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Big ideas in a small package. That's what kids are, and our children's playhouse is a perfect match. With built-in swings, a slide, and a lookout platform, adventure is never far away. Your fun? Building it with our step-by-step plans.



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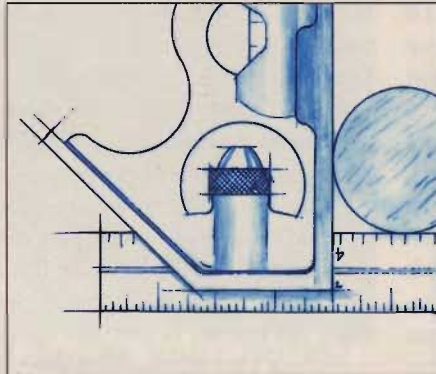
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D-I-Y Rewards

If I were in charge of everything — a recurring fantasy of mine — I'd require building centers to post really big warning signs. I'd hang these blaze orange signs above entrance doors and at each aisle. I'd even put matching stickers on every product. They'd read something like this: "Warning. Remodeling your home can be hazardous to the health of your bank account, your marriage, and your mental state. These products have been linked to nervous breakdowns. This goes double if you're redoing a kitchen."

Readers who've been following along the past few issues know that we stumbled into some expensive trouble with our kitchen remodeling project. Thanks to termite and water damage, uneven and out-of-level floors, and a host of small setbacks, we jetted past our budget line faster than Richard Petty ever pushed a final lap.

Not that this is unique to us. Ask most D-I-Yers and they'll tell you horror stories of budget-busting overruns

and heart-stopping return trips to the building center. And that includes many of the entrants in our Kitchen Design Contest. The old adage, "figure how much time it will take and how much it will cost, then multiply by three," truly applies here.

At the very least, you can't afford to lose your sense of humor. But despite these pitfalls, or pratfalls as the case may be, we all live through the mess to enjoy the results. Before and after photos of our kitchen overhaul give you a taste for the difference (below). And the winning entries in the Design Contest (see page 18) speak even more eloquently of remodeling's virtues.

So, to remodelers everywhere, I say "Hang in there. It's worth the effort." But in case you forget what big projects can do to you, I think my sign idea could be a helpful reminder. Maybe all they should say is "Remember, look before you leap!"

Chris



WORKBENCH

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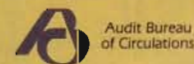
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Questions & Answers

Create Curved Moldings with Kerf Bending

Q *I have an arched entryway into my dining room, and I'd like to add molding similar to that shown in the doorway of the coffered ceiling article in your June 1997 issue. How do I make molding to follow the curve?*

*Joe Kennedy
Abington, PA*

A The simplest method for making this type of arched casing is called kerf bending. As the name implies, kerf bending involves cutting a series of saw kerfs across the width of a board. By cutting through most of the board's thickness and leaving a thin layer of wood, you create flexible sections that allow the wood to bend.

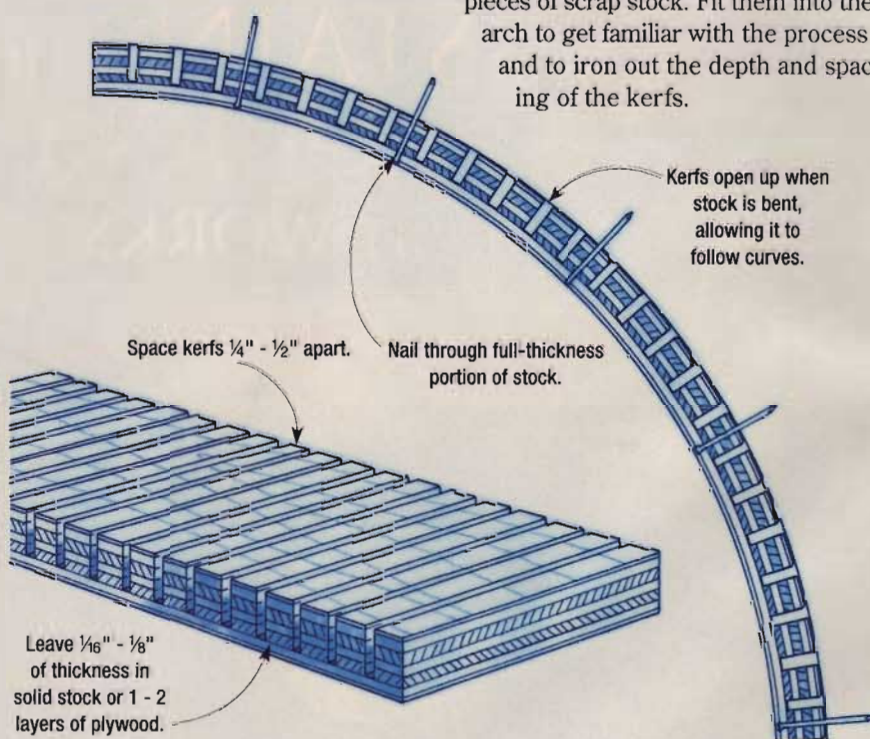
You can kerf bend solid wood or plywood. If you use solid wood, select stock with straight grain — quarter-sawn stock has the most predictable grain. With plywood, the grain pattern doesn't matter as much. Cut the kerfs across the face grain. Kerfs cut parallel to the grain leave weak spots that could break when you bend the wood.

How flexible the wood will be depends on the kerf depth and the distance between them. The closer together and deeper the kerfs are, the more flexibility the piece will have, but the

more fragile it will be. With solid wood, leave all but 1/16" to 1/8" of the stock's thickness. In plywood, cut through all but one or two plies. Spacing of 1/4" to 1/2" between kerfs should be fine for all but very tight curves.

When you attach the kerfed stock to the arch, remember that the thin areas don't offer much holding power for a nail, so mark the full-thickness spots on the face and drive your nails at those points.

Before cutting your prized casing stock, kerf and bend some practice pieces of scrap stock. Fit them into the arch to get familiar with the process and to iron out the depth and spacing of the kerfs.



SHARE YOUR QUESTIONS!

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



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Sorting Out Table Saw Power

Q I'm thinking of upgrading my table saw from an inexpensive benchtop model. I've looked at 1½-hp and 3-hp models, but I'm not sure I need the extra power. Is the smaller saw adequate for home workshop use?

David Milburn
Miami, FL

A Generally speaking, a 1½-hp contractor-type table saw should be adequate for the type of work it sounds like you'll be doing. Rather than spend the money to get the extra (and probably unnecessary) horsepower, I'd sink some of the savings into upgrading the fence.

One other consideration is your shop wiring. A 3-hp model is going to require a 220-volt outlet which can add to the cost of your saw upgrade.

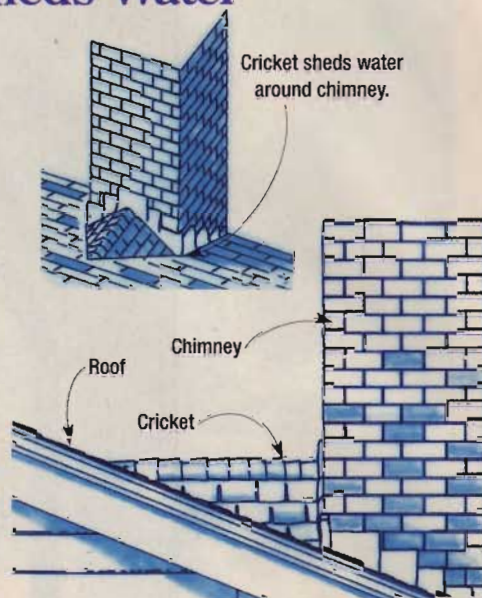
Chimney Cricket Sheds Water

Q The home inspector's report on the house I just bought stated that the chimney is in good shape, but the cricket should probably be rebuilt. I want to get this taken care of, but I've just got one problem. What's a cricket?

Aaron Bean
Pierre, SD

A A chimney cricket has an odd name, but an important job. When a roof slopes down into one wall of a chimney, a valley is created where rainwater will sit and potentially cause a roof leak. To prevent this, a small A-frame structure, or cricket, is built on the up-roof side of the chimney. It spans between the roof and chimney and diverts the water around the chimney.

When you rebuild the cricket, make sure to replace all the metal flashing that ties it into the chimney and roof. If you have a brick chimney, this may



involve repointing the mortar. If you're not comfortable doing this, I advise hiring a professional roofer or mason to make sure the new cricket gets sealed properly.

HELP WANTED

Associate Editor

Workbench would like to find an associate editor to join its staff. Serious candidates must have excellent writing skills and enthusiasm for woodworking and home improvement. Prior magazine experience is a plus. Relocation to Des Moines, IA, is required. To be considered, send cover letter, resume and writing samples to August Home Publishing, Workbench - Dept. E, 2200 Grand Ave., Des Moines, IA 50312. Or fax to: (515) 282-6741.

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Product Information Number 189

Dry Well Helps Solve Rainwater Drainage Problems

Q *One of my downspouts drains into a low area in my yard, and after heavy rain I end up with standing water. What can I do to get rid of this standing water?*

*R. Hammond
Santa Fe, NM*

A By far the simplest way to get rid of the water would be to redirect the downspout so the water drains to another part of the yard. If this isn't possible, you'll have to improve the drainage in the low area.

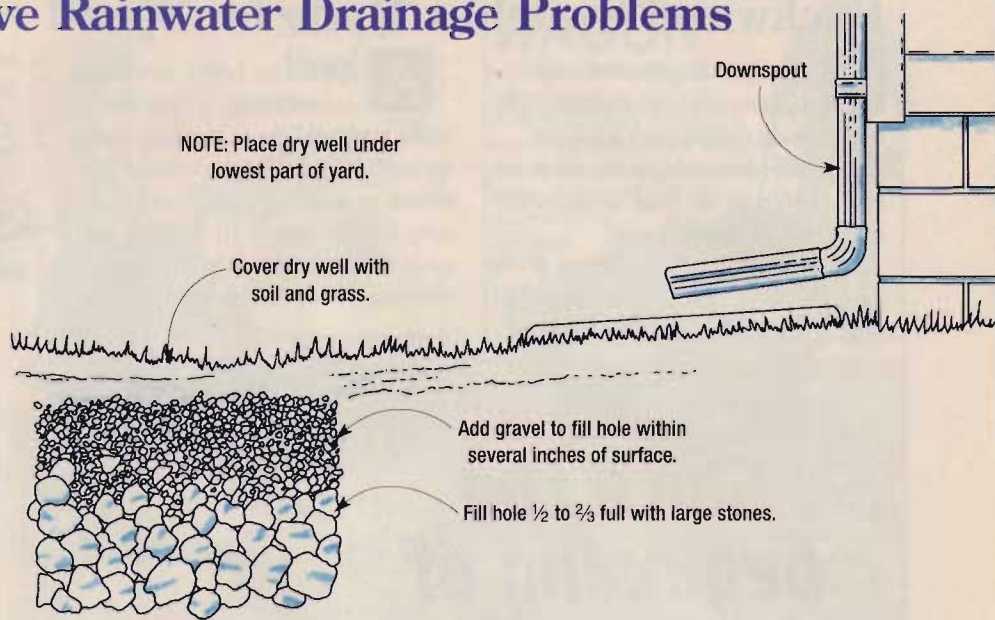
One option for increasing the drainage capacity of the low spot is a dry well. Buried underground, a dry well gives water a place to collect, then leach out into the soil.

You can make a dry well by digging a hole 24" to 48" in diameter and several feet deep. Fill the bottom part of the hole with large stones and put smaller gravel on top of the stones.

Then cover the top with soil and grass seed or sod.

Plastic dry wells are also available in home centers. Place one in the hole and surround it with gravel to keep

the soil from filling the well. Then cover it with gravel, soil, and grass. You can either bury the drain line leading to the well, or let the water run over the ground to the well.



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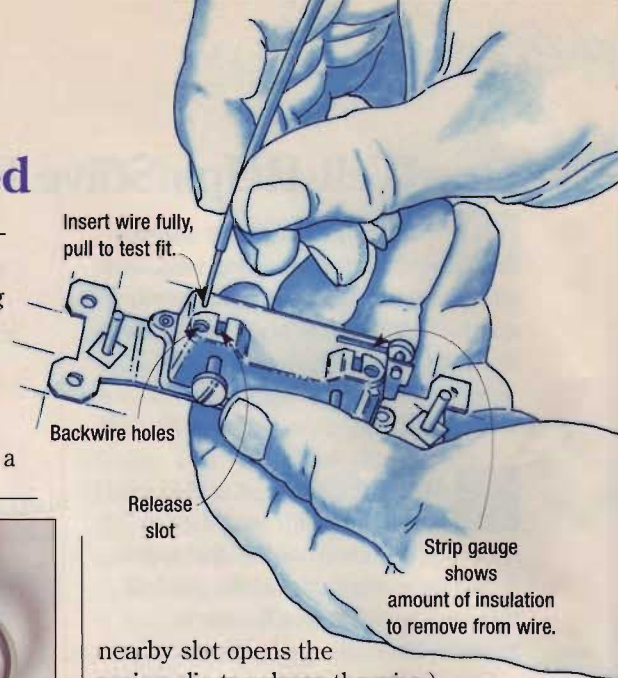
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Backwired Switches Made for Speed

Q *I'm installing several new light switches and outlets. The replacement components all have both screw terminals for the wires as well as holes in the back to insert the wires. Which should I use?*

*Mark Willis
Lexington, KY*

A Backwire holes on electrical switches accept the wires and hold them in place using spring tension. They speed up the wiring process since all you do is strip the insulation off the end and push the bare wire into the hole. (Pressing a small screwdriver into a



nearly slot opens the spring clip to release the wire.) Most manufacturers mold a gauge into the back of the switch that shows how much insulation to remove, usually about $\frac{5}{8}$ ".

If you're using the backwire holes, make sure your wiring meets the switch specifications for type and gauge size (typically #12 or #14). Use only solid copper wire, never stranded wire. (Consult an electrician if your house has aluminum wiring.) Fully insert the wire and pull to test the fit.

If you don't mind the extra work, the screw terminals provide a larger contact area with the wire, and allow a quick visual check of the connection. Hook-up is a bit slower, though. Always loop the wire around the screw so that when you tighten the screw down, the head of the screw forces the loop closed.

Plane Reference

Q *I just bought two antique planes. Is there a book that I can use to identify them and illustrate their proper use?*

*Roland Cardenas
APO AE*

A *The Handplane Book* by Garrett Hack (1997, Taunton Press) is a relatively new reference that provides a wealth of information on collecting, choosing, using, tuning, and repairing planes.

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Product Information Number 184

Feed Direction for Safe Routing

Q I'm fairly new to using a router, and I still get mixed up about which way I should move the router in different situations. Can you help straighten me out?

Karl Jameson
Ft. Lauderdale, FL

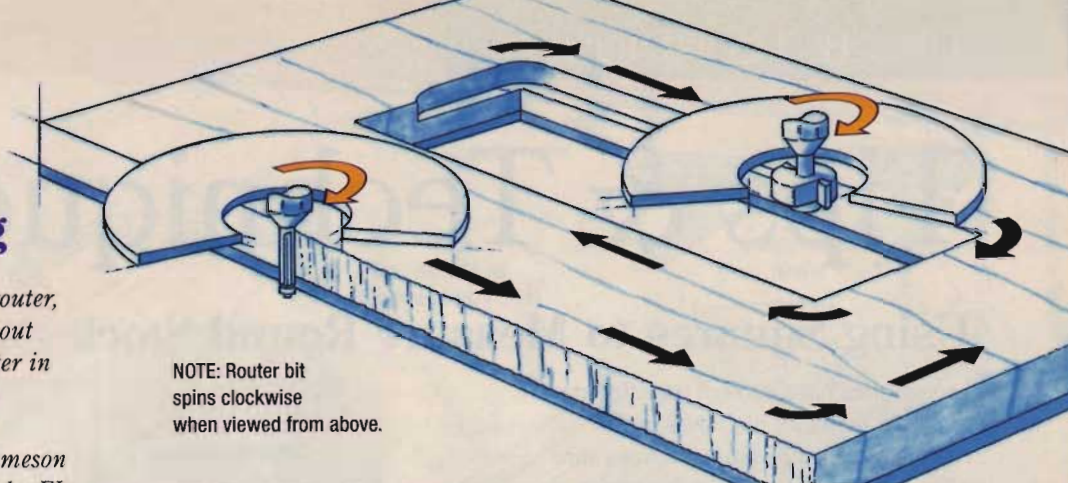
A Keeping feed direction straight is easier if you remember two things. The router bit spins clockwise (when viewed from above), and when edge-routing you want to move the router against the direction of rotation so the wood offers some resistance to the cutting flutes. This resistance counterbalances the pressure you're applying to move the router along, making the router easier to control.

Moving the router with the direction of rotation (a technique called "climb cutting") is sometimes done to reduce tearout in certain woods. As the name suggests, the router climbs along the edge because both the bit rotation and the force you're applying are assisting its travel, rather than balancing each other. It's tougher to control the cut.

There's no simple answer because the orientation of the workpiece edge can change depending on the task. But each situation involves three basic elements — you, the router, and the workpiece edge.

If the edge is toward you and the router's between you and that edge, rout from left to right. If the edge is away from you (say you're reaching over a workpiece to rout the far edge), rout right to left.

If the bit is cutting into the face of a workpiece rather than its edge — when routing dadoes, for example — guide the router base against a fence and apply the same rule: left to right if the fence's guiding edge faces you; right to left if it faces away. Because the bit will still want to climb the cut edge opposite the guide, it's best to use a bit narrower than the dado and cut it in two passes with a guide on either side.

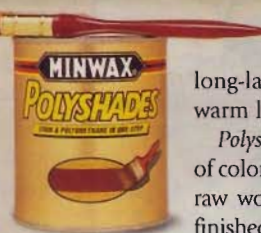


NOTE: Router bit spins clockwise when viewed from above.

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Tips & Techniques

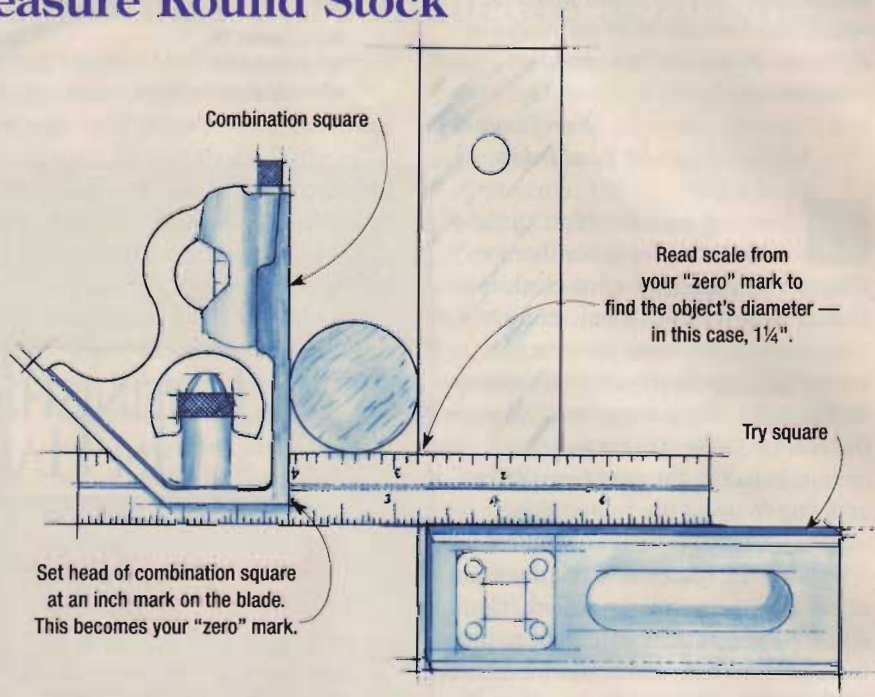
Using Squares to Measure Round Stock

I sometimes have a tough time finding the exact diameter of dowels and round pieces, since I'm not always sure if I've measured exactly at the center. Rather than struggle with it, I let a couple of squares do the work for me.

One square can be any type, but the other has to be a try square or combination square with a head thicker than its blade. I usually use a combination square and a try square together.

For example, set the blade on your combination square with an inch mark indexed right at the edge of the head. Place the dowel in the corner of the combination square, then hold the head of the try square against the blade of the first square and slide it against the dowel. When the blade of the try square touches the dowel, just scan down to where it crosses the blade of the other square.

I've also used this method to measure other odd-shaped objects. Even on flat boards, I'll use this technique



Set head of combination square at an inch mark on the blade. This becomes your "zero" mark.

and the $\frac{1}{64}$ " scale on my combination square if I need a very accurate measurement of the board's width. For checking larger pieces, I just grab my

framing square instead of the combination square.

*Sidney Phillips
Melville, NY*

Disposable Dust Mask Filters Thinner

The other day I was cleaning paintbrushes with paint thinner I'd poured into a coffee can. In no time the thinner got dirty and filled with gunk, so the brushes weren't coming out very clean.

I just happened to have a box of disposable white paper dust masks sitting nearby on my workbench. So I took one and put it on top of another coffee can (a 1-lb. can is just right), making a sort of bowl. I was even able

to slip the rubber strap under the can to hold the mask in place.

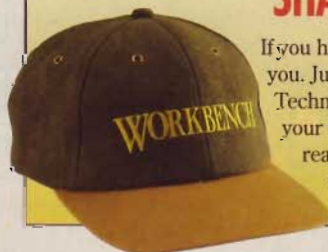
I poured the dirty thinner through the mask into the can, and the thinner came through very clean. I finished cleaning the brushes, then filtered the thinner again so I could use it later. Let the mask dry thoroughly before throwing it away in the trash.

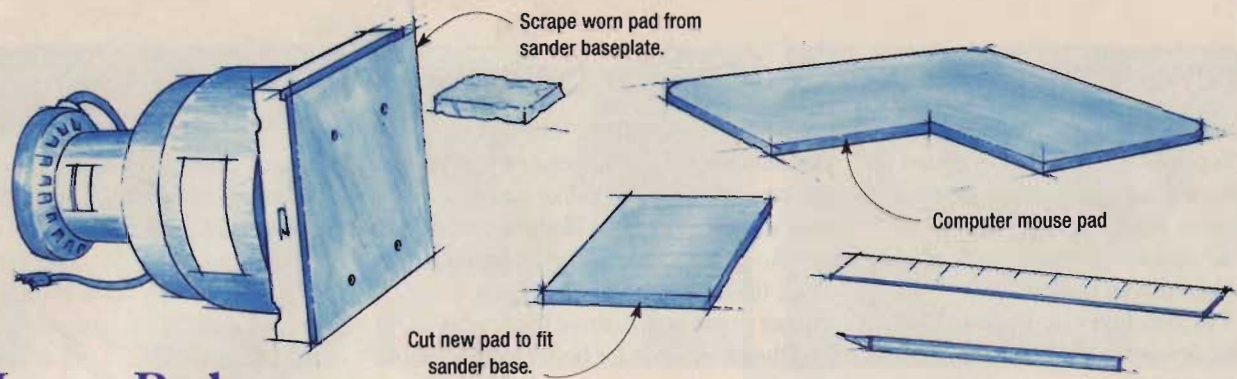
*Rick Sandberg
Ottumwa, IA*



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Mouse Pad Sander Base

My palm sander has seen a lot of use on woodworking projects. Eventually, the pad that the sandpaper sticks to wore out, causing the sandpaper to slip and rip. Finding a replacement pad was aggravating to say the least. The store where I bought the sander didn't have new pads in stock, and I thought the price quote was a bit high anyway.

