

**ENTER TO WIN!** Ultimate Deck-Building Contest

# WORKBENCH™

WOODWORKING TO IMPROVE YOUR HOME

## garden Gazebo

Modular Design  
Makes It Easy

**Plus:**

- 5 Surefire Storage Solutions
- Build a Cherry Bedside Table



# Contents



**18**

## Deck Contest!

Enter the Workbench and California Redwood Association Deck Contest for a chance to share in over \$6,000 in cash and prizes. You'll find complete contest rules and an official entry form inside this issue.



**18**



**22**

## Bedside Table

Interesting details — along with a few woodworking challenges — make this cherry bedside table a perfect companion piece to our heirloom bed.

**30**

## 5 Surefire Storage Solutions

Tired of battling a messy garage? Combat clutter for good — build five simple storage projects in a weekend for under \$200.



**30**

## 36

### Garden Gazebo

Thanks to a modular design and a unique layout frame, this fancy gazebo is truly a builder-friendly project.

Even the matching lowered cupola is easy to make when you follow our practical tips and step-by-step photos.



36

## DEPARTMENTS

5

Questions & Answers

8

Tips & Techniques

11

Workbench Interactive.com



8

14

In The Shop

55

Around The House

59

Sources & Resources

60

Craftsmanship



60



## EDITOR'S NOTES

**H**ow do you divide a pie into eight equal pieces? Not a homemade pie with a killer crust and fancy filling. I'm talking about laying out eight identical, pie-shaped sections of a circle.

Okay I know. It's just basic geometry, right? Nothing difficult about it, at least on paper. But it did present a bit of a challenge when building the *Garden Gazebo* for this issue. That's because the gazebo has *eight* symmetrical sides — a perfect octagon.

This meant that the eight footings for the gazebo had to be *precisely* the same distance apart. That's a real trick, especially when working outside on uneven ground. I think you'll like the solution we came up with — a rigid, eight-sided, wood frame that looks like a giant spider web. It provided a foolproof way for locating the footings.

That's just one of the things that makes this gazebo such an interesting project. Even if you don't plan to build it, be sure to check out our construction tips. I'm sure there are a few prac-

tical ideas you can use on your next project. For example, there's a table saw jig for ripping the thin, louvered strips on the gazebo's cupola (shown above). And a nifty method for gluing up the wedge-shaped roof pieces is definitely worth a closer look.

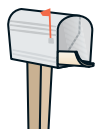
### NEW FACES

We're pleased that Mike Donovan has joined us as an Assistant Editor. Mike is a young guy in the process of remodeling an old (1880's) house. With his experience in home improvement and furniture building, he's a great addition to the *Workbench* team.

As for me? Let's just say I've been building home improvement projects since Mike was a kid. My most recent "project" is to pick up the responsibilities as Editor at *Workbench*. I'm excited about all the great projects we have in store for you. If you'd like to share your own project ideas, drop me a line. I look forward to hearing from you.

*Tim*

## HOW TO REACH US



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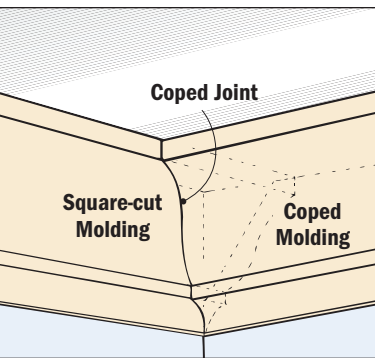


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# Questions & Answers

## A Trick for Fitting Inside Corners: Cut Coped Joints



**Q** When working with crown molding, I've never had much success getting a tight-fitting joint on inside corners. What's the best way to do this?

Terry Underwood  
Colorado Springs, CO

behind the coped piece. Yet when you look at a coped joint (see drawing at left), both pieces look mitered.

The real advantage of coping is that it allows you to compensate for minor irregularities in a corner by trimming one piece of molding to fit exactly against the other. But there's more involved in getting a good fit than just making a coped cut. That's because crown molding doesn't fit flat against the wall — it "leans" forward. This means the end of the coped piece has to be cut at a compound angle.

### CUTTING COMPOUND MITERS

Half the battle in fitting crown molding is in cutting this compound

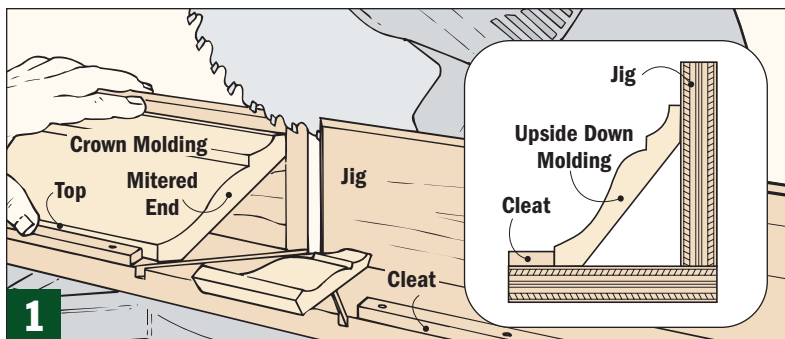
miter accurately. To do this, I use a power miter saw and a simple jig shown in *Figure 1*. The jig is constructed from two scraps of plywood screwed together to form an "L." A cleat attached to the bottom piece helps support the molding.

The jig acts like a makeshift wall and ceiling, supporting the molding as if it were being installed while you make the cut. The 45° cut provides an outline of the shape you must cut with the coping saw.

First, clamp the jig to the miter saw. Then place a piece of crown molding in the jig with the *bottom* edge facing up. Now cut a 45° angle as if you were cutting an inside corner miter.

A coped joint appears to be mitered because the square end is hidden behind the coped piece.

**A** The best way I've found to get a good, tight fit on an inside corner is to cut a coped joint. With this type of joint, one piece of molding is cut square where it meets the inside corner. The mating piece is cut (coped) to match the profile of the crown molding. The square end is hidden

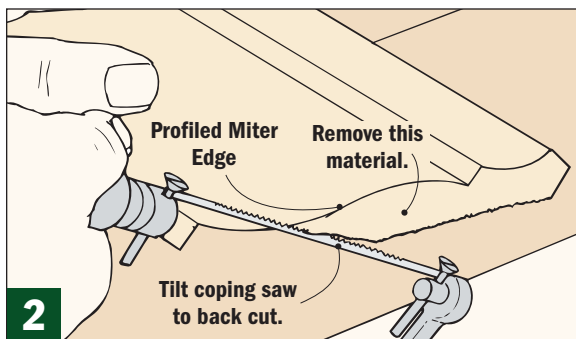


To begin coping a joint, rest the molding in a simple "L"-shaped jig and cut a 45° angle to reveal the profile. The jig helps hold the molding "upside down" at the angle at which it will be installed along the ceiling.

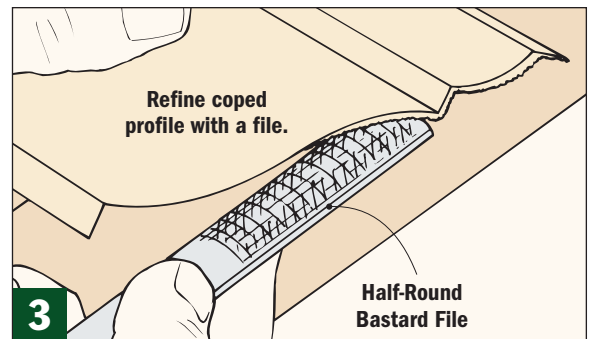
### COPING THE MOLDING

Because crown molding sits at an angle to the ceiling, you have to remove additional material from the backside of the coped piece. Do this by angling the coping saw toward the back of the molding then cut along the profile line, as shown in *Figure 2*.

Don't expect a perfect fit when you're done coping. To get a really tight joint line, you'll probably need to file across the coped end, as shown in *Figure 3*. File and test until you're satisfied with the fit.



Next, back cut along the profiled edge of the miter with your coping saw tilted sharply. This will remove the extra material that might interfere with the fit of the coped joint.



No matter how precisely you cut with the coping saw, you'll probably still need to reshape the coped profile a bit with a file until you're satisfied with how the pieces fit together.

## Two Types of Built-Up Moldings

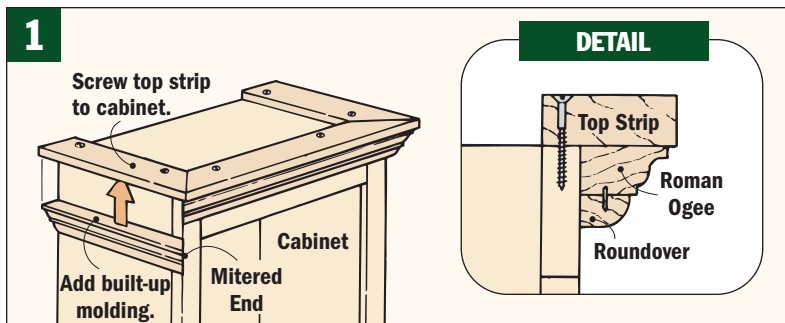
**Q** I've always admired the detailed molding often found on fine pieces of furniture. Is there a simple way I can make these elegant moldings myself?

Jeff Holderhouse  
Salt Lake City, UT

**A** All you need to make professional looking moldings is a router and a few ordinary

bits. The idea is to rout a profile in two (or more) strips of wood and then glue them together to create a "built-up" molding as shown at left.

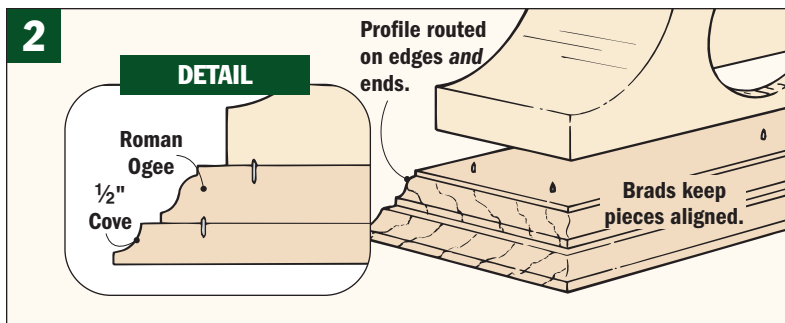
If you look at the drawings below, you can see that all of these profiles are made using four common router bits: a cove bit, a Roman ogee bit, and two roundover bits. There are two basic ways to create these moldings, but the technique is similar for both.



### STRIP MOLDING

Strip molding is what I like to apply to the top of cabinets. To make strip molding, all you have to do is rout a profile on the front edge of several strips of wood and rip them to desired width.

After gluing up the strips to create the profile you're after, miter the molding to fit. Then attach the built-up molding to the top of the cabinet as shown in *Figure 1*.



### LAYERED MOLDING

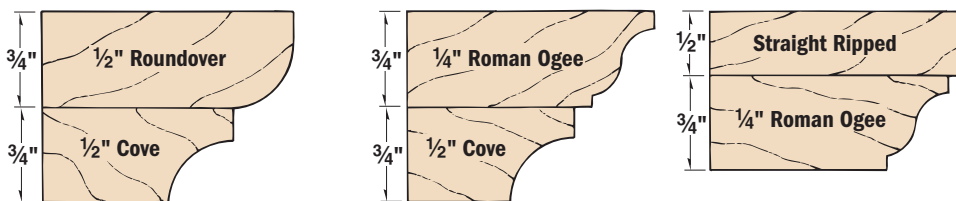
Another typical way to use built-up moldings is to rout the profiles on the edges and ends of full-width boards. Then glue up the stack of boards in layers as shown in *Figure 2*.

One reason I like layered molding is because it's faster to make and easier to install than strip molding. That's because you don't have to mess around with mitering the corners. Here's a tip: If you're having problems with the pieces sliding around during glue up, nail a few wire brads in one of the layers. Then snip off the heads of the brads.

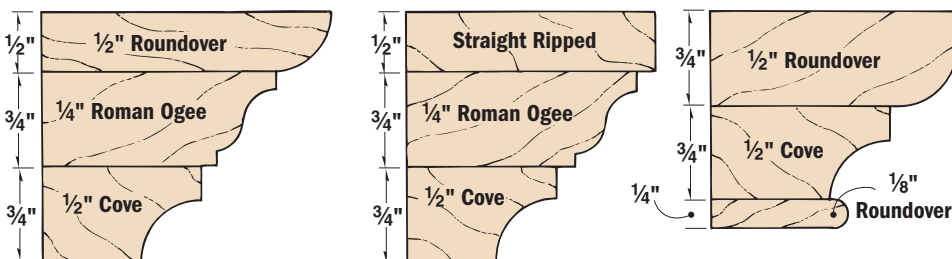
Layered molding does have a disadvantage, though. Because you're routing the ends, the end grain is exposed. I usually get around this problem by sanding the ends of the molding several grits finer than the rest of the project.

**Design Note:** With layered molding, I always limit the width of the workpieces to around 5" or less. I've discovered that anything wider has a tendency to warp or twist with seasonal changes in humidity.

## DOUBLE PROFILES



## TRIPLE PROFILES



## Don't Get Bugged Down in Figuring Board Feet

**Q** I'm new to woodworking and am confused about how to calculate the number of "board feet" in a piece of lumber. Is there an easy way?

Tom Granger  
via the Internet

**A** When calculating board feet, you need to take into account the thickness, width and length of a particular board. That's because board feet is a **volume** measurement. One board foot equals 144 cubic inches. An easy way to visualize 144 cubic inches is to picture a 1"-thick board that's 12" long and 12" wide.

The tricky thing is that this 144 cubic inches can come from many different dimensions. Take the three boards shown at left for example. They're different sizes yet all of them equal one board foot.

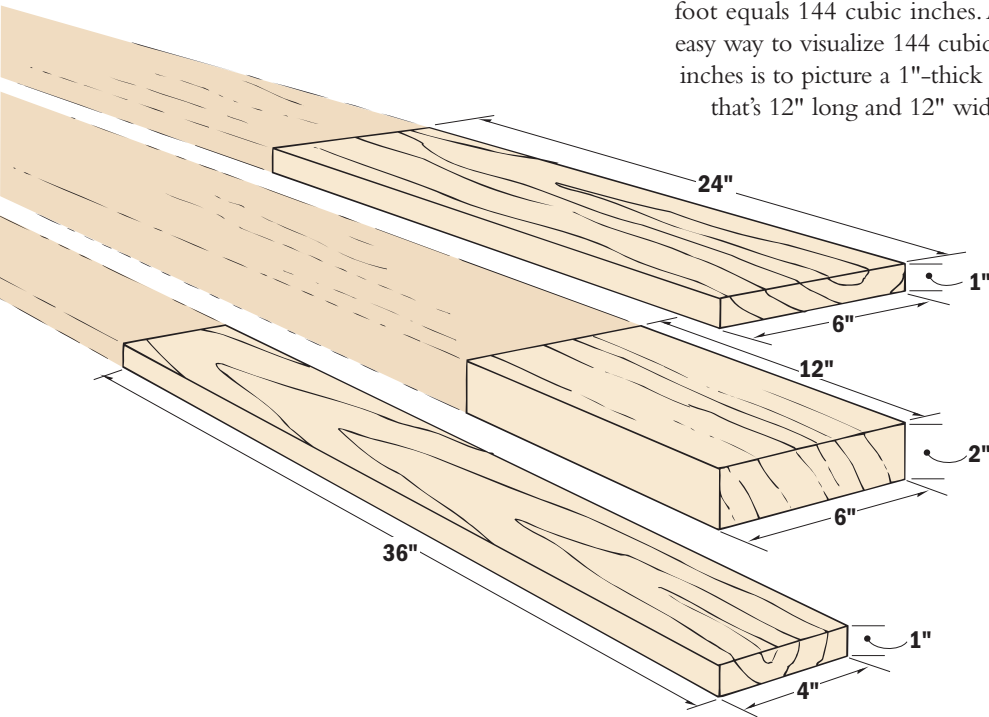
### SIMPLE FORMULA

To calculate the number of board feet, start by measuring a piece of lumber in inches (not feet). Be sure to convert fractional dimensions of width and length to the next inch. After determining the dimensions, multiply the thickness times the width times the length. Then divide by 144 (total cubic inches in a board foot).

For example, let's say you want to buy a piece of 5/4 lumber (1 1/4" rough thickness) that's 3 1/2" wide and 6' long. The board feet calculation would be:

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

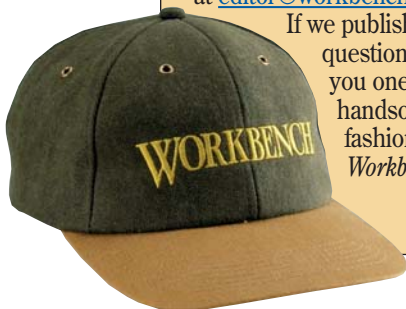
$$360" \div 144 = 2.5 \text{ board feet}$$



## SHARE YOUR QUESTIONS!

If you have a question about woodworking or home improvement, write it down and mail it to WORKBENCH Q&A, 2200 Grand Ave., Des Moines, IA 50312. Please include your name, address and daytime phone number in case we have any questions for you. You can also reach us via Fax at (515) 283-2003 or by E-mail at [editor@workbenchmag.com](mailto:editor@workbenchmag.com).

If we publish your question, we'll send you one of our handsome and fashionable Workbench caps.



## Say Good-Bye to Slippery Moldings

**Q** I want to dress-up my windows like you showed in the Jan./Feb. 2001 issue. But everytime I work with moldings I have problems with glue squeeze-out and with the moldings sliding out of alignment. What can you suggest?

Mary Fisher  
Quad Cities, IA

**A** The best thing I can suggest is a new glue made specifically for working with moldings: Titebond Wood Molding Glue.

One thing I like about this glue is it's thicker than the yellow woodworker's glue I use most often. Because of this, it doesn't run or drip as much.

It's also "stickier" than other glues. As a result, parts don't slip or move around once they're in place.

One thing to be aware of about

this glue is you probably won't find it at your local home center or hardware store. Instead, check with the nearest woodworking store or order it direct from *Woodworker's Supply* at (800) 645-9292. Ask for item #921-971 (\$6.95 for a 16 oz. bottle).

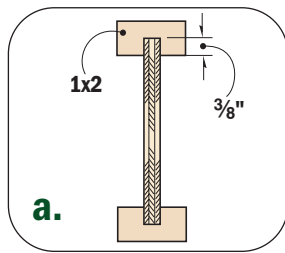
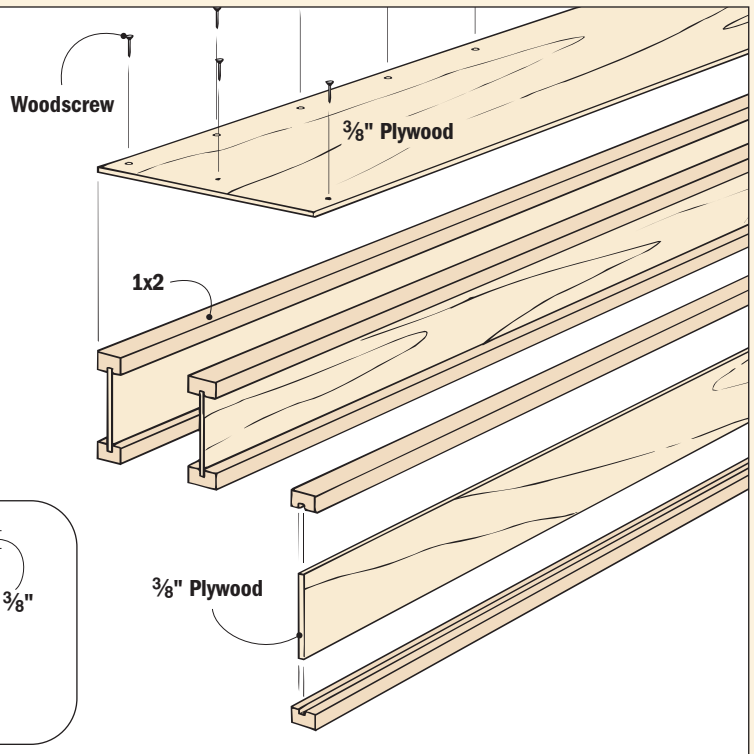
### SOURCE:

Franklin International  
(800) 669-4583  
[www.Titebond.com](http://www.Titebond.com)



# Tips & Techniques

## FEATURED TIP



## I-beam Scaffolding Adds Strength, Height

Painting a house is hard enough work without having to lean off an extension ladder to get it done. Although I could've rented scaffolding for the job, it's an expensive alternative.

My solution was to try an articulating ladder that can be folded into different shapes (see photo below). It was definitely better than a plain ladder, but it still had one weakness. In order to use it as scaffolding, I had to set a plank of some type on it. I tried a number of materials, including plywood and a 2x8. But the plywood flexed, and the 2x8 wasn't really wide enough. Neither one made me feel safe.

Then I got the idea of attaching three I-beams under the plywood

to add rigidity (see illustration above). I designed my I-beams after the ones I've seen being used as floor joists in new houses.

I ripped narrow strips of  $\frac{3}{8}$ "-thick plywood, then sandwiched them in between 1x2's to build the beams (Detail a). I cut grooves in the 1x2's to match the thickness of the plywood and glued the pieces with construction adhesive.

To attach the plywood plank to the completed I-beams, I used more construction adhesive and woodscrews about every 8" along the length of the scaffold.

The rigidity of the scaffold really impressed the people helping me paint, and even I was surprised by how lightweight it turned out.

The I-beam substructure also added some height to my scaffolding, which was helpful on taller walls.

*Chris Glowacki  
Des Moines, IA*

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



**An articulating ladder can adjust to a variety of forms and makes an excellent scaffold base.**



## Angle-Drilling Jig

I was working on a project recently that required me to “toe-screw” several pieces together — drive the screws in at an angle, in other words.

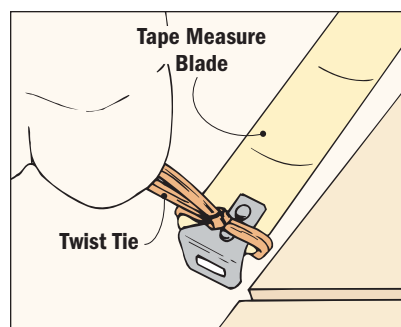
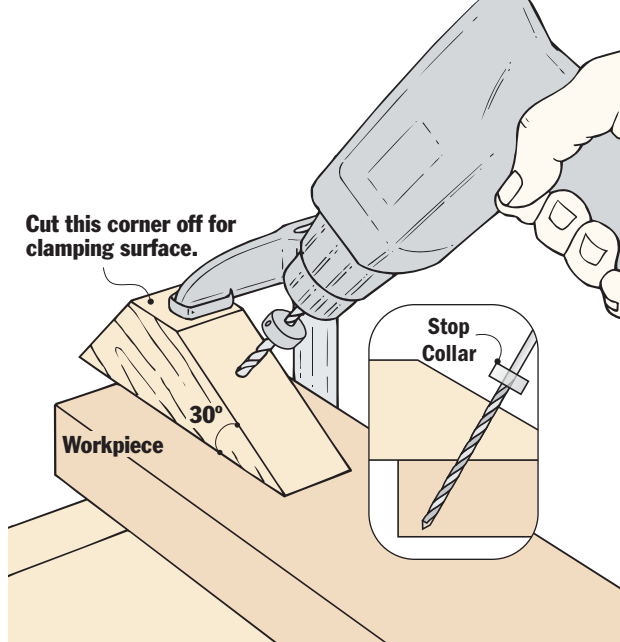
Typically, I’ll drill pilot holes and drive the screws freehand. This time, I had a lot of screws to drive and wanted to make sure they were consistent.

My solution was to make a simple jig. First, I drilled a 3/8"-dia. hole in the edge of a 2x6, about 3" from the end of the board. Then I cut the

corner of the board off at a 30° angle. I also cut the “top” corner of the board as a clamping surface.

When I drill the pilot holes, I stop the drill bit just shy of going all the way through the stock — it adds just a bit more strength. Once I’ve found the perfect depth to drill, I use a stop collar on the drill bit so I can duplicate it easily.

*Robert Foss  
Lincoln, NE*



## Twist-Tie Rescues Tape Measure

This may seem like a silly thing, but it has always bothered me when the end of my tape measure gets wedged in small cracks, like the ones between deck planks. Whenever that happens, there’s always a chance of breaking the tape measure blade when you try to wiggle it free.

That happened to me several times while building my deck recently. Then it occurred to me that a wire tie, like those used to close bread sacks, would make it much easier to free the blade.

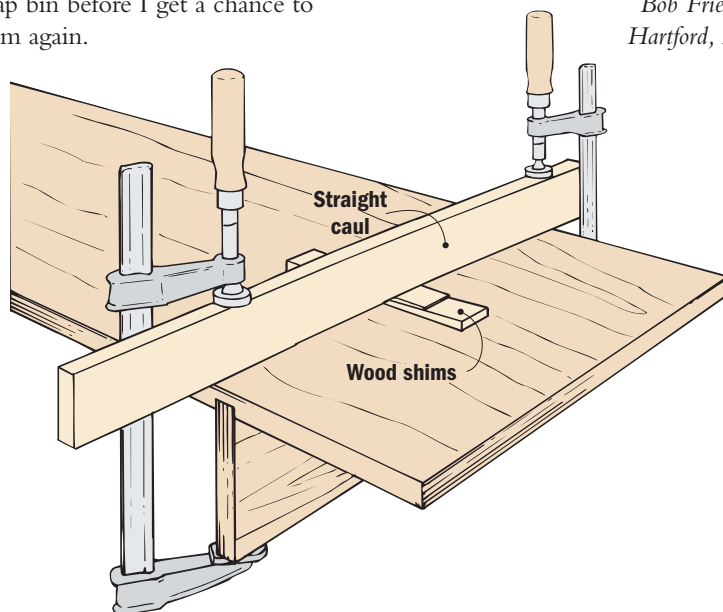
*Mark Graves  
Russells, IA*

## Using Shims Makes Simple Cauls

Whenever I need to clamp across a wide surface, such as gluing a shelf into a dado, I’ve used curved cauls to make sure there was plenty of clamping pressure along the entire joint. Problem is, making the cauls is an extra step. And they always end up in my scrap bin before I get a chance to use them again.

Recently, though, I came up with the idea of using a straight piece of hardwood and then shimming it at the center. I stand the hardwood on edge for the most rigid caul possible and then tap opposing wood shims in at the center.

*Bob Friend  
Hartford, IA*



## Share Your Tips, Jigs, and Ideas

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

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Des Moines, IA 50312.

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

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Also, The Stanley Works will award \$250 in Stanley Tools for the Featured Tip in each issue.

For a free woodworking tip every week via e-mail, go to [WoodworkingTips.com](http://WoodworkingTips.com).



## Clamping Station

It seems that no matter how many clamps I own, it's never enough when it comes time to glue up a number of solid-wood panels.

I've toyed with the idea of investing in more clamps, but decided I could come up with something that would work just as well and cost a lot less.

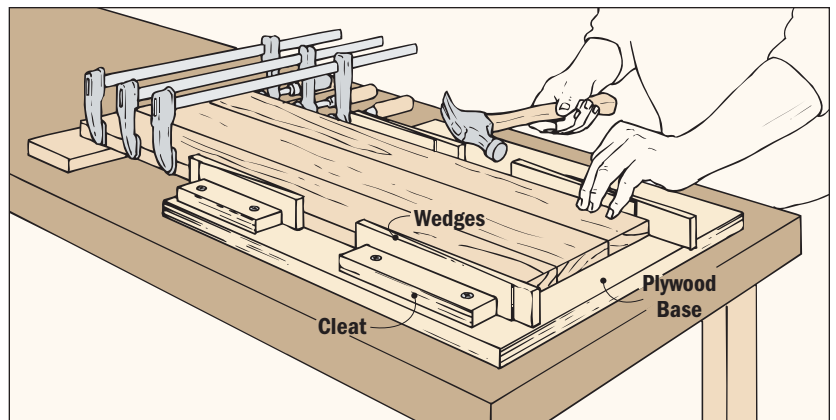
My solution is a simple clamping station. I started with a piece of plywood that was about 4" wider than the panels I needed to glue up. Then I screwed some cleats to the plywood. The cleats were spaced so the

panel would fit between them with about 1/4" gap on each side.

Once I edge-glue the boards that make up the panel, I use a few clamps to hold them together, then I position the panel in my clamping station.

By tapping wood wedges between the cleats and the panel, I was able to apply enough pressure to hold the pieces firmly while the glue set up. This simple solution made my clamp supply go quite a bit further.

*Donald McNaughton  
E. Rochester, NH*



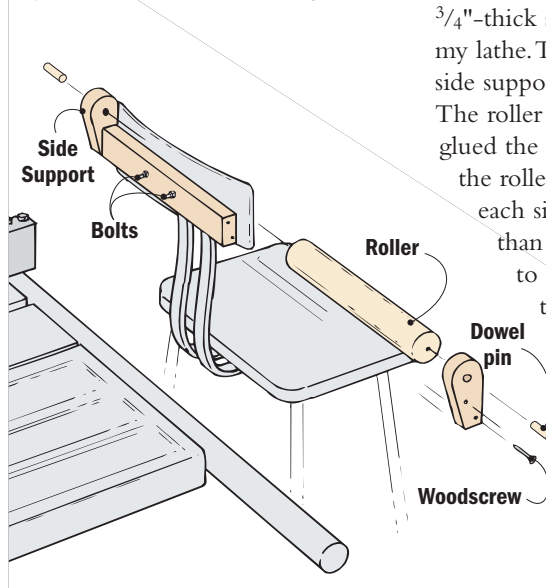
## Chair Supports Work, Saves Space

I'm always looking for ways to save space in my all-too-small wood shop. My most recent idea was to get dou-

ble-duty out my shop chair by turning it into an outfeed roller stand.

I made the roller by laminating 3/4"-thick stock and turning it on my lathe. Then I band sawed two side supports from scrap plywood. The roller spins on dowel pins. I glued the dowels into the ends of the roller and drilled a hole in each side support slightly larger than the dowels to allow them to spin freely. The whole thing attaches to the chair with a piece of 1x stock and a couple of bolts.

*Bruce Finney  
Camillus, NY*





## HVAC for Idiots



Of all the things I've learned about maintaining and improving a home over the years, one topic that still baffles me is HVAC — short for Heating, Ventilation, and Air Conditioning.

So when my furnace started to show signs of giving out recently, I had two choices: Learn a little something about HVAC, or put myself at the mercy of the professionals.

Hands-down, the most valuable tool my online HVAC research turned up was a piece of software called HVAC-Calc.

Two versions of the program are available from software publisher HVAC Computer Systems Ltd. ([www.HVAC-Calc.com](http://www.HVAC-Calc.com)).

I used the residential version, which is downloadable only. To get full use of this version, I called a toll-free number and registered the program. Registration costs \$39.95. (A trial version of the software will run without registration for evaluation purposes). A professional version is also available.

The intent of this program is to take what you know about your house — the size of the rooms, the climate you live in, how many windows and doors your house has, etc. — and then calculate all the stuff you don't know. Namely the heat gain and loss of your house.

Once you understand how your house loses and gains heat energy, you can use a formula included in the software tutorial to determine the proper size furnace or central air unit for your house.

That's the simple explanation of what HVAC-Calc does. There's actually quite a bit more to it than that.

The two things that impressed me most about the program were the level of detail it used to calculate the energy efficiency of my home and how simple it was to learn.

Besides obvious factors like number and size of windows, the program also lets you plug in less obvious things, like how many people use one room at a time or whether there are any miscellaneous heat sources in a room (an oven, for instance).

Despite all that detail, the program is simple to use. That's thanks largely to the number of help features included with the program.

First is the tutorial, which you'll need to print to get started. It's easy to follow and written in terms that even a layman can understand.

Second is the program interface — the screen where you enter all the

information the program requires. There are several cues to help guide you through the process.

