight*, and *level*.

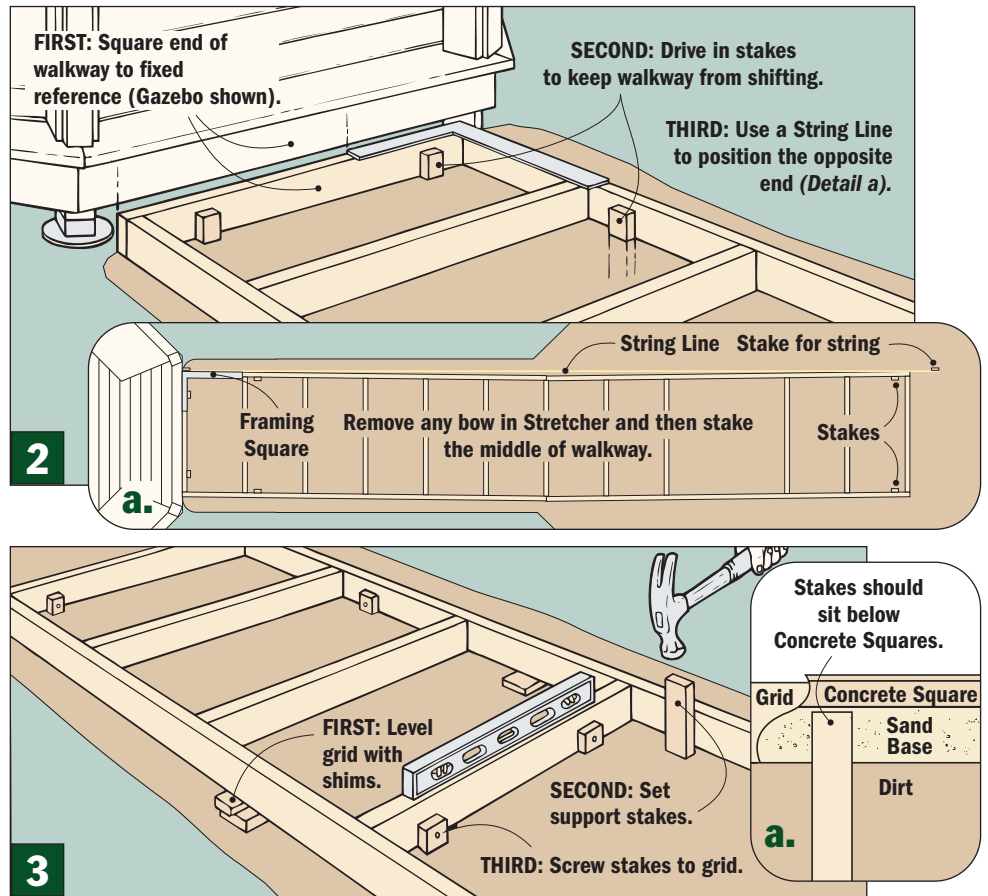
SQUARE IT UP. If the walkway leads to a building (or a structure like the gazebo), it should sit square to the entrance. To accomplish this, I started by squaring one end of the walkway to the gazebo (Fig. 2). Then to keep it from shifting out of position, I drove in a wood stake near each inside corner.

SET IT STRAIGHT. The next step is to remove any curves or bows in the walkway. To do this, attach a string line to the squared-up end and pull it tight (Fig. 2a). Then align the opposite end to the string and drive in stakes. Finally, pull out any bows in the middle of the walkway and stake it in place.

CHECK FOR LEVEL. Now it's time to check it for level. I wanted a modest amount of "fall" away from the gazebo, so I leveled and shimmed it as needed and then screwed the stakes to the stretchers (Fig. 3). Just be sure the stakes are set low enough not to interfere with the concrete squares (Fig. 3a).

ADD DIVIDERS. Once the main walkway is leveled, you can add the dividers (C) that form the halves of each opening. As before use the spacers to locate the dividers before screwing them in place (Detail c).

EXTENSIONS. At this point, you can add any extensions to the grid. For me, this meant building a "wing" on each side to create the octagonal area. Although this requires



some angled cuts, the basic construction is similar to the walkway.

Each wing has three angled sides (E) that are beveled on both ends to fit around the walkway (Grid Assembly and Detail b). Here again, identical rails (B) form the rectangular openings. Only this time, I added two short outer rails (F) and beveled one end of each piece to fit against the side (Detail d). Like the walkway, a divider (C) separates each rectangular opening into two equal parts.

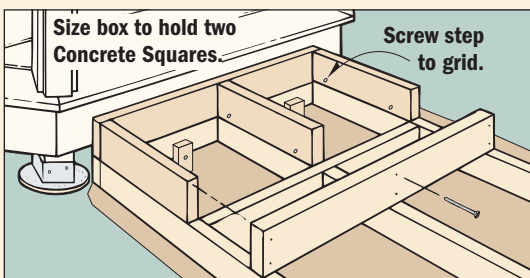
Now it's just a matter of leveling the extensions to the walkway, as shown in the photo below.

ADDING A STEP. One final note. To create a step up into the gazebo, I added a wood frame that holds two concrete squares. (See sidebar below.) This same idea can be used to make steps for a variety of projects.



After assembling the wings (or whatever extensions you add), shim and level them to the main walkway. Then anchor the extensions with stakes and screws as before.

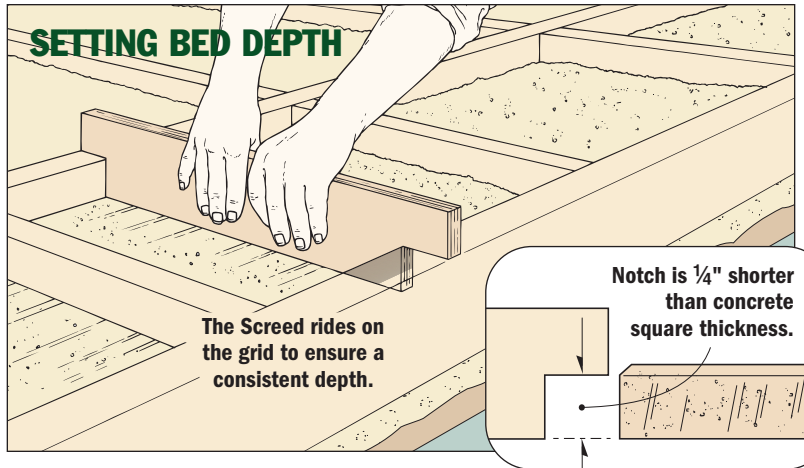
STEPPIN' UP TO NEW HEIGHTS



It's easy to add a step. Just build a wood frame to hold the concrete squares. Using either 2x6 or 2x8 lumber creates a convenient "rise" for the step.



TAMP FOR SUCCESS. The secret to a flat, level walkway is to compact the bed with a tamper.



SETTING BED DEPTH

The Screed rides on the grid to ensure a consistent depth.

Notch is 1/4" shorter than concrete square thickness.



A mitered wood block makes it easy to tamp the sand in the angled corners of the grid.

BUILDING UP THE BED

With the grid completed, it's time to add the sand. It forms a solid bed that helps prevent the concrete squares from settling or breaking.

The best way to determine the amount of sand you'll need is to contact your local sand and gravel supplier. The walkway I built required two tons of sand which I had delivered to the site for about \$100.

FILL & TAMP. To create a solid bed, you'll want to fill the grid openings in *layers*, tamping the sand between each one (See photo above).

BED DEPTH. Once the sand is within an inch of the top of the grid, it's time to establish the final depth of the bed. I wanted the bed to be about 1 1/2" below the top of

the grid. This way, the concrete squares (which were 1 3/4" thick) would sit about 1/4" proud of the grid.

SCREED. To make the bed a consistent depth in each opening, I used a shop-made screed (See drawing and detail above). This is just a board that's notched at each end to form two "ears." As you work the screed back and forth across the sand, the ears ride on top of the grid which ensures a consistent depth.

Note: The final depth of the bed depends on the size of the notches in the screed. I cut 1 1/2"-deep notches to make a bed of the same depth.


LAYING THE SQUARES

After preparing the bed, the moment you've been waiting for

has arrived — laying the concrete squares in the grid.

EASY DOES IT. The squares are very durable — once they're in place. But fitting them into the openings requires a gentle touch. The photo below shows a method that worked well for me. Rest one side of each square on the grid and *slowly* lower it into the sand. Try to resist the temptation to stomp on the square to seat it in the bed. Instead, grab the corners and wiggle it down into the sand.

CUTTING THE SQUARES. With all of the full-size concrete squares in place, there was still the matter of filling the triangular openings in the grid. That required making a diagonal cut across the concrete squares. The guidelines in the sidebar at left should make this a fairly simple task.

FILL GAPS. After fitting the triangular pieces into place, it's just a matter of using sand and a broom to fill in the gaps around the squares. 

CUTTING CONCRETE SQUARES

Cutting concrete squares is definitely dusty, but it's not difficult. All it takes is a circular saw and a masonry blade, as shown below.

You can find masonry blades at a home center for about \$7. These blades "grind" through the concrete squares very efficiently.

THINK SAFETY. Before you get started though, put your safety goggles on. It's definitely not

worth having a small particle of concrete fly into your eye.

SLOW & STEADY. The key to cutting the concrete is a slow, steady feed rate. So

with the saw adjusted for a full-depth cut, gradually move it forward until the blade begins to cut. Then guide the saw through the cut carefully and deliberately.



GENTLE TOUCH. To avoid breaking a concrete square, prop it on the grid and then lower it gently into the sand.



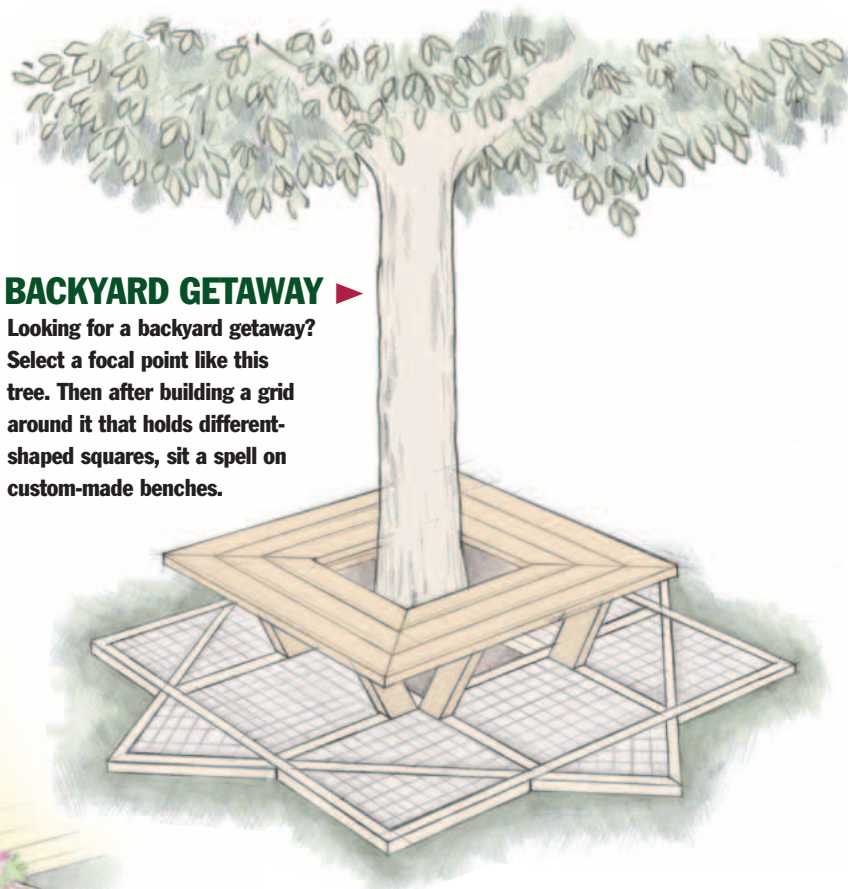
Design Options

There's one big advantage to the simple, straightforward design of the *Garden Walkway* — it can be easily modified to build a variety of outdoor projects.

To create your own unique walkway, change the shape or size of the wood grid; use different colors, shapes, and patterns of concrete squares; or experiment with multi-level projects. The design options below should provide a step in the right direction.

BACKYARD GETAWAY ▶

Looking for a backyard getaway? Select a focal point like this tree. Then after building a grid around it that holds different-shaped squares, sit a spell on custom-made benches.



◀ PATIO

By cutting concrete squares in half (or in quarters), you can create a decorative border for a patio. To ensure proper drainage, just be sure to slope the patio away from the house.

ENTRY STEPS ▶

A bank of steps provides a grand entrance to a home. Each step is a wood frame that holds the concrete squares. Like the step on [page 19](#), using either 2x6 or 2x8 lumber forms pre-sized risers.



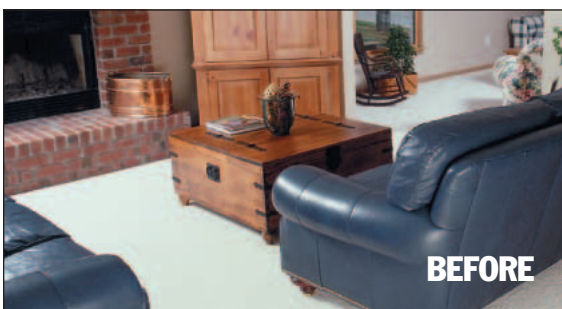
◀ SERVICE WALK

Even an ordinary service walk can add a distinctive element to your home. And you can knock it out in a weekend — without the hassle or expense of pouring concrete.



Install Your Own Solid Wood Floor

With pre-finished wood strips, installing a wood floor is a do-it-yourself project.



It's hard to beat the warmth and beauty of a solid wood floor. Just take a look at the 'Before' photo shown at left and the photo above to see what I mean.

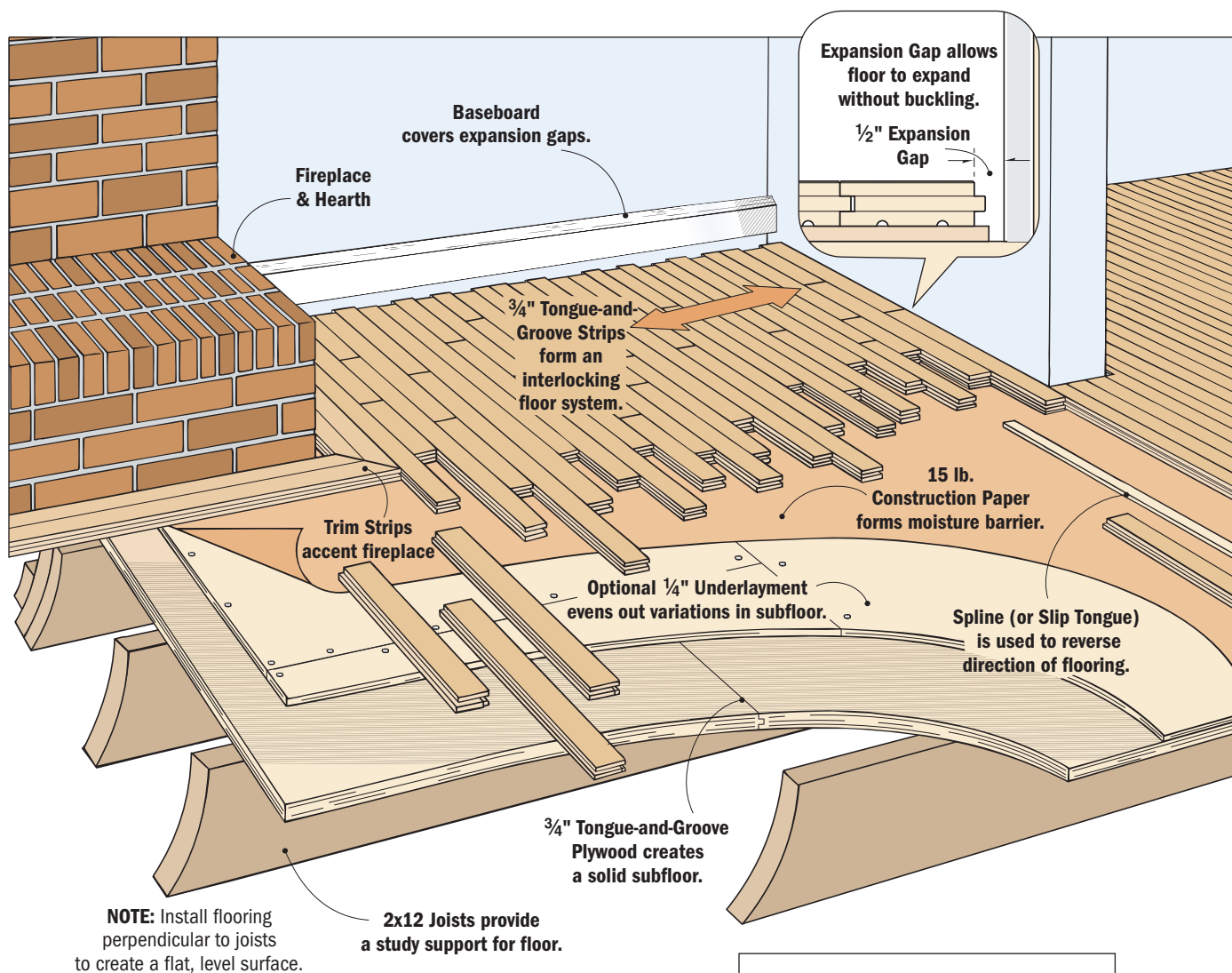
Okay, so it's a great looking floor and durable enough to last a lifetime. Plus, it adds a tremendous amount of value to a house.

But let's face it, the prospect of

laying a solid wood floor can be a bit intimidating. In fact, it's not a job that's usually tackled by most homeowners.

Not that the actual installation is all that difficult. It's just that sanding and finishing a wood floor is a real chore. Not to mention having to deal with all the sanding dust and fumes from the finish.

ANATOMY OF A SOLID WOOD FLOOR



Fortunately, there's an ideal solution that won't drive you out of the house. That's to install *pre-finished* wood flooring. This type of flooring has a durable finish applied at the factory. So the difficult job of sanding and finishing is already done.

You'll find pre-finished wood flooring in a variety of widths, thicknesses, and wood species. We used 2 1/4"-wide strips of 3/4"-thick oak for this project. (See photo at right.)

Notice that these strips of flooring have a tongue on one edge that fits into a corresponding groove in the adjoining piece. Likewise, interlocking tongue-and-groove joints provide a way to fit the ends of the strips together. This makes it easy to install a flat, solid floor. (For more

information about pre-finished wood flooring products, turn to [page 30](#).)

No matter which flooring you choose, a good understanding of how it's installed will help prevent problems from cropping up later.

The drawing above shows an overview of all the elements in our floor installation. But you should be able to apply these same basic concepts to your own situation, as well.