My solution was to make my own sander pad from a computer mouse pad. A mouse pad has the right thickness and consistency, and the cloth surface grips the stick-on sandpaper well.

To make a new pad, I removed the baseplate from the sander and scraped off the old rubber pad. I put the sander base on the mouse pad, traced around the outside, and marked the location of the mounting holes. Then I cut the new pad to size and glued it to the sander's base plate with contact cement. For about \$4 I got enough material to make several sander pads.

*Mike Ricchetti
Northport, NY*

Spray Halts Rust

I don't have an air-conditioned shop, so the summertime humidity wreaks havoc with the cast iron surfaces of my table saw, jointer, and band saw. Wax works fine until the friction from using the tool rubs the wax off. Now after I make the last cut of the day, I just give the tools a quick spray of protectant (such as TopCote) to keep rust away.

*Norm Smith
Houston, TX*

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Screws Provide a Needed Lift for Sagging Gutters

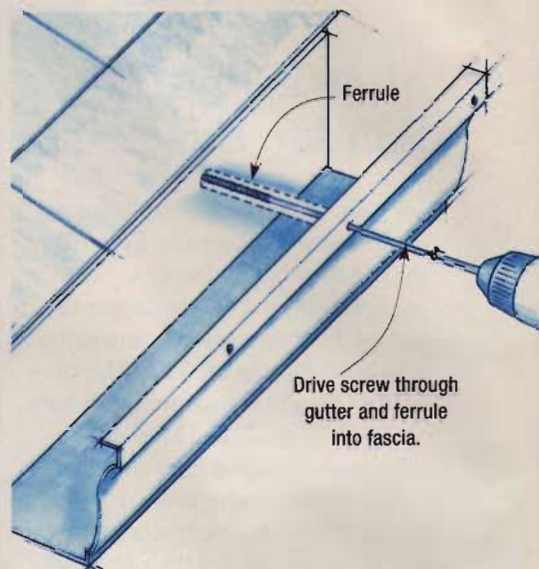
Every time I've hung gutters that are held in place with spikes, I've ended up leaving at least one hammer dent in the gutter. Plus, over time the spikes tend to work loose and never hold very well when driven back in.

So I've switched to using long screws. Screws have much better hold-

ing power, making them less likely to pull out over time. And because you're not hammering them in like you do with spikes, you're less likely to damage the gutter. If there's no 2x framing stock (called a sub-fascia) backing the thinner fascia board, drive the screws into the rafter ends for better hold.

I used 6"-long screws (to hang 4"-wide gutters). Home centers may not have them, but an industrial fastener supply or top-notch hardware store will.

*Bob Settich
Des Moines, IA*



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Fence Post Jack

I had a chain-link fence around my home's back yard that was in bad shape. Rather than salvage it, I decided to tear it out and build a wood one.

Removing the fence fabric was easy, but the posts were another story. Whoever put them in sunk concrete footings about 2 ft. into the ground. I dug out the first one by hand, then decided there had to be an easier way.

On each post I left one of the lowest fence clamps, and tightened it down good and snug. Then I wrapped a short length of heavy link chain around the post and clamp. I scrounged up an old-style car jack (the type that hooks into a slot in the car's bumper and ratchets up using the lug wrench as a handle).

I set the jack next to each post, hooked the jack into the links of the log chain, and jacked the post out of the hole. It was much faster than digging, and it saved my back.

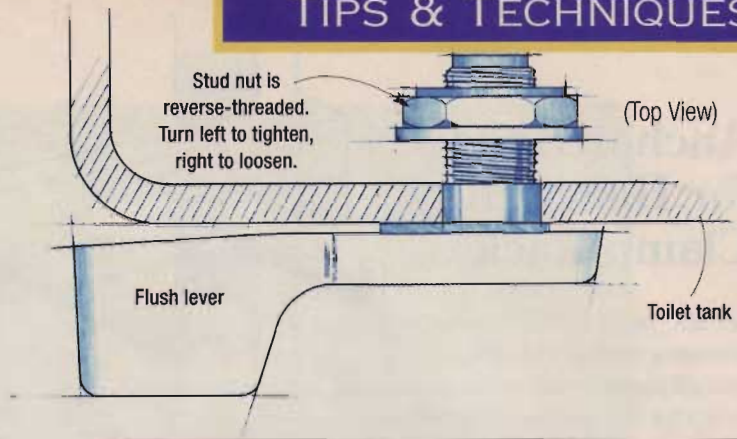
*Matt Sullivan
Denver, CO*

Reverse Threads Cause Toilet Troubles

Here's a tip that may save you the aggravation I suffered. I had to replace the flush lever on my toilet, and while removing the old one, I had a hard time loosening the nut that holds the lever to the tank. I used a little more force, and cracked the tank. That's when I realized the nut was reverse-threaded! This "simple" repair ended up costing me \$50 for a new tank, and a lot of wasted time.

*William McLean
San Marcos, CA*

(Editor's note: Toilet lever mounting threads have reverse (left-hand) threads to help keep the lever from working loose each time you flush.)



Put Router/Vac on Same Switch

To pick up dust and chips from my router table, I use a shop vacuum with a hose connected to the fence. But I've always found switching the two tools on separately inconvenient.

To get them both up and running simultaneously, I installed a single-gang box and a 20-amp duplex receptacle on one front leg of the router table. I wired this outlet to a 20-amp switch mounted in a separate box. Then I wired a 3-wire, 12-gauge cord (about 12-feet long) with a grounded plug to the switch.

With the cord plugged into a regular wall outlet, the switch controls electricity to the table-mounted outlet. I plug my router and vacuum into the outlet, and leave their power switches on. When I flip the switch, it sends power to the outlet, and both the vacuum and router turn on — and off — at the same time.

Having the router plug within easy reach is also handy, since I *always* unplug while changing bits or setups for obvious safety reasons.

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Product Information Number 190

Anchor Bolts for Heavy-Duty Clamp Rack

Anchor bolts, the L-shaped fasteners used to cinch wood mudsill plates to concrete foundations, have a lot of other uses in the shop.

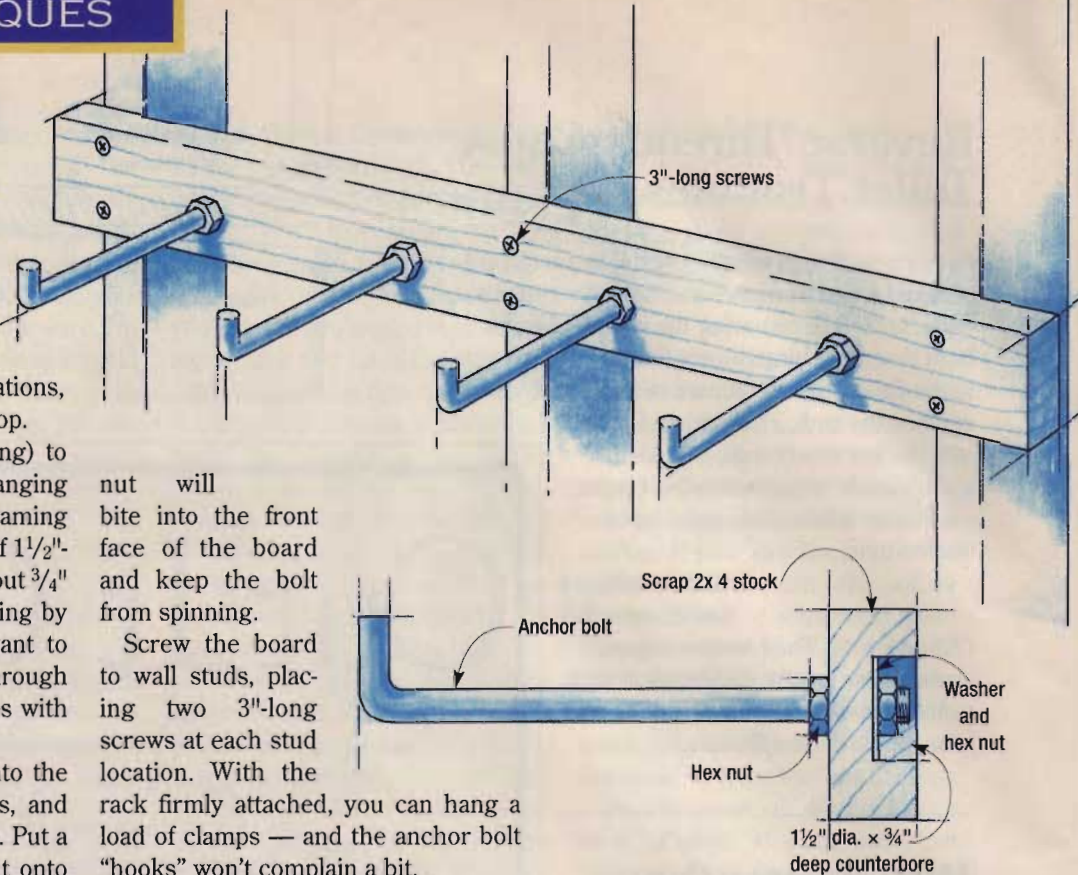
I used some (1/2" dia. x 8" long) to make a wall-mounted rack for hanging clamps. Take a length of 2x4 framing lumber and counterbore a row of 1 1/2"-dia. holes into one face, each about 3/4" deep. (Determine the hole spacing by laying out the clamps you'll want to store on the rack.) Then drill through the center of these counterbores with a 1/2" bit.

Run a hex nut all the way onto the anchor bolt thread until it jams, and insert that end into the 1/2" hole. Put a flat washer and another hex nut onto the bolt from the back (counterbored) side, and cinch it tight. The first hex

nut will bite into the front face of the board and keep the bolt from spinning.

Screw the board to wall studs, placing two 3"-long screws at each stud location. With the rack firmly attached, you can hang a load of clamps — and the anchor bolt "hooks" won't complain a bit.

*David Harrison
Salem, OR*



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News and Events

Kitchen Design Contest Winners

When we put out the call last year for entries in our Kitchen Design Contest, we didn't anticipate the overwhelming response we'd get.

Design entries included everything from simple makeovers to full remodels, and even adding on new space. We saw designs sketched out on paper and refined with the help of professionals, and those conceived and executed solely by homeowners. Some readers installed commercial cabinets — others built their own from scratch.

All the entries had some things in common, such as careful planning, attention to detail, and obvious pride in craftsmanship. We studied the photos and examined each plan in detail. Needless to say, picking a winner wasn't easy, and congratulations are due to everyone who submitted their designs.

But from all the entries, we needed to pick a winner and two runners-up, so here they are: First prize goes to David and Kitt Deyarmin of Havelock, NJ. Together they planned their new kitchen using a home design software program. David, a sergeant in the U.S. Marine Corps, built all of the cabinets in the base woodworking shop. He also installed them, built the countertops, did his own plumbing and wiring, and



even built the new ceiling arch. Congratulations, David and Kitt! It looks like you'll put your prizes — a Hitachi C8FB2 (8½") sliding compound miter saw and a Bosch 14.4-volt cordless drill — to great use.

David and Kitt Deyarmin set out to update their kitchen with a budget of \$2,000 — a sum that doubled as the originally modest upgrade grew into a larger remodeling job. Their hard work earned the couple our grand prize — a Hitachi sliding miter saw and a Bosch cordless drill kit.



Brad Setterson's access-friendly cabinet designs earned him first runner-up — and a Porter-Cable router package.



Our first runner-up award went to Brad Setterson of Marinette, WI. Brad bought rough-sawn ash and built a full set of custom cabinets from scratch. The cabinetry features pull-out trays and bins that simplify access for Brad and his wife, both of whom suffer

from arthritis. Nicely done, Brad — you can indulge your woodworking hobby even more now with your prize — a Porter-Cable 693K router kit for both plunge and fixed-base routing.

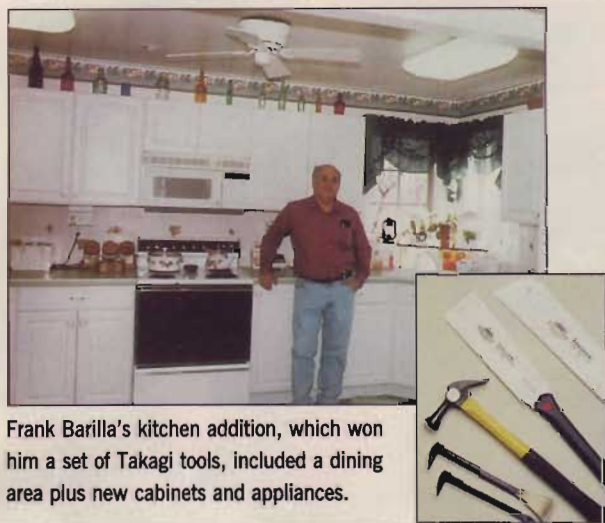
Our second runner-up, Frank Barilla of Parkville, MD, had a kitchen with a nearly universal problem — lack of space. He wanted to correct that shortcoming before attending to the details of his cabinets and storage, so he designed and built an addition that almost doubled the kitchen's size (*photo next page*). After all that work, he decided to install manufactured cabinets rather than tackle building his own.

(continued on next page)

Frank will receive a set of Takagi hand tools, so he'll be able to enjoy some of the hands-on woodworking he may have missed during his large-scale remodel.

Congratulations to our three winners! In addition to the prizes you've won, we'll also add a year to each of your *Workbench* subscriptions.

And to everyone who entered, thanks again for sharing the results of your efforts!



Frank Barilla's kitchen addition, which won him a set of Takagi tools, included a dining area plus new cabinets and appliances.

New Window Ratings

Shopping for windows, doors, and skylights may get easier, thanks to new energy performance ratings from the National Fenestration Rating Council (NFRC).

(If you're wondering what fenestration is, *Merriam Webster's Collegiate Dictionary* defines it as "the arrangement, proportioning and design of windows and doors in a building.")

The NFRC is not a regulatory agency. Membership is strictly voluntary, but many manufacturers are members of the organization. The U.S. Energy Secretary does have the power to monitor the NFRC to ensure it furthers energy efficiency and improves the accuracy of performance ratings.

The new ratings being developed by the NFRC will make it easier to compare the energy efficiency of windows, doors, and skylights made by different manufacturers. Two numbers between 0 and 10 will be listed on labels. One represents the product's energy performance during the summer cooling season. The other represents its performance in winter.

Currently, the only rating required on window, door, and skylight labels is their U-Factor, representing their insulating value. But this information is better suited to building inspectors and code officials than to consumers.

With the new system, you'll know that products from different manufacturers that carry the same rating numbers have equal energy performance. The new NFRC ratings will appear on window and door labels soon.

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Product Information Number 203

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Students in the school's classes work together to build a version of the "six-hour canoe," a plywood craft that's easy to build and stable on the water. The kids learn how to read plans, use hand tools, and work together to solve problems during the construction process. They also learn marketable

skills, and see that there are alternatives to the lives they've known. Students launch their completed canoes on local lakes.

For more information, you can contact the Philadelphia Wooden Boat Factory at (215) 334-1758, or by e-mail at pwbfb@libertynet.org.



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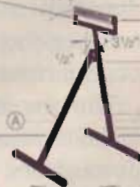
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Within each of these categories, you'll find a variety of subjects. Woodworking workshops, for example, cover everything from hand tool use, to boat building, to kitchen design. Workshops run year-round, with many taught by respected visiting artists from around the nation.

Brookfield's teaching studios, an exhibition gallery, and a retail shop are housed in four colonial vintage buildings on a 2 1/2-acre campus.

The nonprofit Center is supported mainly by tuition and retail sales, with

some supplemental funding from state, federal, and private donations.

Tuition is \$135 for one-day workshops, \$215 for two-day, and \$480 for five-day. Brookfield also offers scholarship opportunities, and an hour-for-hour volunteer work/study program.

For more information, or to get a catalog, contact the Brookfield Craft Center, PO Box 122, Brookfield, CT 06804-0122, or call (203) 775-4526.



At the Brookfield Craft Center in Connecticut, classes cover a wide range of subjects, from traditional turning methods, above, to blacksmithing and metal forging, shown at left.



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Manufacturers haven't known the exact amount of mercury to

put in, which means at the end of a lamp's life, most still contain excess mercury. If not disposed of properly, this mercury can leak into the environment.

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Product Information Number 202

The Backyard Playhouse



The last time my neighbor Doug invited me over, I thought he might need me for some heavy lifting, or want to show me where my dog had attacked another one of his pop-up lawn sprinklers. Instead he handed me a catalog full of kids' play structure kits. He explained that he

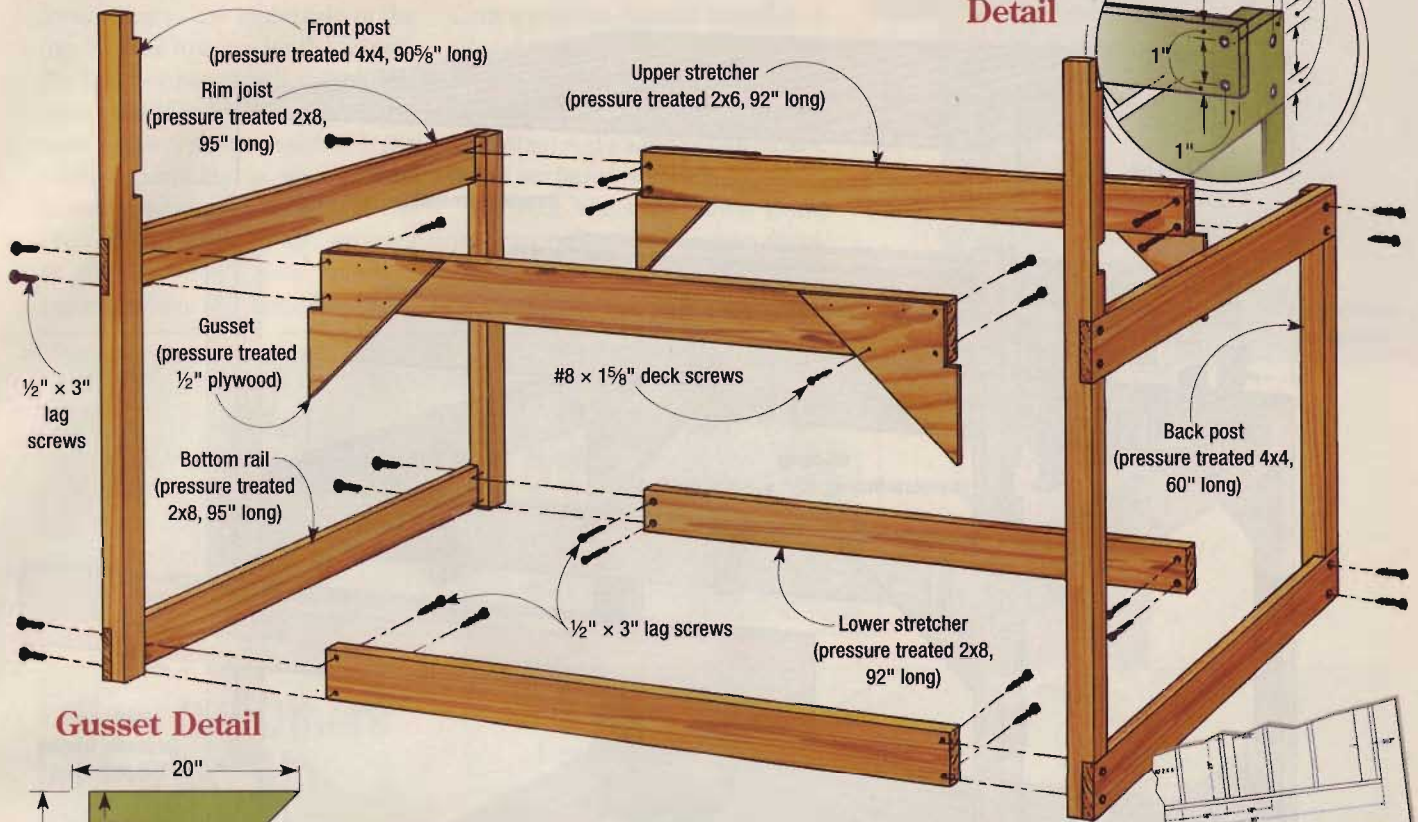
wanted to build one that included an enclosed playhouse, a design not available in any of the kits.

While Doug felt he could easily assemble one of the kits, he wasn't confident he could plan and build the design he really wanted. I offered to provide some guidance, and the more we talked the more ideas started to

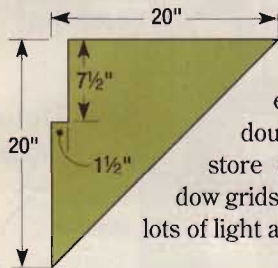
flow. It wasn't long before we had a plan sketched out.

A month of evenings and weekends later, Doug finished up the structure shown above. It features an enclosed playhouse perched atop the platform, and a sandbox beneath it. After scrambling up the ladder, children can "escape" down the plastic slide at the other

Base Construction View



Gusset Detail



end. A Dutch door doubles as a make-believe store counter. Simple window grids prevent falls, yet let in lots of light and air.

Frame the Platform

To simplify construction, we designed the project so Doug could build portions of it in his garage as he had time, then assemble those sections on site. Using pressure-treated lumber, he assembled the platform end frames first (**Base Construction View**). He began by gang-cutting dados and notches in the four corner posts to accept the rim joists and bottom rails (**Figure 1** and **Post Elevations**).

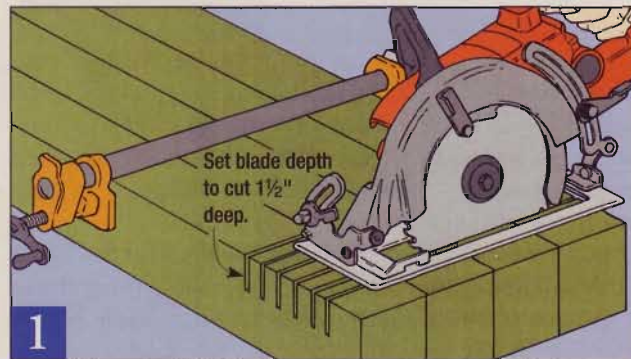
The longer front posts also get dadoed and notched for the railings now, even though you don't install the railings until later (leaving them off makes it easier to hoist the playhouse walls into place). When you cut the railing notches, be sure to orient the posts so the rim joist dados are to the outside.