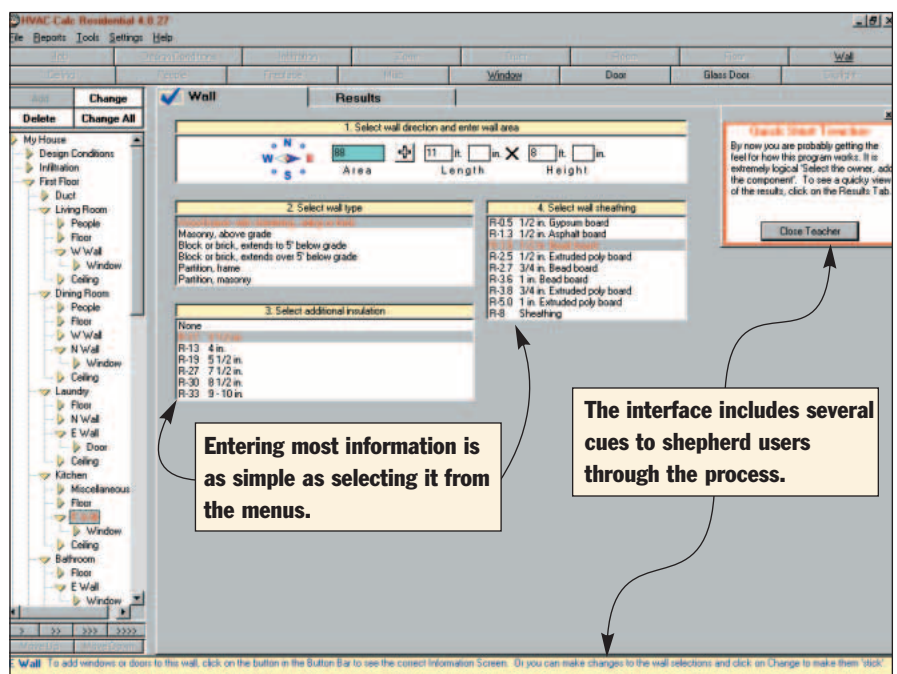
The last, and maybe most valuable help feature, is the toll-free number that's included with the tutorial. If you get stuck, pick up the phone and give the support techs a call. I did this once, and quite frankly, I'd have been happy to pay for the call. The help was courteous and effective.

### THERE'S ALWAYS A BUT...

As much as I like this software, I want to clarify a couple things:

This software is not meant to turn you into an HVAC expert — please don't think you'll be able to overhaul your heating and cooling systems after purchasing this software.

Also, there's still no substitute for experience. Use this program to educate yourself, then discuss what you've learned with a qualified HVAC professional.

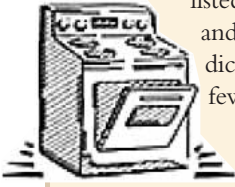


Entering most information is as simple as selecting it from the menus.

The interface includes several cues to shepherd users through the process.

## Appliance Myths Debunked

Among the promotional news releases in [RepairClinic.com's](http://RepairClinic.com) "Newsroom," there was one that listed appliance myths and facts that contradict them. Here are a few of my favorites:



**MYTH:** Gas range burners heat faster than

electric ones.

**FACT:** Most electric burners will actually heat things faster than gas, but gas burners allow for faster changes in temperature, thus more control.

**MYTH:** Refrigerators naturally lose freon over time and need to be recharged.

**FACT:** The freon or other refrigerant should never leak out, dissipate or break down.

**MYTH:** Today's laundry detergents work just as well in cold water as warm or hot.

**FACT:** In northern climates, the incoming cold water can be as cold as 40 degrees. Modern detergents work best at temperatures of 60 degrees and higher. You may want to use the warm cycle in the winter for more effective cleaning.

## RepairClinic.com Offers Appliance Know-How

There are three undeniable truths about household appliances:

1. They die in packs.
2. They always die on the weekends while the service centers are closed.
3. No matter how many times you open and close their doors, spin their knobs, flip their switches, or push their buttons, they will not fix themselves.

Considering all that, the typical DIY homeowner is helpless against a broken appliance (or broken appliances, see rule #1).

Now, however, there's a Web site that aims to level the playing field — [www.RepairClinic.com](http://www.RepairClinic.com).

RepairClinic.com, which launched in January of 2000, uses interactive features such as their Part Detective and Repair Guru to help the "appliance-challenged" to first identify their problems and then to fix them. Conveniently, they'll even sell you the parts and repair manuals you need to finish the job. (Hey, something has to be for sale, folks.)

The Part Detective is one of the most useful online tools I've seen on any of the sites I've assessed for [WorkbenchInteractive.com](http://WorkbenchInteractive.com). Even if you know almost nothing about your particular appliance, you can use the Part Detectives selection menus to describe the part you



need. (Is it all plastic or all metal? Is it all one color? What is the part's longest dimension?) From that, you'll get a list of parts (many with pictures) that match your criteria. It should be pretty easy to find a match from those.

The Repair Guru is another problem-solving feature on the site. Here again, you answer a series of questions about what your appliance is (or isn't) doing, and the Guru offers a few things for you to check out on your machine.

If all else fails, you can e-mail the Appliance Guru with the details of your specific problem. They answer most questions within one day.

## Site To Watch



[www.TomboyTools.com](http://www.TomboyTools.com)

Today's Tomboy is a competent, confident DIYer — or at least that's how the women of [TomboyTools.com](http://TomboyTools.com) define the term. The women behind this new Web site hope they'll be able to strike a chord with other women no longer satisfied with settling for tools designed for men.

But that doesn't mean these women want frilly tools — the site motto is "No Pink Tools!" What they want are tools designed for the way women use them.

The site is brand new, so there isn't much going on yet, but the site is worth keeping an eye on for a different perspective on tools. The idea is certainly long overdue.

## Toolkit Winner!

The winner of the Workbench Ultimate Toolkit Giveaway is:

2nd Lt. Kevin Wiley, USAF.

Kevin hails from Oak Park, IL and was stationed at Kirtland AFB when we contacted him. Congratulations to 2nd Lt. Wiley and thanks to all who entered the drawing.

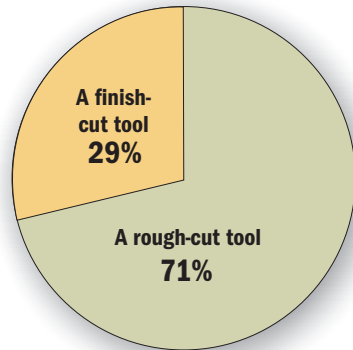
Keep an eye on this space and our Web site for more tool giveaways from *Workbench* coming soon.



## Quick Poll: Band Saw Cuts

We're doing some research on band saw blades and how woodworkers use them for an upcoming tool review. Here's a sample of what Web site visitors have told us so far.

### GENERALLY SPEAKING, A BAND SAW IS:



New Quick Polls go up on the Web site all the time, so visit [WorkbenchInteractive.com](http://WorkbenchInteractive.com) often to take part in them.

## Brighten Walls for Better Shop Lighting

I have invested over \$200 to improve my shop lighting and it's still not ideal. My walls are currently dark OSB. Will painting them gloss white dramatically improve things?

— Kevin

My workshop has concrete block walls that were dull gray. I painted them bright white and it improved greatly. It even "feels" better to be working in the shop with the bright walls.

— Scott

My 20' × 24' shop is lighted adequately with two 300-watt bulbs. The walls are refrigerator high-gloss white. I put three coats of latex on, so it's not only very shiny, but also easy to clean.

— Lynn

White is 81% reflected.  
 Cream is 69% reflected.  
 Gray is 56% reflected.  
 Natural concrete color is 25% reflected.  
 Typical industrial reflectance requirements are:  
 Ceiling - 70%  
 Walls - 60%  
 Floors - 30%  
 Color makes a huge difference in lighting levels.

— Darin

## DIY Terms Defined @ HomeGlossary.com

With over 10,000 real estate, construction, and home improvement terms, [www.HomeGlossary.com](http://www.HomeGlossary.com) may be the most useful list of DIY terminology anywhere. It's also one

of the fastest and easiest to use because the site designers didn't clog it up with unnecessary pictures or other frills. It's just an excellent online reference tool.

Match the definitions at right to the terms below. An answer key is provided at the bottom of this page, or you can look the terms up @ [HomeGlossary.com](http://HomeGlossary.com).

- \_\_\_ 1. A-frame Design
- \_\_\_ 2. Bungalow
- \_\_\_ 3. California Bungalow
- \_\_\_ 4. California Ranch
- \_\_\_ 5. Cape Cod
- \_\_\_ 6. Early Georgian
- \_\_\_ 7. Eastlake House
- \_\_\_ 8. Ranch Style
- \_\_\_ 9. Tudor
- \_\_\_ 10. Victorian Style

- A.** Nineteenth-century style of architecture featuring three dimensional ornamentation, made by hand with a chisel and gouge.
- B.** Type of home prominent in Williamsburg in the 1700's; characterized by two to three stories with double-hung windows and a simple exterior.
- C.** A style of house incorporating a high, peaked roof. It has an open and airy interior, featuring open ceiling rafters.
- D.** Architectural style of the mid-19th Century.
- E.** A one-story house or cottage, which often has either an open or enclosed front porch.

- F.** Early 20th Century type of a small one-story home.
- G.** Long, one-story house with sloping roof with skylights and contemporary windows.
- H.** A style of wood-frame house with a steep roof and windows projecting outward from the second floor. Typical features are bedrooms on the first floor and a finished attic.
- I.** Modern style of home with all of the rooms on one floor.
- J.** An English-style imposing looking house with fortress lines. Siding is chiefly stone and brick with some stucco and half timbers. Windows and doors have molded cement or stone trim.

# In The Shop

## A Simple Crosscut Sled for Cutting Wide Panels

The miter gauge that comes with most table saws is fine for crosscutting a narrow board. But there's a problem when it comes to working with wide panels like those used for the top and the shelf of the *Bedside Table* on [page 22](#).

When you pull the miter gauge out, the head starts to wobble because the bar isn't fully supported in the slot. That makes crosscutting not only difficult, but potentially dangerous also.

One way to get around that is to use a simple crosscut sled. It works like a giant miter gauge, allowing you to crosscut wide panels safely and accurately.

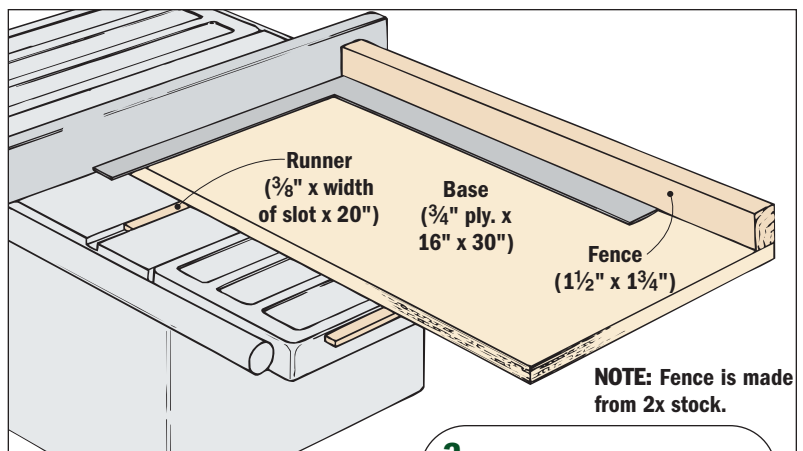
The panel rests on a large, flat base that you slide across the saw table. A pair of runners guides the sled and the workpiece smoothly through the saw blade. And a fence on the back edge of the sled ensures square cuts.

### BUILD THE BASE

To build the crosscut sled, start by cutting a piece of  $\frac{3}{4}$ "-thick plywood for the base. (I made my base  $16" \times 30"$ .)

Next, cut a hardwood runner to fit in the miter gauge slot of your table saw. The goal is to size the runner so it slides smoothly in the slot. Notice that the runner sticks out from the end of the base 4" to 5". This adds to the stability of the sled, allowing you to pull the base back far enough in the slot to hold wider panels.

Now lower the table saw blade and position the runner in the miter slot. Then set the base down over the runner, aligning it just past the table saw blade. Mark the location of the runner on the front and back of the base. Now flip the base over and drill and countersink for  $\#6 \times \frac{3}{4}"$  Fh woodscrews. Then



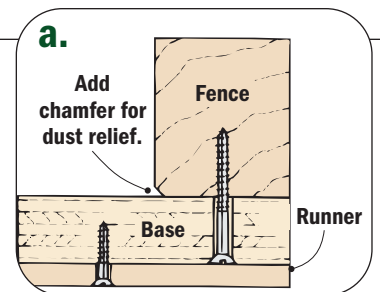
glue and screw the runner to the bottom, see *Detail a*.

To help keep the sled aligned, a second runner is added. This one rides against the edge of the extension wing on the table saw, see photo and the drawing above. To position it, use a couple of spring clamps to hold it. Then screw it in place.

Once both runners are attached, place the sled on your saw and trim off the right edge of the base.

### ADD A FENCE

For the fence, I used a piece of 2x stock ripped to width, with a



chamfer routed on the bottom edge for dust relief (*Detail a*).

To position the fence on the sled so it's square to the blade, use a framing square, see the drawing. Finally, drill and countersink for  $\#8 \times 1\frac{1}{2}"$  Fh woodscrews, and then screw the fence to the base.

# Cutting Accurate Half-Blind Dovetails



The drawer in the *Bedside Table* that's featured on page 22 is held together with half-blind dovetail joints. One quick, accurate way to cut this type of joint is with a router, a 1/2" dovetail bit, a guide bushing, and a special dovetail jig.

## DOVETAIL JIG

The half-blind dovetail jig is a comb-shaped template that fits on a base, see drawing. The base has clamping bars to hold the workpieces in place while the router is guided in and out of the "fingers"

on the template to cut evenly spaced dovetails on a drawer's front, back and sides. Note: The procedures outlined here are for using the *Woodsmith Dovetail Jig* (see *Sources*, page 59), but it's similar for most half-blind dovetail jigs.

To cut dovetail joints with a router and template requires a little planning ahead. For example, the drawer for the table is exactly 3 1/2" wide. I planned for this width so the opening would accommodate a drawer joined with router-cut dovetails. That is, the width (height) of the drawer front has to be a multiple of 7/8". This produces a dovetail joint that's symmetrical both on the top and bottom edges, see the photo above. Note: The drawers for the *Bedside Table* are flush front drawers,

meaning the width of all the drawer pieces will be the same.

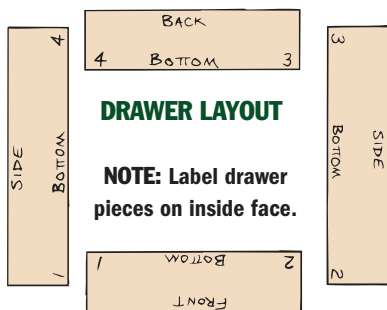
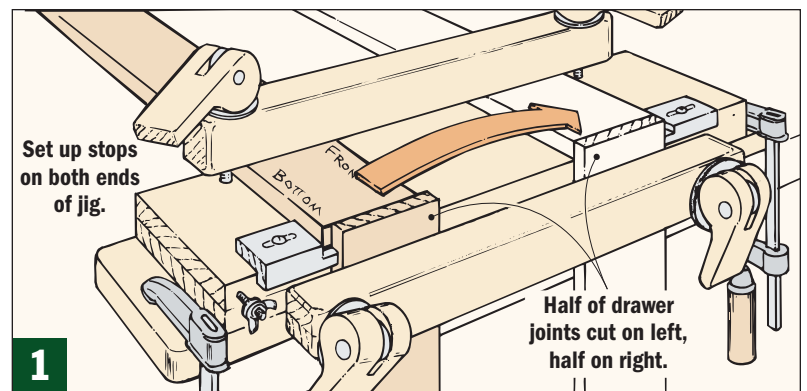
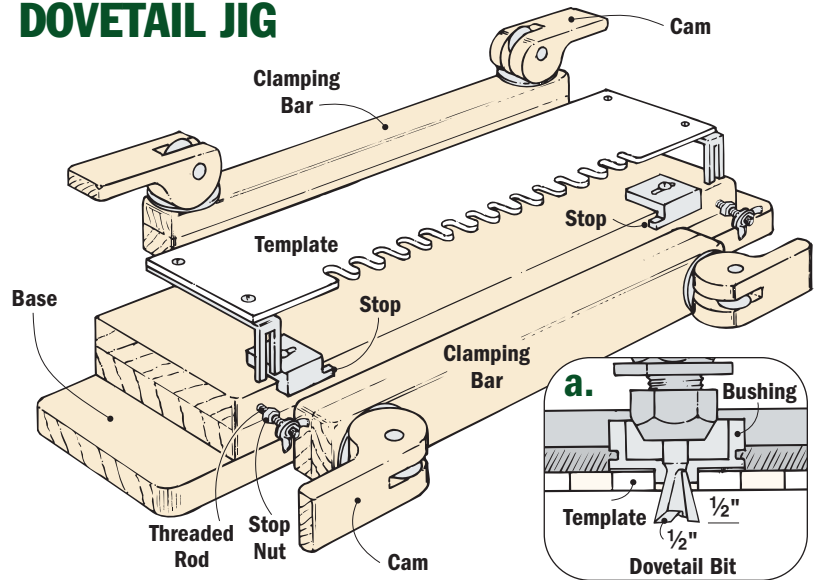
Another consideration is the length of the drawer pieces. To make sure the corners are square, check that the drawer front and back, as well as the drawer sides, are equal lengths. Once the pieces are cut to size, lay them

out and label the bottom edge of each piece, as shown below. Also, number the matching corners.

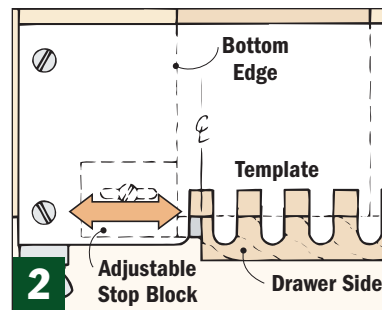
## SET UP

Setting up the jig takes some trial and error, so I first used some scrap pieces that are the same thickness

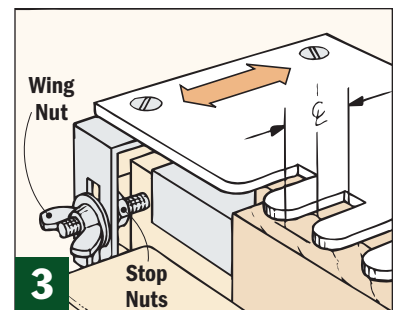
## DOVETAIL JIG



Lay out drawer pieces on bench with insides face up. Then label all the pieces and number matching corners.



Adjust the stop block so the edge of the front workpiece is centered in the first notch of the template.



Stop nuts should be adjusted in or out so fingers of template are centered over the "joint line" between the two pieces.

and width as the drawer pieces. Then I made test cuts, before going on to the real thing.

Start by mounting a drawer side under the *front* pressure bar and a drawer front under the *top* bar. Note: The bottom edges should be tight against the left-hand stop block, and the insides of the drawer should face out (Fig. 1).

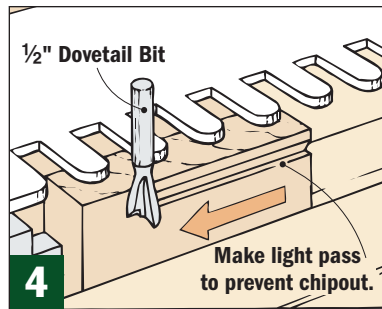
After the drawer front is clamped down, reposition the drawer side so the end is level with the drawer front.

Next, mount the “comb” template on the jig. The goal is to have the first notch of the template centered on the bottom edge of the drawer side. If it’s not, change the position of the stop block side to side to adjust it (Fig. 2). Now hold the template flat on the drawer front and tighten the wing nuts (Fig. 3). The location of the stop nuts on the studs may take some minor adjustment.

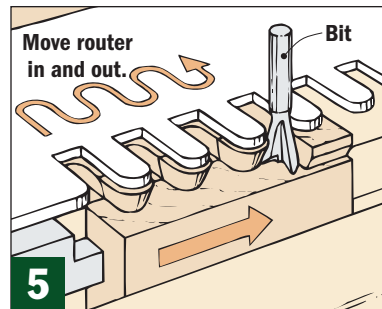
### ROUTER SET-UP

The router is guided in and out of the template with the aid of a guide bushing (Detail a).

Next, mount a 1/2" dovetail bit in the router, making sure the bit is centered in the guide bushing. If it’s not, adjust the router’s base slightly. As for the depth of the bit, start with



**To prevent chipout on drawer side, start by making a light pass from right to left. This creates a clean shoulder line.**



**Now move router left to right, working in and out of notches. Bushing must contact back of notch for complete cut.**

it 1/2" deep (from the base), but you may need to adjust the height of the bit, see box. Note: See page 59 for sources of bushings and dovetail bits.

### ROUTING THE PIECES

Now all of the drawer pieces can be routed. To prevent chipout on the drawer sides, start by making a light scoring pass, routing from right to left (Fig. 4).

Then gently move the router in and out of the fingers, this time moving the router from left to right (Fig. 5). You should be able to feel the guide bushing stop at the back of each notch. After routing, but before removing the pieces from the jig, check that you’ve routed each socket evenly and all the waste is removed.

Take a look at the *Drawer Layout* drawing on page 15. You’ve now routed the joint at the left front corner of the drawer (marked No. 1). Next, rout the right rear corner joint (marked No. 3). Mount the drawer side on the front of the jig, the drawer back on the top of the jig — with the bottom edges against the stop on the left and the insides facing out.

The other two joints (No. 2 and 4) are routed with the pieces tight against the stop block on the *right* side of the jig. Again, always clamp the drawer side to the *front* of the jig, the inside of the pieces facing out, and the bottom edges against the stops (this time on the right). When routing the right side, follow the same procedure as you did on the left.

## TROUBLESHOOTING YOUR DOVETAILS

Setting up to make router-cut dovetails is always a trial-and-error effort. You may need to fiddle around and readjust trial pieces to get a perfect fit. See below for pointers on how to fix possible problems.

Most other problems are usually caused by the pieces not being clamped down in the jig so they’re flush across the top, or because they move out of position as they’re being routed.



**TOO LOOSE:** If joint is too loose, increase bit depth. **TOO TIGHT:** If joint is too tight, decrease depth.



**TOO DEEP:** If pins go deep, move template toward you. **TOO SHALLOW:** If not deep enough, move toward jig.



**OFFSET:** If pieces don’t align at top or bottom, they may not have been tight against the stops.

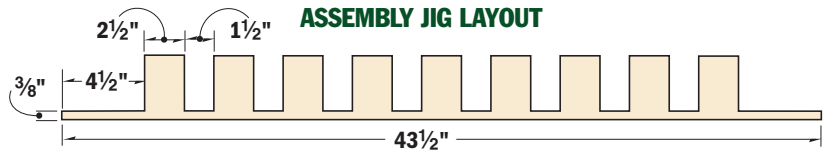


## Assembly Jig

When building the wall panels for the *Garden Gazebo* on [page 36](#), I wanted to make sure that all the balusters were spaced evenly apart. Plus, I wanted the balusters in the upper lenth assemblies to align with those in the lower rail assemblies.

The problem was that it would have required a time consuming layout for each wall panel. The solution is the assembly jig shown in the photo at right. It ensures even spacing and proper alignment. Plus it holds the balusters in place so you can easily attach them to the rails.

The assembly jig consists of two strips of wood that are notched to hold the balusters. (I used 1x4 stock.) Notice there's a wide notch at each end of the jig to hold the end balusters. The



balusters in between fit into the narrow notches of the jig.

To use the jig, start by laying the top and bottom rails out on a workbench, then place both jig pieces on the bench between the rails.

Note: Be sure to orient the *beveled* face on the rails toward the jig.

Next, align the bevels of the end baluster and the rails. Lay the balusters in the notches and use wood-screws to attach them to the rails.

## Cutting Thin Strips Safely

When building the cupola for the *Garden Gazebo* ([page 36](#)), I needed a bunch of thin wood strips to use for the louvers. That seems easy enough to do on the table saw. But if you position the rip fence so the strip is

between it and the blade, the strip can get pinched and kick back.

Granted, you could position the fence so that the strips fall to the *waste* side of the blade. But this requires moving the fence for each

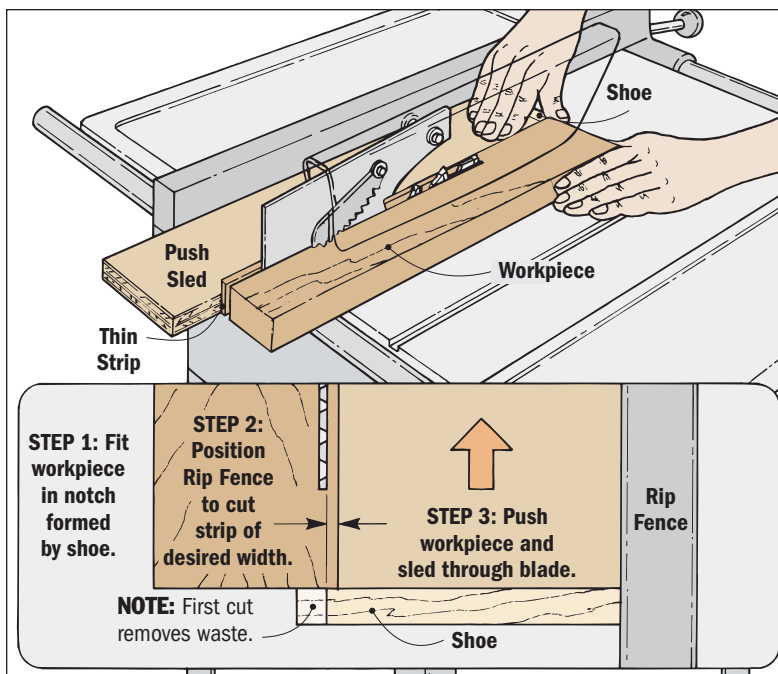
cut. Plus there's a good chance the strips will vary in thickness.

So to rip strips that are a consistent thickness, I use a simple push sled. It's just a piece of 3/4" plywood with a wood shoe glued on the end so it overhangs the edge of the push sled, see drawing and detail.

The idea is to fit the workpiece into a notch formed by the shoe. Then after positioning the rip fence to cut a strip of the desired thickness, slide the workpiece and the push sled through the saw blade. Note: The first cut through the blade will remove the waste at the end of the shoe.

Once you've set the rip fence, the important thing is not to move it again. Just repeat the process for the rest of the strips, and each one will be identical in thickness.

Safety Note: Always use a blade guard and splitter while cutting the strips. I also use a zero-clearance insert to prevent the strips from falling into the opening next to the saw blade.



# Dynamite Decks!

*Enter the Workbench and California Redwood Association's deck-building contest — share in over \$6,000 in cash and prizes.*

Deck designs have certainly changed during the past few years. They're no longer just a place to barbecue or relax. They've become total outdoor living

spaces — complete with grilling centers, conversation pits, unique lighting, even hot tubs and spas. The decks shown on the following pages are a perfect example of how

changes in lifestyle have influenced the way decks are being designed. Multi-level spaces now allow several activities to go on at the same time. Elaborate wrap-around decks pro-



1

## ELEGANT WRAP-AROUND ... SLEEK RAILING

1. This curved redwood deck wraps invitingly around the front and side of a rustic mountain home.

2. Horizontal brushed stainless steel rails give this multi-level deck a sleek, contemporary look.

2

vide access to the house at a number of different places. And built-in bars and barbecues provide places for outdoor entertaining.

More than ever before, decks have also become a reflection of their owners' personalities. Take a quick tour through the photos on these pages to see some ingenious ways homeowners all across the country are personalizing their decks. You'll find things like privacy screens, hand-crafted lighting fixtures, and even mini-kitchens and hot tubs.

### EVERYBODY LOVES A CONTEST

If you've always wanted to incorporate these types of unique features into your own deck-building projects, we've got just the ticket. You guessed it — a deck-building contest.

Here's your chance to show off your design and building skills. But this is more than just a contest where we give away cash and prizes. Keep reading to learn more.

For the first time, *Workbench* magazine has teamed-up with the California Redwood Association to

sponsor the ultimate deck-building contest. Together, we're going to choose the "Best Decks in America" — from New Orleans to New York, and from Minneapolis to the mountains of Colorado.

The decks belonging to the winners of the contest will be featured in a spring 2002 issue of *Workbench* magazine. If you take a look at [page 21](#), you'll find the official "Entry Rules" for the contest. So what makes for a winning deck? [Turn the page](#) to find out.



### SPA ... VERANDA ... CURVES

**3. A built-in spa and solarium/sun room partially enclosed in glass highlight this Colorado deck.**

**4. This 1,890-square-foot redwood deck wraps around the house, reminiscent of an Australian veranda (the owner's native country).**

**5. Elements of this elegantly designed deck include a graceful curving shape with knotty redwood combined with copper accents.**





6

### GATE ... RAILS ... LIGHTS

6. A focal point of this deck is the Japanese-style, redwood entry gate.

7. Notice the rich blend of this shining copper and redwood railing.

8. Lit from within, these decorative posts provide a dramatic show at night.



7



8



9



10

### DETAILS THAT COUNT

So what are we looking for in the winning decks? Certainly quality construction and creative design are important. But as with most projects, it's the details that really make a big difference — those interesting and unique things that can turn an ordinary deck into something special.

Perhaps it's a lattice gate leading to a secluded garden spot, a circular bench with built-in storage, or a sunken, Japanese-style fire pit. Maybe you've come up with a clever way to screen your deck from the neighbors' view or provide shading for a built-in dining area. It could even be a new twist on outdoor lighting or a clever railing treatment.

Here's the bonus part of the contest. Even if you don't enter, you'll want to keep your eyes peeled for the winning decks. That's because we plan to provide step-by-step instructions and detailed illustrations of the unique design elements of the winning decks. Then you'll be able to incorporate these features into your next deck-building project.

### DON'T FORGET TO ENTER

If you know someone who has a really neat deck feature, be sure to tell them about this contest. In fact, tell all your neighbors and friends — the more decks, the better.

We can't wait to see all those dynamite decks around the country. Who knows, perhaps we'll be honoring you as one of our winners next year. Good luck!

### BENCH ... PLANTERS ... BAR

9. These built-in benches feature curved backs and lattice inserts for the arms.

10. Built-in six-sided planters provide lots of space for flowers and splashes of color.

11. This ground-level wet bar with ceramic tile counter is part of a three-tiered, total entertainment deck.



11

# ENTER TO WIN! REDWOOD DECK CONTEST

Send us photos and drawings of your deck projects for a chance to share in over **\$6,000 in cash and prizes!**



**PRIZES:** Three cash prizes will be awarded, and all winners will receive at least one additional prize as well. The grand-prize winner will receive a cash prize of \$3,000; the first runner-up will receive a cash prize of \$2,000; and the second runner-up will receive a cash prize of \$1,000. The three winning decks will be featured in a Spring 2002 issue of Workbench magazine and all prizes will be distributed at the time of publication.

**WHO CAN ENTER:** The contest is open to homeowners who have built a deck or had one built for them, as well as to contractors, architects and designers who have built or designed a deck for a client as long as the client/homeowner consents to the submission. Redwood must have been used in the construction of the deck, preferably on visible surfaces. Other materials may have been used for structural support and design accents. The deck must be no more than three years old and cannot have been published elsewhere. In addition, the deck must be able to be photographed attractively. Employees of Workbench magazine and California Redwood Association are not eligible to enter.

**HOW TO ENTER:** Fill out the entry coupon. Enclose several different photographs of your deck; there is no limit on the number you may submit. Color prints are preferred, but slides are acceptable. If the deck is attached to a house, include a shot that clearly shows the two structures together. The photographs must have been taken in 2001 to show the current condition of the deck.

Also include a dimensional drawing that shows the nominal sizes of piers, posts, beams, joists, decking and railing members and their spacing. A sketch will suffice if it is labeled with critical dimensions. Also include a list of all materials used: redwood, other lumber or plywood, hardware and finish and accent materials, such as brick, stone or tile.

You must also furnish a written description of the design goals and how they were achieved, including any special design or construction problems and solutions. Entries must include all of the required enclosures to qualify for the contest. Models and/or presentation boards over 18x24 in.-with the exception of blueprints-will not be accepted.

**ENTRY DEADLINE:** Entries must be delivered to the address shown on the coupon by August 31, 2001. No entries will be acknowledged except the three winners, and none will be returned unless accompanied by a written request and a self-addressed envelope with proper postage.

**TERMS:** The submission of an entry signifies your agreement to the following: (1) you warrant that you, as the entrant in the contest or with the written consent of others, have the authority to make the submission and grant the rights herein granted; (2) you warrant that the material submitted with the entry, including the publication thereof by Workbench magazine and the California Redwood Association, will not violate or infringe upon the rights of others; (3) you warrant that the material as submitted with the entry, including designs and photographs, have not been previously published and distributed in any manner, including both printed and electronic media; and (4) you will not permit the material to be published in any other publication, whether printed or electronic media, until after December 31, 2001 for non-winners and December 31, 2002 for prize winners. If you are a prize winner, in consideration thereof, you grant to Workbench magazine and the California Redwood Association the exclusive right and license to reproduce and publish in both printed and electronic media all material submitted with the entry, along with your name and location, and grant reasonable access for photographs to be made by representatives of Workbench magazine and the California Redwood Association, until December 31, 2002, and, thereafter, such rights as granted shall continue on a non-exclusive basis. FURTHER, each entrant agrees to indemnify Workbench magazine and the California Redwood Association in the event the entrant violates any of the foregoing terms.

**HOW DECKS ARE JUDGED:** Contest entries will be judged by representatives of Workbench magazine published by August Home Publishing Company and the California Redwood Association. The judges will also be looking for the most attractive and interesting uses of redwood in the deck projects. The winners will be chosen based on design, construction quality, innovative details and overall appearance in relation to the home and yard. The determination of the judges will be final. Winners will be notified by October 1, 2001.

