WORKBENCH®

THE ORIGINAL WOODWORKING AND HOME IMPROVEMENT MAGAZINE

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DEPARTMENTS

EDITOR'S NOTES

A couple months ago our four editors told me they had to see me about something "important." (At times like these, I usually consider hiding out in the shop and hoping it blows over.)

Apparently they'd been "surfing the Web," and couldn't believe how much home improvement and woodworking stuff was out there. They seemed pretty excited about sharing this information with our readers.

A NEW DEPARTMENT

Before long they had me hooked too. So after kicking it around, we decided to start a brand new department, "*Workbench* Interactive" (see page 10).

We've found hundreds of Web sites and online forums dedicated to helping do-it-yourselfers and woodworkers. And most of this information is completely free. The question is, how do you sort it all out?

That's where we'd like to help. We'll do the legwork of finding the Web sites and software that offer useful tips, help you find supplies, and make building projects easier.

Okay, this sounds like a good idea, but what if you don't have a computer or access to the Web? If that's the case, we'll pass along the best information we've found on the Web in this new department.

TOOL REVIEWS

Since I'm talking about new things, let me tell you about something new that's been added to our tool reviews. We've asked several of the guys who also work in our shop to test the tools and offer their "Points of View."

That got me thinking. Why not ask the readers about their own experiences with these tools and whether they agree with our results? And I'm sure the manufacturers of the tools will have *plenty* of opinions as well.

So I decided to open up the discussion. On page 50 you'll find out how to get involved. I look forward to hearing from you soon.

Doug

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Woodworker's Central Web Site Invites Visitors to Join In

Hot Site

www.woodworking.org

Woodworker's Central has everything you'd expect from a good woodworking Internet Web site — a ton of useful information, plenty of tool reviews, and lively discussion forums. But what really sets this site apart are several unique, interactive elements.

Features like the *Woodworker's Gazette* (an online magazine written by woodworkers) and the Tool Survey (a database of tool reviews) are a couple ways that this site is truly interactive. Not only can you search these areas for the information you want, but you can submit your own tool review or article for others to read.

The guys responsible for this site are Jim Mattson and Chuck Ring — lifelong woodworkers who live on opposite sides of the country. The two crossed paths on the Internet and teamed up to create a site with good information and no advertising. They do sell memberships to help offset the cost of the site, but mostly pay for it out of their own pockets.
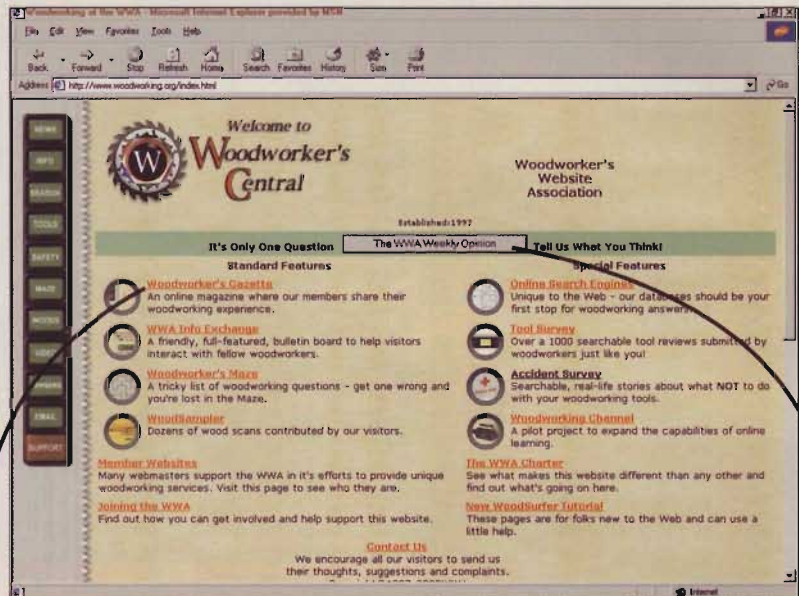
Tip from the Woodworker's Gazette

Add a 1/4" of mineral spirits to a polyurethane glue container before capping it for storage. The mineral spirits will sit on top of the glue and block the ambient moisture that causes it to cure in the bottle. Dump the mineral spirits before using the glue again.

Weekly Opinion sample question

Is it worth sharpening steel blades or should you just buy carbide?

No opinion — 5%
Steel is a better value — 7%
Forget steel go carbide — 88%
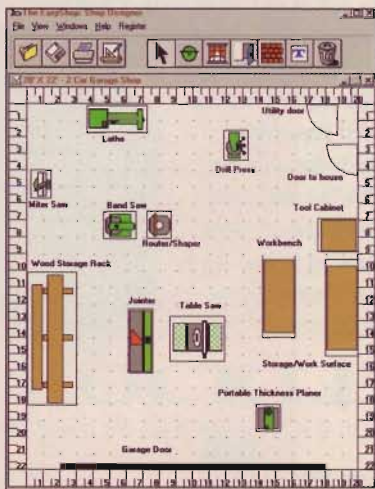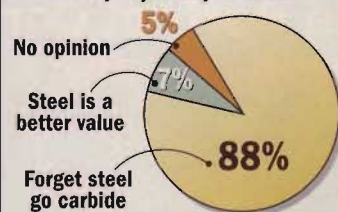
Shop Designer Makes Moving Tools Easy

Software Review

If you're thinking of building a new shop or reconfiguring the old one, *Shop Designer* can help customize an area to fit your needs.

This downloadable software lets you lay out your shop area and then drag and drop tools until you find the best configuration.

I tried this program and it took me less time to figure out than it would have taken me to move one stationary tool across the shop floor.

I took points away from the program for two reasons: First, it doesn't let you angle tools in the shop — which is a great way to save space. Second, the price is a bit high. Just the same, this is still better than throwing out your back moving real tools around in the shop.

Title: *Shop Designer*
Cost: $23.45
Developer: Information Architects
Web site: www.infoarchitects.com
Rating: ⚙ ⚙ ⚙ of 5

Hand Tools vs. Power Tools

There's a new discussion forum at www.WorkbenchMagazine.com called *Workbench* Interactive. In this forum, we ask the questions and visitors give their opinions. The best responses will be printed here. You can participate by sending us a question you'd like to have posted in the forum. If we use it, we'll send you a free *Workbench* cap. Submit questions to:

Workbench Interactive Forum
2200 Grand Avenue
Des Moines, IA 50312
or, editor@workbenchmag.com

WHEN IS A HAND TOOL A BETTER CHOICE THAN A POWER TOOL?

A hand tool is better than a power tool when you want to get the feel, texture and workability of your stock. I sometimes use hand tools when starting a project to see how the wood cuts, planes or works before going hard at it.

— *tcat*

When a small job doesn't warrant the setup time.

— *Dave Arbuckle*

1. When you need the gentle touch and feel that is absent from power tools.
2. When it's late at night and the noise will drive your wife crazy.
3. When the power is off and you've just got to finish the project that you are working on.
4. When you really want to pour your heart and soul into a masterpiece that you've created.

— *Jim Tincher*

I have found that hand tools are the best choice when I want to make mistakes at a slower rate of speed.

— *Wood Butcher*

I like to give each project I build my personal touch. If there is carving on the piece, that will be my touch. Sometimes I will accomplish it through hand sawing, or chiseling. Anything to ensure I have done some work without a power tool.

— *bernie*

I use hand tools when the process is more important than the product. There is something wonderful about the sound of a sharp plane iron spinning shavings off of a piece of wood that brings peace to the soul.

— *Mike Caldwell*

With practice I have found that using hand tools will save a lot of setup time and do the job just as well. Until you have devoted the time to practice using your hand tools you have not fully experienced woodworking satisfaction.

— *es4778*

You've Got E-Tips

Tips are like tools — you can't have too many. Sign up and we'll send you a free tip *every* Friday in your e-mail. (And don't worry, we won't sell your name or address to other companies.)

FREE TIPS BY E-MAIL

To sign up, go to www.WorkbenchMagazine.com and look for the free tips icon.

Undeniable Construction Truths

Here's some advice from a Web site devoted to improving the relationship between homeowners and contractors. Learn more at: www.smartconstruction.com

1. Architects, engineers, and contractors will all make mistakes. So will you. Work together to overcome them.
2. Not all contractors are dishonest — but some are.
3. Not all homeowners are dishonest — but some are.
4. There is no free lunch in construction — don't ask contractors to do more than they have contracted for.
5. Construction will never go like clockwork.
6. Never lie to your contractor.
7. You have the right to expect the contractor to staff your job with competent personnel.
8. A small down payment is reasonable — beware the contractor that needs money up front to buy materials.
9. Make all your choices before construction begins, or don't be surprised when your contractor makes them for you.
10. Visit your contractor's place of business. He will pursue your job in the same way he keeps his office.

Questions & Answers

Repairing Mitered Siding Corners

OPTION 1

First: Clean dirt and debris from gap.

Second: Cover gap with oil-base primer.

Third: Overfill gap with caulk.

OPTION 2

Fill larger gaps with exterior wood putty.

Force putty in using a putty knife.

Sand putty flush after it cures.

OPTION 3

Force top of cap under siding course above.

Prime gaps to protect wood.

Install lower caps first and work upward.

OPTION 4

Prime edges to protect wood.

Caulk siding edges before installing corner boards.

Cut through siding down to sheathing layer.

Overlap corner boards.

Q *I'm getting ready to repaint my 42-year-old house and I need some advice. It has cedar siding that's mitered at the corners, and some of the miters are opening up. How can I fix them before I paint?*

Robert Reinholdt
Ashland, OR

A Like all wood, house siding expands and contracts as humidity changes. Paint helps minimize the movement, so keeping a good coat on everything is a must.

But anywhere there are joints or breaks in the siding, the paint will eventually crack. This lets moisture in that can warp, expand, or twist the boards. This is probably the cause of your problems. How you fix these areas depends on how far the corners have separated.

Option 1: If the separations are minor, simply work exterior oil-base primer into the joint, then fill the joint with a paintable acrylic latex caulk. Just overfill the joint with caulk and cut it flush with the siding after the caulk cures.

Option 2: When the joints have opened farther, you can't rely on caulk to fill the gap. In that case, use exterior-grade wood putty (try Minwax or Durham's Rock Hard brands). Again, overfill and sand the putty flush once it's dry.

Option 3: If a lot of the joints are open, filling them could be more work than you want. If so, you can cover all the corners with aluminum corner covers. They'll be noticeable up close, but not from a distance.

Option 4: As last resort in a severe case you could cut away all of the mitered corners by tacking up a straight-edge then cutting through the siding with a circular saw. Next, go back and install vertical corner boards. Of all these options, though, this would change your home's appearance the most.

A Quick Cover-Up for a Paneled Room

Q *I want to change the appearance of a paneled room in my house, and I'm considering putting up wallpaper. Can I paper over the paneling or will I have to remove it?*

Jeffrey Anderson
via the Internet

A You can wallpaper over the paneling, but first you need to fill the grooves or they'll show through. Traditionally, this meant filling the grooves with joint compound, then sanding and priming the wall. That's messy work.

A clean and easy way is to cover the paneling with a heavy wallpaper called lining paper. It's sold in rolls like regular wallpaper, but lining paper is thicker. Inside the paper are synthetic fibers running lengthwise. When you apply wallpaper paste (sorry, it's not pre-pasted), some of
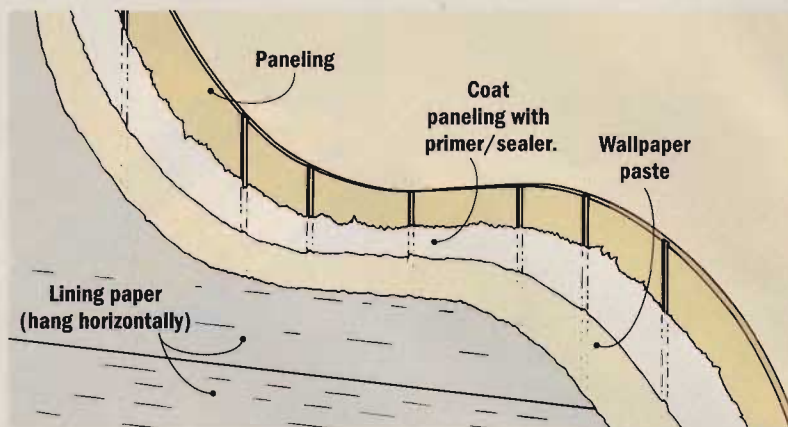
the moisture soaks in, causing the fibers to shrink and shorten. This pulls the lining paper taut, so it bridges the grooves in the paneling. Wallpaper stores in my area sell a 56-sq. ft. double roll for around $10.

To use the lining paper, start by sanding the paneling or applying a deglossing solution to give the sur-

face some "bite." Then apply a primer/sealer. Next, paste and apply the lining paper according to the instructions — it usually goes on horizontally. Follow that with a coat of primer over the lining paper. Then hang the wallpaper of your choice. Or, if you prefer, you can paint the lining paper.

Getting the Most From an Insulation System

Insulation R-value	= 15.0
Rigid foam R-value	= 3.75
House wrap R-value	= 1.0
Total wall R-value	= 19.75
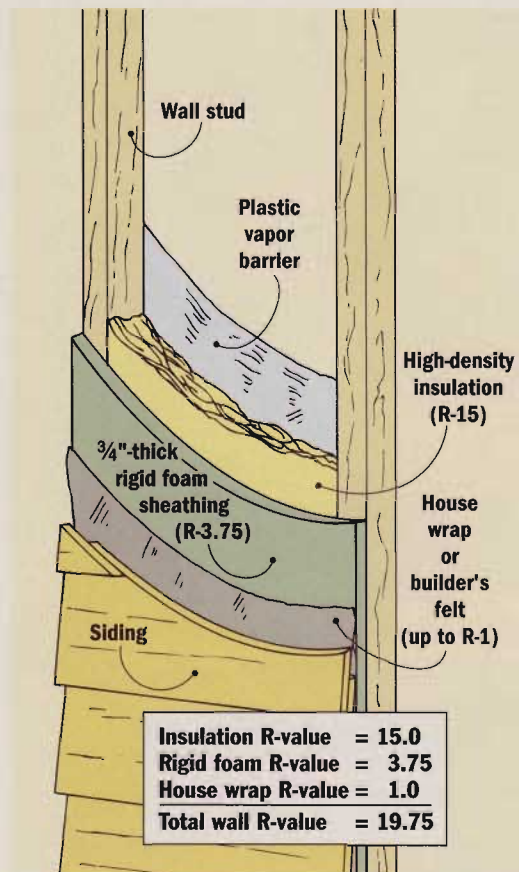
Q *In "Insulation that Works" in your September/October 1999 issue you talked about high-density insulation rated at R-19. I'm having no luck finding it, do you know where it's available?*

Thomas Kaiser
Detroit, MI

A Several readers have run into problems locating the high-density insulation, and unfortunately it's because we made an error. There are high-density fiberglass batts available, but the highest rating is currently R-15, not R-19. Standard insulation batts are rated at R-11.

The R-19 figure represents the minimum total recommended R-value in most areas for a 2x4 exterior wall. Obviously, if even the high-density insulation is rated at just R-15, something more is needed to achieve the R-19 total. That's where the rest of the "insulation system" comes into play.

As shown in the drawing at left, an exterior wall needs insulation plus three more components: exterior sheathing, house wrap, and an interior vapor barrier. Together they keep outside air and moisture from getting in, and stop interior air and moisture from escaping.

Placing insulation between the wall studs does the bulk of the job. And for years, it had to do the whole job. Exterior sheathing was usually wood planks or plywood, and neither is a good insulator. Now many builders use rigid foam in place of, or over, wood sheathing.

Foam's R-value varies by type and manufacturer, but you can figure on getting about R-5 per inch of thickness. So if you use standard R-11 insulation in the walls, you need over 1½"-thick sheathing to reach the recommended R-19 value. Using the new high-density R-15 batts, you can get by with thinner sheathing. That keeps overall wall thickness down.

Safe Extension Ladder Setup

Q *How far from the wall should the base of an extension ladder sit?*
Mark Wilson
Chicago, IL

A The setback distance (**S**) varies depending on the ladder's extended length (**L**).

Setback should be $1/4$ of the Length, ($S = L \div 4$), but that's tough to measure without climbing the ladder.

Instead, stand straight, with your toes against the ladder's base. Extend your arms, and if you can rest your palms on the rung closest to shoulder level, the ladder's setback is fine.

Extend arms straight out at shoulder level.

Palms should rest on rung.

Keep back straight.

Place your toes against ladder base.

Computer Desk Finish Formula

Q *I liked the appearance of the computer desk in the Nov/Dec 1999 issue. What type of plywood was used and what did you use for stain and finish?*
Don Wagman
via the internet

A We built the computer desk with cherry veneer plywood and edge banded it with solid cherry. While cherry does eventually darken with age to a rich, reddish brown, the process takes time and exposure to sunlight. To "speed up" the aging process, we've developed a stain that gives new wood a traditional "aged" cherry look.

The stain is a mixture of three parts Zar Cherry stain with one part Wood-Kote Cherry Jel'd Stain. The latter gel stain minimizes blotching that sometimes occurs with cherry.

Once the stain dried thoroughly, we followed it with three coats of General Finishes Arm-R-Seal Satin, a wipe on oil and urethane finish. And between coats, we rubbed down the surface with a 3M Scotchbrite white buffing pad.

Tips & Techniques

Another Solution for Warped Deck Boards

I've read several deck building articles that suggest positioning warped deck boards with a bar clamp by skipping a plank and fitting it in later. But installing the skipped board can be difficult, especially with long deck boards or with a hidden fastening system.

To avoid the trouble, I use bar clamps that work as spreaders. I attach a temporary support ahead of the work area and position the clamps between the temporary support and the board I'm installing. The method works great and I don't have to go back and fit in skipped boards.

Michael Schwartz
Vestal, NY

Flashing

Siding

Nail used as spacer

Warped deck board

Hidden fastening system

Support temporarily fastened to joist.
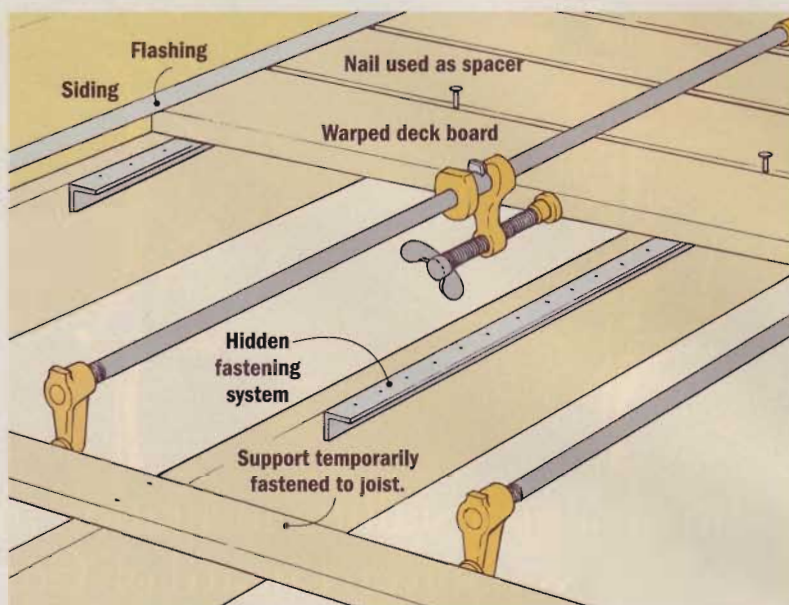
PVC Pipe Makes Post Repair Easy

In the Nov/Dec 1999 issue of *Workbench*, you described using a galvanized tin or copper sleeve around the bottom of a fence post when setting it in concrete. That way if the post breaks off, you can pull it out of the sleeve and replace it. For many years I've used large diameter PVC pipe as a sleeve for things like flagpoles and light posts.

To do this, I start by digging a large diameter post hole 6" deeper than the frost line. Then I place about 6" of pea gravel in the bottom.

Now cut a piece of plastic pipe for the sleeve. The pipe's inside diameter should be large enough to leave at least $1/2$" all the way around the post. It should be long enough to embed in the pea gravel several inches and still clear the top of the hole.

Next, plumb the pipe and pour concrete around it. When the concrete has cured, insert the post. Then fill any space between the PVC pipe and the post with more pea gravel.

6" ID PVC pipe

Concrete 3" thick

4x4 post
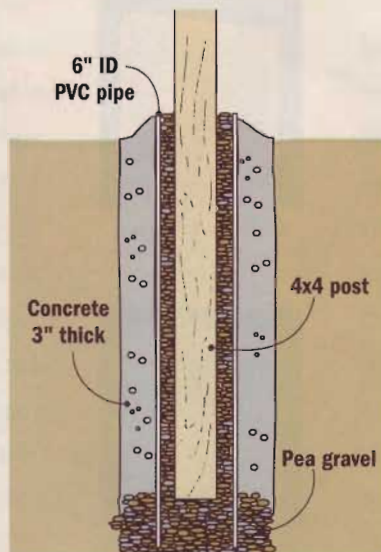
Pea gravel

If the post ever breaks or needs to be replaced, simply use a shop vac to pull the gravel out of the pipe and free up the broken post. Insert your new post and replace the pea gravel you just vacuumed out.

Tom Laney
Troy, MI

Save Shop Space with Portable Tool Bases

My shop is pretty small, so I can't leave power tools like my scroll saw or thickness planer out when I'm not using them. To store them, I mount each one on a section of countertop. (You can buy short pieces of damaged or discontinued countertop fairly cheap at most home centers.) I bore 1"-dia. holes in the pieces of countertop and hang them on wood pegs attached to my garage wall.

When I'm ready to use the tools, I clamp them to my workbench in the shop, or my picnic table or sawhorses when I'm working outside.

David Cross
Branch, MI

Portable planer

Hang on wood pegs

Countertop

C-clamp

Hole for 1"-pegs
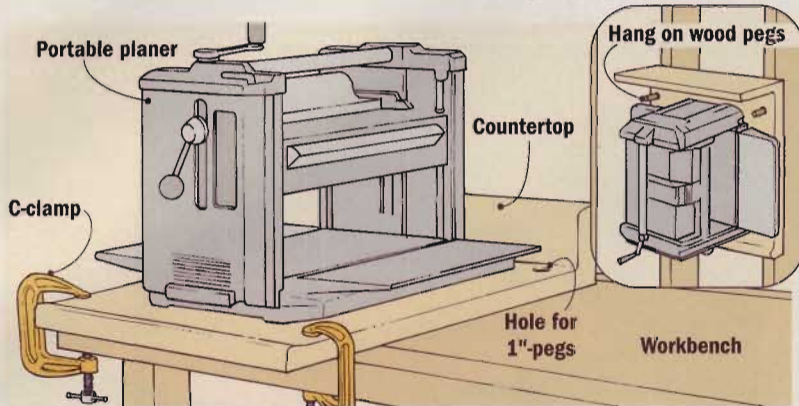
Workbench

In recognition of his tip, *Workbench* reader David Cross wins a set of tools from The Stanley Works. Send us your tip and you could be a winner, too.
The Stanley Works
New Britain, CT
www.stanleyworks.com

Dividing a Circle Equally Is Simple

I always wanted to make a circular tie rack that would hang on the wall in my closet. It would hold all my ties and choosing one would take just a spin of the wheel.

After making a round wood wheel, I tried to mark off the places to screw in the tie holders at evenly spaced increments. That took a lot of time and guess-work.

To save time and be more accurate, I cut a paper circle the same diameter as the tie rack. Then I folded the paper circle in half, and in half again, and again, until I had folded it four times. When I unfolded the paper, I had divided it into 16 identical wedges.

Placing the paper on top of the tie rack, it was easy to mark the wheel at each fold line. This gave me 16 perfectly spaced positions to attach the tie hangers.

Ben Racowski
Camarillo, CA

Fold the paper circle four times.

Paper circle
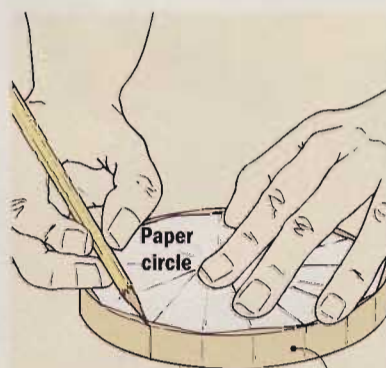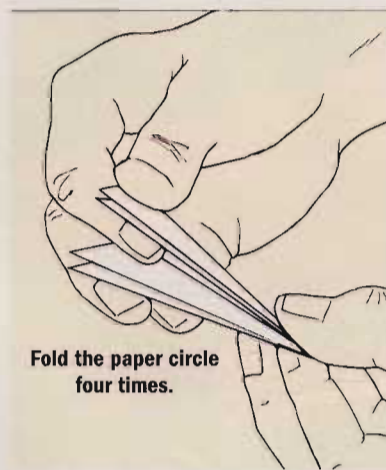
Unfold paper and mark wheel at the creases. **Wood wheel**

Prototypes End Size Dispute

My wife and I have both wanted to add an island work center to our kitchen for a number of years. But when the time finally came to put one in, we couldn't agree on the size. She thought my design would crowd the kitchen. I thought her plan was a bit undersized.

Rather than build something one of us would be unhappy with, we decided to start out with some cardboard prototypes.

I headed for the local grocery store and gathered up as many cardboard boxes as they would give me. When I got home, we cut the boxes into pieces and duct-taped them together into full-size prototypes of our island designs.

These cardboard prototypes were light enough to move around the room, and having them full-size made visualizing the new kitchen easy.

Karl Welsh
Rock Island, IL

Tapping out Old Wood Plugs

I recently attended an auction and purchased a couple teak chairs that needed some attention. They were in pretty good shape overall, but years of use had left them a bit wobbly.

The biggest problem seemed to be where the chair apron attached to the back legs. The screws had loosened over the years and needed to be replaced. The problem was that the screw heads were covered by glued wood plugs. The question was how to remove the plugs without damaging the surrounding wood.

My solution was to drive a wood screw into the plug until the point encountered the old screw. As I continued to drive in the screw, it forced the plug out of the hole.

This worked about four times out of five. When it didn't work, I backed the screw out and used the hole as a starter hole for a drill bit to bore the plug out.

Bill Britton
Albuquerque, NM

Chair seat

Old woodscrew

Chair leg

Wood plug

Screwdriver

Chair apron
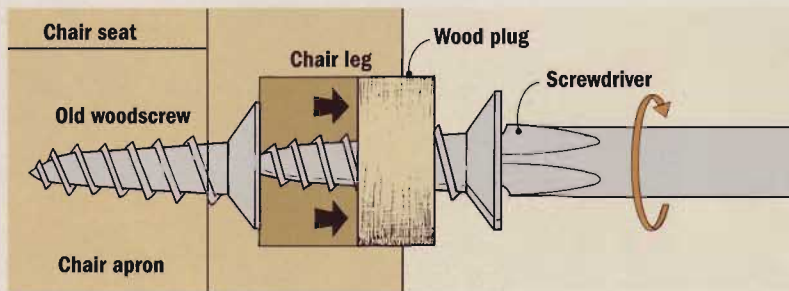
From Seam Ripper to Wire Stripper

When my wife discarded a seam ripper that had become too dull for her sewing work, I grabbed it to use as a wire insulation stripper. It works well on all wire sizes, from small speaker wire and regular lamp cords to thick pieces of Romex.

H. L. Downing
Portland, OR
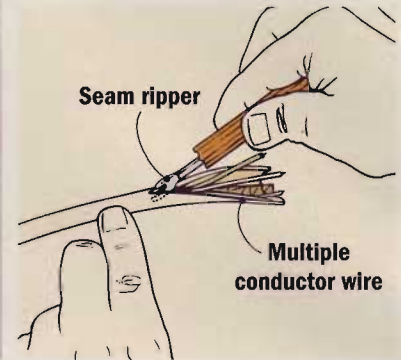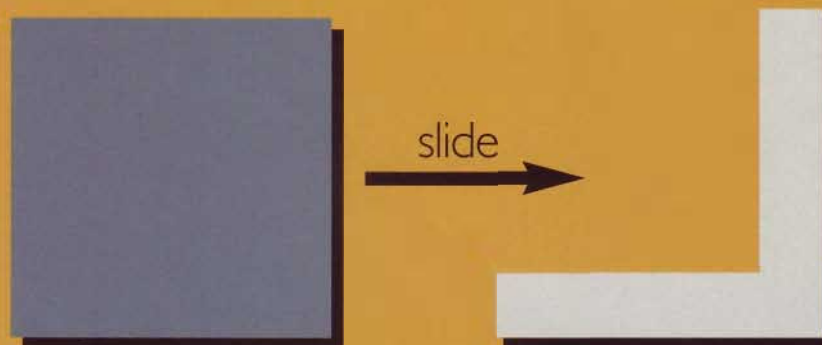
Seam ripper

Multiple conductor wire

Backer Board Ends the Hunt for Studs

I recently undertook the job of installing 3⅝" crown molding in several rooms of my house. One problem I faced was locating all of the ceiling joists to nail the top edge of the molding to. So I did something a little different. I installed backer boards at the intersection of the wall and ceiling. Then the molding could be nailed to the backer boards without having to worry about joist location.

I made the the backer boards out of 2x2's. Working with 8-ft. lengths, I beveled the boards ¾" in from one edge at 45°. The bevel keeps the backer board from interfering with the crown molding and provides wider nailing surface than the sharp corner would have.