Once you've cut the notches, dry-fit each frame together, check it for square, then drill the counterbores and pilot holes for the lag screws (**Corner Detail**). Slip a washer onto

the screws and drive them home.

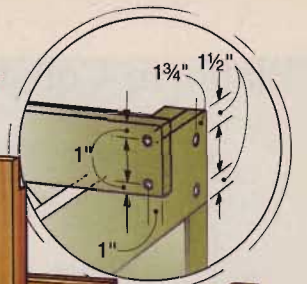
Using lap joints between the posts and the rim joists and bottom rails helps prevent the end frames from racking. Plywood gussets on the stretchers between the end frames add to the platform's rigidity.

Cut the gussets to shape (**Gusset Detail**). Then align the gusset notches flush with the ends of the upper stretchers and attach the gussets with deck screws. Drill a 3/4" counterbore (1/4" deep) on the back sides of the upper and lower stretchers, then drill 1/2" clearance holes for the lag screws.



Clamp the four corner posts together and gang-cut the notches, making multiple passes with a circular saw. Chisel out the waste.

Corner Detail

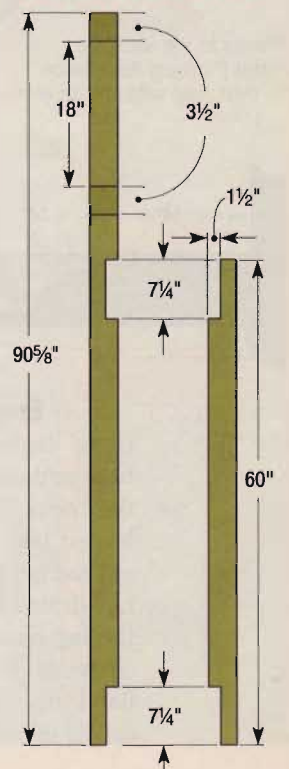


PLAYHOUSE PLANS

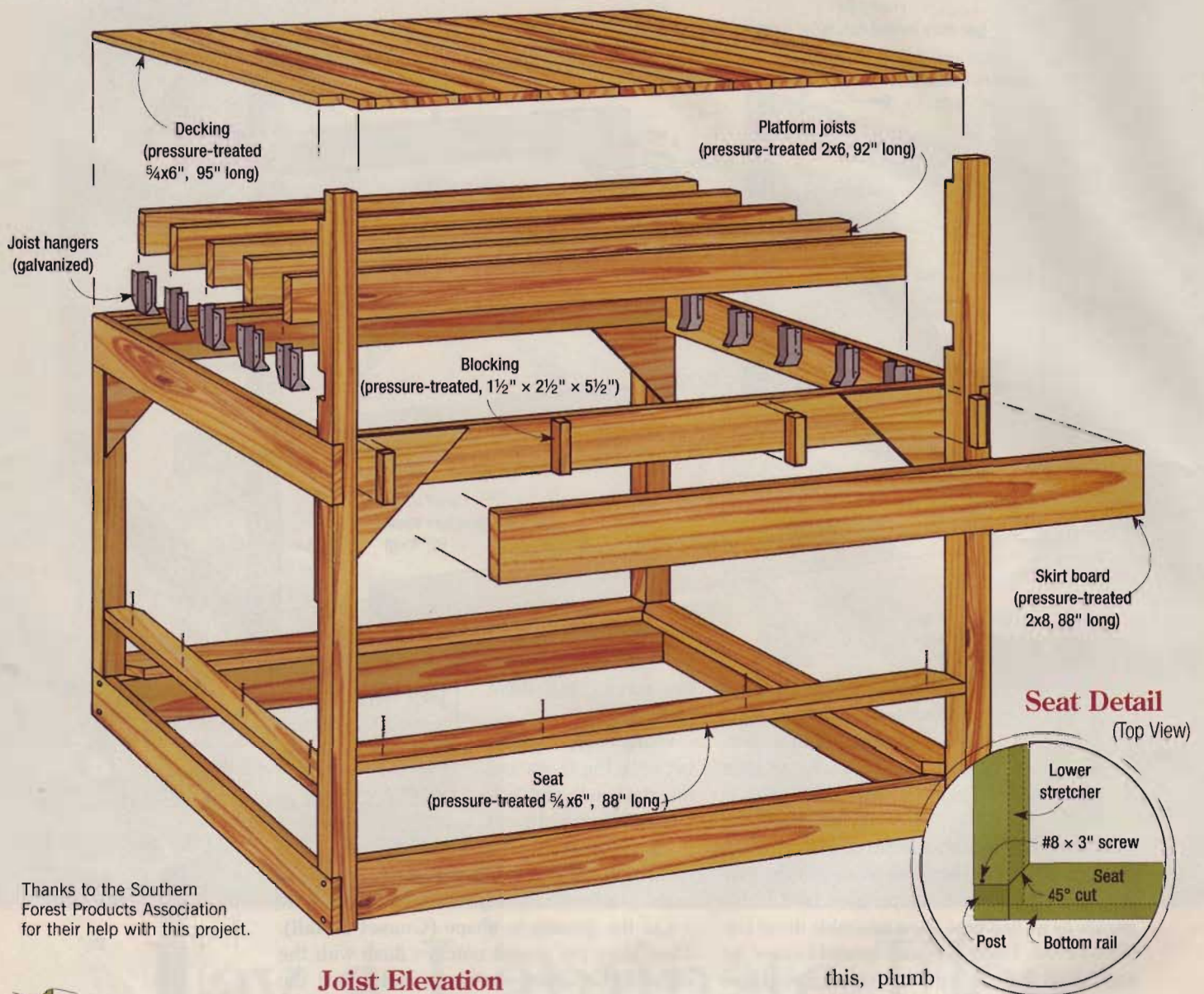
If you'd like to build the playhouse and want a full set of detailed plan drawings, you can order them by calling (800) 311-3994.

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Post Elevations

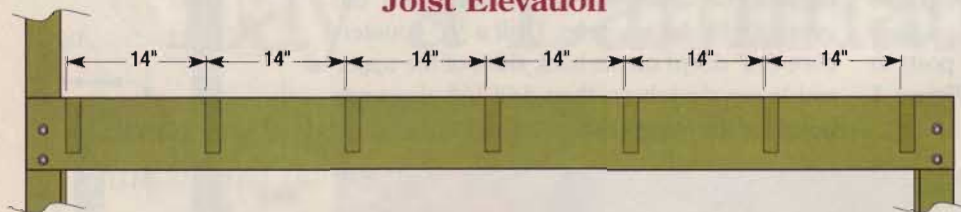


Platform Construction View



Thanks to the Southern Forest Products Association for their help with this project.

Joist Elevation



Erect the Base

Doug had already leveled the backyard site for the playhouse, so the next Saturday morning I helped him carry the end frames out and get them positioned. Doug had drilled the through-holes (for the lag screws) in the stretchers, so while I held each frame, he lined up the lower stretchers, drilled pilot holes in the posts, and

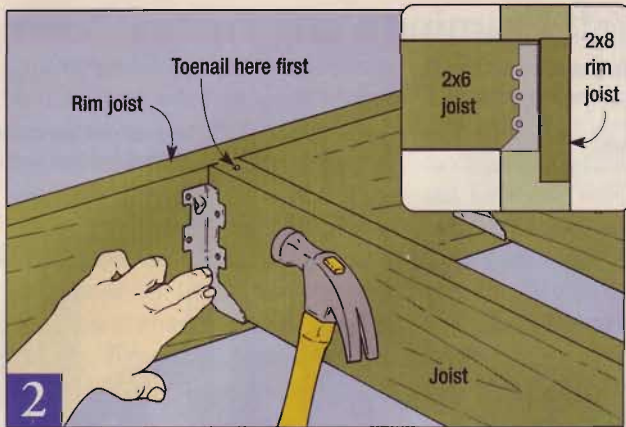
lagged the stretchers to each end frame. We then tacked in some temporary 1x2 bracing between the stretchers and posts to help hold the structure upright.

As I positioned one of the upper stretcher assemblies, Doug drove one screw through each of the gussets into the posts. Then we attached the other upper stretcher. With the frame assembled like

this, plumb the posts and drive more screws through the gussets to keep the framework aligned square. Then drill pilot holes in the posts and secure the upper stretchers with lag screws.

Hang the Joists

After breaking for lunch, we spent that Saturday afternoon installing the platform deck (**Platform Construction View**). The deck has five joists spaced evenly between the rim joists, approximately 12 1/2" on center (**Joist Elevation**). After laying out the joist locations, Doug grabbed the joist hangers and was about to nail them to the rim joists,



Toenail the joists, crown up and on 14" centers, flush with the top edge of the rim joists. Fit the joist hangers underneath the joists and nail the hangers in place.

when I suggested taking a more pragmatic approach.

Variations in the width of 2x dimensional lumber are common. If the hangers are already installed, this can position joists above or below the top edge of the rim joists. To keep things level, I always toenail the joists, crown up, to the rim joists with the top edges flush. Then I go back and nail in the joist hangers (**Figure 2**).

After you install the joists, add 2x8 skirt boards that fit between the posts on the front and back. First, screw blocking to the upper stretchers, then screw the skirt boards to the blocking, keeping their top edges flush with the top of the stretchers.

Add the Deck

Since the pressure-treated deck boards were still a bit wet, I suggested laying the planks edge to edge. When they dry — and shrink — gaps will appear but won't become large enough to entrap a child's small fingers.

Starting at both ends of the platform, Doug notched the outermost deck boards to fit around the front posts. He aligned the outside edges of these boards flush with the rim joists, and screwed them down, driving two deck screws at each joist location.

The rest of the planks go down quickly with the ends overhanging

the skirt boards. To install the last board, you'll need to rip about an inch off the width to get it to fit.

Routing a 1/4" roundover on this board's ripped edge matches it to the rest of the decking.

To trim the deck boards to length, Doug snapped a chalkline 1/4" proud of the skirt boards and used a portable circular saw to cut the boards (**Decking Trimming Detail**). Later he used a router and a flush-trimming bit to machine the ends flush with the skirt board.

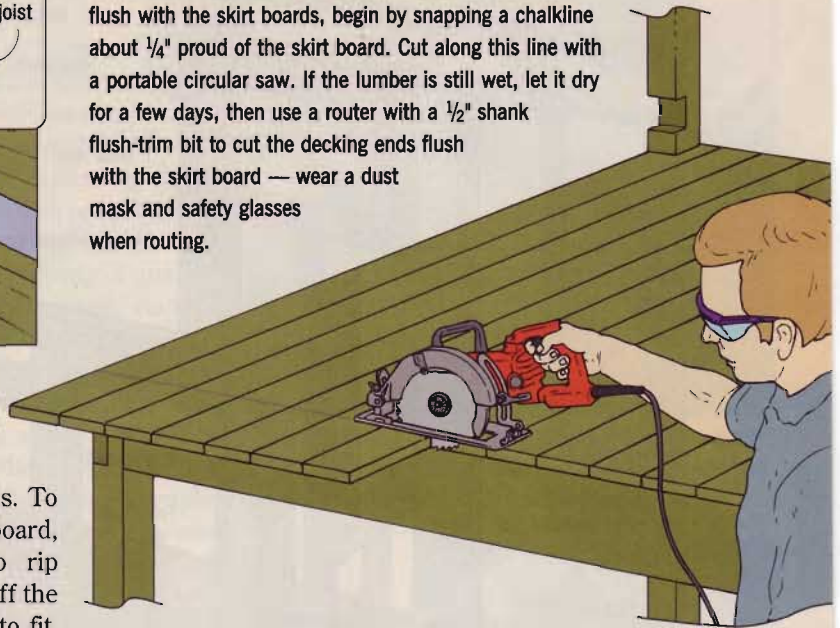
If you also use this technique, be sure to wear eye protection and a dust mask. Some nontoxic varieties of treated lumber are making their way onto the market, but the wood you buy at your local supplier will likely be CCA-treated, which contains forms of arsenic and chromium. It's safe to work, but you don't want the dust in your eyes or lungs.

Seats for the Sandbox

Our quickly drafted plans called for seats on just two sides of the sandbox, but Doug was concerned about leaving the edges of the 2x8 stretchers exposed. We ended up using left-over deck boards around the sandbox's perimeter. We butted the ends of all four

Deck Trimming Detail

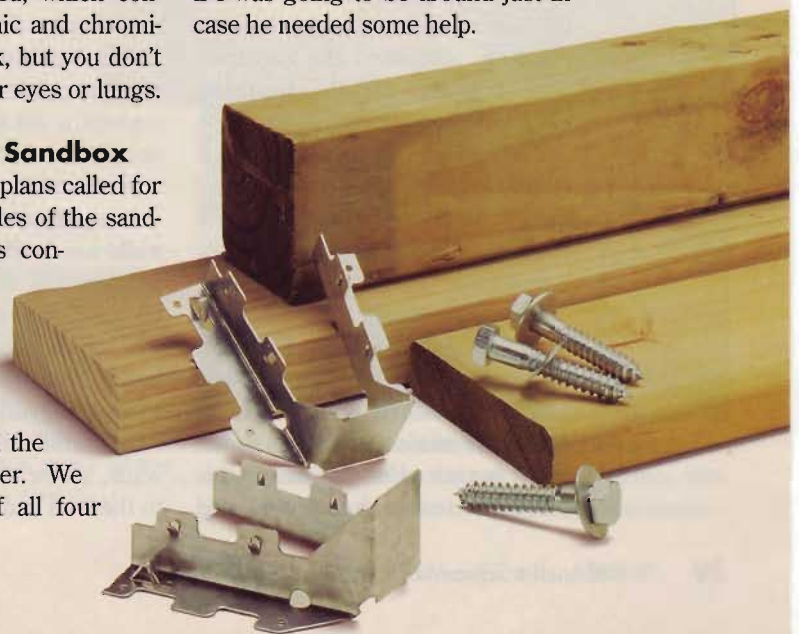
Note: To trim the ends of the pressure-treated decking flush with the skirt boards, begin by snapping a chalkline about 1/4" proud of the skirt board. Cut along this line with a portable circular saw. If the lumber is still wet, let it dry for a few days, then use a router with a 1/2" shank flush-trim bit to cut the decking ends flush with the skirt board — wear a dust mask and safety glasses when routing.



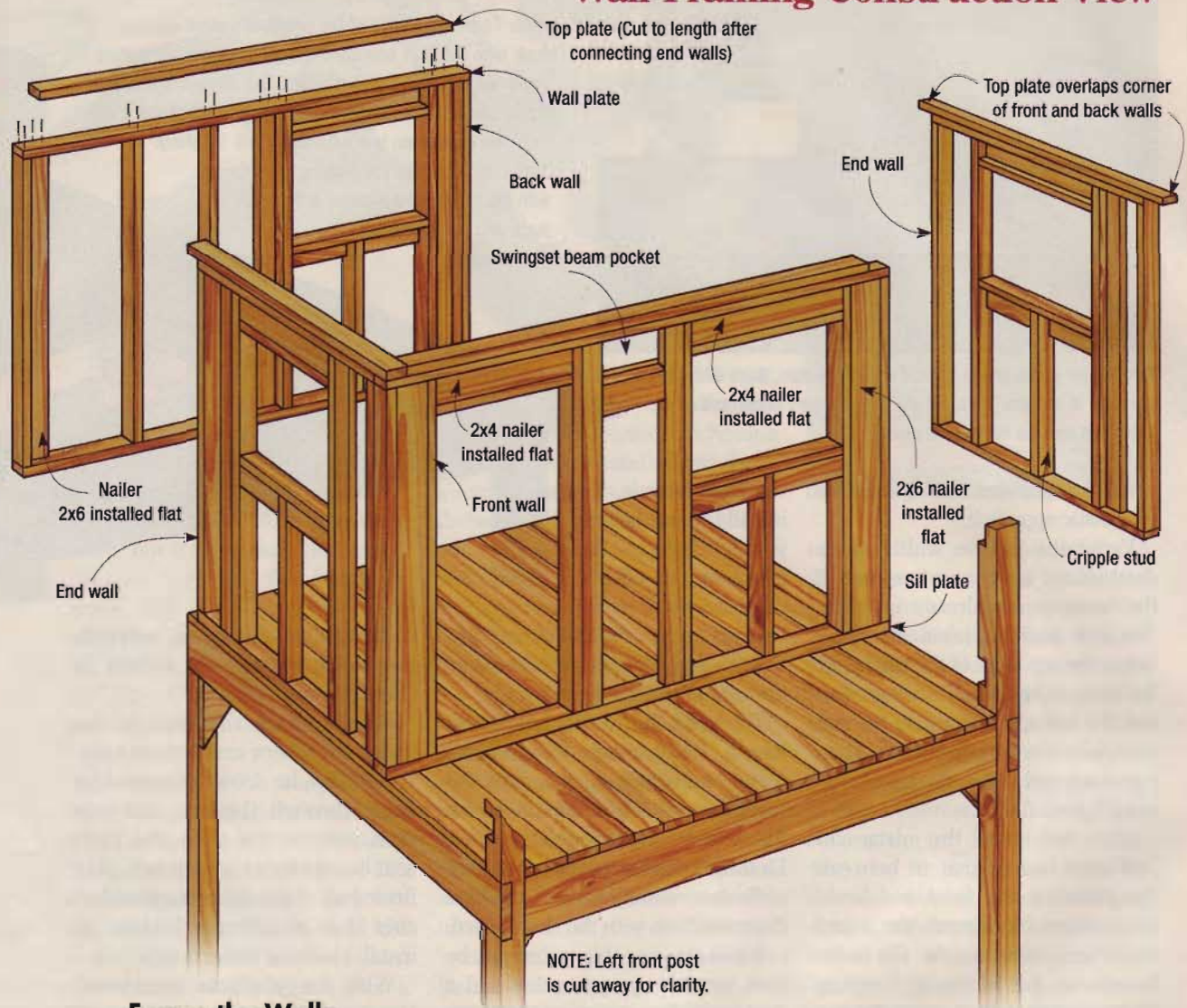
seats against the posts, mitering the inside corners for a tight fit (**Seat Detail**).

Screws attach the seats to the lower stretchers and bottom rails. In addition, he drove a screw at an angle through the seat and into each post on the front and back seat boards for extra support. This firmed up these seats so considerably that we scrapped plans to install blocking underneath.

With the platform completed, Doug was anxious to get going on the playhouse construction. He vowed to his children to have it up the following weekend, then asked if I was going to be around just in case he needed some help.



Wall Framing Construction View



Frame the Walls

Doug hadn't done much wall framing, so the playhouse proved to be a good learning experience. While the framing may seem overbuilt for this size structure, the way he built the walls simplified the construction process (**Wall Framing Construction View**).

The two end walls are identical (**Wall Frame Elevations**). Having the top plate overlap the front and back walls helps tie all four playhouse walls together.

Though he could have managed with his circular saw, I loaned Doug my miter saw and showed him how to set up a stop block to cut all the studs and nailers to the same length. He also used this technique to cut the window and

door parts — sills, headers, blocking, and cripple studs.

Doug used 3" deck screws to attach the studs to the plates and the window framing to the studs. This not only made for a rock-solid structure, but when he needed to replace a sill board that split, he simply backed out a couple of screws and fixed the problem.

You frame the front and back walls nearly the same — the window layouts are identical, but the back wall has two studs in place of the rough door opening that you build into the front wall (**Wall Frame Elevations**).

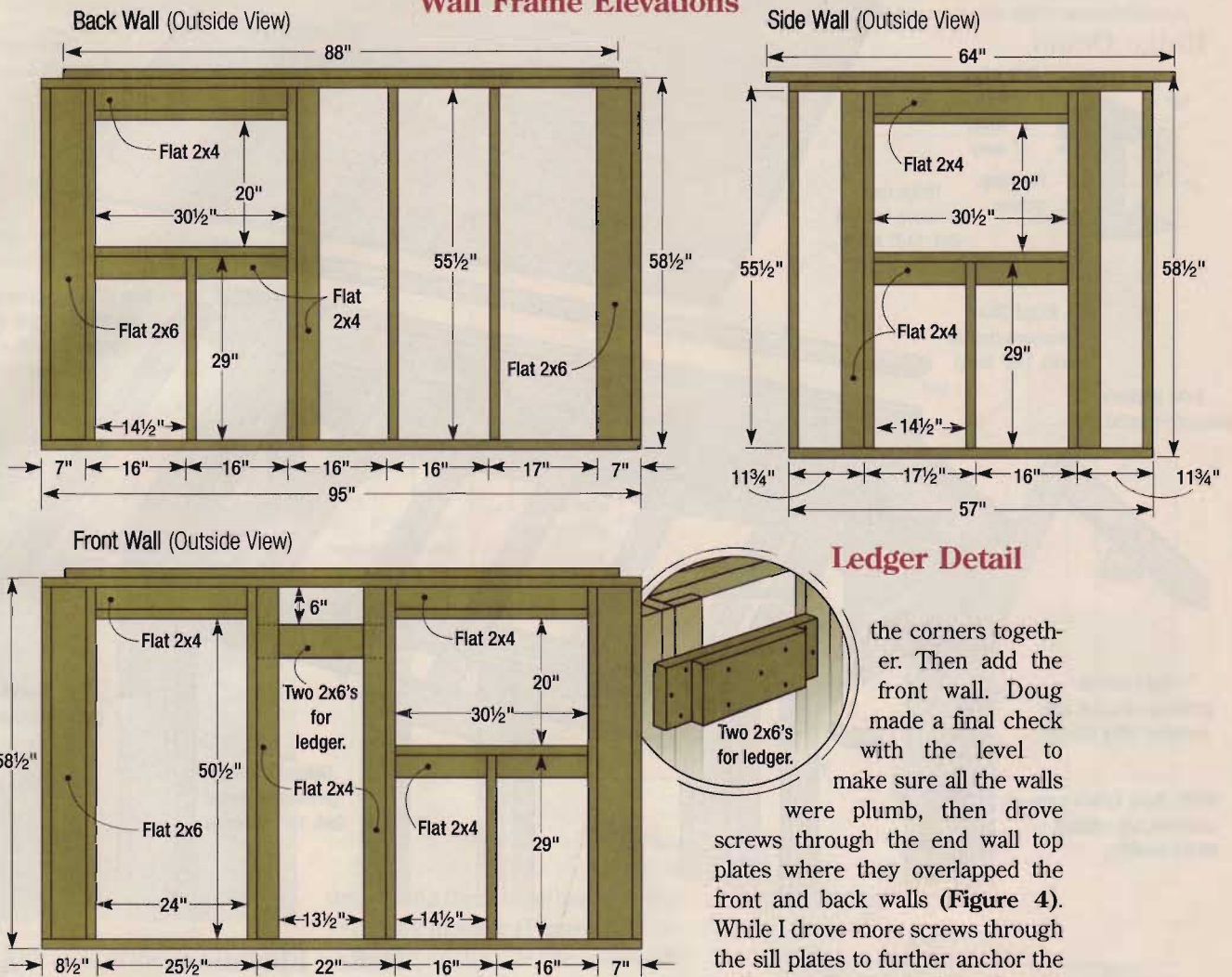
To build the front and back walls, screw the first stud in place to the wall and sill plates, then add

a 2x6 nailer, installing it flat and flush with the outer face of the wall. (This provides a nailing surface when you install the trim later, and it helps pull the wall and sill plates into square with the first stud.) Then work your way across the wall, adding studs and window and door framing pieces.