## Enter Me in the Workbench/California Redwood Association Deck Contest

**Send entries to:**

Workbench/California Redwood Association Deck Contest  
405 Enfrente Drive, Suite 200, Novato, CA 94949  
Telephone: 415-382-0662

(Please print or type)

Name \_\_\_\_\_

Firm Name \_\_\_\_\_

(for building and design professionals only)

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Phone(day) \_\_\_\_\_ (evening) \_\_\_\_\_

Date project was completed \_\_\_\_\_

Date enclosed photos were taken \_\_\_\_\_

**Please circle all that apply:**

The person entering is the: Homeowner Pro builder  
Pro designer/architect

The deck was designed by a: Homeowner Professional

The deck was built by a: Homeowner Professional

# Bedside Table

*Solid wood construction and elegant details make this cherry bedside table a perfect companion to the heirloom bed.*



If this *Bedside Table* looks familiar, there's a good reason for it. It's a companion piece to the heirloom bed that was featured in the [March/April issue](#) of *Workbench*.

Like the bed, the table has four solid corner posts for legs that are connected to the rails with traditional mortise and tenon joints. The sides and back are similar too — they each have solid wood panels made up of a number of slats that are assembled with tongue-and-groove joints.

But it's the details that make this table a nice complement to the heirloom bed — like a wide chamfer running the length of each leg, graceful tapers at the bottom end of each leg, and a gently curving front apron.

Of course, this bedside table is a great project all by itself. And building the table provides a number of woodworking challenges that make for an extremely satisfying project.

## WOOD MOVEMENT

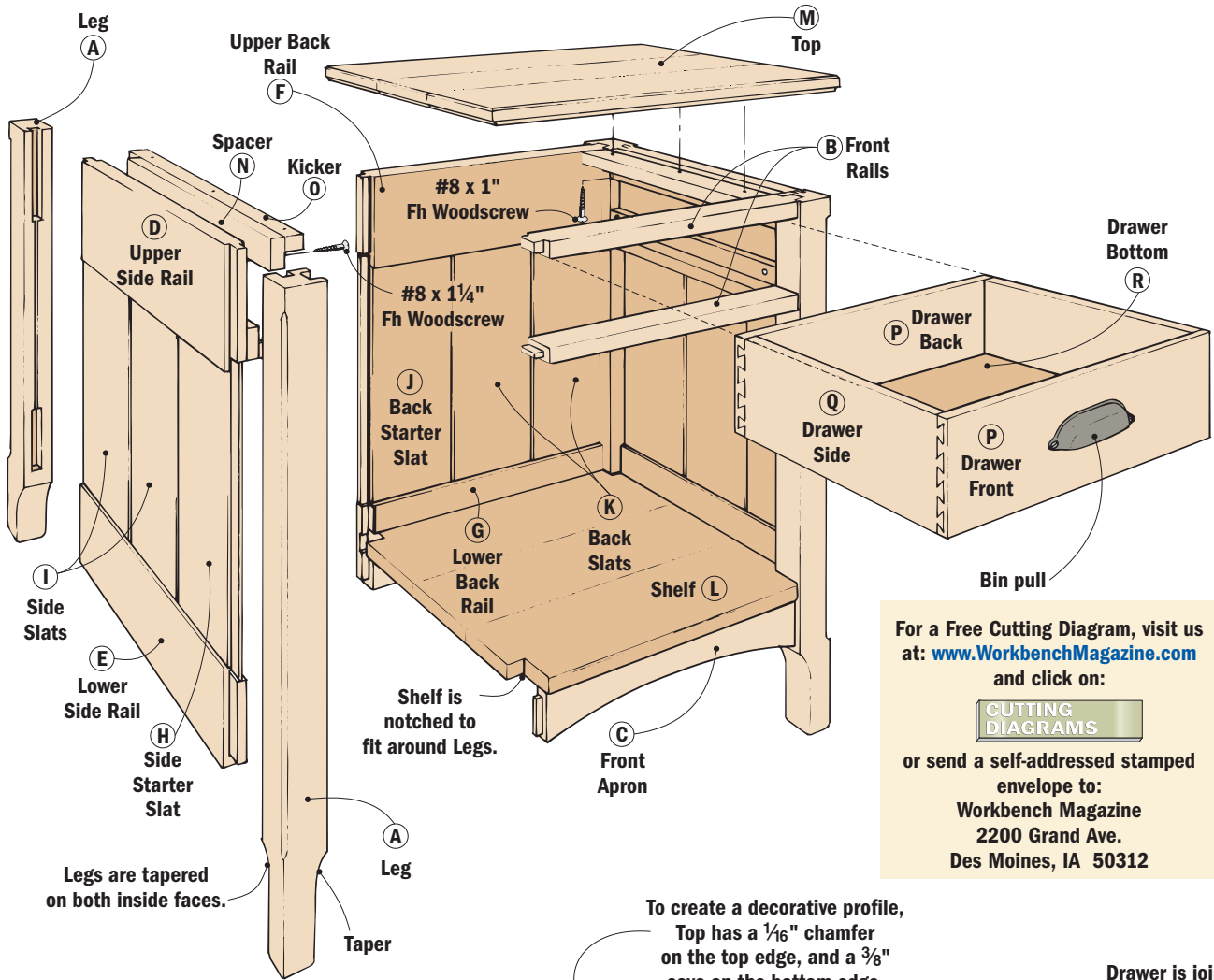
For example, with the exception of the drawer bottom, the entire project is made of solid wood. (I used cherry.) Since wood expands and contracts with changes in humidity, you'll need to allow for this during nearly every step of the project. But don't worry, we've provided a number of helpful tips to deal with wood movement.

## DOVETAILED DRAWER

Finally, the drawer provides an opportunity to try out an interesting woodworking technique — cutting half-blind dovetails. We've even included a step-by-step article to walk you through this process on [page 15](#).

# BEDSIDE TABLE CONSTRUCTION VIEW

OVERALL TABLE SIZE: 20"W x 26"H x 18"



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## MATERIALS LIST

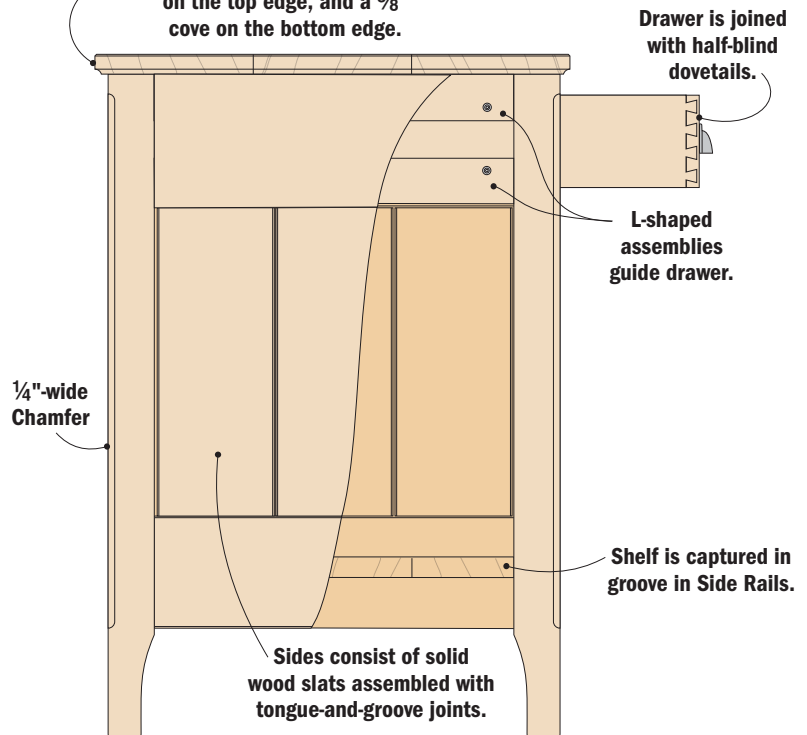
### LUMBER

A (4) Legs	1 <sup>3</sup> / <sub>4</sub> " x 1 <sup>3</sup> / <sub>4</sub> " x 25 <sup>1</sup> / <sub>4</sub> " (cherry)
B (2) Front Rails	3/4" x 1 <sup>9</sup> / <sub>16</sub> " x 16" (cherry)
C (1) Front Apron	3/4" x 2" x 16" (cherry)
D (2) Upper Side Rails	1" x 5 <sup>1</sup> / <sub>16</sub> " x 14 <sup>5</sup> / <sub>8</sub> " (cherry)
E (2) Lower Side Rails	1" x 4 <sup>1</sup> / <sub>4</sub> " x 14 <sup>5</sup> / <sub>8</sub> " (cherry)
F (1) Upper Back Rail	1" x 5 <sup>1</sup> / <sub>16</sub> " x 16" (cherry)
G (1) Lower Back Rail	1" x 4 <sup>1</sup> / <sub>4</sub> " x 16" (cherry)
H (2) Side Starter Slats	5/8" x 5 <sup>3</sup> / <sub>16</sub> " x 12 <sup>5</sup> / <sub>16</sub> " (cherry)
I (4) Side Slats	5/8" x 4 <sup>13</sup> / <sub>16</sub> " x 12 <sup>5</sup> / <sub>16</sub> " (cherry)
J (1) Back Starter Slat	5/8" x 5 <sup>11</sup> / <sub>16</sub> " x 12 <sup>5</sup> / <sub>16</sub> " (cherry)
K (2) Back Slats	5/8" x 5 <sup>5</sup> / <sub>16</sub> " x 12 <sup>5</sup> / <sub>16</sub> " (cherry)
L (1) Shelf	3/4" x 16" x 16 <sup>5</sup> / <sub>8</sub> " (cherry)
M (1) Top	3/4" x 18" x 20" (cherry)
N (2) Spacers	1/2" x 1 <sup>3</sup> / <sub>4</sub> " x 13 <sup>5</sup> / <sub>8</sub> " (cherry)
O (4) Kicker/Runners	3/4" x 3/4" x 14 <sup>13</sup> / <sub>16</sub> " (cherry)
P (2) Drawer Front/Back	1/2" x 3 <sup>1</sup> / <sub>2</sub> " x 14 <sup>15</sup> / <sub>16</sub> " (cherry)
Q (2) Drawer Sides	1/2" x 3 <sup>1</sup> / <sub>2</sub> " x 15 <sup>5</sup> / <sub>16</sub> " (cherry)
R (1) Drawer Bottom	1/4" x 14 <sup>15</sup> / <sub>16</sub> " x 14 <sup>3</sup> / <sub>8</sub> " (cherry ply.)

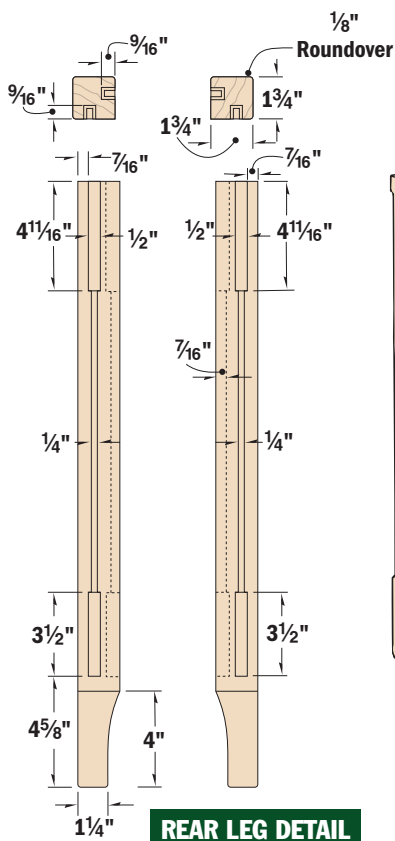
**HARDWARE:** (See pages 59 for information on sources.)

- (1) Bin Pull
- (6) #8 x 1" Fh Woodscrews
- (8) #8 x 1<sup>1</sup>/<sub>4</sub>" Fh Woodscrews

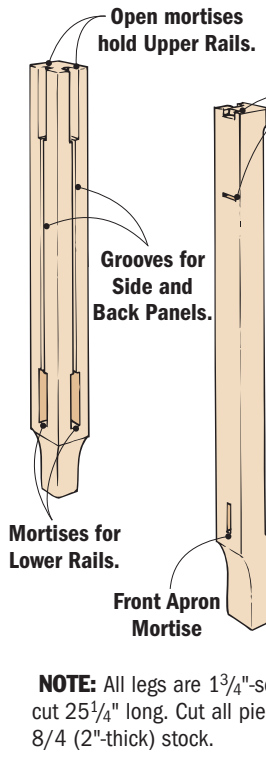
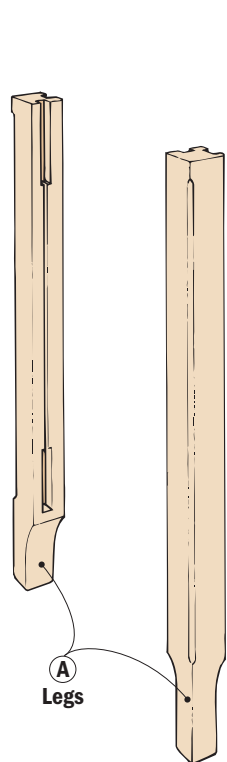
To create a decorative profile, Top has a 1/16" chamfer on the top edge, and a 3/8" cove on the bottom edge.



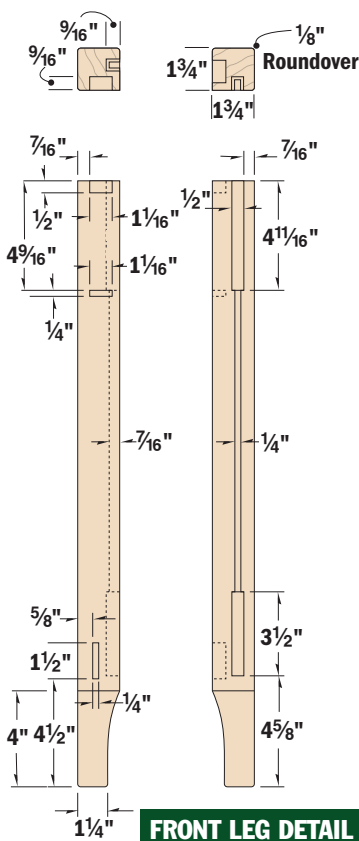
# LEG CONSTRUCTION VIEW



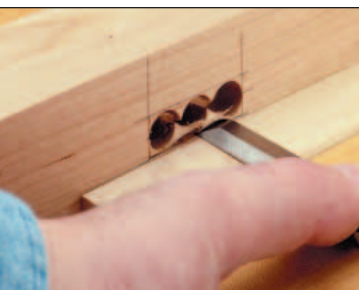
**REAR LEG DETAIL**



**NOTE:** All legs are 1 3/4"-square posts, cut 25 1/4" long. Cut all pieces from 8/4 (2"-thick) stock.



**FRONT LEG DETAIL**



## LEGS

One of the first things you notice about this bedside table are the four sturdy corner posts that form the legs. They're connected by a number of rails using strong mortise and tenon joints.

**Mount the leg in a bench vise, and align guide block along edge of mortise. Then clean up the sides with a sharp chisel.**

As you can see in the drawing above, each leg (A) starts off as a 1 3/4" square blank that's cut from 8/4 stock. To ensure a good color match, I'd suggest cutting all four legs from the same board. Then square up the blanks and trim them to final length (25 1/4").

To accept the rails that connect the legs, you'll need to cut a number of mortises. It's easy to accidentally cut one of these mortises in the wrong location. So to avoid confusion, it's a good idea to label each leg before laying out the mortises.

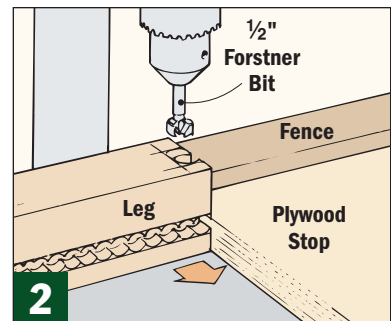
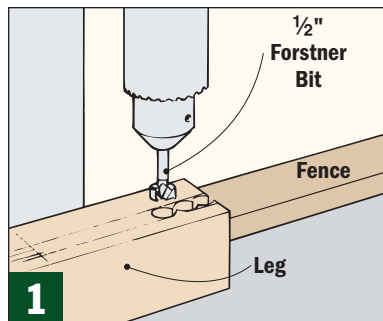
As you can see in the *Leg Construction View* above, the back legs have two pairs of mortises. One pair near the bottom of the legs holds the lower rails, and two "open" mortises near the top accept the upper rails. In addition, there are two mortises on the inside face of each front leg. These mortises hold the upper and lower side rails. To make these mortises, the first step is to rough out the mortises.

To do this, clamp a fence to the drill press table and use it to position the leg as you drill a series of overlapping holes (*Fig. 1*).

That takes care of the mortises for the rails on the sides and back of the table. But you'll also need to cut mortises for the *front* rails. (These are the rails that form the drawer opening.) If you turn back to the *Construction View* on [page 23](#), you'll see that the edge (not the face) of these rails is visible. Because of that I cut horizontal mortises to hold these rails. This required a slightly different setup.

Once again, I clamped a fence to the drill press table. But this time, I also clamped a scrap of plywood to the table as a stop (*Fig. 2*). The stop and fence form a "corner" that's used to position the leg and keep the mortise square to the edge.

To cut the mortise, set the leg against the fence and butt the end against the stop. After drilling the side of the mortise closest to you, nudge the leg away from the fence to complete the mortise. Once these mortises have been roughed out, switch to a smaller bit, reposition the stop,



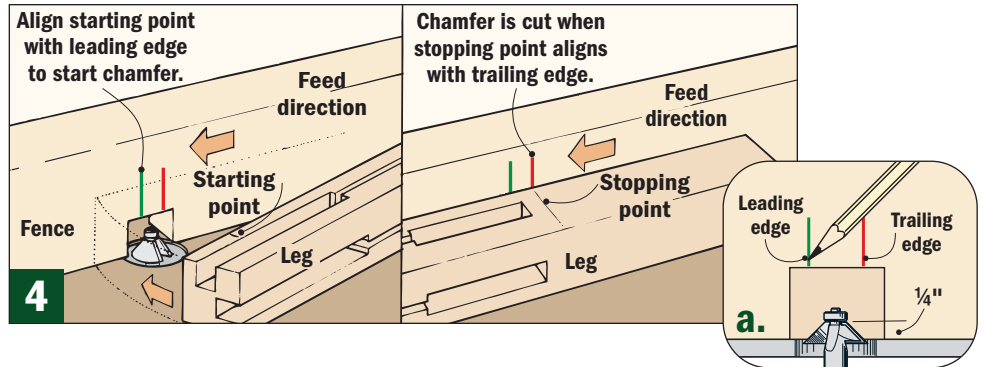
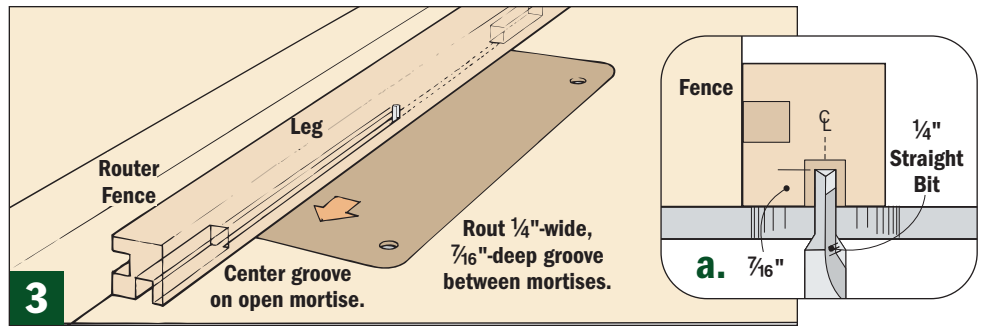


and cut the mortise for the second (lower) front rail. There's just one last mortise. To hold the front apron, you'll need to cut a short, narrow mortise on the inside face of each front leg. Finally, clean out all the remaining waste with a sharp chisel (margin photo, far left).

### GROOVES FOR THE SLATS

The slats that make up the side and back panels have tongues that fit into long grooves in the legs. To accept the tongues you'll need to rout two grooves in the back legs and a single groove in the front leg to accept the tongues. This allows the slats to expand up to 1/8" side-to-side with changes in humidity.

To do this, I used a 1/4" straight bit and a router table (Fig. 3). First align the fence. Note: The grooves are centered on the open mortises in the back legs and the mortises for the side rail in the front legs (Fig. 3a). Then place the leg on the table and rout through the open top mortise and along the leg, stopping when you reach the bottom mortise.



### ROUT CHAMFERS

Now all that's left is to add a few details to the legs. To add visual interest, there's a 1/4"-wide chamfer on the outside corner of each leg. This chamfer doesn't extend to the top or bottom of the legs — it's a "stopped" chamfer.

To cut it, first chuck a 45° chamfer bit in a table-mounted router. Then draw a starting and stopping point for the chamfer on the legs. Next, draw two lines on the router fence (Fig. 4). The green line represents the leading edge of the bit (where the cut begins). The red line shows the trailing edge (where the cut stops). Set the bit to the depth shown in Figure 4a and align the bearing flush with the fence.

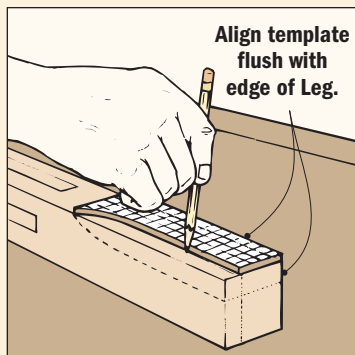
To make the cut, ease the stock into the bit so the starting point aligns with the green mark. Then rout until

the stopping point aligns with the red mark. Next, I softened all of the remaining edges, except for the inside corner and around the top of the legs, using a 1/8" round-over bit.

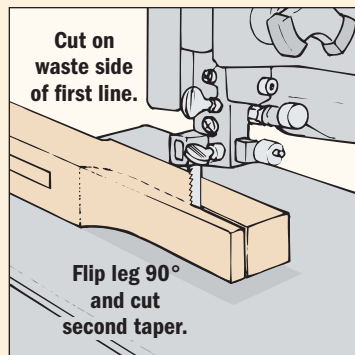
### ADD TAPERS

Finally, add a curved taper on the inside faces of each of the legs, see box below. Make a template to lay out the curves. Then cut them on a band saw and sand up to the layout lines. To complete them, I used a mill file and sandpaper to add a roundover to the tapers and the leg bottoms.

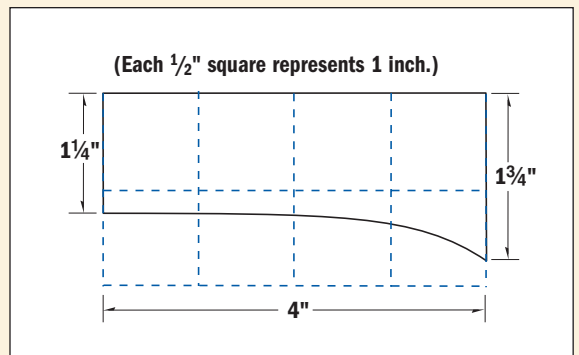
## CUTTING THE TAPERS



Align the template flush with the outside and bottom of the leg. Then mark the inside faces to be cut.



Make the first cut, staying outside the layout lines. Then flip the leg 90° and make the second cut.



Use the scaled pattern above to make a full-sized template. It can be blown up 200% on a copier, then transferred to a hardboard template.

## BUILD THE RAILS

The table legs are connected with several rails. As you can see, there are two rails (B) that create the drawer opening in front of the cabinet and a curved front apron (C) on the bottom (Case Assembly). On the

sides and back of the cabinet, the legs are connected by wider top and bottom rails (D, E, F, G).

After cutting all the rails to final size, the next step is to add a tenon on each end. All of the lower rails and the apron fit into closed mortises. So

in order to form a tenon, you'll need to cut a shoulder on all four edges. But the tenons that fit into the open mortises don't have a shoulder on the top. This means you'll be cutting a three-shouldered tenon on these rails, see the *Case Assembly* and *Details*.

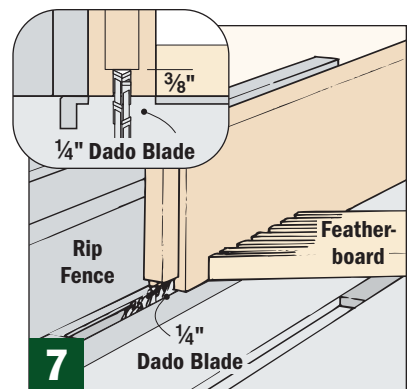
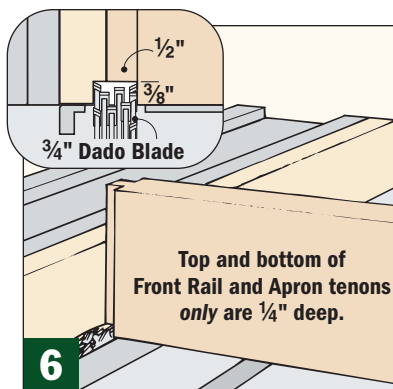
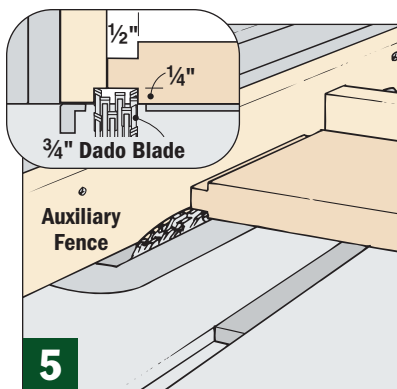
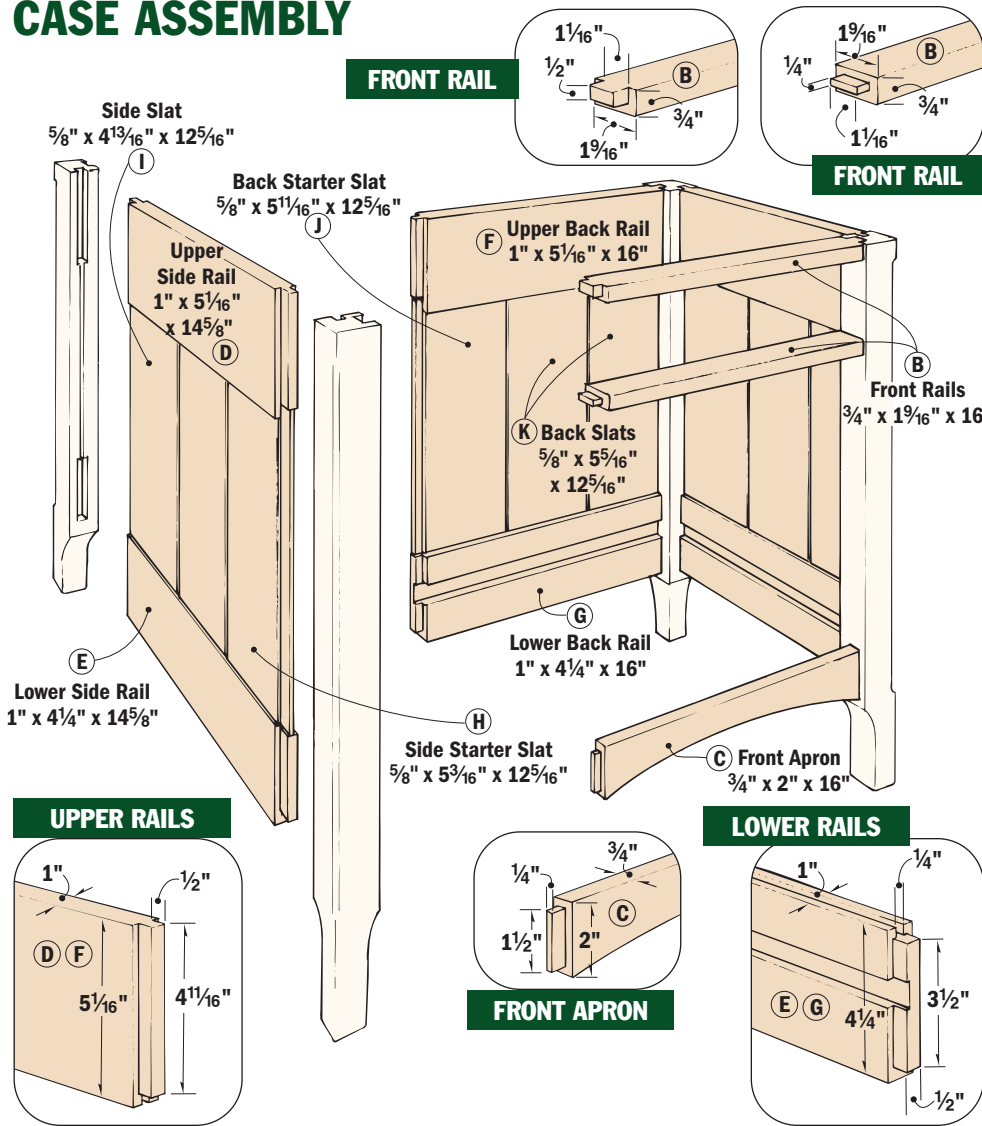
Each of these tenons have one thing in common: they're identical in length ( $\frac{1}{2}$ " ). So to start, I installed a  $\frac{3}{4}$ " dado blade in the table saw and partially "buried" it in an auxiliary fence to make a  $\frac{1}{2}$ " cut.

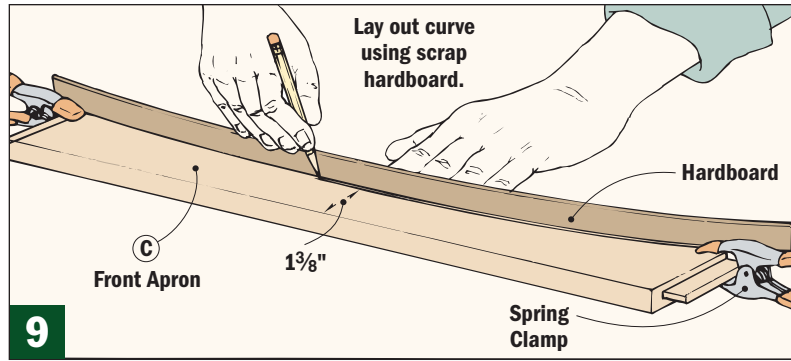
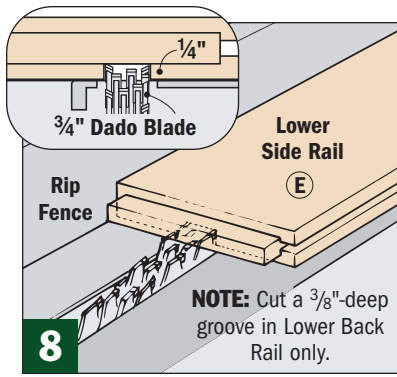
Begin by cutting the tenons for the front rails (B) and the front apron (C). To do this, set the height of the dado blade to  $\frac{1}{4}$ ". Then with the workpiece face down on the table, butt the end against the fence, and cut the cheeks of the tenons first (Fig. 5). Next, set the rails on edge and cut the top and bottom shoulders (Fig. 6). Don't forget the top front rail has a shoulder on *three edges* only.

Once the front rail and the apron tenons have all been cut, set these pieces aside and complete the tenons on the side and back rails. I used the same setup to make the face cuts for the remaining rails. But, in order to cut the top and bottom shoulders, you'll have to raise the height of the dado blade to  $\frac{3}{8}$ ", see *Figure 6* and *Case Assembly*. Once again, all of the upper rails have a shoulder on three edges only.

There are just a few steps left to complete the rails on the sides and back of the table. To hold the slats, you'll need to cut a centered groove in the inside edge of each rail. An easy way to do this is to switch to a  $\frac{1}{4}$ " dado blade and use a two-pass

## CASE ASSEMBLY





method to cut the groove. Start by setting the rip fence so the blade is roughly centered on the thickness of the workpiece. Then after making a single pass, turn the piece end for end and make a second pass to complete the groove (Fig. 7).

In addition to the grooves in the edge, you'll need to cut a  $\frac{3}{4}$ "-wide groove in the inside face of the lower side and back rails. This holds the bottom shelf on three sides.

It's a good idea to dry-assemble the case to determine the location of these grooves. The goal is to locate them so the bottom edges of the grooves are even with the top of the apron (C). This will allow the shelf to sit flat on top of the apron.

Just one more note before you cut the grooves. The shelf will be a solid wood panel, so it will expand and contract with changes in humidity. That means I had to allow for the shelf to "move" front to back (across the grain). To allow for this wood movement, I cut the groove in the back rail  $\frac{1}{8}$ " deeper than the grooves in the side rails (Fig. 8).

### CUT THE ARC

The next step is to cut a gentle arc in the bottom of the front apron. I used a thin scrap of hardboard and a

couple of spring clamps to lay out the curve. Set the clamps at the ends of the arc and bend the scrap into the desired location (Fig. 9). Then cut the arc with a band saw (or a jig saw) and sand it smooth.