Next, I nailed the the backer boards to the wall top plate, leaving them short of the corners
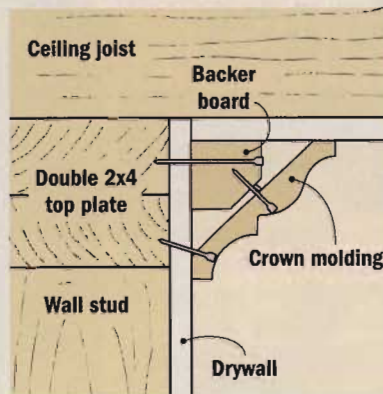
about 1½" so they wouldn't interfere with the mitered corners of the molding. Then I nailed the molding into the wall top plate and the backer board.

The backer board provided a firm nailing surface and eliminated the guesswork of finding the joists.

Bill Gourla
Westlake Village, CA

Ceiling joist
Backer board
Double 2x4 top plate
Crown molding
Wall stud
Drywall

Simple, Affordable PVC Supports

To support a workpiece while gluing or finishing, I use ¾" PVC pipe with a Tee fitting on the end to keep the pipe from rolling. The pieces are cheap and can be thrown out when they get too messy.

Dave Youngren
Clovis, CA
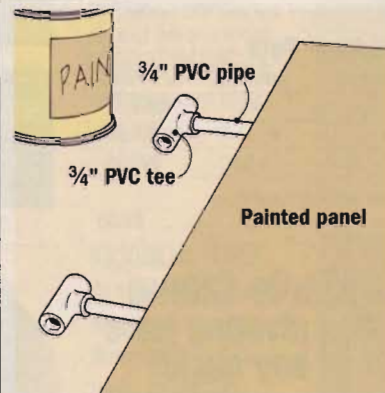
¾" PVC pipe
¾" PVC tee
Painted panel

Garden Arbor

You can build this adaptable arbor in a weekend using a few portable power tools and easy-to-find materials.

ARBOR WITH BENCH
OVERALL SIZE: 64$^1/_2$"W x 31"D x 86$^1/_4$"H

Your yard probably looks much different than mine. And that's fine. This versatile project adapts to fit just about any home landscape.

By itself, the arbor makes a simple pass-through and gives garden vines a place to climb. Add the bench, as shown here, and you've got a comfortable resting spot — ideal at the end of a garden path. With a gate, it becomes a dramatic entryway that draws guests into your yard. Or add fence panels to help enclose a wide-open patch of lawn.

This arbor design uses standard dimensional western red cedar lumber so there's nothing to rip. (You'll find a materials list for the basic arbor on page 36.) Even the premium-grade lattice is a standard item at home centers (turn to *Around the House* on page 68 to find out more about buying and working with lattice). Using these materials means you can build the whole thing with just a circular saw, a jigsaw, a drill, and a router.

Slat

CANOPY ASSEMBLY
(See pages 32-34)

Stretcher

Ridge

Arch

Plate

SIDE PANEL ASSEMBLY
(See pages 34-36)

BENCH ASSEMBLY
(See page 37)

NOTE: Go to www.WorkbenchMagazine.com to download cutting diagrams for this project. **CUTTING DIAGRAMS** If you don't have Web access, send a stamped, self-addressed envelope to: Workbench Cutting Diagrams, Attn: Garden Arbor, 2200 Grand Ave., Des Moines, IA 50312

BUILD JUST THE ARBOR . . .
See pages 32-34

ADD A GATE . . .
See pages 38-39

OR INSTALL A FENCE
See pages 40-41

CANOPY ASSEMBLY

Slat
(2x2–29½" long)

Ridge
(2x6–31" long)

#8 x 2¾" Fh
exterior woodscrew

#8 x 2" Fh
exterior woodscrew

#8 x 3½" Fh
exterior woodscrew

Stretcher
(1x4–26" long)

Arch
(2x8–36" long)

Plate
(2x6–29½" long)

#8 x 3½" Fh
exterior woodscrew

CANOPY PLAN VIEW

64½"

1½"

3⅞"

4½" 4½" 4½" 4½" 4½"

4½" 4½" 4½"

1½"

4" 5½" 22"

START WITH THE ARCHES

A large part of this arbor's appeal comes from the graceful arched canopy. At first glance, it may not seem possible, but each arch can be cut from a single, 36"-long piece of 2x8 cedar lumber.

The key to shaping the arches correctly is creating flat surfaces where the arches meet the ridge and the side panels (*Canopy Assembly*). To do this, first lay out the angled straight cuts on the arch blanks (*Arch Blank Layout*). Then cut along these lines with a circular saw.

The exact shape of the curve isn't critical as long as you cut the arch pieces all the same and make them a uniform 3½" wide. A template makes it easy to create identi-

cal parts. (I like to use hardboard for templates since it flexes little and holds up better than cardboard.)

To make the arch template, first cut a piece of hardboard to the same size and shape as the arch blank. Next use the *Arch Template Grid* to plot the bottom edge of the arch on the template. Carefully cut the curve to shape with a jigsaw or band saw, then sand the edge smooth.

For the arch to be a uniform width, the curved top edge must be parallel to the bottom edge. You can accomplish this easily with a simple marking guide (*Fig. 1*). The guide's two pins (4d nails) follow the bottom curve. To use it, hold a pencil in the notch and mark a perfect echo line 3½" away.

Once you duplicate the curve, lay out the arch's radiused end on the hardboard. Then finish cutting the template to shape. If necessary, sand any rough spots. To complete the template, add the alignment marks roughly near the center of the two flat edges (*Arch Template Grid*).

Now the template is ready to use. Line up the flat faces of the template with the corresponding faces on an arch blank. Use a square to strike pencil marks across the edge of the blank at the alignment marks (*Fig. 2*). Then trace the template outline onto the arch blank.

Here's a tip. Before moving onto the next arch blank, flip both the blank you just marked and the template over. Now realign the template

1

Guide pins
(4d nails)

Hardboard
marking guide

3½"

Hold pencil
in notch

Hardboard
template

2

Trace
template

Alignment
mark

Arch blank

Extend line across
edge of blank

3

Cut just outside
the line, then
sand the arch
to final shape.

Waste stock
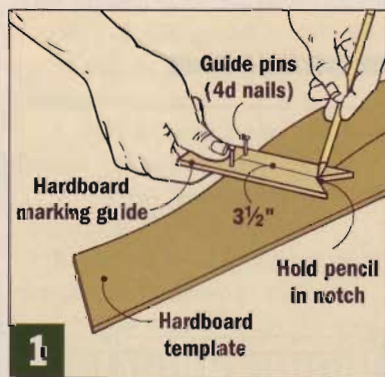
With the bottom curve cut on the template, hold the marking guide's pins against the template. Mark the upper curve as you move the guide along.
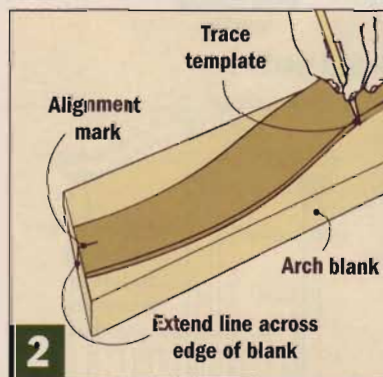
Align the template on the arch blank and mark the blank's edge at the template alignment points. Then trace the template on both sides of the blank.
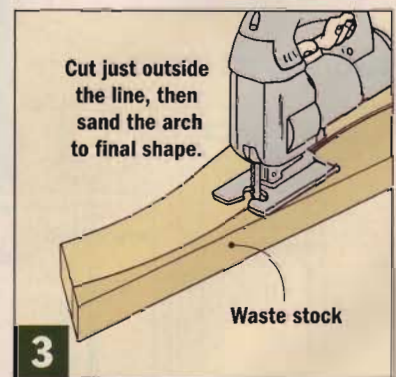
Use a jigsaw to cut the arches to shape. Stay to the waste side of the line and watch out for blade wander. If necessary, file and sand the edge square.

ARCH BLANK LAYOUT

36"
7¼"
3¹¹⁄₁₆"
13¾"
1¹⁵⁄₁₆"

RIDGE DETAIL
1"
1"

SLAT DETAIL
1½"
¾"
¾"
2½"

ARCH TEMPLATE GRID

Alignment mark

Alignment mark
1" grid
3½"
2" rad.
1½" rad.
3½"
6½"
1⅛"
Start grid at this corner

PLATE DETAIL
½"
2½"

---
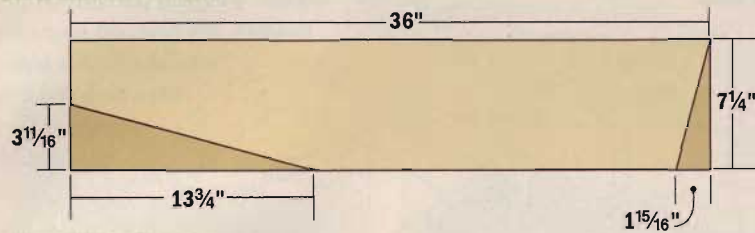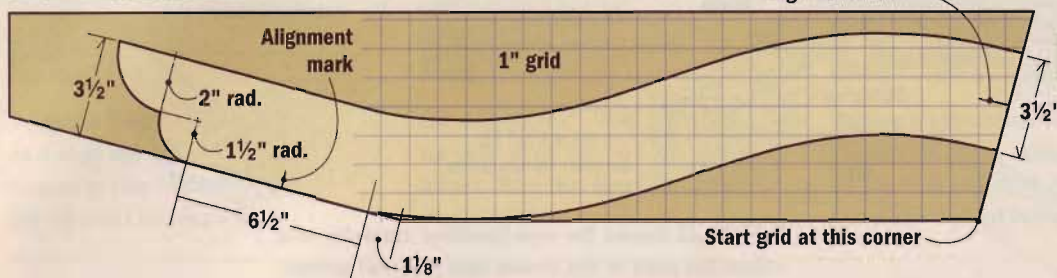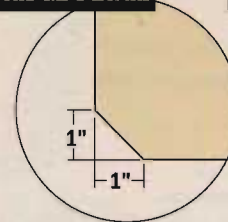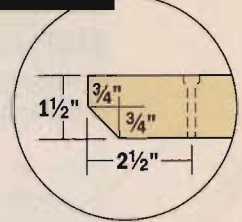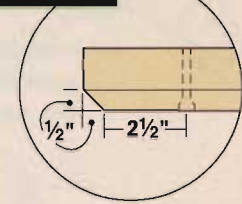
with the reference marks on the blank's edge and trace the template's outline on the other side.

This may seem like overkill, especially if you have a good band saw. But when I started cutting out the arches with my jigsaw, it didn't take long for the blade to heat up and start to flex. My first arch wound up with an edge that grew progressively more beveled. By marking arch outlines on both sides of the blank, it gave me a reference line so I could quickly file and sand the beveled edge back into square.

When you have all the blanks marked, cut them to shape with a band saw or a jigsaw (*Fig 3*). (To see the latest in jigsaw technology, turn to *Top-Notch Jigsaws* on page 46.)

MOVE ON TO THE SLATS

After cutting out all the arches, the next step is to lay out the locations for the canopy slats. If you study the *Canopy Plan View*, you'll see that the slats run parallel to each other. Ordinarily, you could use a scrap wood spacer to keep the gaps uniform, but these slats cant in and out as they follow the curves.

To keep the spacing even, lay the arches side by side on your bench and clamp them together (*Fig 4*). Don't worry if the curves don't line up exactly, as long as the upper ends are flush — this is, after all, an outdoor project that will shrink and expand with changes in the weather.

Starting at the upper end of one arch, hold a tape measure so it con-

forms to the arch and make a mark for the outer edge of each slat. You may want to drive a brad through the hook end of the tape so you have both hands free to hold the tape down against the curve of the arch. Once the slat locations are marked, use a square to transfer the marks across all four arches.

From here on out, the remaining canopy parts — the slats, ridge, stretchers, and plates — are straight, dimensional lumber. After you cut these pieces to length, bevel the bottom ends of the ridge and slats (*Ridge Detail, Slat Detail,* and *Fig. 5*). You also need to chamfer the lower edges of the plates (*Plate Detail*). A router with a piloted chamfering bit works well for this.

Clamp arches together
Use a square to transfer slat locations across all four arches.
Bend measuring tape to fit arch curve and mark the slat locations.

4

Clamp slats together
Edge guide
Tilt saw to 45°

5
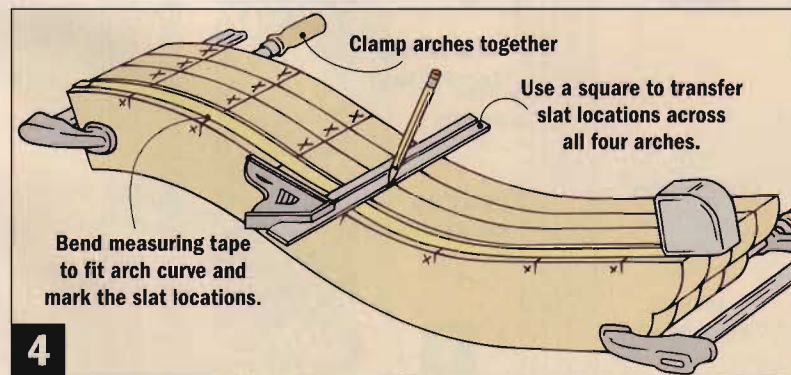
Clamp the four arch pieces together with the upper ends flush. Tack a tape measure in place on the upper end and hold the tape against the arch's curved surface to mark the first slat at 3⅞" and the remaining slats at every 4½". Then use a square to extend the slat location marks across all four arches.
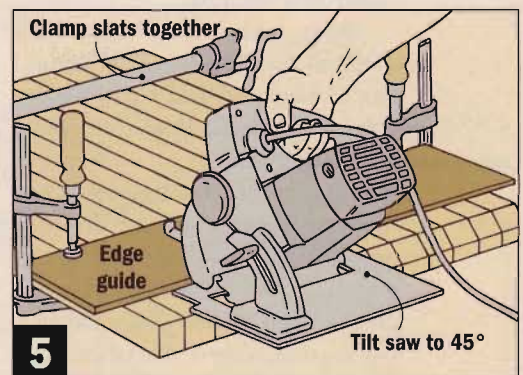
Clamp the slats together with the ends flush. Then tilt your circular saw blade to 45° and use an edge guide to gang-cut the bevel on both ends.

CANOPY ASSEMBLY SEQUENCE

STEP 1: Glue and screw each stretcher to upper ends of two arches.

#8 x 3½" Fh exterior woodscrews

Plate

Framing square

Stretcher

4"

Arch

STEP 3: Block the ridge in position, and glue and clamp the wing assemblies to the ridge. Then screw the stretchers to the ridge.

Support block

Align the stretchers 1½" below the top of the ridge.

#8 x 2" Fh exterior woodscrews

#8 x 3½" Fh exterior woodscrews

STEP 2: Square the arch/stretcher assembly, and attach the plate to the arches with glue and screws.

ASSEMBLE THE CANOPY

Putting the canopy together reminds me of the model airplanes I built as a kid. You assembled the two identical wings first, then fastened them to the fuselage.

Here, you start with the two arch assemblies on each side of the ridge (*Canopy Assembly Sequence, Step 1*). Begin by gluing and screwing the stretchers to the upper ends of the arches. (Consider using construction adhesive or polyurethane glue for a strong, weather-tite bond.)

Next, mount the plates. To square the assembly, hold a framing square against each arch and the stretcher (*Step 2*). Apply adhesive to the plate, line up the plate on the arches, and drive two screws to fasten it at each arch. Then repeat the process for the other arch assembly.

With your "wings" assembled, position the ridge between them. I cut a block to hold up the ridge while I glued and clamped the wings in position (*Step 3*). Once they're in position, drill countersunk screw holes in the stretchers and drive the screws. You'll want to be sure to off-set the screw holes slightly so the screws won't collide (*Ridge Detail*).

Starting nearest the ridge, align and install the slats on the canopy assembly, but leave the next-to-last slat off on both sides (*Step 4*). This will give you access to install the plates to the side panels later on.

CONSTRUCT THE SIDE PANELS

Compared to the canopy, the rest of this project is straightforward. The two identical side panels consist of a pair of 2x4 legs joined by 2x4 rails (*Side Panel Assembly*). Grooves routed in the rails and in 2x2 retainer

strips keep the lattice in place.

If you noticed the *Leg Plan View*, it calls for a ³⁄₄" groove. This isn't a misprint. I chose a ⁵⁄₈"-thick, premium-grade lattice for this project because it has fewer knots so it's sturdier and looks much nicer. That's

SIDE PANEL ASSEMBLY

Upper side rail (2x4– 23" long)

#8 x 2¾" Fh ext. woodscrew

Rail backer (2x4– 23" long)

Retainer strip

1½"

4" Timberlock screw or ¼" x 4" lagscrew

14"

Retainer strip (2x2– 59" long)

Leg (2x4– 72" long)

#8 x 2" Fh ext. woodscrew

Leg

4" Timberlock screw or ¼" x 4" lagscrew

Lower side rail (2x4– 23" long)

Lattice panel (⁵⁄₈" x 20⅞" x 59⅞")
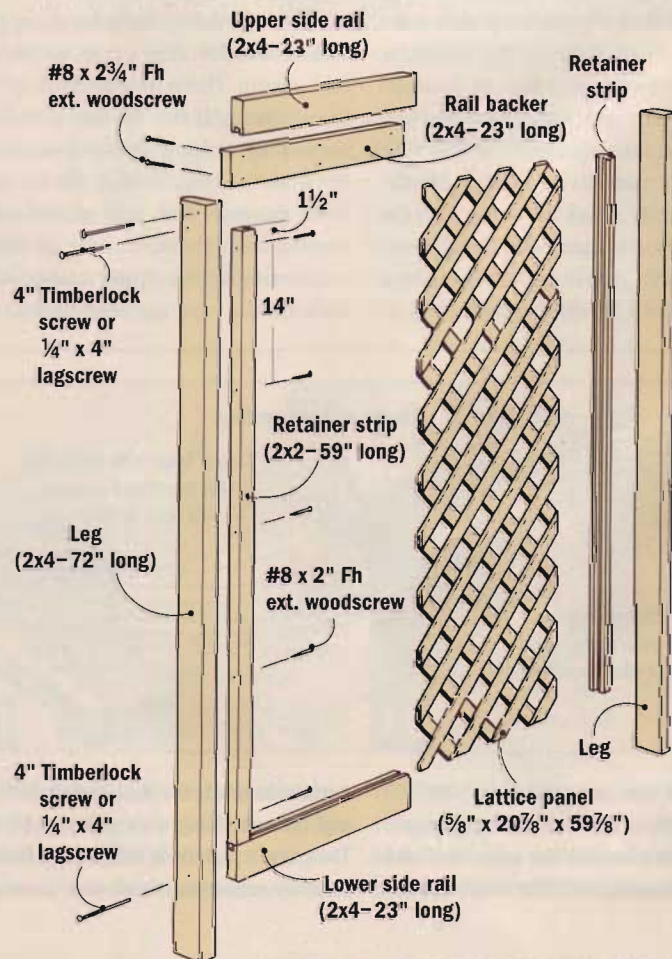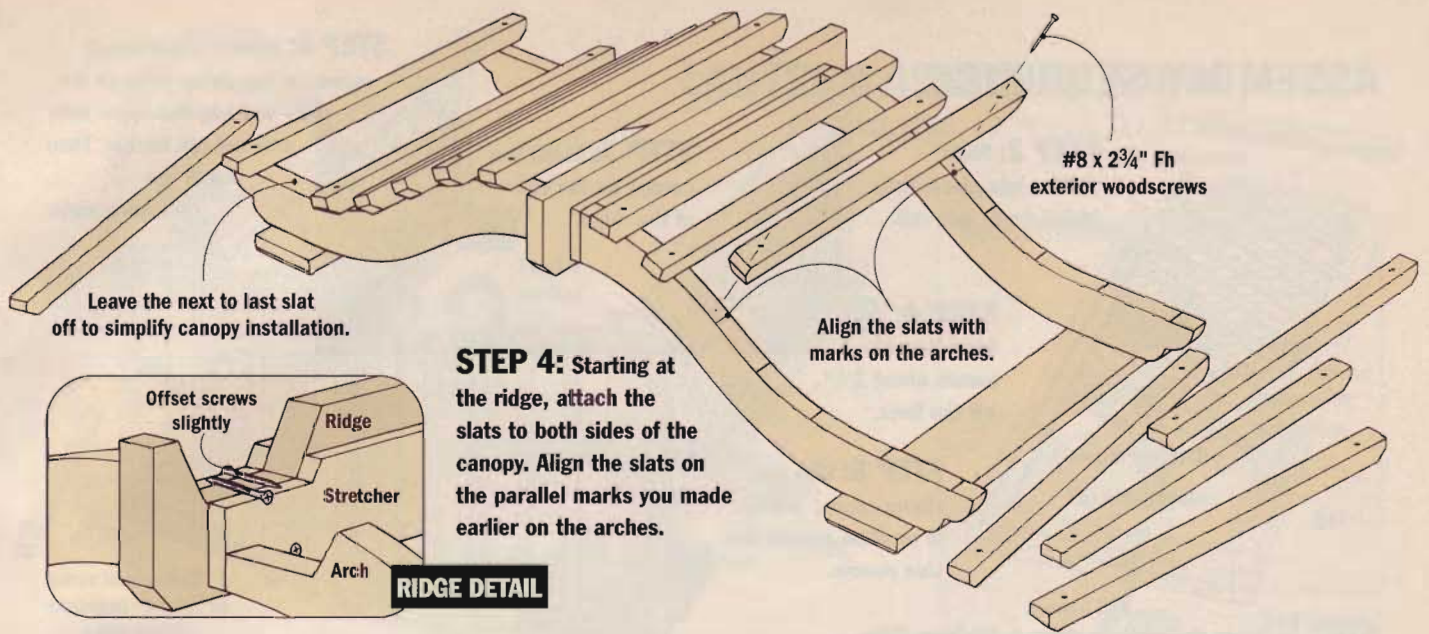
Leave the next to last slat off to simplify canopy installation.

#8 x 2¾" Fh exterior woodscrews

Align the slats with marks on the arches.

STEP 4: Starting at the ridge, attach the slats to both sides of the canopy. Align the slats on the parallel marks you made earlier on the arches.

Offset screws slightly

Ridge

Stretcher

Arch

RIDGE DETAIL

important here since both sides of the lattice will be out in plain view. The added thickness makes it more rigid, so it adds some structural strength to help keep the side panels from racking. The oversized groove lets you slide the lattice into place.

LEG PLAN VIEW

Upper side rail — 1½" — ¾"

Timberlock or lagscrew location

2¾"

Rail backer

¾" groove, ½" deep

Retainer strip

¾" groove, ½" deep

Retainer strip

Lower side rail

7¾"   Leg   6"

The legs were designed to sit on top of a concrete footing or pad. If you want to sink them in a post hole, lengthen them accordingly (see *Moving and Mounting* on page 36 for details).

Once you've cut the legs to length, move on to the retainer strips and rails. First, rout a groove in one edge of the 2x2 retainer strips (*Fig. 6*). To hold each piece firmly, I temporarily screwed a 1x4 to the bottom edge, then clamped down the 1x4. Use the same process to groove an 8-ft. length of 2x4 for the rails.

Because cedar is soft and the groove is only ½" deep, I routed the grooves in one pass with a ¾" bit. It really speeds things up to do it in one pass. To keep the grooves prop-

erly aligned during assembly later, mark one face of each piece and keep the router's edge guide riding against the faces with the marks.

With the grooves routed, cross-cut the rails and retainer strips to length. Cut the top rail backers to length as well. These provide a beefier mounting surface for the plates on the canopy.

Depending on the lattice pattern, you should be able to cut both pieces of lattice from one 4x8 sheet. When I cut out my panels, I trimmed the sheet to length first, then used the two long factory edges which left a waste piece down the middle. Just be sure to provide firm support when you make the cuts (see *Around the House* on page 68).

Router with ¾" straight bit and edge guide

1x4 screwed to retainer strip

6

½"   ¾"   Edge guide

1x4
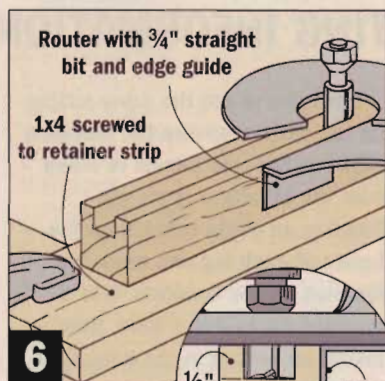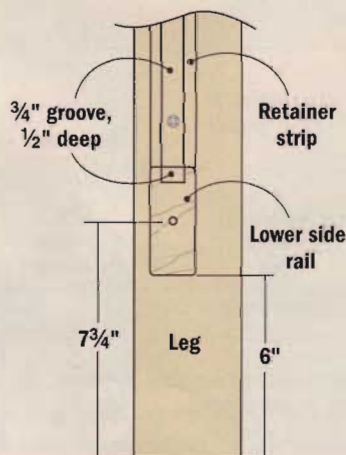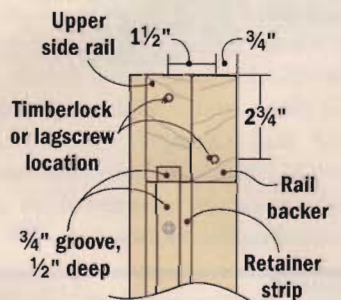
Temporarily screw a retainer strip to a 1x4. Clamp the 1x4 down and rout a groove in the strip.

7

Rail blank

¾"-wide groove, ½" deep
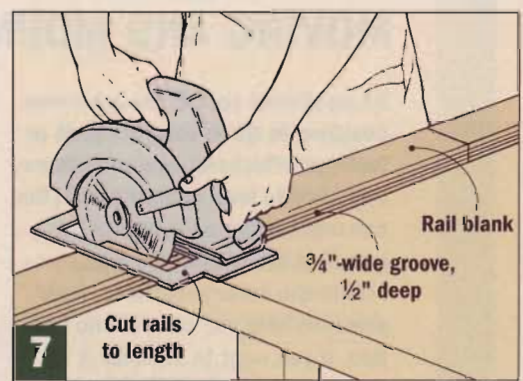
Cut rails to length

With the ¾"-wide groove cut in the 2x4 rail blank, crosscut the rail pieces to length. Then cut the two rail backers from ungrooved 2x4 stock.

ASSEMBLY SEQUENCE

Lower side rail

STEP 2: Slide lattice into place, then install lower side rail.

STEP 3: Stand the canopy on the end of the ridge.

STEP 6: Drive 4" Timberlock screws or lagscrews through the plate and into the upper side rail and rail backer. Then install the remaining slats.

STEP 4: Shim the side panels about 2½" off the floor.

Retainer strip

Upper side rail

Leg

STEP 5: Glue and clamp canopy plates in position against the side panels.

Rail backer

STEP 1: Screw the retainer strips to the legs. Then screw the legs to the upper side rail and rail backer.

4" Timberlock screw or ¼" x 4" lagscrew (6 per side)

MATERIALS LIST

LUMBER: (CANOPY & SIDE PANELS)

(4)	Arches	1½" x 7¼" x 36"
(2)	Stretchers	¾" x 3½" x 26"
(1)	Ridge	1½" x 5½" x 31"
(14)	Slats	1½" x 1½" x 29½"
(2)	Plates	1½" x 5½" x 29½"
(4)	Legs	1½" x 3½" x 72"
(4)	Side Rails	1½" x 3½" x 23"
(2)	Rail Backer	1½" x 3½" x 23"
(4)	Retainer Stp.	1½" x 1½" x 59"
(2)	Lattice Panels	⅝" x 20⅞" x 59⅞"

HARDWARE:

- (32) #8 x 2" Fh exterior woodscrews
- (40) #8 x 2¾" Fh exterior woodscrews
- (16) #8 x 3½" Fh exterior woodscrews
- (24) 4" Timberlock screws or ¼" x 4" lagscrews

ASSEMBLE THE SIDE PANELS

To assemble each side panel, start at the top. Begin by gluing and screwing an upper side rail and rail backer together. Next, lay this assembly on the floor and align the end of the legs flush with the top edge. Then mark the bottom edge and top face of the rail on the legs.

To locate the retainer strips on the legs, lay each leg flat and align the strip with the marks you just made on the leg. Attach the strips to the leg by driving screws along the bottom of the groove.

Now, screw the legs loosely to the top rail assembly so you can easily slide the lattice into place (*Assembly Sequence*). Then snug down the screws and screw the lower rail in place.

PULL IT ALL TOGETHER

At this point you're ready to mount the canopy to the side panels. To position the canopy, stand it on edge and shim it until it rests on the end of the ridge. Shim the side panels off the floor until they're centered on the canopy plates, then glue and clamp the plates to the side panels.

No other joint in the arbor gets as much stress as where the side panels meet the plate. That's why I used special screws I found at my home center. These hardened fasteners, called Timberlocks, have coarse threads, a thin shank, and a washer-type hex head (call Olympic Fasteners at 800 633-3800 for a dealer near you). With the canopy mounted, finish up by installing the last two slats.

MOVING AND MOUNTING INFORMATION

As mentioned earlier, the arbor was designed to sit on concrete pads or footings. Whichever type you choose, take time to level all four pads. (You can make minor adjustments by trimming the ends of the legs.)

With the arbor assembled, have someone help you carry it into position. If you want to stabilize it for the move, temporarily tack a 1x4 across the opening. This helps take stress off the ridge joint and the side-to-plate joints.

Once you've got the arbor sitting on the pads, measure the distance between the side panels to make sure the structure is plumb. Position an angle bracket on the inside of each leg and mark the location on the concrete. Use a masonry bit to drill a hole, then install an anchor in the hole. Bolt the anchor to the pad, then screw the bracket to the leg. This allows you to detach the arbor from the footings for repairs or maintenance.