To help guide you through the entire process, we've included some practical tips and techniques in the next few pages for installing a pre-finished, solid wood floor. From the initial planning and preparation to figuring out the basic layout of the floor, here's everything you need to get professional-looking results.

W WORKBENCH
ONLINE

Visit us at WorkbenchMagazine.com for:

- Exclusive How-To Video Clips on using a "blind" nailer and a time-saving jamb cutter

NEW



We installed **Mirage Classic** oak flooring with an auburn stain. For distributors and manufacturers of pre-finished flooring, see [page 52](#).

PLANNING & PREPARATION

Installing your own wood floor is definitely a “do-able” job. But it shouldn’t be rushed. To get good results, it takes planning and preparation.

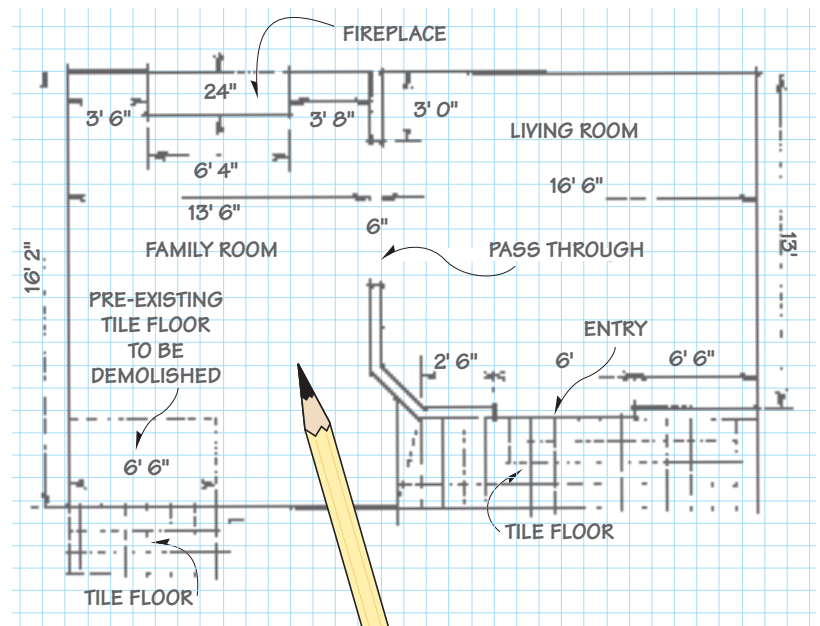
ESTIMATE MATERIAL. The first step is to estimate the amount of flooring material that’s needed. This depends on the total square footage of the room.

This is easy to calculate if it’s a square or rectangular room. Just multiply the length of the room by its width. If it’s an irregular-shaped area, it helps to make a scaled floor plan, as shown at right. Then calculate the square footage of the smaller rectangles and add them together.

One thing to keep in mind is there will be some waste when cutting the strips of flooring to fit the room. Also, you may end up discarding a few pieces because of defects or a mismatched color. To take those things into account, it’s a good idea to buy about 5 percent more flooring than needed.

LET IT BREATHE. Once you bring the flooring home, it’s tempting to start laying it down right away. But to avoid potential problems caused by moisture and wood movement, it’s best to set it aside for awhile to let it “breathe” or acclimate to the moisture level of the house. Most manufacturers recommend waiting at least 24 hours. For information on how to measure moisture content, check out the sidebar on [page 25](#).

FLOOR PLAN



PREPARING THE SUBFLOOR

While you wait for the flooring material to acclimate, it’s a good time to get started on the subfloor. Keep in mind that the floor will only be as good as the condition of the subfloor. So it’s important that the subfloor is solid, flat, and level.

Depending on where the floor is installed (or the age of the house), the subfloor may be made of solid wood slats, plywood, or concrete. In my case, $\frac{3}{4}$ " tongue-and-groove plywood had been used as a subfloor.

To provide access to the subfloor, you’ll first need to remove the old floor covering. For me, this meant

taking off the baseboard shoe and molding, rolling back the carpet, and then prying off the tack strips as in *Figure 1*. Removing the carpet was easy compared to the next step.

I wanted to lay wood flooring in the small area next to the kitchen that was covered with tile. (Refer to the *Floor Plan* above.) Breaking up these tiles was a real workout — and somewhat messy (*Fig 2*). But in the end, incorporating this area as part of the wood floor installation was worth the extra effort.

CLEAN SWEEP. After scooping up the rubble and sweeping the subfloor, it’s time to give it a good once-over. Scrape off any dried adhesive or joint compound, and fill knots and holes. Also, look for loose spots and secure them with nails or screws. While you’re at it, set any protruding nails or screwheads flush with the surface of the subfloor.

Sometimes there are more severe problems that can result in a wavy, uneven floor. To check for these potentially troublesome areas, place a long, straight board at several different locations and slide it across the floor. If there are large dips or high spots, you may want to consult a professional to look at the underlying structure of the floor or house.



1 To prepare the subfloor, I started by using a wrecking bar to pry off the tack strips that held the carpet.



2 Demolishing the tile floor next to the kitchen exposed the subfloor so I could lay wood flooring there, as well.

CHECKING MOISTURE CONTENT

One of the secrets to installing a wood floor is patience. To avoid damage to the floor, it's important to give it time to adjust to the moisture level of the house.

How long do you have to wait before installing the floor? That depends on the *moisture content* of the flooring material



To check the moisture content, jab the prongs of the meter into the bottom of a strip of wood flooring.



Make sure the moisture content of the underlayment is within 4 percent of the flooring before installation.

and the subfloor (or underlayment). Moisture content is the amount of water trapped inside a board compared to the weight of the wood when it's dry.

To measure moisture content, I use a special meter that has two sharp prongs (sensors). When you jab these prongs into a board, the moisture that's present completes a circuit between the sensors. A small computer reads the moisture content, which is displayed as a percentage on the meter. (Sources of moisture meters are listed in the margin below.)

Ideally, the difference in moisture content between the wood flooring and the underlayment should be no more than 4 percent. This will allow the flooring and underlayment to expand and contract at similar rates with changes in humidity. Checking the moisture content as shown at left — and waiting to install the floor until they're in the correct range — will ensure a long-lasting floor.

UNDERLAYMENT. Once you're satisfied with the condition of the subfloor, the next step is to decide whether or not to add underlayment. It's made up of plywood sheets that are laid perpendicular to the subfloor.

Not all flooring projects require underlayment. I used it on this project for one reason. Without it, the tile floor in the kitchen and hall would sit about $\frac{1}{4}$ " higher than the wood floor. This would mean having to step down onto the floor. So to even out these two surfaces, I installed sheets of $\frac{1}{4}$ " lauan mahogany, as shown in *Figure 3*.

Note: If the subfloor is uneven (and the underlying structure is sound), try installing $\frac{1}{2}$ " or $\frac{3}{4}$ " plywood to create a flat surface.

LAY DOWN PAPER. Regardless of whether you use underlayment, it's a good idea to cover the entire area with construction paper (*Fig. 4*). The paper acts as a vapor barrier that prevents moisture from migrating into the floor, which can cause the strips to cup.

One of the side benefits of the construction paper is it provides a clean worksurface. And later, when you're laying out the floor, it will make it easy to see the pencil lines.

TRIM JAMBS. Before laying out the floor, there's one last thing to do. That's to trim the door jambs and casing so you'll be able to slip the flooring underneath. A hand saw makes quick work of this. I use a scrap piece of the flooring as a gauge to establish the proper height of the cut (*Fig. 5*).

If there are quite a few doors, you might want to consider using a power jamb saw. These tools are available at many rental stores.

Editor's Note: To see a short video demonstration of how a jamb saw works, visit us at our web site: www.WorkbenchMagazine.com

The following sources sell moisture meters for under \$40:

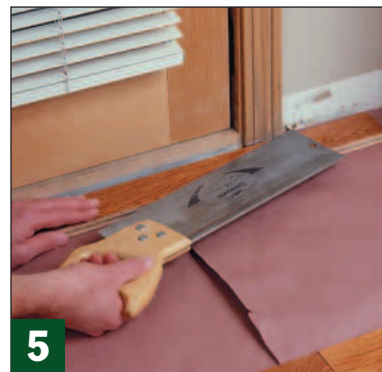
- Amazon.com
- Woodcraft
800-225-1153
- Tools-Plus.com
800-222-6133



To "raise" the height of the wood floor, I screwed sheets of $\frac{1}{4}$ " plywood perpendicular to the subfloor.



Next, to create a moisture barrier, roll out construction paper in overlapping strips and staple it in place.

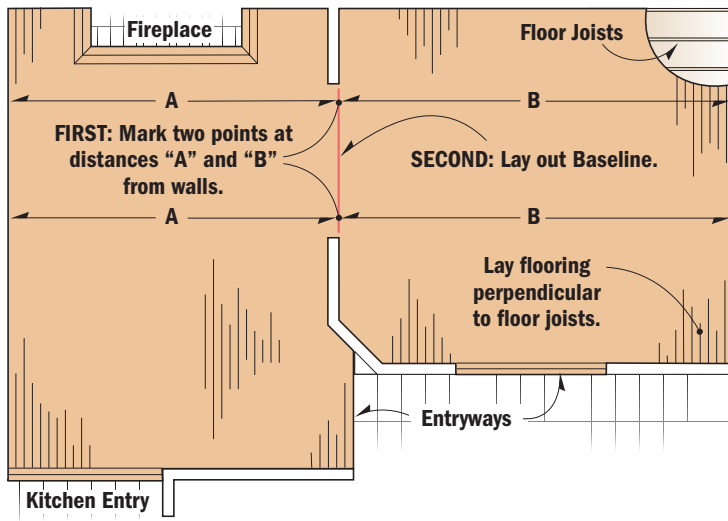


When cutting door casings, use a scrap of flooring as a gauge. Just rest a hand saw on the scrap and trim the casing.

LAYING OUT THE FLOOR

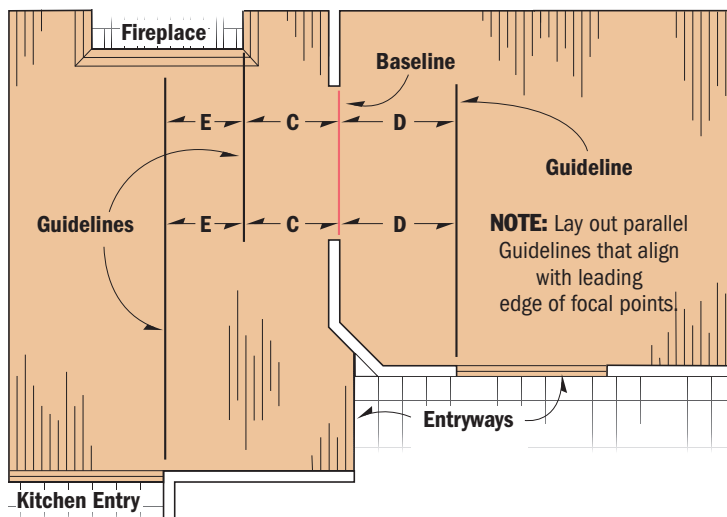
STEP 1:

To determine the location of the baseline, consider the focus areas, transitions from room to room, and the direction of the floor joists.



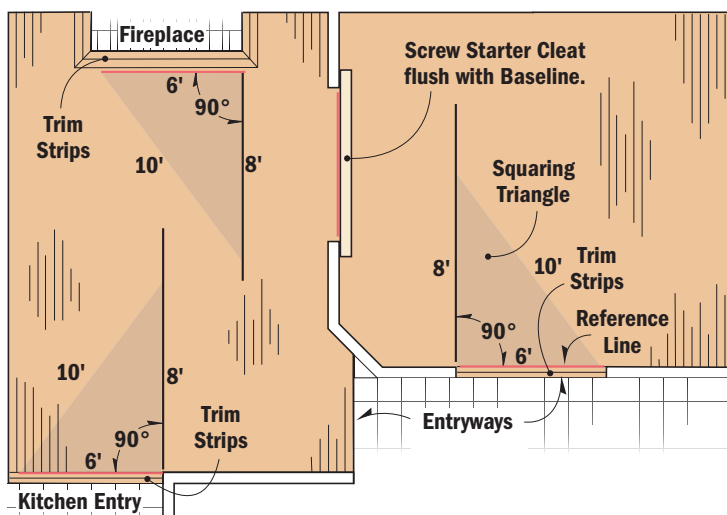
STEP 2:

From the baseline, measure to the leading edge of any focal areas and establish parallel guidelines.



STEP 3:

Laying out squaring triangles makes it easy to create reference lines that will be used to locate the trim strips.



CAREFUL LAYOUT IS THE KEY

The best piece of advice I can give you for laying out a floor is to *take your time*. It took an entire morning for me to plan, measure and lay out my floor, but all this puzzling was definitely time well spent.

BASELINE. To lay out the floor, the first step is to establish a *baseline*. This is the starting point for the first row of flooring. As you can see in *Step 1* at left, I decided to lay out the baseline in the pass-through between the two rooms. I did this for a couple of reasons: the direction of the floor joists and the size of the rooms.

A good rule of thumb is to lay the flooring *perpendicular* to the floor joists. This way, you'll end up with a solid, stable floor. So what does this have to do with the location of the baseline? It needs to run in the same direction as the flooring.

The second consideration in establishing the baseline was the size of the rooms. In my case, they were quite large (about 425 square feet). So locating the baseline between the rooms divided the project into more manageable areas.

Another look at *Step 1* will explain how to lay out the baseline. The idea is to mark two points that are *identical* distances from the wall and then snap a chalk line. Since I wanted to start near the middle of the floor, I made two measurements from *each* wall.

GUIDELINES. Once the baseline is established, the next step is to lay out some guidelines (*Step 2*). These lines will provide an important reference that will help keep you on track as you lay the flooring. I'll explain more about that later.

The process for laying out the guidelines is similar to that for the baseline. Only this time, the goal is to make the guidelines parallel to the *baseline*, as shown in *Step 2*. So here, just lay out a couple of marks the same distance from the baseline and snap a line.

Notice that I laid out three guidelines, and each one is aligned with a highly visible area of the room (the fireplace and two entryways). There's



6 After screwing a wood cleat to the subfloor, set the first flooring strip against it and nail it in place.



7 Racking the boards helps you select the colors, grain patterns, and lengths that blend together in the completed floor.

a good reason for that. I planned to highlight these areas with trim strips that run perpendicular to the flooring. So to establish the location of these trim strips, I needed one more set of reference lines that were square to the guidelines. (These are the red lines shown in *Step 3* on page 26.)

SQUARING TRIANGLE. To lay out these reference lines, I used an old trick. It's called a squaring triangle, and it's based on the fact that any triangle with sides that yield a 3:4:5 ratio will guarantee a right angle corner. With that in mind, I laid out three large (6:8:10) triangles to create a square corner between the guidelines and the reference lines.

GETTING STARTED

After completing the layout, it's time to get started. I recommend rounding up a couple of air nailers like those shown at right. It will definitely make the job go quicker and provide better results in the end.

Since I planned to start in the pass-through opening between the rooms, I was able to use the blind-nailer to install the first strip of flooring. If you're starting near a wall, you'll have to face-nail the first few strips until there's clearance for the blind nailer.

STARTER CLEAT. To install the first strip, I had to use a starter cleat. This is a straight board that's positioned along the baseline and

screwed in place. The starter cleat acts as a stop. With the cleat in place, set the first strip of flooring tightly against it (*Fig. 6*). This way, the impact from the nailer won't push it off the baseline.

To provide a nailing surface, the tongue on this strip should face *away* from the cleat. The nails are driven in about 8" apart to fasten the strip to the subfloor.

Before going on, it's a good idea to "rack," or arrange, a number of

flooring strips in front of you. That way you can sort through them and place boards with similar color and grain in a loose sequence of how you'll want to install them (*Fig. 7*). This way, you'll be able to grab a board, nail it in place, and move on to the next piece without having to search for the right strip.

One thing I'd suggest is mixing the lengths of the strips. If there are too many similar length strips in one area, it can cause a noticeable — and not very pleasing — pattern where the ends of the strips come together. If possible, avoid H-shaped patterns or "stairsteps."

Also, make it a point to repeatedly measure the distance from the *last* strip of flooring that's installed to the guidelines. These lines that you painstakingly laid out are there for a reason — to keep you on track.

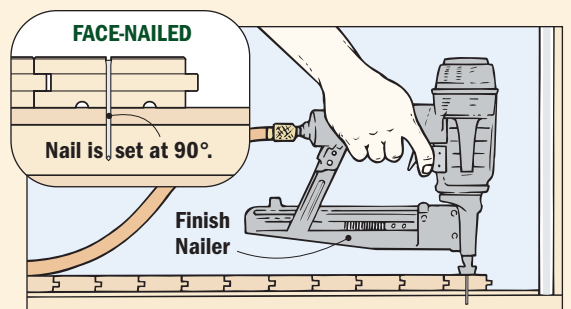
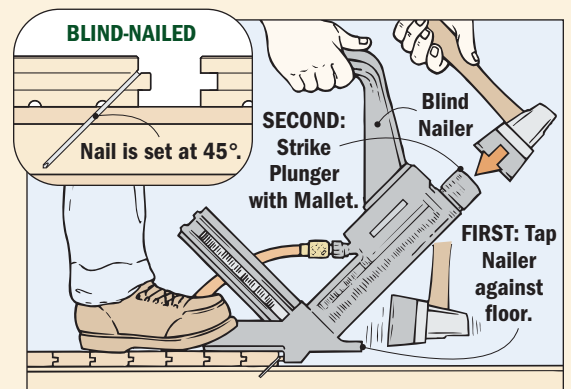
I measured after every five or six rows. If there's any discrepancy, try to compensate for it by making a *very* small correction between one strip and the next. At most, this means leaving a $1/32$ " gap at the end that needs to be adjusted.

PNEUMATIC FASTENERS

Always use the right tool for the job. That old saying definitely holds true for installing wood flooring. I used two types of air nailers for this floor project.

The first one is called a Blind-Nailer. It drives nails at a 45° angle through the tongue of each strip. It works by setting the nailer directly on the flooring, tapping it back into position against the flooring, and then striking the plunger with the rubber mallet.

I also used a Finish Nailer. This works a little different than the Blind-Nailer. It drives the nail at a 90° angle through the face of the flooring strip. I used the finish nailer to fasten down all the trim strips and the flooring strips close to the wall.



HIGHLIGHTS & TRANSITIONS

One of the things I like to do when laying a wood floor is to highlight the most visible areas. For this project, those areas turned out to be the fireplace and the entryways. The transitions from one room to the next also deserve special attention.

TRIM STRIPS

To accent each of these areas, I installed two trim strips. These were long pieces of the same flooring strips I'd been using for the rest of the project. But what really set them apart is they're *perpendicular* to all the rest of the flooring strips.