Finally, rout a  $\frac{1}{16}$ " chamfer on the front edge of the arc and on the outside edges of the side and back rails.

### ADD THE SLATS

The last step is to add the solid wood slats that make up the side and back panels. The slats are made of  $\frac{5}{8}$ "-thick hardwood with tongue-and-groove joinery so they slide together easily. Each side and back assembly has one starter slat (H, J) and two more slats (I, K). All of them have a tongue on the top and bottom that fits into the grooves in the rails (Slat Assembly).

To determine the length of the slats, dry assemble the side (or back) and measure the distance between the grooves. (My slats were  $12\frac{5}{16}$ " long.)

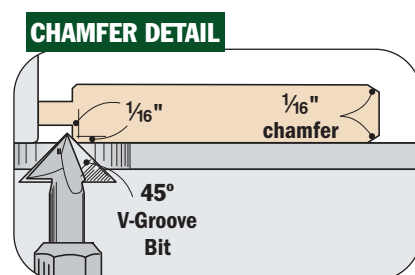
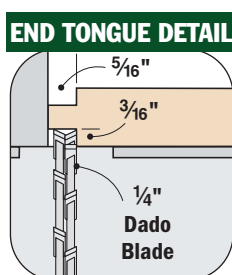
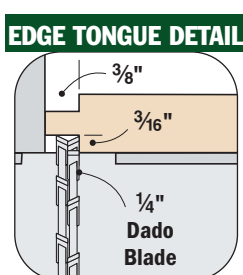
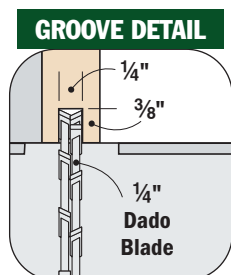
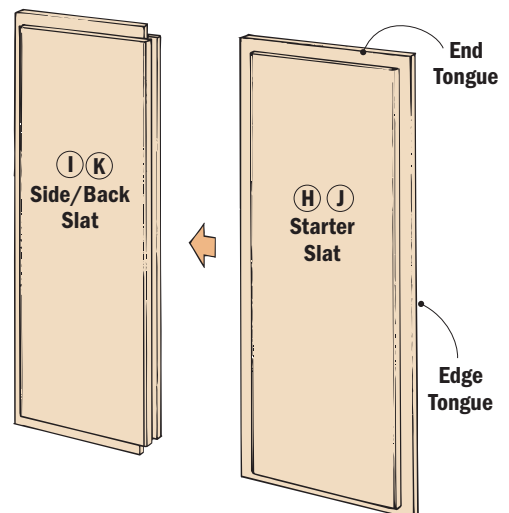
Another consideration is the width of the slats. The starter slats are  $\frac{3}{8}$ " wider than the others. That's because they have a tongue on both long edges. One tongue fits into the long groove in the legs, and the other fits into the groove in the adjacent slat. After cutting all the slats to size, it's

time to cut the tongue and groove joints. Start with the groove (Groove Detail). Then cut tongues on the edges to fit (Edge Tongue Detail).

Before cutting the tongues in the ends of the slats, nudge the rip fence closer to the blade to cut a narrower tongue (End Tongue Detail). Finally, I routed a  $\frac{1}{16}$ " chamfer on all four edges (Chamfer Detail).

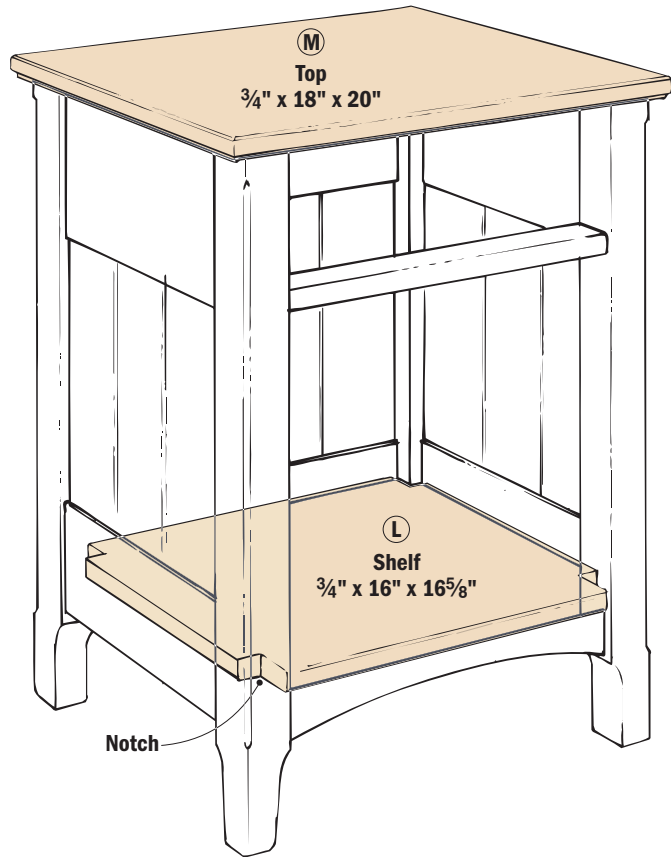
Before going to the next step, I applied stain to the slats, including the tongues. (If the slats shrink, any unstained tongues might be visible.) I used a mixture of three parts Zar cherry stain and one part Woodkote Jel'd cherry stain.

## SLAT ASSEMBLY

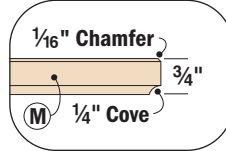


**NOTE:** Slat sizes shown in Case Assembly on Page 44.

# TOP & SHELF CONSTRUCTION



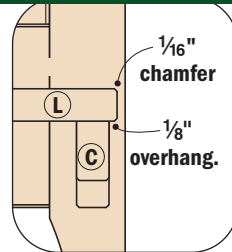
## TOP EDGE DETAIL



**FIRST:** Glue-up oversize panel for the Top and Shelf from 3/4"-thick hardwood.

**SECOND:** Cut panels to final size (see page 14).

## SHELF EDGE DETAIL



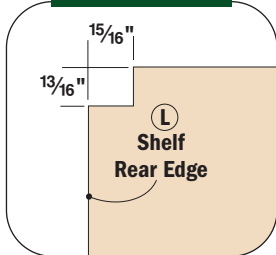
## SHELF & TOP

Now that most of the case is complete, work can begin on the shelf (L) and top (M). They're very similar in that each one is a glued-up, solid wood panel. Start by gluing up an oversized panel, then cut it to final size on the table saw, see *Top/Shelf Construction View*. For more on cross-cutting wide blanks, see [page 14](#).

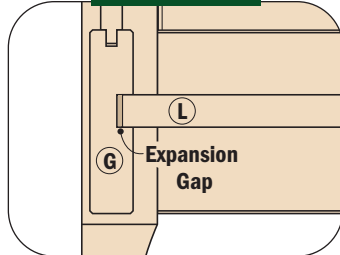
Once the top and shelf are cut to finished size, I routed a cove and chamfer around all four edges of the top (*Top Edge Detail*), and a chamfer on both edges of the shelf front (*Shelf Edge Detail*). At this point, you can set the top aside and concentrate on the shelf.

To complete the shelf, you'll need to cut a notch in each corner to fit around the legs (*Notch Details*). Notice that the notches in the front are deeper than the ones in back. The reason for this is to create a gap where the shelf fits around the back legs. When combined with the deeper groove (cut earlier in the back rail), the gap allows room for the shelf to expand (*Gap Detail*).

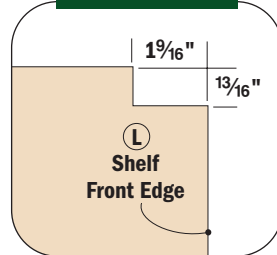
## NOTCH DETAIL



## GAP DETAIL



## NOTCH DETAIL



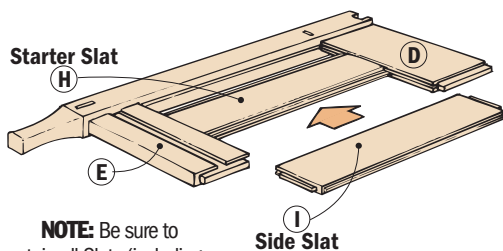
## CASE ASSEMBLY

Next, I put the case together in stages (*Assembly Sequence*). Start by gluing up the two side assemblies (*Step 1*).

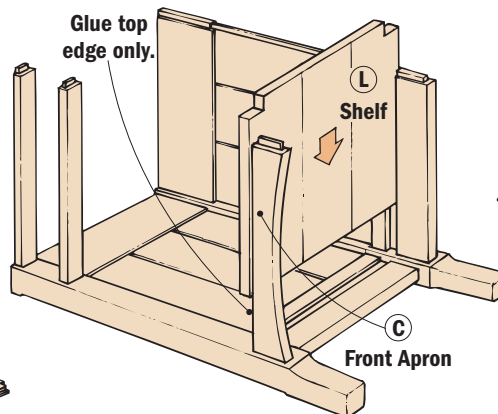
Once the glue dries, lay one of the sides on a workbench with the inside facing up. Now add the top and bottom rails for the back of the case and slide in the slats.

## ASSEMBLY SEQUENCE

**STEP 1:** Begin by gluing the Upper and Lower Side Rails to the Legs to make the side panels. Then slide Starter Slat in first, followed by Side Slats.

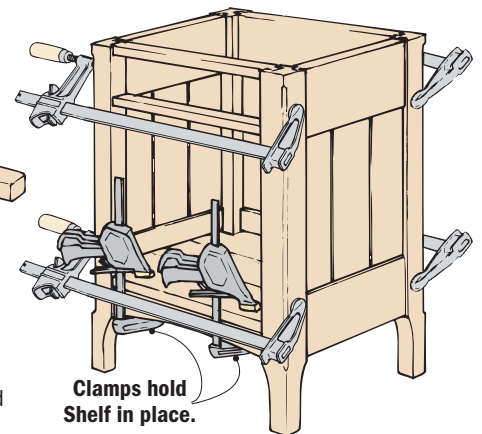


**NOTE:** Be sure to stain all Slats (including tongues) before assembly.



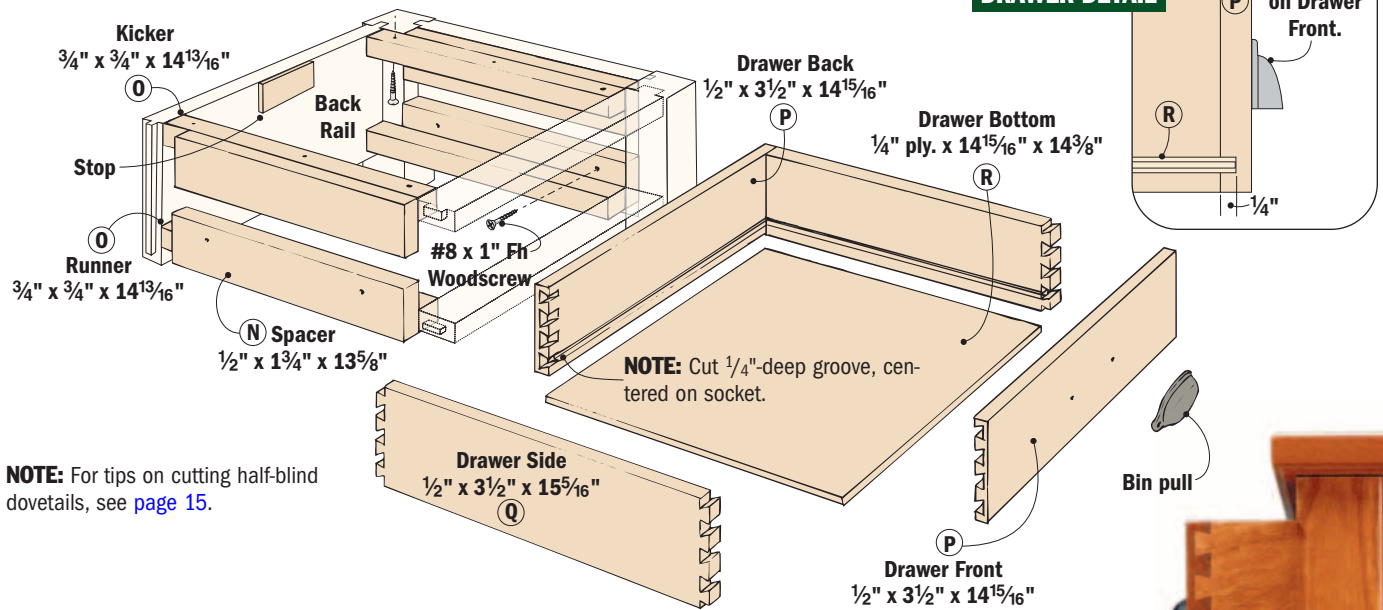
**STEP 2:** Follow same procedure to install back panel. Glue Front Rails and Apron into mortises and slide in Shelf, adding glue to top of Apron only.

**STEP 3:** To complete assembly, clamp the Shelf in place, install other side assembly, set the case upright, and add clamps.



Clamps hold Shelf in place.

# DRAWER & GUIDE ASSEMBLY



**NOTE:** For tips on cutting half-blind dovetails, see [page 15](#).

Next, glue in the front rails and the apron (*Step 2*). But, before installing the shelf, I glued the top edge *only* of the apron and then slid the shelf in place. Then I added a couple of clamps to hold it to the apron (*Step 3*). This way, the shelf expands into the back groove. Note: The shelf should overlap the front apron by an  $\frac{1}{8}$ " (*Shelf Edge Detail*).

Finally, assemble the remaining side and set the case upright. You'll want to measure diagonally across the corners, making sure the case is square. Then use bar clamps to hold everything together.

Next, make two "L"-shaped guides to hold the drawer in the opening. Each guide consists of a spacer (N) that centers the drawer and a kicker/runner (O) to support it.


Take a look at the *Drawer and Guide Assembly* drawing for how the guides are oriented. Before installing them in the table, you'll need to drill shank holes in the spacer. I also drilled oversized shank holes in each kicker and the top front rail for the screws used to attach the top (*Top Assembly*). Note: The two front holes in the kickers and rails are slightly elongated to allow the top to expand in front.

## DRAWER CONSTRUCTION

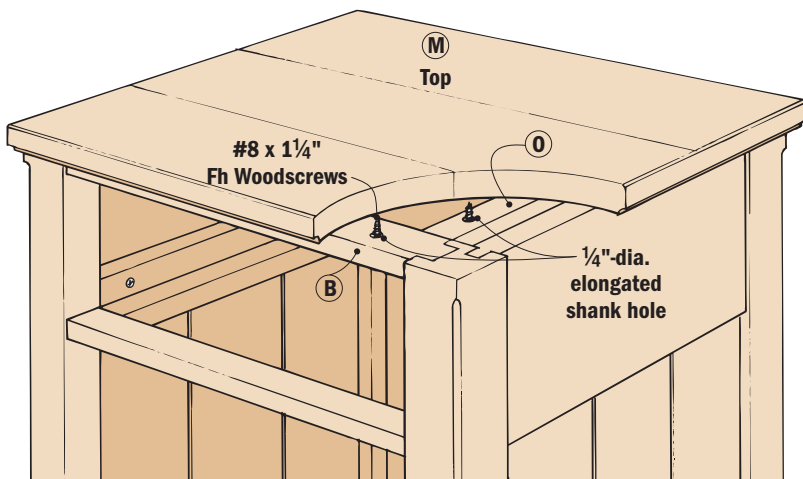
The drawer is joined with dovetails, and it's sized to allow  $\frac{1}{16}$ " gap at the top. To build the drawers, start by cutting the drawer front/back (P) and sides (Q) to size. Then these pieces are joined with  $\frac{1}{2}$ " machine-cut dovetails, and a cherry plywood bottom (R) is added. For more on how to cut dovetails, refer to [page 15](#).

Cut the groove for the drawer bottom on a table saw. Set the fence so the blade is *centered* on the bottom socket of the front/back (P). This way it will be hidden by a pin on the drawer side (Q). Finally, glue up and assemble the drawer.

Once the drawer is complete, you'll need to add a stop to the back rail. It ensures the drawer will be flush with the front rails when it's closed. The stop is a thin strip of wood that's sanded to thickness. Depending on your drawer, the thickness may vary, so be sure to test the fit before gluing it in place.

After the stop was added, I stained the project with the cherry mixture I used on the slats. To protect the wood from moisture, I applied three coats of an oil varnish. Finally, attach the bin pull (see [Page 59](#)). Center it on the drawer front and screw it in place. 

## TOP ASSEMBLY





# 5 Surefire Storage Solutions

*Tired of the constant battle against a messy garage? Combat clutter by building one or all five of these simple storage components.*

I've got a hunch my garage isn't all that different than a lot of other garages. Stuff just seems to accumulate overnight.

As a result, I'm constantly wrestling with a tangled heap of rakes and shovels, or tripping over bikes, brooms, and boxes. Sometimes my tools even disappear when it's time to use them.

But the final straw came when I couldn't find my favorite tackle box right before a recent fishing trip. That's when I said, "I've had it, time to clean up the clutter."

**The Plan.** After taking a break from Saturday morning chores, I

came up with a clever plan for my garage — five simple projects that provide a variety of storage options. My goal was to get as much stuff off the garage floor as possible, and group similar items together.

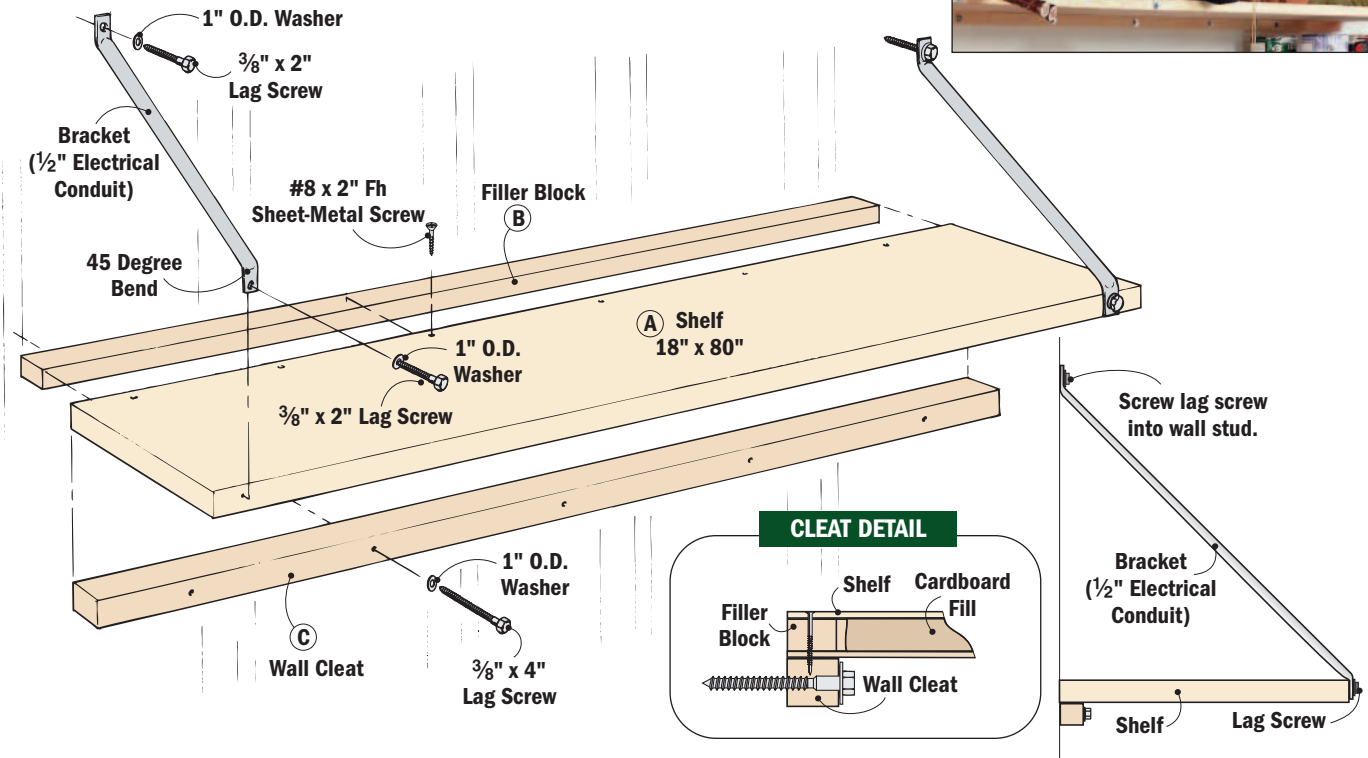
**The Projects.** I started by building a couple of long overhead shelves to store bulky seasonal items. Next I "sandwiched" three large corner shelves between a pair of tall storage towers.

To complete the transformation, I built some custom accessories: a multi-purpose tool rack, a compact bike rack that holds two bikes, and a pair of utility hangers.

**Custom Design.** One of the best things about these projects is they make it easy to customize your own storage system. You can build as many, or as few, of the components as you need. For example, you may want to build a whole wall full of shelves. Or maybe skip the bike rack, and add a second tool rack instead. Either way, I'm sure you'll find storage ideas here that you can put to use right away.

The other thing I like about these five projects is everything needed to build them is available at the home center. Best of all, I spent under \$200 and built the entire storage system in a weekend.

# PROJECT 1 overhead shelf



It's hard to imagine a quicker way to add a shelving system than long shelves mounted high on the wall. They're perfect for storing light-weight, bulky items (150 lbs. max.), and they take advantage of space that usually goes to waste.

## DOORS DO DOUBLE-DUTY

The unusual thing about these shelves is they're made from hollow-core interior doors. (I used 36"-wide doors.) They make perfect shelves because they're flat, smooth, and inexpensive.

Note: Hollow-core doors are available at most home centers for about \$20, or you might find a bargain in the "scratch and dent" bin.

Each door makes two shelves (A). This is just a matter of ripping the door 18" wide using a straightedge and circular saw equipped with a plywood blade, as shown in *Figure 1*. To prevent the thin "skin" of the door from splintering, I taped the cut line.

The only problem is there's nothing to support the veneer along the cut line. To prevent the thin

veneer from breaking, I added a filler block (B). This is a piece of 2x stock ripped to width to fit into the opening. (In my case, 1 1/8" wide.)

## MOUNTING THE SHELF

After gluing the filler block, you're ready to mount the shelf. The back edge is screwed to a wood cleat (C) attached to the wall with 4" lag screws, see *Cleat Detail*. I wanted plenty of holding power so I used lag screws to hang all of the projects.

To support the front edge of the shelf, I used two brackets. These are a bit unusual. They're made of 1/2"

electrical (EMT) conduit. To create the flat, angled ends that attach to the wall and the front of the shelf, simply crimp and bend the conduit in a vise.

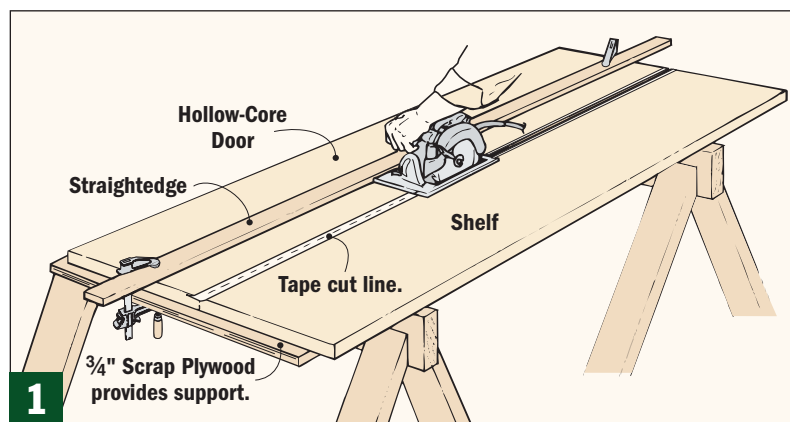
## MATERIALS LIST (FOR 2 SHELVES)

### LUMBER

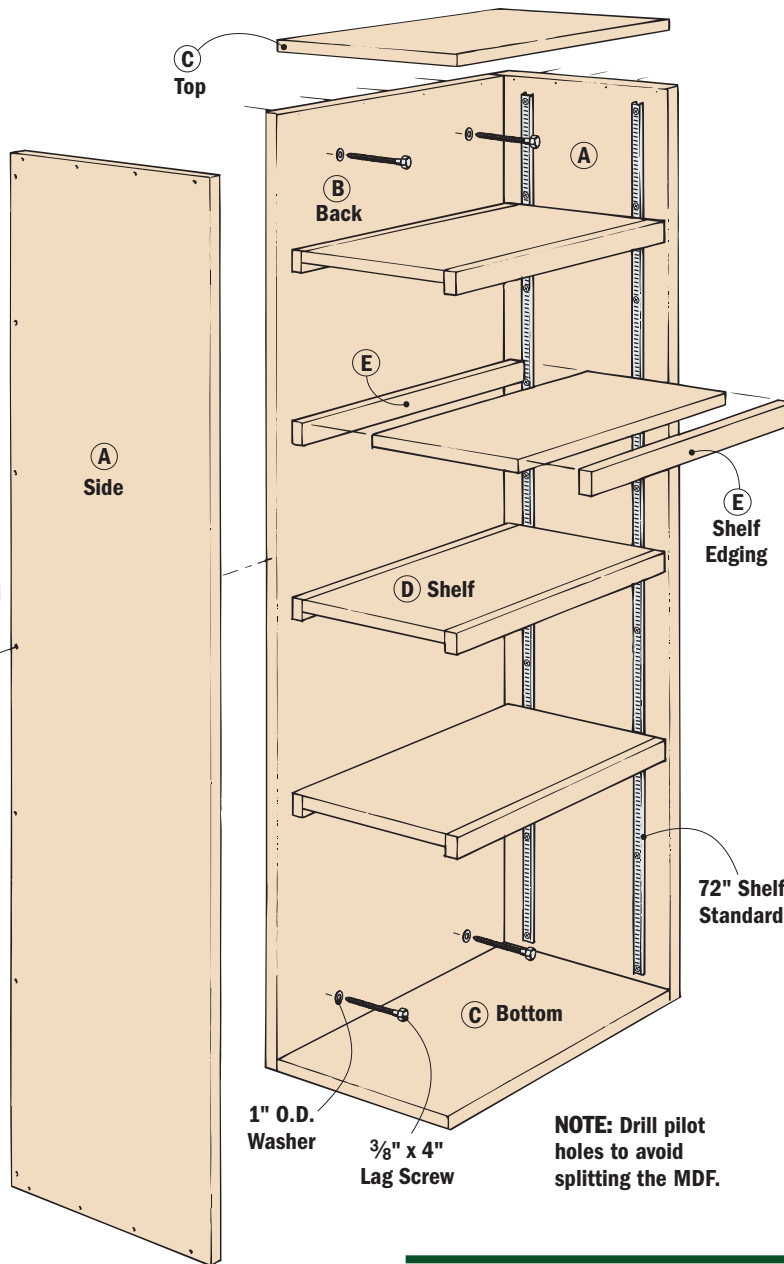
- A (2) Shelves (H-C Door) 18" wide x 80" long
- B (2) Filler Blocks 1 1/2" x 1 1/8" x approx. 78"
- C (2) Wall Cleats 1 1/2" x 1" x approx. 80"

### HARDWARE

- (10) 3/8" x 4" Lag Screws w/Washers
- (8) 3/8" x 2" Lag Screws w/Washers
- (12) #8 x 2" Fh Sheet-Metal Screws
- 1/2" Electrical Conduit (approx. 10 ft.)



# PROJECT 2 storage tower



These tall storage towers have adjustable shelves that provide plenty of storage. You can build two towers and use them to support the corner shelves, as shown on the [next page](#). Or by mounting two towers along the same wall, you can add the multi-purpose tool rack between them (see [page 34](#)).

## BUILD A BASIC BOX

Each tower is an open-front box made of  $\frac{3}{4}$ " Medium-Density Fiberboard. (You could also use plywood.) I paid about \$40 for two  $49" \times 97"$  sheets of MDF (enough to build one tower).

Start by cutting the sides (A) and back (B) of the tower following the dimensions shown. Again, I recommend a circular saw and straightedge for accuracy. The top and bottom (C) of the tower are  $\frac{3}{4}$ " narrower than the sides to leave room for the back.

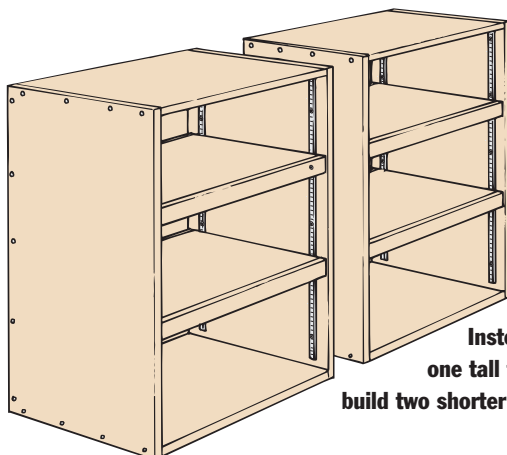
The tower is screwed together with sheet-metal screws. The straight shank of a sheet-metal screw isn't as likely to split the MDF as a standard woodscrew with a tapered shank. Even so, it's still a good idea to drill pilot holes.

## ADD THE SHELVES

Once the basic box is complete, it's time to add the adjustable shelves (D). Each tower has four shelves that rest on clips installed in a pair of shelf standards on each side.

Two strips of wood edging (E) on each shelf keep it from sagging. After ripping  $1\frac{1}{2}$ "-wide strips, just glue the edging in place.

## SHORT TOWER OPTION



Instead of one tall tower, build two shorter ones.

## MATERIALS LIST

(FOR 1 TOWER)

### LUMBER & SHEET MATERIAL

- A (2) Sides  $\frac{3}{4}" \times 18" \times 74"$
- B (1) Back  $\frac{3}{4}" \times 25\frac{1}{2}" \times 74"$
- C (1) Top/Bottom  $\frac{3}{4}" \times 17\frac{1}{4}" \times 25\frac{1}{2}"$
- D (4) Shelves  $\frac{3}{4}" \times 15\frac{1}{2}" \times 25"$
- E (8) Shelf Edging  $\frac{3}{4}" \times 1\frac{1}{2}" \times 25"$

### HARDWARE

- (4)  $\frac{3}{8}" \times 4"$  Lag Screws w/Washers
- (38) #8 x 2" Fh Sheet-Metal Screws
- (4)  $\frac{5}{8}" \times \frac{3}{16}" \times 72"$  Shelf Standards w/Screws
- (16) Shelf Clips

## MOUNTING THE TOWERS

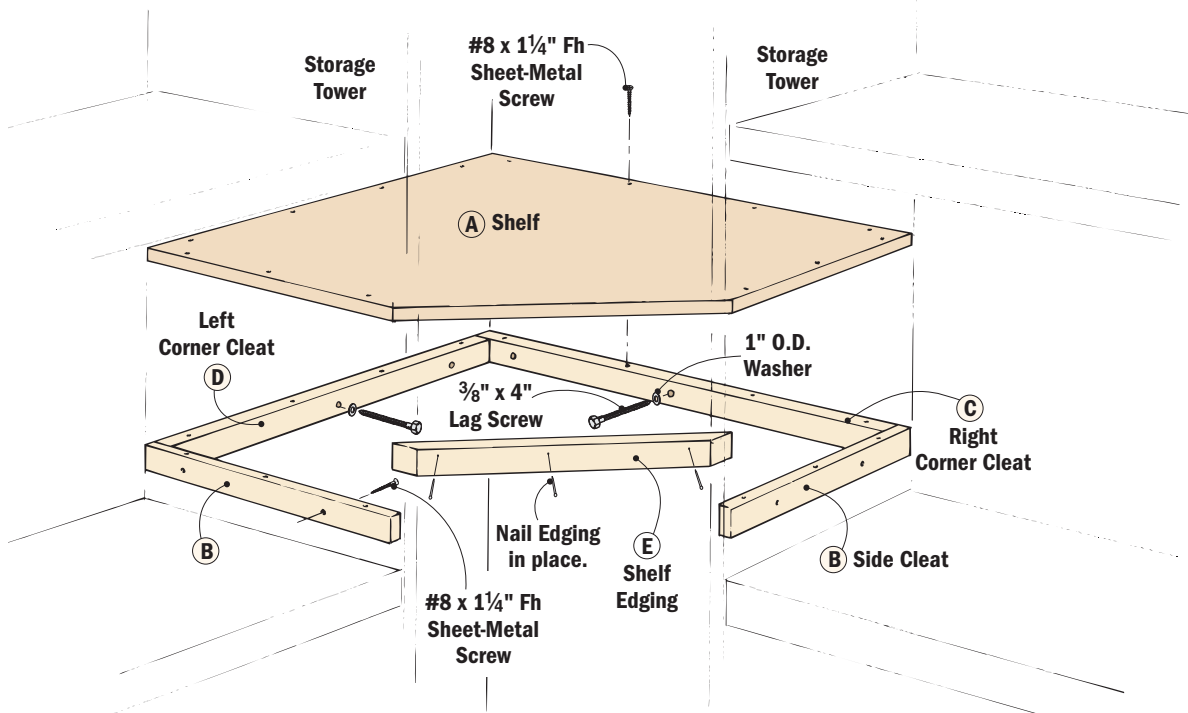
To prevent moisture from damaging the towers, I mounted them about 6" off the floor. This also gave me room to clean underneath.