¼" x 1" lagscrew

Arbor leg

Angle bracket

Concrete footing

Concrete anchor
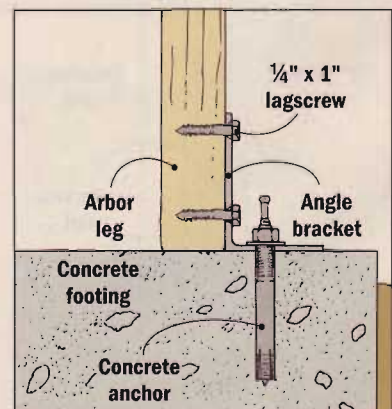
MATERIALS LIST FOR ARBOR CANOPY & SIDE PANELS

LUMBER: (CANOPY & SIDE PANELS)

(4)	Arches	$1\frac{1}{2}$" x $7\frac{1}{4}$" x 36"
(2)	Stretchers	$\frac{3}{4}$" x $3\frac{1}{2}$" x 26"
(1)	Ridge	$1\frac{1}{2}$" x $5\frac{1}{2}$" x 31"
(14)	Slats	$1\frac{1}{2}$" x $1\frac{1}{2}$" x $29\frac{1}{2}$"
(2)	Plates	$1\frac{1}{2}$" x $5\frac{1}{2}$" x $29\frac{1}{2}$"
(4)	Legs	$1\frac{1}{2}$" x $3\frac{1}{2}$" x 72"
(4)	Side Rails	$1\frac{1}{2}$" x $3\frac{1}{2}$" x 23"
(2)	Rail Backer	$1\frac{1}{2}$" x $3\frac{1}{2}$" x 23"
(4)	Retainer Stp.	$1\frac{1}{2}$" x $1\frac{1}{2}$" x 59"
(2)	Lattice Panels	$\frac{5}{8}$" x $20\frac{7}{8}$" x $59\frac{7}{8}$"

HARDWARE:

- (32) #8 x 2" Fh exterior woodscrews
- (40) #8 x $2\frac{3}{4}$" Fh exterior woodscrews
- (16) #8 x $3\frac{1}{2}$" Fh exterior woodscrews
- (24) 4" Timberlock screws or $\frac{1}{4}$" x 4" lagscrews

CUTTING DIAGRAM FOR ARBOR CANOPY & SIDE PANELS

2 x 8 - 72" TWO BOARDS

B	B
B	B

2 x 6 - 96" ONE BOARD

A	E	E	

2 x 4 - 96" SIX BOARDS

F
F
F
F

G	G	G	G	

H	H	
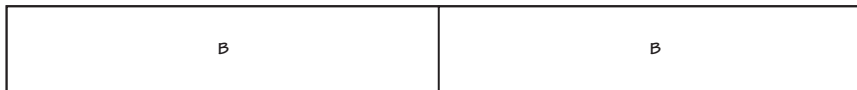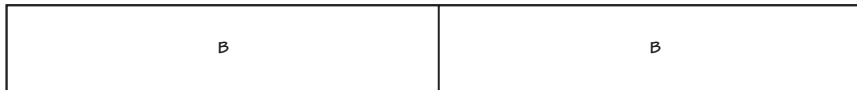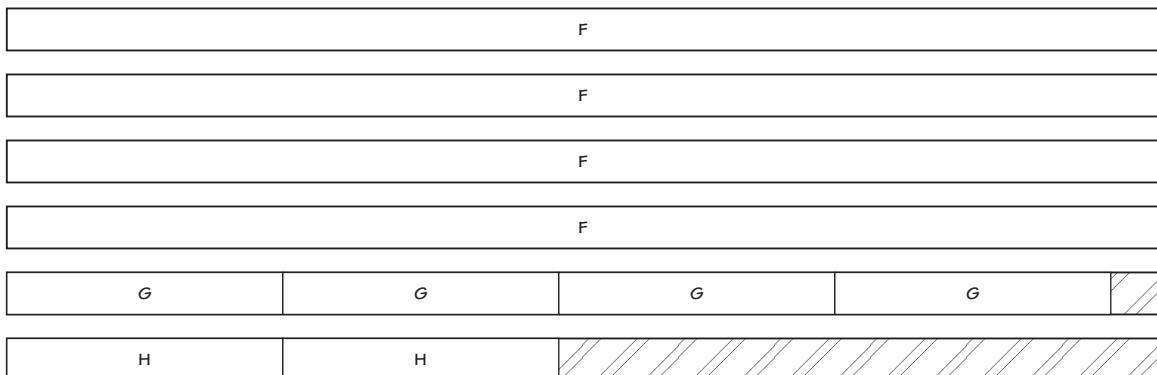
CUTTING DIAGRAM FOR ARBOR CANOPY & SIDE PANELS

ARBOR CUTTING DIAGRAM

2 x 2 - 96" 8 BOARDS

C	C	C	/////
C	C	C	/////
C	C	C	/////
C	C	C	/////
C	I		/////
C	I		/////
I	/////////
I	/////////
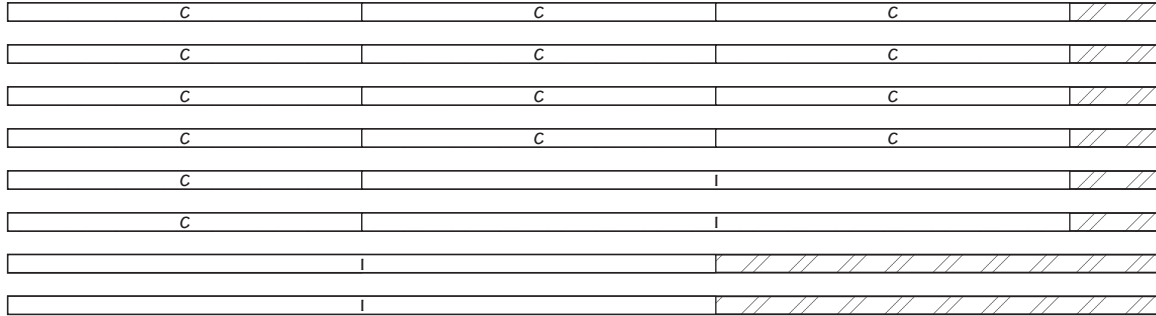
1 x 4 - 72" ONE BOARD

| D | D | ///////// |

MATERIALS LIST FOR BENCH

LUMBER:

(2)	Ends	$1^1/_2$" x $3^1/_2$" x $21^1/_2$"
(1)	Front Rail	$1^1/_2$" x $3^1/_2$" x $47^1/_2$"
(1)	Back Rail	$1^1/_2$" x $5^1/_2$" x $50^1/_2$"
(5)	Seat Planks	$^3/_4$" x $3^1/_2$" x $50^1/_2$"
(1)	Back Rest	$1^1/_2$" x $5^1/_2$" x $50^1/_2$"
(1)	Seat Brace	$1^1/_2$" x $3^1/_2$" x 16"
(8)	Back Slats	$^3/_4$" x $3^1/_2$" x $11^1/_4$"

HARDWARE:

(29)	#8 x 2" Fh exterior woodscrews
(4)	#8 x $2^3/_4$" Fh exterior woodscrews
(20)	#8 x $3^1/_2$" Fh exterior woodscrews
(16)	4d galv. box nails (w/heads clipped)

CUTTING DIAGRAM FOR BENCH

2 x 6 - 72" TWO BOARDS
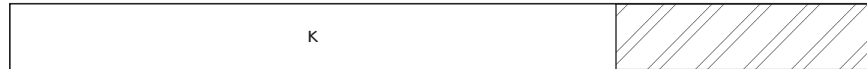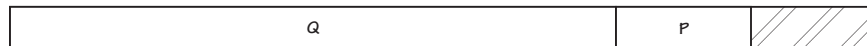
| K |
| L |

2 x 4 - 72" TWO BOARDS

| M | O |
| N | N |

1 x 4 - 72" SIX BOARDS

Q	P
Q	P
Q	P
Q	P
Q	P
P	P	P

WING CUTTING DIAGRAM (PAIR)

2 x 6 - 48" ONE BOARD

R	R	

2 x 4 - 72" two BOARDS

T	

T	

2 x 4 - 96" TWO BOARDS

U	S	

U	S	

1 x 4 - 96" TWO BOARDS

V	V	V	

V	V	V	
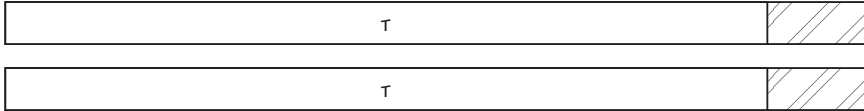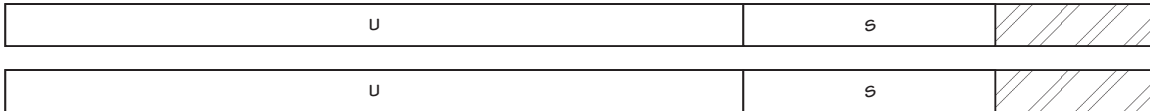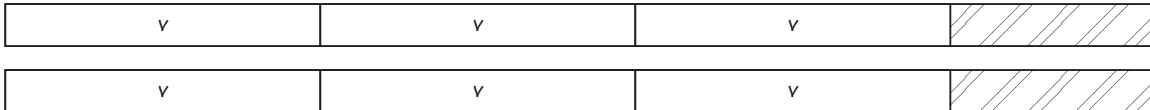
FENCE CUTTING DIAGRAM (SINGLE SECTION)

2 x 4 - 120" TWO BOARDS
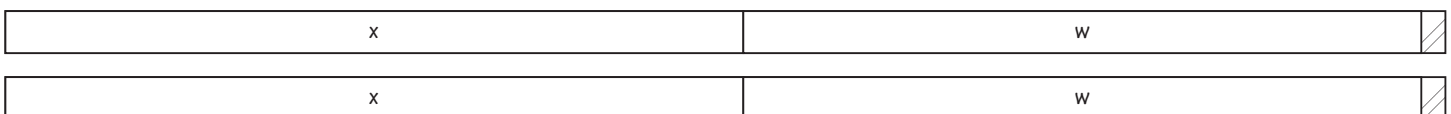
X	W	

X	W	

1 x 4 - 96" THREE BOARDS
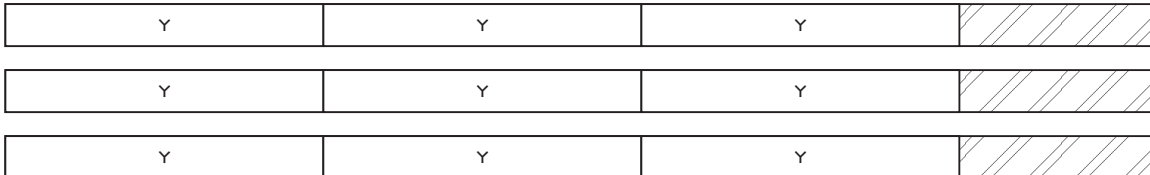
Y	Y	Y	

Y	Y	Y	

Y	Y	Y	

WING CUTTING DIAGRAM (PAIR)

2 x 6 - 48" ONE BOARD

Z	Z	

2 x 4 - 48" ONE BOARD

A2	A2	

2 x 2 - 96" TWO BOARDS

B2	B2	

C2	C2	

1 x 4 - 96" TWO BOARDS

D2	D2	D2	

D2	D2	D2	
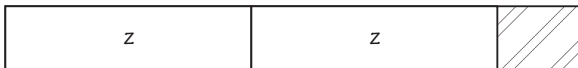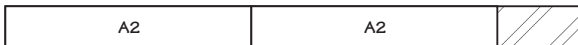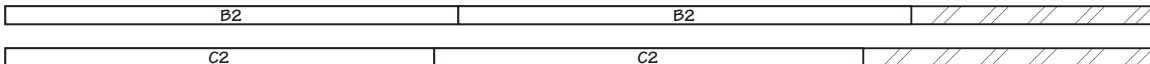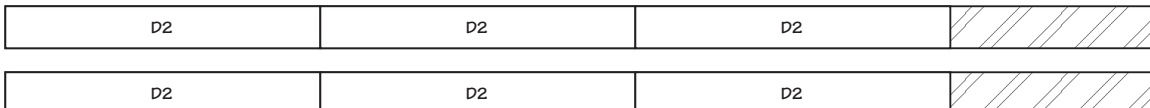
Add a Garden Bench

Expand the arbor's versatility and good looks by building this garden bench. A simple frame supports the seat and a slatted back lets the garden breeze pass through.

By itself, this arbor will attract plenty of attention. But add this bench and you create a convenient spot to relax and enjoy the garden scenery around you.

BUILD THE FRAME FIRST

A simple 2x4 frame holds up the bench seat and also ties the two arbor side panels together. The back is built similar to the arbor's side panels — grooves capture the seat's back slats.

Even though the *Materials List* gives bench part dimensions, you'll want to measure your arbor before cutting any material. With the parts all cut to length, rout the groove for the back slats in the back rest and back rail. Then lay out and cut the back rest to shape (*Back Rest Detail*).

Now, screw the seat frame together. To hold the frame in position, clamp temporary cleats to the arbor legs (*Fig. 1*). Next, screw the seat planks to the frame. Then set the slats in the back rail groove and fit the back rest over them. Screw the back rest to the arbor. Use a 2½"-wide spacer to position the slats, then tack them in place with 4d galvanized box nails (*Fig. 2* and *Slat Detail*).

BENCH ASSEMBLY

SLAT DETAIL

¾"
½"

4d galvanized box nail. Snip off head and countersink.

#8 x 3½" Fh exterior woodscrew

#8 x 2" Fh exterior woodscrew

Back rest (2x6– 50½" long)

Back slat (1x4– 11¼" long)

Seat plank (1x4– 50½" long)

Back rail (2x6– 50½" long)

End

#8 x 3½" Fh exterior woodscrew

Brace (2x4– 16" long)

Front rail (2x4– 47½" long)

End (2x4– 21½" long)

#8 x 3½" Fh exterior woodscrew

BACK REST DETAIL

8"
4"
2"
2" Radius
2" Radius

MATERIALS LIST

LUMBER:

(2)	Ends	1½" x 3½" x 21½"
(1)	Front Rail	1½" x 3½" x 47½"
(1)	Back Rail	1½" x 5½" x 50½"
(5)	Seat Planks	¾" x 3½" x 50½"
(1)	Back Rest	1½" x 5½" x 50½"
(1)	Seat Brace	1½" x 3½" x 16"
(8)	Back Slats	¾" x 3½" x 11¼"

HARDWARE:

(29)	#8 x 2" Fh exterior woodscrews
(4)	#8 x 2¾" Fh exterior woodscrews
(20)	#8 x 3½" Fh exterior woodscrews
(16)	4d galv. box nails (w/heads clipped)

17¼"
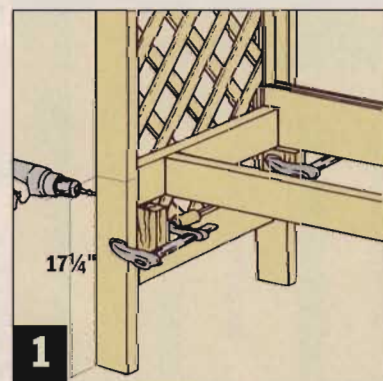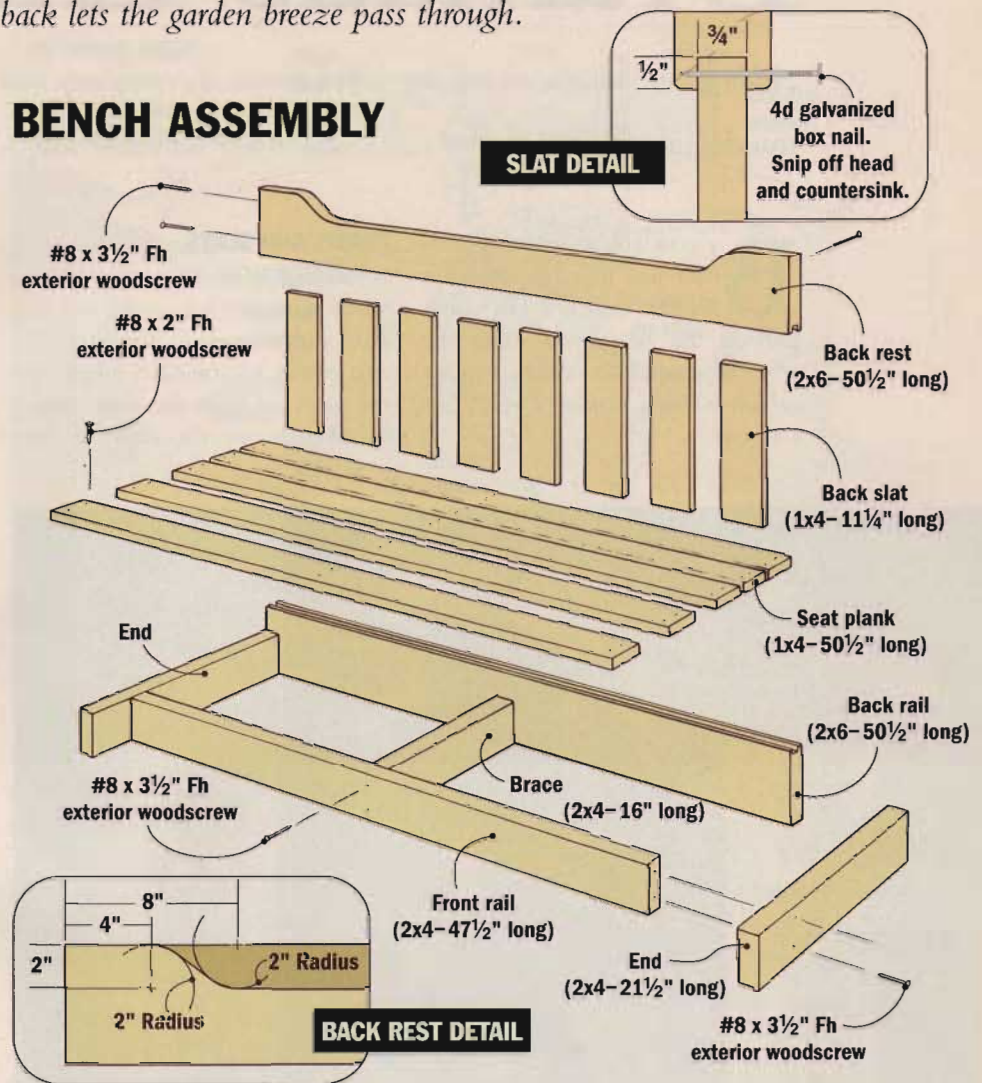
1

Clamp cleats to the arbor legs to support the bench frame until you can drive the screws. Position the cleat so the top of the seat end is 17¼" high.

Back rest
4d nail
Slat
Back rail
2½" spacer
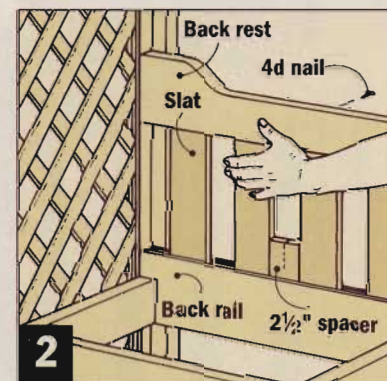
2

Fit the slats in the grooved back rail, then install the backrest over the top of the slats. Slide the slats into position with a spacer and tack them in place.

Dramatic Entrance

Adding gates to the arched-top arbor creates an entryway that draws you in and makes you wonder what's on the other side. Simple gate hardware keeps construction clean and easy.

By now, you've probably realized just how versatile this project can be. The gates provide the option of using the arbor to control access to a yard or garden without making it seem like a barrier.

FRAME AND SLATS

If you look at the bench on the previous page, you'll have a good idea how these gates go together. The two panels mirror each other. And the gates are built the same way as the bench — the slats fit into grooves cut in the top and bottom rails. Stiles of 2x2 lumber complete the frames. Dimensions for the gate components are shown in the *Materials List* on the opposite page but take time to measure your completed arbor's opening and build your gates to fit accordingly.

HARDWARE AND HANGING

The gate hardware is as straightforward as the gates themselves. I used 3" zinc-plated butt hinges to mount the gates to the arbor legs (*Hardware Installation View*). A simple cane bolt holds one gate closed until you need wide open access, and a gate latch keeps the other gate from swinging open on its own.

To hang the gates, start by mounting the hinges to the gate stiles. Then round up an extra pair of hands and have that person hold one gate in position while you screw the hinges to the arbor leg.

Resting a level on the edge of a long, straight board, transfer the position of the installed gate stile to the other side of the arbor. Then mount the second gate so it's level with the first one.

With the gates hung, clamp them closed temporarily while you install the latch and the cane bolt. Then close the gates and drop the cane bolt to make a mark on the ground.

To create a "latch" for the cane bolt, drive a short (4"-6") length of ³⁄₄" I.D. pipe (PVC or rigid copper will work) into the ground on the mark. The top of the pipe should be flush with the ground. Use a piece of wire to clean the dirt out of the pipe so it will accept the bolt.

HARDWARE INSTALLATION VIEW

4" bar gate latch

7¼"

1¾"

1¾"

3" butt hinge

5¼"

2½"

1¾"

6"

2"

½" x 12" cane bolt

TOP RAIL DETAIL

8"

4"

2"

2" Radius

2" Radius
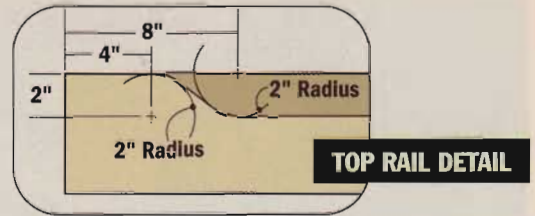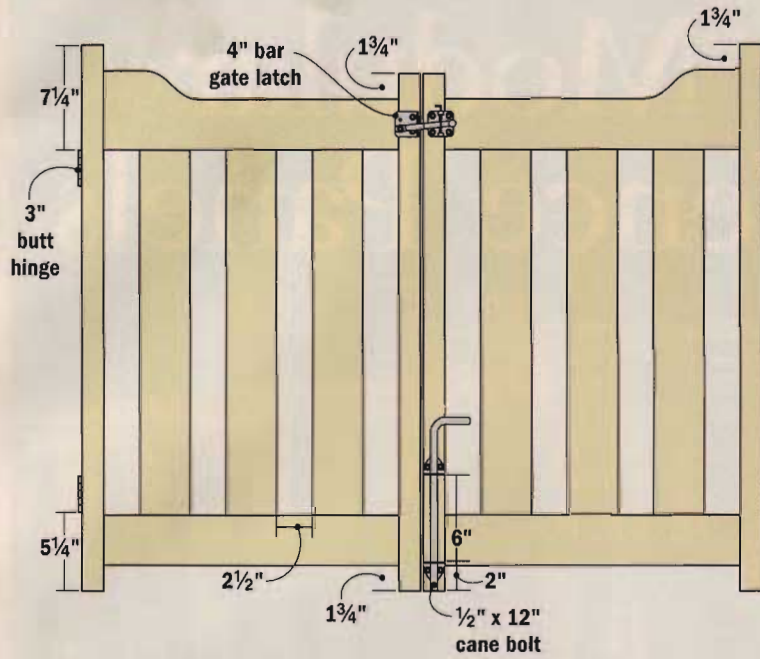
MATERIALS LIST

LUMBER: (FOR TWO GATES)

(2)	Outer Stiles	$1^1/_2$" x $1^1/_2$" x $37^3/_4$"
(2)	Inner Stiles	$1^1/_2$" x $1^1/_2$" x $35^3/_4$"
(2)	Top Rail	$1^1/_2$" x $5^1/_2$" x $20^1/_2$"
(2)	Bottom Rail	$1^1/_2$" x $3^1/_2$" x $20^1/_2$"
(6)	Gate Slats	$^3/_4$" x $3^1/_2$" x $26^1/_4$"

HARDWARE:

(4)	3" zinc-coated butt hinges w/screws
(1)	4" bar-type gate latch w/screws
(1)	$^1/_2$" x 12" zinc-coated cane bolt w/ screws
(16)	#8 x $3^1/_2$" Fh exterior woodscrews
(12)	4d galvanized box nails (clip the heads)
(1)	4"-6" length of $^3/_4$" I.D. copper or PVC pipe

GATE ASSEMBLY

4" bar gate latch

Top rail
(2x6–20½" long)

½" x 12" cane bolt

Inner stile
(2x2–35¾" long)

Gate slat
(1x4–26¼" long)

3" butt hinge

Outer stile
(2x2–37¾" long)

Bottom rail
(2x4–20½" long)
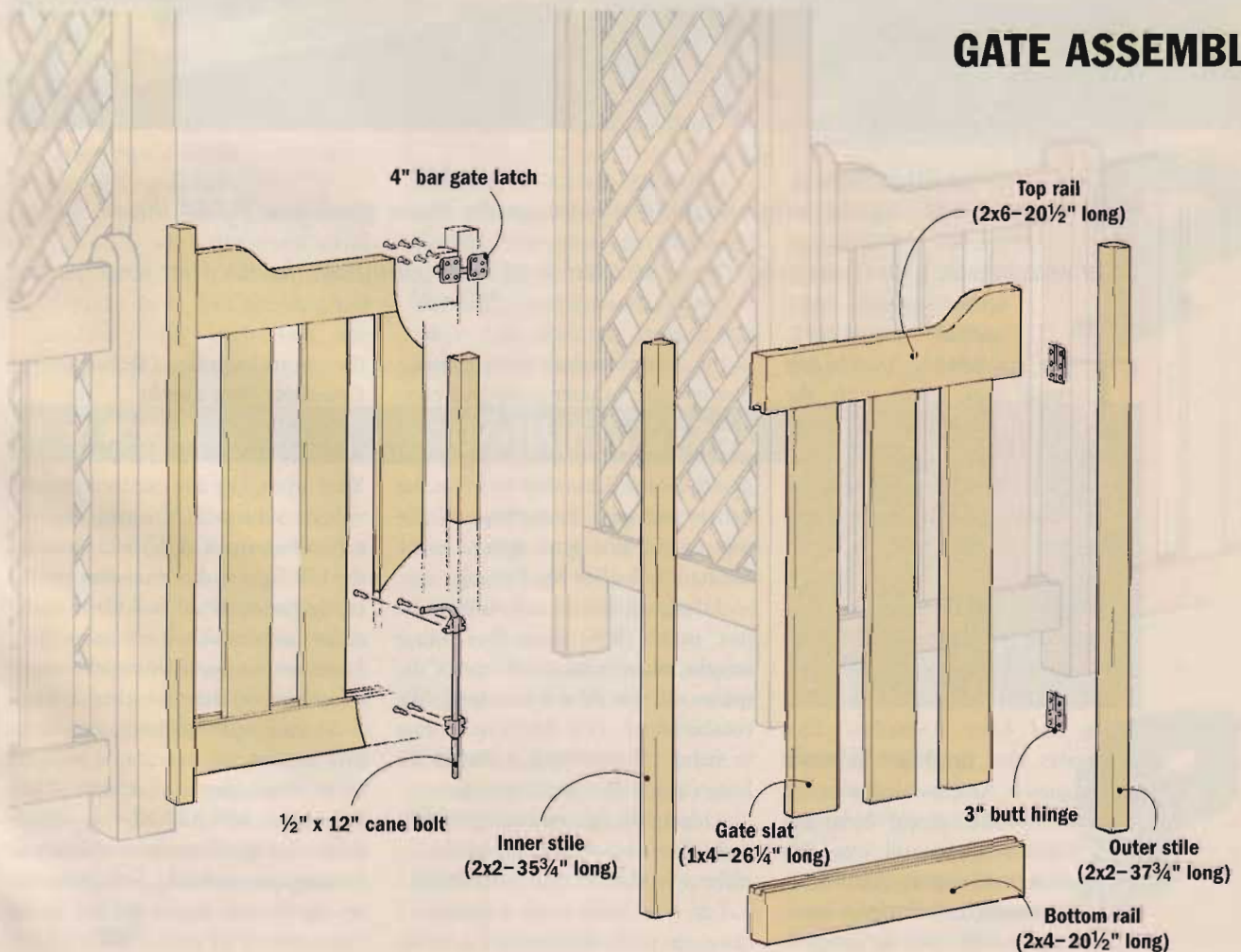
Modular Fence Panels

Whether you add just the wings or build a fence for the entire yard, you'll find these decorative panels simple to build. And the extra-long stiles eliminate the need for fence posts.

The small wing panels not only look great with the gated arbor, they add some structural support as well. And if you choose to build the fence panels, the wings provide a nice transitional step down from the tall arbor.

INTEGRATED POSTS

Both panels are constructed similar to the gates. For these panels, however, I used 2x4 lumber for the stiles (*Wing and Fence Assemblies*). This eliminates the need for separate fence posts. And with stiles of adjoining panels going into the same post hole, you still wind up with substantial support. (Note that while this method works for a lightweight, decorative fence design such

as this, a heavier, barrier-type fence may require heavier posts and concrete footings.)

The top rail on the wing panel gets the same decorative touch as the bench and gate. Rounding off the tops of the stiles gives them a more finished look (*Post Top Radius*).

I designed these fence panels to be just under 5-ft. long. For other lengths, add or eliminate some of the spaces and slats (6" for each space/slat combination). This flexibility comes in handy if you need a shorter or longer panel to complete a run.

Depending on your situation, you may also need to turn a corner or make a bend to fit your yard. When I had to deal with both situations, I came up with ways to still connect

the posts solidly (*Techniques for Connecting Fence Panels*).