Doug left the top plate (also called a "doubler," because it's the second plate that caps the wall) off these walls for now, opting to cut and install them after the four walls were set in place on the platform and plumbed with each other.

The front wall has a ledger, installed to the right of the door opening, that supports the inboard end of the swing set beam (**Ledger**

Wall Frame Elevations



Detail). Because the ledger has to carry a hefty load, drive several 3"-long screws through the ledger into the 2x4 nailers, then drive a couple of screws through the studs and into each end of the ledger to secure it firmly.

You build the end walls using a similar sequence, but add the doubler plates now so you can drive screws through them where they overlap the front and back walls.

Raise the Walls

Working several weeknights, Doug assembled all four wall frames in his garage, and early the next Saturday morning I helped carry them down to the platform. Starting with the back wall, we hoisted it into position, with its outer face flush with the back edge of the decking.

Sinking a couple of screws through the sill plate into the deck joists locked it in position (**Figure 3**).

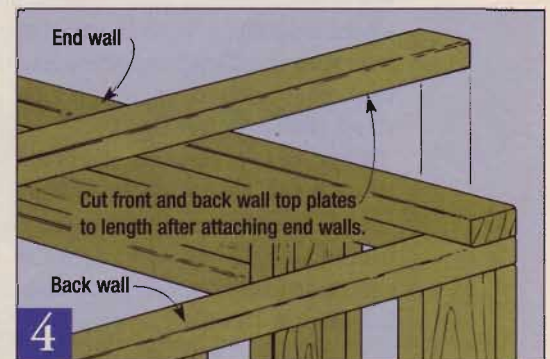
If you get an end wall in place right away, you won't have to brace the back wall. Plumb each end wall with the back wall before screwing

the corners together. Then add the front wall. Doug made a final check with the level to make sure all the walls were plumb, then drove screws through the end wall top plates where they overlapped the front and back walls (**Figure 4**). While I drove more screws through the sill plates to further anchor the walls, Doug measured for the top plates on the front and back walls, then cut some 2x4 stock to length and fastened the boards in place.

With the walls firmly attached, I cut the sill plate out of the door opening with a handsaw, taking care not to gouge the decking.



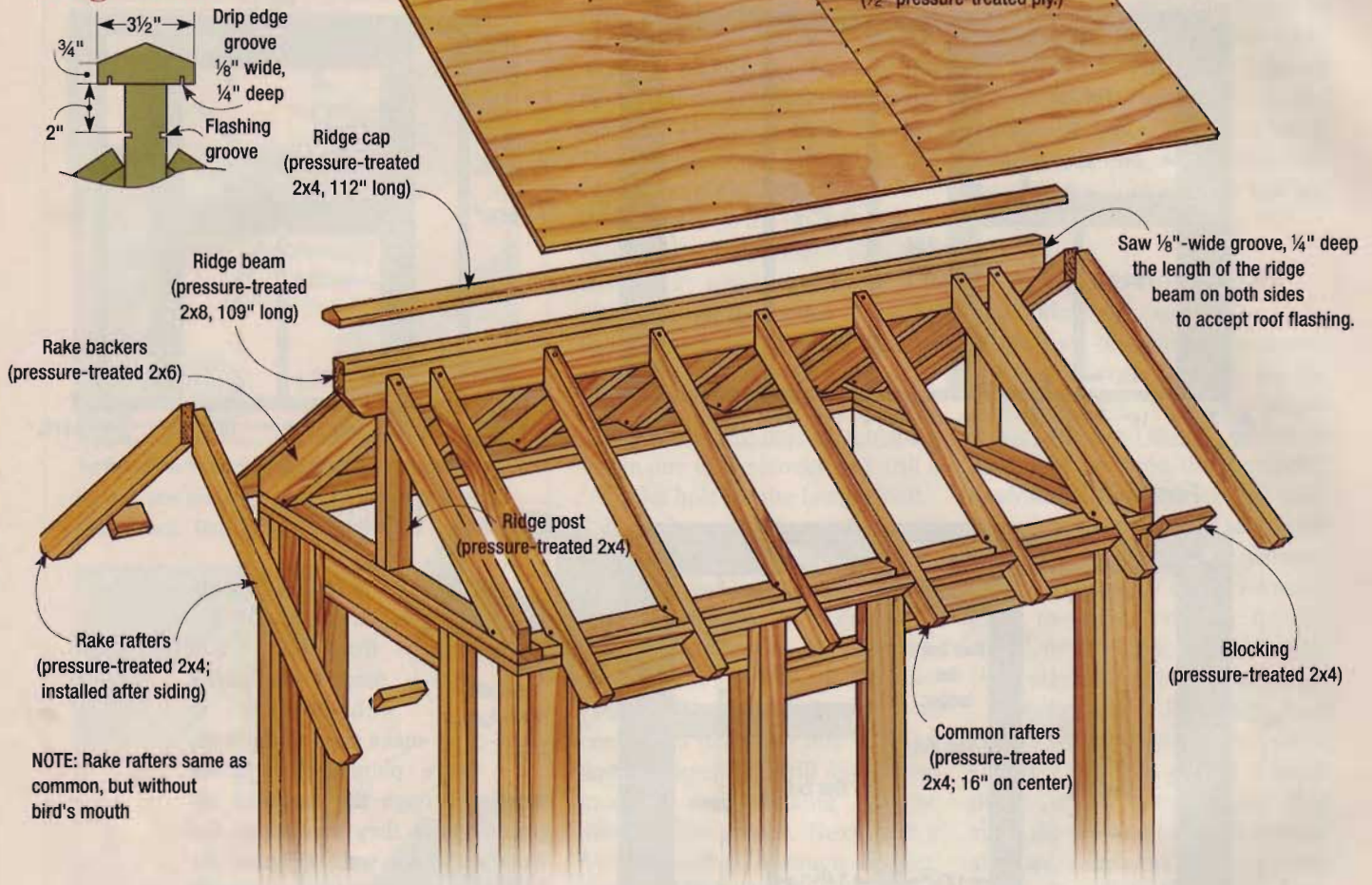
3 Drive screws through the back wall sill plate into the deck joists. Check the wall for plumb with a level.



4 The top plate of the end walls overlaps the front and back walls. Check the two adjoining walls for plumb and drive screws through the top (doubler) plates.

Roof Construction View

Ridge Detail



NOTE: Rake rafters same as common, but without bird's mouth

Raise the Rafters

We discussed the next phase — the roof — while we broke for lunch. Even though Doug had been a quick study on wall framing, it was clear he didn't have a handle on how to top off the structure (**Roof Construction View**). His eyes started to glaze over as I explained roof pitch, so I offered to help with the layout and show him the cuts required on a common rafter (**Rafter Elevation**).

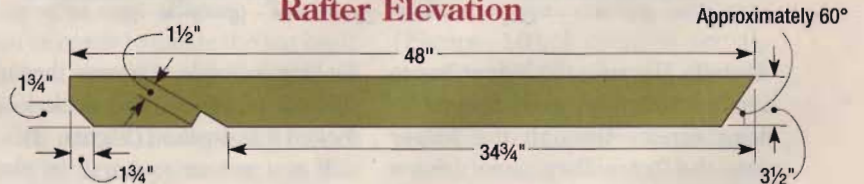
Because everything is tied to the ridge beam, that's where to start (**Roof Elevation**). Cut the ridge beam to length and rip a groove in each side to accept a piece of flashing (**Ridge Detail**).

Then cut the ridge posts to length and toenail them to the top plates on the end walls. Scrap 2x4 scabs attached to one side of each

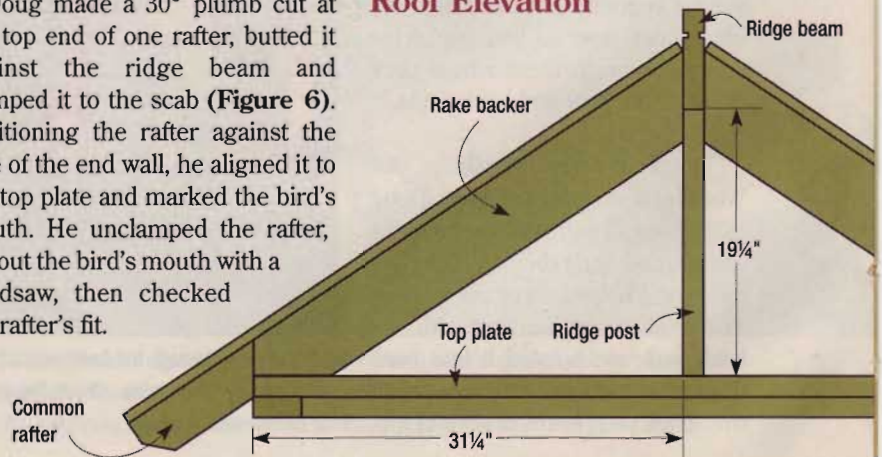
ridge post help hold the ridge beam in place until you can screw it to the posts (**Figure 5**).

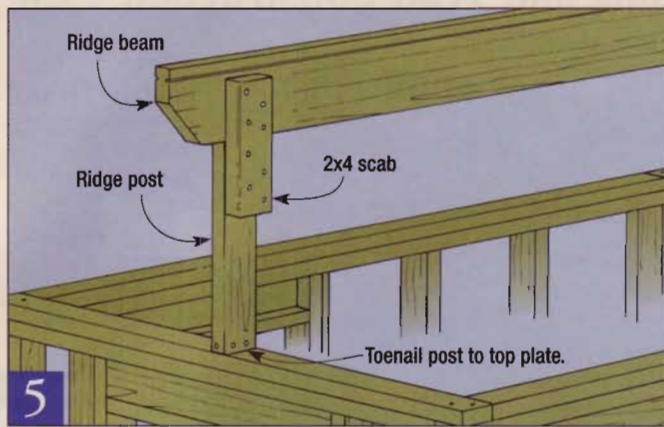
Doug made a 30° plumb cut at the top end of one rafter, butted it against the ridge beam and clamped it to the scab (**Figure 6**). Positioning the rafter against the face of the end wall, he aligned it to the top plate and marked the bird's mouth. He unclamped the rafter, cut out the bird's mouth with a handsaw, then checked the rafter's fit.

Rafter Elevation

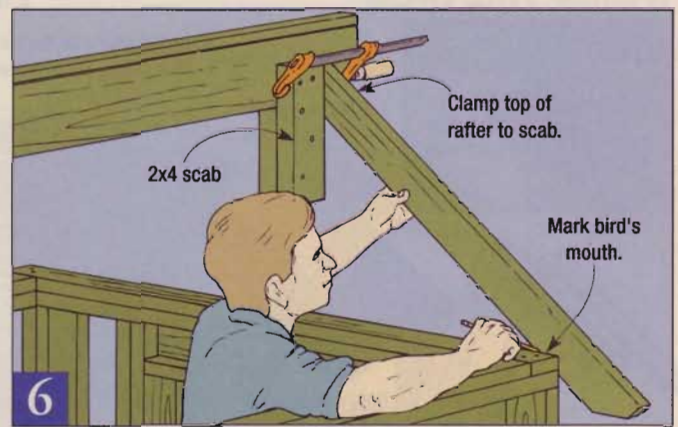


Roof Elevation





5 Toenail the ridge posts to the top plates and temporarily screw a 2x4 scab to each post. The scabs help hold the ridge beam in position until you can toenail the beam to the posts.



6 Miter the top end of the rafter to fit against the ridge beam. Position the rafter against the ridge and flush with the outer face of the side wall, then mark the location for the bird's mouth.

Once he had a good fit, Doug used this rafter as a pattern to lay out the rest of the common rafters, and the 2x6 rake backers. With the rafters marked, he clamped them together, then used a straightedge guide to gang-cut the bird's mouth plumb cuts as well as the rafter tail cuts. Then he made the seat cut on each bird's mouth with a jig saw.

Screw through each rafter into the doubler plate to hold the lower end of the rafters (**Rafter Spacing Detail**). At the upper end, one screw through the top and another from each side into the ridge beam is sufficient.

Blocking installed between the rafters prevents them from twisting and also closes openings in the eaves. Position the blocking so the bottom edges butt against the wall (**Blocking Detail**). Doug screwed through the rafter into one end of each block, then drove screws at an angle into the other end.

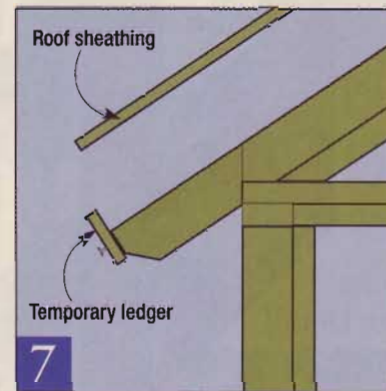
Cap the Ridge

Rather than leave the flat top edge of the ridge beam exposed to the elements, we designed a simple ridge cap. It sheds water and dresses up the roof (**Ridge Detail**). Rip two drip-edge grooves in the bottom face, then rip bevels on the top face of your 2x4 stock to create the sloped top surfaces.

Mount the cap using screws near each end of the ridge beam and about every 24" in between.

Add the Sheathing

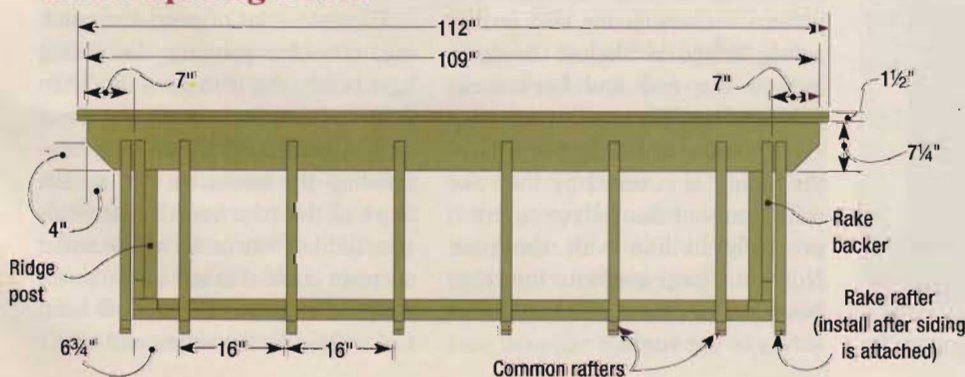
I offered to help install the roof sheathing, but Doug said he'd imposed enough already. But before I reached the gate, I heard him yell and I turned just in time to see a sheet of plywood narrowly miss his head as it slid off the roof on its way back to the ground. "I suppose you saw that," he mumbled sheepishly as I helped him lift the sheet back into place.



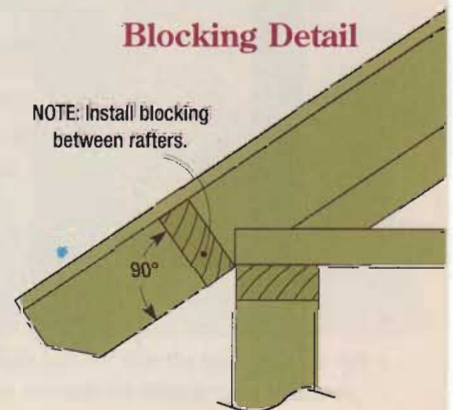
7 Temporarily screw a 1x4 to the rafter tails, then slide the plywood roof sheathing into place. The ledger holds it for nailing.

To prevent a repeat performance, I grabbed a piece of 1x scrap and screwed it to the rafter tails (**Figure 7**). This temporary ledger holds the roof sheathing in place until it can be nailed down. The sheathing needs to extend beyond the rake backers by 2" so it will overlap the siding and the rake rafter you still have to add.

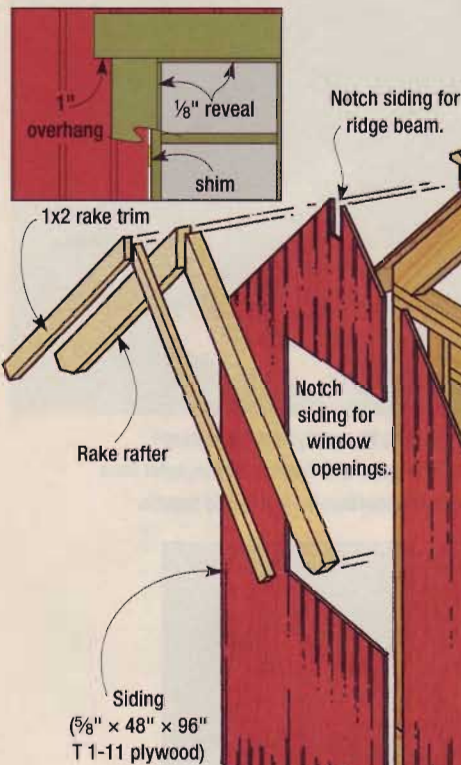
Rafter Spacing Detail



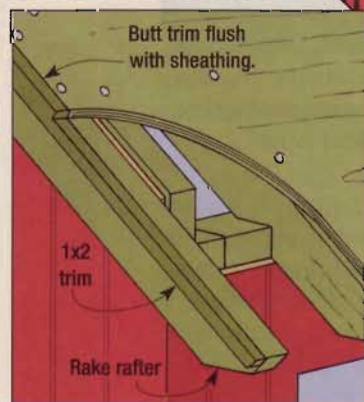
Blocking Detail



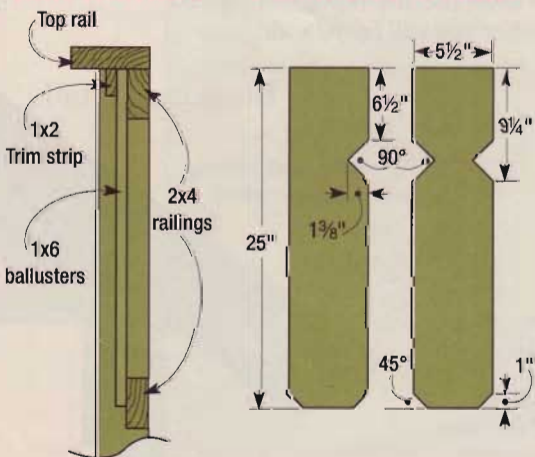
Window Trim Detail



Rake Rafter Detail



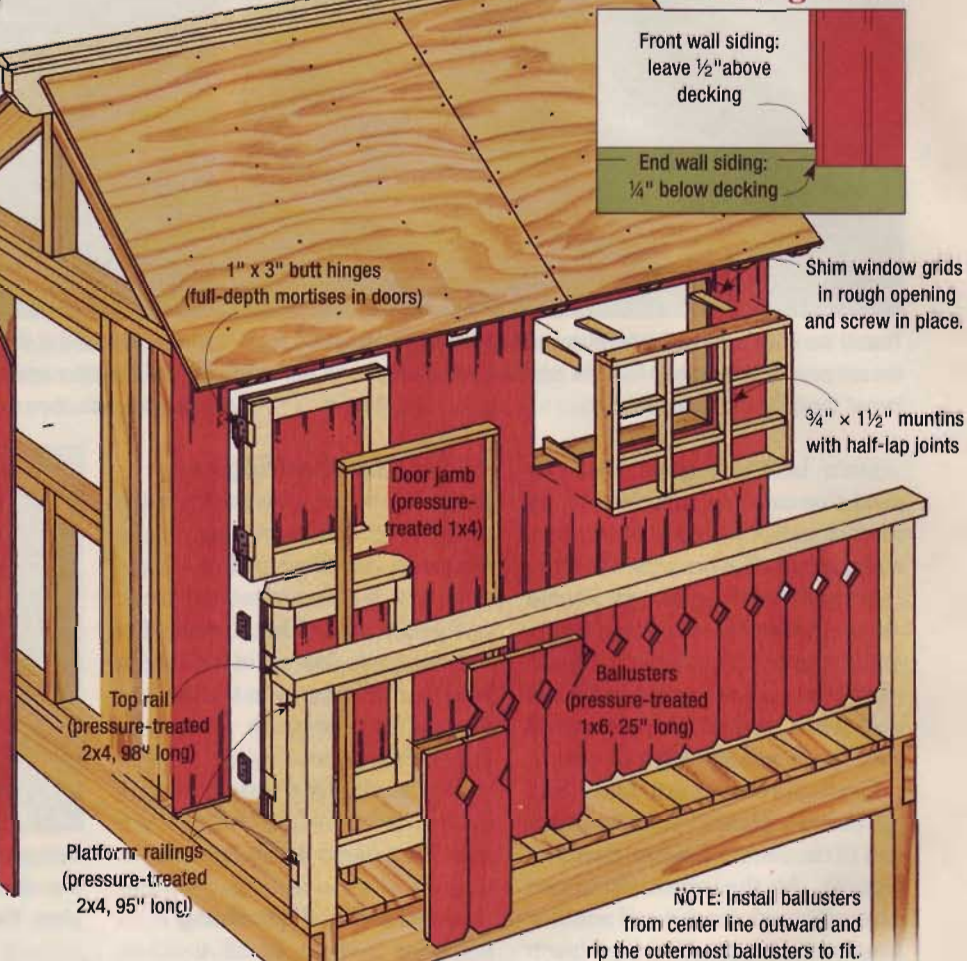
Rail Elevation & Baluster Details



Siding and Trim Construction View

NOTE: Cut siding so the joints fall over a stud and the groove pattern remains consistent.

Siding Detail



Put on the Siding

With the roof on, Doug promised me he'd call only if he really needed help. He was using plywood siding (4"-on-center T 1-11), but the pieces were manageable (**Siding and Trim Construction View**).

He fit the siding so all the joints landed on studs and kept the groove pattern consistent. He also let the siding extend 1/4" below the decking on the end and back walls (**Siding Detail**).