The towers weigh a ton (MDF is quite heavy), so you'll need some help supporting them. They're mounted on the wall with lag screws driven into wall studs.

Note: If you plan on building the corner shelves on the [next page](#), mount them to the wall *before* you install the towers.



# PROJECT 3 corner shelves



The corners of my garage don't get used much, except for junk. But by adding three large shelves supported by one of the storage towers on each side, I was able to use that wasted corner for additional storage. And I didn't take up a lot of floor or wall space, either.

## CORNER SHELF STORAGE

As you can see in the drawing above, each shelf (A) starts out as a square piece of  $\frac{3}{4}$ " MDF that's sized to fit flush with the front edge of the towers. To prevent the sharp outside corner of the shelf from sticking out in front of the towers, it's cut at an angle. A circular saw makes quick work of trimming off the waste.

Each shelf is supported by four wood cleats. A pair of side cleats (B) are attached to the towers, and two corner cleats (C and D) mount to the wall. Note: Cut the left corner cleat (D)  $\frac{3}{4}$ " shorter than the right cleat (C). All four cleats are screwed to the bottom of the shelf.

As with the tower shelves, a strip of wood edging (E) helps strengthen the front, unsupported

edge of each shelf. After mitering the edging to length, I glued it to the shelf and tacked in a few nails to "clamp" it in place.

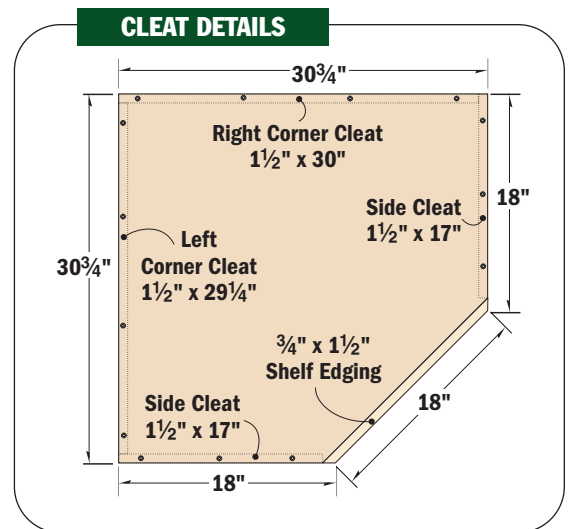
## MOUNTING SEQUENCE

Now you're ready to mount the shelf to the wall and towers.

**Shelves First.** Start by attaching each shelf to the wall with a pair of lag screws through both corner cleats (C and D). I found it worked best to position the top shelf so it would fit flush with the tops of the towers. This gave me a long, continuous storage space.

The spacing between the remaining shelves is up to you. I left room underneath the bottom shelf to store my shop vacuum. But if you don't need that space, you can always add a fourth shelf flush with the bottom of the towers.

**Towers Next.** Now that the shelf is secured to the wall, go ahead and fit the towers flush with the shelf. To hold the towers and shelf snug, drive a couple of screws through each side cleat (B) into the side of the tower. Don't forget to secure the towers to the wall, too.



## MATERIALS LIST

(FOR 1 SHELF)

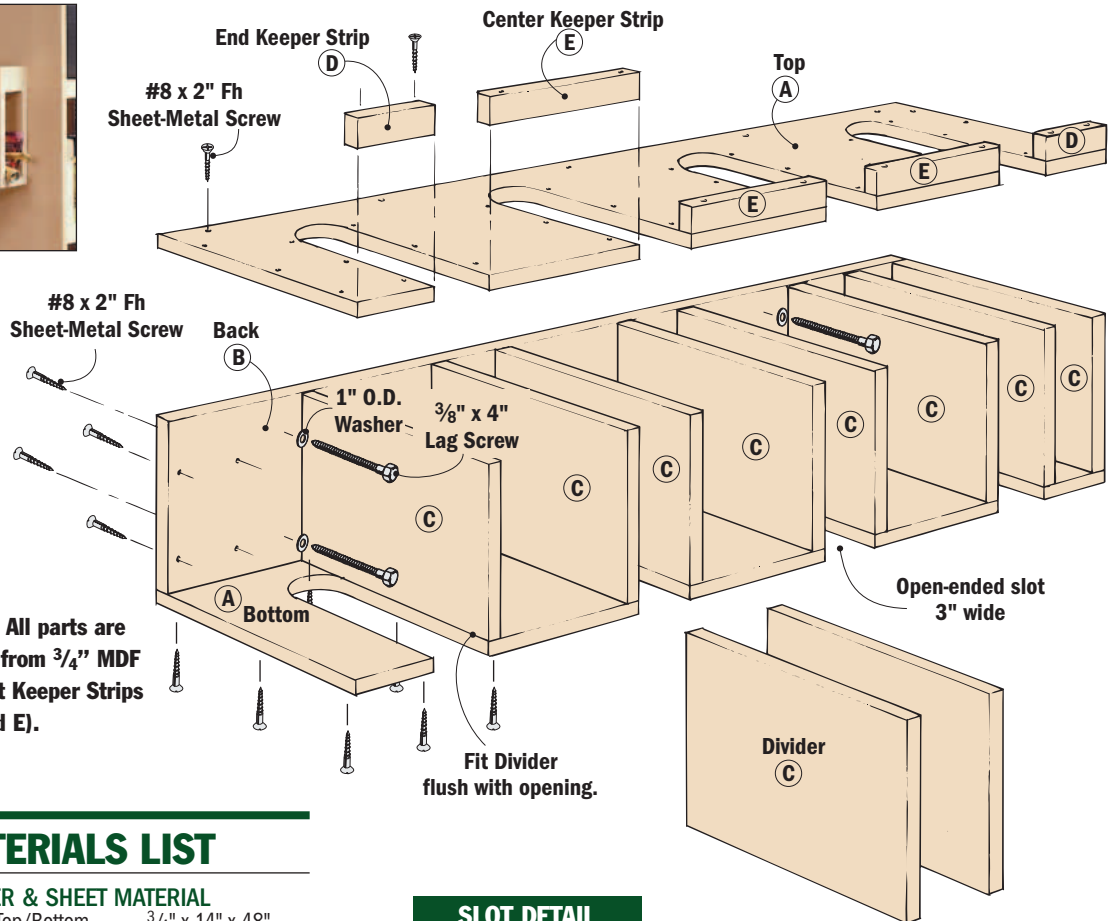
### LUMBER & SHEET MATERIAL

- A (1) Shelf  $\frac{3}{4}$ " x  $30\frac{3}{4}$ " x  $30\frac{3}{4}$ "
- B (2) Side Cleats  $\frac{3}{4}$ " x  $1\frac{1}{2}$ " x 17"
- C (1) Right Corner Cleat  $\frac{3}{4}$ " x  $1\frac{1}{2}$ " x 30"
- D (1) Left Corner Cleat  $\frac{3}{4}$ " x  $1\frac{1}{2}$ " x  $29\frac{1}{4}$ "
- E (1) Shelf Edging  $\frac{3}{4}$ " x  $1\frac{1}{2}$ " x  $19\frac{1}{2}$ "

### HARDWARE

- (4)  $\frac{3}{8}$ " x 4" Lag Screws w/ Washers
- (18) #8 x  $1\frac{1}{4}$ " Fh Sheet-Metal Screws

# PROJECT 4 multi-purpose tool rack



## MATERIALS LIST

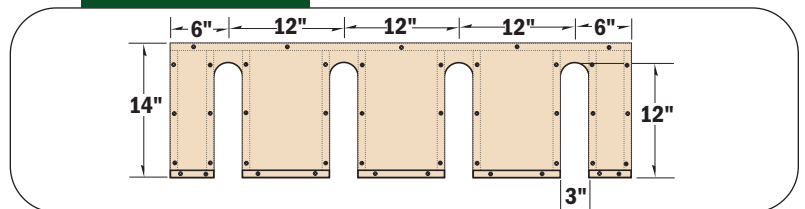
### LUMBER & SHEET MATERIAL

- A (1) Top/Bottom  $\frac{3}{4}$ " x 14" x 48"
- B (1) Back  $\frac{3}{4}$ " x 8" x 48"
- C (10) Dividers  $\frac{3}{4}$ " x 8" x 13 $\frac{1}{4}$ "
- D (2) End Keeper Strips  $\frac{3}{4}$ " x 1 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ "
- E (3) Ctr. Keeper Strips  $\frac{3}{4}$ " x 1 $\frac{1}{2}$ " x 9"

### HARDWARE

- (100)#8 x 2" Fh Sheet-Metal Screws
- (4)  $\frac{3}{8}$ " x 4" Lag Screws w/Washers

### SLOT DETAIL



Here's a handy multi-purpose tool rack that will hold more than a dozen different items — ranging from shovels and rakes to brooms and posthole-diggers — with room to spare. Plus, a series of dividers create a row of convenient compartments to hold small tools and supplies.

### IDENTICAL TOP AND BOTTOM

There's nothing complicated about this tool rack. It starts off as an identical top/bottom (A) piece, each with wide, open-ended slots to accept the tool handles. (I used  $\frac{3}{4}$ " MDF for the top and bottom.)

I didn't want my tools bumping into each other, so I cut the slots 12" apart (on-center). You may want to customize the spacing for your tools.

After cutting the slots with a jig saw and sanding the edges smooth, the next step is to add the back (B). In addition to enclosing the back of the compartments, it also provides a way to mount the rack to the wall.

You'll also need some dividers (C) to form the individual compartments. These are pieces of MDF that are screwed between the top and bottom and to the back. The two end dividers should align flush with the

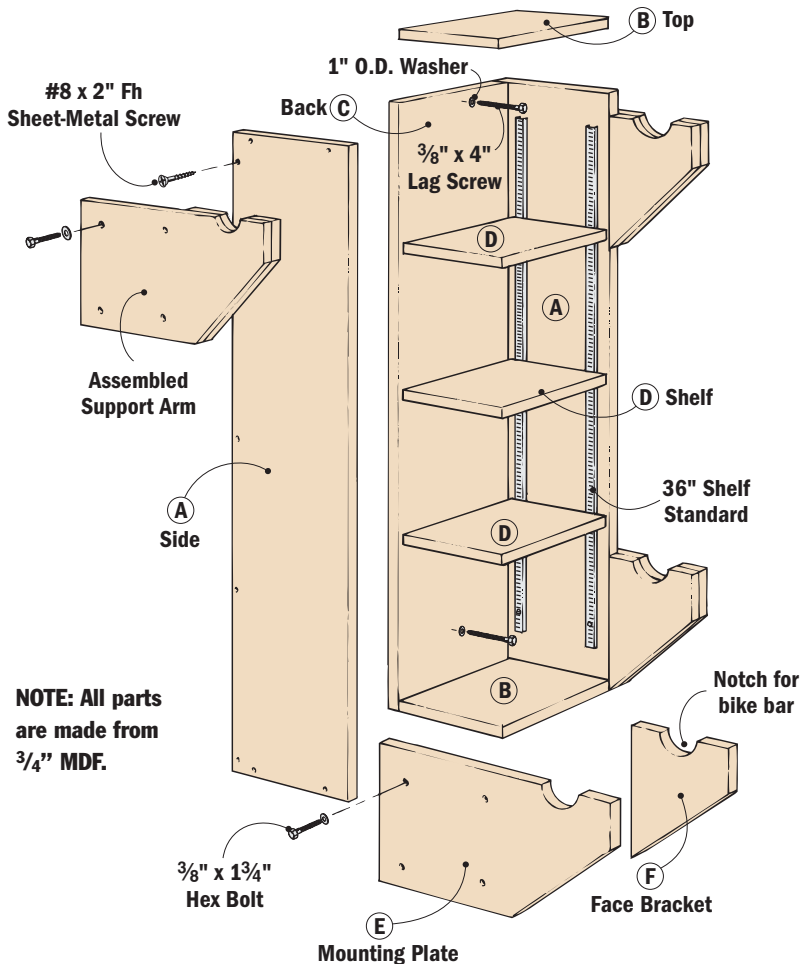
top and bottom of the rack. Position the other dividers as close to flush as possible with the sides of the slots.

### FINAL DETAILS

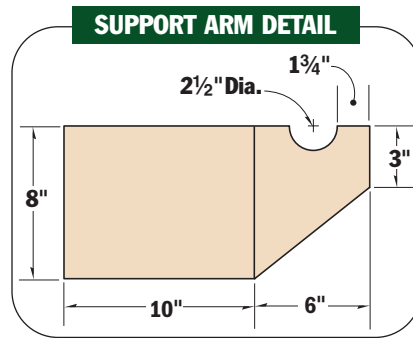
There's one more thing to consider before you hang the rack — how to prevent tools from accidentally slipping off. The solution is to add some wood keeper strips (D and E) to the top of the rack. These are short blocks of wood cut to fit between the slots and then glued and screwed in place.

Again, the tool rack is mounted to the wall with  $\frac{3}{8}$ " x 4" lag screws and washers.

# PROJECT 5 compact bike rack



**NOTE: All parts are made from 3/4" MDF.**



## MATERIALS LIST

### LUMBER & SHEET MATERIAL

- A (2) Sides 3/4" x 10" x 40"
- B (1) Top/Bottom 3/4" x 9 1/4" x 10 1/2"
- C (1) Back 3/4" x 10 1/2" x 40"
- D (3) Shelves 3/4" x 9" x 10"
- E (4) Mounting Plates 3/4" x 8" x 16"
- F (4) Face Brackets 3/4" x 8" x 6"

### HARDWARE

- (2) 3/8" x 4" Lag Screws w/ Washers
- (2) #8 x 2" Fh Sheet-Metal Screws
- (16) 3/8" x 1 3/4" Hex Bolts
- (4) 5/8" x 3/16" x 36" Shelf Standards w/ Screws
- (12) Shelf Clips

This rack is the perfect solution for storing bikes. It provides a way to hang two bikes out of the way, yet still within easy reach. And three shelves keep helmets and other gear close at hand. But the thing I like best about the rack is it doesn't eat up space.

### A BETTER-BUILT BIKE RACK

The bike rack is similar to the storage tower except it isn't as deep. This way, the bikes can hang in front of the rack without sticking too far out into the garage.

As with the tower, the bike rack is an open-front box that consists of two sides (A), a top/bottom (B), and a back (C). Here again, to make the shelves (D) adjustable, they sit on clips installed in a pair of shelf standards that are mounted to each side. Note: These small shelves don't need edging.

### MAKE THE SUPPORT ARMS

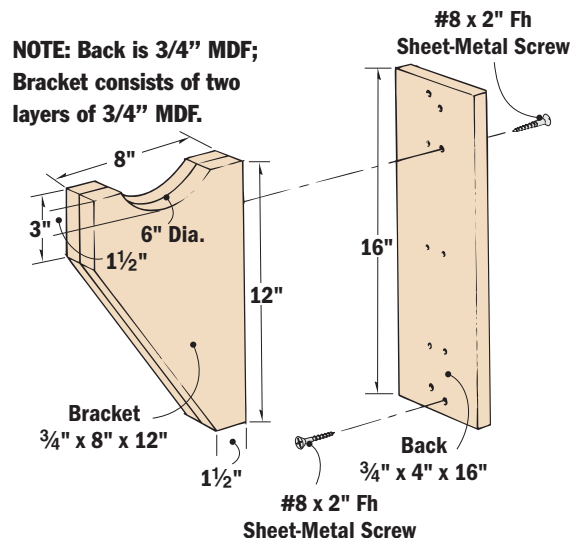
The next step is to add two pairs of support arms that cradle the bikes. To provide sturdy support, each arm consists of two pieces of 3/4" MDF. There's a long mounting plate (E) attached to the side of the rack. And a short, inside face bracket (F) provides the thickness needed to beef up the support arms.

After gluing up the two pieces, there are a couple more things to do. First, trim the lower corner of each support arm at an angle. This way you don't have to worry about sharp corners. You'll also need to cut a curved notch to hold the bar of the bike.

Shop Tip: Use a spray paint can to lay out the notch. Then cut it with a jig saw and sand the edges smooth.

All that's left is to bolt the finished support arms to the rack and attach the rack to the wall with lag screws.

## BONUS PROJECT utility hanger





# Garden Gazebo

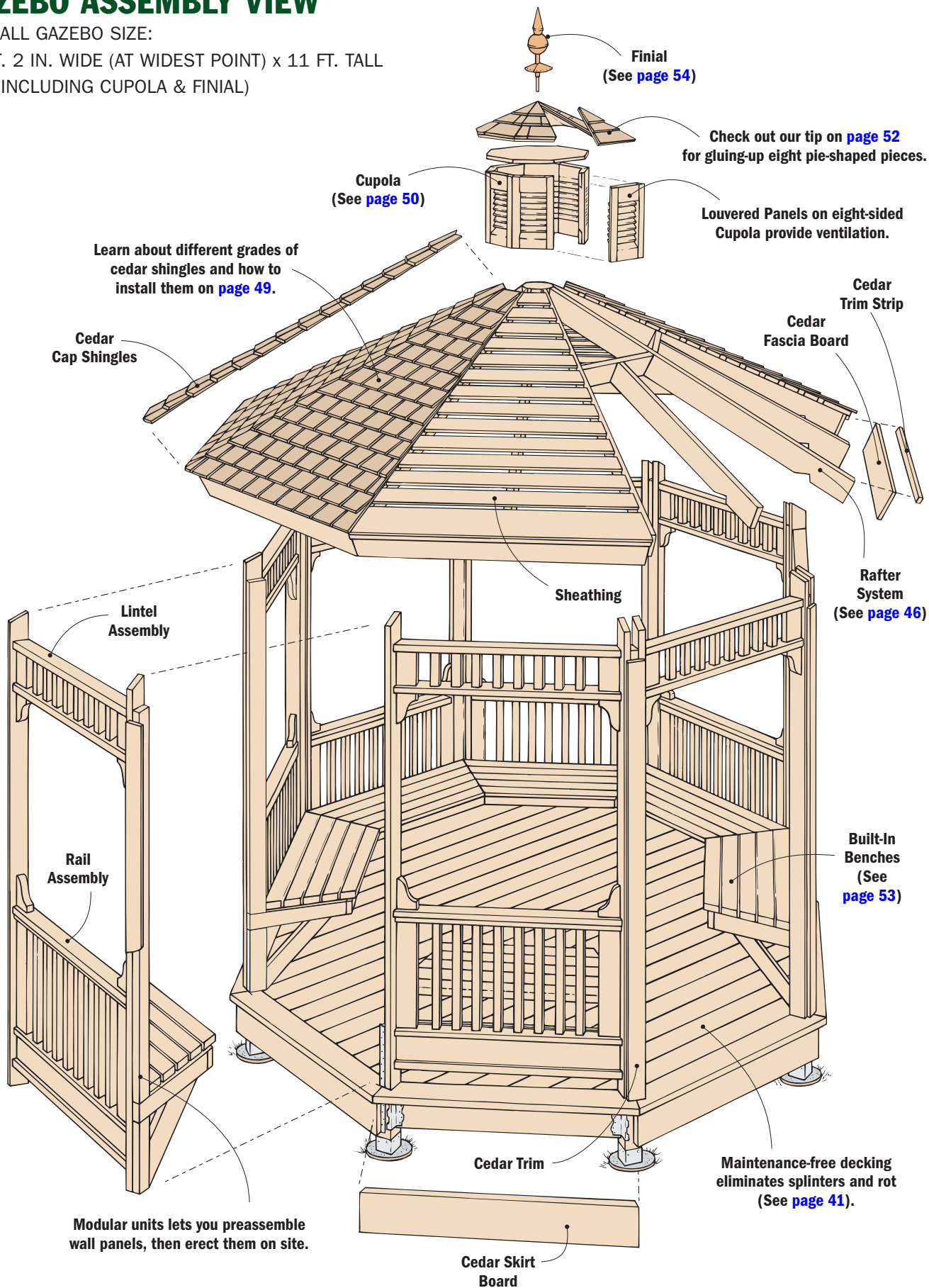
*Modular design and a unique layout frame make it simple.*

**A**t first glance, this gazebo may look complex — after all, doesn't an eight-sided structure have lots of tricky angles? Not really. By using a remarkably simple layout frame and shop-built prefab wall panels, you're almost guaranteed perfect results. Still don't believe it's possible? Well, read on to see how we did it.

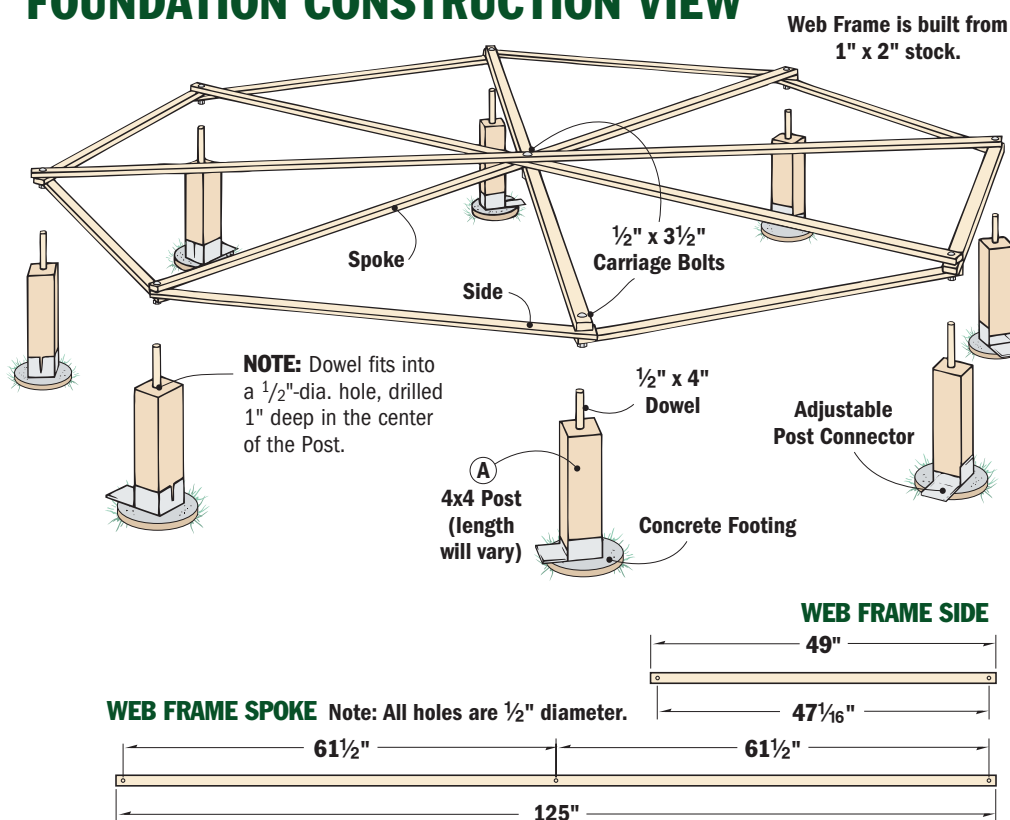
# GAZEBO ASSEMBLY VIEW

OVERALL GAZEBO SIZE:

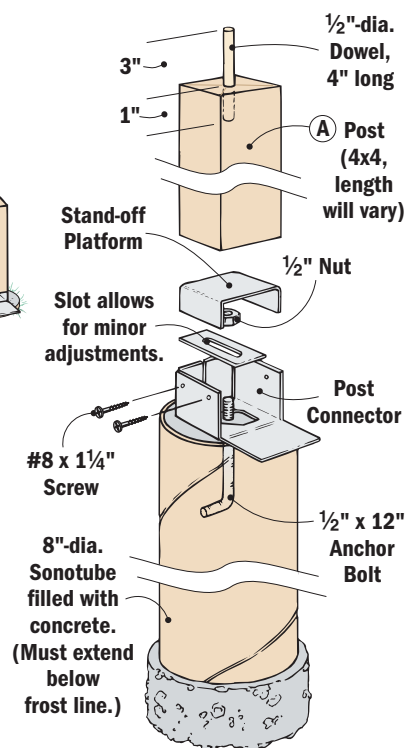
11 FT. 2 IN. WIDE (AT WIDEST POINT) x 11 FT. TALL  
(NOT INCLUDING CUPOLA & FINIAL)



# FOUNDATION CONSTRUCTION VIEW



## FOOTING ANATOMY



### A SOLID FOUNDATION

The foundation of the gazebo is a set of eight wood posts that rest on concrete footings (*Foundation Construction View*). The location of these posts is important. To end up with a symmetrical, eight-sided structure, the centerpoints of each adjacent pair of posts have to be the same distance apart. Plus the distance between each pair of opposing posts has to be identical, as well.

The problem is using a tape measure to accurately lay out the loca-

tions of the posts is next to impossible. What's needed is a rigid layout device to "fix" all eight hole locations.

The solution is an eight-sided wood frame that looks like a giant spider web. It consists of four long spokes and eight sides. These pieces are made from 1x2's and then bolted together to create a rigid frame.

The exact length of the frame pieces isn't critical. (I cut the spokes 125" long and made the sides 49" long.) But to ensure accurate results, take your time to carefully lay out and

drill the holes for the bolts as shown in the web frame details above.

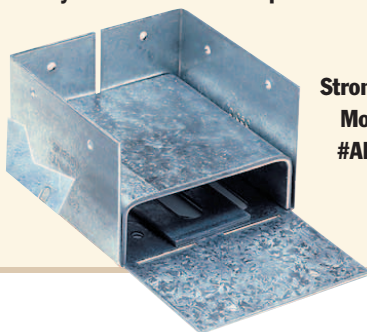
The best way to do this is to lay out the hole locations in one spoke. Then clamp the spokes together in a stack and drill 1/2"-dia. holes through all four pieces. I used the same technique to drill holes in the sides, working with four pieces at a time.

### FOOTINGS FOR SUPPORT

After bolting the web frame together, you can use it to lay out the location of the holes for the

## ADJUSTABLE POST CONNECTORS

To secure the wood posts to the footings on the gazebo, I used Simpson Strong-Tie connectors. This connector is adjustable, so it's easy to "fine tune" the position of the



Strong-Tie  
Model  
#AB44

post. Plus it raises the post off the footings to prevent moisture from causing it to rot.

The connector consists of two parts. The lower part is a box with an adjustment hole that fits over the anchor bolt in the footing. An open flap allows you to tighten a nut against a pressure plate, which secures the connector to the footing.

The second part, the platform, fits inside the box and forms a "pocket" for the post. To secure the post, fold the flap up and screw all four sides of the box to the post.

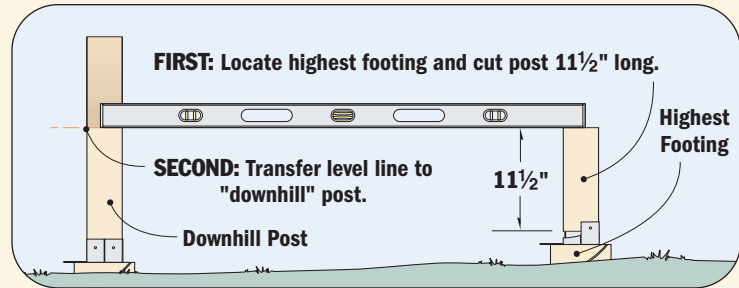


1

Locate the "high" footing by holding a level across the post connectors and working your way around the footings.

## FINDING LEVEL ON SLOPING GROUND

It's a pretty safe bet that the slope of the ground will vary from one footing to another. To compensate for this, the foundation of the gazebo is leveled by varying the length of the wood posts. The idea is to cut the post on the *highest* footing to final length (11½"), then use a level to transfer the proper elevation to the "downhill" posts.



concrete footings. To do this, set the frame where you plan to build the gazebo. Then press down to mark the ground with the bolts.

Now it's just a matter of digging the holes for the footings. To avoid frost heave, I dug 42"-deep holes. You'll want to check with your local building inspector for the proper depth in your area.

The footings extend above the ground (grade) about 2" to 3", so you'll need a form to contain the concrete (*Footing Anatomy*). I used 8"-dia. cardboard cylinders called Sonotubes. (They're available at most home centers.) These tubes are set into the hole and filled with concrete.

While the concrete is still wet, insert an L-shaped anchor bolt in each footing. These bolts are used to secure the connectors that hold the posts (see the box on [page 38](#)).

The goal is to center the anchor bolts on the footings. Here again, the web frame comes in handy. Just remove the bolts connecting the sides of the frame (one at a time) and fit the holes over the anchor bolts. Then leave the frame in place for two to three days until the concrete cures.

### ANCHOR THE POSTS

Now you can concentrate on the posts. I used 4x4 posts made from pressure-treated southern pine and cut them to rough length (will vary).

The metal post connectors secure the posts to the footings. Bolt these connectors *loosely* in place for now. You'll probably need to make

some minor adjustments later. When installing the posts, the idea is to start with the highest footing. You'll need to "eyeball" the highest footing and check it with a level, as shown in *Figure 1*.

Once you find the high footing, insert a post and mark the desired height for the floor joists of the gazebo (*Fig. 2*). This was 11½" in my case. Then remove the post and cut it to final length.

After reinstalling the post, secure it to three sides of the metal bracket with screws. (Leave the flap on the fourth side open to provide access to the nut on the anchor bolt.)

Once the first post is in place, temporarily install the rest of the posts. Then, to allow for differences in the slope of the ground at each

footing, transfer a level line from post to post, as shown above and in *Figure 3*. Now remove the posts, cut them to length, and secure them to the connectors. **Shop Tip:** Be sure to label the posts so you can put them back in the right place.

It may be necessary to tweak the location of the posts. (Remember, the distance between the center-points *must* be identical.) The web frame makes this a simple task. Just drill a centered hole in the top of each post, insert a dowel, and place the frame over the dowels (*Fig. 4*).

Once the frame is in place, make sure the inside face of each post is square to the center of the frame. Then tighten the nut on each anchor bolt, bend up the tab, and screw it to the post.



**2** Now set a post in the connector on the high footing, mark the height of the floor joists, and cut the post to length.

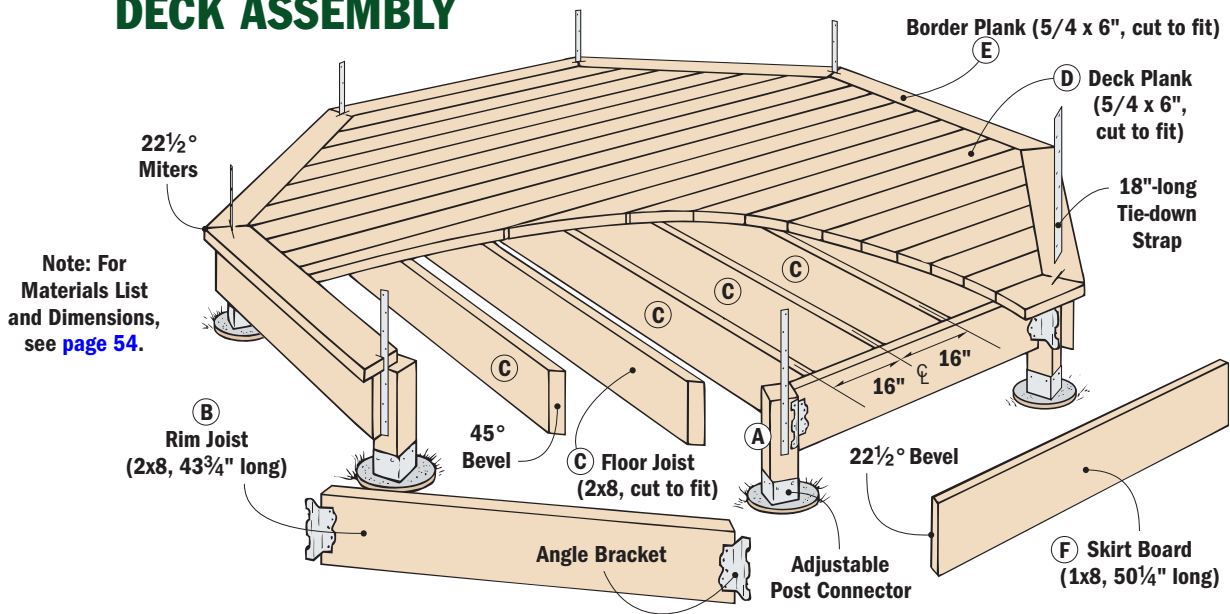


**3** To mark the next post, set a level on top of the first post and mark a level line. Work from post to post.



**4** Use the web frame to position the posts and connectors. The frame fits on dowels centered in the top of each post.

# DECK ASSEMBLY



## FRAMING THE DECK

Once the posts for the foundation are set, the next step is to frame the deck of the gazebo (*Deck Assembly*).