PROTECTING YOUR PROJECT

Your arbor, like any outdoor project, will be subject to the rain and the sun's ultra-violet (UV) radiation. It's the UV light — not moisture — that breaks down the surface fibers of the cedar and causes it to turn gray. Moisture just lets mildew and rot get a foothold on these weathered fibers.

If you want to keep the cedar looking natural, use a UV resistant clear finish (such as Cabot Clear Solution, 800-877-8246) which limits damage from the sun and protects against water. Expect, however, to rejuvenate this type of finish every couple of years.

TECHNIQUES FOR CONNECTING FENCE PANELS
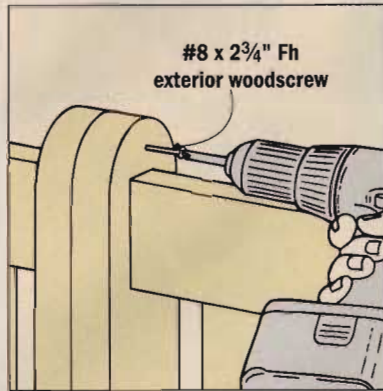
#8 x 2¾" Fh exterior woodscrew

STRAIGHT ON . . .
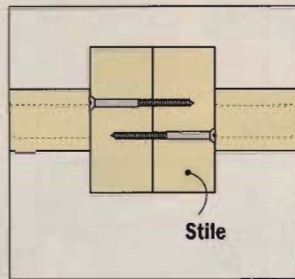
Stile

Drive exterior grade screws on both sides of the posts.

TURN A CORNER . . .
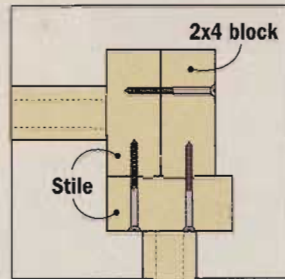
2x4 block

Stile

For right angles, screw a 2x4 block of wood to both stiles.

OR CHANGE DIRECTIONS
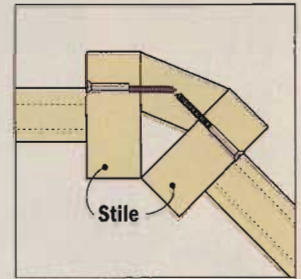
Stile

Miter a piece of wood to fit the angle you need.

WING AND FENCE ASSEMBLIES

Wing top rail
(2x6–20½" long)

Slats
(1x4–26¾" long)

Fence rail
(2x4–56½" long)

Wing inner stile
(2x4–63½" long)

Wing bottom rail
(2x4–20½" long)

Wing outer stile
(and fence stile)
(2x4–61½" long)

Fence rail
(2x4–56½" long)

37½"

2½" gaps

#8 x 3½" Fh
ext. woodscrews

NOTE: Stile length can vary depending on how deep you want the posts anchored. Dimensions shown allow for 24" below ground.

24"
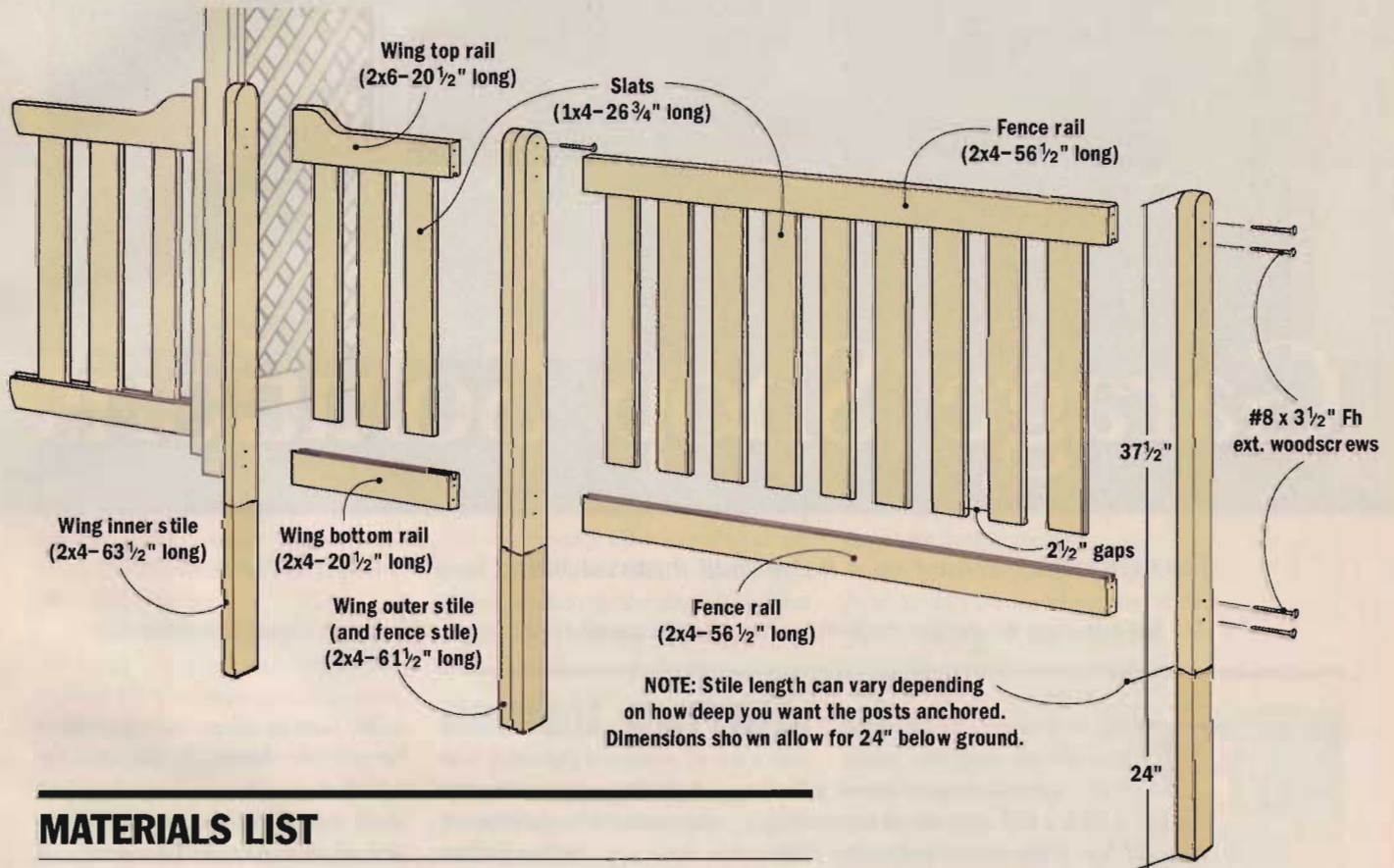
MATERIALS LIST

LUMBER: (FOR ONE WING)

   (2) Inner Stile 1½" x 3½" x 63½"
   (2) Outer Stile 1½" x 3½" x 61½"
   (1) Top Rail 1½" x 5½" x 20½"
   (1) Bottom Rail 1½" x 3½" x 20½"
   (3) Slats ¾" x 3½" x 26¼"

HARDWARE: (FOR ONE WING)

   (8) #8 x 3½" Fh exterior woodscrews
   (6) 4d galv. box nails (heads clipped)

LUMBER: (FOR ONE FENCE PANEL AS SHOWN)

   (2) Stiles 1½" x 3½" x 61½"
   (2) Rails 1½" x 3½" x 56½"
   (9) Slats ¾" x 3½" x 26¼"

HARDWARE: (FOR ONE FENCE PANEL)

   (8) #8 x 3½" Fh exterior woodscrews
   (18) 4d galv. box nails (heads clipped)

POST TOP RADIUS
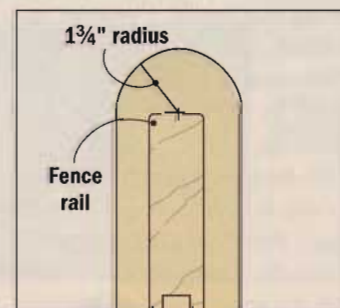
1¾" radius

Fence rail

Garage Shop Solutions

For many of us, setting up a home shop means working in the garage. Try out these

10 simple tips to get more from your garage work space and still have room for your car.

Take a minute to imagine your dream shop. You probably see a large room equipped with a full array of power tools. It has loads of cabinets for storage, plenty of lights and outlets, a heating and cooling system, and centralized dust collection. There's even a dedicated finishing area with windows to let in plenty of light and fresh air.

Now back to reality. Many of us have a few power tools and a bench crammed into the corner of a garage. And actually setting up shop means leaving a car out on the driveway.

But if you look around, there's probably a lot of untapped potential. The challenge is finding it. Here are 10 simple tips some of us here at *Workbench* have used to make our garage shops a better place to work.

1 USE MOBILE TOOL BASES TO SHORTEN SHOP SETUP TIME

When I wanted to start a project in my garage shop, it used to take me the better part of a morning just to get things set up. I was wasting valuable woodworking time. Now, I have sawdust flying inside of 15 minutes.

By putting all my stationary tools on mobile bases, I can quickly wheel them into position. You can build your own, but for the money and time involved, I'd opt for a heavy-duty commercial base.

That's just part of the solution. By marking the bases' locations on the garage floor with paint, you can wheel each tool right back to its "ideal" spot (see the photo *above*). This helps you recreate an efficient workflow, but more importantly you don't waste time leveling up the tools each time, since most garage floors slope or have peaks and valleys.
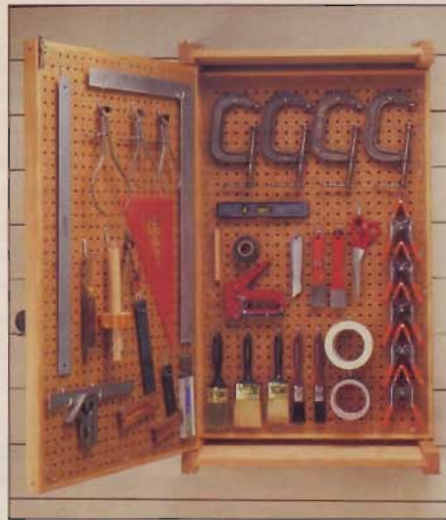
2 COMBINE LUMBER STORAGE WITH A MITER SAW STATION

Handling long boards in cramped quarters sometimes requires a little fancy footwork. To save steps and your back, consider creating a lumber rack that doubles as a miter-saw stand (see the photo at *left*).

A setup like this lets you lift boards straight onto the mitersaw without having to change their orientation. Whether you crosscut the piece to finished length, or just trim a board to a manageable size, it really simplifies material handling.

3 USE OTHER TOOLS TO SUPPORT TABLE SAW WORK

Who wouldn't love to have a cabinet-style table saw with massive extension wings and outfeed tables? But you may as well try parking an aircraft carrier in your garage if you're short on space. One way to keep table saw size in check is to use other tools to help support large

workpieces. Clamp a board to a jointer fence (see photo at *lower left*) or crank your drillpress table down to match the table saw's height.

4 UTILIZE WALL SPACE WITH PEGBOARD OR SLOTWALL

Floor space in any shop is a precious commodity, but it's particularly true in a garage shop where you typically share the space with cars, bikes, and yard equipment. To free up floor space, consider making maximum use of the wall space.

Pegboard and slotwall offer greater flexibility than fixed shelves. With some careful planning, you can double or triple the capacity of a patch of wall space. Hinged pegboard panels, such as the unit above, let you utilize both sides of the pegboard without eating up much space. (To find out how to build the unit shown, call 800-347-5105 and ask for volume 5, issue 27 of *ShopNotes*. The price is $4.99 plus shipping.)

5 REGULAR WAXING HELPS KEEP TOOLS FREE OF RUST

Controlling the climate in most garage shops amounts to opening or closing the overhead door. The heat and cold may be tough on you, but it's the humidity that's tough on tools. Rust can form on cast iron tool surfaces almost overnight.

You can stay ahead of rust by polishing your table saw, jointer, and other tool surfaces at least a couple of times a year. There are any number of products that work from paste wax and WD40 to Boeshield or Top Kote, which are specifically designed for tool surfaces.

I like to use a floor-type paste wax and rub it in with a Scotchbrite pad — the gray type available at automotive parts stores. The abrasive pad helps cut rust and pitch deposits and the rubbing action helps remove the old wax and deposit new wax. Buff the wax once it dries to a dull finish. (It takes a lot less time than waxing my car.)

power. A strain relief cord connector firmly grips the cord where it enters the electrical box and keeps the wiring from pulling loose. You can find the cord, connectors, plugs, and boxes at an electrical supply store or have an electrician rig a couple of quad boxes for you.

The four outlets allow me to plug in several machines. But since I can't physically operate more than one tool at a time, I don't worry about overloading the circuit.

Hanging the cords overhead keeps them from underfoot, and you shouldn't have to continually swap the extension cord from one tool to another and back. When it's not in use, the box can be pulled up against the ceiling with a length of rope and a pulley. Run the rope along the ceiling and tie it off on the wall.

6 PROVIDE POWER FROM ABOVE WITH QUAD BOXES

To get electricity to the various power tools in my garage shop, I used to string out extension cords across the floor. But when you're running a table saw, you don't want to be tripping over a tangle of cords.

Unfortunately, all the outlets were located along one wall. So unless I rewired the garage, I needed another solution. The answer was to hang quad box extension cords from the ceiling over the garage stalls (*above*). Heavy-duty, rubber-covered (Type S) 12-gauge, three-wire cord delivers the

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TURN A SOLID-CORE DOOR INTO A BENCH

QUICK PROJECT

7 FOLDING YOUR BENCH FLAT AGAINST THE WALL CONSERVES FLOOR SPACE

It seems there's never enough bench space, particularly during the assembly stage of a project. Yet, free-standing workbenches eat up a ton of floor space, particularly when you have to park a car in the middle of your shop.

One way to deal with this problem is to mount a solid-core door on hinges to the shop wall. When you need the bench, it swings up and locks in place on the folding support wings. With the project complete, tuck away the wings under the bench and it folds down flat against the wall, leaving room for vehicles or tools.

I've bought a few solid-core doors with minor damage (at times with hinges attached) in the "scratch and dent" section of the local home center. If the door has already been drilled for a lockset, simply mount the hinges to that side and feed cords from power tools through the hole.

2x4 ledger screwed to wall studs

2x4 mounting plate screwed to wall stud

Solid-core door (1¼" x 28" x 80" exterior door shown)

Mount door hinges to edge with lockset hole

Continuous hinge

Support wing ¾" x 24" x 24" plywood

Support wings fold in to allow the bench to fold down.

Ledger

28"

Support wing

30"

4¾"
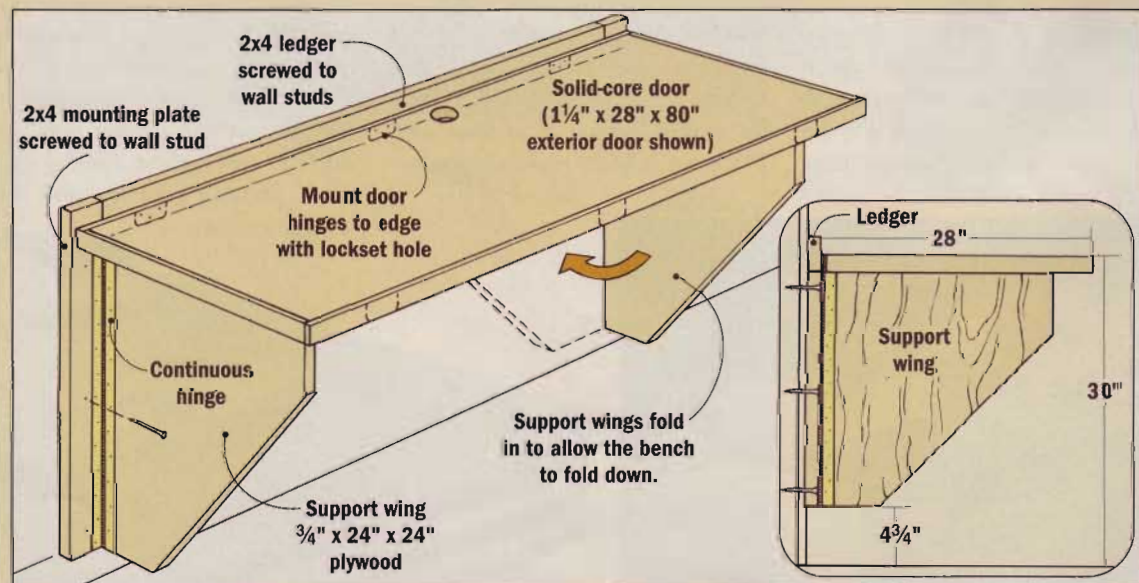
8 EPOXY-COAT YOUR SHOP FLOOR FOR EASIER CLEANING

Shop dust really sticks to an untreated concrete floor. Concrete also holds moisture whether it comes up from the ground or drips off the car.

To fight dirt and moisture, coat your shop floor with an epoxy paint. There are a number of water-borne epoxy floor finishes on the market, such as Armor Seal by Sherwin-Williams (800-474-3794) or EpoxyShield by Epoxi-Tech (800-696-3280).

No matter what finish you choose, the key to getting the paint to stick is thoroughly cleaning the floor. Citrus-based degreasers will cut most of the grime, but you may need to have the floor professionally acid etched or shot blasted to give the paint a clean surface with which to bond.

9 GRAB AIRBORNE DUST WITH A FURNACE FILTER AND A FAN

No matter what you try, you'll never eliminate all the sawdust from a shop. Here's a simple, inexpensive way to at least breathe a little easier and keep dust off the car.

Mount a furnace filter to the intake side of a box-type window fan (below). Attaching the filter with duct tape seals the area around the perimeter of the filter and forces the fan to draw air through the filter.

This setup comes in handy prior to applying finish because the filter captures some of the fine, airborne dust particles that can settle onto the wet finish. Periodically clean the filter to avoid overheating the fan.

PVC PARTITION POLES

To create a quick, clean finishing area, close off a small portion of your shop with plastic sheeting held in place against the ceiling with PVC tensioning poles.

10 CREATE AN INSTANT FINISHING ROOM

No one has room to set up a dedicated finishing area in a garage shop. So do what professional contractors do — use plastic sheeting and spring-loaded poles to create an instant, dust-free finishing area.

Each pole shown here consists of two pieces of PVC pipe and a 32" length of bungee cord. Cut the 1¼" I.D. outer pipe 84" long and the ¾" I.D. inner pipe 48" long. After cutting one hook off the bungee cord, thread that end of the cord through a hole drilled near the top of the outer pole. Then knot that end of the cord and feed the other end (with the hook) down into the outer pipe.

So the pole can grip the ceiling, make a simple wooden pad to fit on the top end of the inner pole. To increase the pole's height (from 7½-ft. up to 10½-ft.) or boost the tension, pull some of the cord out and tie it in a loop.

PARTITION POLE ASSEMBLY

Drill 1" hole and sand to fit pipe

¾" x 2½" x 4½" wooden pad

#8 x 2¼" woodscrew

#6 x 1" drywall screws

Bungee cord

½"-dia. hole

¾" I.D. PVC pipe, 48" long

1¼" I.D. PVC pipe, 84" long
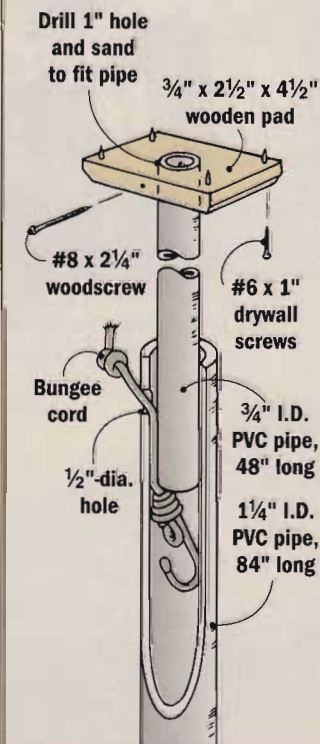
Top-Notch Jigsaws

Today's high-tech jigsaws, like the six we tested, offer a lot of advantages over inexpensive or older models. Packed with features and power, they're great for more than just cutting curves.

Chances are good you own a jigsaw. And I'll bet you use it for simple jobs like cutting curves or making pocket cuts. The rest of the time, it sits on the shelf.

Maybe that's why so many people make do with an inexpensive or older saw, even though it vibrates, and won't always make clean cuts. But if that old dust-covered version works when needed, why spend more?

That's what I wondered as I considered trading up to one of today's higher-end saws with features like toolless blade changing, variable speed, and orbital action. But are these saws really more useful than lesser versions? Or will they still spend most of their time on the shelf?

To find out, I went to local tool dealers and home centers and bought six popular jigsaws priced between $140 and $165 — one each from Bosch, Craftsman, DeWalt, Makita, Milwaukee, and Porter-Cable. Then I tested them to see how the saws perform and how they compare.

WHAT YOU GET FOR YOUR MONEY

Just looking at the features listed may be enough to convince you these jigsaws are superior to lesser versions. But features alone won't make these saws better. They have to offer real benefits.

Toolless blade change: This may not seem like a big deal, but I think toolless blade changing is important.

First, jigsaw blades get dull. That's why they're disposable. And good luck getting a straight, smooth cut with a dull one. Plus, there's a blade for most any material and application. If they're easy to change, you're likely to switch blades more often.

Power: Motors in these jigsaws range from 4.5- to 6.2-amps which is a big step up from cheaper saws' 3- to 4-amp motors. That keeps these six cutting in situations that would likely stall a lesser saw.

Variable speed: Varying the cutting speed — measured in strokes per minute (spm) — fine-tunes the

TESTS AT A GLANCE

Evaluating performance took a lot of tests. We timed blade changes, tried the adjustments, and evaluated the saw's controls. Then we made a variety of cuts in lumber, plywood, melamine, and even metal. Using identical Lenox blades helped level the playing field.

Blade changing: The toolless systems on these saws beat using a wrench any day. But some are more cumbersome than necessary.

Power: These saws are all powerful enough to handle thick stock or tough materials. But one saw did suffer a lack of low speed power.

saw to the material. Combine this with the right blade, and working with different materials is a breeze.

Orbital cutting: Using the orbital cutting feature allows even more control. Turning a dial changes the path the blade follows (see *Orbital Cutting* below), making the saw cut more aggressively as the amount of orbit increases.

Handle style: Bosch, DeWalt, and Milwaukee each offer a version of the saws I tested, but with a barrel-style grip. I stuck with the more common top-handle models for testing.

WHAT IT ALL MEANS

So are these jigsaws more useful, and more likely to get used, than lesser versions? In a word, yes.

Each of these saws is great at what a traditional jigsaw is good for. Plus they'll do a lot more. In fact, any of them can substitute for a portable circular saw or even a band saw in many situations. (See *Easy-to-Build Jigsaw Table* on page 51 for another way to get more from a jigsaw.)

And now for the big question: Among six very good jigsaws, is one clearly the best? Read on to find out.

ORBITAL CUTTING

For a more aggressive cut, these saws all offer orbital cutting action.

When set on zero orbit, the blade simply moves straight up and down. In orbital mode, tension on a roller behind the blade relaxes during the downstroke. This allows the blade to drop back, clearing chips. On the upstroke, the blade moves forward in a scooping motion.

The photo below shows four 20-second timed cuts. The more aggressive orbital settings clearly cut farther.

Support roller

Clean blade gets a larger bite on the upstroke.

Pushing back on downstroke allows chips to drop out of kerf.
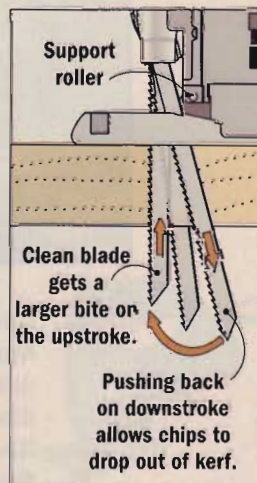
Milwaukee 6266-21 ★★★★★

You should change blades often with a jigsaw, and the Milwaukee makes it simple. Just slide over the spring-loaded lever (*left*), pull out the blade, stick a new one in, and release the lever. In tests this took four seconds. More importantly, though, it was foolproof. The blade slips in and out with ease.

Quick blade changes are great, but a good jigsaw needs more. The 6266 delivers with vibration-free power at all speeds, and well-placed controls that operate easily. And this saw tracks like a prison hound.

If you're looking for faults, they're pretty minor. The blade guard does obscure the cut line, but not too badly. Also, the 6266 only accepts T-shank blades, not universal blades, and it's tough to fit the saw in its case with a blade installed.

Specifications:
Amperage:	5.7
Speed (SPM)	450-3,100
Blades:	T-shank
Blade Change:	Toolless
Shoe Adjust:	Hex Wrench
Price:	$160

Virtues: Simplest blade change; low vibration; good power.
Vices: Stamped-steel shoe; accepts only T-shank blades.
Verdict: For the best overall package, this saw wins hands down. Plus it's smooth, powerful, and quiet.

DeWalt DW321 ★★★★★

Pick a speed, pull the trigger, and the DW321 cuts with smooth, unyielding power. Plus it follows a straight or curved line with ease.

You'll never worry about locating a wrench, either, since this saw doesn't require one for changing the blade or adjusting the shoe. The twist-style blade release isn't as simple to use as the Milwaukee's, but grips the blade firmly and holds it straight.

A simple lever locks or releases the shoe (*left*). It works well, but can vibrate loose if not firmly engaged.

And the saw offers an adjustable dust blower to keep the cut line clear. A variable trigger allows changing speed in mid-cut, too.

If totally toolless operation and raw power are important to you, then you may favor the DeWalt.

Specifications:
Amperage:	5.8
Speed (SPM)	500-3,100
Blades:	Univ./T-shank
Blade Change:	Toolless
Shoe Adjust:	Toolless
Price:	$165

Virtues: Very powerful, completely toolless, accepts all blades.
Vices: Heavier than most; blade release awkward; touchy trigger lock.
Verdict: This saw cuts with power and precision. But it suffers from a few minor quirks in the controls.

Bosch 1587AVS ★★★★★

Smoothness may rank atop your wish list. If so, take a look at the Bosch. Its vibration is always low. Even the controls, like the orbital action and dust blower switches (*left*), are smooth.

The main problem with this saw is the blade changing mechanism.

The system is toolless, and fairly easy to use once mastered. But there's no sure-fire way to lock the blade in straight. You have to eyeball it. In freehand cuts this is no big deal. But when the saw is used with an edge guide or trammel, there can be trouble with tracking.

The 1587 accepts only T-shank blades, not the universal style. But this is no surprise, since Bosch pioneered the T-shank style.

Adjusting the shoe on this saw does require a wrench, but like most others, the wrench stores on-board.

Specifications:
Amperage:	5.0
Speed (SPM)	500-3,100
Blades:	T-shank
Blade Change:	Toolless
Shoe Adjust:	Hex Wrench
Price:	$160

Virtues: Solid performance; dust blower; variable speed trigger.
Vices: No way to lock blade straight; accepts T-shank blades only.
Verdict: Offers good performance and smoothness, but needs some way to hold blade accurately straight.

★★★★★ Porter Cable 9543

Porter-Cable's 9543 was introduced to the market after the other saws here, so its designers had a chance to incorporate the competition's best features. It has toolless blade changing (*right*) and shoe adjustment, and the only shoe with stops at angles other than 0° and 45°.

Plus, this saw has the highest-amp motor of any saw in the test. And that powerful motor is useful for driving the blade with ease at any chosen speed.

Once you've got a blade in place in the 9543, it stays put well, and stays straight. What's tough is getting a blade in or out. The spring-loaded tabs (*right*) are small and have a strong spring, so you really have to squeeze. Combine this with a tight opening for the blade, and the process seems tougher than necessary.

Virtues: Completely toolless; bevel stops on shoe; comfortable handle.
Vices: Blade-changing mechanism is picky; more vibration than expected.
Verdict: A well thought-out saw, but needs improvements to the blade changing system.

Specifications:

Amperage:	6.0
Speed (SPM)	500-3,000
Blades:	Univ./T-shank
Blade Change:	Toolless
Shoe Adjust:	Toolless
Price:	$160

★★★★★ Makita 4304T

In most tests, the Makita 4304T performed well. In fact, the shoe adjustment may be the best in the bunch, with a simple lever that releases and locks it in place (*right*). Of all the twist-style blade releases, this one is easiest to use, too. And the saw grips T-shank or universal blades with equal ease.

The Makita fell off the others' pace, though, with the speed set at less than about 60%. When ripping 2x Douglas fir at half speed, a test conducted with each saw, the Makita stalled repeatedly.

With a 5.5-amp motor (fourth most powerful in the group) this tendency to stall seems odd. Keep the speed wound up, though, and the 4304T is a great performer.

Also, the blade guard does make it difficult to see the blade and cut line.

Virtues: Great blade change and shoe adjustment; good feel; smooth.
Vices: Power drops way off at lower speeds, causing some stalling.
Verdict: The adjustments are first-rate, and the saw is very compact, but it needs more low-speed power.

Specifications:

Amperage:	5.5
Speed (SPM)	500-3,000
Blades:	Univ./T-shank
Blade Change:	Toolless
Shoe Adjust:	Toolless
Price:	$160

★★★★★ Craftsman 27251

The Craftsman 27251 is a good basic saw, but lacks features found on the others. It's the only one without toolless blade changing, it has the least-powerful motor, and it doesn't come with a case like the rest of the saws tested.

The trade-off for this lack of features is a price that's at least 10% lower than the other five saws. Some stores may discount the price even further. So if the other prices seem too steep, but you want a variable-speed, orbital action saw, check out the Craftsman.