On the end walls, the top edge of the siding is covered by the rake rafter, so you don't have to cut it precisely in line with the roof. Notch the large piece for the ridge beam and window, then nail the siding to the studs.

Siding on the front and back walls butts against the blocking under the eaves. Position the siding on the front so the edges of the 4-ft.-wide main section fall on the stud underneath the window and above the door opening. Leave the front siding 1/2" above the surface of the decking — this prevents water pooled on the decking from wicking up into the siding (**Siding Detail**).

To avoid a lot of precision painting, consider painting the siding now before the trim goes on. Then fit the trim boards, but paint them before you nail them in place. Painting the backs as well as the faces of the trim boards also seals the "hidden" surfaces where water seepage could damage unprotected wood. (Doug used Flood E-B Solid Color Stain on the siding and trim.)

Time for the Trim

Once the stain dried on the siding, Doug began fitting the trim along the roof line — the rake rafters, rake trim, and under-eave trim (**Rake Rafter Detail**).

Next came the corner boards. Doug ripped $\frac{3}{4}$ " off the edge of the trim boards that attach to the end walls. Then he installed the trim boards on the front and back wall so they overlapped the end trim, creating equal face exposures on the adjacent walls. The trim boards extend $\frac{1}{8}$ " below the bottom edge of the siding.

With the trim cut to size, he painted the boards on both sides and nailed them in place.

Windows and Door

The windows consist of a simple box frame with a half-lapped grid-work of $\frac{3}{4}$ " x $1\frac{1}{2}$ " stock (**Window Elevations**). Doug ripped the grid muntins from 1x4 stock, then cut the half-lap dados on a table saw, using his miter gauge equipped with a stop block. Exterior grade glue and screws hold the window assemblies together.

Half-lap joinery also connects the rails and stiles of the Dutch door frames. Doug built the frames first, then attached the T 1-11 plywood to the back (**Door Elevations**). With the door halves assembled, he marked and cut mortises to accept the full depth of the hinges (both leaves when folded). Shallow scoring cuts with a circular saw roughed out the mortises; a chisel was used to pare them clean. Then Doug mounted the hinges in place and added the shelf on top of the lower door.

It's best to paint the windows and door prior to installation. Once they're painted, set the windows in the rough openings, shim them level, then drive screws to secure them. Nail the prepainted door jamb assembly in the doorway, and surface mount the hinges to the left side jamb. You'll need to notch the side stops for the door to

accommodate the door shelf. A slide-bolt connects the two doors.

Once the windows and door were installed, Doug added the trim around the window and door openings. He left a $\frac{1}{8}$ "-wide reveal on the windows and door jambs (**Window Trim Detail**). The top and bottom trim boards extend beyond the side trim pieces roughly 1" on each side. This lets you avoid the need for a perfect fit and also allows for wood movement.

Construct the Railing

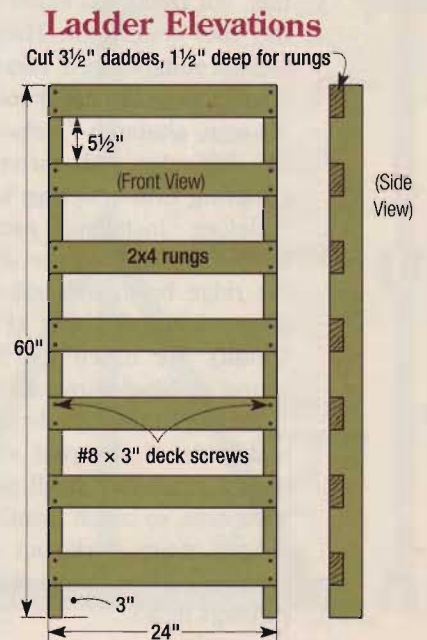
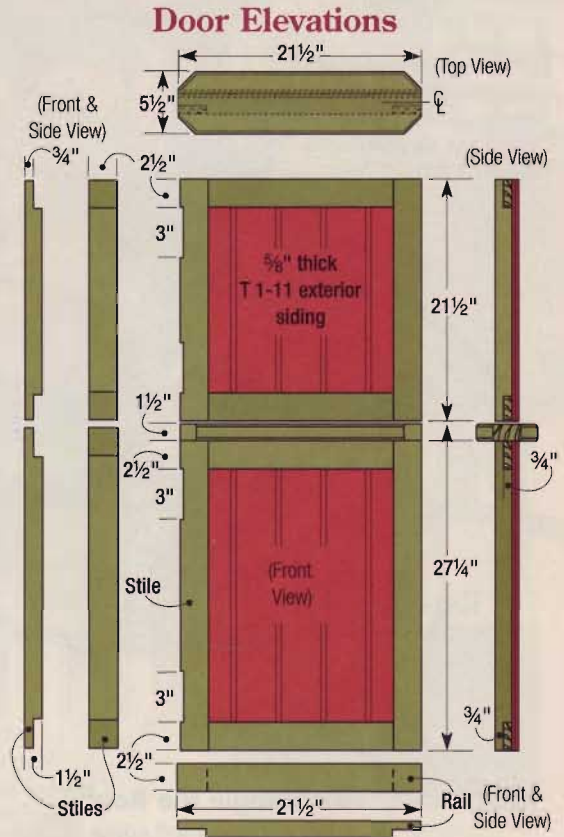
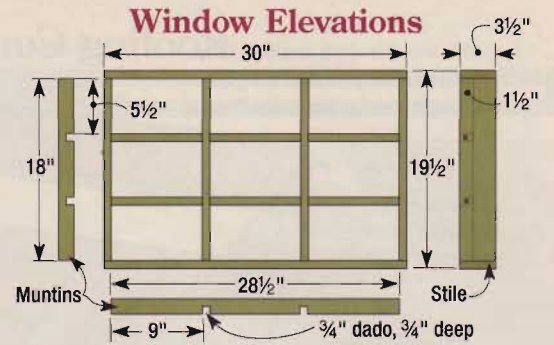
Install the upper and lower rails in the front posts and add the cap (**Rail Elevation and Baluster Details**). Doug gang-cut the decorative balusters with a circular saw, notching all but the outside two boards on both sides. Like the rest of the trim, the balusters were painted prior to their installation on the railings.

Working left and right of the centerline, he installed the balusters by butting them together with their bottom ends flush. The outermost balusters were ripped to width to fill the remaining space. He touched up the exposed edges with paint, installed the final balusters, and tacked on a thin trim strip to hide the slightly uneven top edges.

Build the Ladder

Kids can't get to the platform without a ladder, and we designed one with closely spaced rungs to accommodate small climbers (**Ladder Elevations**). By inseting the rungs into the legs, we gave the ladder greater strength, and by now Doug was an old hand at gang-cutting dados. Two screws at each joint hold the rungs in place.

Despite pleas from his kids to install the ladder, Doug delayed putting it up to keep the kids off the platform until he could finish the roofing and get the slide installed. A couple of wheelbarrow loads of sand in the sandbox kept them occupied and out of harm's way in the interim.



Roofing Construction View



Shingle the Roof

Roofing felt provided some protection, but Doug was eager to make the roof watertight. Having laid asphalt shingles gave him the confidence to tackle cedar roofing on his own, although I helped install the drip edge and starter course (**Roofing Construction View**).

Before installing each final course, we caulked the groove in the ridge beam with silicone and inserted the flashing (**Flashing Detail**). We nailed the the final course of shingles over the flashing.

Nails protruding through the underside of the roof sheathing pose a hazard to small playhouse occupants, so clinch them over. It's tedious, noisy work, but worth it from a safety standpoint. (Foam earplugs help.)

Ladder and Slide

Before mounting the ladder, Doug eased all the edges with a $\frac{1}{2}$ " roundover bit. He also routed any other edges that would make the playhouse more kid friendly. Edges inaccessible to the router were rounded over with a rasp.

By driving 3" deck screws from inside the rim joists and bottom rails, Doug fastened the ladder to the platform. It's best if the top of the ladder is flush with the deck.

Doug bolted the plastic slide to the decking following the manufacturer's instructions.

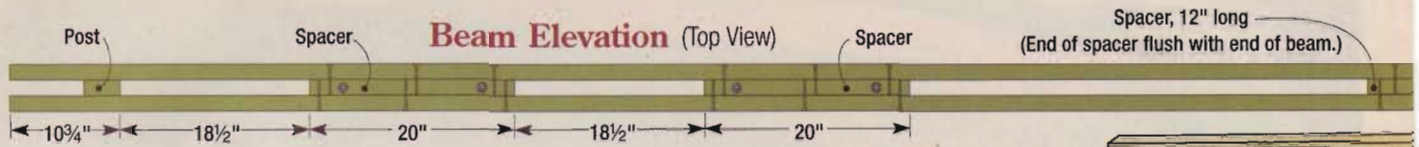
Add the Swing Set

Now that the ladder and slide were in place, the kids could finally give the playhouse a proper testing. While they played, Doug put together the swing set structure.

Unsure just how tall the post needed to be, he planned to trim its top end later. So he notched the post for the feet and brackets, which by now was second nature, and cut stock for the braces, feet and brackets (**Leg Elevations**). Doug used $\frac{1}{2}$ "-dia. \times 3"-long lag screws with washers to secure the leg assembly joints.

The beam consists of three 2x6 spacers — two for hanging the swings and one at the end of the beam for the beam pocket — sandwiched by two long 2x6's (**Beam Elevation**). Any swing hardware you choose will include installation instructions, and you can alter the spacers if needed. Drive 3"-long deck screws to secure all the 2x6's in the beam assembly.

Cut the playhouse siding to expose the beam pocket, then get help to heft the beam into position.



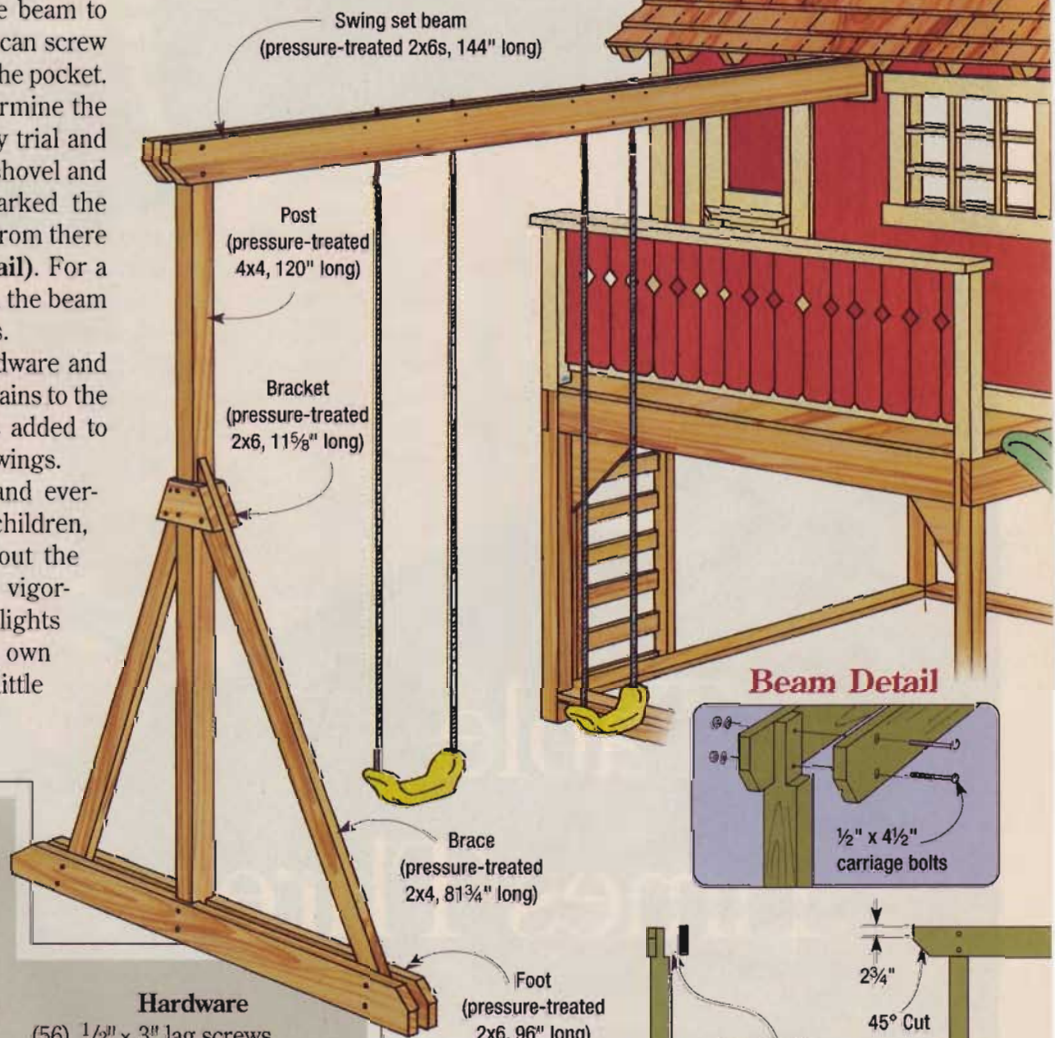
With one person on the platform and one on a ladder, slide the beam into the pocket. Level the beam and square it to the playhouse, then tack 2x4 legs to the beam to hold it in this position. Now you can screw the beam to the framing around the pocket.

At this point Doug could determine the position for the leg assembly. By trial and error he leveled the site with a shovel and plumbed the post, then he marked the beam location on the post. And from there it was clear sailing (**Beam Detail**). For a nice touch he added trim around the beam pocket to cover a few small gaps.

Doug mounted the swing hardware and the kids helped him adjust the chains to the right length — extra chain was added to the lengths that came with the swings.

Judging by the worn grass and ever-present squeals from excited children, the playhouse is a hit throughout the neighborhood. And though he vigorously denies it, I know Doug delights in the fact that his kids now own bragging rights to the best little playhouse around. ■

Swing Set Construction View



What You'll Need

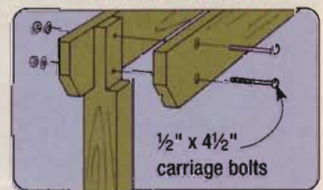
Lumber

- (1) 10-ft. pressure-treated 4x4
- (2) 8-ft. pressure-treated 4x4's
- (2) 6-ft. pressure-treated 4x4's
- (1) 10-ft. pressure-treated 2x8's
- (8) 8-ft. pressure-treated 2x8's
- (4) 12-ft. pressure-treated 2x6's
- (2) 10-ft. pressure-treated 2x6's
- (9) 8-ft. pressure-treated 2x6's
- (16) 12-ft. pressure-treated 2x4's
- (10) 10-ft. pressure-treated 2x4's
- (13) 8-ft. pressure-treated 2x4's
- (4) 8-ft. pressure-treated 1x6's
- (9) 12-ft. pressure-treated 1x4's
- (6) 10-ft. pressure-treated 1x4's
- (1) 8-ft. pressure-treated 1x4
- (21) 5/4 x 6 pressure-treated deck boards
- (7) 1/2" x 4 ft. x 8 ft. siding
- (3) 1/2" x 4 ft. x 8 ft. pressure-treated pine plywood

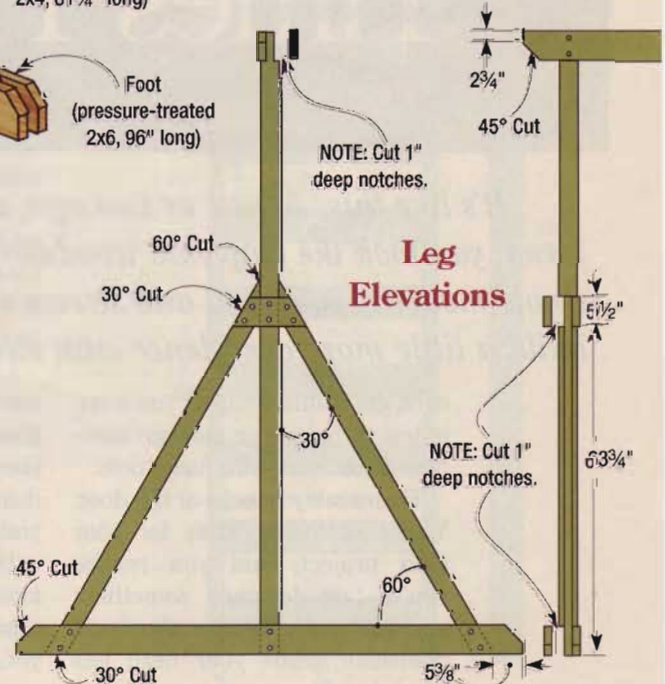
Hardware

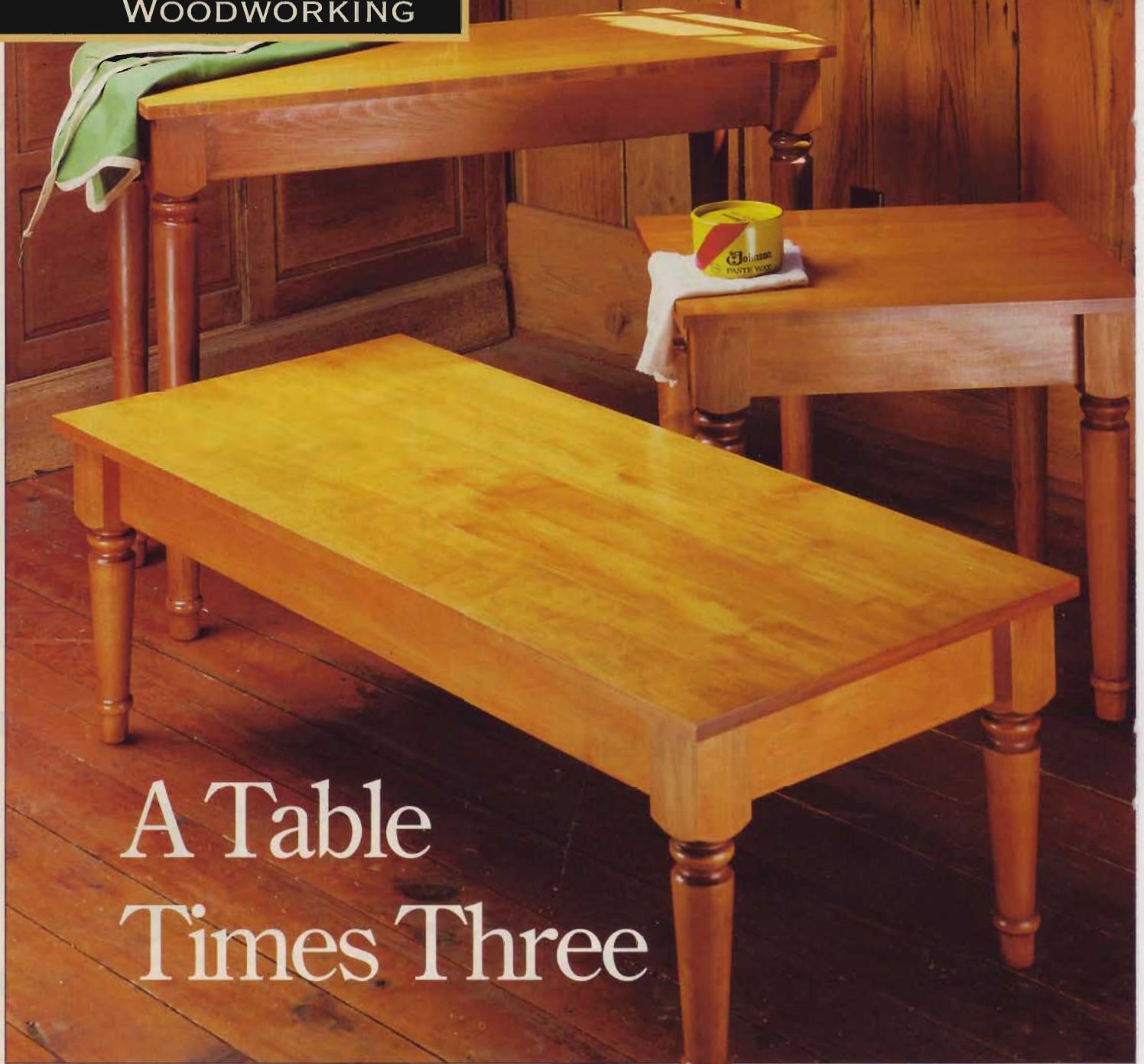
- (56) 1/2" x 3" lag screws
 - (2) 1/2" x 4 1/2" carriage bolts
 - (58) 7/16" washers
 - (4) 3" butt hinges
 - (1) 2" slide bolt
 - (1) roll 15# builder's felt
 - (2-3) bundles cedar shingles
 - (2) lengths (10 ft.) drip edge
 - (2) lengths (10 ft.) flashing
 - (5) lbs. 1 1/4" cedar shingle nails
 - (1) lb. #8 x 1 5/8" deck screws
 - (5) lbs. #8 x 2 1/2" deck screws
 - (10) lbs. #8 x 3" deck screws
- (FINISHES: 1 gal. solid color stain for siding; 1 qt. solid color stain for trim.)

Beam Detail



Leg Elevations





A Table Times Three

It's like this. A year or two ago, checkbook in hand, you took the leap into woodworking. Your shop space is now modestly equipped and strewn with sawdust, and you build a little more confidence with each new project, maybe

even get a little smug as you learn a new technique or manage some nice detail work with hand tools.

Then reality knocks at the door. You're sketching ideas for your next project, and you realize you've just designed something you can't build. That enthusiastic craftsman inside your head lets

out a howl of protest so horrific that had you actually given it voice, your neighbors would have heard it and assumed you drilled through your thumb again.