There are eight rim joists (B) that span the posts and support the floor joists. For strength, I used 2x8's (pressure-treated pine). The rim

joists are beveled at each end (22½°) to fit against the posts. But before cutting them to length, it's a good idea to cut a test joist and check its fit between each pair of posts. (Thanks to the web frame, there shouldn't be much difference.) Then cut the remaining rim joists

to length and secure them to the posts with metal angle brackets and screws (*Outside Corner Detail*).

Now you can add the floor joists (C). There are seven floor joists — three that run perpendicular to the rim joists, and four (two on each side) that meet them at a 45° angle.

It only takes a few minutes to lay out the location of the floor joists. The middle joist is centered on the length of the rim joist, and the others are set 12" apart on-center. Notice that the three full-length joists are cut square on the end and fastened to metal joist hangers (*Fig. 5*). As for the two shorter joists on each side, bevel them to length and mount them in a 45° joist hanger (*Inside Corner Detail*).



5



6

After centering the first joist hanger on the length of one of the rim joists, mount all the other hangers 12" apart.

Now draw a line centered on the thickness of the rim joists that will be used when trimming the deck planks to length.

## LAY THE DECKING

Now you're ready to lay the decking. It's made up of 1¼"-thick planks that



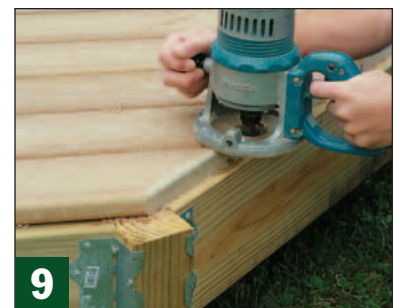
7

Next, tack a wood cleat on the line and use ¼"-thick spacers to create a uniform gap between each deck plank.



8

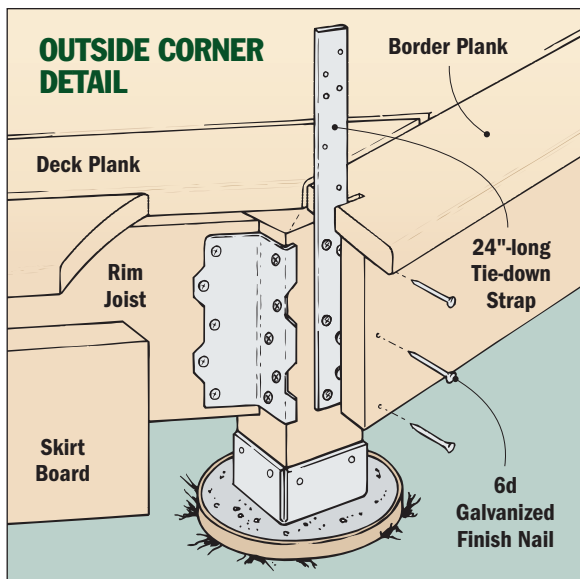
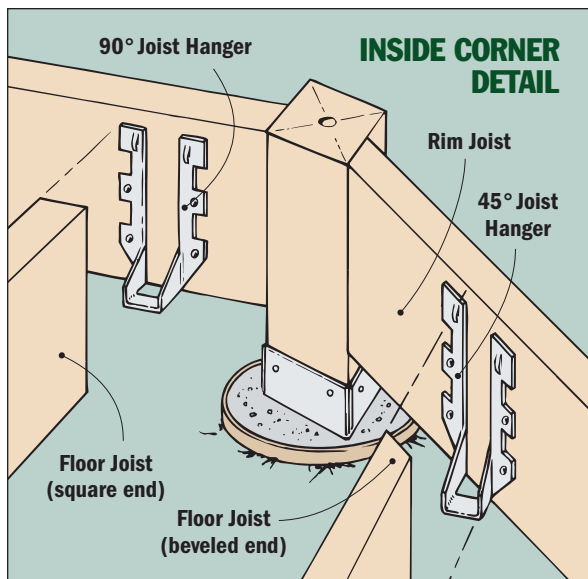
To guide the saw when cutting the deck planks, tack on a straightedge that lines up with the trim line on the rim joists.



9

A hand-held router and ¼" round-over bit make quick work of routing the ends of the deck planks to match the edges.





Made of plastic and wood, Trex is a great decking material that won't crack, rot, or shrink. I used natural-colored, 5/4 x 6" planks. For sources, call (800) 289-8739 or visit their website: [www.trex.com](http://www.trex.com)

run perpendicular to the floor joists and eight border planks.

The decking I used is a manufactured material called Trex. (See margin.) It doesn't have to be sealed or waterproofed like solid wood. Plus it won't shrink or splinter.

Before installing the decking, mark a heavy line centered on the thickness of the rim joists (Fig. 6). It's used as a reference when trimming the deck planks to length later.

The line provides a starting point for a cleat used to position the first deck plank (D), as shown in Figure 7. To allow water to run off, all the planks are spaced 1/8" apart. Be sure to lay out *all* the planks before nailing them. The goal is to have a full-width plank on two opposite sides.

When installing the decking, it will save time if you let the planks run long. After nailing them down, trim them all to length at the same time (Fig. 8). Then round over the ends of the planks to match the edges (Fig. 9).

Now you can add the border planks (E). They're mitered at a 22 1/2° angle where they meet over the centerline of the posts. Each plank should be identical in length. Even so, it's a good idea to fit each plank as you work around the perimeter (Fig. 10).

One thing to note is there's a metal strap attached to each post that sticks up through an opening in the border planks. These will be used later

to anchor the wall panels. To create the opening for the straps, nail one plank down and cut a kerf in both ends with a jig saw (Fig. 11). Once the adjoining plank is attached, enlarge the kerf to accept the anchor strap. Then fit the strap through the kerf and screw it to the post (Fig. 12).

All that's left is to wrap the deck with skirt boards (F). These are 1x8 cedar boards that are beveled at each end. Here again, fit and nail the skirt boards one at a time, aligning the joint line directly under the mitered ends of the border planks, as shown in Fig. 13 and Outside Corner Detail.



**10** Mark the 22 1/2° cut off angle on the ends of the border planks. Use an adjacent plank to ensure a tight fit.



**11** To create an opening in the border planks for a metal strap, use a jig saw to cut a slot that's flush with the post.

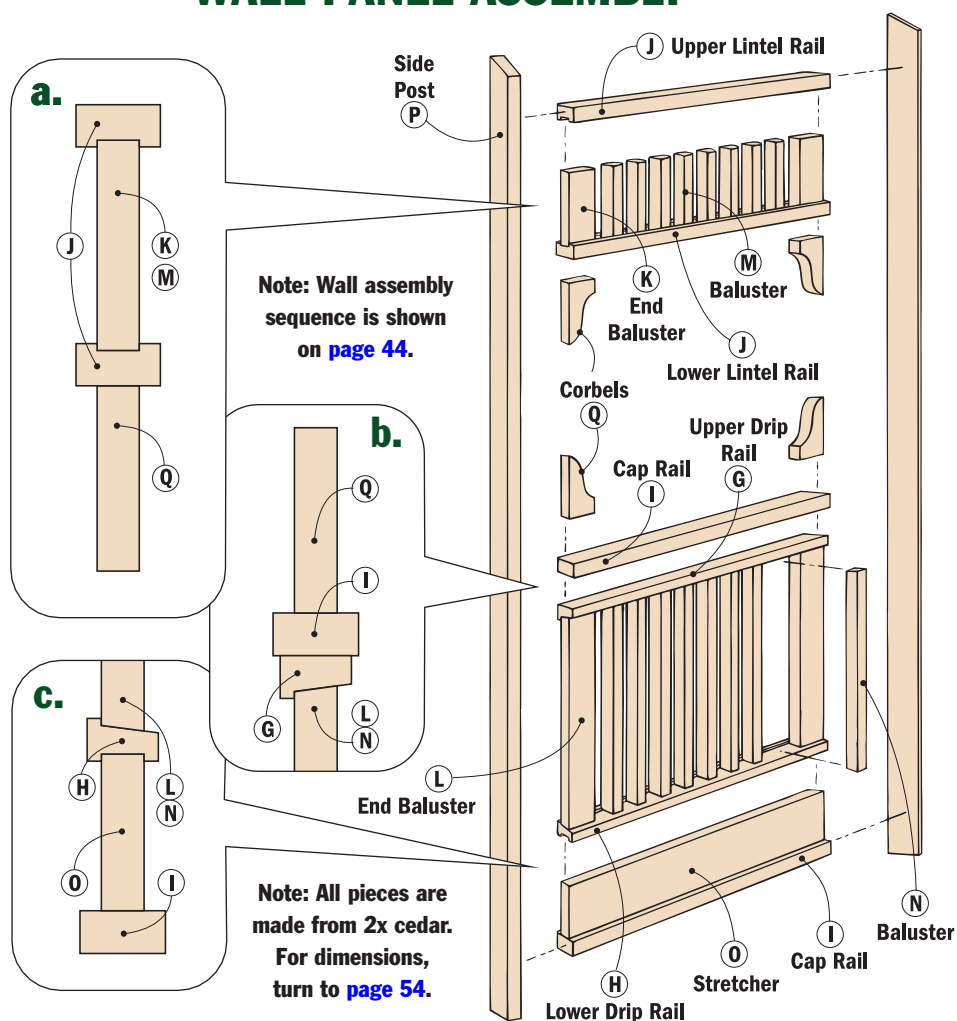


**12** After slipping a 18"-long "tie-down" strap through the slot, fasten it to the outer face of the post with screws.



**13** To determine the final length of the skirt boards, transfer the location of the miter joints from the border planks.

# WALL PANEL ASSEMBLY

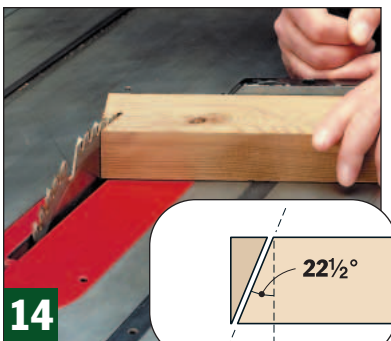


## PREFAB THE WALLS

To simplify the construction of the gazebo, it's designed with identical wall panels. This speeds things up considerably because it allows you to make all the "like" parts of each wall panel using the same tool setups. Also, you can assemble the panels in the

comfort of your shop and then erect the "prefab" walls as weather permits.

The wall panels have two main sections: a lower rail assembly and an upper lintel assembly that are connected by a pair of tall side posts (*Wall Panel Assembly*). Altogether, you'll need seven rail assemblies and eight lintel



**14** Miter both ends of the 2x4 rail blanks at 22½°. Eventually, this will allow the wall panels to form an octagon.



**15** To accept the balusters in the lintel (and to fit over the stretcher), cut a centered groove in rails (H) and (J).

assemblies. (There isn't a rail assembly at the entrance of the gazebo.) Note: I used cedar for the wall panels because it's resistant to rot and decay.

## MAKING THE RAILS

Each wall panel is made up of several different rails (G, H, I, and J). So take a minute to familiarize yourself with them before cutting any lumber.

If you look at the lower rail assembly, you'll see there are two drip rails (G, H) that capture a row of balusters between them. A couple of cap rails (I) form the top and bottom of this rail assembly.

As for the lintel assembly, it's much simpler. The balusters fit between an upper and lower rail (J).

The final width of these rails will vary. But to get into a "production mode," I started by ripping enough stock for all the rails to a width of 3".

Before cutting the rails to length, notice that there's a 22½° miter at each end. As a result, the tall side posts (which are attached to the rails) sit at a corresponding angle. When the wall panels are installed later, this produces the octagonal shape of the walls.

One thing to be aware of here is the *length* of the rails. The cap and lintel rails (I, J) are slightly longer than the drip rails (G, H).

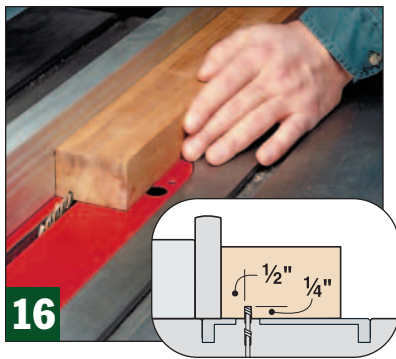
With that in mind, tilt the head of the miter gauge on your table saw 22½°, as shown in *Figure 14*. (Or, use a power miter saw instead.) Then miter all the rails to final length.

At this point, the cap rails (I) are complete, so set them aside. But the remaining rails still need some work.

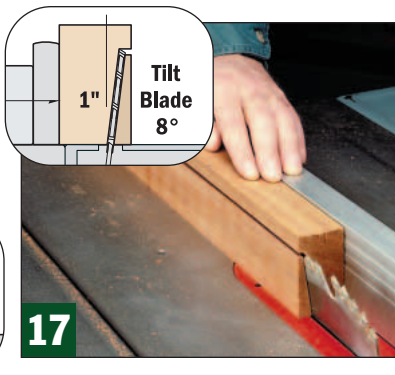
To see what I mean, take a look at the *Wall Panel Assembly* again and also *Detail 'a'*. Notice that the balusters in the lintel assembly fit into grooves in the upper and lower rails (J). A dado blade mounted in the table saw makes quick work of cutting these grooves (*Fig. 15*).

You'll also need to cut an identical groove in the *lower drip rail* only (*Detail 'c'*). This groove fits over a stretcher that's added later.

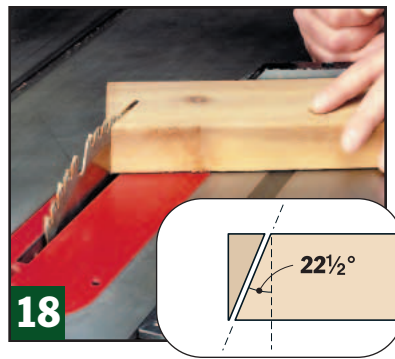
With the groove complete, the next step is to rip the drip rails to width. This is pretty straightforward



**16** The first step to forming the beveled face on the drip rails is to cut a 1/4"-deep kerf, 1/2" from the inside edge.



**17** Now set the fence 1" from the blade and tilt the saw blade to 8°. Raise the blade until it just intersects the kerf.



**18** Miter the top ends of the posts (P) at 22 1/2°. This will match the pitch of the roof later when the rafters are installed.

for the upper drip rail. Just set the fence and rip the rail to width (2 1/2"). But the process for the lower rail is different. That's because the groove is centered on the width of the rail. So here, I made two separate fence setups, ripping a 1/4" off the width at each setting.

All that's left to complete the drip rails is to cut a bevel on the inside face that sits against the balusters (Details 'b' and 'c'). This bevel helps shed water. There's also a small lip that centers the balusters on the width of the rails and keeps them from twisting.

To form the bevel and the lip, I used a two-step process. First, cut a shallow kerf (Fig. 16) in each rail. Then tilt the blade to 8°, adjust its height until it intersects the kerf, and rip the bevel in each rail (Fig. 17).

### BRING ON THE BALUSTERS

Once the rails are completed, you can turn your attention to the two rows of balusters. There are 10 balusters in each lintel and rail assembly — two wide end balusters (K, L) act as bookends for the eight narrow balusters (M, N) between.

In addition to creating an attractive rail (and lintel), the end balusters add rigidity to the wall panels. Each end baluster meets the post at the same angle as the rails. This requires ripping a 22 1/2° bevel on the edge that fits against the post.

Before cutting the balusters to length, there's one thing to be aware of. The balusters for the lintel (K, M) are cut square at the top and

bottom (Detail 'a'). But the balusters (L, N) for the lower rail assembly are cut at an 8° bevel to match the angled faces of the drip rails (Details 'b' and 'c'). A miter saw with a stop block works great for this task. You could also use an auxiliary fence on your table saw miter gauge with a stop block.

### STRETCHER, POSTS, & CORBELS

At this point, all that's left to complete each wall panel is to add a stretcher, two tall posts, and the corbels. To support the lower rail assembly, a stretcher (O) spans between the side posts. Each

stretcher is a 2x6 that's beveled on both ends (22 1/2°) so it will fit against the posts.

The next step is to add the two side posts (P). These are 2x4's that are mitered on the top end to match the pitch of the roof (Fig. 18). A 22 1/2° miter will match the angle of the roof rafters just right.

Finally, it's time to add the corbels (Q). These are the curved, decorative blocks that fit into the corners of the wall panels. There are 30 corbels altogether, and I wanted each one to be identical. So to save time and create exact copies, I used a few production tips, as shown below.

## TIPS FOR MAKING CONSISTENT CORBELS

At first, it might seem like a difficult task to make 30 identical corbels (not to mention chewing up a lot of

time). Oh, and did I mention that the edge that fits against the wall post has to be beveled at a 22 1/2° angle? And that you need right- and left-facing corbels?

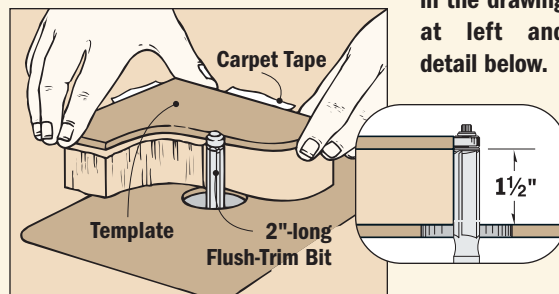
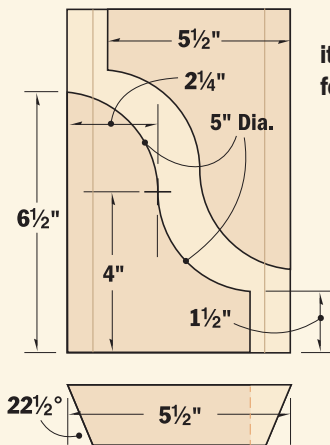
Actually, it's not as hard as it sounds. All it takes is a few production tips.

Start by ripping a bevel on

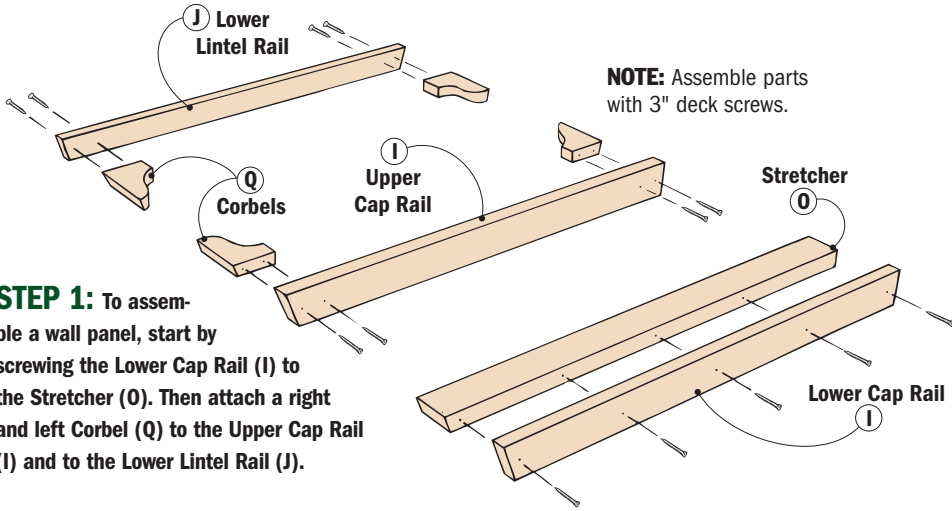
both edges of a 2x6 (Corbel Detail). Then make a hard-board template and trace the shape of the corbels. After rough cutting the corbels to shape, attach the template with carpet tape. Then, using a flush-trim bit in a router table, trim each corbel to shape, as shown

in the drawing at left and detail below.

### CORBEL DETAIL

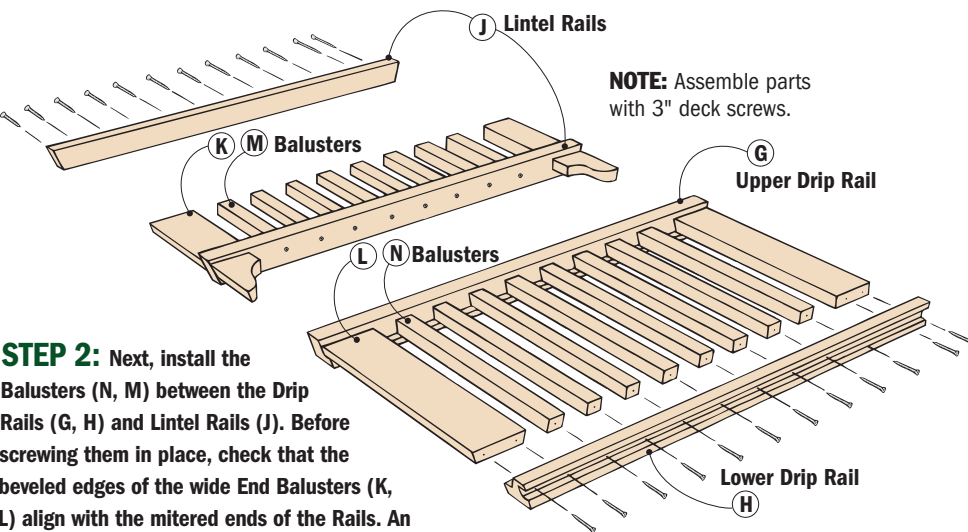


# WALL ASSEMBLY SEQUENCE



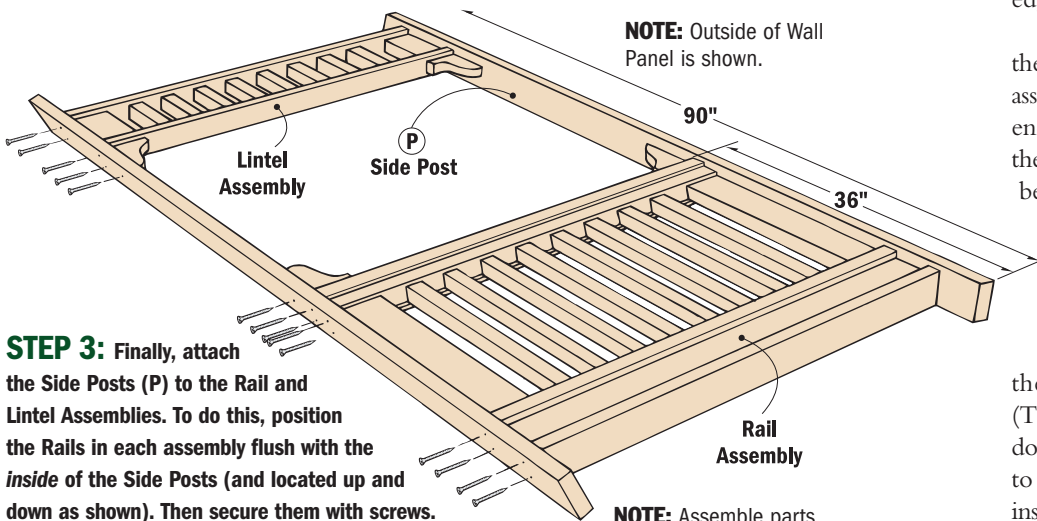
**NOTE:** Assemble parts with 3" deck screws.

**STEP 1:** To assemble a wall panel, start by screwing the Lower Cap Rail (I) to the Stretcher (O). Then attach a right and left Corbel (Q) to the Upper Cap Rail (I) and to the Lower Lintel Rail (J).



**NOTE:** Assemble parts with 3" deck screws.

**STEP 2:** Next, install the Balusters (N, M) between the Drip Rails (G, H) and Lintel Rails (J). Before screwing them in place, check that the beveled edges of the wide End Balusters (K, L) align with the mitered ends of the Rails. An assembly jig (page 17) will ensure the Balusters are spaced evenly (2½") apart.



**NOTE:** Outside of Wall Panel is shown.

**NOTE:** Assemble parts with 3" deck screws.

**STEP 3:** Finally, attach the Side Posts (P) to the Rail and Lintel Assemblies. To do this, position the Rails in each assembly flush with the inside of the Side Posts (and located up and down as shown). Then secure them with screws.

## PUT THE PANELS TOGETHER

Assembling the panels is easy, especially if you use the step-by-step sequence shown here. To prevent twisting or racking, assemble them on a flat area like the garage floor or driveway.

The first step is to center the lower cap rail (I) on the width of the stretcher (O), as shown in *Step 1*. Then just screw the rail in place.

Next, attach a right and a left corbel (Q) to the upper cap rail (I) and also to the lower lintel rail (J). Center the corbels on the width of the rails, and position their beveled edges flush with the ends of the rails.

Now you're ready to install the two rows of balusters in each wall panel (*Step 2*). To ensure even spacing (and to speed up the assembly process), I used a jig made from scrap 1x4's. (For more on this, see [page 17](#).)

To complete the rail assembly, fit the groove in the lower drip rail down over the stretcher and tack in a couple of nails. (I used 8d galvanized casing nails.) This will hold it in place until the side posts are attached.

You'll also need to add the upper cap rail (the one with the corbels) and tack it in place. To keep the nails from showing, I drove nails at an angle from the drip rail up into the cap rail.

All that's needed to complete each wall panel is to attach the side posts (P) to the lintel and rail assemblies (*Step 3*). The idea is to position each assembly flush with the inside edge of the posts.

As for the up and down location, there's nothing critical about the rail assembly. (I set it 36" above the lower end of the posts.) But the location of the lintel assembly is important. That's because the roof rafters rest on it. So to establish the proper roof pitch, I screwed it in place as shown (90" from the bottom of the posts).

Now just repeat the process for the remaining six wall panels. (There's no rail assembly in the doorway, just a lintel.) You may want to save the two straightest posts and install these on the lintel-only section. They're the most visible, and you want the best looking posts here.

## MAKING THE CONNECTION

With most projects, you reach a point where it really starts to take shape. For this gazebo, that time is now — when you begin to connect the wall panels to each other.

To create the appearance of a thick post at each corner, the wall panels are connected by two 2x spacer blocks ripped 3" wide (*Corner Connection*). A short (R) and a long spacer block (S) are sandwiched between the side posts of two adjacent wall panels.

Notice that there's a 3½"-tall opening between the two blocks. This opening creates a "pocket" that will eventually hold a bench support.

One more thing to be aware of is that the long spacer block acts as a support for the hip rafters on the roof. So to ensure proper roof pitch, it's important that the upper end of this block is even with the top of the lintel.

After cutting the spacer blocks to length, you can attach them to the side posts. To avoid having two sets of spacer blocks come together, I made it a point to screw them to the *left* side post of each wall panel (as viewed from the front). Shop Tip: Insert a scrap 2x4 between the blocks to produce the proper size pocket.

## UP WITH THE WALLS

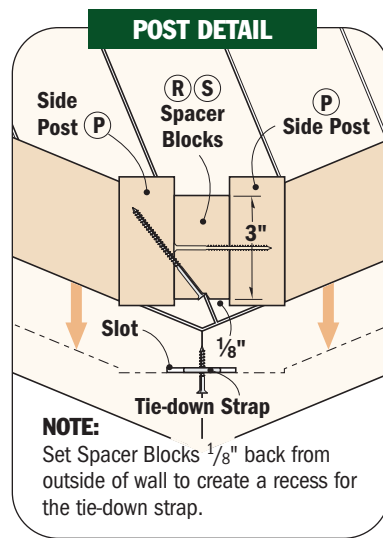
Before installing the wall panels, I'd suggest rounding up a friend to provide a helping hand. The large panels can be heavy and awkward to handle.

To erect the walls, start to the left side of where the doorway for the

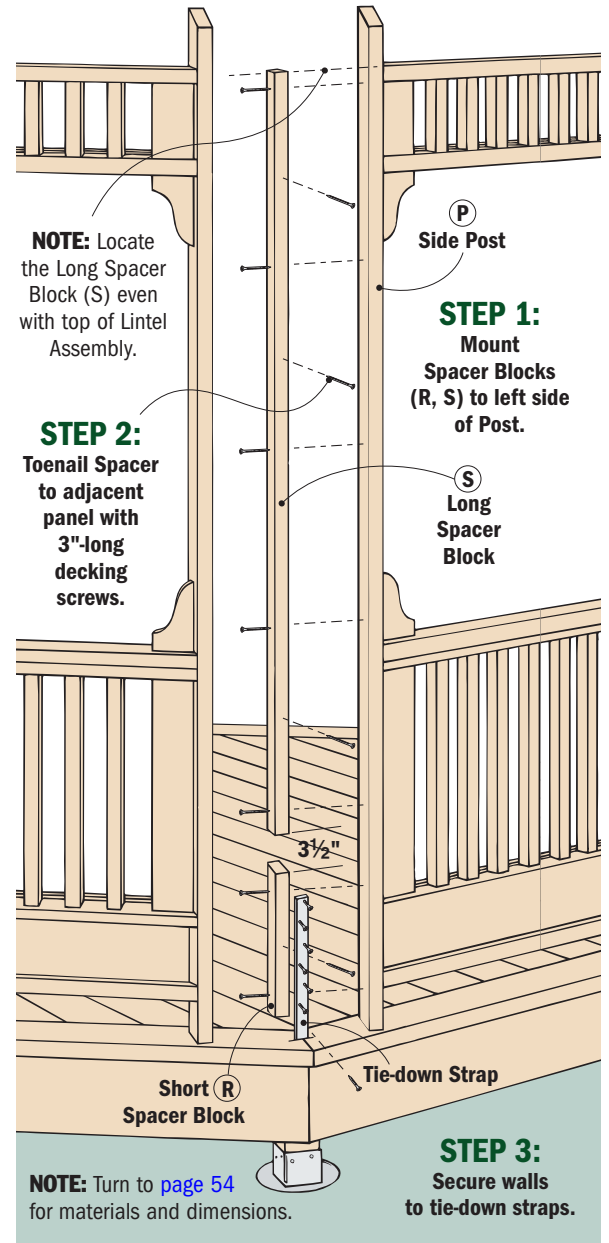
gazebo will be located. Then lift the first wall panel and set it on the deck. While your helper holds it upright, slide a second wall panel against it and clamp them together at the corner. The panels are fastened together by "toenailing" screws through the spacer blocks and into the side post of the adjacent wall. (See *Figure 19* and *Post Detail* below.) Continue like this, working your way around the gazebo, installing one wall at a time.

The next step is to "anchor" the walls to the deck by fastening them to the metal tie-down straps. To do this, tap the walls into place so the short spacer block (R) is centered on the strap. Then drive screws through the strap into the spacer block (*Fig. 20*).

With the walls in place, stand back and take a minute to admire the gazebo before starting on the roof (*Fig. 21*).



## CORNER CONNECTION



19

To fasten two wall panels together, "toenail" screws at an angle through the spacer blocks and into the post.



20

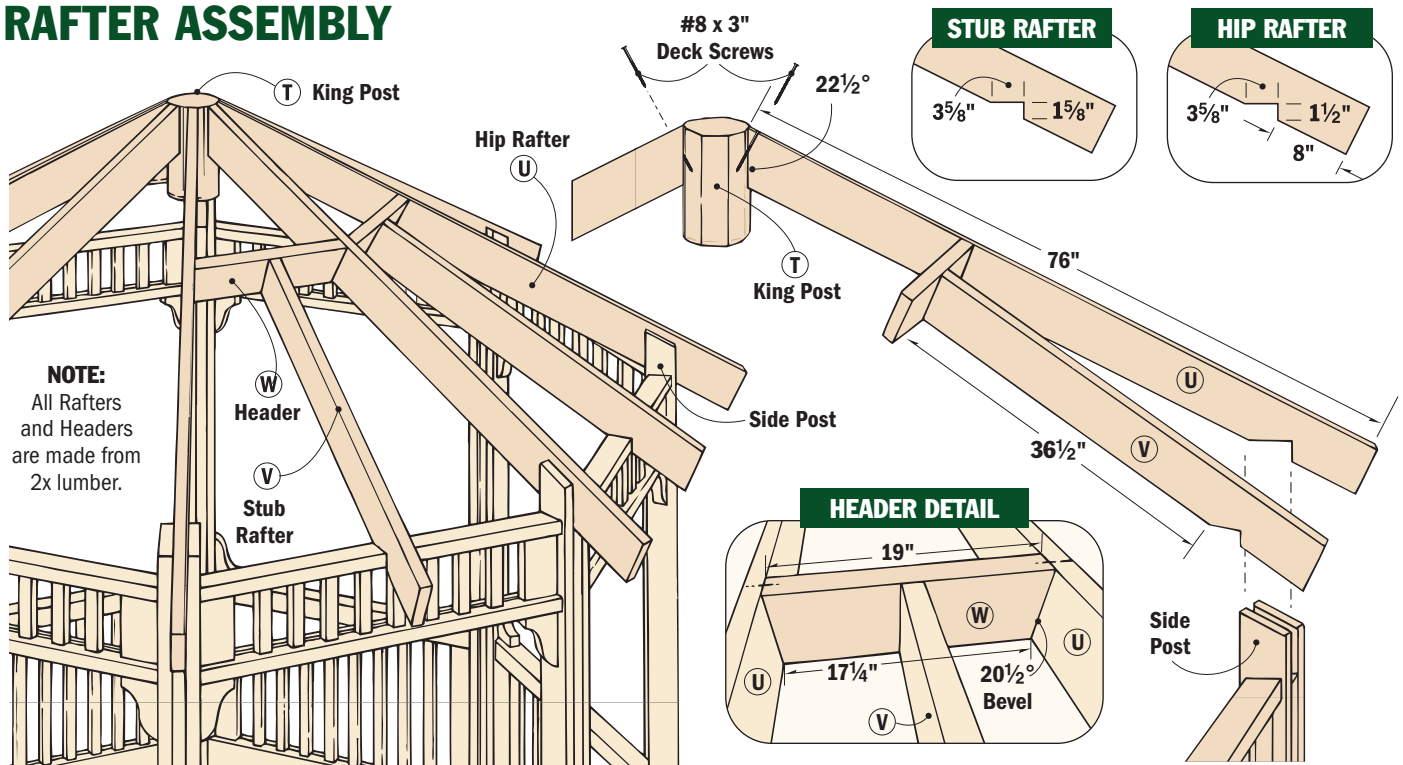
With the wall panels in their final position, screw the tie-down straps to the spacer blocks (R) at all eight corners.