Requiring hex wrenches for the blade and shoe isn't awful, but this saw uses a different size wrench for each. On the plus side, the bevel scale is adjustable (*right*).

The 27251 is an adequate saw, but isn't in the same league as the others.

Virtues: Aggressive orbital action; lowest price in test; light weight.
Vices: Takes two hex wrenches; vague speed adjustment; cheaper feel.
Verdict: This is a capable saw with adequate power, but lacks the features and refinement of the others.

Specifications:

Amperage:	4.5
Speed (SPM)	0-3,100
Blades:	Univ./T-shank
Blade Change:	Hex Wrench
Shoe Adjust:	Hex Wrench
Price:	$140

The Final Cut

By now you've probably read the at-a-glance comparisons on pages 48 and 49. So what more can I say?

For starters, these six jigsaws are much better than older or inexpensive models. And any of them will exceed your expectations.

I'd also venture that not one of these jigsaws will spend much time on the shelf, thanks to their multiple personalities. In orbital mode they'll power through thick stock in a hurry. But they'll also hug a line and cut smooth in non-orbital mode.

Blade deflection — a problem on saws I was used to— is minimal with all six jigsaws. Even when making scroll cuts in thick stock, square cuts require just a steady hand, and a zero-orbit setting.

But just saying "they're all good" isn't good enough. They *should* be good at these prices. So what's the bottom line?

RECOMMENDATIONS

In this field of six jigsaws, the Milwaukee 6266-21 rated best overall. The quick, simple blade changing system helped this saw win. But it also performed well in all tests, and did so without excess noise or vibration.

Second place goes to DeWalt's DW321. It also performs well, but lacks the slick blade changing setup. And the DeWalt is larger, making it less maneuverable in close quarters.

The Bosch 1587AVS runs a close third. And soon, Bosch will debut a blade changing system that may rival Milwaukee's.

Fourth and fifth place go to the Porter-Cable and Makita respectively. Each saw was held down by a single shortcoming. Porter-Cable's was the clunky blade changing system. The Makita lacked low-speed power.

That leaves the Craftsman in sixth place. It works fine, but needs more features to compete.

And that's the real bottom line. In a league this tough, success takes more than a couple good features. It takes the whole package.

SOUND OFF ONLINE

Now you know what we think about these jigsaws. Next it's your turn. Do you agree with our conclusions, or has your experience with these tools been different? Letting us know is easy.

You can share your point of view with us and your fellow readers by **logging on to the Tool Reviews page at www.WorkbenchMagazine.com. We'll post your responses, and we'll encourage manufacturers to share their thoughts on the tools and tests.**
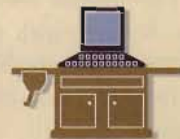
POINTS OF VIEW: Opinions from other tool users

All six jigsaws have features I like. But to me, the *best* jigsaw would combine the greatest attributes of each saw. Since I can't have that I'll pick from the saws that really exist.

I like the Milwaukee for its sweet blade change system and well-placed controls. And it's smooth.

My second place saw is the Makita. I like it's compactness and adjustments. Yes, it has less power, but there's plenty for homeowner use.

The DeWalt and Bosch get third and fourth place, respectively.

Kevin Boyle
Workbench Sr. Project Designer

It might be hard to pick a clear winner if the Milwaukee's blade changing system wasn't so good. Plus, the saw is well-balanced and quiet.

In second place, the DeWalt and Bosch tie. Changing their blades is more awkward. The systems aren't bad, they just aren't as convenient as the Milwaukee's simple lever. Both the Bosch and DeWalt are much easier than changing blades in the Porter-Cable, though.

The Makita comes in third, but it really needs more low-speed power.

Kerry Gibson
Workbench Associate Editor

I also like the Milwaukee best. It runs very smooth, and the blade change is slick. Id like to see a toolless system for the shoe, but this isn't as big a deal, since I don't make bevel cuts with a jigsaw that often.

Second place was a tie between the DeWalt and the Makita. Both run very smooth and have toolless adjustments that work well. If the Makita's power was ever a problem, I'd just keep it cranked to full speed.

If I have to choose a third place saw, it'd be the Bosch.

Steve Johnson
Workbench Shop Craftsman

Easy-To-Build Jigsaw Table

Mount a jigsaw under this table, and it'll work like a scroll saw or band saw. There's even a blade guard for safety.

This table increases the versatility of any jigsaw by leaving both hands free to control the workpiece. The table is simple to build, and setting up or removing the saw is a snap.
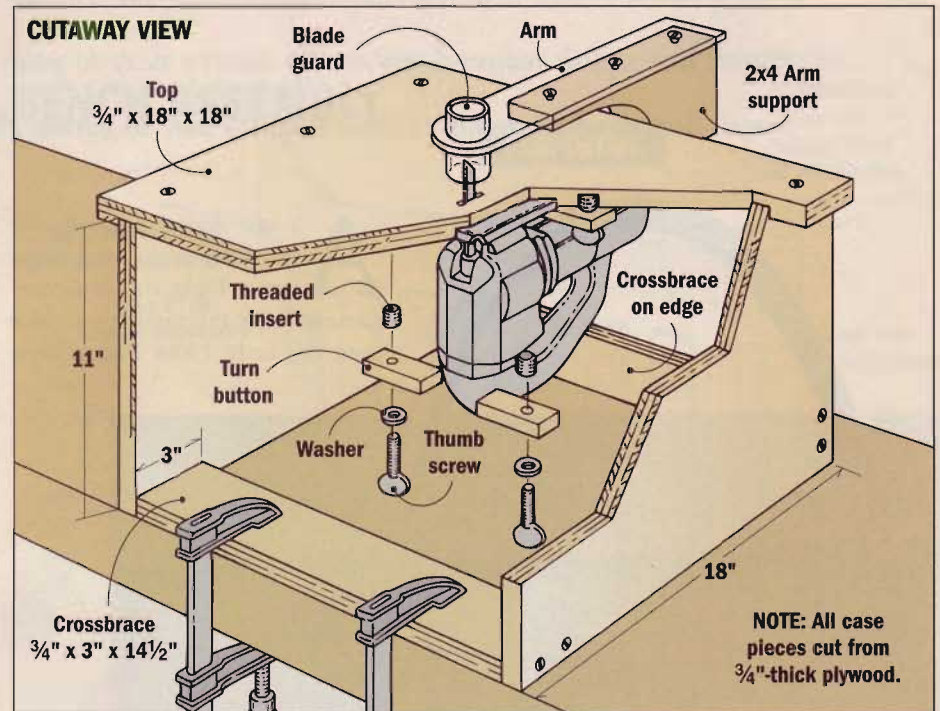
BUILDING THE TABLE

To make the table, start by cutting a top, two side panels, and a pair of crossbraces to size (*Cutaway View*).

Blade Slot: To cut a slot for the blade, drill a series of overlapping $1/16$"-dia. holes centered on the width of the top (*Fig. 1*). Then clean up the slot with a fine-tooth jigsaw blade.

Routing a Recess: The jigsaw mounts in a recess in the top (*Fig. 1*). Hold the saw on the underside of the table top, and trace around the shoe.

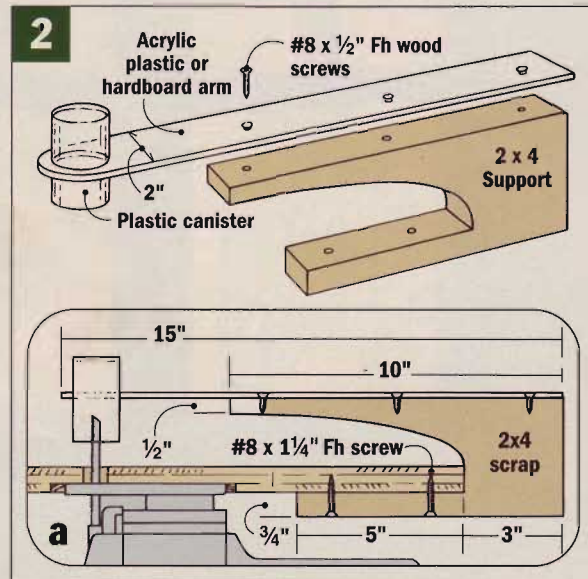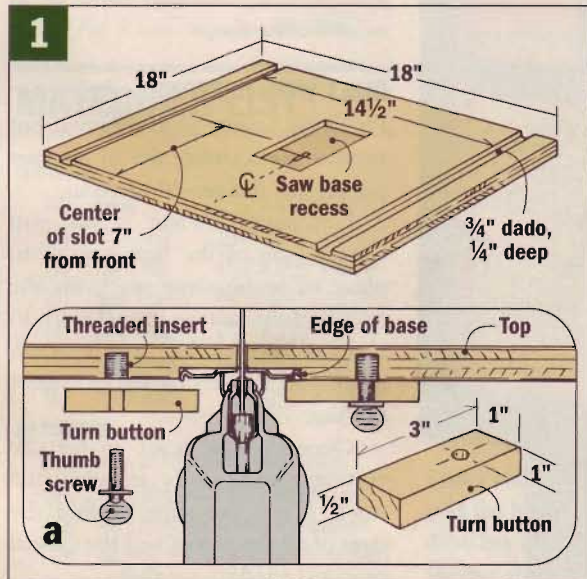Next, rout a recess slightly larger than the jigsaw's shoe, and just a bit shallower (*Fig. 1a*). This way, the jig-saw can be secured with four turn buttons made from scrap hardwood. Thumb screws and threaded inserts hold the turn buttons tight (*Fig. 1a*).

Blade Guard: A simple guard covers the exposed teeth of the moving blade (*Fig. 2*). The guard is a piece of scrap 2x4 with an arm made of hardboard or acrylic plastic. Glue in a 35mm film canister or a pill bottle for a simple blade cover (*Fig. 2a*).

Using the table: Use fine-tooth blades to keep the workpiece from hopping around. And cut with the workpiece face up to minimize chipout on the finished side.

CUTAWAY VIEW

- Blade guard
- Arm
- 2x4 Arm support
- Top ¾" x 18" x 18"
- Crossbrace on edge
- Threaded insert
- 11"
- Turn button
- Washer
- Thumb screw
- 3"
- 18"
- Crossbrace ¾" x 3" x 14½"
- **NOTE: All case pieces cut from ¾"-thick plywood.**

1
- 18"
- 18"
- 14½"
- Saw base recess
- Center of slot 7" from front
- ¾" dado, ¼" deep

1a
- Threaded insert
- Edge of base
- Top
- Turn button
- Thumb screw
- 3"
- 1"
- 1"
- ½"
- Turn button

2
- Acrylic plastic or hardboard arm
- #8 x ½" Fh wood screws
- 2 x 4 Support
- 2"
- Plastic canister

2a
- 15"
- 10"
- ½"
- #8 x 1¼" Fh screw
- 2x4 scrap
- ¾"
- 5"
- 3"

Arts & Crafts Lantern

Attach this stylish redwood and copper lantern next to your front door or hang it from a simple decorative lamp post. Either way, it's sure to garner glowing praise.

As one friend pointed out, this lamp looks a lot like a house. I take that as a compliment since the inspiration came from the early 1900s Prairie Style architecture of Frank Lloyd Wright. But it's the details — the copper top, the stained glass "windows," and the unique hanging system — that give this lamp its distinctive Arts and Crafts look. Each of these details also provides a unique opportunity to work with some different materials.

Take the copper top for example. If you've never worked with thin copper foil, you'll find that it's easy to cut with a pair of household scissors. And you won't have to do any soldering to build this lantern.

The hanging system is made from soft copper tubing available at any home center or hardware store. The tubing already comes coiled in a curved roll, and the end can be flattened easily with a vise or hammer. Then a hook can be curled on it to hang the lantern. Finally, you can pick up the glass at a stained glass store or at some hobby shops.

BUILT WITH REDWOOD

I built this lantern from redwood, but another good choice for an outdoor project like this would be cedar.
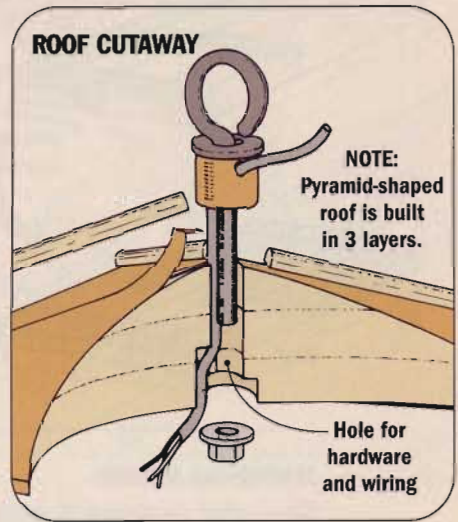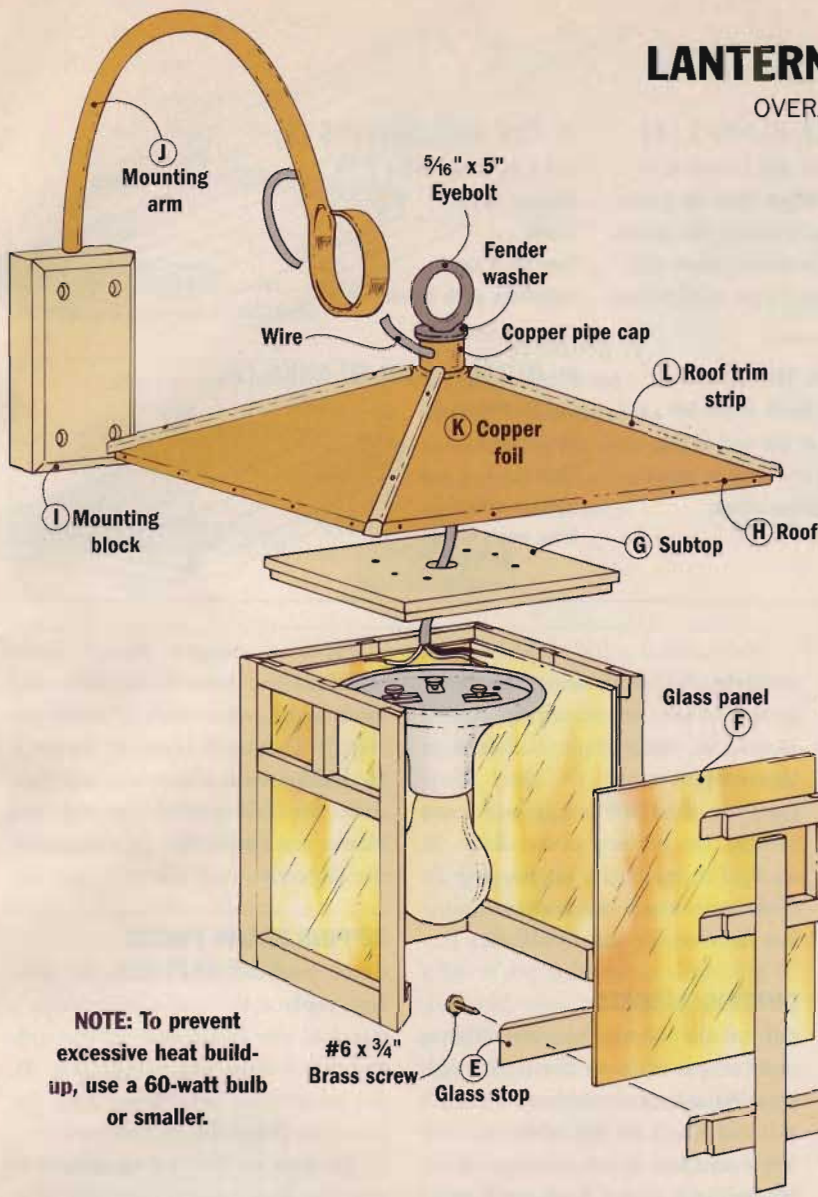
No matter what wood you choose, one of the first steps is to plane or resaw some stock for the frames of the lantern base (*Fig. 1*). To resaw the stock safely, I made a push block and a "zero clearance" insert (*see page 72*).

Once the saw is set up for safe cutting, you're ready to resaw the stock. (Turn the page to find the sizes of all the pieces and the special process I used to cut them.)

LANTERN ASSEMBLY VIEW

OVERALL SIZE: 11"W x 11"D x 11"H

Mounting arm — J

$^5/_{16}$" x 5" Eyebolt

Fender washer

Wire

Copper pipe cap

L — Roof trim strip

K — Copper foil

I — Mounting block

G — Subtop

H — Roof

ROOF CUTAWAY

NOTE: Pyramid-shaped roof is built in 3 layers.

Hole for hardware and wiring

Glass panel — F

Top rail — B

A — Side stile

Center stile — D

NOTE: To prevent excessive heat build-up, use a 60-watt bulb or smaller.

#6 x $^3/_4$" Brass screw — E

Glass stop

C — Bottom rail

Push block

Rip fence

3"-wide stock

Featherboard

Zero clearance insert

1

When resawing, position the fence for the final thickness you want ($^3/_8$"). Use a featherboard to hold the stock and a zero clearance insert.

MATERIALS LIST

LANTERN: (FOR ONE LAMP)

A	(8) Side Stiles	$^3/_8$" x $^3/_4$" x 7"
B	(8) Top Rails	$^3/_8$" x $^1/_2$" x $6^1/_2$"
C	(4) Bottom Rails	$^3/_8$" x $^3/_4$" x $6^1/_2$"
D	(4) Center Stiles	$^3/_8$" x $^1/_2$" x $2^1/_2$"
E	(4) Glass Stops	$^3/_4$" x $^1/_2$" x $5^3/_4$"
F	(4) Glass Panels	$^1/_8$" x $5^5/_8$" x $6^1/_4$"
G	(1) Subtop	$^1/_2$" x $5^3/_4$" x $5^3/_4$"
H	(1) Roof*	$2^1/_4$" x $10^1/_2$" x $10^1/_2$"
I	(1) Mounting Block	$1^1/_2$" x 3" x $5^1/_2$"
J	(1) Mounting Arm	$^1/_2$" O.D. Soft Copper Tubing, $26^1/_2$" long
K	(4) Copper Foil***	$5^3/_4$" x 11", 36-gauge
L	(4) Roof Trim Strips	$^3/_8$" x $^1/_4$" x $7^1/_2$"

POST: (FOR ONE POST)

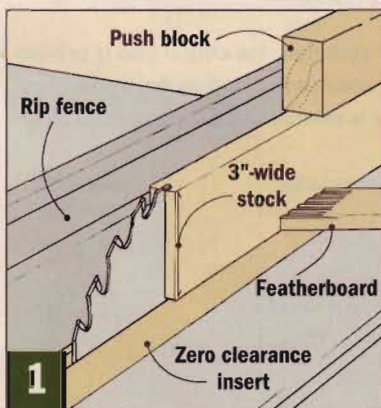|		
M	(2) Post Front/Back	$^3/_4$" x $3^1/_2$" x 72"
N	(2) Post Sides	$^3/_4$" x 2" x 72"
O	(1) Post Skirt	$^3/_4$" x 5" x $7^1/_2$"
P	(1) Cap**	$1^1/_2$" x $6^3/_4$" x $6^3/_4$"
Q	(1) Cap Base	$^3/_4$" x 5" x 5"
R	(1) Cap Cleat	$1^1/_2$" x 2" x 2"
S	(4) Cap Trim Strips	$^3/_8$" x $^1/_4$" x 5"

*Roof is glued up in three layers.

**Post cap is glued up in two layers and covered with copper.

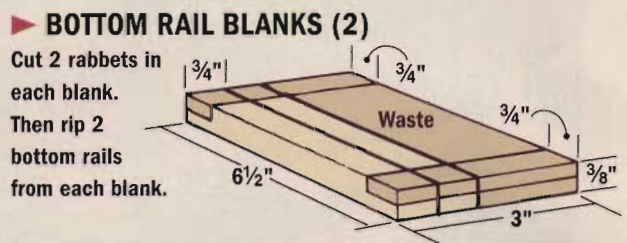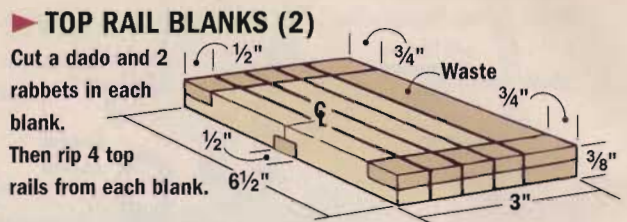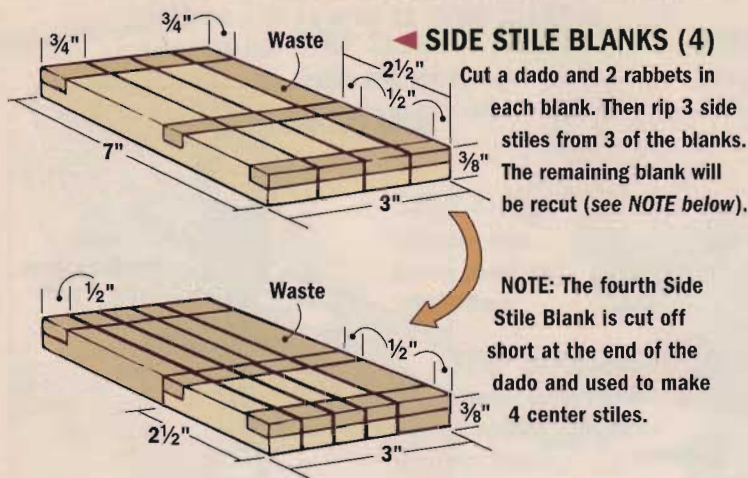***Available at some hobby shops; you can also order a 12"x36" roll from St. Louis Crafts, Inc. at (800) 841-7631.

HARDWARE: (FOR ONE LAMP AND POST)

(1) $^5/_{16}$" x 5" Eyebolt with nut
(1) $^5/_{16}$" x $2^1/_2$" Screw eye
(2) $^5/_{16}$" Fender washers
(2) $^3/_4$" Copper pipe caps
(1) $^5/_{16}$" Flat washer

(8) #6 x $^3/_4$" brass screws
(4) #8 x $2^1/_2$" Fh exterior woodscrews
(8) #8 x $1^1/_4$" Fh exterior woodscrews
(1) Porcelain lampholder that fits $3^1/_4$" or 4" outlet box
(60) #17 x $^3/_4$" copper nails

FRAME BLANKS (to make one lantern)

◄ **SIDE STILE BLANKS (4)**

Cut a dado and 2 rabbets in each blank. Then rip 3 side stiles from 3 of the blanks. The remaining blank will be recut (see NOTE below).

NOTE: The fourth Side Stile Blank is cut off short at the end of the dado and used to make 4 center stiles.

► **TOP RAIL BLANKS (2)**

Cut a dado and 2 rabbets in each blank. Then rip 4 top rails from each blank.

► **BOTTOM RAIL BLANKS (2)**

Cut 2 rabbets in each blank. Then rip 2 bottom rails from each blank.

MACHINING BLANKS

To simplify construction, I designed each wall of the lantern as a frame. The six pieces in each frame are held together with half-lap joints, which you can cut on your table saw with a dado blade.

Because the joinery is identical in all the frame pieces — and the sizes of the pieces are rather small — I decided to machine extra-wide stock. (This kind of gang-cutting operation increases safety and saves a lot of time.)

Start by cutting eight blanks from the 3"-wide stock that you resawed (or planed) down to $\frac{3}{8}$" thick (*Frame Blanks*). While you're making blanks, cut some extra material to use for testing the half-lap setups.

Next, install a $\frac{1}{2}$" dado blade in the table saw and, using the miter gauge with an auxiliary wood extension, cut sample half-laps in the test pieces.

Once the blade height and fence setting are perfect, cut a dado in each of the side stile blanks (*Fig. 2*). Then reset the fence and cut a similar dado in the top rail blanks.

CUTTING RABBETS

All of the blanks require rabbets cut in the ends to form the half laps. To cut these rabbets, install a sacrificial face on the table saw's rip fence and butt the fence against the blade. Then rabbet both ends of *all* the blanks (*Fig. 3*).

Note a couple things here: Some of the rabbets are only $\frac{1}{2}$" wide while others are $\frac{3}{4}$" wide (*see above*). So you'll have to make a second pass for the wider rabbets. And the rabbets in the top rail blanks are cut in the face opposite the dado.

RIPPING FRAME PIECES

Once you're done cutting the half-laps, replace the dado blade with a standard saw blade and rip the rails and stiles from the blanks (*Fig. 4*). Set aside one side stile blank for now. You'll recut it in a minute.

Be sure to use a push block so you can keep your hands well away from the blade while ripping these

5
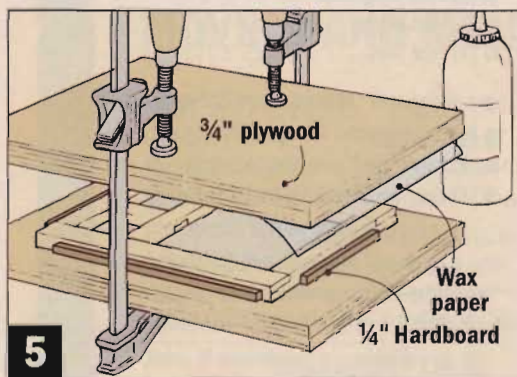
Make sure the assemblies are square before leaving them to dry. Sandwich the glued-up frames between wax paper and two pieces of plywood clamped together while the glue dries.
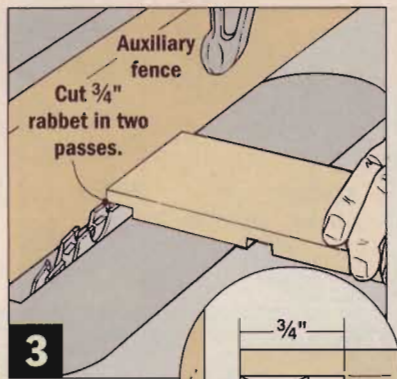
MITERING SLED

This jig will help you get accurate cuts safely each time. The critical step is to make sure the inside of the sled base is cut to the exact same length as the top and bottom rails (6$\frac{1}{2}$"). This will ensure each frame is mitered to the same finished size.
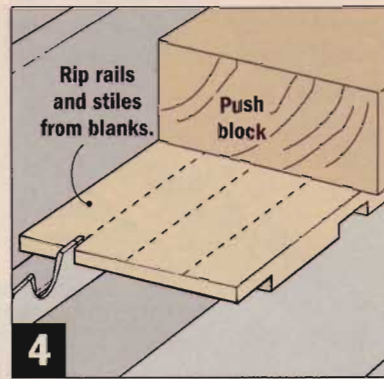
Rip fence

3/8"-thick blank
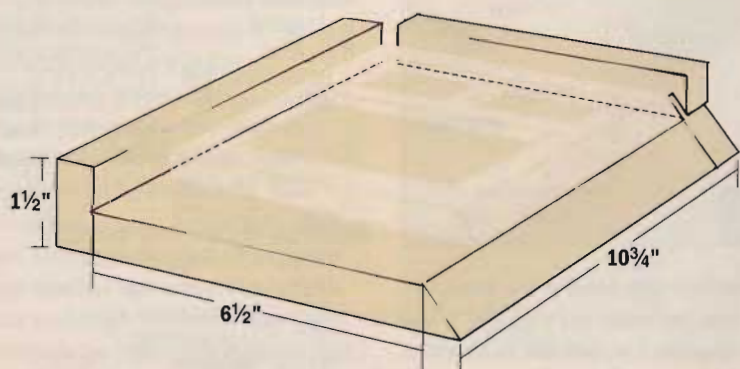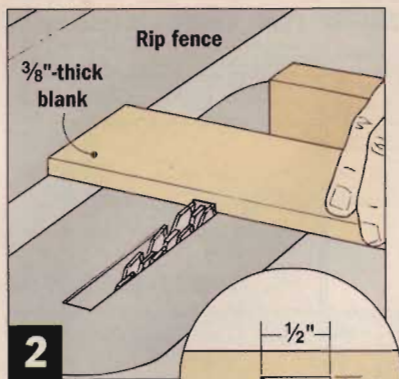
2

Using the fence as a stop, cut the dadoes in your blanks for the stiles and top rails.

1/2"

3/16"

Auxiliary fence

Cut 3/4" rabbet in two passes.

3

Cut rabbets in the ends of *all* the blanks. Note that they vary in width.

3/4"

3/16"

Rip rails and stiles from blanks.

Push block

4

Holding a push block that can travel through the blade against the fence, rip the rails and stiles from the rabbeted and dadoed blanks.

---

narrow pieces. (I like to sneak up on the cuts until they just fit into their matching dadoes and rabbets.)

The last pieces you need to make are the center stiles. They're pretty simple, but still take a few steps.

You'll actually begin with that fourth side stile blank you put aside. First set the fence so the blade lines up with the bottom edge of the dado in this blank. Then crosscut the blank, leaving the entire dado.

What remains is a 2 1/2"-long center stile blank (see *Frame Blanks*). Next, rip four 1/2"-wide center stiles from this new blank.

STILE AND RAIL ASSEMBLY

The next step is to form the actual walls of the lantern. Don't do any gluing until you've dry fit each

assembly. If the machine setups were accurate, the half-lap joints will be tight and the frames square. After fine tuning any pieces that need it, glue the stiles and rails together to make four frames.