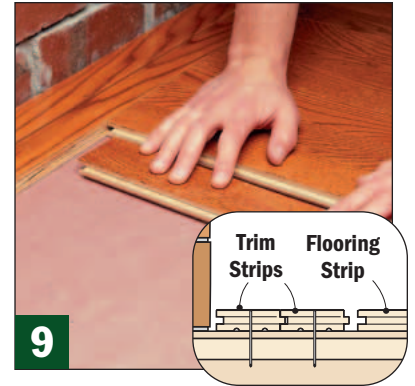
A look at *Figures 8 and 9* shows a double row of these trim strips next to one of the entryways and the fireplace. Notice that they're butted edge-to-edge with the tongue facing into the room. This way, the groove in the end of each flooring strip will slip over the tongue and create a nice, tight-fitting joint. At least that's the goal.

To make this work, the trim strips must be perfectly square to the *ends* of the flooring strips. That's where the layout line made earlier with the squaring triangle comes in. By placing the trim strips *precisely* along this layout line, it ensures that they'll be perpendicular to the flooring strips.

With the trim strips in position, it's just a matter of face-nailing them, as shown in *Figure 8*. After installing the rest of the trim strips,



To create an attractive transition between rooms, I face-nailed a double row of trim strips in the entryway.



A careful layout results in a tight-fitting joint where the flooring strips meet the trim strips around the fireplace.

you can fit the main flooring strips against them, as shown in *Figure 9*.

When laying these rows of flooring, a general rule of thumb is to work *away* from the trim strips, not *toward* them. There's a good reason for this. The last wood strip installed in each row usually has to be cut to length. This requires removing the "factory" end of the strip. You really don't want this end of the board to be in a highly visible area (like up against a trim strip). It's better to hide the cut end under the base molding at the opposite end of a row.

BACK-LAYING

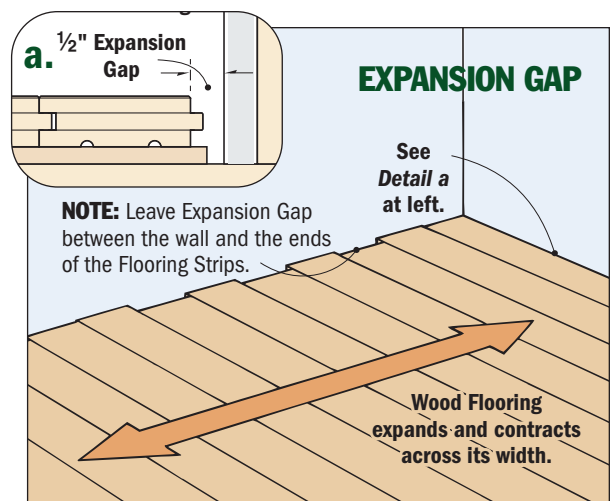
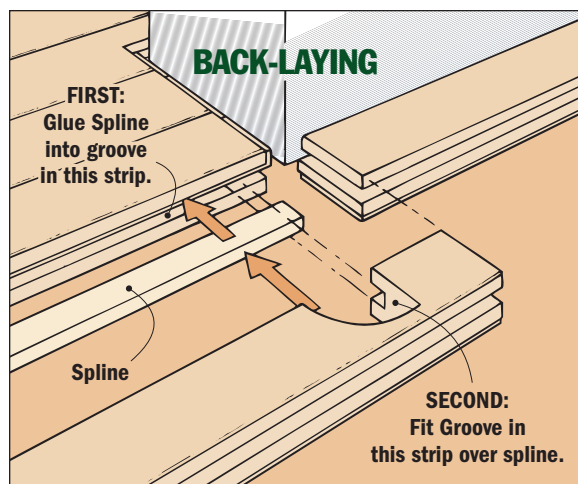
Installing the trim strips was just one of the interesting challenges presented by this flooring project. It also gave me a chance to try my hand at a technique called *back-laying*. Like the name suggests, back-laying is

installing flooring in the *opposite* direction from which you started.

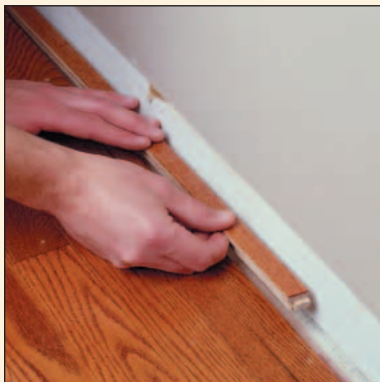
If you recall, I laid out the baseline and installed a starter cleat in the pass-through between the two rooms. So the first row of flooring that was set against the cleat (and all the subsequent rows up to this point) had one thing in common — the tongues faced *away* from the cleat. That way, they could be fastened with the blind nailer.

But in order to lay flooring on the *opposite* side of the cleat, I had to reverse direction. In other words, the tongues on the flooring strips had to face the other way. That much was easy. I just turned the strips around. But this also meant that two of the flooring strips would be placed groove-to-groove.

To connect these two strips, the idea is to insert a *slip tongue* or spline



LAYING THE LAST STRIP

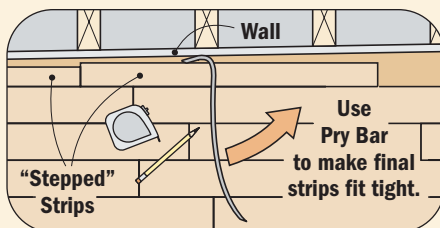


If there's an uneven gap between the floor and the wall, you can compensate by installing strips of different widths.

When it comes to laying the last strips of flooring, you'll probably notice there's an uneven gap between the wall and the floor. That's because very few rooms are perfectly square, and very few walls will be absolutely parallel to the edge of the floor.

Fortunately, there's an easy solution. That's to create a "stair-stepped" row of flooring next to the wall that compensates for the gap. (See drawing below.) This requires ripping strips of different widths and fitting them in place, as shown at left. Be sure to leave a $\frac{1}{2}$ " gap between the strips and the wall so the floor can move with seasonal changes.

There's not much room to work when installing the last row. Using a pry bar as a lever will help coax the last strip into place. If the space is just too tight to get the tongue-and-groove joint together, cut the bottom edge off the groove and simply set the board in place. Then tap one end of the strip with a hammer to seat the opposite end and face-nail the strip.



into the grooves. (Refer to the *Back-laying* illustration on [page 28](#).) The spline is just a piece of hardwood that's ripped to the thickness of the grooves and glued in place.

Once the glue dried, I fit the groove in the next strip of flooring over the spline. Then I nailed that strip in place and continued working my way across the floor. The pace of the project picked up considerably at this point. And before I knew it, I was ready to install the last few rows of flooring. (See *Laying the Last Strip*.)

EXPANSION GAPS

There's no need to cut the last flooring strips to fit tightly against the wall. In fact, it's just the opposite. You

want to leave a gap between the wall and the floor. This gap allows the wood floor to expand and contract with changes in humidity.

If you look at the *Expansion Gap* illustration on [page 28](#), you can see that most of this wood movement occurs *across* the width of the floor. This means you'll want to leave the largest gap next to the *long edge* of the floor. A $\frac{1}{2}$ " gap should be plenty to allow the floor to move freely without binding against the wall (*Expansion Gap Detail a*).

As for the gap next to the *ends* of the flooring strips, about $\frac{1}{4}$ " is all that's needed. There's not as much movement *with* the grain (along the length) of the flooring.

FINAL DETAILS

To complete the project, there were just a few final details to take care of.

BASEBOARD. First, I reinstalled the baseboard (*Fig. 10*). In my case, it was thick enough to cover the expansion gap. But if necessary, you can add a shoe molding to cover wider gaps.

TOUCH UP. Finally, I touched up a few boards that I accidentally scratched during installation. The touch-up kit supplied by the manufacturer (shown below) came in handy here. It contained a wax stick for filling nail holes (*Fig. 11*). And for fixing deep scratches, there's a stain marker and a small bottle of polyurethane topcoat.



10

After completing the installation, the gaps around the floor are covered with baseboard and a shoe molding if needed.



11

Finally, a wax "crayon" that matches the floor color creates an almost invisible repair when filling the nail holes.

This touch-up kit has everything that's needed to fill nail holes and repair scratches in the pre-finished wood floor.



Pre-Finished Wood Flooring

Find out which type — solid hardwood or engineered — will work best for you.



**3/4" SOLID
HARDWOOD FLOORING**

**3/8" ENGINEERED
FLOORING STRIP**

There are several good reasons to choose a pre-finished product for your next flooring project. One of the biggest benefits is the hassle-free installation (see [pages 22-29](#)).

NO SANDING. A pre-finished floor doesn't require sanding. This means your home won't need a top-to-bottom cleaning once the job is completed. Plus, you don't have to worry about gouging a brand new, expensive floor with a heavy sander.

NO FINISHING. As the name implies, with a pre-finished floor, all the finishing is done at the factory — not in your home. So there's no waiting for the finish to dry or the fumes to disappear before you can move the furniture back and breathe the air in the house.

CONSISTENT LOOK. Finally, it's almost impossible to duplicate the consistent quality and appearance of a pre-finished floor. A builder often finishes a floor on-site in three steps — stain, seal, finish coat — but a manufacturer can go through four, seven, even up to 13 steps. The additional sanding and extra finish coats result in an extremely high-quality product.

But when buying pre-finished flooring, there's more to consider than the finish. As you can see in the photos at left, there are two types of pre-finished wood flooring: *solid wood* and *engineered*.

On the surface, both solid wood and engineered products look the same once they're installed. Both types are manufactured in strips (typically 2 1/4" wide) or planks (3" or

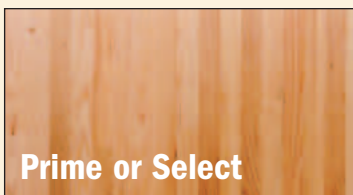
CHOOSING THE RIGHT GRADE OF PRE-FINISHED FLOORING

Pre-finished wood flooring — solid *and* engineered — is graded based upon the number and prominence of the "character marks" of the individual wood species. Some of these marks include pin knots, mineral streaks, and natural color variations.

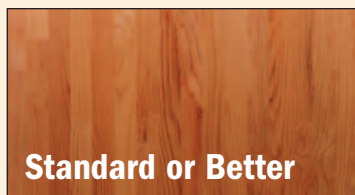
As you might expect, Prime- or Select-grade flooring that has very few noticeable character marks (almost entirely clear) will cost more than flooring of the same

species that shows a lot of heavy character marks. However, sometimes you can use grading to your advantage. For example, you might want to install an oak floor that has a lot of natural character to it. Choosing a Tavern- or Cabinet-grade of flooring will not only give you the look you're after but will also save you money.

It's important to note that some manufacturers' warranties vary depending on the grade of flooring.



Prime or Select



Standard or Better



Tavern or Cabinet

Natl. Oak Flooring Manuf. Assoc.

wider). One difference is that engineered planks often come in wider widths than solid hardwood — up to 7" or more.

All pre-finished flooring — solid wood and engineered — is milled to very exact thicknesses. Interlocking tongues and grooves hold each individual strip or plank in place to create a solid, level floor. But there are a few significant differences between the two types you'll want to consider.

SOLID WOOD FLOORING

A solid wood floor is exactly what its name implies — solid wood throughout (see top photo, page 30). It's not a wise choice for damp areas (especially below grade) because the wood absorbs moisture, which can cause the floor to buckle. This means it's also unsuitable for use over a concrete slab unless a subfloor is installed.

The most common way to install a solid wood floor is to nail it to a plywood subfloor, as shown above. Some flooring projects may require a lauan underlayment between the subfloor and flooring (see page 25).

Solid hardwood flooring is usually sold in 3/4"-thick strips. As you might expect, material prices vary depending on the species of wood, finish, manufacturer, and grading (see box

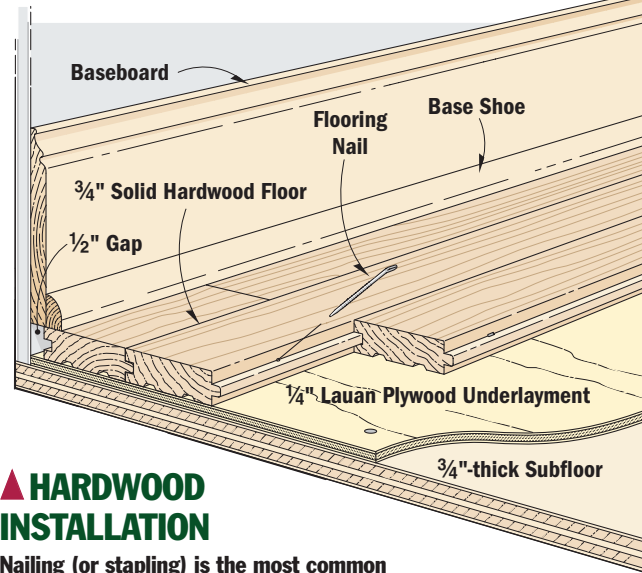
on page 30). You can expect to pay anywhere from \$4.99 per square foot for standard-grade oak up to \$15 per square foot for premium-grade mahogany (uninstalled).

ENGINEERED WOOD FLOORING

Unlike solid hardwood, engineered flooring consists of several layers of wood — 3/8" to 1/2" thick — glued together (see bottom photo, page 30). The top "wear" layer is usually 1/16" to 5/32" thick. Depending on its thickness, it can be sanded and refinished several times.

This multi-layered design makes engineered flooring more dimensionally stable than solid wood and a good choice for below-grade installations. It can be nailed to a plywood base. But more often, it's glued-down using a mastic adhesive, as shown at right. When applying engineered flooring over concrete, it's important to follow the manufacturer's recommendation on which type and brand of adhesive to use.

You might expect to pay less for engineered flooring. But the extra time it takes to manufacture the product offsets any potential price savings. So expect to pay about the same amount for engineered flooring as you would for solid wood.

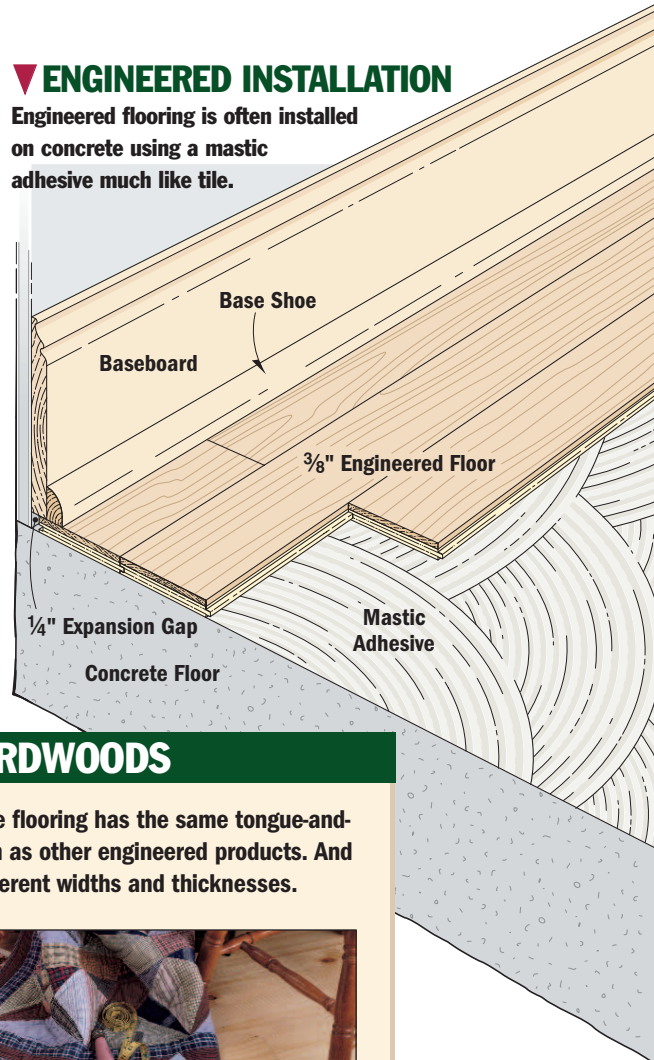


▲ HARDWOOD INSTALLATION

Nailing (or stapling) is the most common way to install solid hardwood flooring.

▼ ENGINEERED INSTALLATION

Engineered flooring is often installed on concrete using a mastic adhesive much like tile.



PRE-FINISHED PINE: AN ALTERNATIVE TO HARDWOODS

Everywhere you look, homeowners are using wide wood planks to create historic, elegant, and bold flooring styles. With its distinctive grain pattern and rustic look, pine flooring is an option worth considering when you're looking for a floor with lots of character. And now it's also available as a pre-finished product. Seen here is Rustic Pine flooring from the Coastal Woodlands collection from Bruce Flooring.

The engineered construction of this pre-finished pine flooring makes it a realistic and practical alternative to common hardwood floors. Although pine flooring will show more wear and indentations than a harder flooring such as oak, the factory-applied finish again makes it tough and durable. Plus, the natural pitch in pine flooring will harden over time.

Pre-finished pine flooring has the same tongue-and-groove construction as other engineered products. And it's available in different widths and thicknesses.



Courtesy of Bruce Flooring

Weekend Entertainment Center

Build an elegant cabinet in a weekend? For only \$400? Now that's entertainment.



When it comes to building a large cabinet or furniture project, two things always seem to be in short supply — time and money. This entertainment center solves both of those problems.

By using a simple “shortcut,” you can build the entire project in a weekend. Better yet, the entire cost for the materials is only about \$400.

BASE CABINET. The secret is to start with a manufactured kitchen base cabinet, as shown on [page 33](#). (I bought an oak cabinet made by the Mill’s Pride Company). Then build the entertainment center around it.

Alright, I admit it. This *is* a rather unorthodox approach. But as you can see in the photo at left, the results are impressive.