21

With the eight wall panels fastened in place, the gazebo really begins to take shape. At this point, you're ready to begin building the roof.

# RAFTER ASSEMBLY



## RULES FOR RAFTERS

With the walls complete, it's time to add the roof rafters. There are eight long hip rafters that fit into saddles formed by the side posts of the walls (*Rafter Assembly*). These hip rafters connect to a large, eight-sided block called a king post. There are also eight short stub rafters that "tie" into headers, which span across the hip rafters.

## FIT FOR A KING POST

I began by making the thick, eight-sided king post (*T*) that forms the hub of the rafter system (*King Post Detail*). It is made up of four 2x8 cedar blocks ripped to a width of 6 1/4" and glued together. (I used

polyurethane glue for a waterproof bond.) Once the glue dries, joint all four sides to make a 6"-square block.

The next step is to lay out the eight sides of the king post. The goal is to end up with eight sides that are equal in size. To do this, locate the centerpoint of the post by drawing diagonal lines from corner to corner (*Drawing 'a'*). Then set the tip of a compass at the centerpoint and draw a circle that just touches all four sides.

The intersecting points (where the compass arc crosses the diagonals) are used to lay out the angled corners of the block. Set the 45° side of a combination square against the block. Then align the blade with each point

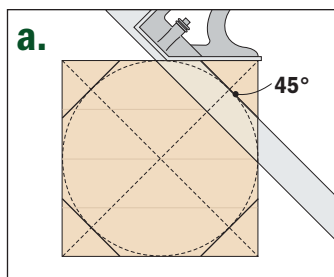
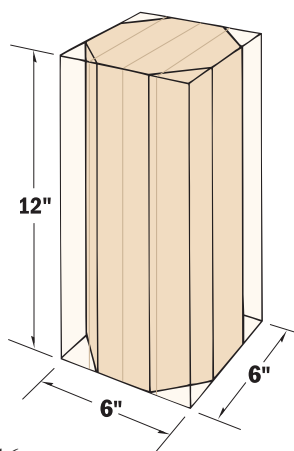
and draw a line across the corner. To bevel the corners of the post, tilt the blade on your table saw to 45° (*Drawing 'b'*). Then set the rip fence so the blade aligns with the layout line and bevel the first corner. Now trim the remaining corners, rotating the post 90° between each pass.

Finally, since the king post will be exposed inside the gazebo, I routed a decorative 1/2" roundover around the bottom edge (*Drawing 'c'*).

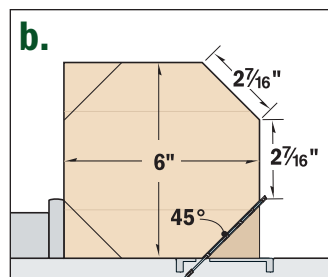
## READY FOR THE RAFTERS

With the king post completed, it's time to add the roof rafters. Note: I used 2x6's (cedar) for all the rafters and headers.

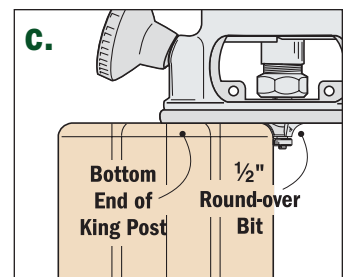
## KING POST DETAIL



To lay out the king post's angled sides, mark across the corners (where arc crosses diagonals).



Tilt the blade to 45° and adjust the fence to line up the cut. After each cut, rotate the block 90°.



Route a 1/2" roundover around the bottom of the king post to give the exposed part a finished look.



**Attach two hip rafters (U) to the king post (T) and lift the assembly into position. Check the fit at both ends.**

The hip rafters (U) come first. Notice how the upper end of each hip rafter is mitered to fit against the king post. The lower end has a notch (bird's mouth) that fits over the wall (*Hip Rafter*). The dimensions shown should get you close. But keep in mind that cutting and fitting rafters is a trial-and-error process.

To produce a good fit, I started by cutting two hip rafters and temporarily screwed them to opposite sides of the king post. Get some help to lift this assembly into place and check the fit at the king post and where the bird's mouth rests on the wall (*Fig. 22*).

After making any necessary adjustments, try the assembly again. When you're satisfied with the fit, take the assembly down and use one of the rafters as a pattern for the remaining six hip rafters.

Now reattach the pattern rafter to the king post, lift the assembly back into place, and drive screws through the side posts to secure it



**After making any adjustments to the rafters, secure them to the posts by driving screws in from both sides.**

(*Fig. 23*). Then begin fitting the remaining hip rafters, installing them in opposing pairs (*Fig. 24*).

Note: If the rafters don't fit just right, you can use a ratchet-type, nylon tie-down strap pulled between opposing posts to snug things up.

### STUB RAFTERS & HEADERS

With the hip rafters in place, it's time to add the stub rafters and headers. Here again, this is a trial-and-error process. The reason has to do with the header. It has to be mitered *and* beveled to fit between the hip rafters (one of the few compound angles in the gazebo). This makes the process of cutting and fitting the stub rafters a bit more involved.

To do this, start with an extra-long (50") stub rafter (V). Note: The rafter "tails" will be trimmed to length later. Then cut the top end square (where it joins the header) and notch the bird's mouth.



**Install the remaining hip rafters in opposing pairs. Use a ratcheting tie-down strap to pull the walls into place.**

The stub rafter is used to determine the length of the header. Set it in place (perpendicular to the wall) and mark a line where the stub rafter meets the hip rafter (*Step 25*). After repeating this process on the other side, measure between the two lines (at the top and bottom edges of the hip rafters) to determine the length of the header. In my case, the dimensions worked out as shown in the *Header Detail*.

After laying out two lines to show the miter angles on an extra-long blank, tilt the saw blade to  $20\frac{1}{2}^\circ$  and bevel both ends of the header (W).

The rest of the roof assembly goes quickly. Just screw the stub rafter to the wall (*Fig. 26*). Then fit the header down between the hip rafters (*Fig. 27*) and screw it in place.

Repeat this process for each roof section, and then stretch a chalkline between the hip rafters to mark the ends (tails) of the stub rafters. Then cut them to final length.



**With a stub rafter set at right angles to the wall, mark its location on the hip rafters on both sides.**

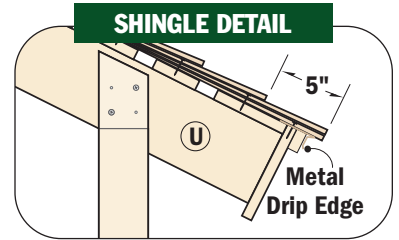
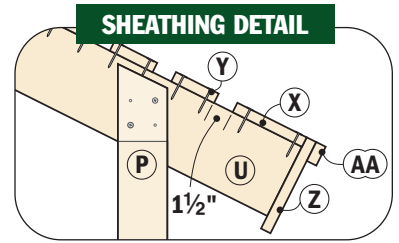
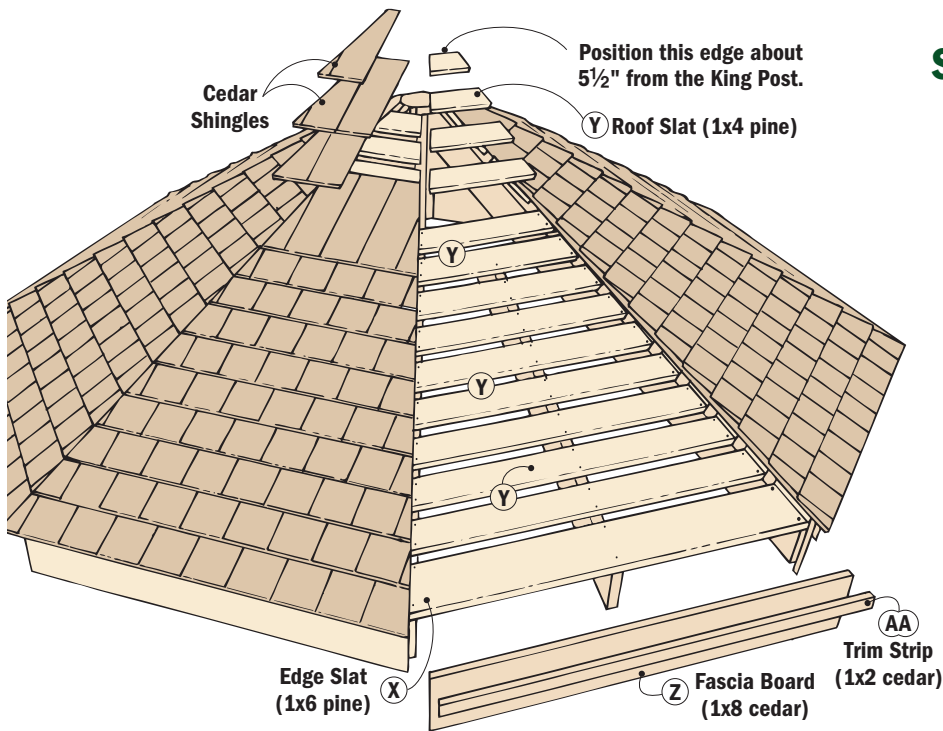


**Attach the stub rafters (V) to the center of each wall panel by driving a screw through the bird's mouth notch.**



**Trim a compound angle on the ends of the header (W) until it fits between the hip rafters and against the stub rafter.**

## SHEATHING & SHINGLES



**Tack a 1x6 edge slat (X) to the rafters, aligning it flush with the ends of the rafter tails.**



**Tack 1x4 roof slats (Y) in place, leaving them extra long on each end. Use a chalkline to mark them to length.**



**Hold a 1x8 fascia (Z) against the rafters and mark the compound angle needed. Fit each board to the previous one.**

### SHEATH THE ROOF

The roof of the gazebo is covered with cedar shingles that are nailed to evenly-spaced wood slats. The space between the slats allows air to circulate so the shingles can dry out between rains.

To provide ample nailing surface for the starter course of shingles, I used a 1x6 for the edge slat (X), as shown in *Figure 28*. With the edge slat in place, tack on 1x4 roof slats (Y), letting the ends run past the hip line (*Fig. 29* and box below). Note: I nailed the slats at the hip and stub rafters with 5d galvanized box nails.

The last roof slat (the one nearest the peak) should stop about 5½" from the edge of the king post. This will leave space for air to circulate up into the cupola. With the slats in place, snap a chalkline down the center of each hip and

then trim the slats to length. You can measure the slats on the first roof section to cut identical slats for the seven remaining sections.

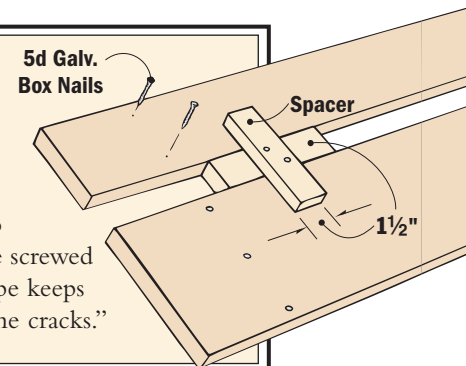
### CUSTOM FIT THE FASCIA

The edge of the roof is wrapped with 1x8 cedar fascia boards (Z) and a 1x2 trim strip (AA) as shown in the *Sheathing Detail*. The fascia attaches to the ends of the rafters, while the trim strip keeps the drip edge away from the fascia board.

Because the ends of the rafters tip inward, the ends of the fascia are mitered *and* beveled — the second compound angle in the gazebo. Here's an easy way to determine this angle. Hold an extra-long fascia board against the rafters (*Fig. 30*), and mark the rafter centerline at the top and bottom of the fascia board. Take the board down and draw a

### SKILL BUILDER

While installing the sheathing, I used a spacer like the one shown here to ensure proper spacing between the slats. It's made of two pieces of 1½"-wide stock that are screwed together to form an "X". The shape keeps the spacer from "falling through the cracks."





## GET GOOD GRADES WITH CEDAR SHINGLES

The lumberyard where I bought the cedar shingles for the gazebo sold two grades: #1 (Blue Label) and #2 (Red Label).

Shingles that are #1 grade have straight, parallel grain without any knots, cracks, holes or other defects. As a result, they resist cupping and twisting.

The shingles graded #2 are another good option. But they have flat grain on the face of the shingle (the U-shaped pattern of

the grain) as well as wide color variations and a few defects above the exposed face. Because of the defects, nailing into them will sometimes cause splitting or even loosen knots.

In the end, I chose #1 grade shingles for the gazebo. With proper care and maintenance, they'll last many years.

Expect to pay more for the #1 cedar shingles. (In my area they cost nearly \$50 a bundle, while

#2 came in closer to \$40.) But I thought the extra cost was worth it for their appearance and durability.



31

**Tack the drip edge in place and sight along the ridge line to mark it to length. Nail it to the sheathing.**



32

**Let a shingle overlap the ridge line, then use a straight edge to mark the angle. The shingles overhang 1".**



33

**With a double starter course installed, measure and mark a 5" reveal to position each subsequent course.**

line between the two marks to establish the miter angle. Then adjust the saw for a  $22\frac{1}{2}^\circ$  bevel and cut along the layout line.

After nailing the first fascia board in place, cut the same compound angle on *one* end of the second board. Then fit that end against the first board, mark the opposite end as before, and trim the second piece to length. Continue this process as you work your way around the gazebo.

Finally, use the same process to install the cedar trim strips (AA) and the metal drip edge (Fig. 31).

### BRING ON THE SHINGLES

The starter course of shingles is two layers thick and extends 1" beyond the drip edge. At each end of the course, cut the shingles at an angle to match the angle of the hip rafters (Fig. 32).

With the starter course complete, measure up 5" for each subsequent course (Fig. 33). Be sure to mix up



34

**Alternate wide and narrow shingles and overlap the joints in the course below. Drive one nail near each edge.**

the shingle widths randomly and overlap the joint between shingles on the previous course. Keep in mind that cedar shingles need to "breathe," so don't overdo the nails. Two nails per shingle near the edges is all that's needed (Fig. 34).

One thing to mention here is I planned to install a *working* cupola for ventilation. To provide air circulation, I didn't shingle completely to the top. Instead, the shingles stop flush with the top edge of the last slat.



35

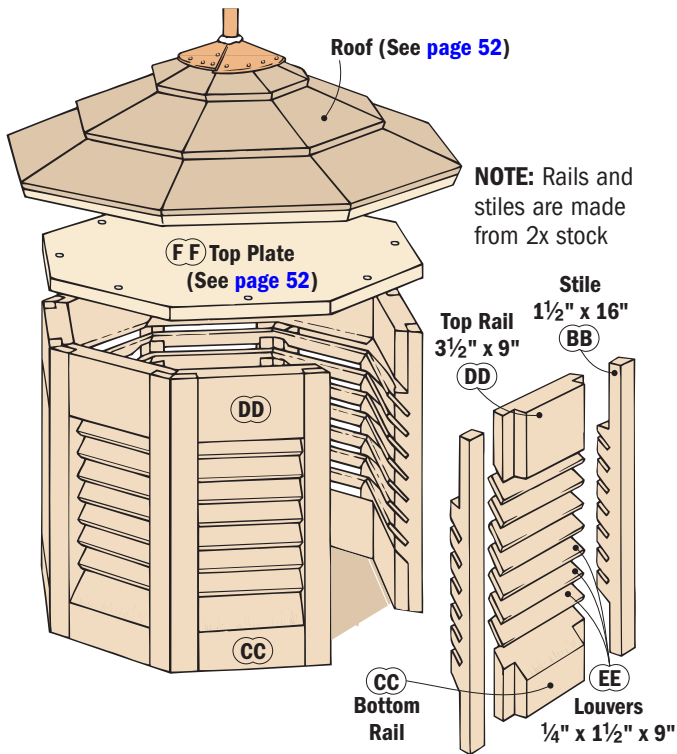
**Fit beveled cap shingles along the ridge line. Roofing felt goes under each course to help prevent leaks.**

Note: If you plan to build the cupola, it needs to be installed now — before attaching the cap shingles that go on next. (For instructions on building the cupola, see [page 50](#).)

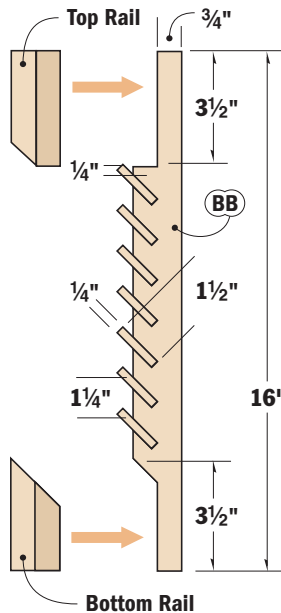
### CAP THE HIPS

To complete the shingling, you'll need to "cap" the seams along the hips (Fig. 35). To do this, rip 3"-wide shingles and bevel their mating edges at  $15^\circ$ . For extra protection, I placed roofing felt under the cap shingles.

# CUPOLA CONSTRUCTION



## SIDE VIEW



lap joints. This is a quick joint to cut. Plus it creates a large, face-to-face glue surface, so it's quite strong.

## FIRST, THE FRAME

Now that you have a basic understanding of how the cupola goes together, start by making the *frame*.

The first step is to cut the stiles (BB) and rails (CC, DD) to size from 2x cedar. To make the stiles, I ripped long, 1 1/2"-wide strips and then cut them to length (16"). As for the rails, they're 3 1/2" wide, so just cut them to length from a 2x4.

The next step is to make angled slots in the stiles to hold the louvers. To ensure consistent spacing between slots, I made the jig shown below.

One important note is there are seven louvers in each side panel, but you need to cut *eight* slots. The eighth slot defines the angled shoulder of the half-lap at the bottom of the stiles.

## THE CROWNING TOUCH

I wanted something extra to top off the gazebo, so I added the cupola shown above. With eight identical sides and a similar-style roof, the cupola is almost a miniature version of the gazebo.

But it's not just for looks. Warm air escapes through the cupola's louvered sides. The louvers also let light filter in. The result is a cooler gazebo

with an open, airy feel.

The body of the cupola consists of eight side panels with seven louvers apiece (*Cupola Construction*). Notice that the louvers are slanted at an angle and held in place by a wood frame. This frame is made up of a pair of *stiles* with angled slots to hold the louvers and two wide *rails*.

The frame is assembled with half-

## CUTTING HALF-LAPS

A look at the *Cupola Construction* shows that the half-laps are cut in the *outer* faces of the rails and the *inner* faces of the stiles. To cut these joints quickly, I set up a 3/4" dado blade in the table saw.

The first step is to establish the angled shoulder of the joint on the bottom of each stile. This is where the eighth slot comes in. By cutting

# INDEXING JIG FOR CUTTING ANGLED SLOTS

Here's a quick, easy way to cut evenly spaced slots (like the angled slots in the stiles for the cupola).

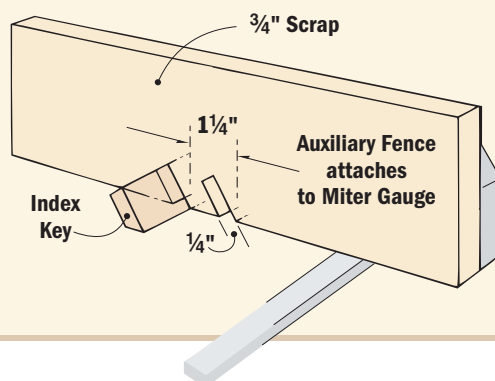
It's a two-part jig: a fence that attaches to the miter gauge on your table saw and a "key" that indexes the workpiece as you cut each slot.

To set up the jig, mount a 1/4" dado blade in the table saw, tilt the blade 45°, and make a single kerf in the fence. Then reposition the fence on the miter gauge so the first slot is 1 1/4" from the blade (the distance between louvers).

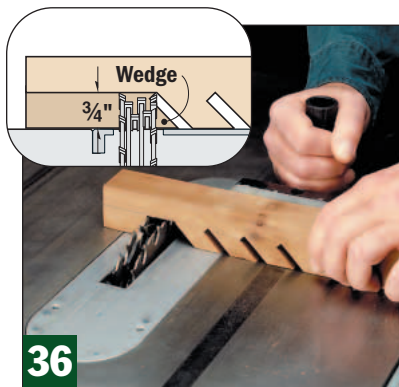
Next, cut the first (bottom) slot in each stile. Note: I clamped a stop block to the fence to position each piece.

Now glue a 1/4"-thick scrap in the first slot as a key. Fit the slot already cut in the stile over the key and cut the

second slot. Set the second slot over the key and make another pass. To cut the remaining slots, repeat the process, shifting the stile between each pass.



When cutting the angled slots in the stiles of the cupola's side panels, a jig with a wood index key ensures even spacing



36

The blade must be close enough to the last slot to remove the small wedge of waste under the slot.

up close to this slot, a small wedge of waste material will fall away to form the angled shoulder (Fig. 36).

Once that first cut is made, slide the stile over on the miter gauge and plough out the remaining waste.

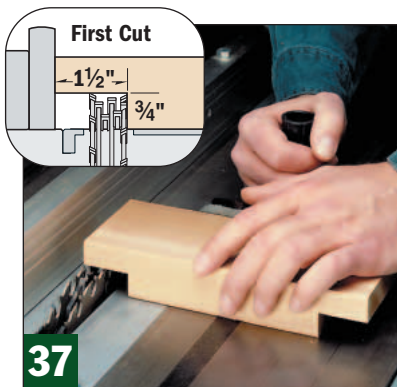
The next step is to cut the half-lap at the top of the stile. To establish the shoulder of this half-lap, I used my rip fence to position the stiles on the miter gauge. To do this, butt the end of the workpiece against the fence and then use the miter gauge to push the stile through the saw blade.

After wasting out the remaining stock, you can cut the half-laps in the rails. Here again, use the rip fence to position each rail as you cut the shoulder of the joint. Then shift the rail to the side to remove the rest of the waste (Fig. 37).

All that's left to complete the rails is to cut a bevel in each piece (*Cupola Construction, Side View*). To provide clearance for the louvers, cut a narrow bevel on the lower, inside edge of the top rail (Fig. 38). Also, cutting a wide bevel on the bottom rail forms a water-shedding surface that matches the angle of the louvers.

At this point it's time to make the louvers. Altogether, there are 56 louvers, and I wanted each one to be the exact same thickness to fit in the angled slots. So I made a jig for the table saw that provides a quick, easy way to cut the louvers (EE) to uniform thickness. (For a look at this jig, turn to [page 17](#).)

Now it's just a matter of gluing up the side panels. Start by gluing



37

Without changing the dado blade setup, cut a half-lap joint in each end of the top and bottom rails.

the louvers into the slots (Fig. 39) with water-resistant, yellow woodworker's glue. (I used *Titebond II*.) Then glue and clamp the frames together.

There's just one thing left to complete the side panels. To get the eight sides to fit together, you'll need to rip a bevel on each of the long edges, as shown in Figure 40.

#### ADD THE TOP PLATE

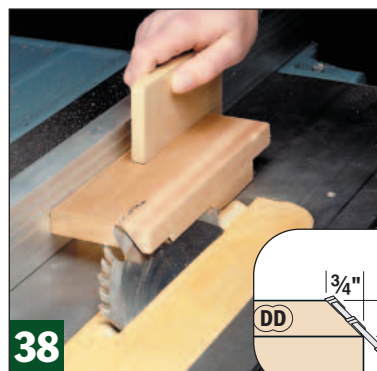
Before gluing the side panels together, it's best to make the top plate (*Cupola Construction*). It adds rigidity when gluing up the cupola.

The top plate (FF) is a piece of 3/4" plywood that's cut to the shape of an octagon. Here again, the goal is to end up with eight sides of equal length. So I used the same procedure as with the king post to lay out the sides. Only this time, I started with a 21 3/4"-square blank (the distance across two opposing sides of the cupola).

After cutting the top to shape, it's time to glue up the eight side panels. This isn't as difficult as it might seem, especially if you have a couple of band clamps on hand.

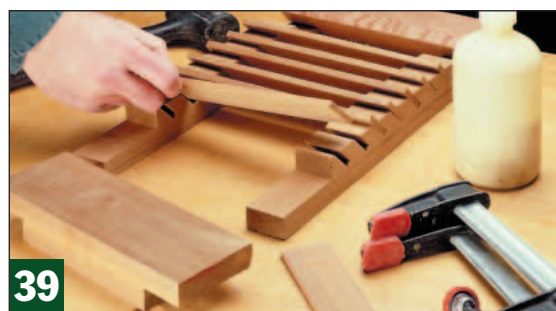
Start by applying water-resistant glue to the beveled edges of the panels. Then stand the panels on end and fit them together. Now slip on the band clamps and slowly draw them snug (not tight) against the side panels.

All that's left is to set the top plate in place and tap the side panels flush (if necessary). Finally, screw the top plate in place and tighten the clamps.



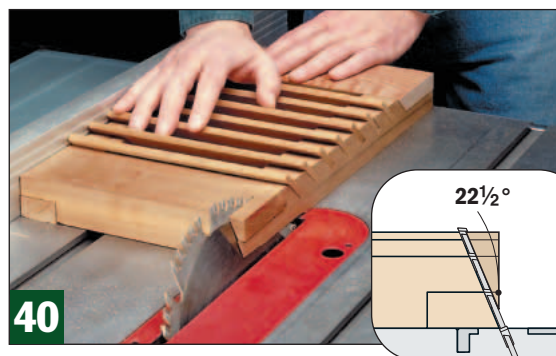
38

To rip the top rail, tilt the saw blade to 45°. Then adjust the rip fence to cut a 3/4" bevel as shown in the detail.



39

Glue the louvers into the slots cut in the stiles. The slat ends should be flush with the outer edge of the stiles.



40

With the side panel face down on the table saw, bevel the two long edges of each side panel at a 22 1/2° angle.



# CUPOLA ROOF ASSEMBLY

## CAPPING THE CUPOLA

Overall, the cupola roof is a minor detail, but building it is one of the most interesting parts of this project.

The challenge is to cut eight *identical* triangles to form the roof. As simple as that sounds, consider that the long edges of each triangle are beveled at 10° — that's 16 compound cuts that need to be *precisely* the same.

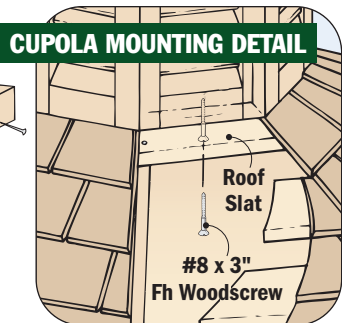
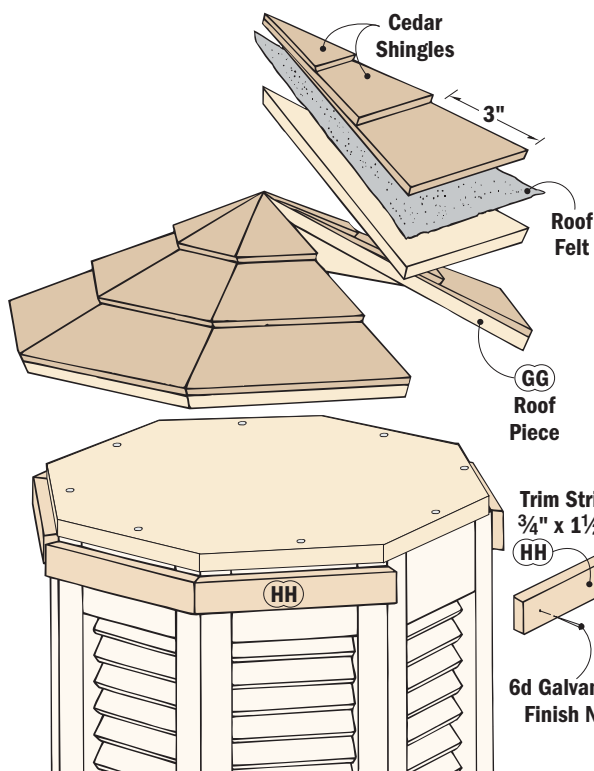
Before you decide you don't want a cupola after all, take a look at the following steps. They'll simplify the process considerably. To get started, you'll need a piece of 3/4"-thick ply-

wood large enough to cut all eight triangles (14 1/4" wide × 48" long). Now set your table saw up to cut the triangles. First, mount an auxiliary fence to your miter gauge and tilt the gauge 20 1/2° degrees. Finally, tilt the blade to 10°.

With your table saw set up this way, cut a kerf in the auxiliary fence. This kerf will be used as a reference that will be used to position the plywood when cutting each triangle.

To make the first cut, place the plywood against the auxiliary fence and position the corner of the plywood against the reference kerf (Fig. 41). Now make the first cut to remove a wedge-shaped, waste piece.

It's the *second* cut that will make the first roof piece (GG). To do this, flip the plywood edge-for-edge, and align the new corner with the kerf (Fig. 42). Then make the cut, flip the plywood, align the corner, and make another cut. Continue this way until you've cut all eight roof pieces.



**41** Tilt the blade to 10° and the miter gauge to 20 1/2°. Trim one end of the plywood blank.



**42** Flip the plywood over, align the tip of the triangle to the outside of the kerf in the fence and cut the second side.



**43** Tape the triangles edge-to-edge with the bevels down. (That extra space will close up when you "raise" the roof.)



**44** Carefully turn the roof over and brush a generous amount of glue in each joint and on one of the two exposed edges.

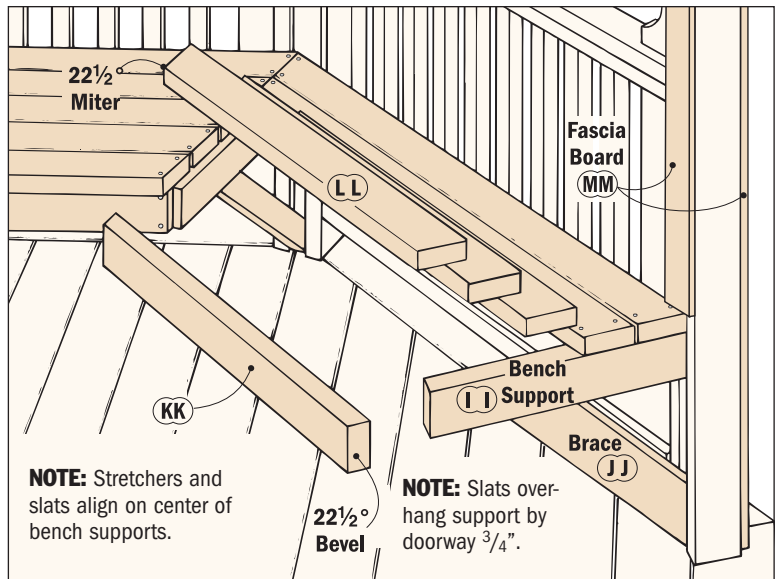
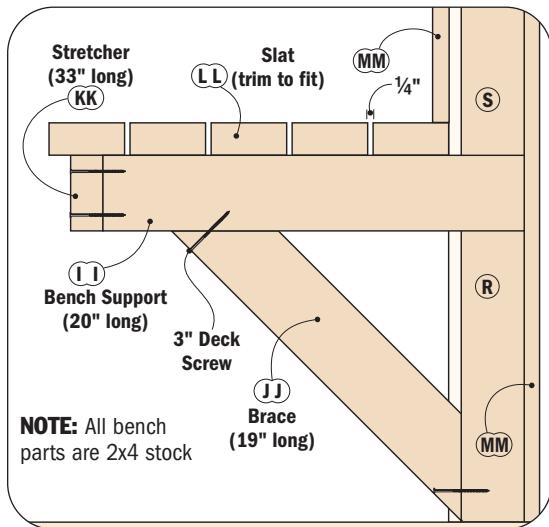


**45** Turn the roof back over and pull the last joint together. Then tape it closed and let the glue dry overnight.



**46** Measure and mark 12" down from the center of the king post along each hip. Use these marks to center the cupola.

## BENCH ASSEMBLY



### RAISING THE ROOF

Because of the compound angles on the roof pieces, I had to come up with an unusual way to hold them together while “raising the roof.” Take a look at *Figures 43, 44, and 45* to see how duct tape provided a solution.