You'll want to clamp each frame to hold the joint surfaces snug while the glue dries. A good way to do this is by sandwiching a frame between two pieces of plywood. Be sure to use wax paper in case of glue squeeze-out (*Fig. 5*).
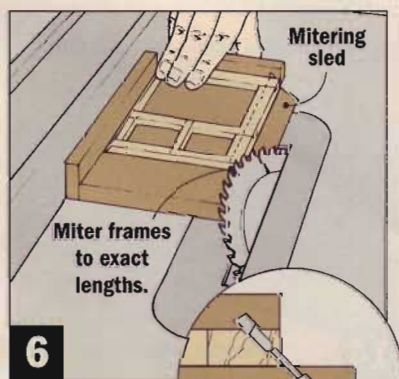
MITERING THE FRAMES

Mitering is a pretty simple process. But when working with such small frames, accuracy becomes essential. To get precise cuts on each frame, I built a sled that made the procedure easy and safe (*Mitering Sled*).

Don't rush into cutting your assembled frames. First tilt the blade precisely to 45°, then make cuts in a couple of scrap pieces. Once you can set the scrap pieces together to form a 90° angle, go ahead and miter the frames (*Fig. 6*).
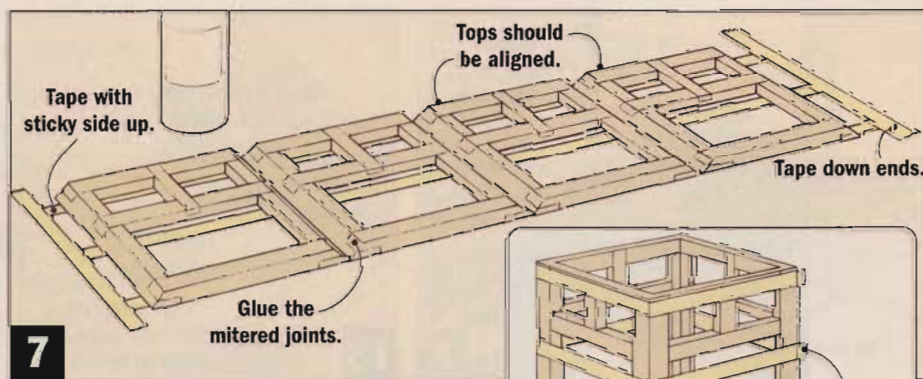
GET GOING WITH THE GLUE

After you've mitered the edges, there's a neat trick for gluing them into a "box." First lay down three strips of masking tape on a flat surface with the sticky side up. Tape the ends to hold the strips in place.

Then butt the frames together on top of the tape strips with the miters facing up (*Fig. 7*). Next, spread glue in all the miter joints. Finally stand the pieces up to form a box and finish taping (*Fig. 7a*).


Mitering sled

Miter frames to exact lengths.

6

With the inside face up, cut completely past the corner on both edges of each frame.

Tilt blade 45°

Tape with sticky side up.

Tops should be aligned.

Tape down ends.

Glue the mitered joints.

7

Line up the frames with the miters facing up and the ends flush. The tops should be aligned together. After gluing the miter joints, stand the assembly up and finish taping to form a box.
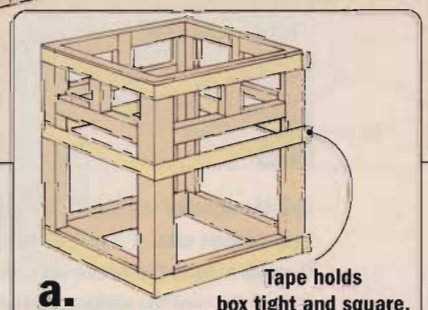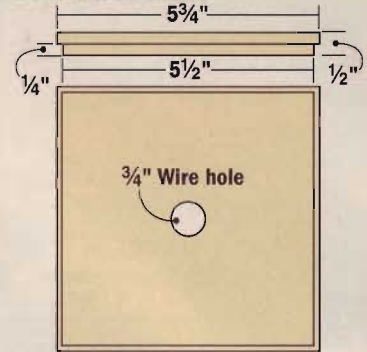
a.

Tape holds box tight and square.
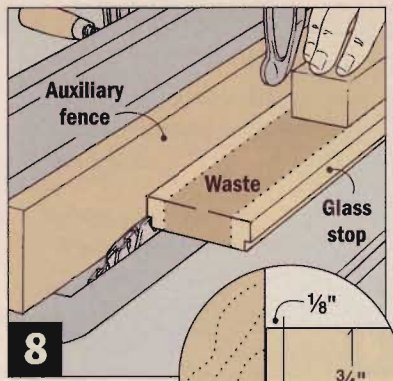
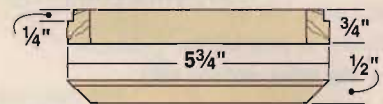**8** Cut glass stops from a 3"-wide blank. First rabbet for the glass panels, then rip to width.

Auxiliary fence

Waste

Glass stop

1/8"

3/4"

1/4"
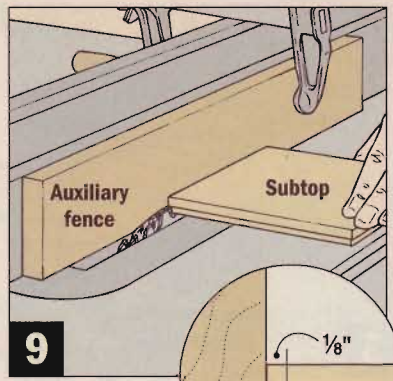
9 Use a 1/4" dado blade to cut shallow rabbets on the underneath side of the subtop.

Auxiliary fence

Subtop

1/8"

1/4"

SUBTOP PLAN VIEWS

5 3/4"

5 1/2"

1/4"

1/2"

3/4" Wire hole

GLASS STOP PLAN VIEWS

1/4"

5 3/4"

3/4"

1/2"

CUT A SUBTOP

With the basic box done, you can shift gears to the subtop and glass stops. To make the subtop, first cut a 3" × 12" piece from 3/4" stock. Then resaw (or plane) it to 1/2" thick.

Next, crosscut this piece in half and edge glue the halves together. Once the glue sets, trim the subtop to fit tightly into the top of the lantern box, but don't fasten it in place yet.

MAKE THE GLASS STOPS

The glass stops are another instance when I preferred to machine the stock before cutting it into smaller pieces. Start with a 3" × 12" blank of 3/4" stock. After cutting this blank to size, the next step is to cut rabbets along two edges of the blank to accept the glass panels (*Fig. 8* and

Glass Stop Plan Views). To set up the saw to cut these rabbets, you'll need to measure the thickness of your glass (see *Glass Mounting Detail* on page 58).

Note: While the dado blade is set up, also cut a shallow rabbet around the bottom of the subtop (*Fig. 9* and *Subtop Plan Views*). This rabbet also accepts the glass panels.

Once all the rabbets are cut, replace the dado blade with a standard blade and rip 3/4"-wide strips off the glass stop blank.

The stops are mitered to fit in the bottom of the lantern. To determine their length, measure the inside of the box and then cut 45° miters at both ends of each stop. Sneak up on the cuts until the stops just fit the opening.

COMPLETE THE SUBTOP

Getting back to the subtop, draw lines from corner to corner to mark the center. Then drill a 3/4"-dia. hole completely through the subtop for the electrical cord to pass through.
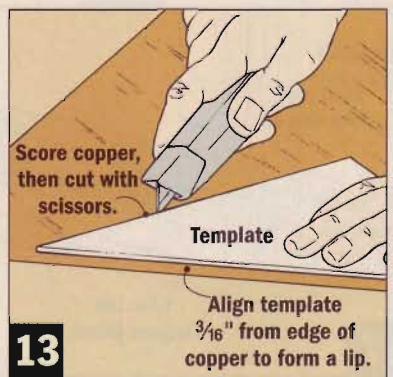
Now the subtop can be inserted into the lantern box (rabbet down) and nailed in place. You need to watch the placement of the nails. To avoid cracking the stock, first drill two nail holes through the top rail of each frame 1/8" from the top edge. Then tap in 3/4"-long copper nails.
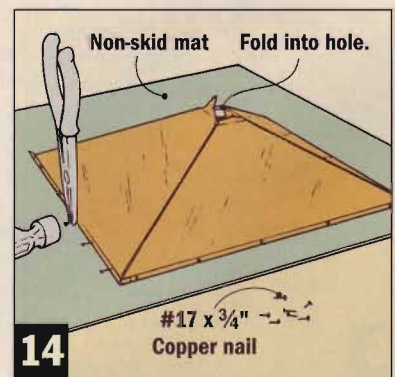
TOPPING IT OFF

The roof is one of the most appealing aspects of this lamp. And it also serves a very practical function — hiding the ugly wiring. But there was a challenge here.
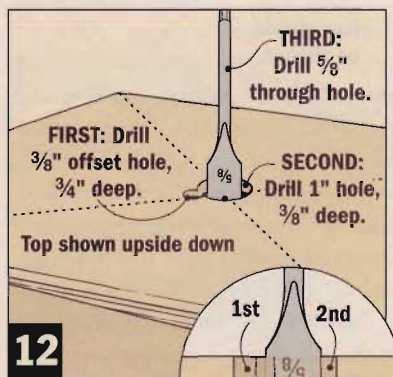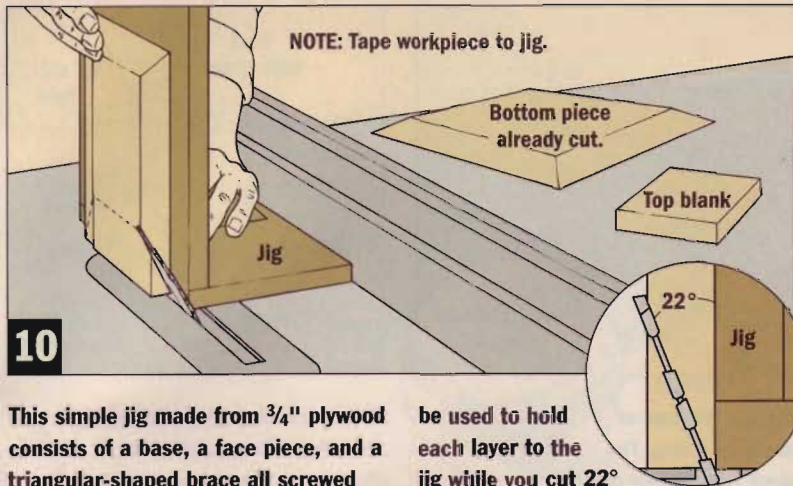
12 Drill three holes — two shallow, one through — from the bottom of the roof for wiring and hardware.

THIRD: Drill 5/8" through hole.

FIRST: Drill 3/8" offset hole, 3/4" deep.

SECOND: Drill 1" hole, 3/8" deep.

Top shown upside down

1st   2nd   3rd

13 Using a posterboard template cut to size, score the copper foil with a utility knife. Then cut the roof pieces with household scissors or a tin snips.

Score copper, then cut with scissors.

Template

Align template 3/16" from edge of copper to form a lip.

14 With the copper in place, fold the sharp edges into the hole at the peak of the roof. The small lip around the bottom should be folded and nailed.

Non-skid mat   Fold into hole.

#17 x 3/4" Copper nail

10 NOTE: Tape workpiece to jig.

Bottom piece already cut.

Top blank

Jig

22°

Jig

This simple jig made from ³/₄" plywood consists of a base, a face piece, and a triangular-shaped brace all screwed together. Double-sided carpet tape can be used to hold each layer to the jig while you cut 22° bevels on the edges.
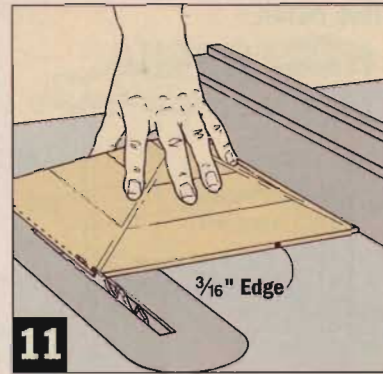
11 ³/₁₆" Edge

After gluing the three roof pieces together and sanding flat spots for the trim, cut a ³/₁₆" edge all around the bottom for nailing the copper.

Each side of the full pyramid-shaped roof was too tall to cut on the table saw. Nevertheless, I did end up using the table saw, but to cut three shorter beveled pieces. Then I glued these shorter pieces together.

The layers are cut from ³/₄"-thick stock. To make them, start by cutting the larger one 11 ³/₈" square, the middle one 7 ³/₄" square, and the smallest one 4" square. Since the roof angle is 22°, the pieces have to be stood on edge for beveling. I designed a simple jig to safely and accurately make the cuts (*Fig. 10*).

Once the layers are all beveled, glue them together to form a pyramid shape. After the glue dries, sand a ³/₈"-wide flat spot along the ridges for trim strips that will be added later. Then cut a ³/₁₆" flat edge all around the lower edge of the roof for nailing the copper trim (*Fig. 11*).

CREATING HARDWARE SPACE
Before applying the copper and trim strips to the roof, you need to create space for the wiring and the hardware.

Drilling from the bottom of the roof, make a small ³/₄"-deep offset hole to feed the wiring and then a larger ³/₈"-deep hole where the nut and washer will fit (*Fig. 12* and *Wiring the Lamp* on page 58). Finish by drilling a ⁵/₈" hole completely through the roof for an eyebolt to hang up the lantern.

TRIMMING THE TOP
A posterboard template helps when laying out the copper triangle roof pieces (*Fig. 13*). After cutting the triangles, spray adhesive to one side and attach the pieces to the roof.

Once the copper pieces are in place, you can trim and fold any sharp points around the edges, and tuck any excess near the roof peak into the wire hole. Finally, fold the copper along the bottom edge of the roof and nail it in place (*Fig. 14*).
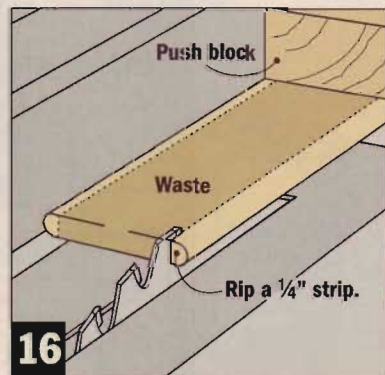
The last parts on the roof you'll need to make are the rounded-over trim strips, which have beveled ends. Once again, I started with a wider, ³/₈"-thick blank about 16" long to make these pieces.

First, round over all four edges of the stock by hand or with a router table (*Fig. 15*). Next, rip a strip off each side of the blank (*Fig. 16*). After cutting four trim pieces 7 ¹/₂" long, shape 22° bevels on all the ends. Then nail the trim in place with copper nails. Be sure to leave room for a ³/₄" pipe cap (see *Wiring the Lamp* on page 58).

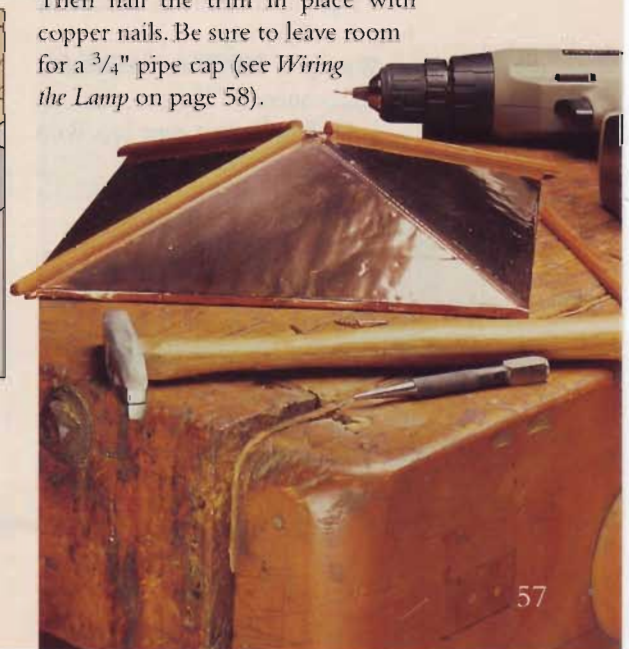**15** ¹/₄" Roundover bit

Position fence flush with bearing on bit.
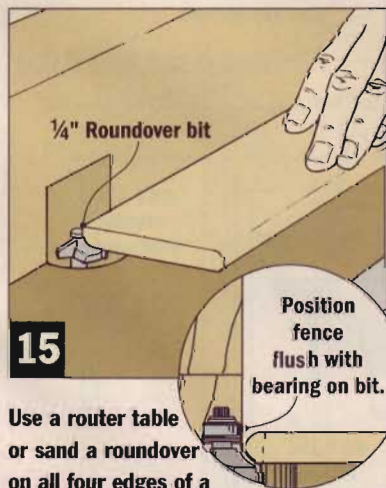
Use a router table or sand a roundover on all four edges of a piece of ³/₈"-thick stock.
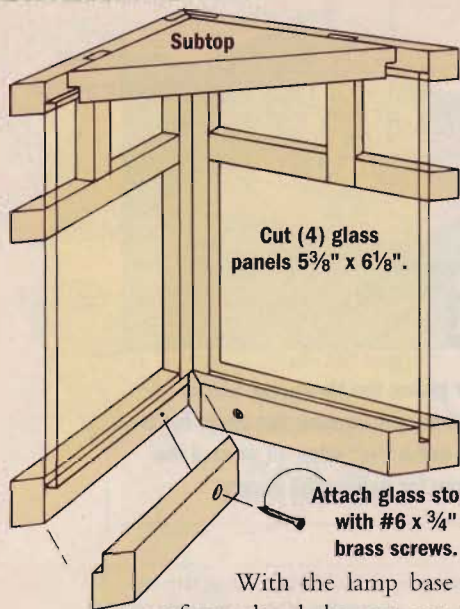

16 Push block

Waste

Rip a ¹/₄" strip.

Once the roundovers are done, set the fence and rip away a ¹/₄" strip from the blank. Reset the fence and rip a second strip from the other edge.
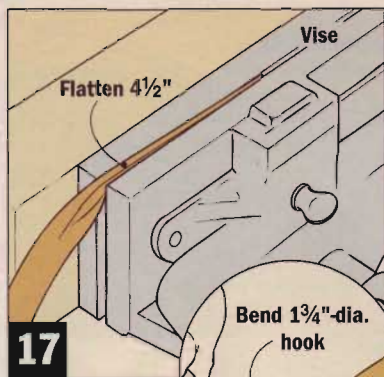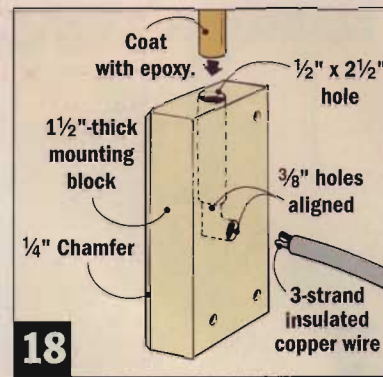
GLASS MOUNTING DETAIL

Subtop

Cut (4) glass panels 5⅜" x 6⅛".

Attach glass stops with #6 x ¾" brass screws.

Vise

Flatten 4½"

17

Bend 1¾"-dia. hook

Flatten the copper easily in a vise. The hook for hanging can be formed with a needle-nose pliers.

Coat with epoxy.

½" x 2½" hole

1½"-thick mounting block

⅜" holes aligned

¼" Chamfer

18

3-strand insulated copper wire

With the wiring pulled through the mounting block, apply a small amount of epoxy to the mounting arm and insert it into the top hole until flush.

With the lamp base and roof completed, the next step is to wire the lamp, insert the glass panels, and attach the fixture (see *Wiring The Lamp* below). Once these things are done, you can get started on the mounting block and arm.

ATTACHING YOUR LAMP

Building the mounting block and arm is pretty simple. Start by cutting a piece of soft copper tubing to length (26½"). Use a piece of string for measuring. Using a vise, or hammer and a flat surface, smash down 4½" of one end of the tube. Then curl the flattened end to create a 1¾"-dia. hook for hanging the lamp (*Fig. 17*). Because the tubing comes already coiled, forming the arm's final radius isn't difficult.

Finish the mounting arm by drilling a ⅜" hole in the underneath side of the tube right above the smashed end to feed the wiring. Now you can turn your attention to the mounting block.

Begin by cutting a piece of 1½"-thick stock to 3" × 5½". Next drill two holes in the top and one in the back of the mounting block to accept the copper mounting arm and the wiring (*Fig. 18*). Chamfering the front edges of the mounting block adds a finished look.

After stringing the wire through the copper tube and out the backside of the mounting block, simply insert the mounting arm into the top of the block so it rests on the ledge created by overlapping holes.

Although the lantern looks great by itself next to a doorway, you may want to hang it from a decorative lamp post. ▼██
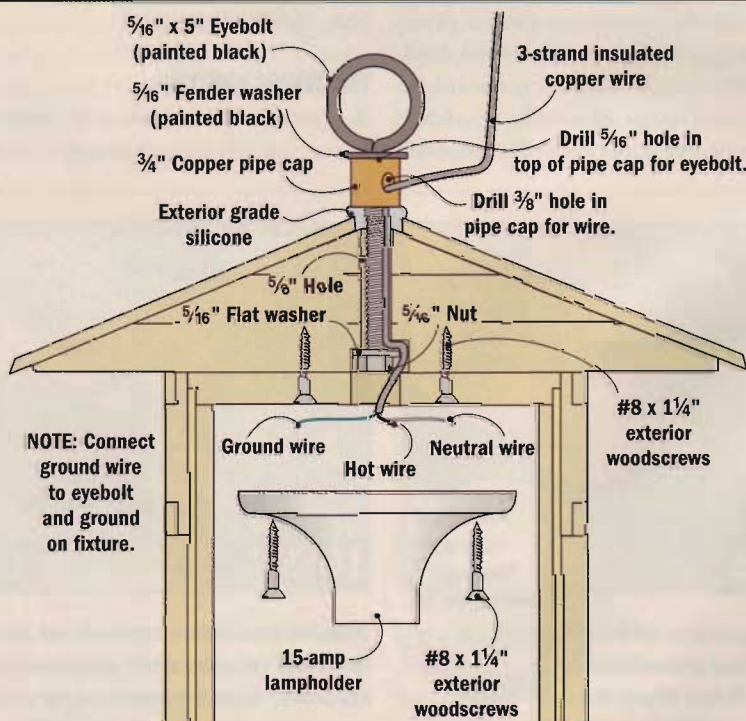

WIRING THE LAMP

If you aren't comfortable working with electricity, I suggest you build the lantern base and have a qualified electrician install the fixture and wiring.

Wiring is best done in the following sequence:

1. Drill holes in a pipe cap. Run wiring through the cap.
2. Thread wiring through the opening in the lantern roof.
3. Cut an eyebolt approx. 4½", then attach hardware to the roof.
4. Screw the subtop to the roof.
5. Attach wires to the fixture.
6. Screw fixture in place.

After the wiring is done, you can install the glass panels and glass stops (*Glass Mounting Detail*).

5⁄16" x 5" Eyebolt (painted black)

5⁄16" Fender washer (painted black)

¾" Copper pipe cap

Exterior grade silicone

3-strand insulated copper wire

Drill 5⁄16" hole in top of pipe cap for eyebolt.

Drill ⅜" hole in pipe cap for wire.

⅝" Hole

5⁄16" Flat washer

5⁄16" Nut

NOTE: Connect ground wire to eyebolt and ground on fixture.

Ground wire

Hot wire

Neutral wire

#8 x 1¼" exterior woodscrews

15-amp lampholder

#8 x 1¼" exterior woodscrews

Plant a Decorative Post

The Arts and Crafts lantern looks stunning all alone. But hang a couple on a matching lamp post, and you'll be amazed at how well they complement each other.

The lamp post is made from the same material and designed in a similar style as the lantern itself. I built the post from 1x4 redwood and assembled it with simple butt joints. A mitered skirt and copper cap give the post a special touch.

Start by ripping and gluing ³/₄"-thick pieces of stock to create a 3¹/₂" × 3¹/₂" × 72" post. Next, make a 5" × 7¹/₂" base, or skirt, to fit around the bottom of the post. A band clamp comes in handy when gluing the skirt. Chamfering the top edges and mitering the corners to 45° adds a finished look and blends nicely with the lamp design.

If the post cap looks familiar, it should. It's designed much like the roof on the lantern. But this time start with only two square blanks — 7¹/₂" and 4" — and bevel all four edges of each. After gluing the two layers together, sand flat spots along the ridges for the trim. Then cut a ³/₁₆" flat edge around the bottom of the cap (see *Cap Details*). Finally, cut and attach the copper and trim pieces to the cap. And like the lantern, the post cap also has an eyebolt threaded through a copper pipe cap.
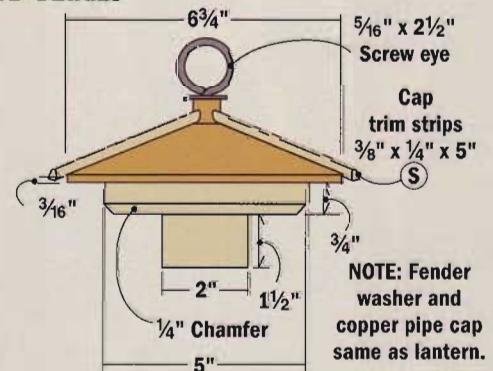
Unlike the lantern roof, the post cap has a chamfered base. You can cut it to size next. Chamfer the bottom edges, beginning with the ends. Then glue it centered on the underneath side of the cap. A cleat fits inside the opening in the post and is screwed in place to complete the cap (see *Cap Details*).

Finish by drilling a ³/₈" hole in the post to feed the wiring. After screwing a mounting block in place, you're ready to anchor your post for everyone to enjoy.

POST ASSEMBLY VIEW
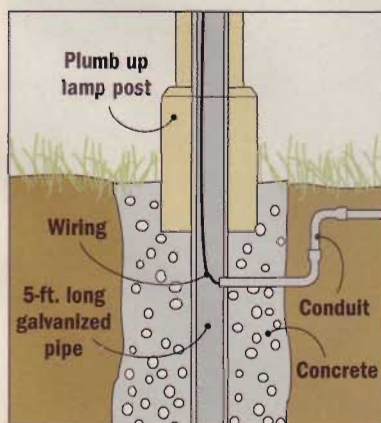
Cap base ³/₄" x 5" x 5" — Q

P Cap 1½" x 6¾" x 6¾"

R Cap cleat 1½" x 2" x 2"

#8 x 1¼" exterior woodscrew

N Post side ³/₄" x 2" x 72"

M Post front ³/₄" x 3½" x 72"

¼" Chamfer

Post skirt ³/₄" x 5" x 7½" — O

2"-dia. galvanized pipe

POST ANCHORING

Plumb up lamp post

Wiring

5-ft. long galvanized pipe

Conduit

Concrete
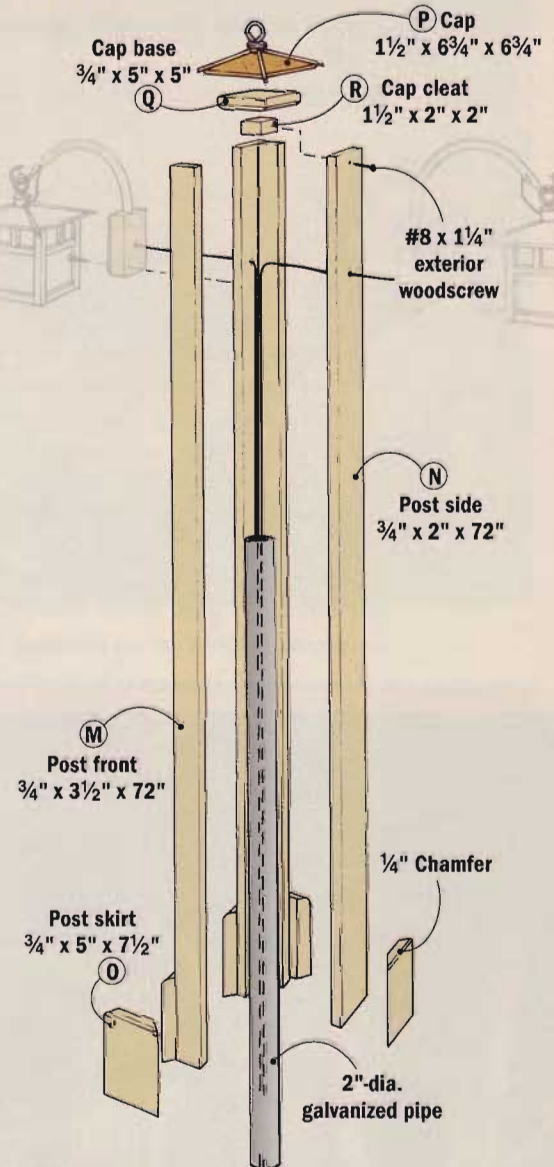
Before digging, check the wiring codes in your area. You will probably have to run the cable underground in conduit. Here's one way to anchor your post: Dig a 2- to 3-ft. deep hole about a foot wide. Then get a 5-ft. long galvanized pipe that just fits inside the opening of your lamp post, and drill a hole in it large enough to accept the conduit. Fill the post hole with concrete and bury the metal post. Slip your lamp post over the metal post a few inches into the concrete. Finally check that the lamp post is plumb.

CAP DETAILS

6¾"

⁵/₁₆" x 2½" Screw eye

Cap trim strips ³/₈" x ¼" x 5" — S

³/₁₆"

2"   1½"

¾"

¼" Chamfer

5"

NOTE: Fender washer and copper pipe cap same as lantern.

A New Look at Night

Learn how to turn your home and yard into a dramatic display of colors, shapes and shadows

for just pennies a night with a safe, easy-to-install low-voltage lighting system.

You wouldn't build a new house or remodel a kitchen without considering lighting. The same should hold true for outdoor projects, too.

One of the most popular additions to home landscapes recently has been low-voltage lighting. If you've ever played with a model train, then you're familiar with the concept behind low-voltage lights. Both operate on 12-volt electricity.