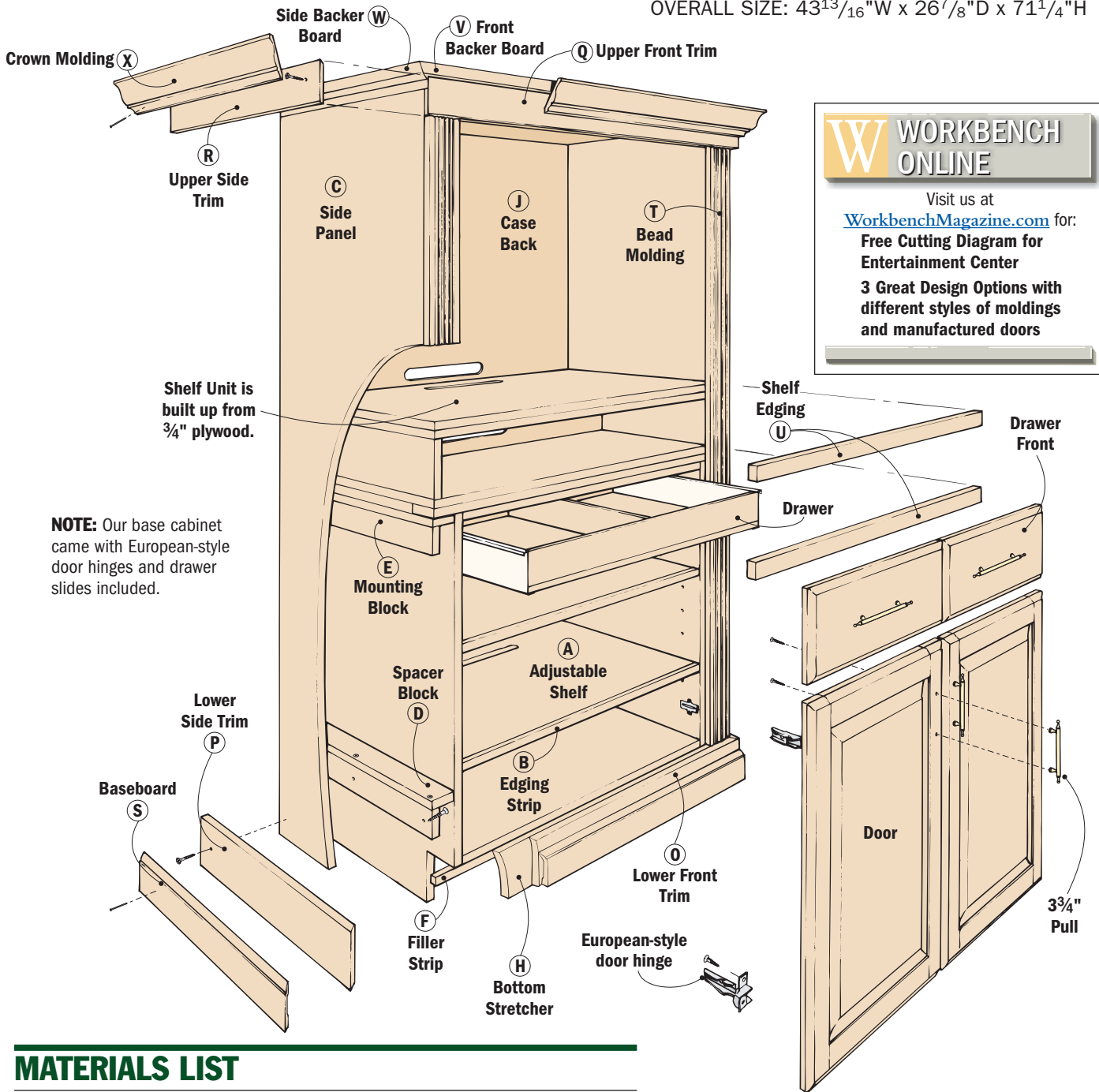
PRE-MADE MOLDINGS. One thing that gives this entertainment center its distinctive appearance are the fancy moldings on the front and sides of the cabinet. Now don’t worry, this won’t require any special tools. In fact, you don’t need to make them at all. We used pre-made, oak moldings that are available at most home centers.

FINISH. Now it’s one thing to match the oak base cabinet by buying oak moldings and oak plywood. But what about the finish? How do you ensure a good color match?

The solution is to remove one of the doors (or drawer fronts) and take it to a local paint store. They should be able to mix up a stain that’s almost identical in color. As for the finish, I brushed on three coats of a semi-gloss varnish to match the sheen of the existing finish.

ENTERTAINMENT CENTER ASSEMBLY

OVERALL SIZE: 43¹³/₁₆"W x 26⁷/₈"D x 71¹/₄"H



MATERIALS LIST

LUMBER

A (2) Adjustable Shelves	3/4" x 21 1/2" x 31 1/4"	P (2) Lwr. Side Trim	3/4" x 4 1/2" x 25 1/4"
B (2) Edging Strips	1/4" x 3/4" x 31 1/4"	Q (1) Upper Front Trim	3/4" x 3" x 40 1/2"
C (2) Side Panels	3/4" x 23 3/4" x 69 3/4"	R (2) Upper Side Trim	3/4" x 3" x 25 1/4"
D (4) Spacer Blocks	3/4" x 2 1/4" x 23 1/2"	S (1) Baseboard	3/8" x 2 5/8" x 120" rgh.
E (4) Mounting Blocks	3/4" x 3" x 23 1/2"	T (2) Bead Moldings	3/4" x 3 1/4" x 64"
F (1) Filler Strip	3/4" x 3/4" x 37 1/2"	U (2) Shelf Edgings	3/4" x 1 1/2" x 34" rgh.
G (1) Top Stretcher	3/4" x 2 1/4" x 39"	V (1) Frt. Bkr. Board	3/4" x 4 1/2" x 43 1/8"
H (1) Bottom Stretcher	3/4" x 4 1/2" x 39"	W (2) Sd. Bkr. Boards	3/4" x 4 1/2" x 26 9/16"
I (1) Top Panel	3/4" x 24 1/4" x 39"	X (1) Crown Molding	3/8" x 3 9/8" x 144" rgh.
J (1) Case Back	1/4" x 29 1/2" x 38 1/4"		
K (2) Shelf Ends	3/4" x 5" x 23 1/2"		
L (1) Shelf Back	3/4" x 5" x 36"		
M (3) Shelf Panels	3/4" x 23 1/2" x 37 1/2"		
N (2) Shelf Supports	3/4" x 3" x 37 1/2"		
O (1) Lwr. Front Trim	3/4" x 4 1/2" x 40 1/2"		

HARDWARE: (See pages 51 for sources.)
(2) Liberty No.4520 Minaret Pulls (Pkg. of 2)
(13) #6 x 1" Fh Woodscrews
(77) #8 x 1 1/4" Fh Woodscrews
(64) #4 Finish Nails



This manufactured base cabinet serves as a starting point for the Entertainment Center. For a close-up look at how different styles of doors and moldings changes the look of the project, visit us at:

www.WorkbenchMagazine.com

BOX INSIDE A BOX

This entertainment center is really nothing more than a box inside a box. To see what I mean, take a look at the *Cabinet Assembly* shown below. The manufactured kitchen base cabinet serves as the inner box. Then the large outer case of the

entertainment center is “pieced” together around it.

ASSEMBLE THE BASE CABINET

There are a number of inexpensive cabinets available. I purchased a kitchen base cabinet manufactured by the Mill’s Pride Company. (For

sources and additional information, please turn to [page 51](#).)

It only takes a few minutes to assemble the base cabinet (*Base Cabinet Assembly*). It’s held together with knock-down fittings that “lock” the pieces together. And pre-drilled holes make it a snap to mount the drawer slides and European-style hinges. Note: To avoid scratching the doors and drawers, it’s best to set them aside until later.

ADJUSTABLE SHELVES. The base cabinet comes with a shelf, but it was quite narrow. So I added a couple of wide shelves (A) made of $\frac{3}{4}$ " plywood. Gluing a thin strip of hardwood edging (B) to the front of each shelf covers the exposed plies.

To provide access for power cords and cables, there’s a wide slot near the back edge of each shelf (*Detail a*). This is just one of a number of access slots in this project. So to cut them quickly, I made a template to use with a hand-held router and a pattern bit. (For more information about this, turn to [page 14](#).)

To make the shelves adjustable, you’ll need to drill holes in the sides of the cabinet for shelf pins. The pins on one side need to align with those on the other. Otherwise, the shelves will rock back and forth. To prevent this, I drilled holes in a scrap piece of hardboard and used it as a template when drilling the holes for the shelf pins (*Detail a of Base Cabinet Assembly*).

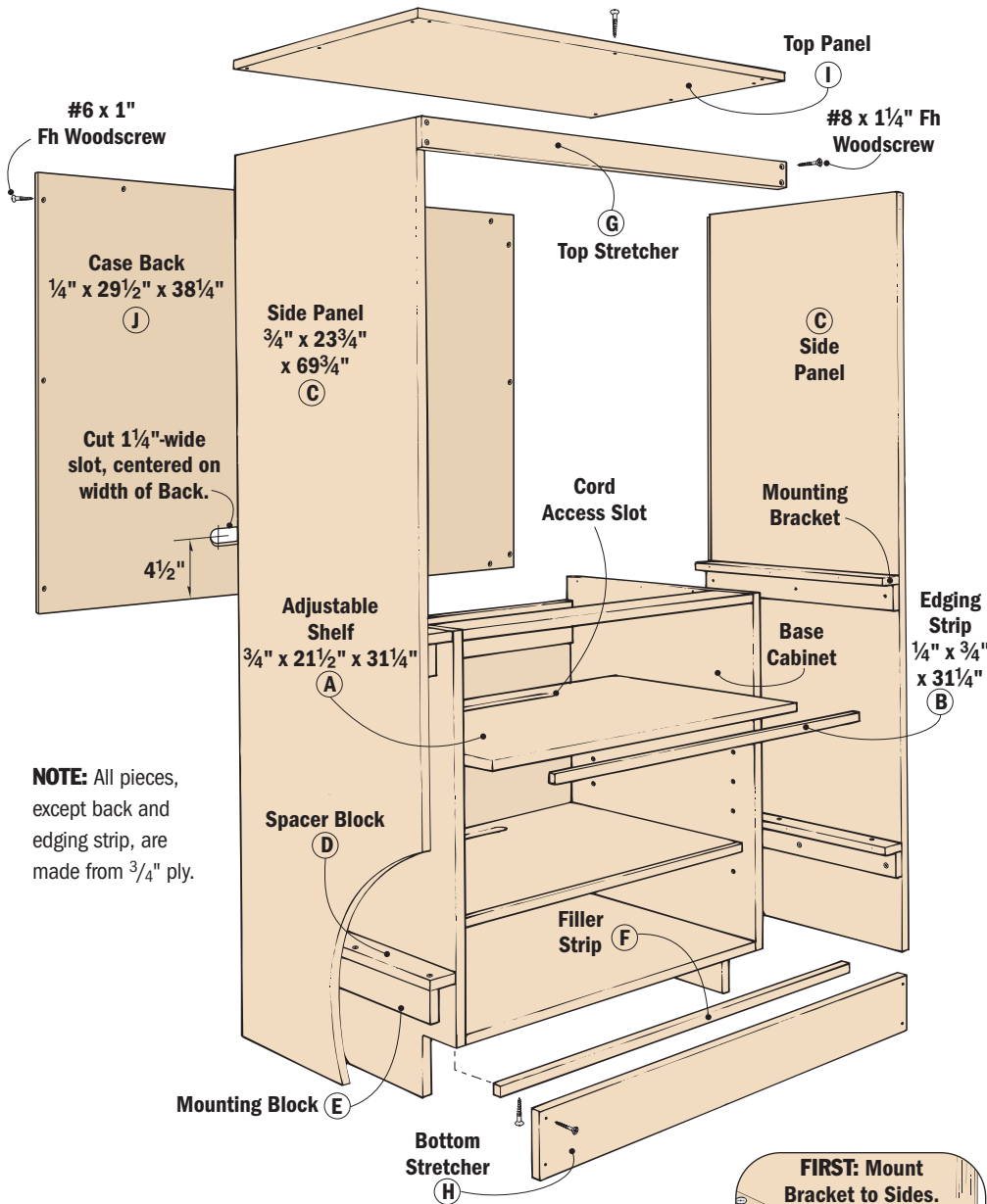
BUILD THE CASE

With the base cabinet complete, you can turn your attention to the large case that’s built around it.

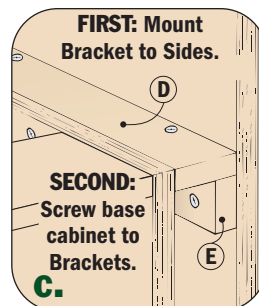
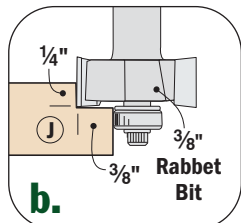
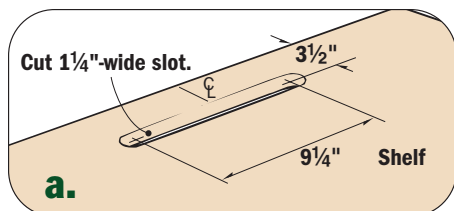
SIDE PANELS. The first step is to add a couple of tall, plywood side panels (C). The width of the side panels should equal the depth of the base cabinet. As for the length (height), I wanted it to be tall enough to accommodate a 30" television and the shelf for a DVD player.

Start by cutting the two sides (C) from a full sheet of $\frac{3}{4}$ " plywood. These are large pieces (almost six feet long), so I used a circular saw and a shop-made edge guide to do

CABINET ASSEMBLY



NOTE: All pieces, except back and edging strip, are made from $\frac{3}{4}$ " ply.



this, see page 15. Then I added rabbets for a plywood back. Rout the rabbet along the back edge of the case sides, sizing it as shown in *Detail b* of the *Cabinet Assembly*.

MOUNTING BRACKETS

Once the sides are cut, the next step is to attach two L-shaped mounting brackets to each side panel (*Fig. 1*).

The brackets serve two purposes. First they gave me a way to attach the base cabinet to the side panels. Also, by holding the sides out away from the base cabinet, they provide room to install the 3 1/4" bead molding applied to the front of the case.

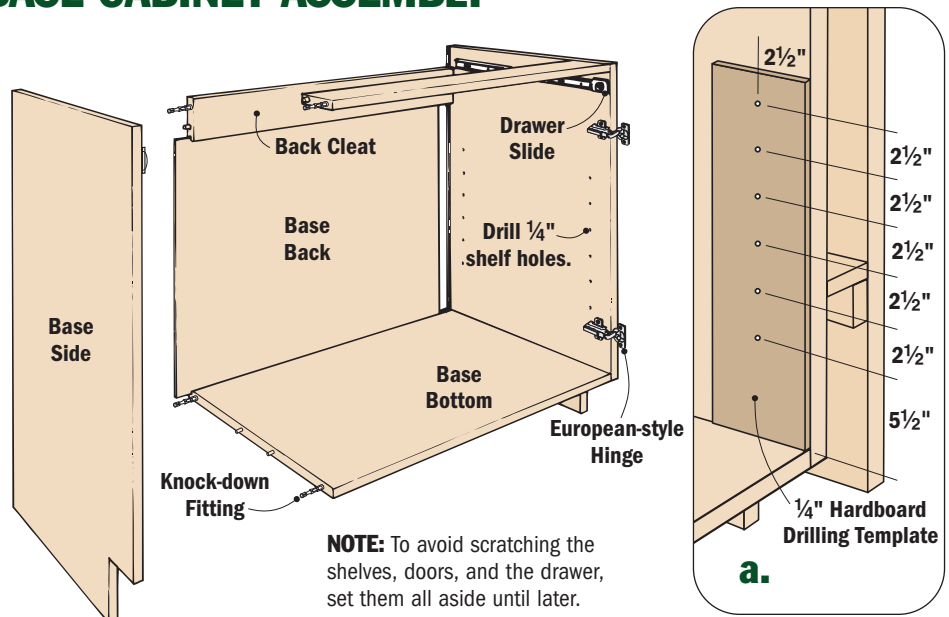
There are two parts to each of the brackets, a spacer block (D) and a mounting block (E) (*Fig. 1*). Cut them to size, then glue and screw the parts together to make the four L-shaped brackets.

I attached the lower brackets as shown in *Fig. 1*. Then I positioned the top brackets flush with the top of the base cabinet. This way both the base cabinet and the brackets help to support the shelf unit, which is added later.

ADD STRETCHERS & THE TOP

At this point, the case will have a tendency to rack a bit. But don't

BASE CABINET ASSEMBLY



worry. Installing a filler strip, two stretchers, and a top panel will add rigidity to the cabinet.

Start by adding the filler strip (F) to the underside of the toe kick on the base cabinet. The filler strip hides a small gap between the bottom stretcher and the base cabinet.

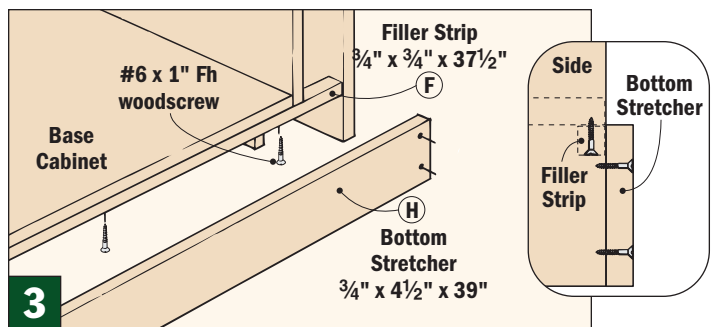
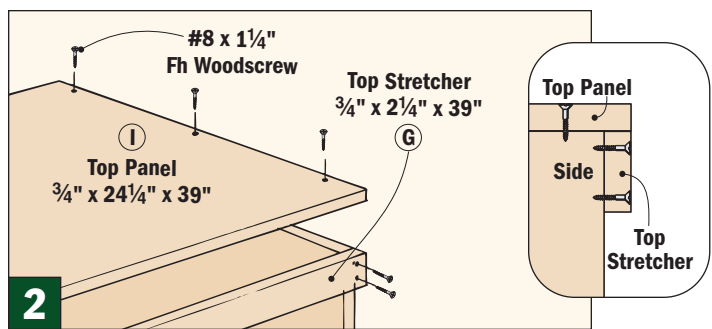
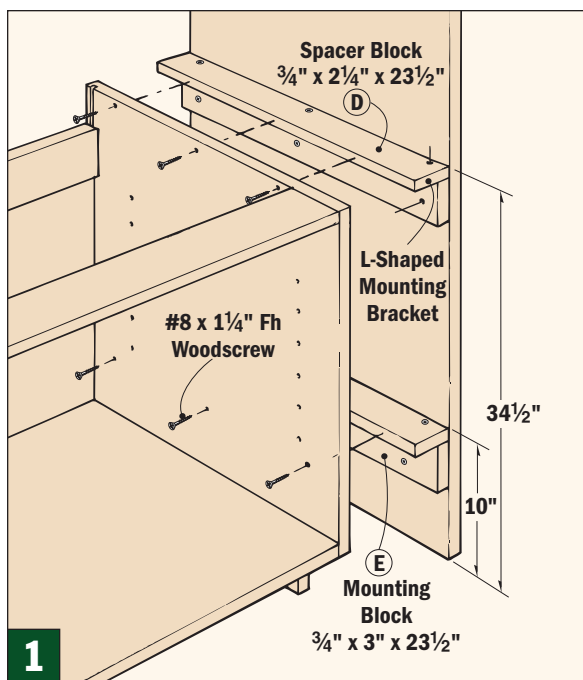
Now add the top and bottom stretchers (G, H) to the cabinet sub-assembly. I simply glued and screwed these stretchers to the front of the cabinet (*Figs. 2 and 3*).