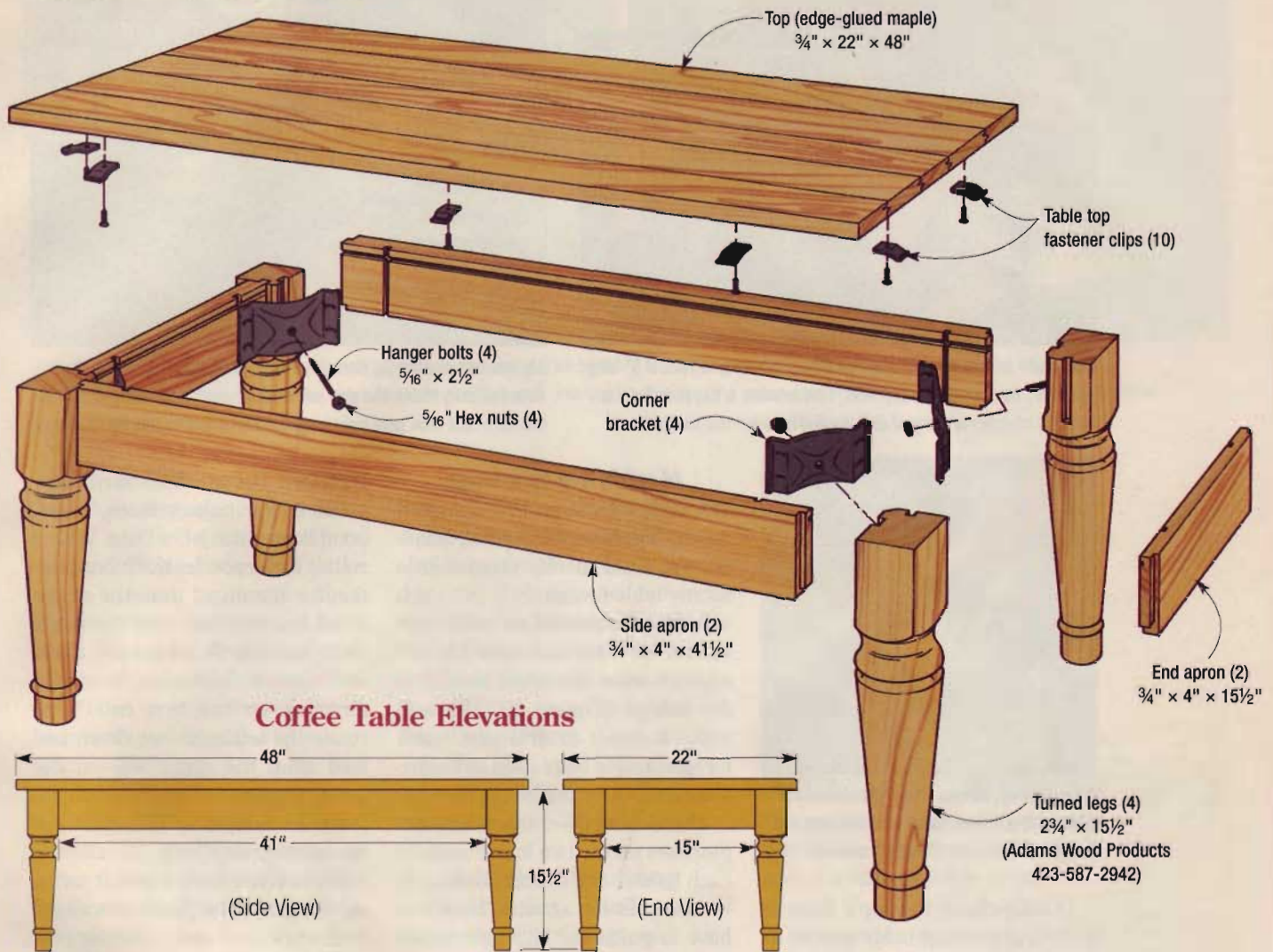
Don't imagine the universe is toying with you alone. The frustration of having your reach exceed your grasp hits just about every

woodworker on the planet, but this project is proof that modest shop tools or skills don't always have to limit the furniture ideas you have.

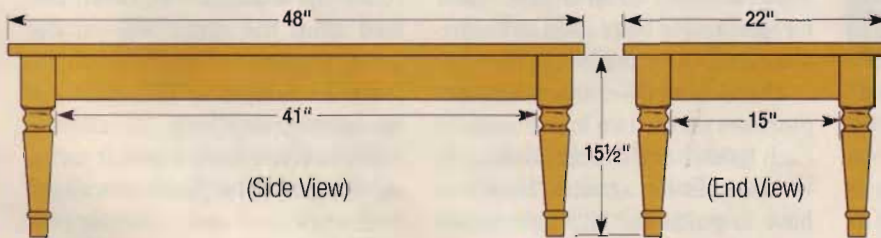
My solution? Using readily available wood components — turned legs in this case — along with parts I made myself, to build a set of three tables — a coffee, end, and sofa table. I purchased the legs from Adams Wood Products of Morristown, TN (423-587-2942). This approach kept the cost and time reasonable, and still gave me the design I wanted.

Coffee Table Construction View

OVERALL SIZE: 16 $\frac{1}{4}$ "H x 22"W x 48"L



Coffee Table Elevations



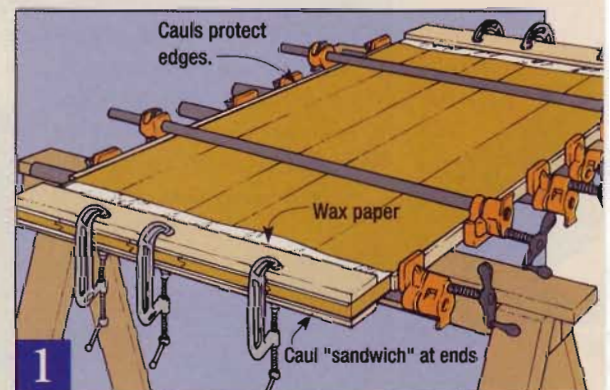
Take It from the Top

Deciding to use commercially turned legs not only offers you more in the way of design options (unless you're a turner yourself), it lets you concentrate on the other main components of the tables — the tops. You have choices here too. Hardwood plywood or a shop-made veneered panel (if you edgeband them) and of course solid wood are all good options. I thought a solid top was appropriate here.

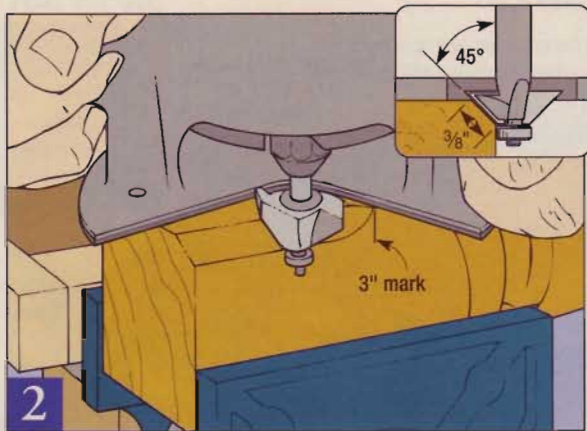
Using solid wood does require a design that allows the top to safely expand and contract with changes in humidity. I accomplished that by using table top fastener clips to hold the top to the aprons (**Coffee Table Construction View**).

If you're patient and careful milling your stock, or very selective when buying surfaced boards, gluing up a smooth flat top isn't difficult. I made it easier by routing a self-aligning glue joint on the board edges (see *Edge-glued Panels* on page 40). One helpful technique is using clamping cauls across the panel to hold it flat (**Figure 1**). Use scraps of plastic laminate (face down) or wax paper to prevent the cauls from sticking to any excess glue. Another trick is to alternate the placement of clamps on the panel — some on top, some on the underside. This prevents unequal pressure that would pull the panel more on one face than the other.

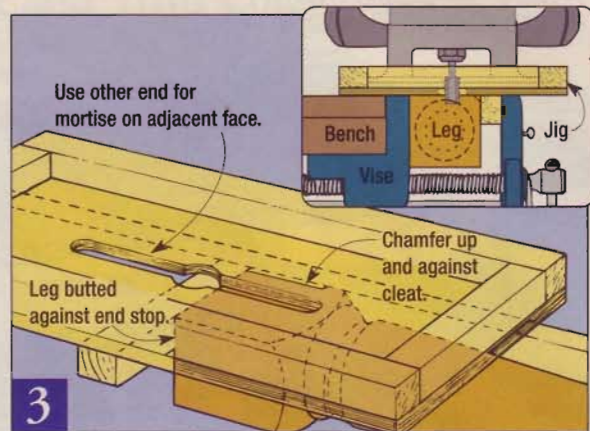
These steps help ensure the panel is flat when you make it. To help it stay that way, you'll need to apply finish uniformly to both the top and bottom. More on this later.



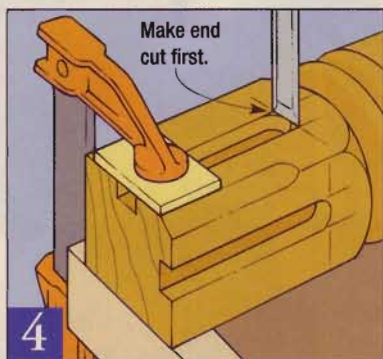
Whether you simply butt and glue the board edges or mill a self-aligning joint, alternate the clamps above and below.



Designate an inside corner on each leg bolster and rout a 3"-long chamfer, starting at the top end. This creates a flat face for the drill bit to enter when you drill a pilot hole for the hanger bolt.



My mortise-routing jig (facing page) features built-in stops that automatically index the end and side of each leg. The mortise on the adjacent face gets cut using the other end of the jig.



After routing, square the ends of the mortises with a chisel. Lead with the end cut (shown), then pare the side corners.

Double-check the top's flatness by laying a straightedge across its width. After the assembly has had an hour or so to set, scrape off the rubbery glue squeeze-out.

Modifying the Legs

The table legs I purchased arrived crisply machined and finely sanded, but I did modify them a little for my table design.

First, I designated an inside corner on each leg and routed a $\frac{3}{8}$ "-wide chamfer along the first 3" of the bolster (**Figure 2**). This will make it easier to drill pilot holes for the hanger bolts used to secure the corner brackets to the legs.

The next step — cutting shallow mortises on the two inside faces of each bolster (for the apron tenons) — also calls for a router. Here you have to guide the bit's path either with a router table setup or by using a jig like the one I designed (**Mortise Details and Router Jig**

Details). The mortises aren't centered in the bolster faces, which complicates the job a little. With a router table, you set the fence position for the offset from the chamfered corner, then feed the stock (with its chamfered corner down and against the fence) from one direction for the first cut. Next, rotate the adjacent face down and feed from the other side of the table. Clamp a stop block to the legs each time so you don't cut the mortises too long.

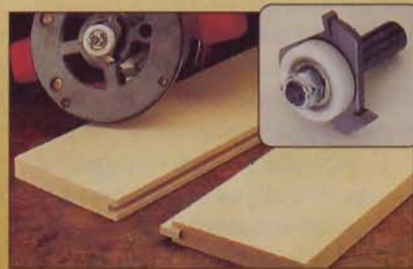
If you don't have a router table, don't worry. The jig shown aligns both workpiece and router for you, and it has built-in stops that control the router's travel. Like the router table procedure, you have to work

Edge-glued Panels: Four Simple Joinery Options

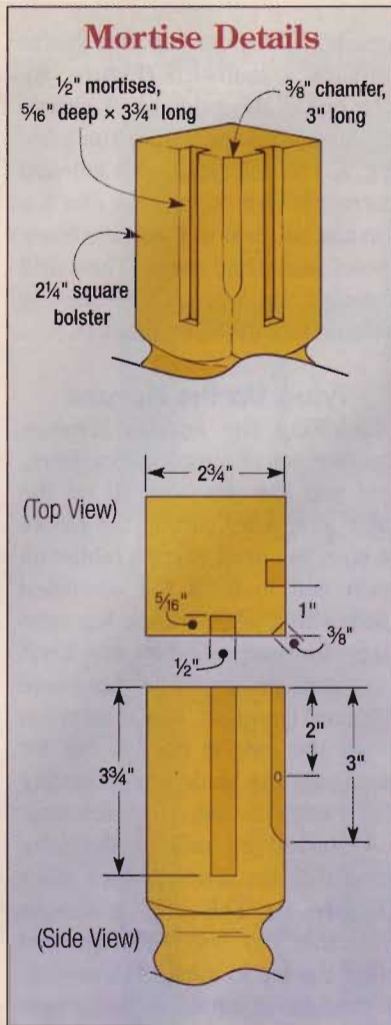
Whenever I glue up solid boards to make a wider panel, I always machine some kind of joint so the faces of the boards align automatically. There's nothing worse during glue-up than scrambling around with clamps while slippery glue lines shift and move with each turn of the clamp handles. Tongue-and-groove and spline joints are among the simplest solutions, and either can be cut on a table saw or with a handheld router. Aside from making the assembly process a little less frantic, these joints provide good inherent mechanical strength and also give you additional gluing surface area.



A simple tongue-and-groove joint can be cut easily on a table saw. Or, cut grooves on both edges and glue a spline between.



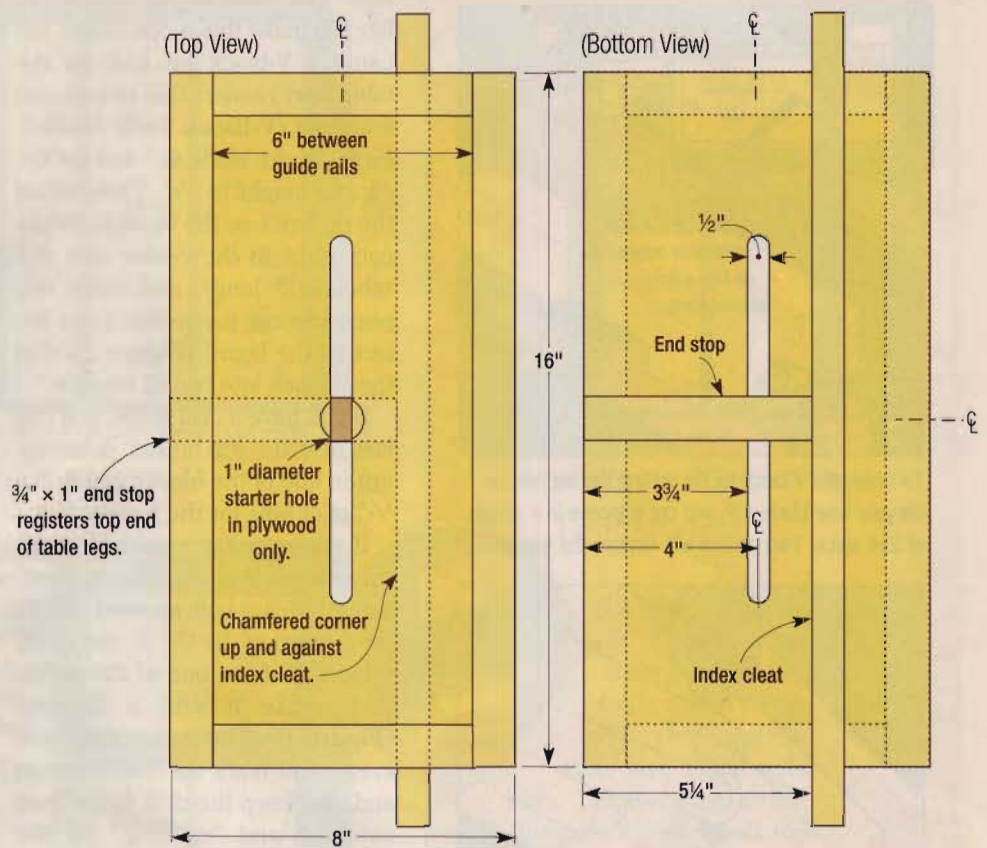
The guide bearing on a slot-cutting router bit controls cut depth. Again, you can cut slots for a spline joint, or mill a tongue-and-groove.



from both ends of the jig to get the offset right for the mortise. Place the chamfered corner up and against the index cleat, butt the top of the bolster against the end stop,

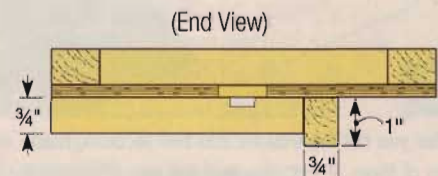
Router Jig Details

NOTE: Jig designed for router with 6"-dia. base. Adjust as necessary if your router base is different.

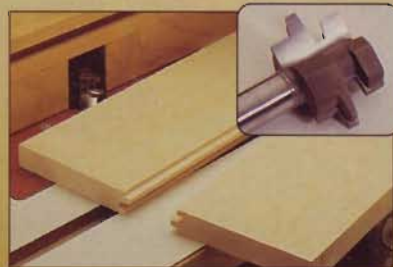


then clamp them together in a vise to cut the mortise (**Figure 3**).

Square up the mortise ends with a chisel afterward (**Figure 4**). And don't panic if your chisel work isn't perfect — the joint is designed so small glitches don't show.



Although a table-sawn or routed spline joint offers a substantial improvement over a butt joint, other techniques provide even more advantages. Some specialty cutters, for example, machine a tapered joint that fits tightly only when it's fully closed. This lets you press-fit the boards together with just hand pressure, then cinch them tight with a clamp. My favorite bit — and the one I used for my table tops — is the reversible glue-joint cutter, but it has to be used in a router table. After adjusting the cutter height for the board thickness, you simply machine adjoining boards, one of them face up and one face down, to create a mated joint. Another option is biscuit or plate joinery. This European-born system uses small football-shaped wood biscuits inserted in slots cut with a special tool.

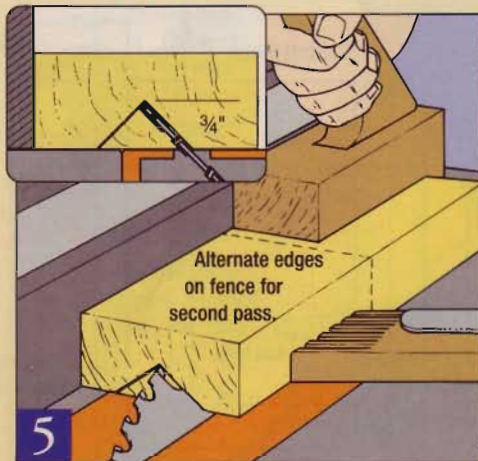


Reversible glue-joint bits cut a self-aligning tapered joint. You'll need a table-mounted router, but the easy assembly is worth it.



Plate joiners plunge-cut short slots in board edges (and faces) to help joints align. Then small football-shaped biscuits get glued in.

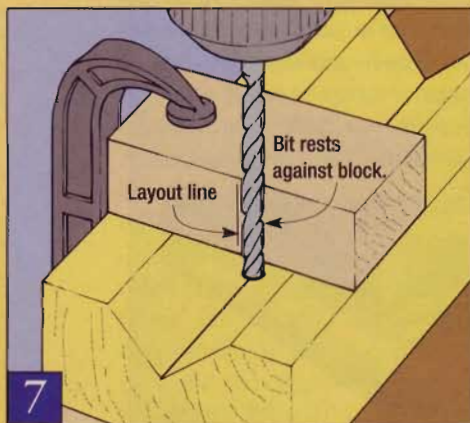
V-Block Drill Guide



5 To make the V-block jig for drilling the leg bolster, tilt your saw blade 45° and cut a groove in a length of 2x4 stock. Two passes will remove the wedge.



6 After you cut the V-block into two sections, mark one of them 2" from the end and use a 1/4" bolt to punch a dimple in the bottom of the groove.



Clamp a square-edged block on top of the workpiece to guide the drill bit. Layout lines on the block help even more by providing a visual reference for you.

Drilling pilot holes for the hanger bolts completes the work on the legs. The chamfer you routed earlier will make this much easier, but using a V-block jig (cut on the table saw) renders this step almost foolproof (**V-Block Drill Guide**). First, tilt the blade 45° and set the cutting height to 3/4". Then adjust the rip fence so the tip of the blade cuts right to the center of a 2x4 (about 12" long), and make two passes to cut the wedge from the face of the board (**Figure 5**). Cut the V-block into two 6" lengths.

If you have a drill press, you can just nest the leg bolster (chamfer up) in one of the blocks and drill a 1/4" pilot hole for the hanger bolt.

If you're using a portable drill, the process is a bit different. First, set a 1/4"-dia. bolt or steel rod in the bottom of the "V" in one block (placed 2" from one of the ends), then strike it with a hammer (**Figure 6**). The punch mark you create will mark the hole location and also keep the drill flutes from catching and "walking" on the sides of the groove. Next, drill a 1/4" guide hole through the jig, using the face or end of a board to align the drill (**Figure 7**). Now you're ready to tackle the leg itself.

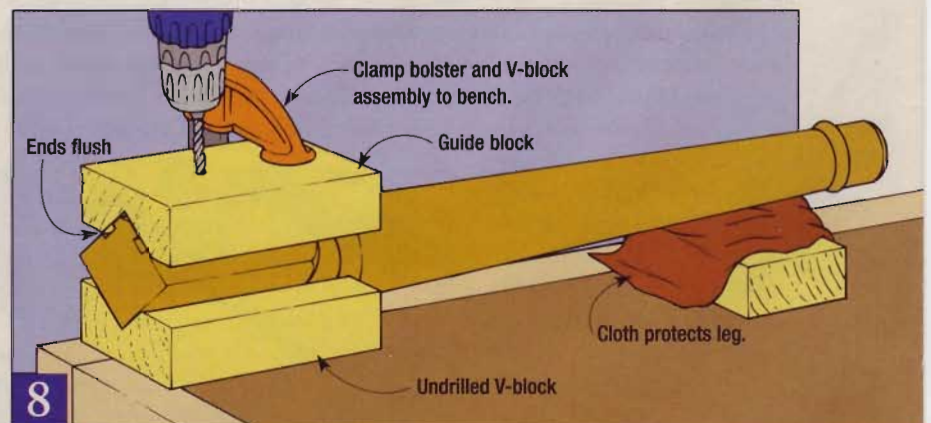
First, place the undrilled V-block on your bench, with the groove facing up. Set the leg bolster (with its chamfered corner up) in this block, then clamp the drilled

(guide) V-block on top, like you're building a sandwich (**Figure 8**). The end of the guide block should be flush with the top of the table leg, so the hole position is indexed correctly. (If it helps, you can fasten a small cleat to the guide block to act as an end stop.) Then drill through the V-block into the leg bolster, to a depth of about 1".

Tying Up the Aprons

Machining the aprons involves another set of simple procedures, and you can do them all on the table saw. After cutting the pieces to size, you need to cut a rabbet on each end to form the one-sided tenons that fit into each leg mortise, plus some shallow saw kerfs to accept the assembly hardware (**Apron Details**). The orientation of all the cuts is critical, but for simplicity the blade height setting (1/4") stays the same for each step.

I started by milling the long groove on the inside of each piece (**Figure 9**). This groove accepts the table top fastener clips that allow the top to move with seasonal changes in humidity. Next came the cross-grain kerfs that hold the ends of the corner brackets (**Figure 10**). I changed the rip fence's position so I could use it as an end stop to index the cuts, but I used the miter gauge to guide the stock through the cut. The same thing goes for machining the



8 With the leg bolster nesting in the undrilled V-block, set the guide block on top and align its end flush with the end of the leg. Then drill through the guide block hole to make a 1/4"-dia. pilot hole for the hanger bolt. For stability, prop the other end of the leg up.

tenons — which you produce by cutting rabbets on the outside face and bottom edge of each of the apron pieces.

The tenon length is $\frac{1}{4}$ " , so you can't cut it in a single pass with a standard blade. There's no sense installing a dado blade for this one step, however. In the time it would take you to change blades, you can already have the joints cut. Just scoot the rip fence close to the blade, so that the far edges of the cutting teeth are $\frac{1}{4}$ " away from the rip fence (Figure 11). Using the miter gauge to guide the workpiece's travel, butt the board end against the fence for the first pass, then back the board off the fence for a second pass to remove the leftover "tail."