Yet, as friendly as they seem, low-voltage lights aren't totally foolproof. Without careful planning, you can easily overdo it. Here are some tips for using a low-voltage lighting system.

PLANNING A LAYOUT

Before buying anything, first decide what to light and why. Answering a couple questions will help:

Where is light needed the most? Map out your property, paying special attention to the location of the driveway, paths and entryways. Look around the landscape for special features such as sculptures or a favorite tree to highlight.

I like to limit myself to one or two focal points in each area of the yard. The key is to be creative without providing too much light.

What effect is desired? Lights produce different effects, depending on where and how the fixtures are positioned. Some of the most common lighting patterns are shown on the facing page. To get an idea of how something might look, I use a flashlight to mimic the effect.

Once you're satisfied with the layout and the lighting patterns, shopping comes next.

HOW THE BASIC PARTS WORK

All low-voltage lighting systems are composed of three main parts:

TRANSFORMER

The heart of any low-voltage lighting system is the transformer. It converts 120-volt AC electricity into 12-volt DC needed to power the low-voltage lights.

Transformers range in size from a small unit, which powers a single entrance light, to large models that can safely operate 25 or more lights. To determine what size is needed, simply add up the wattage of all the lights that will be used. Then select a transformer that closely matches the total wattage of the lights.

In addition, transformers include several control options that can turn lights on and off — even when nobody is home. Some have an automatic timer. Others use photo controls that switch lights on at dusk and off at dawn. Motion sensors are a third option.

CABLE AND CONNECTORS

Electricity is delivered through an insulated two-wire cable (There's no need for a ground wire). The lights attach with simple clips that pierce the cable's self-sealing insulation to tap into the power. Usually, 16-gauge cable is sufficient. It's a good idea to use 12- or 14-gauge on runs over 150 feet or when 10 or more lights are installed.

LIGHT FIXTURES

You can buy $4 plastic lights all the way up to $100 metal deck fixtures. I was surprised to even find a $20 kit with everything for a basic system: 10 lights (4 watts each), 50 feet of cable, and a 44-watt transformer with a manual timer.

CREATE THE RIGHT EFFECT

In most instances with landscape lighting, you want people to notice the effect created by the light rather than the fixture itself. A single fixture can cast many different patterns depending on its placement. Here are six of the most common lighting effects you're likely to use.

DOWNLIGHTING
When you want to cast light over a broad area, a floodlight mounted on the house or high in a tree works well.

ACCENT LIGHTING
Create sparkling islands of light spread across focal points to illuminate walkways and direct pedestrians.

UPLIGHTING
To highlight an object's shape, hide a well, spot, or accent light at ground level to throw light upward.

MOONLIGHTING
To recreate the mood of moonlight, place floodlights high in trees so the light filters down through the branches.
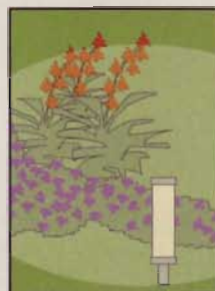
SPREAD LIGHTING
Mushroom, tier, and cylindrical-shaped lights will bathe flower beds in soft, circular patterns of light.

SHADOWING
Place a low-angle spotlight in front of bushes and objects near a tall wall to make the objects appear much larger.

INSTALLING A SYSTEM

You can install everything in three easy steps. All it takes is a screwdriver and a pair of pliers.

1. **Installing a Transformer.** The transformer can be mounted indoors or outside at least a foot off the ground next to a grounded outlet. Follow the manufacturer's instructions for attaching the cable wires.

2. **Stringing the Cable.** Route the cable to the desired fixture locations. The first light must be at least 10 feet from the transformer. Since you're working with low voltage, the cable doesn't need to be run in conduit. Once the entire installation is completed and the lighting effect is achieved, you may want to bury or hide the cable so that a mower won't accidentally cut it. I used a sidewalk edger to make a shallow trench that's the perfect size.

3. **Connecting the Lights.** Each manufacturer has its own system for attaching fixtures to the cable. Many connectors have prongs that simply pierce the cable and lock in place to make contact.

The only thing left to do now is wait for dark to test the system and fine tune the lights.

Screened from View

Central air-conditioning units, trash containers, or stacks of firewood — they can all hurt a

home's appearance. Now you can hide them in plain sight with this attractive enclosure.

The central air-conditioning box sitting next to your house is a small price to pay for cool air on demand. But, let's face it — that box is pretty ugly.

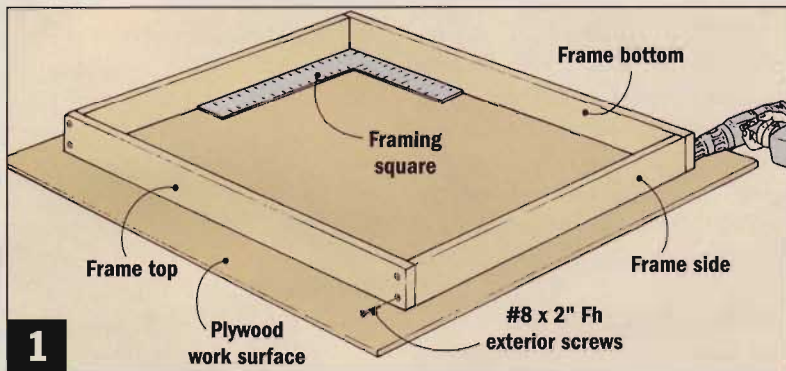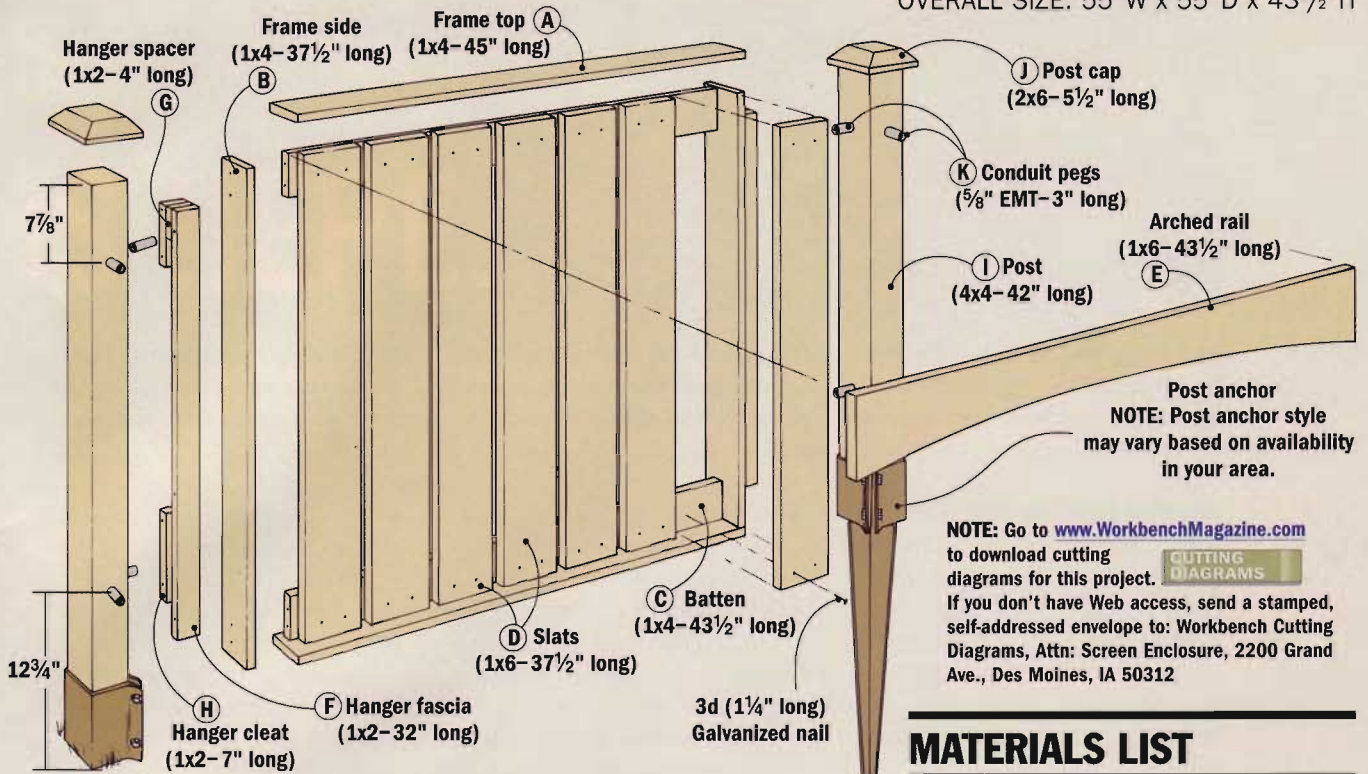This knockdown enclosure might just solve the problem. It's a whole lot nicer to look at than a metal box, and it comes apart easily whenever you need to service the air conditioner.

If this particular screen isn't quite to your taste, take a look at the *Simple Screen Options* on page 67. One of those designs might be a better match for your home.

All three designs are easy to build, but this first one is probably the simplest. The frame, battens, and slats are all built from dimensional lumber, so all you need to do is cut the pieces to length. The posts are 4x4's cut to height and anchored with spikes that can be found at any

SCREEN ENCLOSURE WITH ARCHED TOP RAIL

OVERALL SIZE: 55"W x 55"D x 43½"H

Hanger spacer
(1x2– 4" long)
G

Frame side
(1x4– 37½" long)
B

Frame top **A**
(1x4– 45" long)

7⅞"

12¾"

H
Hanger cleat
(1x2– 7" long)

F Hanger fascia
(1x2– 32" long)

D Slats
(1x6– 37½" long)

C Batten
(1x4– 43½" long)

3d (1¼" long)
Galvanized nail

J Post cap
(2x6– 5½" long)

K Conduit pegs
(⅝" EMT– 3" long)

Arched rail
(1x6– 43½" long)
E

I Post
(4x4– 42" long)

Post anchor
NOTE: Post anchor style
may vary based on availability
in your area.

NOTE: Go to www.WorkbenchMagazine.com
to download cutting
diagrams for this project. **CUTTING DIAGRAMS**
If you don't have Web access, send a stamped,
self-addressed envelope to: Workbench Cutting
Diagrams, Attn: Screen Enclosure, 2200 Grand
Ave., Des Moines, IA 50312

MATERIALS LIST

LUMBER: (THREE-SIDED ENCLOSURE AS PICTURED)

|		
A (6)	Frame Top/Bottom	¾" x 3½" x 45"
B (6)	Frame Sides	¾" x 3½" x 37½"
C (6)	Battens	¾" x 3½" x 43½"
D (21)	Slats	¾" x 5½" x 37½"
E (3)	Arched Rails	¾" x 5½" x 43½"
F (6)	Hanger Fascia	¾" x 1½" x 32"
G (6)	Hanger Spacer	¾" x 1½" x 4"
H (12)	Hanger Cleats	¾" x 1½" x 7"
I (4)	Posts	3½" x 3½" x 42"
J (4)	Post Caps	1½" x 5½" x 5½"
K (12)	Conduit Pegs	⅝" EMT x 3"

HARDWARE:

(108) #8 x 2" Fh exterior screws

(4) #8 x 2½" Fh exterior screws
(to attach post caps)

(111) 3d (1¼" long) galvanized box nails

1

Frame bottom

Framing
square

Frame top

Frame side

Plywood
work surface

#8 x 2" Fh
exterior screws

Use a framing square to help keep the frame assembly true. Pre-drill and countersink holes through the top and bottom pieces and into the frame sides. Then assemble the frame with exterior wood screws.

home center. The arched top rails are a little more involved and if you make your own post caps like I did, that adds a few steps. Both are worth the effort, though, for the way they dress up the project.

One twist in the project is the way the panels attach to the posts. Small pieces of conduit are driven into the posts to serve as pegs for the panels to hang on. The pegs fit inside hangers that are built out of the same type of wood as the rest of the

panel. When it's all put together, you can't see anything unusual. But when you need access, the panels simply lift off.

START WITH THE FRAMES

There are a couple things to keep in mind before you start cutting lumber. First, give yourself plenty of space to work. Find a flat surface like the driveway or the floor of your shop. A sheet of plywood can also become a temporary work surface.

Second, don't try to cut all the pieces for a panel and then assemble them. The thickness of your stock will vary a little, so you'll have to cut each piece to fit in between the others.

With that in mind, start by building a frame. The first thing to do is cut the pieces from 1x4 stock and lay them all out on your work surface. Then drive two screws at each corner, keeping the frame square while you assemble it (*Fig. 1*).

2

Mark ⅝" from one end

⅝" Gap

Battens

Slats will be nailed to battens here.

First, clamp the battens together. Mark the position of the first slat ⅝" from one end of the battens. Then mark both

3

Batten

¾"-thick spacer

sides of each slat and leave ⅝" space between them. Use a framing square to extend the lines across both battens.
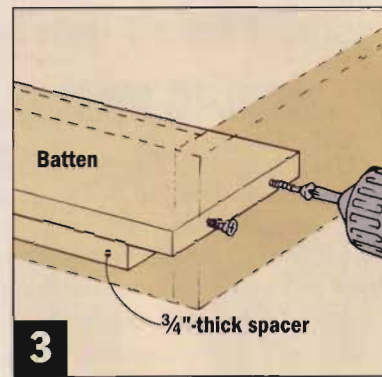
A ¾"-thick spacer positions the batten the correct distance from the back of the frame while you drill and screw.

ADD THE BATTENS AND SLATS

After you've built the frames, you can move on to the 1x4 battens. To find their lengths, measure between the sides of each frame. It might seem like an extra step, but measure for the top and bottom battens. You might be surprised how much difference there is in the thickness of the side pieces even in that small space.

Next, cut the battens to fit snug inside the frame, but don't attach them yet. This is a good time to lay out the slat locations on both battens.

Set the battens edge to edge with their ends flush and clamp them together (*Fig. 2*). Then mark for both edges of each slat and use a framing square to extend the lines across both battens. Leave about a ⅝" space between slats.

Now you're ready to mount the battens in the frames. Lay the frame

on its back and position the battens inside it. I used ¾"-thick spacers to support the battens from underneath. Make sure all the layout lines are facing up and drive screws through the frame sides and into the ends of each batten (*Fig. 3*).

The 1x6 slats are next. Measure the distance between the frame top and bottom and cut the slats accordingly. Don't feel like you have to cut the slats for a tight fit, though. If they're a little small, that's fine. Just leave the gap at the top and an arched top rail will cover it later. Now position the slats on the layout lines and, with the battens still supported from underneath, nail on the slats (*Fig. 4*).

CUT THE ARCHED TOP RAIL

The next step is to add an arched rail made from 1x6 stock that will dress up the top of the panel. I start-

ed by rough cutting a 1x6 a little longer than the battens.

One way to lay out the arc is to use a flexible stick as a drawing guide (*Fig. 5*). First, locate the centerline and ends of the arc (*Top Rail Layout*). Next, drive a small nail at each end of the arc. Use the flexible stick to bridge the nails and create the desired crown. Then trace along the edge of the stick to draw the arc.

Rough cut the arc with a jigsaw and sand it to shape. Then cut the rail to the same length as the top batten. Use this first top rail as a template to lay out any others you need before nailing it to the panel.

BUILDING IN THE KNOCKDOWN

You may only need to remove the panels once a year to service your AC, but that will be plenty for you to appreciate how easily it comes apart.

6

#8 x 2" exterior screw
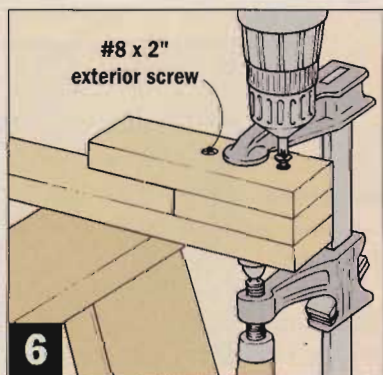
Clamp the fascia, the spacer, and the top cleat together while you pre-drill and drive screws to assemble them.

7

Lay frame face down

Fascia

#8 x 2" Fh exterior screw
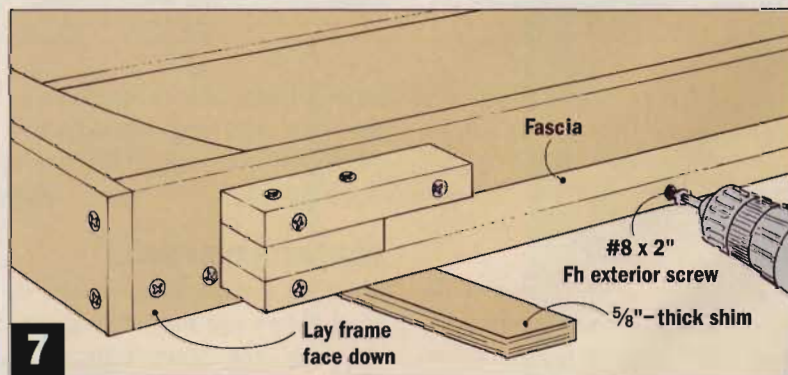
⅝"-thick shim

Some ⅝"-thick shims are helpful for aligning the hanger while you screw it to the frame. Attach the fascia with at

least four screws so it will support the weight and withstand the panel being removed and replaced.

TOP RAIL LAYOUT
43½" — 3½" — 5½"
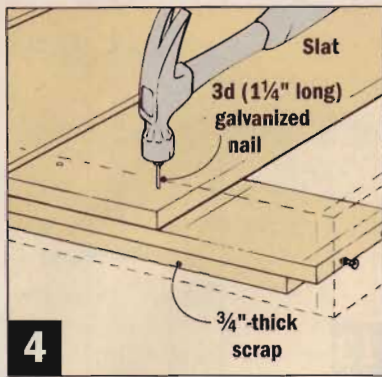
4 Drive two nails through each end of each slat. Leave the spacers underneath the battens for support.

Slat
3d (1¼" long) galvanized nail
¾"-thick scrap
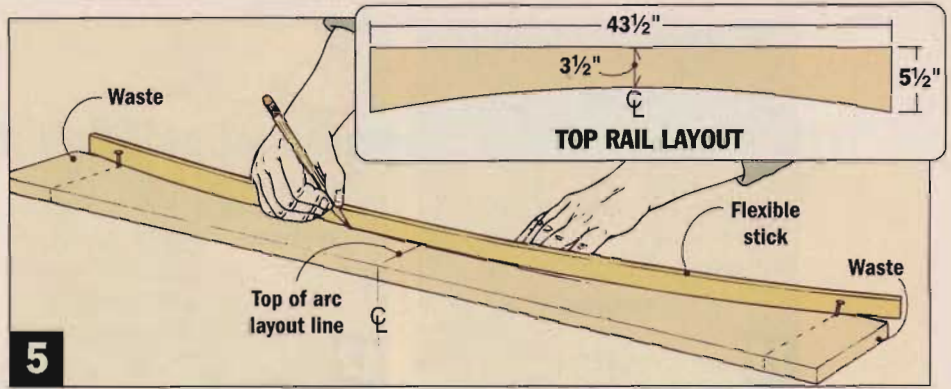
5 A ¼"-thick piece of hardboard or scrap stock makes a great flexible stick to trace an arc. Since the desired arc runs the length of the top rail, lay it out on a longer board and then cut the board to final length after cutting the arc.

Waste
Flexible stick
Waste
Top of arc layout line

And it doesn't even require fancy hardware or fasteners to work. Some short pieces of electrical conduit, a simple wood hanger, and the pull of gravity are all that are needed.

Most of the work is in the hanger, so that's the best place to get started. You'll need to cut four pieces for each hanger assembly: the fascia, the spacer, and two cleats (*Hanger Side View*). Two sets of hanger parts are needed for each panel.

To assemble the upper part of a hanger, clamp the fascia, spacer and one cleat together and fasten them with two screws (*Fig. 6*).

Now attach the hanger to the frame side. To position the hanger, draw a line on the frame about 3½" down from the top and align the top of the hanger with that. Lay the panel facedown and shim the hanger while screwing it in place (*Fig. 7*).

The final step in building the hangers is to screw on the lower cleat. Position it ¾" from the fascia (*Fig. 8*).

PREPARING THE POSTS

There's no mystery to the posts themselves — just 4x4's cut 42" long. But to complete the knockdown design, you need to add the conduit pegs that the hangers rest on.

The *Materials List* calls for ⅝" EMT conduit. Don't worry too much about those initials when you go shopping. Depending on your local home center, you may find conduit with the label EMT, IMC, or Rigid Steel. Any of them will work, but EMT will probably be the most affordable. It will also be the easiest to cut.

For a three-sided enclosure, you'll need 12 conduit pegs that are 3" long. First, lay out all the cuts on a length of conduit and clamp the pipe in a vise. Then cut it with a pipe cutter or a hacksaw (*Fig. 9*). At the very least, file the ends of the pegs to get rid of any burrs or sharp edges. With a little more filing you can bevel the edges of the conduit which will make it easier to drive into the post.

Next, lay out the peg positions on the 4x4 posts and drill ⅝"-diameter holes (*Fig. 10*). The holes should be 1½" deep so half the length of each peg is buried in the post. Make sure the holes are a consistent depth.

The pegs should fit pretty snug, so you'll have to hammer them in. That won't be a problem if you're building the screens out of cedar. But if you're using a harder material like pressure treated lumber, use a piece of scrap to protect the end of the peg while you hammer it in.
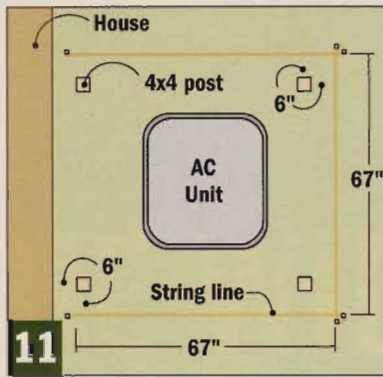
HANGER SIDE VIEW

3½"
⅝"
3½"
G
H
F
H
3"

---
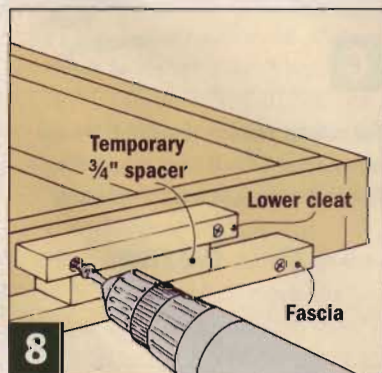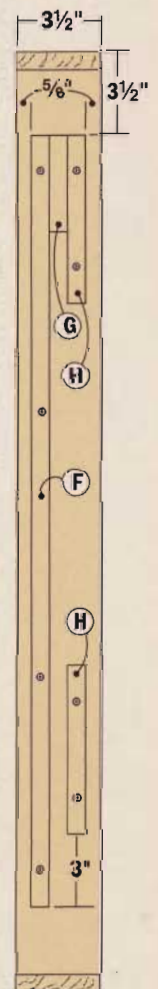
8 Use a temporary ¾"-thick spacer to position the lower cleat the correct distance from the fascia.

Temporary ¾" spacer
Lower cleat
Fascia
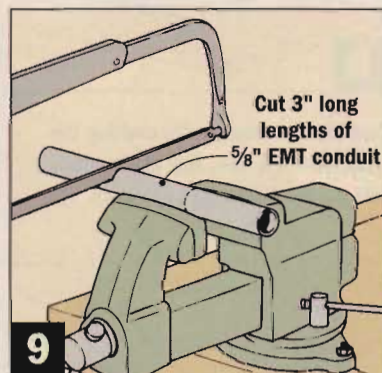
9 If you don't have a pipe cutter, a hacksaw will cut conduit just fine. Be careful not to crimp the conduit in the vise.

Cut 3" long lengths of ⅝" EMT conduit
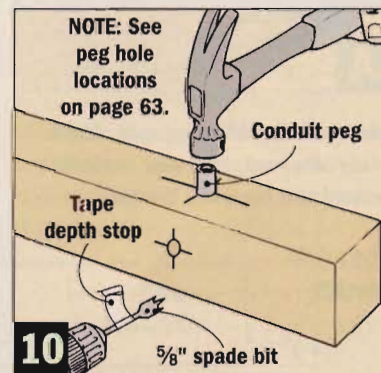
10 Drill holes to a consistent 1½" depth by marking your drill bit. Drive the conduit in until it bottoms out in the hole.

NOTE: See peg hole locations on page 63.
Conduit peg
Tape depth stop
⅝" spade bit

11

House

4x4 post

6"

AC Unit

67"

6"

String line

67"

Position the string line by measuring from the wall of the house or from the center of the AC unit.

12

4x4 scrap block

Position anchor 6" from each string line
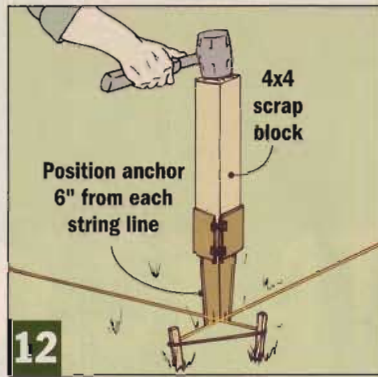
Drive post anchors into the ground with a 4x4 block to prevent damaging the collar of the anchor.

13

Conduit peg
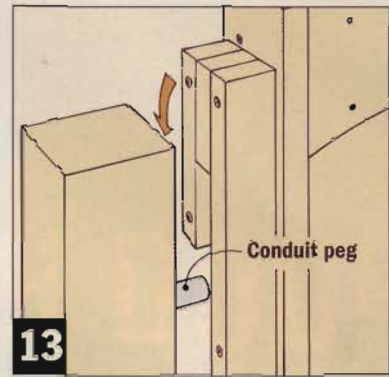
Install the screen by setting the hanger over the lower pegs then pivoting and lowering the screen onto the top pegs.

SETTING THE POSTS

To install the enclosure so it's square, set up a string line before you start setting posts (*Fig. 11*). Set the perimeter of the string line 6" outside of where your enclosure will be and then measure in when you set the posts.

This isn't a large structure, so I decided it didn't need the extra strength of concrete footings. Instead, I found an easy-to-install post spike at the home center (*Fig. 12*). The post slips into a collar that is tightened with a couple bolts. Once the

posts are set, hanging the panel is as easy as sliding the hangers over the conduit pegs (*Fig. 13*).

For a finishing touch, add some post caps. There are several styles available at the home center, or you can make your own (*below*).

MAKING YOUR OWN POST CAPS

Post caps are available in a variety of styles, but they can be expensive and may not look just the way you want. Here's an easy technique to make your own from a 2x6 using only a circular saw.

Start with a 2x6 that's at least 24" long. Screw it to a piece of plywood to help hold it while you're cutting. Be careful to keep the screws out of the path of a cut. Next lay out the cut lines according to

the drawing shown below. Be sure to leave the 1/2" space between each cap as pictured and lay out each cap separately. That way you'll avoid any cumulative mistakes if you miscut.

A

Saw set at 45°

Plywood base
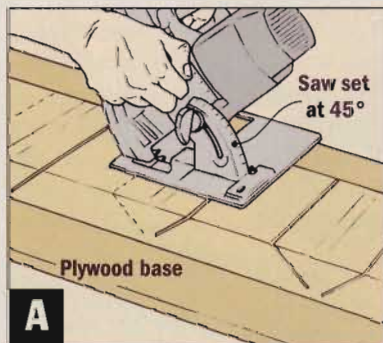
Start with the 45° crosscuts. Make every other cut, turn your workpiece around and complete the cuts.

B

Bevel cut line
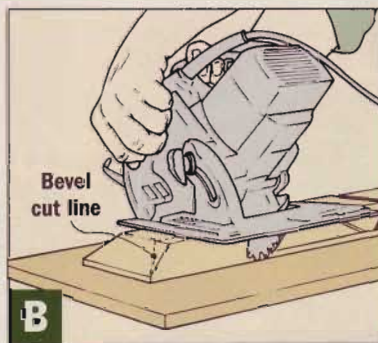
Don't rush when you're making the long, beveled rips. Any blade marks left behind will sand out easily.

C

Saw set at 0° 3/8" deep

Waste
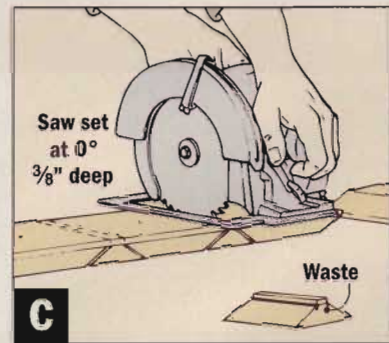
For safety, remove the 2x6 from the plywood and flip it over to cut the finished caps free from the board.