Finally, make a plywood top panel (I) and attach it with glue and screws, as well (*Fig. 2*).

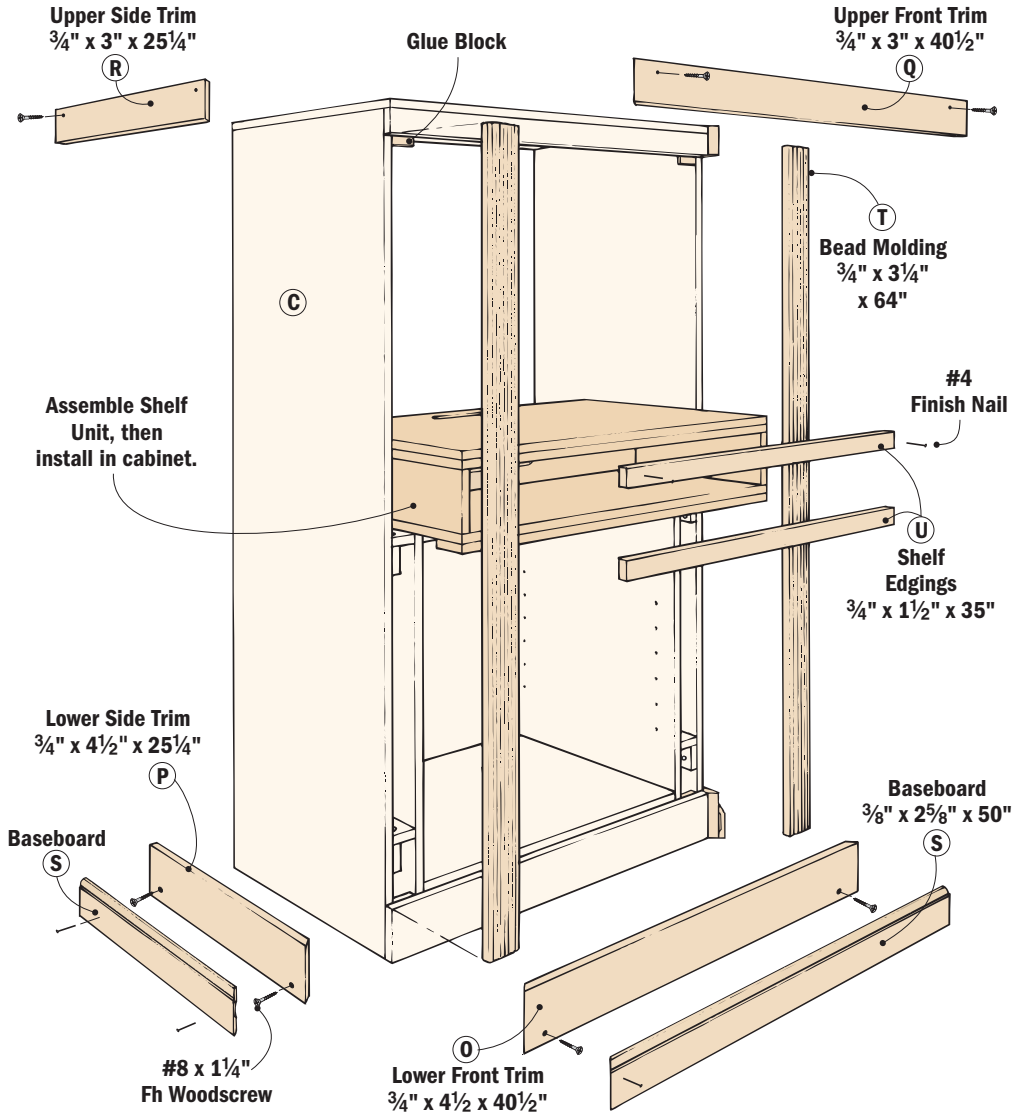
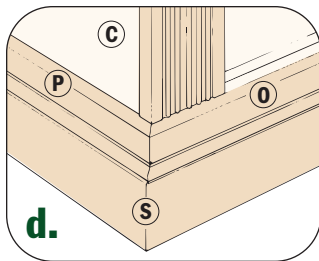
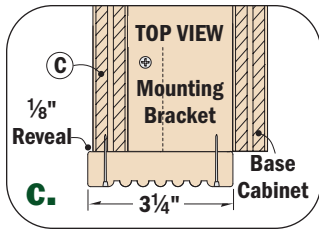
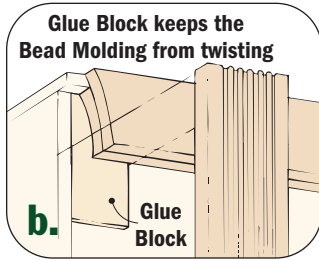
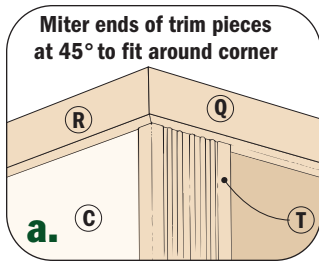
MAKE THE CASE BACK

With the cabinet assembled, go ahead and measure for the case back (J) (*Cabinet Assembly*). Cut it to size and add the cord access slot.

But don't attach the back just yet. It's best to leave the back of the cabinet open so you can use it as a clamping surface.



SHELF UNIT & MOLDINGS



SHELF UNIT

Once the main cabinet is assembled, the next step is to build a shelf unit to hold electronic components. A look at the drawing above shows that this unit is an open-front box. It provides a compartment for a DVD player and a shelf for a television.

To simplify construction, the shelf unit is built separately and then installed in the cabinet. It consists of an H-shaped assembly that's sandwiched between three large panels and a couple of narrow support strips (*Shelf Unit Subassembly*).

When sizing the shelf unit, just remember it has to slide into the opening, so it's built to fit. As for

depth, it's designed to sit flush with the front of the base cabinet and the shoulder of the rabbet in back.

H-SHAPED ASSEMBLY. I began by building the H-shaped assembly. It consists of two shelf ends (K) and a shelf back (L) made of 3/4" plywood. To make the compartment tall enough to hold a DVD player, I ripped the ends and back 5" wide. Also, to hide cords in back of the compartment, the shelf back is located 16" from the front of the shelf ends (*Shelf Unit Subassembly*).

Before assembling the shelf unit drill countersunk shank holes in the end pieces for mounting screws. And I also added a cord access slot

centered in the shelf back. Now, assemble the ends and the back with butt joints and screws.

This assembly is sandwiched between three identical plywood shelf panels (M). Two of the panels form a thick upper shelf. These two layers and the shelf back keep the unit from sagging under the weight of a heavy television. A single panel underneath forms the lower shelf.

Here again, once the panels are cut to size, lay out and cut the cord slots (*Shelf Unit Subassembly*). Now, glue and screw one panel to the top and one on the bottom of the H-shaped assembly. Then, the last panel is added to the top with glue only.

SHELF UNIT SUBASSEMBLY

Finally, I added two shelf supports (N) to the underside of the shelf unit. This way the two shelf layers are the same thickness, adding symmetry to the unit when it's trimmed out. Because they won't be seen, the supports aren't full-sized panels.

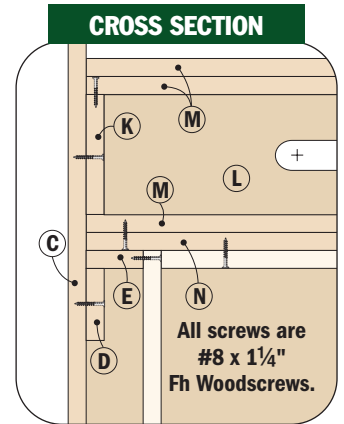
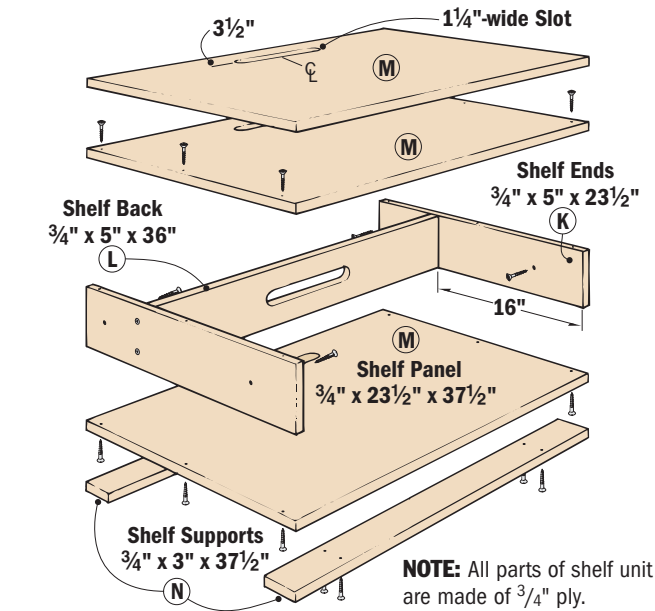
It's time to install the shelf unit. Check that it's flush with the front of the base cabinet, then mount it with screws through the pre-drilled shank holes and into the sides (*Cross Section*).

APPLY TRIM & MOLDINGS

At this point, the basic cabinet is complete, but it still needs something to "dress it up." That's where the trim and moldings come in. By applying these pieces around the top, bottom, and front of the cabinets, it turns what looks like a plain plywood box into an elegant piece of furniture.

TOP AND BASE TRIM. The first steps are to add the upper and lower trim strips (O, P, Q and R). All are made from $\frac{3}{4}$ "-thick oak and vary only in width.

Regardless of their width, the ends of the trim strips are mitered where they meet at the corners of the cabinet. To get these miter joints to fit tightly together, I used the technique shown in the box below. After the trim strips have been cut to fit, glue and screws are used to attach them to the top and bottom of the case (*Details a and d* at left).



This same procedure is used to install the baseboard (S), but with glue and nails instead. Mine is a stock molding with a profile along the top.

BEAD MOLDING. Once the top and bottom trim is complete, I added two wide pieces of bead molding (T). These are $3\frac{1}{4}$ "-wide pre-made moldings (*Detail c* at left).

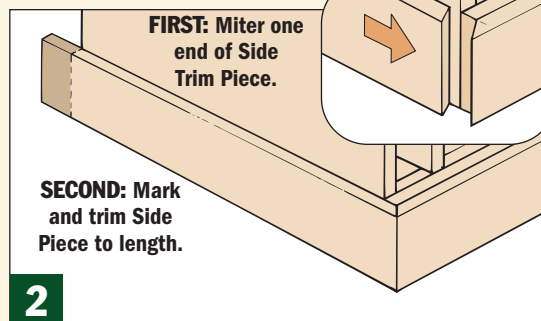
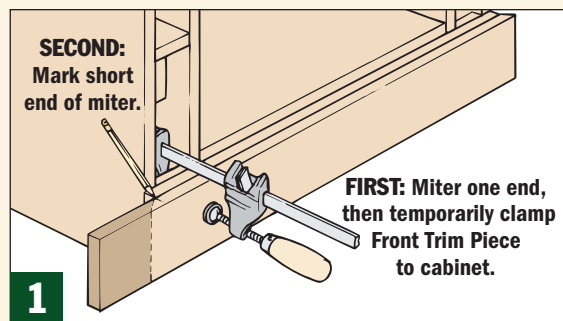
To keep the moldings from twisting, I glued a small plywood block to the back of the upper trim piece (*Detail b* at left). After cutting both strips of bead molding to fit between the upper and lower trim,

use glue and finish nails to attach them to the sides.

SHELF EDGING. One last piece of trim needs to be added before starting on the crown molding. To cover the exposed plies, the shelf unit has solid oak edging (U) added.

Rip the pieces to width and trim them to length. A few finish nails hold them in place until the glue sets up. If necessary, use a block plane and sanding block to trim the edging flush with the shelf. While you're at it, ease the sharp corners of the edging by sanding.

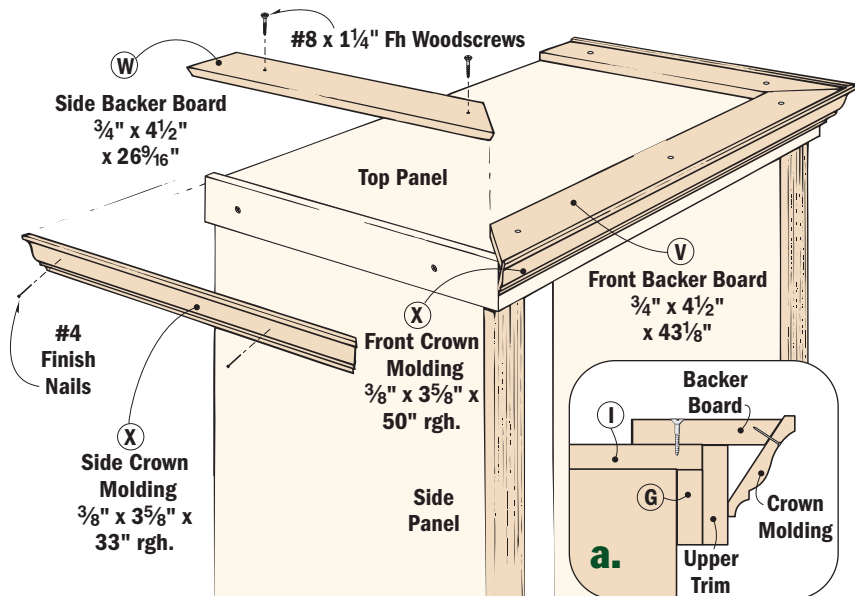
PERFECT-FITTING MITERS



To produce tight fitting miters, start by mitering one end of a front trim piece (*Fig. 1*). After aligning the mitered end at one corner and clamping the strip in place, mark the location of the miter on the opposite end. Remove

the trim strip and miter the end, then attach it to the case. With the front piece cut to size, miter one end of a side piece. Slide it in place, mark the back end, and crosscut the trim piece to length (*Fig. 2*).

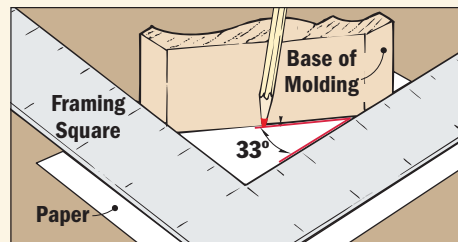
CROWN MOLDING VIEW



CROWN ANGLES

Once it's installed, crown molding projects out from a wall (or project) at an angle. But not all crown molding tilts out at the *same* angle.

To determine this angle for the molding on the Entertainment Center, set a short piece against a square. Then mark the "triangle" formed by the square and the molding. The angle between the *base* of the molding and the square equals the angle of projection (33°).



THE CROWNING TOUCH

When building any project, there's always a point when it's time to apply the crowning touch. That's especially appropriate for this project. To dress up the cabinet, I added crown molding to the front and sides, as shown in the *Crown Molding View* above.

The profile of this crown molding looks complex. But don't worry, you can purchase it right off-the-rack at most home centers. You'll find several different styles to choose from, but the profile doesn't matter as much as the width. (Mine was 3⁵/₈"-wide.)

Cutting and fitting crown molding around the outside corners of a cabinet can be a bit tricky. That's because it doesn't lie flat like other moldings. Instead it "leans" forward at an angle (*Detail a* above). Notice

that the lower edge of the molding rests against the upper trim. As for the upper edge, it requires some kind of support to attach the molding to.

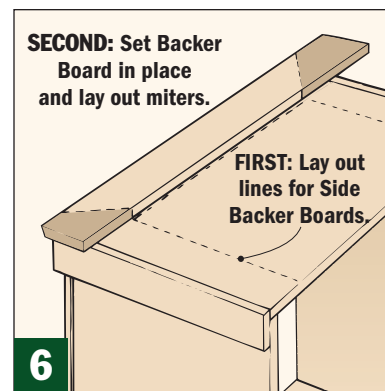
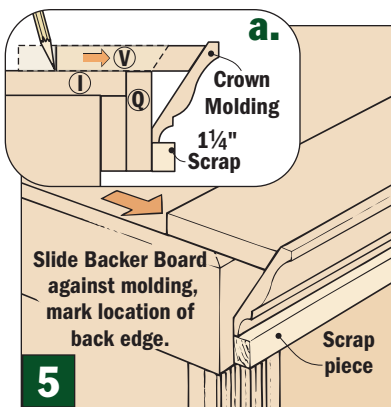
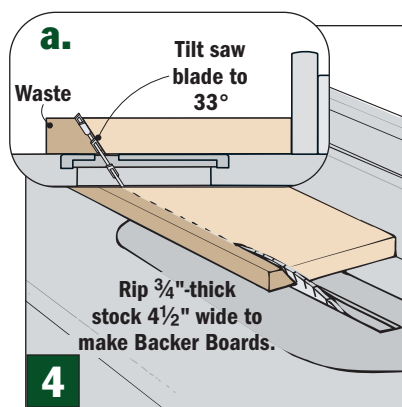
ADD BACKER BOARDS. That's the job of three backer boards (V and W) attached to the top of the cabinet. These are pieces of 3/4"-thick hardwood that overhang the front and sides. The overhanging edge of these pieces is beveled so the molding fits tightly against it.

So what's the correct bevel angle? It should match the angle of the crown molding once it's installed. An easy way to figure out the angle is shown in the box above. Once you determine the angle, go ahead and tilt the blade on your table saw and rip enough stock to width to make all of the backer boards (*Fig. 4* and *4a*).

Eventually these pieces will be mitered to length. But before determining their *final* length, you have to establish the amount of overhang. To do this, it's best to start with extra-long backer boards. Then use one of the boards and a piece of the crown molding to determine the overhang.

The idea is to hold the crown molding and a backer board in their "installed" position. To support the molding, I attached a scrap piece to the cabinet with carpet-tape (*Figs. 5* and *5a*). I allowed for a 1¹/₄" reveal. Then slide the backer board so it fits tightly against the molding, and mark the location of its *back* edge on the top panel.

After measuring the distance from the front edge of the cabinet to this line, lay out lines for the two



side backer boards that are set in the same amount (Fig. 6). These lines will make it easy to position all the backer boards, lay out the miter joints, and miter the pieces to final length. I used a similar process for cutting and fitting the miter joints as shown on page 37.

CUTTING THE CROWN MOLDING

After screwing the backer boards in place, it's time to cut the crown molding. This requires taking *two* different angles into account: the angle at which it tilts out (33°) and the 45° miter angle where the crown molding meets at the outside corners of the cabinet. In other words, the ends of the crown molding are cut at a *compound* angle.

Half the battle in fitting crown molding is in cutting these compound miters accurately. Normally, a compound miter is cut on a table saw by tilting both the blade and the miter gauge. This means you have to worry about two different angles. If either one is off, you won't get a tight-fitting joint.