Once the glue dries (overnight), center the roof on the cupola, and drive one screw in each side panel to secure it. Cover the roof with felt and shingle it as before. Only this time, use a 3" reveal between courses.

Next, miter the cedar trim strips (HH) to fit around the cupola.

Now for the crowning touch. Get some help to lift the cupola up on the roof (*Fig. 46*). Then drive screws up through the roof slats into the side panels (*Cupola Mounting Detail*).

### BUILT-IN BENCHES

Back when you assembled the walls, you left a pocket for the 2x4 bench supports. Depending on how much seating you want, you can build benches on one wall or all seven. (Unused pockets get covered up, but they could be uncovered later.)

To make each bench, insert two bench supports (II) in the pockets. Then miter both ends of the 2x4 braces (JJ) to fit against the bench supports and lower spacer blocks.

After securing the braces with screws, mark the centerline on the top edge of each support. Use these reference marks to fit the stretchers

(KK), as shown in *Figure 47*. The slats (LL) of the bench are cut and fit the same way (*Fig. 48*). Note: I cut the slats by the doorway to overhang the supports by  $\frac{3}{4}$ " and softened the ends by sanding.

Finally, cover the posts (inside and

out) with cedar fascia boards (MM). Fit the outside fascia over the tie-down straps (*Fig. 49*) and raise the fascia slightly off the deck so it won't wick up water. Inside, the fascia rests on the bench and extends up to the bottom edge of the hip rafter (*Fig. 50*).



**47** Bevel the stretcher ends at 22 $\frac{1}{2}$ ° so the stretchers reach from center to center on the supports. Screw them in place.



**48** Miter the slat ends to meet the centerline of the supports. Use spacers to hold them while you nail the slats down.



**49** Position the fascia (MM) on the post and hit the board with your hand. Drill a counterbore at the screwhead dimples.



**50** Nail the fascia boards (MM) to the posts inside and out. Center them to leave a uniform reveal on each side.

## THE FINIAL TOUCH

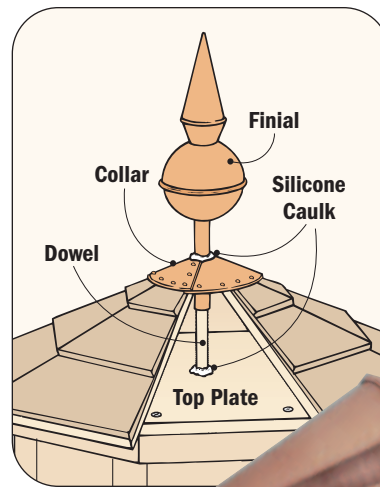
The cupola of the gazebo looks great all by itself. But to “top it off,” I added the copper finial shown at right.

The finial is supported by a dowel that fits inside a mounting tube. As you can see, the dowel rests on the top plate of the cupola.

To install the finial, you’ll need to drill a hole through the peak of the roof. Then apply silicone to the end of the dowel and slip it through the hole until it “bottoms out” against the top plate. (The cured silicon will keep the dowel from moving.)

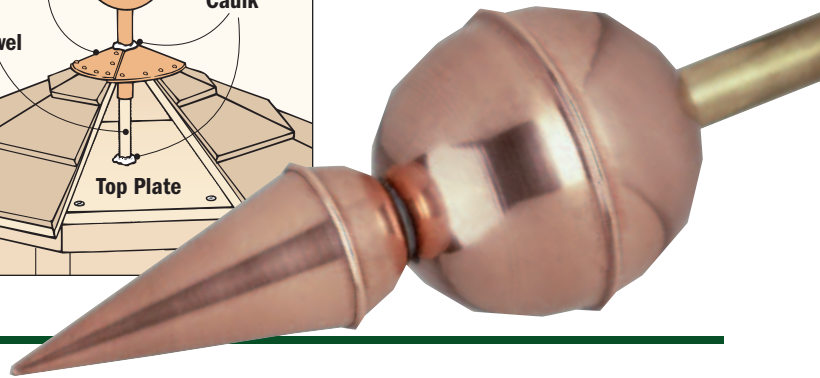
Finally, I added a *collar* as a trim piece. It’s made from a thin sheet of copper with a pie-shaped section removed so you can wrap it around the peak. (Small sheets of copper are

available at many hobby stores.) After tacking the collar in place, apply a dab of silicone to seal out moisture.



Well, that takes care of the finial. As for the gazebo itself, I gave it a coat of clear, exterior wood finish. I plan to apply another coat every year to keep this garden centerpiece looking good as new. 📺

**For a source of finials and other decorative ornaments, please turn to page 59.**



## MATERIALS LIST

### LUMBER (PLATFORM)

A (8) Posts	3½" x 3½" x custom length (pressure-treated)
B (8) Rim Joists	1½" x 7¼" x 43¾" (pressure-treated)
C (7) Floor Joists	1½" x 7¼" x 112" or shorter (pressure-treated)
D (14) Deck Planks	5¼" x 6" x 16" (Trex)
E (8) Border Planks	5¼" x 6" x 51½" (Trex)*
F (8) Skirt Boards	¾" x 7¼" x 50¼" (cedar)

\*Note: The 14 Deck Planks also provide enough material to make Border Planks

### HARDWARE (PLATFORM)

(8) ½" x 12" Anchor Bolts
(8) 4x4 Post Anchors (Simpson Strong-Tie #AB44)
(8) 18" Tie-down straps (Simpson Strong-Tie #MSTA18)
(6) 2x8 Joist Hangers (Simpson Strong-Tie #LU28)
(8) 2x8 45° Joist Hangers: 4 Right (SUR26); 4 Left (SUL26)
(16) Adjust. Angle Mounting Brackets (Simpson Strong-Tie #LS70)
5 lbs. #8 x 1¼" Woodscrews
5 lbs. 8d Spiral Shank Nails (Galvanized)
1 lb. 6d Finish Nails (Galvanized)

### LUMBER (WALL PANELS) Note: List includes 7 wall panels; 1 lintel w/posts

G (14) Upper Drip Rails	1½" x 2½" x 43½" (cedar)
H (14) Lower Drip Rails	1½" x 2½" x 43½" (cedar)
I (14) Cap Rails	1½" x 3" x 44½" (cedar)
J (16) Lintel Rails	1½" x 3" x 44½" (cedar)
K (16) End Balusters/Lintel	1½" x 4½" x 7½" (cedar)
L (14) End Balusters/Rail	1½" x 4½" x 21⅞" (cedar)
M (64) Narrow Balusters/Lintel	1½" x 1½" x 7½" (cedar)
N (56) Narrow Balusters/Rail	1½" x 1½" x 21⅞" (cedar)
O (7) Stretchers	1½" x 5½" x 43½" (cedar)
P (16) Side Posts	1½" x 3½" x 95½" (cedar)
Q (30) Corbels	1½" x 4½" x 6½" (cedar)
R (8) Short Spacer Blocks	1½" x 3" x 13½" (cedar)
S (8) Long Spacer Blocks	1½" x 3" x 73" (cedar)

### HARDWARE (WALL PANELS)

10 lb. #8 x 3" Deck Screws
2 lb. 8d Casing Nails (Galvanized)

### LUMBER (ROOF STRUCTURE)

T (1) King Post	6" x 6" x 12" (laminated from 2x cedar)
U (8) Hip Rafters	1½" x 5½" x 76" (cedar)
V (8) Stub Rafters	1½" x 5½" x 50" rgh. (cedar)
W (8) Headers	1½" x 5½" x 24" rgh. (cedar)
X (8) Edge Slats	¾" x 5½" x 58" rgh. (pine)
Y (56) Roof Slats	¾" x 3½" x Variable Lengths (pine)*
Z (8) Fascia Boards	¾" x 7½" x 60" rgh. (cedar)
AA (8) Trim Strips	¾" x 1½" x 60" rgh. (cedar)

\* Roof Slats require 256 linear feet of 1x4 stock (pine)

Also Needed: 11 Bundles of #1 (Blue Label) Cedar Shingles (16" long)

### HARDWARE (ROOF)

5 lbs. of #3 Coated Roofing Nails
1 lb. of #8 x 3" Deck Screws
5 lbs. of 5d Box Nails (Galvanized)
15# Roofing Felt (2 rolls)
(4) 10-ft. lengths of Aluminum Drip Edge (brown)

### LUMBER (CUPOLA)

BB (16) Stiles	1½" x 1½" x 16" (cedar)
CC (8) Bottom Rails	1½" x 3½" x 9" (cedar)
DD (8) Top Rails	1½" x 3½" x 9" (cedar)
EE (56) Louvers	¼" x 1½" x 9" (cedar)
FF (1) Top Plate	¾" x 21½" x 21½" (exterior plywood)
GG (8) Roof Pieces	¾" x 10⅞" x 14¼" (exterior plywood)
HH (8) Trim Strips	¾" x 1½" x Trim to fit (cedar)

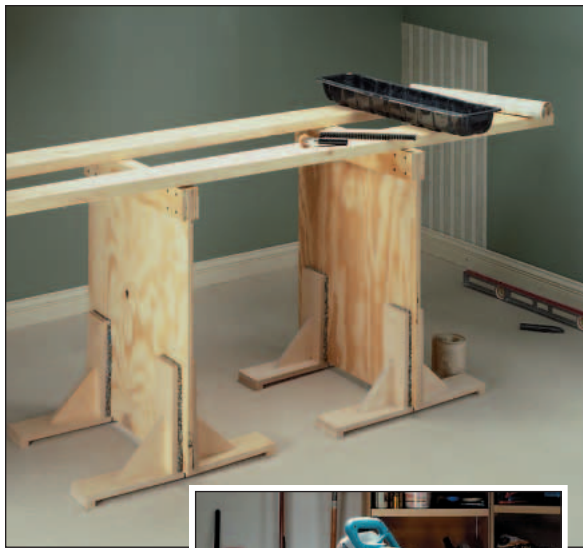
### LUMBER (PER BENCH)

II (2) Bench Supports	1½" x 3½" x 20" (cedar)
JJ (2) Bench Braces	1½" x 3½" x 19" (cedar)
KK (1) Bench Stretcher	1½" x 3½" x 36" rgh. (cedar)
LL (5) Bench Slats	1½" x 3½" x 48" rgh. (cedar)
MM (16) Post Fascia	¾" x 5½" x 89" (cedar)

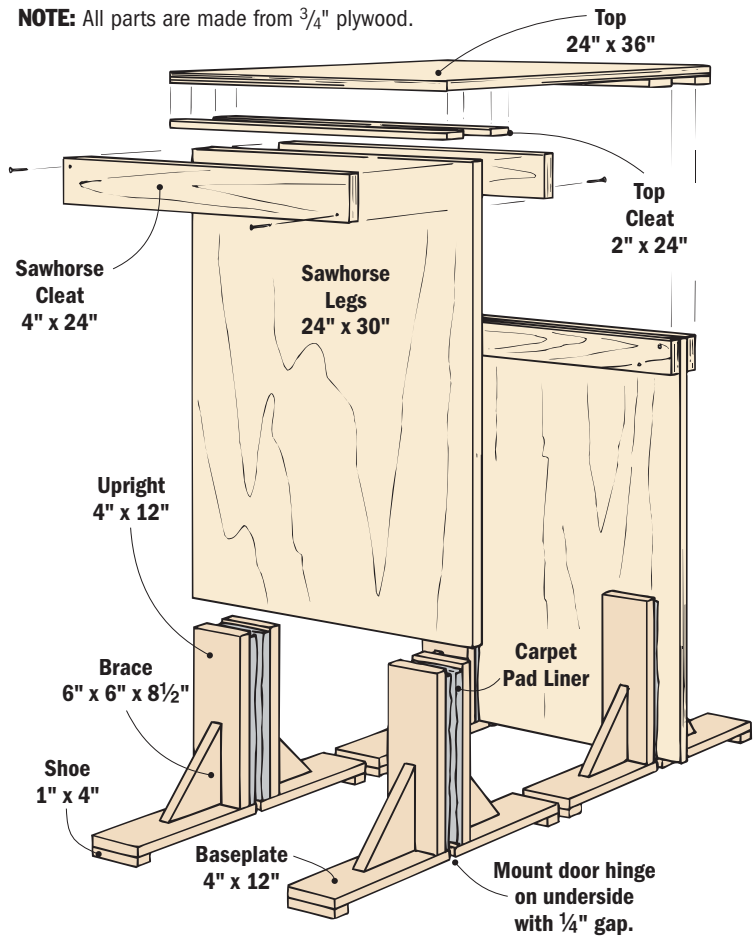
### HARDWARE (PER BENCH)

(12) #8 x 3" Fh Woodscrews
1 lb. 8d Casing Nails (Galvanized)
½ lb. 6d Finish Nails (Galvanized)

# Around The House



**NOTE:** All parts are made from 3/4" plywood.



## Door Dogs Support Sawhorses and a Bench



**A set of door dogs works great to hold a door upright while you plane an edge.**

Many shop accessories are made for a specific project. Take a pair of door dogs, for example. They're especially useful to hold a door upright when planing the end, see margin photo.

But once a project is complete, what do you do with the door dogs? I hate to just toss them on a shelf. That's when I started thinking about other uses for them around the house. Because they work so well to hold a door, I decided to build a second set and use them as a base for some sawhorses and a workbench.

### DOOR DOGS

I built my door dogs from some scrap 3/4" plywood and two sets of heavy-duty hinges. Don't skimp on the hinges. There will be quite a bit of stress on them anytime they're in use. That's because the dogs are hinged at the center and the identical halves are forced tightly together by the weight of the door.

You'll also need some sort of padding to protect your workpiece from scratching. Scrap pieces of carpet pad work great for this.

Cut the pieces to size and assemble them with woodscrews. Then screw the hinges to the underside of the baseplate. Leave

about 1/4" gap between the halves of the door dogs.

### SAWHORSES & BENCH

It took a little less than a full sheet of AC plywood to make all the door dogs, two sets of sawhorses and a jobsite workbench. Together, they're more than sturdy enough to hold most bench-top tools.

My top was only 24" wide and 36" long. Any longer and it may sag in the middle. The legs for the sawhorses are 30" tall, a good working height. Two sets of cleats strengthen the top of each leg, and four cleats on the bottom side of the bench top trap it in place.

## Adding a New Dimmer Switch is a Simple Task

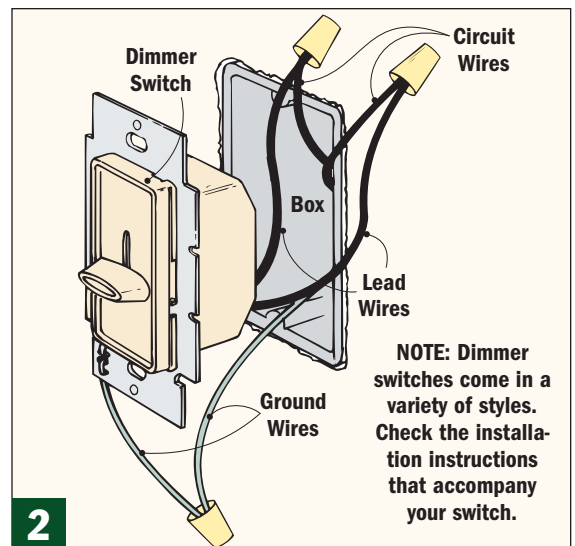
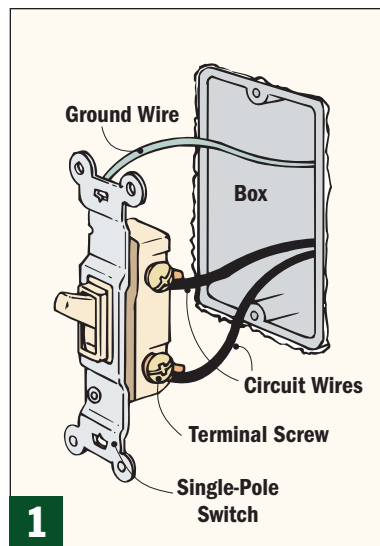
A dimmer switch is one of those little conveniences that, once installed, you'll wonder how you ever lived without it. The good thing is that any standard, single-pole wall switch is a great candidate for replacement with a dimmer switch. There are just a couple of requirements: ample room in the switch's electrical box, and the light source must be incandescent (uses regular bulbs).

Replacing a single-pole switch with a dimmer is easy. Note: Always start by flipping the breaker off at the service panel and then testing to see that power isn't reaching the switch.

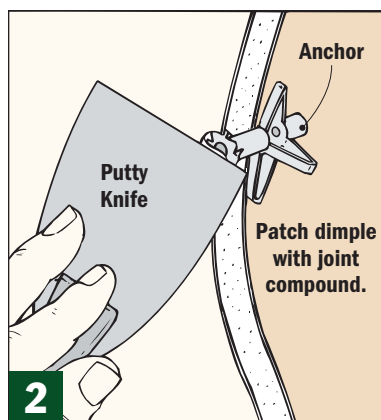
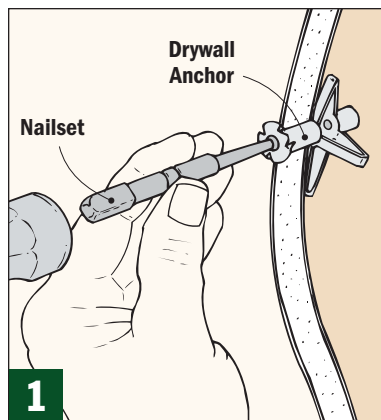
After the power is off, remove the old switch from the electrical box as shown in *Figure 1* and disconnect the wires. Then connect the circuit wires to the dimmer's two lead wires and secure with wire nuts (*Fig. 2*). If your dimmer

switch has a ground (green) wire (not all do), attach it to the circuit's grounding wire or directly to a grounded metal electrical box.

Then it's just a matter of pushing everything back into the box, turning on the power, and testing the new dimmer switch.



## Covering Unsightly Drywall Anchors



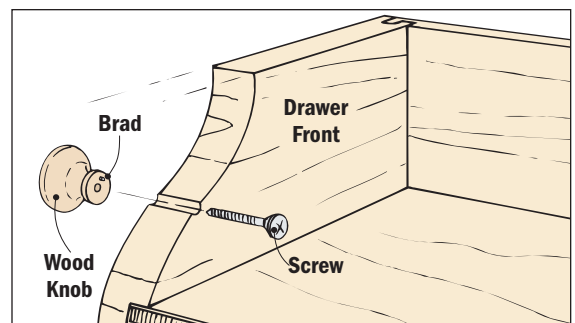
Drywall anchors work great to hang items where there isn't a stud to nail or screw into. That's because they have metal "fingers" that mushroom inside the wall once a machine screw is threaded in. After the fingers grip the drywall, the anchor is locked in place.

There's one problem, though — it's permanent. What if you ever want to remove the anchor? It's nearly impossible to get the anchor out without leaving a large hole in the wall that has to be patched.

But you don't have to *remove* the anchors to get rid of them. An easy solution to this problem is to dimple the head of the anchor with a hammer and nailset (*Fig. 1*). To end up with a dimple deep enough to patch effectively, give the head a couple of firm whacks. Just be careful not to overdo it. Then all you need is a small amount of patching compound to create a smooth surface that's easy to paint over later (*Fig. 2*).

## Stop Knobs from Twisting Loose

I like to use plain wood knobs on my garage or basement cabinets. But it's frustrating when the knobs spin when I pull the drawers open. The wood knobs that I use — the kind with a single screw — often twist loose from use. To keep this from happening, drill a small pilot hole in the back of the knob. Then insert a brad in the knob and clip off the head, leaving about an 1/8" showing. Tightening the screw draws the nail into the drawer front so the knob won't spin.





## Replacing Ceramic Tiles with Add-On Bath Accessories

If a ceramic tile cracks or chips, don't bother trying to salvage it. Instead, just break up the tile and chip away the pieces before moisture has a chance to seep through the cracks. That's the perfect time to replace the bad tile with a soap dish or some other accessory.

To remove a broken tile, start by carefully drilling a series of holes with a masonry bit or a special tile bit to form an X-shaped pattern. Then, working from the center toward the edges, chip out the bro-

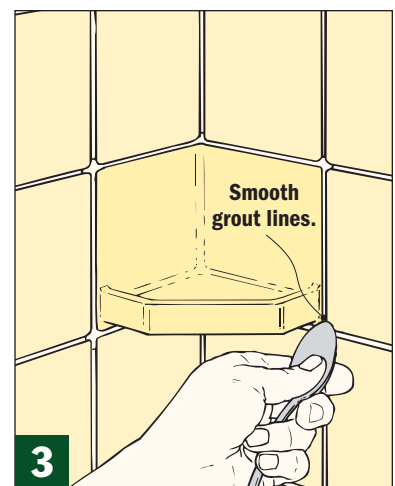
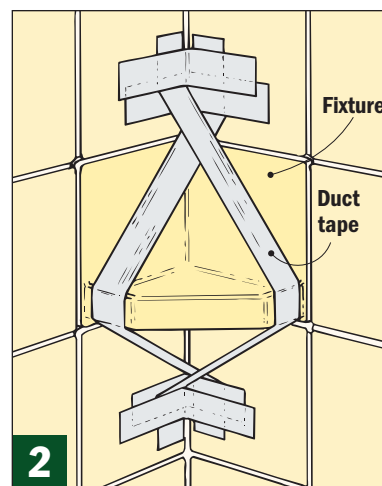
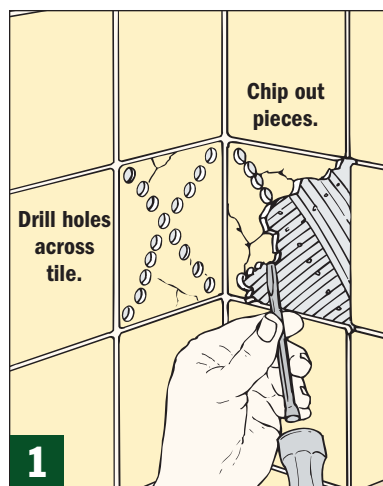
ken tile with a hammer and cold chisel, as shown in *Figure 1*. Note: Always wear safety glasses when striking tile with a tool.

After removing the broken pieces, clean off the old adhesive and grout. Use sandpaper to smooth any rough spots, then dust the area. To ensure a good bond, the substrate should be as clean as possible.

Once the surface is clean, you're ready to attach the new accessory. Ceramic fixtures should be set with epoxy putty or a special fixture

cement — not ordinary tile adhesive (check local tile dealers).

Start by applying cement to the back of the fixture and pressing it firmly into place. Then secure the fixture to the wall with duct tape for the recommended curing time (*Fig. 2*). Wait at least 24 to 48 hours before grouting the seams. A cold or wet spoon works well to smooth out grout lines (*Fig. 3*). Let the grout cure for about 20-30 days, then apply silicone sealer to the joint lines to help prevent mildew.



## Four Steps To Shape Up a Storm Door

After a long winter, there are many things around the house that need extra attention. One of those is converting the storm door back into a screen door. If you're lucky, and winter hasn't left too much damage in its wake, this often means simply raising (or removing) the storm window. Then you'll be ready to let the warmth of spring inside. At least for a few months, until the heat of summer arrives.

But it also means reversing a few of the steps taken in the fall to winterize the storm door. Plus, you'll probably have to do a little door maintenance. Here are four simple tips for getting your screen doors ready for spring.

**Reset Springs.** Screen door plungers have two holes where they attach to the door bracket. The holes are for a pin. The rear pin setting is for winter, when I like the door to slam shut. This helps to keep out most of the drafts on windy winter days. But I prefer a gentle closing action in the summer, so I reset the pin to the front hole each spring.

**Adjust the Sweep.** In the fall, I raise the sweep along the bottom of the door to provide a little ventilation and some extra clearance. This helps prevent condensation. But in the spring, I lower it back down. No point in making it any easier for bugs to enter the house.

**Tweak the Washer.** The "hold-open" washer sometimes gets straightened out so that it doesn't work. This is a simple fix. Just tweak it a little by bending it with pliers to a slightly sharper angle. Finally, test it to make sure it holds. Keep bending it until you're satisfied.

**Fix the Jamb.** If a strong wind catches the door, the screws holding the closer to the jamb can pull out. This will probably leave a couple of oversized holes in the jamb. A quick way to repair those is to drill the holes with a slightly larger drill bit. Then dab some glue in the holes, and fill them with a short dowel before reinstalling the screws.

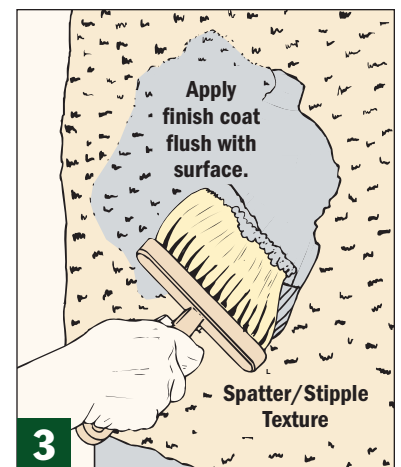
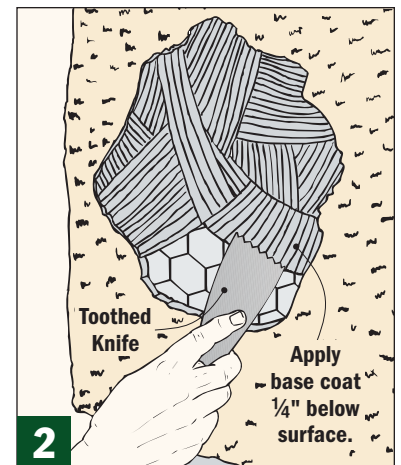
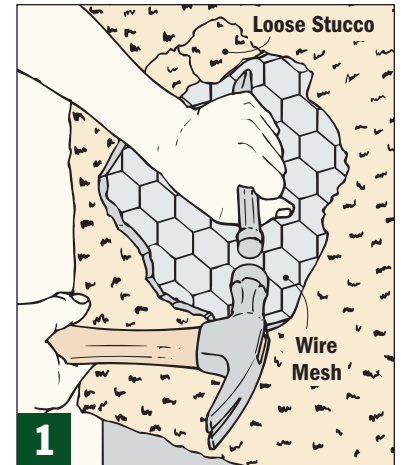
## Quick Stucco Repair: Rebuild It in Three Coats

Cracks and holes are an inevitable part of stucco exteriors. To prevent further damage, remove any loose stucco right away (*Fig. 1*). It sounds crazy, but you'll actually want to increase the size of the damaged area. After blowing out the dust, staple new wire mesh in place.

To rebuild the stucco, you'll need to mist the area with water and apply three coats. Spread on a base coat to within  $\frac{1}{4}$ " of the surface (*Fig. 2*). When firm, score the surface and allow it to cure for two days. Again, mist with water and apply the second coat to within  $\frac{1}{8}$ " of the

surface. The finish coat is applied flush with the existing surface.

While it's wet, texture to match. In *Figure 3*, you'll see a thrown-on spatter (stipple) texture. To finish up, smooth any high spots, and cover the repair with plastic for four days while the stucco cures.



# Sources & Resources

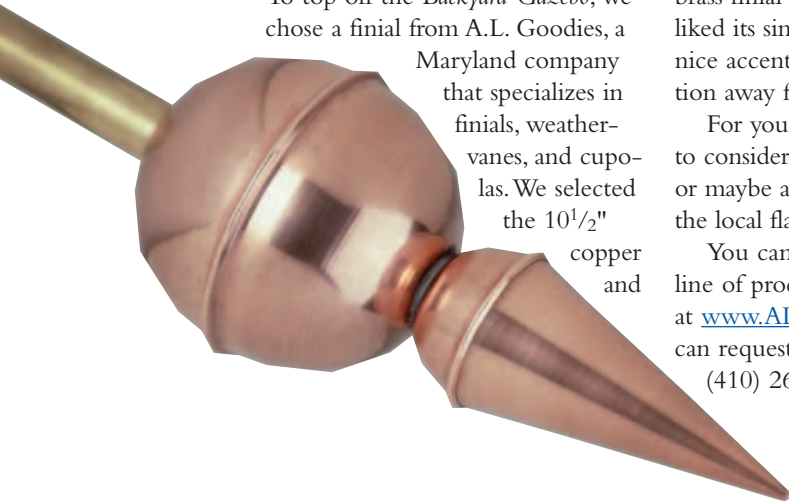
## Giving a Gazebo the Finial Touch – page 54

To top off the *Backyard Gazebo*, we chose a finial from A.L. Goodies, a Maryland company that specializes in finials, weather-vanes, and cupolas. We selected the 10½" copper and

brass finial (model 700) because we liked its simple design. It added a nice accent without taking attention away from the gazebo itself.

For your gazebo, you may want to consider a more elaborate finial or maybe a weathervane that reflects the local flavor of your hometown.

You can see A.L. Goodies' full line of products on their Web site at [www.ALGoodies.com](http://www.ALGoodies.com), or you can request a catalog by calling (410) 269-0071.



## Router Bits

– page 15, 36

Two projects in this issue of *Workbench* call for router bits you may not already have.

First is the *Bedside Table* on page 22. The drawer in that project is dovetailed. We used a ½" (¼" shank), 14° dovetail bit.

The second bit we used is a 2"-long piloted flush-trim bit. This unusual bit made easy work of duplicating the corbels on the *Garden Gazebo* (page 43).

Here are a few sources for these router bits:

Rockler Woodworking and Hardware  
(800) 279-4441  
[www.Rockler.com](http://www.Rockler.com)

The Woodsmith Store  
(800) 835-5084  
[www.WoodsmithStore.com](http://www.WoodsmithStore.com)

Jesada  
(800) 531-5559  
[www.Jesada.com](http://www.Jesada.com)

## Get A Handle on the Bedside Table – page 22

You can order the oil-rubbed drawer pull we used for the *Bedside Table* from Restoration Hardware. Request the Oil-Rubbed Bronze Bin Pull, catalog number 2403.0865. Order the piece online at [www.RestorationHardware.com](http://www.RestorationHardware.com), or call (800) 762-1005.



## Universal Plate and Guide Bushings – page 15

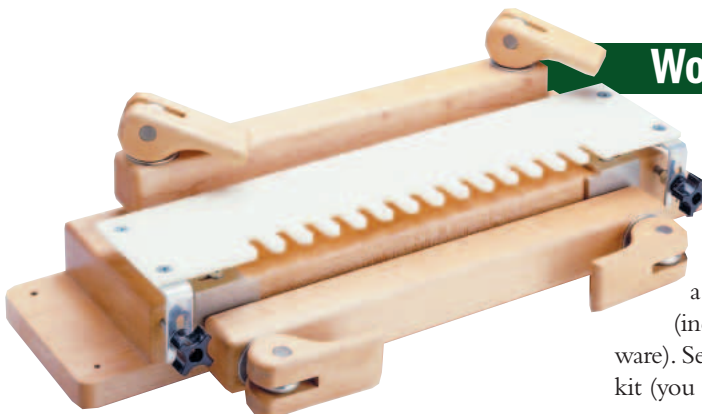
The *Woodsmith* Dovetail Jig requires a 7/16" guide bushing. Vermont American offers a universal plate and a set of bushings through [www.DoItBest.com](http://www.DoItBest.com) item #335681.



## Woodsmith Dovetail Jig – page 15

*Woodsmith Project Supplies* offers two versions of the half-blind dovetail jig like the one used for the *Bedside Table* drawer. First is a ready-to-assemble kit (including wood and hardware). Second is the hardware-only kit (you supply the wood).

Ready-To-Assemble Kit,  
Item #5002200, \$89.95  
Hardware-Only Kit,  
Item #758310, \$44.95  
Available at:  
[www.WoodsmithStore.com](http://www.WoodsmithStore.com)  
or by calling (800) 444-7002.



# Yankee Ingenuity!

In the 1940s, manufacturers were busy making guns, ammo casings, and other ordnance for the Allies. As a result, many items were rationed — clothes, shoes, meat, gasoline, and even electric motors.

Yet Americans still needed to maintain their homes. So manufacturers such as Arco and the

Mall Tool Company responded with some clever tools. One idea that proved successful was interchangeable attachments that turned a power drill into a disc sander, grinder, hack saw, screwdriver, drill press, polisher, planer, even a circular saw.

Suddenly, homeowners could accomplish “Most Everything

Around the House or Farm” with a single tool. And at only \$8-\$10 each, these attachments were much less expensive than comparable full-sized tools.

This accounts for their popularity throughout the '40s and '50s — proof that with a little Yankee ingenuity, you can find a way to get the job done.