POST CAP LAYOUT

24"

5½"

4⅜"

1⅛"

1⅛"

1½" ⅜"

2¾" 2¾" ½"

Plywood work surface

END VIEW

4⅜"

1⅛"

Simple Screen Options

A Frame top

C Horizontal batten

Vertical batten **D**

Frame side **B**

Lattice panel **E**

G Hanger spacer

F Hanger fascia

A Frame bottom

H Hanger cleat
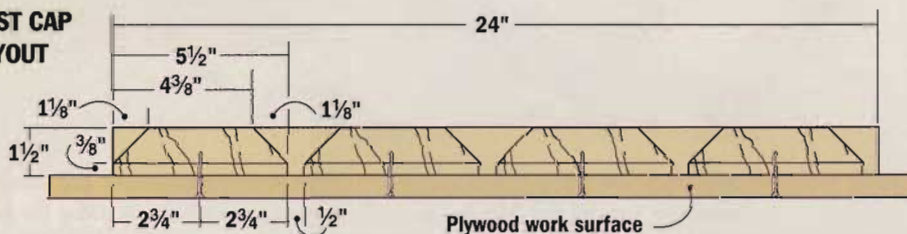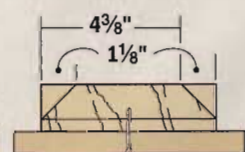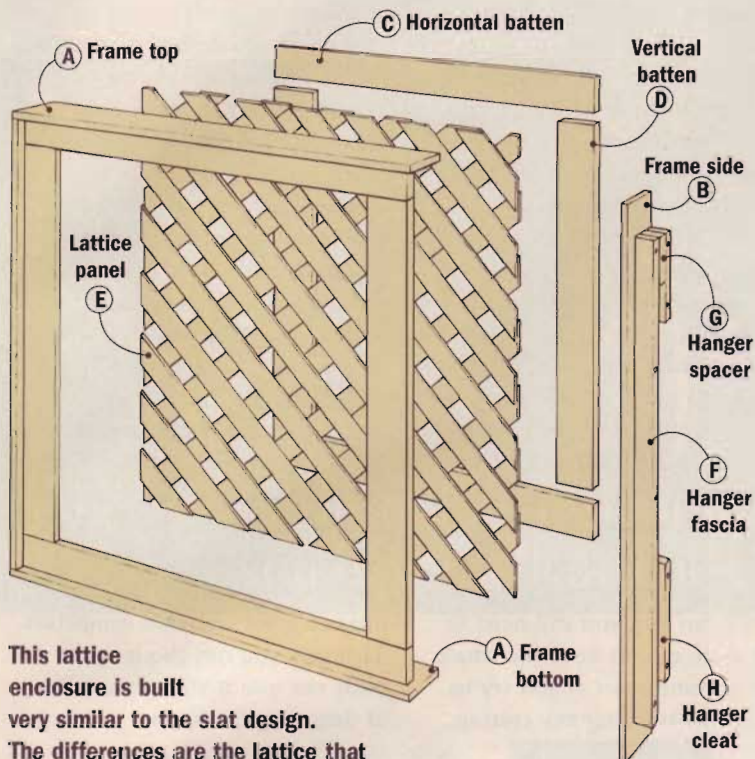
This lattice enclosure is built very similar to the slat design. The differences are the lattice that replaces the slats, and the additional battens that have been added to help capture the lattice panel.

A Panel side

B Batten

Slat **C**

A Panel side

E Hanger spacer

D Hanger fascia

F Hanger cleats
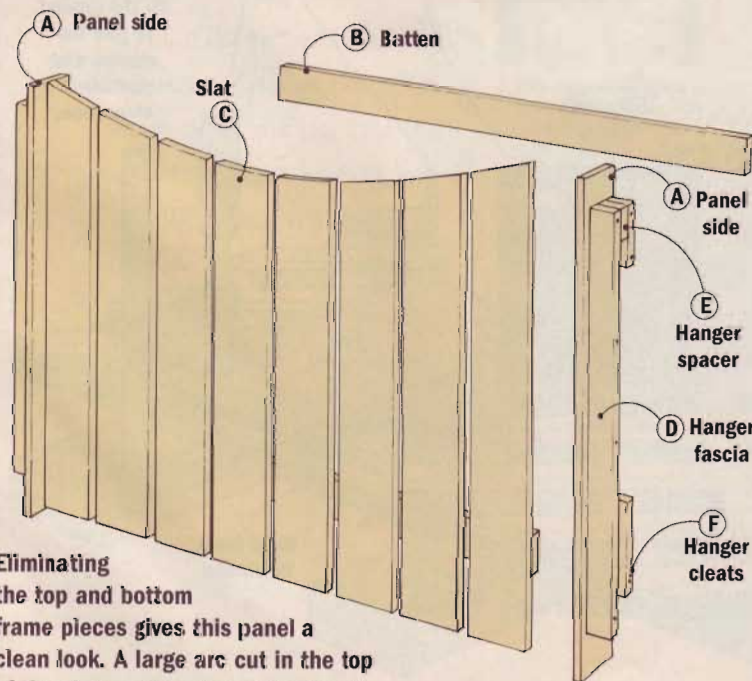
Eliminating the top and bottom frame pieces gives this panel a clean look. A large arc cut in the top of the slats adds a decorative touch.

MATERIALS LIST

LUMBER: (TWO PANELS AS PICTURED)

A	(4)	Frame Top/Bottom	$3/4$" x $3^1/2$" x $49^1/2$"
B	(4)	Frame Sides	$3/4$" x $3^1/2$" x 48"
C	(8)	Horizontal Battens	$3/4$" x $3^1/2$" x 48"
D	(8)	Vertical Battens	$3/4$" x $3^1/2$" x 41"
E	(2)	Lattice Panels	48" x 48"
F	(4)	Hanger Fascia	$3/4$" x $1^1/2$" x 32"
G	(4)	Hanger Spacers	$3/4$" x $1^1/2$" x 4"
H	(8)	Hanger Cleats	$3/4$" x $1^1/2$" x 7"
I	(3)	Posts	$3^1/2$" x $3^1/2$" x 52"
J	(3)	Post Caps	$1^1/2$" x $5^1/2$" x $5^1/2$"
K	(3)	Post Cap Finials	Store bought
L	(8)	Conduit Pegs	$5/8$" EMT x 3"

HARDWARE:

(112) #8 x 2" Fh exterior screws
(3) #8 x $2^1/2$" Fh exterior screws (to attach post caps)

FIREWOOD SCREEN

MATERIALS LIST

LUMBER: (TWO PANELS AS PICTURED)

A	(4)	Panel Sides	$3/4$" x $3^1/2$" x 45"
B	(2)	Battens (for front panel)	$3/4$" x $3^1/2$" x 48"
B	(2)	Battens (for side panel)	$3/4$" x $3^1/2$" x $24^1/2$"
C	(12)	Slats	$3/4$" x $5^1/2$" x 45"
D	(4)	Hanger Fascia	$3/4$" x $1^1/2$" x 32"
E	(4)	Hanger Spacers	$3/4$" x $1^1/2$" x 4"
F	(8)	Hanger Cleats	$3/4$" x $1^1/2$" x 7"
G	(3)	Posts	$3^1/2$" x $3^1/2$" x 48"
H	(9)	Post Caps	$1^1/2$" x $5^1/2$" x $5^1/2$"
J	(8)	Conduit Pegs	$5/8$" EMT x 3"

HARDWARE:

(68) #8 x 2" Fh exterior screws
(6) #8 x $2^1/2$" Fh exterior screws (to attach post caps)
(48) 3d galvanized box nails

TRASH CAN ENCLOSURE

Around The House

Techniques for Working with Wood Lattice

Lattice has always been a nice-looking way to fill outdoor structures. The web-like design provides some concealment while still letting light through. But there are some real challenges to working with wood lattice.

Visual Balance: The first problem is how to keep the panel symmetrical. If you measure from the edge of a full sheet of lattice to lay out the panel you need, the panel can wind up lopsided (*Fig. 1*). To avoid this, shift your measurements over until the panel you intend to cut is symmetrical on all edges (*Fig. 2*).

The simplest way do that is to lay out the center of the panel first and then measure half the total dimension in both directions. Do this for the length and width of the panel for symmetry in both directions.

Cutting Lattice: The nature of lattice — thin strips of wood stapled at the intersections — makes it fragile. Trying to cut it with a circular saw can literally vibrate it to pieces. Some lower-grade lattice isn't even stapled at every intersection.

Obviously, the first solution is to buy the highest quality lattice you can find. You'll find the higher quality lattice labeled something like "premium grade" or "heavy-duty." You can also tell it from the cheaper stuff because it's usually twice as thick. It will cost a few bucks more, but it will be much easier to work with. It won't rot, warp, or come apart as soon, either.

Even with the best lattice money can buy, you still need to take some care to keep the lattice from coming apart as you try to cut it. Before doing any cutting,

check all the intersections to be sure they're well pinned. You may find an occasional missing or poorly positioned staple. Add a staple or small nail wherever you find a problem.

During the actual cutting, it's important to support the lattice so any small pieces near the cut line don't get jarred loose. A good way to do that is to sandwich the lattice between two surfaces (*Fig. 3*).

I like to use a simple cutting guide on top of the lattice. Not only does it hold the lattice firm, but it keeps the saw moving in a straight line as well.

Using a sheet of rigid foam insulation underneath the lattice makes a great vibration dampener. That way you can also let your blade cut into it without any fear of damaging the blade.

1 Edges do not match

2 Edges are symmetrical

3

NOTE: Shim everything off the ground to give the clamps and saw blade clearance.

1x6

Hardboard

Rigid foam insulation
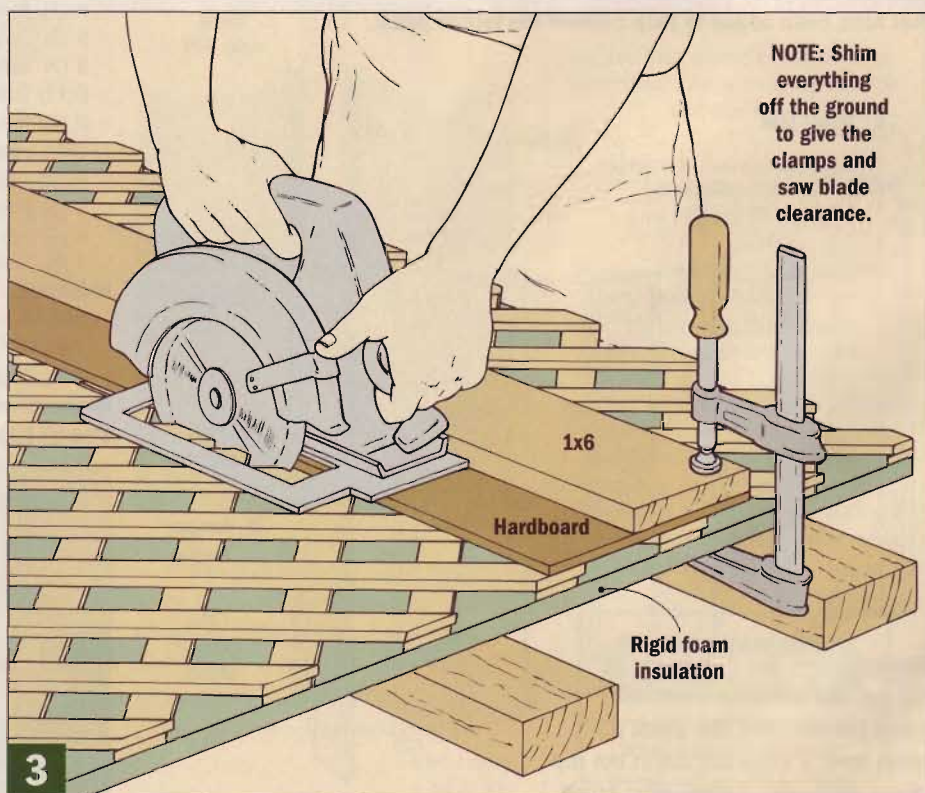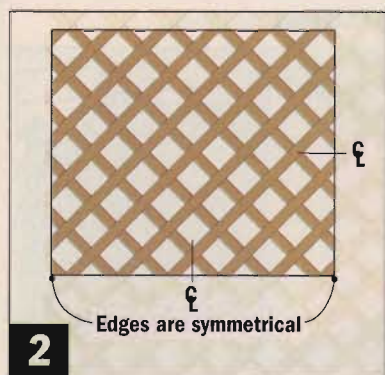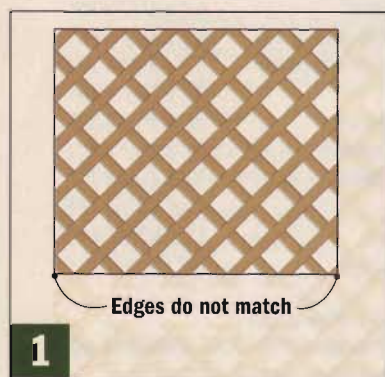
Studless Mounting for Electrical Boxes

Adding a new power outlet to an existing wall can be tricky. The problem is you can't get behind the drywall to attach the box to a stud.

One solution is to use special mounting strips (*below*). The type I used recently were 5¼"-long metal strips with a couple 2" fingers on them. I've heard these referred to by the nickname "battleship" because the fingers sort of resemble the smokestacks of a ship.

To use these strips, you'll have to combine them with the type of outlet box that has mounting tabs on the top and bottom.

Start by tracing the outline of the box on the wall where you're going to install it. Now cut a hole in the wall with a keyhole saw or utility knife. Fit the box inside the hole and slide a mounting strip between the box and the drywall (*Fig. 1*).

With one hand, hold the mounting tabs of the outlet box against the wall. Then use a pair of pliers in the other hand to pull the strip forward until it stops against the back of the drywall (*Fig. 2*). Bend the fingers into the box to hold the box in place (*Fig. 3*). Now follow those steps to install a strip on the other side of the box.

Be sure the fingers are completely flat inside the box so they won't contact any terminal screws on the outlet or switch. For added safety, wrap the body of the outlet in electrical tape before installing it.
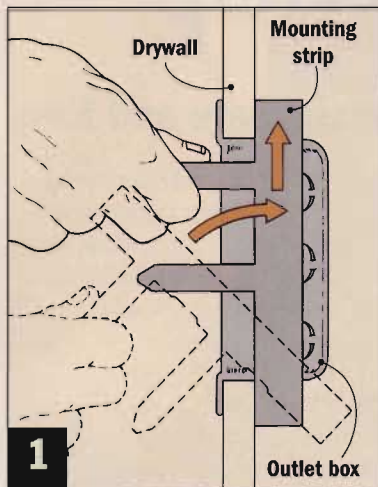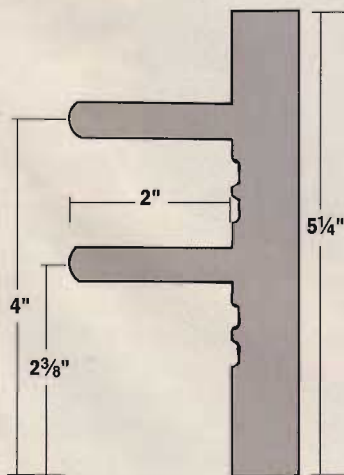
First, insert the bottom of the strip. Then tilt the strip in and slide it up.
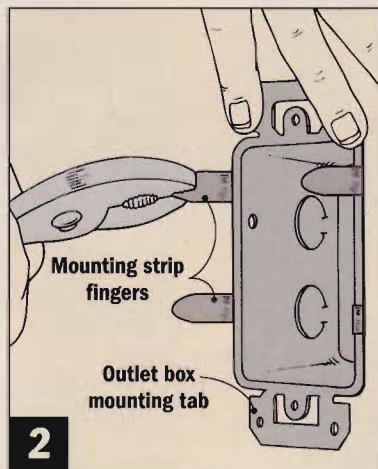
Hold the box tight against the wall while pulling on the "fingers."
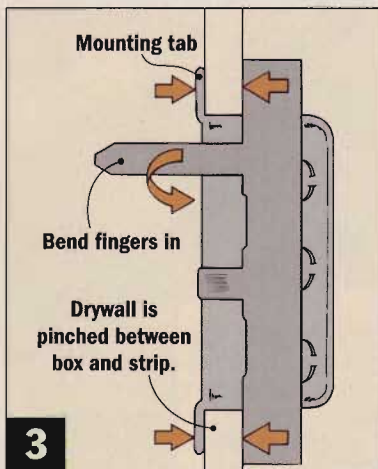
The outlet box is held in place when the fingers are bent into the outlet box and the mounting tabs are against the wall.

In The Shop

Make Cutting Small Pieces Safe and Easy

Cutting small pieces at the table saw takes extra care for several reasons. First, holding small pieces puts your fingers too close to the blade. Second, short pieces may jam between the blade and fence, then kick back. Third, narrow stock can drop through the opening around the blade and get kicked up. But minimizing these risks just takes a few simple jigs.

Zero-Clearance Insert: Before cutting any small pieces, replace the saw's standard metal or plastic throat plate with a zero-clearance insert (*right*). Manufacturers sell them, but making one is easy.

Start by removing the saw's throat plate and tracing its outline onto wood stock of the same thickness. Then cut the piece to shape and test fit it.

Now cut an opening for the blade. It may sound strange, but this can be done with the insert *in the* saw. Before you start, make sure the blade is all the way down, and not touching the underside of the insert.

Next, lock your rip fence in place over the insert, making sure it's not directly above the blade. Then turn on the saw, and *slowly* raise the blade to cut the opening. Note: If your fence won't hold the insert in place, you can clamp a 2x4 over it instead.

Push Blocks: When cutting a small piece, a wide push block allows you to push both the piece being cut to size and the cutoff safely past the blade. Scrap 2x stock is great for making push blocks.

The resawing push block (*bottom left*) is just a 2x4 with a large notch cut out of one edge. For the ripping push block (*bottom right*), glue a hardboard cleat to the bottom of a 2x4, and add a short dowel for a handle.

ZERO-CLEARANCE INSERT

Match insert to thickness of plate.

Trace outline of throat plate.

Lock fence to hold insert in place.

Keep fence clear of blade path.

Start saw and slowly raise blade to cut a slot in the insert.

RESAWING PUSH BLOCK

8"

2x4

1½"

Cut 1"-deep notch

Press down with fingers while pushing forward with heel of hand.

Workpiece

Zero-clearance insert

RIPPING PUSH BLOCK

Drill ¾"-deep hole for dowel.

¾"-dia. dowel

2x4–8" long

¼" x 1" x 3½" Hdbd

Hold push block against fence.

Workpiece

Zero-clearance insert
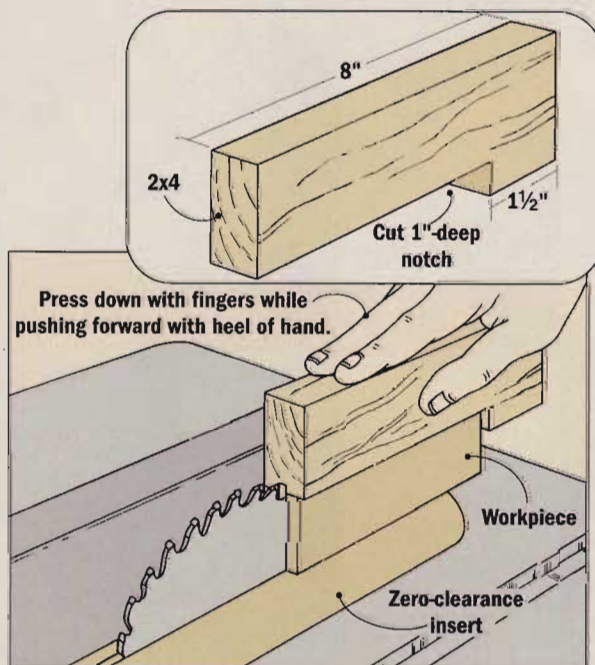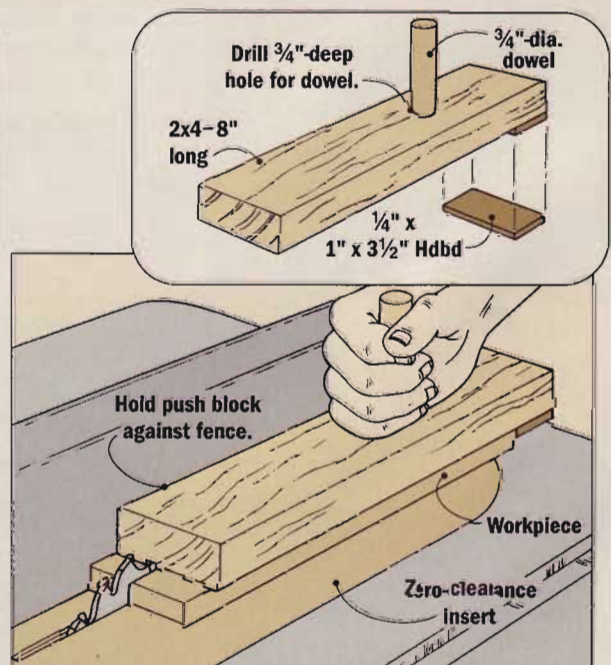
A Quick Jig for Ripping Thin Strips

Plywood projects always look better with the edges covered by thin strips of solid wood banding. But what's the best way to cut consistent thin strips on the table saw?
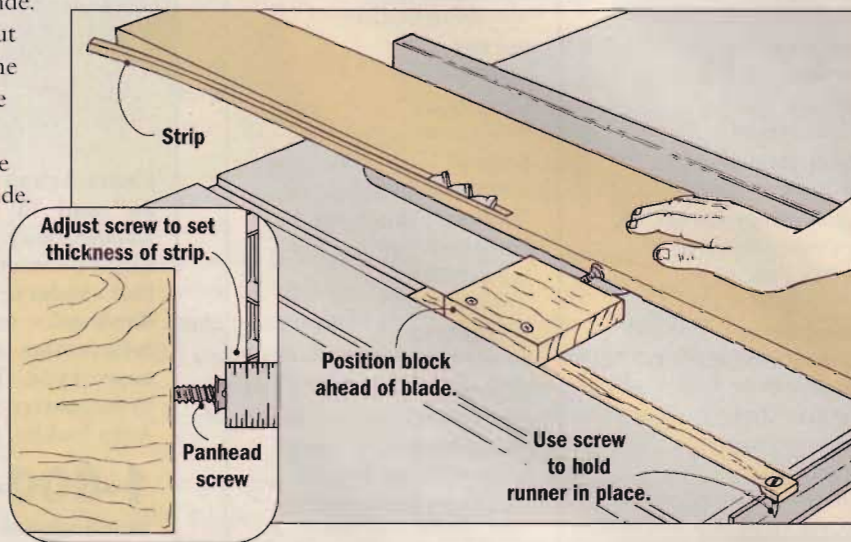
One method is to set the fence the desired distance from the blade. Then make multiple passes to cut enough strips. This works, but the strip can get caught between the blade and fence and kick back.

The other option is to cut the strip on the waste side of the blade. It gives better control of the workpiece, and the strip falls away clear after passing the blade. But moving the fence between passes can yield strips of different thicknesses.

One solution is the jig shown at right. It's just a block screwed to a runner that sits in the saw's miter gauge slot.

Setting up the jig is easy. Position it alongside the blade, and fine tune the jig by turning a pan-head screw driven into one edge. Then pull the jig back so it sits ahead of the blade.

Now butt your workpiece against the screw and lock the rip fence against the workpiece. Make a cutting pass, then repeat the process on each additional pass. All the strips will be the exact same thickness.

Strip

Adjust screw to set thickness of strip.

Panhead screw

Position block ahead of blade.

Use screw to hold runner in place.

Minimize Chipout When Making Jigsaw Cuts

A lot of the newer jigsaws on the market make it easy to get smooth, splinter-free cuts. But even without one of these high-tech saws, there are ways to get good-quality cuts with little chipout.

For starters, be sure to choose the right type of blade. Different models are available for cutting solid wood, plywood, laminates, metal, and plastic. Blades with different numbers of teeth per inch (tpi) are also available. As the tpi drops, blades cut faster but rougher.

And for saws that don't have an anti-splinter insert, consider making a simple shoe cover (*below left*). It's just a piece of ⅛"-thick hardboard that attaches to the saw with double-sided carpet tape.

A narrow slot surrounds the blade, giving support to the stock to stop splintering. Layout lines stay visible thanks to a guide notch.

Carpet tape
Blade slot
Guide notch
⅛" Masonite
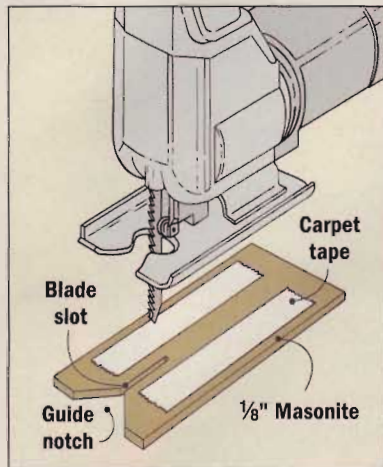
Clean Shop Air While You're Away

A workshop air filter is viewed as a luxury by many woodworkers. But for anyone spending serious time in the shop, it's one more "tool" that belongs on the list of necessities.

A filter won't pick up large chips like a dust collector. But it does help remove very fine dust from the air before it can settle on everything or end up in your lungs.

We have an air filter in the *Workbench* shop that usually runs all day. And to make the filter more effective, we've made a simple improvement. All this took was plugging the unit into an ordinary light/appliance timer.

Before locking up the shop at the end of the day, we set the timer to run the filter for a couple hours, then shut off. That way, the dust still floating in the air gets filtered, and the next day the air (and everything else in the shop) is dust-free.

Tools & Products

Router Reaches New Heights with Simple Crank

Most plunge routers are equipped with a small knob to adjust the height of the bit. It works fine until the router is installed in a router table. Then turning that small knob in close quarters becomes a real pain.

After installing a Kwik-Crank from Eagle America on my plunge router, I can now adjust the height of the router in less than half the time it used to take — with a lot less effort. The extra-long shaft and crank-style handle provide more leverage for turning than the previous knob. You'll think you're cranking down a car window rather than adjusting a router.

Designed primarily for use with table-mounted routers, the Kwik-Crank is well-constructed. It features a threaded steel insert and an aluminum crank shaft with an off-center handle. Different models are available to fit several popular brands of routers.

The only thing I don't like about the Kwik-Crank is how the handle attaches to the crank shaft. It's held in place with an epoxy-type glue. Welding would provide a more long-lasting connection. Under normal use, the handle should be fine. But over time, it might wear loose from the shaft.

Overall, my impressions of the Kwik-Crank are very positive. This simple crank-style adjustment system makes changing the height of a table-mounted plunge router much more convenient.

Depending on which router you own, expect to pay between $30-$35 for the Kwik-Crank. This is a bit more than some other height-adjustment knobs that are available as accessories, but it's worth it. Some routers may require special mounting hardware, which is included in the price of the crank.

For more information, contact Eagle America at (888) 872-7637 or visit the company's Web site at www.eagle-america.com.

Standard Chisel Serves Double Duty as a Plane

I recently borrowed a rabbet plane from a friend and really liked it. After shopping around, I decided I couldn't justify spending $50-$100 to buy one. Then I came across a less expensive option that works almost as well — a Veritas chisel plane from Lee Valley Tools.

The way the chisel plane works is by capturing a 1" bevel-edge chisel in a $1^3/8$"-wide by $5^1/2$"-long plane body. The cast iron body holds the chisel at a 45° angle while cutting 1"-wide dadoes and grooves up to $3/8$" deep.

As long as you keep your chisels sharp, it works great. Plus, I'd rather sharpen a chisel than try to hone the small blade of a rabbet plane any day.

I did discover a few surprises about the chisel plane — not the least of which was that it can also be used to cut hinge mortises. Though it's designed for cutting rabbets and grooves, the best use I found for it was cleaning them up after they were cut with another tool. By the way, it also comes in handy for removing hardened glue.

The large clamping screw is accessible and adjusts easily. I also like the fact the tool is designed to hold chisels with a 20° to 35° bevel with equal success.

The only problem I had with the chisel plane was where to position my hands while using it. There isn't much room to get a good grip. Plus, if you don't keep your hand clear of the arched area just forward of the blade, the shavings won't spill clear.

Retail price for the chisel plane (chisel isn't included) is around $30. To learn more, contact Lee Valley at (800) 267-8735 or check out www.leevalley.com.

Combination Alarm Detects Dual Dangers in Your Home

When I bought my house about a year ago, the inspector told me the furnace was in good condition for its age. But he also warned that because it was an older model, I could eventually have problems with it leaking odorless carbon monoxide gas.

So when it came time to replace the smoke alarms in my house, I decided to install combination alarms that would warn against not only fire, but also high levels of carbon monoxide.

There are a variety of brands of combination alarms available. One of the main reasons I chose the First Alert alarm was because it features separate sensors, and different warning sounds, for smoke and carbon monoxide. This way I don't

have to guess what's wrong when it goes off. Three consecutive long beeps, and a flashing red flame, indicate smoke and a potential fire. A longer on-and-off tone, with a flashing red dot, signals a carbon monoxide problem.

Another feature I like about the alarm is that it's powered by a single 9-volt alkaline battery. The alarm even includes a friendly warning chirp as a reminder when the battery runs low and needs to be replaced.

Suggested retail price for the combination alarm is around $40. Watch for them on sale. I picked up mine for less than $30.

To find out more, call First Alert at (800) 392-1395 or check out www.firstalert.com on the Web.

Old Fixture, New Light

Years of neglect had reduced this fixture to junk.

A craftsman's touch restored it's function.

BEFORE

AFTER

Restoring the beauty of light fixtures like this one is only half the challenge for antique light restorer David Meshek. To make the fixture work as good as it looks, he must also modify its original gas fittings to accept electric light bulbs.

He begins by breaking the fixture down into pieces. The pieces are then soaked overnight in paint stripper and power washed to remove lacquer, dirt, and grease. Next, Meshek silver solders the cracks that commonly appear in antique brass pieces.

He then drills out the light body, gas valves, and tubes to make more space for pulling in electrical wire. There's a fine line between enlarging the openings just enough,

and drilling through the sides and ruining the pieces.

Before reassembling the fixture, each piece is acid washed and polished to remove pitting. They are then immersed in acrylic lacquer to coat them inside and out.

Meshek then reassembles the fixture, pulling wire through the small pieces as he goes. Ornate glass shades complete the fixture's renewal.

Each time the switch is flipped on this restored fixture, the polished brass will reflect 100 years of history, 20 years of experience and countless hours of hard work.

David Meshek owns David Meshek Antique Lighting in West Des Moines, IA (515) 277-9009.