Back to the Tops

With the machining done on the legs and aprons, you have to backtrack a little to the table tops. Once they're unclamped, they need to

be trimmed and sanded. If there's glue squeeze-out still on the panels, use a sharp chisel or scraper to clean it off, then figure out how you want to cut each one to finished size.

As I explained earlier, whenever possible I'll glue up a panel slightly wider than I need, so I can trim the edges clean of clamp dents or other incidental damage. And of course the ends will need to be cut.

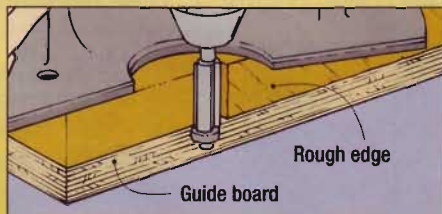
If you've got a table saw with a large support surface, rip the panel to within about $\frac{1}{16}$ " of finished width, then crosscut the ends using a miter gauge to guide the stock. Keep the top face of the panel up so any tearout from the saw blade will occur on the underside. (If you don't have a table saw, or at least one large enough to handle panels of this size, you can use a portable circular saw to trim the tops. If you do, reverse the panel orientation so it's upside-down, since the teeth enter the workpiece from the bottom.)

Clean the saw marks from the long edges with a hand plane or a sanding block. Because end grain is tougher to tame with hand tools, I used a finishing sander there. A flush-trim bit in a hand held router works great also (Pro Tip).

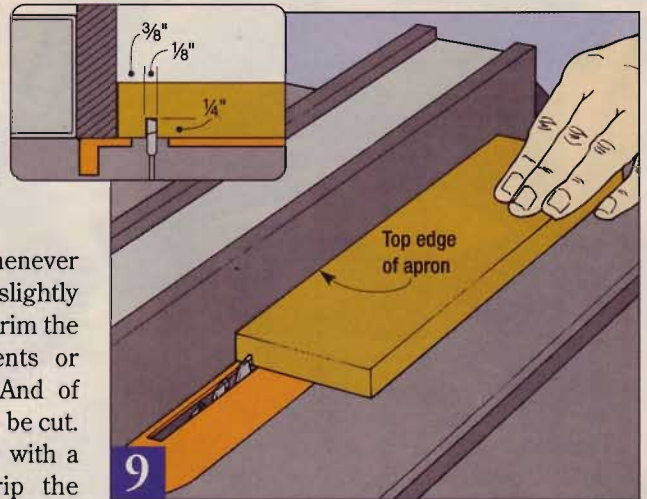
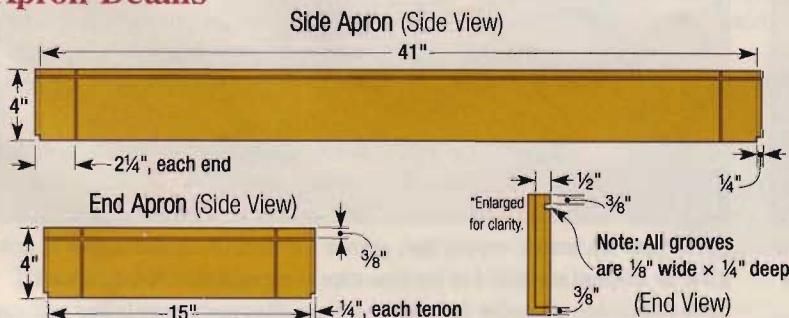
PRO TIP

Trim Bit Routs Clean Edges

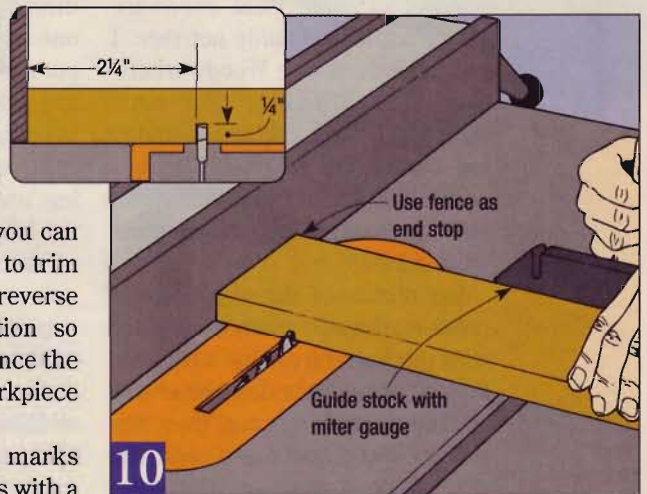
Undo saw marks easily with a router and a flush-trim bit. Leave $\frac{1}{8}$ " of extra material and clamp a guide board along layout marks for finished size. Both edge and end grain rout cleanly.



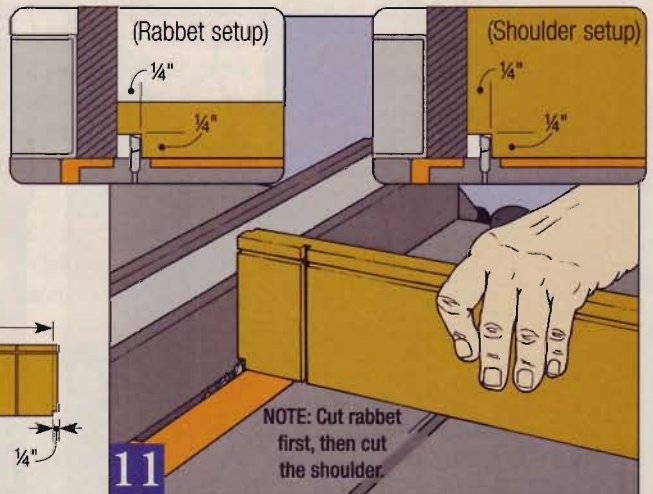
Apron Details



9 A table saw can do all the machining of the aprons, starting with the groove for the table top fastener clips. Be sure to keep the top edge of each board against the fence.



10 Adjust the rip fence so it acts as an end stop, then use the miter gauge to guide the stock while cutting kerfs for the corner brackets. Keep the same faces down as before.



11 Cutting rabbets and shoulders at the ends of the aprons creates the one-sided tenons that seat in the leg mortises. With a standard blade, make two passes to complete each step.



Hardware Brings it Home

The hardware I used for my table group probably won't be on the shelves of your local hardware store, but it's certainly not rare. I got mine from The Woodworkers' Store (800-279-4441). For each table you'll need a set of four metal leg corner braces (#24299), four $\frac{5}{16}'' \times 2\frac{1}{2}''$ hanger bolts (#24422), and a pack of ten table top fastener clips (#34215).

Installation of the hanger bolts presents the only tricky procedure with the hardware. That's because instead of having a drive head like a conventional fastener, they feature a wood thread on one end and a machine thread on the other. The center of the shank has a blank area you can grip with a pair of locking pliers and not disturb

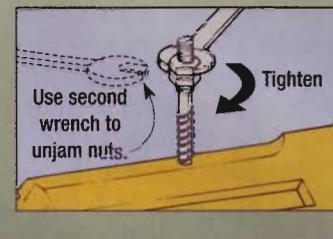
the threads, but I think driving them in that way is awkward. Instead, I use another technique (**Hanger Bolt Installation**). I run a pair of hex nuts on the machine thread and tighten them against one another until they jam. Then I put a wrench over just the top nut and drive the bolt in like I would a lag screw. When the wood thread is buried as far as you want in the leg, use a pair of wrenches to spin the hex nuts apart and back them off the end of the bolt.

Once the hanger bolts are securely home in the leg bolsters, each table assembly involves only two basic steps, and both are easier if you work with the materials upside-down on your workbench.

Start with the apron installation. Insert the tenons from one end apron and one side apron into the mortises in a leg, fit a metal corner

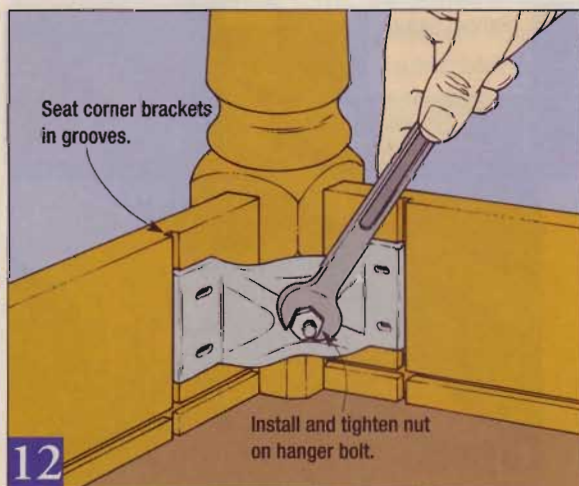
Hanger Bolt Installation

To drive a hanger bolt into wood, tighten two hex nuts on the machine-thread end until they lock. One wrench on the top nut drives the bolt — a pair “unjams” the nuts.

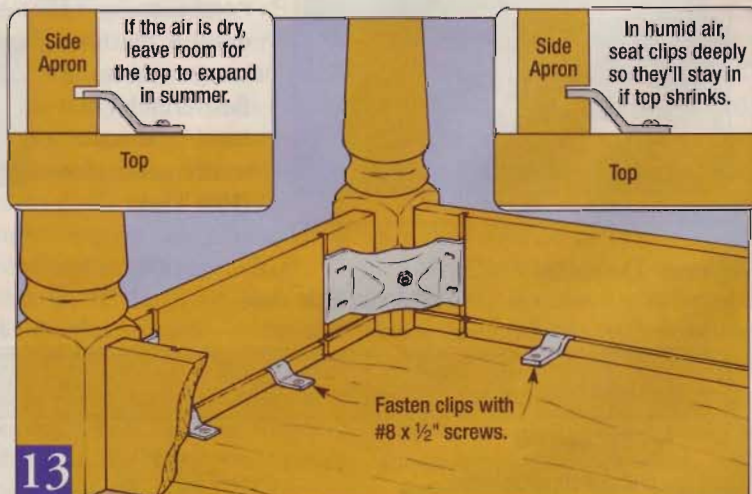


brace onto the hanger bolt and seat its ends into the cross-grain kerfs, then run the nut onto the hanger bolt and cinch it tight (**Figure 12**). Repeat the process for the other three legs, and make sure the assembly sits flat on the bench when everything's snug.

To mount the table top you have to clear your workbench surface and set the top upside-down on it. Then set the leg/apron assembly down on the top, check for a consistent overhang on each edge, and fit the table top fastener clips into the grooves in the aprons — two on each end, three along each side (**Figure 13**). As you screw




12 Once the hanger bolts are installed, you can start assembling the legs and aprons. With the parts upside-down on a bench, fit the corner brackets in place, then crank the hex nuts tight.



13 Fit the table top fastener clips in their grooves and fasten them. Remember to allow for seasonal movement of the three clips along each side. Any significant travel will happen across the top's width; the end clips won't move in and out.

these clips to the underside of the top, be sure to consider the humidity. The hardwood will most likely have been kiln-dried, but it will still move some with the seasons. If the relative humidity is low (typical winter conditions), don't seat the clips all the way into the grooves or the top won't have room to expand when the humidity rises.

Conversely, an August installation should have the clips fully seated, to allow for winter shrinkage. Sealing the top thoroughly (I used a gel stain and a satin polyurethane on *all* surfaces) will help.

As your skills and shop grow, you can make all your own furniture parts, but for now there's no harm in buying a little help. 



What You'll Need

Lumber

- (4) 2³/₄" x 15" turned maple legs
- (14) bd. ft. 4/4 soft maple
- (Note: Lumber quantity required will vary according to rough board sizes and waste factor.)

Hardware

- (4) leg corner braces
- (4) 5/16" x 2 1/2" hanger bolts
- (4) 5/16" hex nuts
- (10) table top fastener clips
- (10) #6 x 1/2" pan-head screws

How the Others Measure Up

Except for sizing the tops and the apron boards differently, building the end table and sofa table to match involves exactly the same procedures used for the coffee table. The part numbers for the table legs are as follows*:

Coffee table legs: A0901-15

End table legs: A0901-21

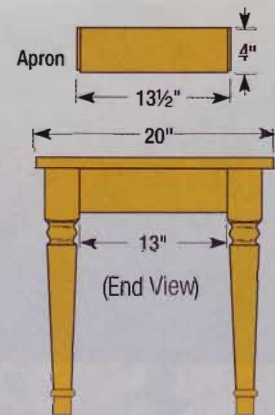
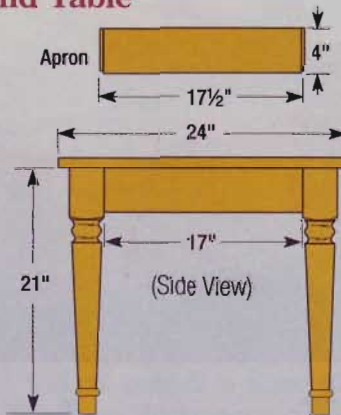
Sofa table legs: A0901-28

*(Adams Wood Products
423-587-2942)

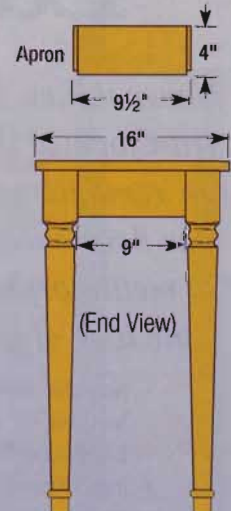
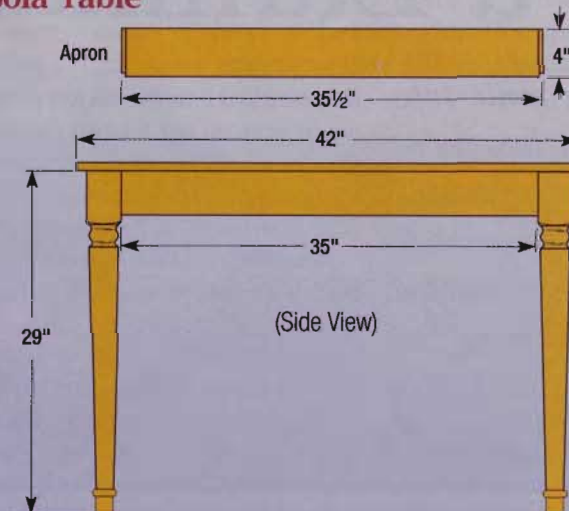
I ordered maple legs, but the same style and sizes are offered in red oak as well. Aside from the change in leg length, the other tables in this group also require different quantities of the 4/4 lumber used for the tops and aprons.

You'll need about 8 bd. ft. of 4/4 stock for the end table, and about 12 bd. ft. for the sofa table. These figures allow about 15 percent for waste, but note the minimum lengths you'll need for certain parts.

End Table



Sofa Table





Lay a Laminate Floor

New cabinets and countertops transformed the kitchen we've been remodeling, but we needed new floor covering to complete the metamorphosis. We wanted the look of wood flooring but

not the installation and finishing hassles or expense of traditional hardwood flooring. Laminate flooring offered these advantages as well as low maintenance, and the variety of colors and patterns avail-

able clinched it as the perfect product to wrap up our kitchen project. (You can find the cabinet and countertop installation in the April and June 1998 issues of *Workbench*.)

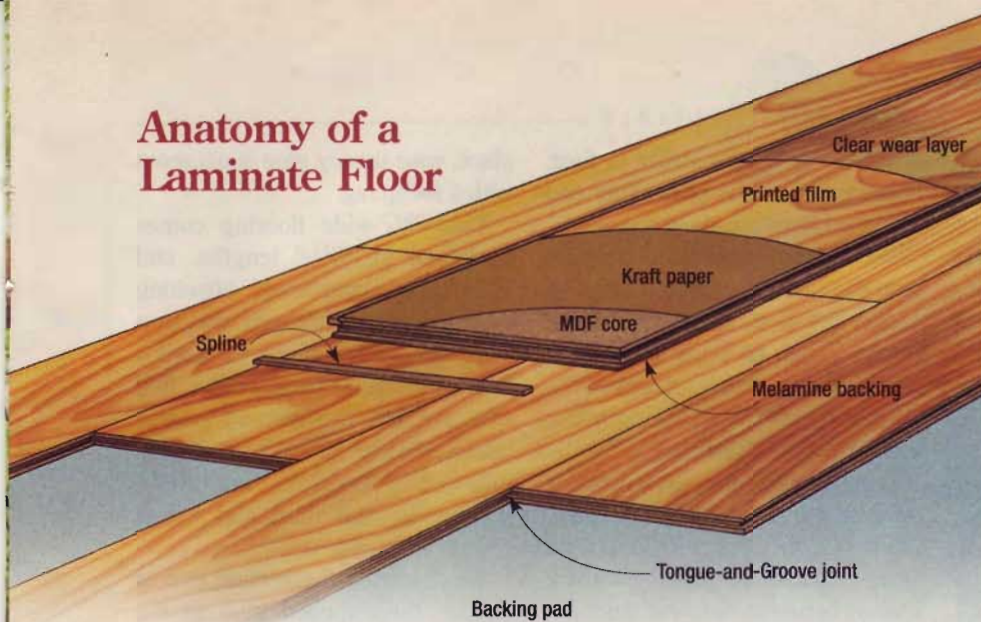
Homeowners Bob and Barbara Settich chose Wilsonart Flooring. Like similar products on the market, this flooring consists of a thin layer of plastic laminate bonded to 3/8"-thick medium-density fiberboard (MDF) backing (see *Anatomy of a Laminate Floor*).

The laminate is like that used for countertops, but is 10 to 20 times

harder to make it more scratch- and stain-resistant. This construction creates a tough, durable floor that is much less susceptible to seasonal climate changes that can cause solid wood flooring to swell or shrink dramatically. While not recommended for potentially wet locations, most laminate flooring can even be laid on a concrete floor as long as you put down a polyethylene vapor barrier first.

Some people confuse laminate flooring with *laminated* wood flooring, an engineered product made of

Anatomy of a Laminate Floor



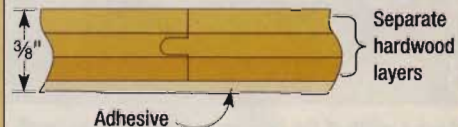
Laminate's Older Cousins

Solid Wood Flooring



- Nailed or stapled to subfloor
- Available in strip (2½"-wide) and plank (3-10"-wide)
- Unfinished or prefinished; can be sanded and refinished

Laminated Wood Flooring



- Fastened to subfloor with staples, glue, or double-faced tape
- Prefinished; can be sanded and refinished

three or five thin layers of hardwood laminated together. Like solid wood flooring, engineered wood products such as this are mechanically fastened to the floor, usually with staples, double-faced tape, or adhesive.

Laminate flooring isn't fastened but goes down on top of a thin foam backing pad. By fitting and trimming the tongue-and-groove planks or tiles, then edge-gluing the joints, you create in essence a seamless, one-piece floor that "floats" on top of the pad. This eliminates the need for a specialized flooring nailer or a messy adhesive.

The only tools you need are a table saw or miter saw to cut the planks to length, a router equipped with a special slot-cutting bit for re-grooving the ends of cut pieces, a hammer, a utility knife, and a big roll of masking tape.

layer of ½" CDX plywood with screws and construction adhesive.

Even then, we found that the floor had settled in an area near the doorway to the dining room. We filled this depression with a two-part leveling compound (Figure 1). These fillers are mixed to a thick liquid consistency that flows out and levels itself when poured onto the floor.

To help minimize shrinking or swelling, let the flooring acclimate to the room for 48 hours before it's installed. Even though it's relatively stable, big changes in temperature and humidity can cause the flooring to expand or shrink slightly.

After the flooring stabilized, we laid out a temporary baseline 18" out from the toekicks of the new base cabinets, marking the floor every few feet with a felt-tip marker. You typically want to lay the planks parallel to the longest axis

of the room and use the longest (and straightest) wall to reference your baseline.

With a baseline roughed out, we dry-fitted some planks to check our pattern alignment (Figure 2). We also made sure the final row of planks would be at least 2" wide for both joint and visual strength. If necessary, shift your baseline toward or away from the reference wall, then snap a chalkline to mark your final baseline position.

Flatten the Subfloor

Like most floor coverings, laminate flooring needs to go down over a smooth surface such as an existing vinyl floor or plywood underlayment nailed over the subflooring. But Bob's kitchen presented a problem. It already had two layers of old vinyl and underlayment that created a wavy surface, so the old stuff had to come out. If we used standard underlayment, we'd wind up with a gap between the floor and the trim.

So we stripped the floor down to the original planks and installed a



1 Use a leveling compound to fill in any depressions. Feather the edges of the compound to reduce sanding after it dries.



2 Establish a baseline along the longest, straightest wall. Dry-fit the planks together to check the flooring alignment and to create the proper spacing for any inset borders.

Pad First, then Planks

Once we had the alignment figured out, we picked up the test planks and rolled out a width of foam backing pad the length of the room (Figure 3). Don't fasten the pad to the underlayment, since this will



3 Roll out a width of the backing pad and cut it to length with a utility knife. Roll out additional widths, butt the edges — don't overlap them — and join them with masking tape.



4 Lay the grooved edge of the first row of planks against a cleat tacked along the baseline. Remove the cleat and fill in the outside edge once the rest of the floor is down.



5 Apply glue only to the edge and end grooves of a plank. The glue bottle nozzle helps place the correct amount of glue in the joint.



6 Tighten up the joints using a hammer and tapping block that's grooved to protect the tongue — the MDF core damages easily.



7 Wipe up any glue squeezeout with a damp rag, and rinse it often to avoid leaving a film. Masking tape holds the joints while the glue dries.

affect the flooring's ability to float. Subsequent widths of backing pad are taped together along the edges.

We transferred our baseline mark onto the pad and tacked a straight-edged 2x4 cleat to the floor along the line. Then we dry-fitted the first row of planks end-to-end against the cleat to determine how long to cut the last plank (Figure 4).

Even though the movement is minimal, you need to allow some room for the floor to float and expand. Place a temporary 1/4"-thick spacer between the wall and the starting end of the first row, and leave a 1/4" gap at the opposite end.

Cutting the planks produces loads of fine dust, so I recommend you set up your saw outside. Also, make sure the saw blade's teeth enter the top of the flooring (the laminate face) to minimize chipping. Use a sharp, fine-toothed carbide blade. If an edge does get chipped, cut another plank and set aside the damaged piece to be trimmed and used elsewhere.