To get around this problem, I leave the table saw blade set at 90° and tilt the crown molding instead. The trick is to hold the crown molding at the same angle it's installed on the cabinet.

AUXILIARY FENCE. To do this, I use an auxiliary fence that attaches to the miter gauge. (See sidebar above and photo in margin.) The front face of this fence is slanted to support the molding at the proper angle.

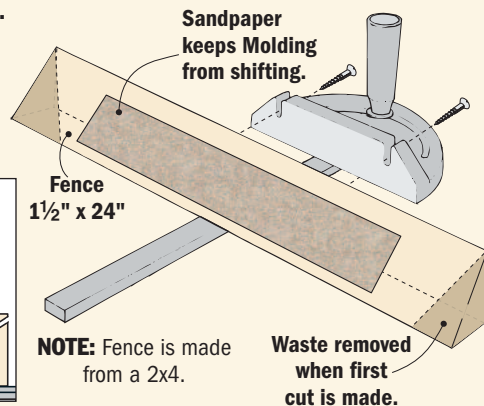
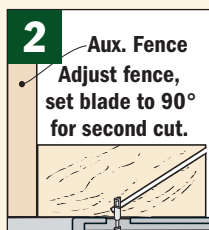
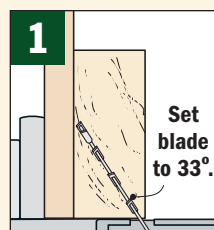
Using the fence is a two-step process. First, set the miter gauge in

SLANT-FRONT FENCE

When cutting crown molding on a table saw, attaching this slant-front fence to the miter gauge makes it easy to cut accurate compound miters. That's because the slanted face of the fence supports the molding at the same angle as it will be when installed (33° in my case).

The fence is just a scrap of 2x stock with an angled face that's bevel cut on the table saw. For safety, I used a two-pass method.

First, tilt the blade to 33° and make the initial cut (Fig. 1). Then reposition the blade to 90° and adjust the fence to make the second cut (Fig. 2).



the slot on the *left* side of the saw blade and tilt the head to 45° (Figs. 7 and 7a). Then place an extra-long piece of crown molding (the one for the front of the cabinet) against the fence. The thing to be aware of here is that in order to get the compound miters to fit together, the molding has to be *upside down*. Now trim one end of the molding.

Before cutting the second miter, you'll need to lay out the final length of the molding. Here again, I used the same process as before — holding the molding against the front of the cabinet and marking the opposite end.

At this point, it's just a matter of moving the miter gauge to the *right* side of the saw blade, tilting the head to the opposite 45° angle, and then trimming the opposite end of the

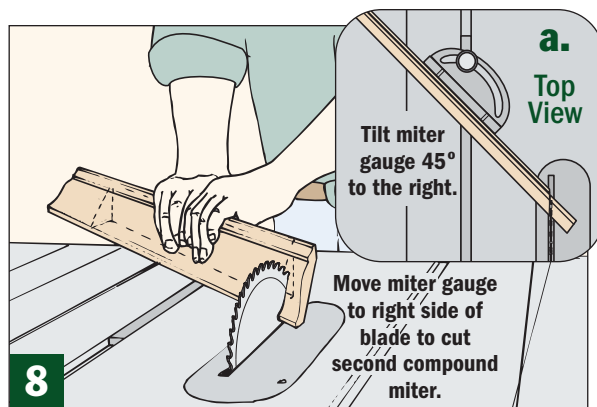
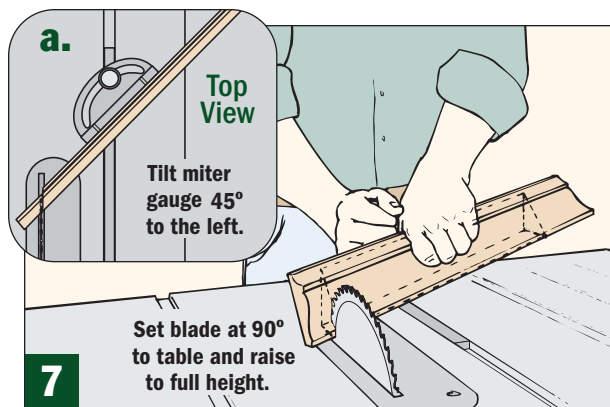
molding (Figs. 8 and 8a.) It's a good idea to cut it slightly long at first. This way, you can sneak up on the final length, checking the fit of the molding until it's just right.

Before cutting the side pieces of molding, temporarily clamp the front piece to the cabinet. This will make it easy to fit the side pieces against it. The setup is exactly the same here. Start with an extra-long side piece and cut the compound miter on one end. The opposite end is designed to fit flush with the back of the cabinet. So just fit the side piece in place, mark the back end, and then crosscut it to final length.

After repeating the process for the other side piece, it's time to add the final crowning touch — gluing and nailing the molding in place. 📦



With the crown molding resting against a beveled fence, it's easy to cut accurate compound miters.





3 QUICK WAYS TO Dress Up Doors



The interior doors of a home are certainly functional. Passage doors provide privacy, and closet doors hide all the stuff that's piled inside.

But let's face it. Quite often, the interior doors of a home are pretty drab. Take the plain-looking doors in the 'Before' photo for instance. Both the passage door and the bi-fold closet doors are your standard, hollow-core doors found in many homes.

Now check out the photo above. These same doors have been transformed into what look like expensive, custom-made doors.

Don't let their appearance fool you, though. All it takes is a few inexpensive materials to turn these plain-looking, hollow-core doors into something special.

HOLLOW-CORE. Actually, it's a bit misleading to call them "hollow-core" doors. They might seem hol-

low because they're incredibly lightweight. But inside, there's a honeycomb of corrugated cardboard. To create a strong, rigid door panel, this cardboard is sandwiched between two extremely thin "skins."

PICK A STYLE

What's inside these doors isn't nearly as interesting as the outside. To see what I mean, check out the photos on the [next page](#).

Country



Two large beadboard panels surrounded by off-the-rack corner moldings create an old-fashioned country look.

We've included three completely different — and distinct — styles of doors for you to choose from: *country*, *traditional* and *contemporary*. This way, you can pick a door that best matches the style of your home.

COUNTRY. If you take a close look at the country-style door, you'll see that it has a couple of large beadboard panels that are recessed into the door.

To accomplish this, the idea is to cut into the veneer skin of the door. This creates two openings that allow you to install the beadboard panels and then surround them with some off-the-rack corner molding.

Traditional



Tall, narrow panels with built-up moldings produce a more elaborate, traditional appearance.

Alright, I know. It takes some courage to cut into a perfectly good door. But it's actually a very simple technique. Our step-by-step instructions begin on [page 42](#).

TRADITIONAL. The same technique is used for the traditional-style door. Only here, the narrow, recessed panels and elaborate moldings produce a more elegant look.

But aren't these fancy moldings difficult to make? Actually, you don't have to *make* them at all. To produce the decorative profile, we combined three different types of moldings, all of which are readily available at most home centers.

Contemporary



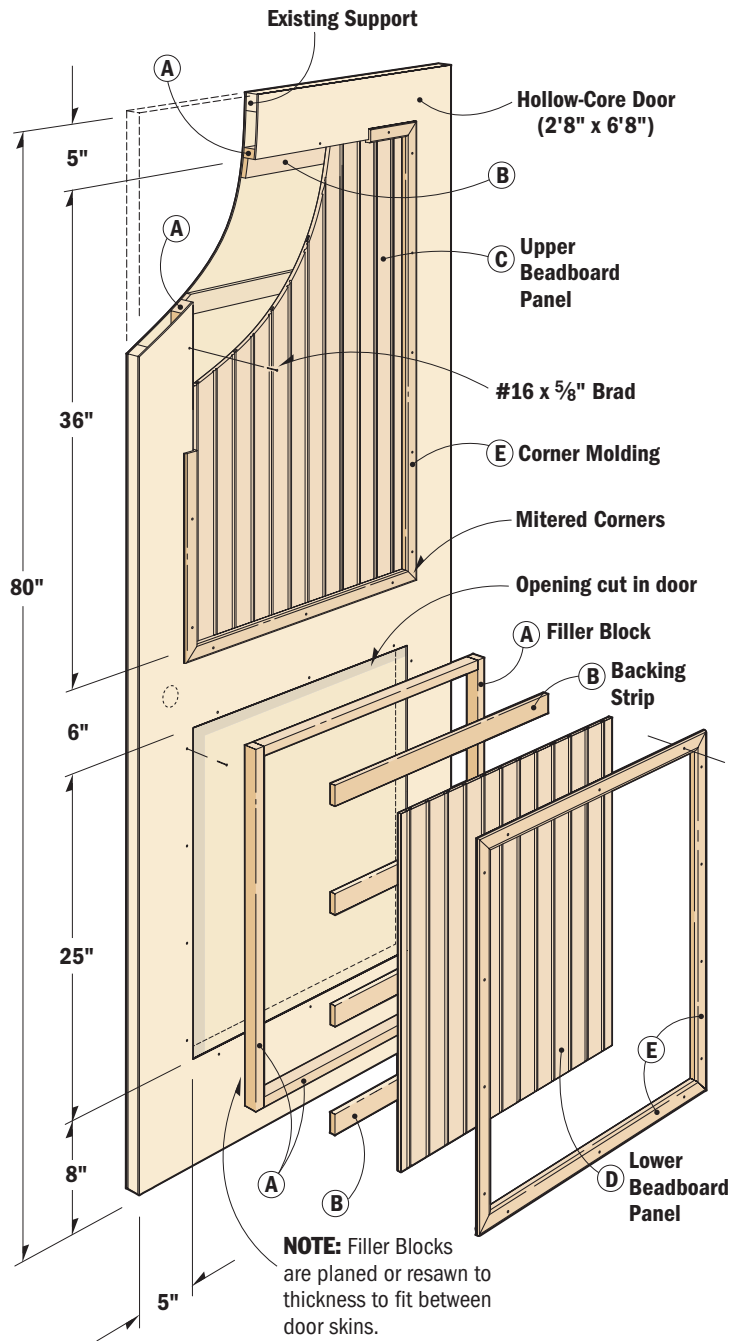
Applied panels wrapped with corner moldings with a natural finish provide a contemporary feel.

CONTEMPORARY. In the case of the contemporary-style door, the panels aren't recessed at all. Instead, $\frac{1}{4}$ " plywood panels are applied to the *surface* of the door and then "wrapped" with corner moldings.

We used oak plywood on this door to complement the oak veneer. But walnut or maple would provide an interesting contrast.

FINISH OR PAINT. To provide a natural look, we applied two coats of a wipe-on varnish to the contemporary door. As for the country and traditional-style doors, using two different colors of paint highlighted the recessed panels.

Recessed beadboard panels lend a country feel to this passage door.



To create a country look, this passage door combines two beadboard panels and off-the-shelf corner moldings. The openings for the bead panels are formed by removing part of the veneer skin on one side of the door. After installing wood strips, a beadboard panel is recessed into each opening and framed with moldings.

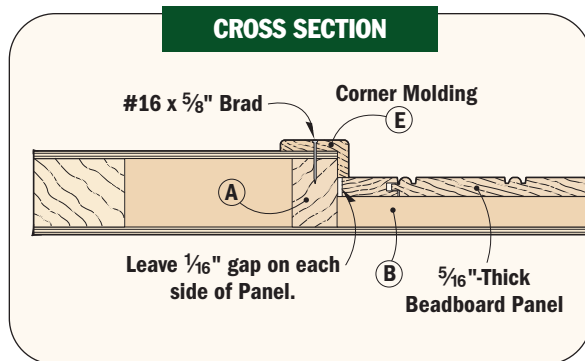
MAKING THE OPENINGS

The first step is to lay out the two openings for the beadboard panels. The size and location of the openings are shown at left. A combination square comes in handy for marking the layout lines.

Once you've completed the layout, you can turn your attention to making the openings for the beadboard panels. A jig saw will make quick work of this. And if you mount a reverse-cutting blade in the saw, it will significantly reduce chipout. (See photo on the [facing page](#).)

Even with a reverse-cutting blade, there's still another thing to take into consideration before you actually cut into the door — the distance covered by the stroke of the blade. If the stroke is too long, the blade will cut through the bottom skin of the door.

Although you can't change the stroke of the jig saw, you *can* shorten the blade. To do this, first set the base of the saw on the edge of the door (Fig. 1). With the blade extended as far down as it will go, mark it just above the bottom skin. Next remove the blade and score it at this mark with a file. Then secure it in a vise and cut it to length with a hacksaw.



MATERIALS LIST (one 2'8" x 6'8" door)

LUMBER

A (8) Filler Blocks	$3/4" \times 1 1/8"$ — 18 1/2 lin. ft.
B (9) Backing Strips	$1/2" \times 1 1/2"$ — 17 lin. ft.
C (1) Upper Beadboard Panel	$5/16" \times 22" \times 36"$
D (1) Lower Beadboard Panel	$5/16" \times 22" \times 25"$
E (8) Corner Moldings	$5/8" \times 1 1/8"$ — 19 lin. ft.

HARDWARE

(60) #16 x 5/8" Brads

Now you're ready to actually cut the openings. To provide a starting point, you'll need to drill a small ($\frac{1}{4}$ " hole in each corner (Fig. 2). Then insert the jig saw blade in the hole and cut along the layout lines.

Once you've cut the openings, carefully peel off the veneer skin, as shown in Figure 3. A stiff putty knife helps to work the skin loose. Underneath, you'll see a maze of cardboard strips placed on edge and glued to the bottom skin. You can probably pull these cardboard strips out by hand, as shown in Figure 4. If necessary, use a utility knife or the putty knife again to cut them off.

When working near the edges of the openings, push the cardboard farther into the door hollow. Then scrape off any dried glue on the inside of the skins and from the exposed lower skin. This will give you a smooth surface for attaching the filler blocks and backing strips that are added next.

It's a good idea to lay the door on a flat, solid surface before scraping. You can easily cut right through the veneer skin if it isn't supported.

FRAMING THE OPENINGS

One thing to be aware of is the skins will be quite fragile near the edges of the opening. That's because there's nothing supporting the skin along the cut edges. So to add rigidity, you'll need to install some filler blocks (A). The blocks are made of 2x that's thickened to fit between the door skins.

Shop Tip: To make it easy to position the filler blocks, I attached a screw in both ends so I could slide it in or out (Fig. 5). Once the blocks are glued and nailed in place, simply remove the screws.

There's just one more thing to do before adding the beadboard panels. To provide a mounting surface for the panels, you'll need to install a set of thin backing strips (B) in each opening. The strips are made from $\frac{3}{4}$ "-thick pine that's either planed or resawn to $\frac{1}{2}$ " thick. This way when the beadboard panels are added later, they'll be recessed into the opening.

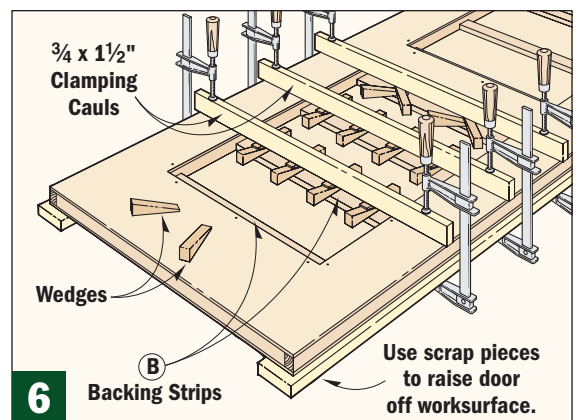
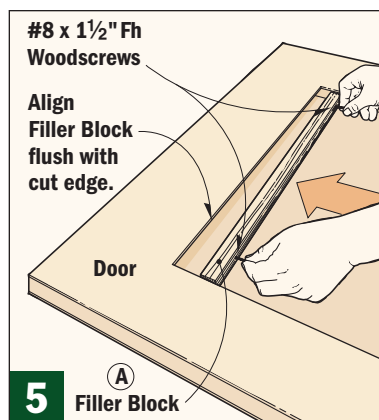
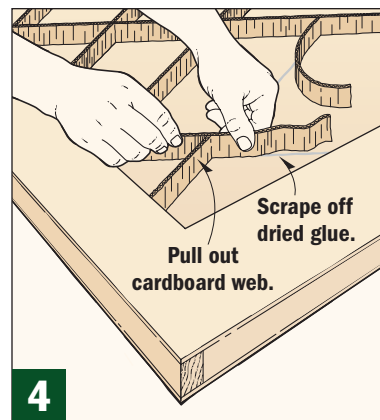
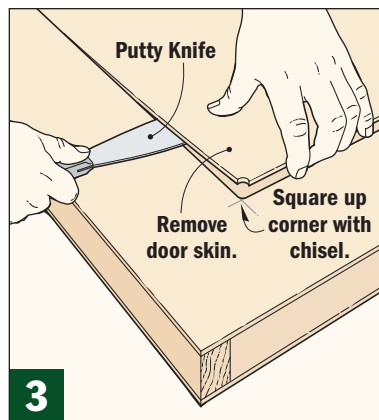
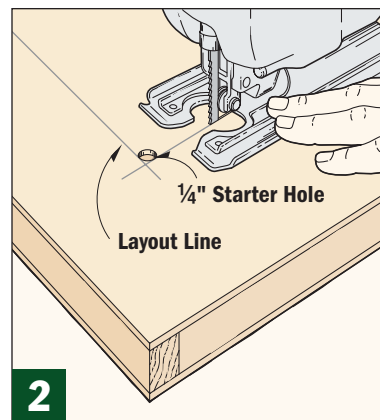
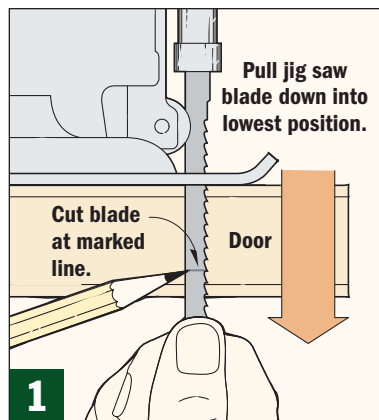
After thickening enough stock to make nine strips (five for the upper opening, four for the lower one), cut the backing strips to length to fit between the filler blocks.

At this point, all that's left is to glue the backing strips in place. The only problem is it's hard to get clamps to reach the middle of the door. A good way around this is to use a system of long cauls, as shown in Figure 6. Slipping wedges underneath the cauls will hold the strips tightly against the skin while the glue dries.

**STANDARD
BLADE**

**REVERSE-CUTTING
BLADE**

The teeth on a reverse-cutting jig saw blade point down (bottom), while a standard jig saw blade's teeth point up (top). As a result, a reverse-cutting blade produces less chipout.



ADDING BEADBOARD PANELS

To complete the country-style door, pine beadboard panels are fit into the recessed openings and then surrounded with corner molding.

The panels are made up of individual strips of Edge and Center Bead, as shown at left. (It's available at most home centers. See [page 52](#) for more information.) A single package includes six 3 1/4"-wide tongue-and-groove strips — enough for one passage door. Be sure to check for splintered pieces or checked ends. You may want to buy extra just in case.

Each of the strips has a bead on the "tongue" edge and also in the center. When making the beadboard panels (C, D), the goal is to end up with a bead that's the same distance from the edge of the opening on each side.

The best way I found to do this is to start by dry assembling enough strips of edge and center bead to make a panel that's wider than the opening. Then lay the oversized

panel across the opening so the bead near each edge is set in the same distance (*Fig. 7*).

Remember, you're working with a solid wood panel that will expand and contract with changes in humidity. To compensate for this movement, it's best to leave a 1/16" gap on each side of the panel. This will allow the panel to expand as the weather changes. After taking this gap into account, lay out a line near each edge showing how much waste to remove. Then remove the two strips that need to be trimmed and rip off the waste.

There's one small detail to consider before you reassemble the panels — priming and painting the beadboard strips (front only). That way you won't have to tape off the rest of the door later. Don't forget to paint the tongues on the strips. Otherwise, if a panel shrinks, the bare wood on the tongues will be exposed.

Once the paint is dry, it's time to reassemble the panel and glue it to the backing strips. Don't overdo the glue. The individual strips still need to be able to expand and contract. To allow for this movement, I put several spots of glue centered on the width of each edge and center bead strip — one spot for each backing strip.

filler block and the veneer skin, the molding creates a transition from the surface of the door to the beadboard panel.

To install the molding (E), start by measuring the distance from the panel to the top edge of the opening. Then trim one leg of the molding so it matches this depth (*Fig. 8a*).

Now you can rough cut the molding to length and cut the miters. There are quite a few miters, so to same time I used a power miter saw. If you take a look at [page 14](#), you'll find a simple way to support the fragile moldings on the miter saw table.

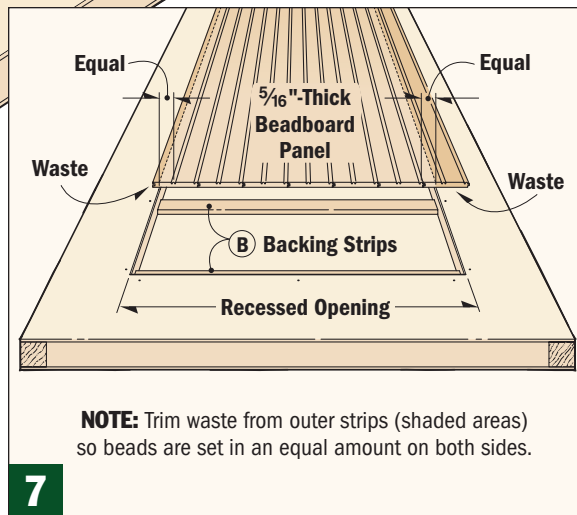
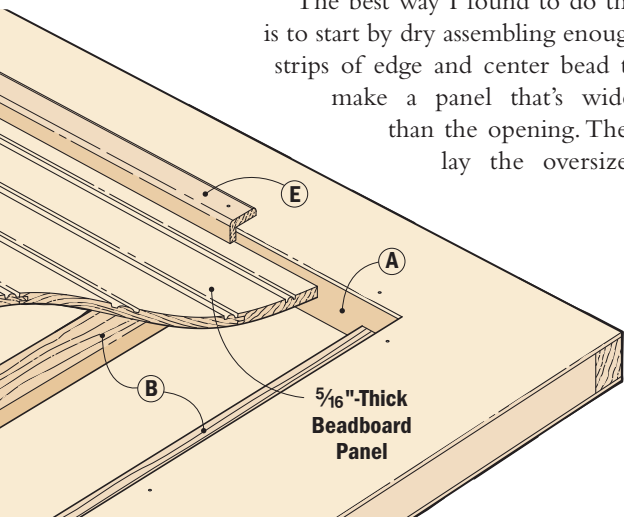
Once the molding is cut to size, it's time again to prime and paint. Then attach the molding to the door with small brads. One problem of working with fragile molding is that it often splits when nailed. To avoid this, try the tip shown at the bottom of the [facing page](#).

A COUNTRY CLOSET

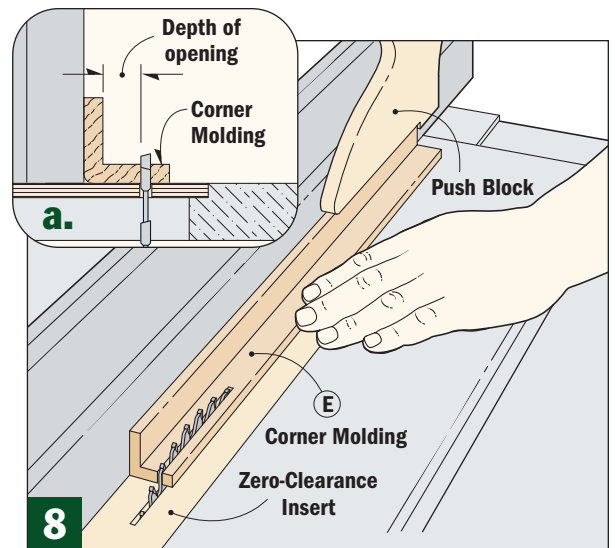
The same beaded panels and corner molding were used to create a country look for a set of bi-fold closet doors. These doors have four individual slabs that are hinged together. You can get all of the measurements needed to complete a set of bi-fold doors from the *Materials List* and the *Bi-Fold Door Assembly*.

Here again, the first step is to cut the openings in the door for the panels. As before, remove the cardboard

This Edge and Center Bead comes in 8 ft.-long pine strips that are 5/16" thick.



7



8

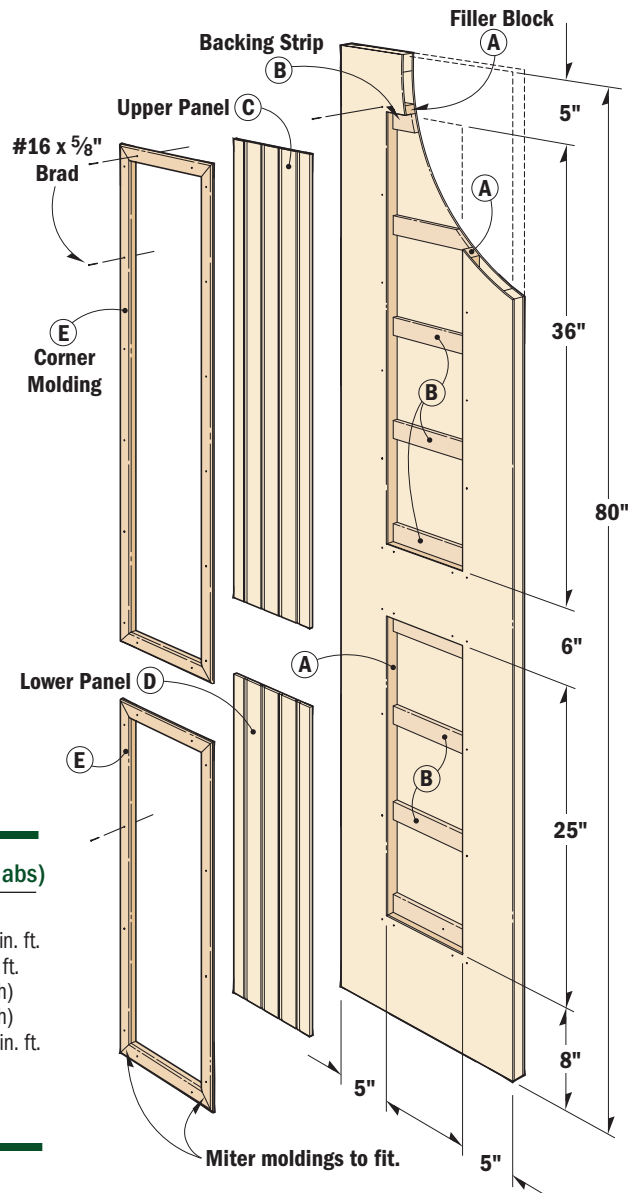
webbing from the center of the door and frame the openings with filler blocks (A). To finish preparing the openings for the panels, fit and glue a set of equally-spaced backing strips (B) in each opening.

The next step is to add the panels. The same technique for sizing and fitting the panels you used before applies. Start by dry assembling oversized panels, then lay them over the openings and mark where they need to be trimmed. Remember, the goal is to end up with a bead that's the same distance from each edge of the opening.

Now it's just a matter of disassembling the panels and trimming the waste from the two outer strips. Prime and paint the beadboard strips before fitting the panels back together. Finally, glue the panels into the recessed openings.

All that's left is to add the mitered moldings. These can be attached with brads just like on the passage door.

BI-FOLD DOOR ASSEMBLY



The set of bi-fold doors shown above is sized to fit a finished closet opening that's 72" wide and 81" tall.

MATERIALS LIST (4 bi-fold slabs)

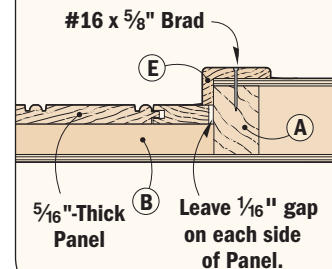
LUMBER

- A (32) Filler Blocks $\frac{3}{4}$ " x $1\frac{1}{8}$ " - 53 $\frac{1}{2}$ lin. ft.
- B (36) Backing Strips $1\frac{1}{2}$ " x $1\frac{1}{2}$ " - 24 lin. ft.
- C (4) Upper Panels $\frac{5}{16}$ " x 8" x 36" (each)
- D (4) Lower Panels $\frac{5}{16}$ " x 8" x 25" (each)
- E (32) Corner Moldings $1\frac{1}{8}$ " x $\frac{5}{8}$ " - 56 $\frac{1}{2}$ lin. ft.

HARDWARE

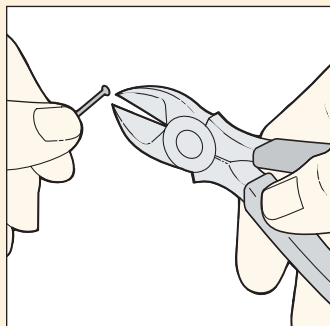
- (60) #16 x $\frac{5}{8}$ " Brads

CROSS SECTION

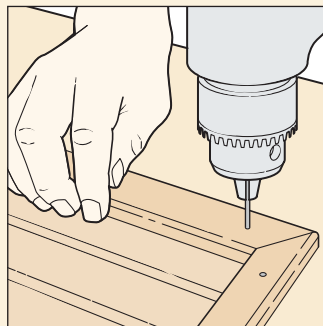


SIMPLE TRICK TO AVOID SPLITTING MOLDINGS

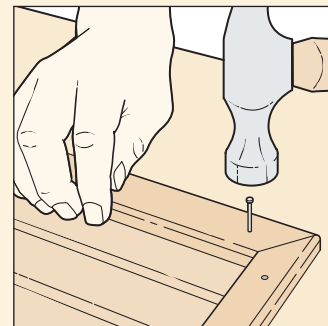
To prevent fragile moldings from splitting when you nail them in place, I use an old trick to drill pilot holes. The idea is to use one of the brads to drill the hole (see drawings). Besides keeping the molding from splitting, using a brad for a drill bit saves a lot of time rummaging through your toolbox looking for the right size bit.



To drill a pilot hole the exact size needed, cut the head from one of the brads you're using.



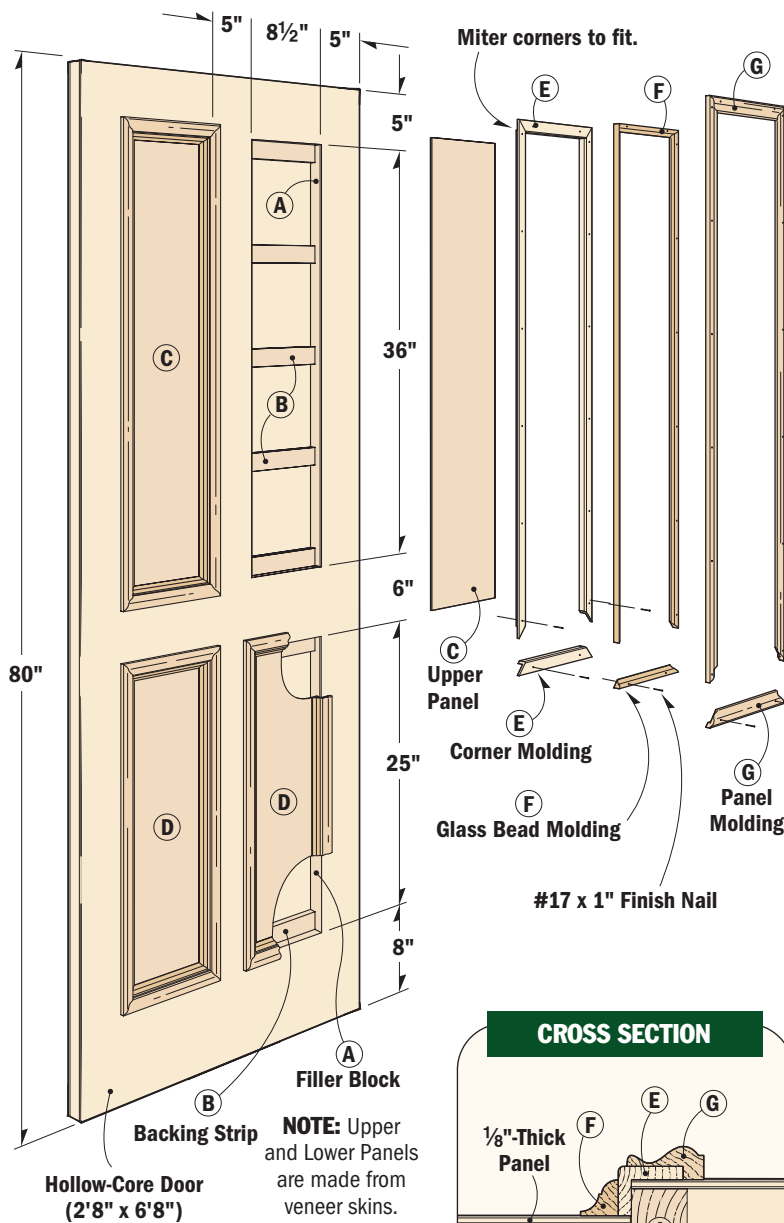
Then chuck the brad in a hand-held drill and use it like a bit to make a pilot hole.



After tapping a new brad into the pilot hole, fill the hole with paintable caulk.

Traditional

This traditional door features recessed panels and elegant, built-up moldings.



The idea behind this traditional-looking door is to use four tall, narrow panels and fit them into a framed, recessed opening. A three-part, built-up molding surrounding the opening gives the door some depth, which creates an elegant look.

CUTTING THE OPENINGS

One thing that's different about this door is that the panels are made from the veneer skins. Because of this, you'll want to be extra careful when cutting the openings. Here again, start by laying out the openings for the panels, drilling a starter hole in each corner, and cutting along the lines.

Once you've cut the openings, carefully peel off the veneer skin. I accidentally broke one of the panels when I was removing it. If this happens, don't panic. Simply make a new one from 1/8" plywood.

As before, the cardboard support inside the door has to be removed and the exposed surfaces of the skins scraped clean before attaching the filler blocks (A). This is especially important because you're reusing the skins for the recessed panels. Again, these panels need a mounting surface, so glue backing strips (B) into the openings.

ADDING BUILT-UP MOLDINGS

The moldings are what really give this door its traditional feel. As before, it's a good idea to drill pilot holes to attach the molding pieces (see page 45).

Once again, I started with a simple piece of corner molding (E) and ripped one "leg" so it fits tightly against the recessed panel (*Cross Section*). Next came a piece of glass bead (F) tucked tightly against the corner molding and the panel.

A piece of panel molding (G) that fits over the corner molding completes the three-part, built-up molding. It also provides a nice transition from the door skin to the recessed panel.

MATERIALS LIST (one 2'8" x 6'8" door)

LUMBER

A (16) Filler Blocks	$3/4" \times 1 1/8"$ – 27 lin. ft.
B (18) Backing Strips	$5/8" \times 1 1/2"$ – 13 lin. ft.
C (4) Upper Panels	$1/8" \times 8 1/4" \times 36"$ (each)
D (4) Lower Panels	$1/8" \times 8 1/4" \times 25"$ (each)
E (16) Corner Moldings	$1 1/16" \times 7/8"$ – 28 lin. ft.
F (16) Glass Bead Moldings	$1/2" \times 1 1/2"$ – 26 lin. ft.
G (16) Panel Moldings	$9/16" \times 1 1/8"$ – 21 lin. ft.

HARDWARE

(60) #17 x 1" Finish Nails

Contemporary

This contemporary-looking door was created by applying two 1/4" plywood panels directly to the face of the door, then wrapping them with corner molding.


APPLYING THE PLYWOOD PANELS

The trick to centering the panels on the width of the door — perfectly aligned with each other — is to cut and glue one at a time.

Start with the upper panel (A), as shown in the drawing at right. You can use a combination square set to

4 1/4" to mark the location of the panel. Then cut the panel to align with the layout lines.

Clamping two 4 1/4"-wide spacers around the panel will help with alignment (Fig. 1). To hold the panel tight against the door during glue-up, use some long cauls clamped on top of a large pad (Fig. 2). The lower panel (B) can be applied the same way.

Once the panels are in place, the only thing left is to attach the corner molding (C), as shown in the Cross Section below. 

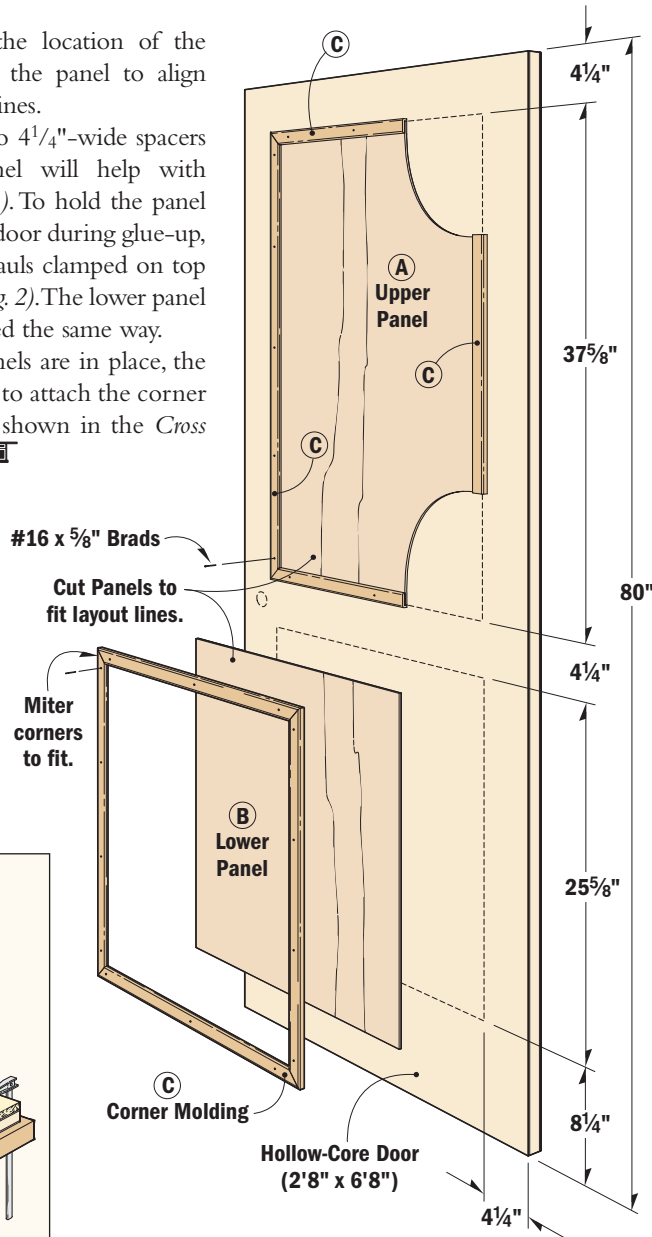
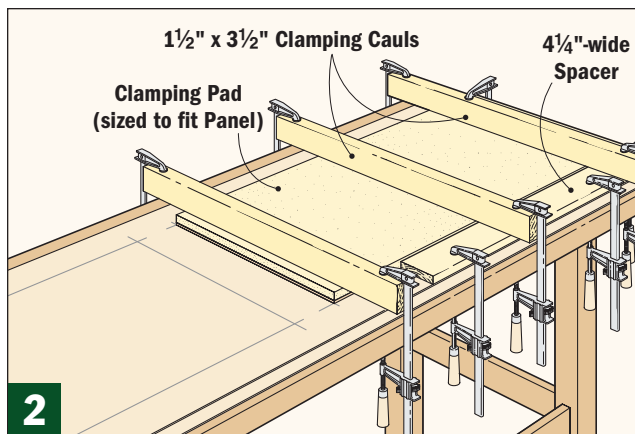
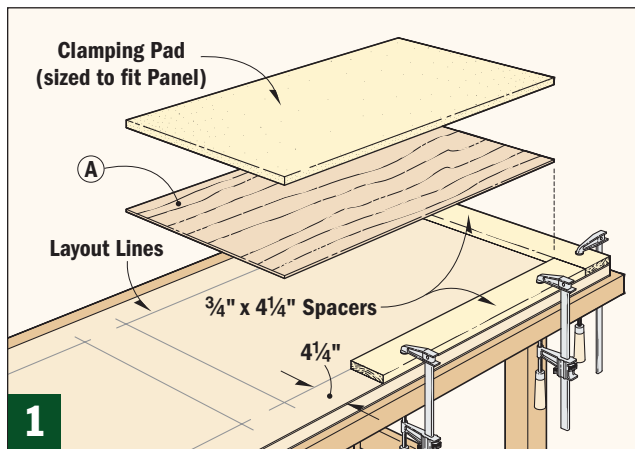
MATERIALS LIST

LUMBER

- A (1) Upper Panel 1/4" x 23 5/8" x 37 5/8"
- B (1) Lower Panel 1/4" x 23 5/8" x 25 5/8"
- C (8) Corner Moldings 7/16" x 1 1/8" — 17 lin. ft.

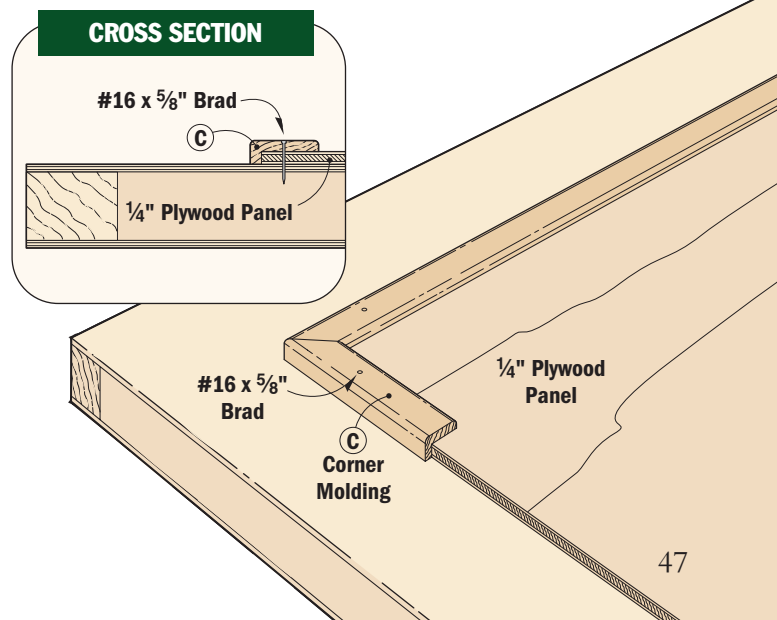
HARDWARE

- (32) #16 x 5/8" Brads



Applied panels, corner moldings, and a natural finish give this door contemporary character.

CROSS SECTION



New Products & Tools



Here at *Workbench*, we have lots of opportunities to try out all sorts of new products and tools. Some of them make woodworking and home improvement projects easier, quicker, or safer. Others are just handy to have around the house. To help you make informed decisions when buying new products, all of these items have been carefully selected and approved by the *Workbench* staff.

This Skinny Blade is no Weaking



This thin-kerf saw blade is specifically designed for cordless circular saws to provide more cuts per battery charge.

■ There's no need to worry about cordless saws "running out of gas" these days. With higher-voltage batteries and faster chargers, they have power to spare. On top of that, new saw blades designed specifically for cordless tools give them even longer run times.

This Xtend blade manufactured by Vermont American is a good example. It's a general-purpose, carbide-tipped blade. More importantly, it cuts an extremely *thin* saw kerf (.064). This means there's less resistance as the blade cuts through the wood, so you get more cuts per charge.

At least that's the theory. To check it out, I bought an 18-tooth Xtend blade and



mounted it in a cordless saw with a "fresh" battery. Then I made a series of full-depth cuts in a piece of treated 2x stock. Even with the thin blade, there seemed to be little, if any, deflection. Better yet, over 150 cuts later, the saw was still running strong. When you combine that with its low price (\$7.99), you've definitely got a blade that's a "cut" above.

Source: Available at most home centers

Lots of Clamping Power at a Low Price



■ To make a tricky cut safely and accurately, I often build a jig. That's why I appreciate toggle-style, hold-down clamps. They exert a *preset* and *consistent* pressure on a workpiece. Plus, I can operate them with one hand.

The metal versions of these clamps have been around for years. But they're quite expensive — as much as \$17 for a 6 $\frac{1}{2}$ " x 4" clamp. This new hold-down clamp manufactured by DeStaco solves that problem. Made of a durable, nylon composite material, it costs about half that of a similar metal version (\$8.75 for a 5 $\frac{5}{8}$ " x 4 $\frac{3}{4}$ " clamp). Yet it does a great job of holding a workpiece securely in place.

Source: McFeely's
(800) 443-7937 or on-line at:
www.McFeelys.com

Drill Press Hold-Down Device



■ Let's face it, clamping a board to the table on a drill press can be a pain. The cast "ribs" underneath the table always seem to get in the way. And if I'm drilling a hole in a small workpiece, my clamps often don't have enough "reach" to be of use.

So when I heard about a new hold-down device for a drill press for only \$90, I decided to give it a try. Manufactured by Drill Sargent, the hold-down can be quickly attached to the side of both floor-model and benchtop drill presses.

Basically, the hold-down is a pressure cylinder connected to a large "foot." As the quill is lowered, the foot contacts the

workpiece just before the drill bit and holds it securely in place.

The amount of pressure applied by the foot can be adjusted from 30 lbs. up to 120 lbs. But even at the lowest pressure setting and using large Forstner bits, I could still hog out material without the slightest movement of the board.

One thing I was concerned about was whether the foot would mar the workpiece. But the rounded edges and flat metal base didn't leave any marks at all.

If there's one limitation to the hold down, it's that the size of the opening in the foot prevents you from drilling holes larger than 2". But I seldom use bits that large anyway.

Source: Woodcraft Supply stores (800) 225-1153, www.Woodcraft.com

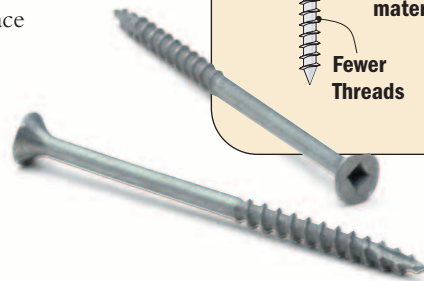
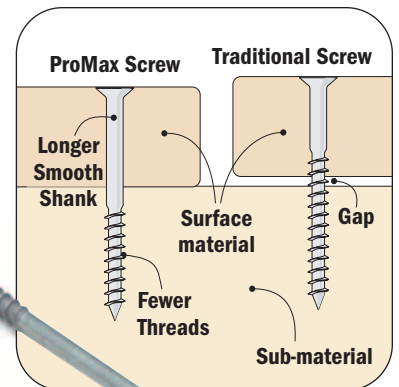


With this hold-down device attached to your drill press, the workpiece won't budge — even when drilling large holes.

A Different Thread Design

■ Sometimes the best innovations are the simplest. Take these new screws made by ProMax for instance, called Optimized Thread Length Screws. That's really just a fancy name for saying the screws have fewer threads and a longer, smooth shank compared to conventional screws. So when attaching two materials, you end up with all of the threads biting into the sub-material rather than part of them still gripping the surface material, as shown at right. This draws the pieces tightly together, so you don't have to worry about gaps. The smooth shaft also eliminates the need for a shank hole.

Source: McFeely's (800) 443-7934, www.Mcfeelys.com
Suggest Retail Price: \$7.68 (box of 100 #8 x 3")



Removing Stripped-Out Screws



■ Nothing is more frustrating — and often very time-consuming — than trying to remove a screw with a stripped-out head. Fortunately, all you need is a reversible drill and one of the new screw removers shown below. It's part of a three-piece set from Craftsman.



Unlike many other screw extractors, these removers don't require drilling a hole in the damaged screw. Instead, each remover has two hardened cutting edges that "bite" into the screw head. Then the remover is backed out — taking the screw with it.

All in all, these screw removers work great. They grab hold of damaged screw heads like a magnet and yank out the screw. At \$19.95 for a 3-piece set, they've earned a place in my toolbox.

Source: Sears stores or www.Sears.com

Ratcheting Combo Wrenches



■ How did I ever get along without one? That's the question I asked the first time I used these ratcheting combination wrenches made by Crescent.

A ratcheting mechanism installed in the box end of the wrench makes it great for working in tight quarters. In fact, it only takes a short "swing" to tighten or loosen a bolt (5° to be exact). To reverse the ratcheting mechanism, just click a button on the head of the wrench.

Another thing I like about using these wrenches is they're easy to fit onto the head of a bolt. That's because the ratcheting ring has 12 separate facets (instead of 6 like most box end wrenches). This makes it a snap to "find" the bolt head when working where visibility is limited.

One final note. You won't have to worry about busting your knuckles with these wrenches. The box end is offset at an angle, so there's plenty of clearance.

These wrenches are available in sets of four and seven in both SAE and Metric sizes.

Sources: Hardware stores and auto supply stores

Suggested Retail Price: \$45.96 (set of 4); \$87.87 (set of 7)



Sources & Resources

Get a Handle on Interior Doors – page 40

In the article beginning on page 40, we show three different ways to “dress up” interior doors. Depending on the style of door, you may want to change the existing door knobs. Most home centers and hardware stores will have a large selection of door knobs and levers available to match your particular door style and other room furnishings. Here’s a list of companies that manufacture the knobs and levers we used. We’ve also included a couple of additional sources for door hardware.

Kwikset	800-327-5625
www.Kwikset.com	
Cameron Ashley Building Products	800-749-4067
(maker of Guardian Door Knobs)	
www.cabp.com	
Schlage Lock Company	800-847-1864
www.SchlageLock.com	
Restoration Hardware	800-762-1005
www.RestorationHardware.com	



Entertainment Center – page 32

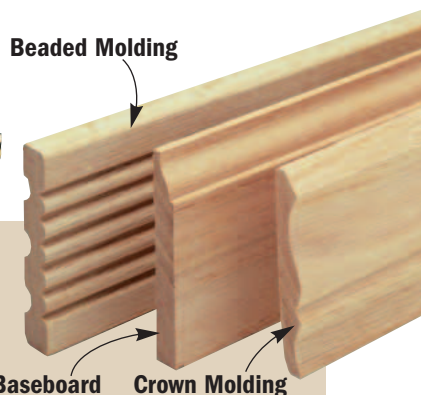
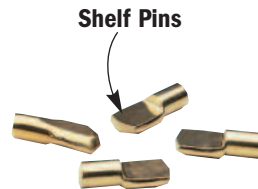
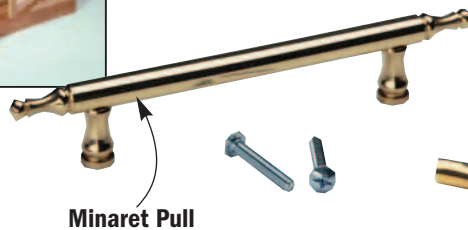
Nearly everything you’ll need to build the *Entertainment Center* on page 32 can be found at your local home center. Here are the specifics on the products and materials we used along with a few other sources to help you find just what you want.

For starters, we purchased a Mill’s Pride base cabinet. The cabinet comes with drawers and steel, side-profile drawer glides and hardware, plus European-style hinges for the doors. Then we chose a “Door Pack” that included two doors and drawer fronts to create the look we were after.

Base cabinet — SKU# 266254 (Home Depot)

Door Pack — SKU# 276760 (Home Depot)

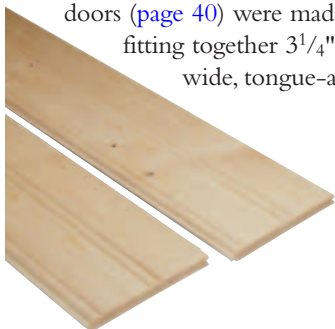
We used brass drawer pulls with minaret ends from Liberty Hardware (also available at Home Depot.) We chose stock moldings to trim the unit. The 1/4" spoon-style shelf pins we used can be found at Rockler Woodworking & Hardware.



Home Depot	770-433-8211
www.HomeDepot.com	
Rockler Woodworking & Hardware	800-279-4441
www.Rockler.com	

Making Beaded Panels – page 40

The beaded panels we used to create country-style passage and closet doors (page 40) were made by fitting together 3¼"-wide, tongue-and-



groove wood strips called edge-and-center bead. We used a knotty pine, solid wood planking (Pro's Choice) manufactured by PGM Products. It was purchased at Home Depot and came in packages of six 8-ft.-long strips.

For a bit more money, you can get premium poplar or red oak beaded paneling manufactured by Babcock Lumber Company.

PGM Products800-752-1478

www.PGMProducts.com

Babcock Lumber Co.888-239-0658

www.BabcockLumber.com

Wood Flooring – page 22

There are several manufacturers that offer pre-finished hardwood floors and related products.

For the wood flooring article on page 22, we used Premium Grade, Mirage ¾" tongue-and-groove red oak pre-finished floor in an auburn stain and a satin polyurethane finish.

Mirage is made by Boa-Franc Inc. of Canada and is distributed in the Midwest by Lockwood Flooring. To locate other distributors, check your local phone book or Boa-Franc's web site.



Boa-Franc, Inc.800-463-1303

www.Boa-Franc.com

Lockwood Flooring800-325-9608

National Wood Flooring Association800-422-4556

www.WoodFloors.org

Bruce Floors800-527-5905

www.Bruce.com

Robbin's Floors800-733-3309

www.RobbinsFlooring.com

Nat'l. Oak Flooring Manuf. Assoc.901-526-5016

www.nofa.com

Feedback and Follow-Up

CHECK YOUR MATH

In the *May/June issue* of *Workbench*, reader Tom Granger asked us to help end his confusion about calculating board feet (*Questions & Answers*, page 7).

As many readers have since pointed out, our explanation may have made things worse for Tom.

Our answer instructed readers to round up *all* fractional measurements to the next whole number. So, in the example we used, the board feet of a piece of material that measured 1¼" × 3½" × 6 ft. was calculated this way:

$$2" \times 4" \times 72" = 576"$$

$$576" \div 144" = 4 \text{ bd. ft.}$$

(Notice that 6 ft. was converted to 72".)

It is correct to round width and length up to the next whole number. But the mistake we made was in also rounding up the *thickness* dimension. The correct equation is:

$$1.25" \times 4" \times 72" = 360"$$

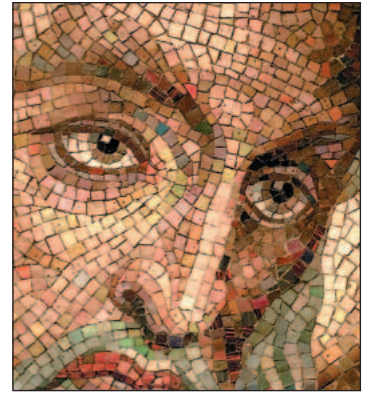
$$360" \div 144" = 2.5 \text{ bd. ft.}$$

SORRY, WRONG NUMBER

On page 41 of the *May/June issue*, we listed a phone number to contact Trex Company — manufacturer of Trex wood/plastic composite decking. Actually, we only listed part of the number. Here's the whole thing: (800) 289-8739

You can also learn more about Trex Company's products online at: www.Trex.com

Mosaic Magic



The Saint Louis Cathedral glitters in gold and glass.

An architectural hybrid of Romanesque and Byzantine styles, the Cathedral Basilica of Saint Louis is more than a place of worship. It's also a work of art.

Beautiful mosaics like the ones you see here adorn the soaring domes and arches throughout the cathedral. These artistic compositions are made up of more than 41 million pieces of glass in nearly 8,000 shades of color. The typical Byzantine mosaic also features a striking gold-leaf background.

It took 20 international artists more than 75 years to create and install the 83,000 square feet of mosaics — the world's largest collection. Together, the mosaics tell the complete story of Judeo-Christian history.

To see more mosaic images of the cathedral, visit WorkbenchMagazine.com. For tour information, call (314) 533-0544.