With the first row of planks dry-fitted, take them apart and squirt a liberal bead of glue in the end grooves of the planks. Wilsonart supplies water-based glue in bottles that have a spout designed to fit into the groove. Lay the planks back in place and temporarily insert a wedge or pry-bar between the wall and the end of the last plank to force the joints together and prevent excess glue from forcing a joint back open. As you fit the planks in

place, wipe up any glue squeezeout with a damp rag.

This 7³/₄"-wide flooring comes packaged in 46¹/₂" lengths, and Wilsonart recommends offsetting the end-joints on adjacent rows by a minimum of 10". Since we used a full-length piece to start the first row, we cut the second course starter to 34¹/₂" for a 12" offset, then followed with 22¹/₂" and 10¹/₂" starters for the third and fourth rows respectively.

We dry-fitted the second row of planks, then applied glue to the edge and end grooves of each plank as we installed them (Figure 5). Tighten up the joints by tapping a block held in place along the edge and end of the plank being glued (Figure 6). Once each joint is tight and the excess glue wiped up, masking tape spanning the joint lines will hold everything together until the glue sets up, typically 45 to 60 minutes (Figure 7).

Because of the extensive remodeling in the kitchen and entryway, we planned to install new door casing on all but one doorway. Adding casing after the flooring simplified the process greatly, but we still had to do a little fitting in and around the doorways (see *Dealing with Doorways and Casing*).

Add a Pattern

An added twist in Bob's kitchen was a square field of flooring set off by a border of darker laminate (Figure 8). This pattern was rela-

tively straightforward, but you can mix and match square laminate tiles with planks to create more complex patterns if you want.

The toughest part of creating a pattern is cutting planks to precise lengths. When you're fitting trimmed pieces, even slight variations in length will result in gaps or a visible shift in the pattern. Planks must also be cut off squarely, so check every cut.

When you cut a field plank to length, you'll be cutting off the tongue it needs to mate with the border. Wilsonart offers a special slot-cutting bit and splines to take care of this situation. We chucked the bit in a small router, made some test cuts in flooring scraps to adjust the cutter to the right setting, then slotted the end and installed the spline (Figure 9).

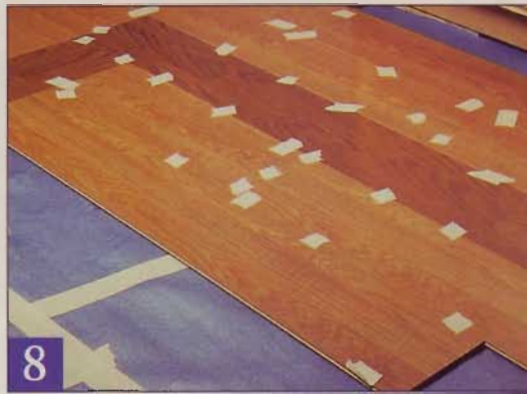
After completing the square-shaped border of darker laminate, we laid the remaining planks. We had to rip the final row of planks to a narrower width for a custom fit.

Finishing Up

Looking at the completed flooring, Bob noticed that some of the joints seemed slightly raised. We assured him, however, that there was no cause for alarm. The water-based glue causes the MDF to swell slightly, but the joints shrink back to normal after the glue dries completely (in a week or two).

We used matching laminate-covered baseboards and quarter-round trim to finish up the project. The laminate-covered poplar trim is impact resistant — although it required us to drill pilot holes for the finish nails (Figure 10).

As we packed up our tools, Bob and Barbara admired their new floor. They appreciated how quickly it went down and commented on the conspicuous absence of any finish fumes and the fact that they didn't have to wait for a finish to cure. After weeks of dust and makeshift meals, they were more than ready to have their kitchen back.



8 Contrasting planks create a square border in the main kitchen area. Such patterns are simple to make but require cutting planks to precise lengths to avoid creating gaps.



9 Use the bit supplied by the manufacturer to cut a groove in the trimmed piece. Glue the spline in place, then install the plank.



10 Drill pilot holes through the laminate-covered base molding and quarter-round before driving the finish nails. We used a nail set to sink them just below the laminate surface.

SOURCES

- Wilsonart
(800) 710-8846
- BHK of America
(800) 663-4176
- Bruce Floors
(800) 722-4647
- Formica
(800) 367-6422
- Mannington Mills
(800) 443-5667
- Pergo
(800) 337-3746

Dealing with Doorways and Casing

Laying laminate flooring around doorways isn't difficult — it just requires a little planning. If possible, consider running the planks lengthwise through the doorway and parallel with the traffic flow. Notch the flooring to fit around door framing. Test fit the piece by sliding it in from the end,

then glue the plank and tap it into place with a tapping block.

Where flooring runs past a doorway opening, you'll need to trim the casings so the flooring can slide underneath without leaving an unsightly gap. A hand saw is all you need to accomplish this task.



Notch an L-shaped plank to fit around the door jamb. Apply glue, slide the flooring in from the end, then tap it firmly into place.



To trim door casing, lay a piece of flooring, laminate side down, on top of a piece of backing pad. Then use a hand saw to cut the casing.



Buying A Chain Saw

For most homeowners, chain saws belong in that difficult tool category that also includes air compressors, generators, and maybe brush chippers or snow throwers. You might not use one all that often, but when you really need it there's

precious little else that will get the job done. Rental center equipment provides an answer for some, but if their inventory and schedule don't cooperate with the timing of your emergency, you could be up you-know-which creek cryin' for a paddle. Besides, doesn't the closet survivalist in you just *want* one?

Not to worry — the *Workbench* staff feels your pain. That's why we gathered a dozen saws, ranging in price from around \$200-\$400, for a hands-on evaluation of

their features and performance. The chain saws in this group, fitted with their standard 16" or 18" bar lengths, can down a sizable tree or buck firewood to length, and will also trim limbs and branches without wearing you out from heavy lifting.

Even the lowest cost model among these saws isn't inexpensive, but if the choice comes down to tackling a tree removal with your own saw or paying someone else to do it, your sweat equity will

probably cover the purchase cost (see *Felling a Tree Safely*, page 56). Of course some situations might require the skills or equipment of a professional crew.

For your own work, we'll show you the features on today's generation of chain saws, and the different ways various manufacturers tackle the same problems. We'll explain chain brakes, catchers, and other safety features, plus maintenance tasks such as chain tensioning and air filter upkeep.

Does Size Matter?

When you start shopping for a chain saw, your initial temptation may be to buy the biggest chain-saw you can afford, or to size it

Chain Saw Anatomy

NOTE: The location and availability of some of these features or controls will vary by saw model and manufacturer.

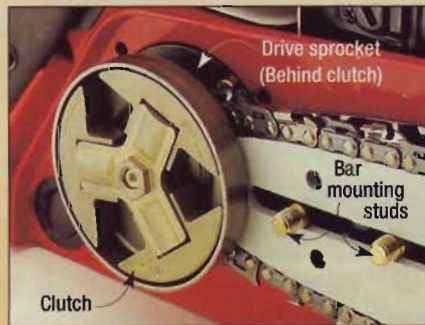


according to the largest job you might tackle. Better instead to plan around likely scenarios and regular use. If you need a saw only for sectioning the occasional fallen tree limb, choose your weapon accordingly. There's no sense paying for power you don't need or excess weight you won't want to lug around.

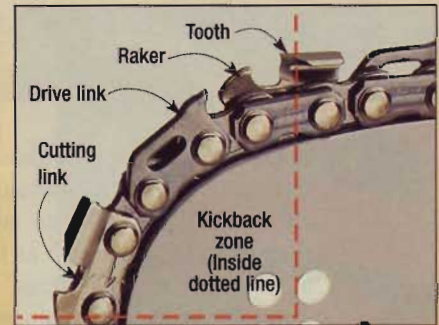
Chain saws are sized by engine displacement (stated in cubic inches or cubic centimeters) and also by the bar lengths they accept, typically ranging from 12" to 48". Most manufacturers don't publish power output figures for chain saws, and that's just as well — the power rating claims you see on some tools are equal parts horsepower and another horse product.

Generally speaking, though, smaller engines produce less power and are teamed with shorter bar lengths. (Incidentally, all feature two-stroke engines that burn a gas/oil mixture rather than straight gas. They also have a reservoir for a different kind of oil to lubricate the chain and bar.)

The pros settle the size dilemma by using a big chain saw (typically with a 24" to 36" bar) to fell the tree and buck the trunk to length, then switch to a small saw (12" bar) for limbing. For frequent tree-clearing or cutting of assorted logs or timbers, this is the way to go if you can justify the added expense. When you're buying only one saw, however, you have to choose. Midsize models offer a balance, so that's what we rounded up (see the specifications chart on page 55).



A removable cover shields the bar mount, drive sprocket, and clutch. As the engine rpm's rise above idle, the clutch engages the chain drive.



The upper quadrant of the bar's tip is the kickback zone, where contacting an object can cause the saw to lurch back abruptly.



The chain brake lever gets bumped forward by your wrist if a kickback lurches the bar toward you. You also engage the brake for starting.



The chain catcher is there to snag a broken or derailed chain, preventing it from lashing back at the operator. On this Makita, it's a flat bar.

First Impressions

Much to the relief of all the standing trees in our area, our evaluation sessions lasted only long enough to get a few solid impressions of how each of the test saws behaved. Still, the hands-on time proved enlightening and valuable. Here, beginning with the medium-

duty saws aimed at home use, is what we learned. The **Poulan 2750**, priced toward the lower end of the group, surprised just about everyone with its tenacity. It started easily and didn't complain when we ran it steadily at high rpm levels. Low-end torque was a little weak (typical of engines this size),

Fingertip Control: Find a Fit That Works For You

Ergonomics and the placement of controls rank among the critical features affecting a chain saw's safety, performance, and ease of starting. Make certain you can easily reach the switches or levers and operate them comfortably

without removing your hand from the grip (the primer bulb is an exception here). Also, watch for switches that could be accidentally triggered while you're cutting, either shutting off the saw or locking the throttle open.



Some saws feature a primer bulb, a flexible clear plastic cap that when pressed helps pull fuel into the cylinder for easier cold starting.



Location of the on/off switch is an important (and personal) consideration. Try out all the controls while wearing your working gloves.



The trigger lock (orange switch near thumb) partially opens the throttle to aid starting. You release it immediately once the engine fires.

but it revved happily without producing a lot of vibration. The choke lever was easy to set, but the on/off switch wasn't as handy, and it had a touch some of us thought was too light. Our test saw had no chain brake, but the company's Poulan Pro (yellow) series does have saws with this feature.

The **Sears Craftsman** saw has a similar look and feel, and it too lacks a chain brake. Surprise — it's made by Poulan. These weren't identical models, though. Our Sears saw had a slightly smaller engine, and featured minor design

differences, including a filler cap with the oil/gas ratio molded in — handy! The consensus on this saw was close to our take on the Poulan — well-mannered, and fine for medium-duty cutting chores.

Our **McCulloch 4600** test saw had an unwelcome two lbs. on the Poulan, though the engine displacement of the two saws was the same. The tuning was different, however, because the Mac pulled much stronger at low rpm levels and didn't seem as comfortable in the scream zone. It was also a little bulkier, but was ruggedly built, reliable, and a very consistent

starter. The extra weight, unfortunately, kept this unit out of the contenders for limb sawing. With more guts than finesse, it seemed a sort of hybrid between a home-use tool and a commercial-duty saw, with a mid-range price.

The **Homelite d3850b** earns points for coming standard with a bar scabbard and a carrying case. It's also the only noncommercial model that had an inertia chain brake. This type of brake stops the chain if kickback forces the saw back abruptly, regardless of the position of the guard lever. The brake can also be set manually.



The bulky housing on this saw got a thumbs down, especially considering its relatively small engine. Starting was easy, though, and cutting power respectable (if we kept the engine speed up). A suggested list price of \$265 seems pricey, but this saw package typically retails for well under \$200 — a good buy considering the extras.

Commercial-Duty Saws

The design and retail distribution network of the other saws in our test group clearly reflect the different market they're intended to serve — professional users such as tree service companies.

The cost differences aren't that great in some cases, though, and there's no harm in upgrading to a heavy-duty saw if you can afford it.

Among the first saws we got in were the German-made **Stihls**, fitted with a number of user-friendly features such as tool-free access to the air filter, a side-access chain tensioner, an inertia chain brake, and a drive sprocket mounted on the outboard side of the clutch (to make chain installation and removal easier). A dual-ring piston is also standard, a feature that helps retard wear and the loss of performance due to reduced compression. Unique to this product line is Stihl's "Master Control Lever," which groups the on/off switch, choke, high idle, and run functions into a single lever. A lot of attention went into making the saws easy to service in the field, a plus for pro use.

Our sole complaint was that we had fits getting the Stihls to start consistently, but a phone call to a company rep and a closer read of

the manual cleared up some of the mystery. The full-down position on the control lever sets the choke. A few pulls on the starter cord will get the engine to burp, then you switch to high idle to start. A few seasoned Stihl users confirmed this sequence works.

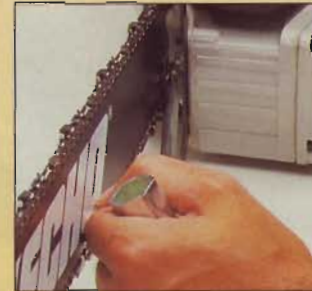
Our other test saws were much more forgiving of our starting technique, though we had no complaints once we had the Stihls running. Both delivered healthy low-end power and kept vibration in check, and the manuals were detailed and fairly comprehensive.

The **Makita DCS 520i** showed similar manners, perhaps because it too shares German lineage. (Makita is a Japanese company, but its Sachs & Dolmar subsidiary in Europe makes the chain saws.)

Our Makita test saw was fairly light for its engine size, but didn't feel like it — its wide bar made the balance slightly front-heavy. The overall feel was tight and solid, and the motor pulled strongly from the low end up. The word "workhorse" aired several times when staffers talked about this saw — not necessarily flashy, but reliable, with good usable power and a tough build. A certain *Workbench* editor, who shall remain nameless here, dropped it six feet onto a blacktop driveway, but the saw suffered nothing but a few scuff marks. One gripe — the kill switch toggle was short and uncomfortable to use.

Chain Adjustment

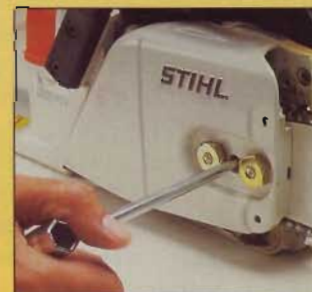
All manufacturers supply a combination screwdriver/socket wrench for routine maintenance. Given the location of most chain-adjustment screws, however, a conventional screwdriver works better. For convenience, Stihl's side-mounted adjustment is tough to beat, especially the tool-free version.



Most saws have the tension-adjustment screw parallel to the blade, which makes using the T-handle screwdriver a little awkward.



Relocating the adjustment screw on the other side of the blade improves access, but it doesn't really solve the problem entirely.



Side-mounted adjustment makes tensioning the chain easier, and avoids the gunk buildup on the bar. Some Stihl saws adjust without tools.



A pair of **Husqvarna** saws rounded out our European contingent. From the country that brings you Saab and Volvo automobiles, these Swedish saws ooze the same no-nonsense Nordic philosophy.

Like the other manufacturers, the Husqvarna folks address vibration problems by isolating the engine from the handle assembly with rubber mounts or steel springs, but their approach seems to allow a freer floating saw head than some others. Vibration levels were nicely subdued, especially on the model 55, which had a throaty engine with good low-end power.

The Husky people make much ado about their air injection system, which uses a fan on the engine flywheel to divert wood chips and dust before the air flows into the filter. A local repair center said the system is very effective at prescreening flying debris around the saw, but added that most saws have some way to scrub the airstream before it enters the filter.

Starting was the typical "More gas!" ritual European two-strokes demand, but the Huskies seemed more willing to fire up than the German saws. Opinions on the controls were mixed, and the saws were slightly on the heavy side, but the smooth power offset those complaints. Other considerations: a thorough operator's manual, a lifetime warranty on the ignition, and a product line of over two dozen models — only Stihl offers more.

The Electric Alternative

Electric chainsaws let you forget about mixing and storing fuel, keeping an engine tuned, and breathing exhaust fumes. The trade-offs? Reduced power, shorter bar lengths (most range from 10" to 16"), and being tethered to an electrical outlet. Still, they're convenient, quieter, lightweight, and typically cost a lot less (from about \$75 to \$300). If you get a big gas chain saw for heavy work, an electric can make a nice limbing saw.



The Japanese **Echo CS-4400** sports a personality very different from the European saws we tried. It weighed in about the same but felt lighter, and most of its serious power came from the upper rpm range. We buzzed the engine quite a bit, but vibration stayed at bay. Like the Stihl engines, the Echo powerplant has a dual-ring piston for better performance.

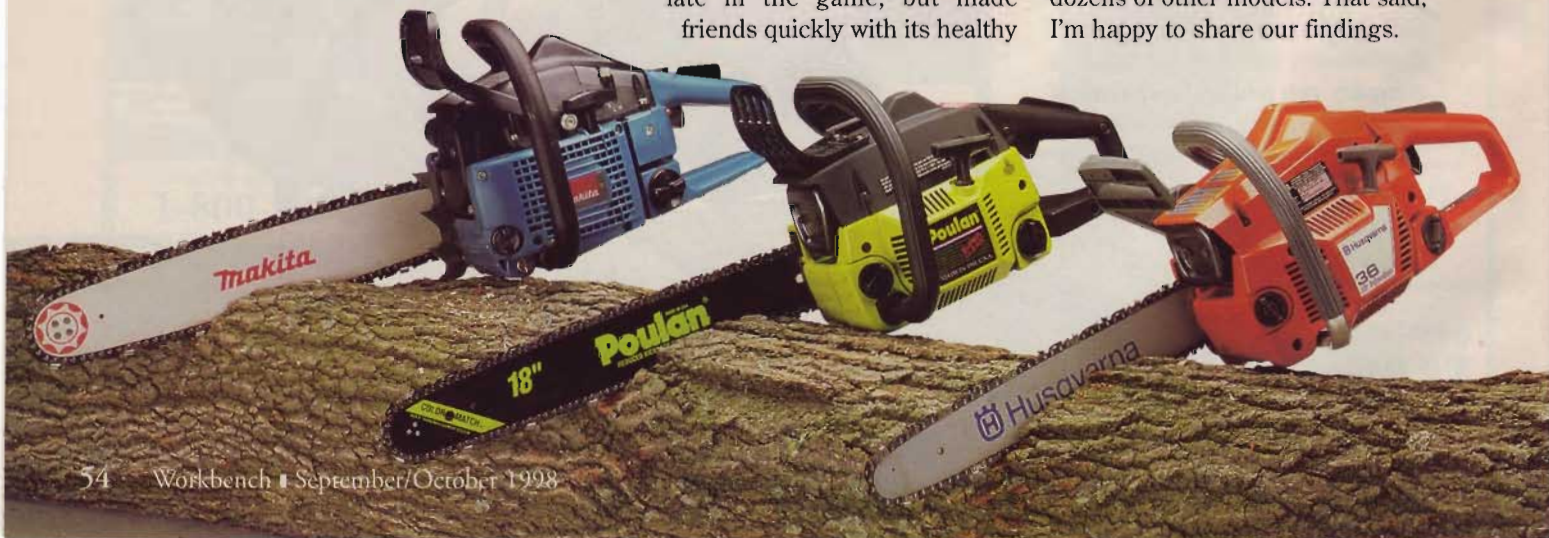
Safety features include Echo's removable Kick-Guard (a small metal nosepiece on the bar), and an inertia chain brake. The Echo was an easy, reliable starter, with good balance and maneuverability, but this saw tied for priciest of the bunch. Perks include a detailed user manual/parts list and a lifetime warranty on the ignition.

The **Shindaiwa 488** came to us late in the game, but made friends quickly with its healthy

power-to-weight ratio. Another Japanese saw, it seemed slightly beefier in the low rpm range than the Echo, and started as easily — usually three pulls from dead cold. A twin-ring piston and chrome cylinder mark the engine for commercial use, and air filter access is a no-tools-required affair. Very highly regarded by professional users, the Shindaiwa's reputation is well-deserved, but it too prices out at the top of our test group.

Sizing Up the Field

Okay, so you've stayed with us this far and now you want the goods. Which saw should you buy? Keep in mind the inescapable logic of "You get what you pay for" (mostly true here), and understand that these same manufacturers offer dozens of other models. That said, I'm happy to share our findings.




Among the medium-duty saws, the Poulan proved itself the pick of the litter. Its combination of light weight, easy starting, and healthy power gave it a slight edge over the smaller Sears saw and the equally powerful but bulkier Homelite and McCulloch saws, and it's priced very competitively.


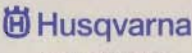
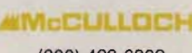

The commercial-duty group is a tougher call to make. Here the preferences tended to sort themselves out by the balance and power characteristics of each saw.

Most everyone liked the throaty power of the European saws, but the occasionally temperamental starting of the Stihls and the Makita did dampen enthusiasm some for these models. The Makita proved itself sturdy and reliable, though, and the Stihls out-distanced the field with their list of standard user-friendly features. Preferences among professional users vary some by region, but tree service company trucks in our area carry Stihls and Husqvarnas like they're standard issue, certainly strong evidence that both these brands offer durability and reliable performance.

The Echo and Shindaiwa saws won converts despite their higher cost. Both got votes for top picks for their impeccable starting manners, light weight, and balance.

Ready for the biggest lesson we learned? It's this: where you buy a chain saw is probably as important as which one you get. Large home centers offer attractive pricing (on saws intended for home use) but not much technical support. If price is the only issue, the decision is half-made for you. Spending a little more at a specialized power equipment shop, though, opens up the choices to include pro model saws, and the dealer will often set up and tune the saw for you before it goes out the door. Maintenance or help from a trained pro will likely be in your saw's future, and it will pay to have that relationship. 

Chain Saw Specifications

Manufacturer/ phone number	Model number	Engine size: cu. in. (cc's)	Bar length range* (in.)	Weight (lbs.)**	Approx. retail price	Consumer warranty †	Country of origin
 (800) 432-3246	CS-4400	2.7 (44)	16", 18", 20"	10.2	\$390	2 years†	Japan
 (800) 725-9500	d-3850b	2.3 (38)	18"	10.0	\$200	1 year	USA
 (800) 487-5962	136	2.2 (36)	12", 16", 18"	9.9	\$180	2 years†	Sweden
 (800) 487-5962	55	3.2 (53)	16", 18", 20"	11.6	\$340	2 years†	Sweden
 (800) 462-5482	DCS 520i	3.2 (52)	15", 18", 21"	10.0	\$350	1 year	Germany
 (800) 423-6302	4600	2.8 (46)	16", 18", 20"	11.9	\$275	1 year	USA
 (800) 554-6723	2750	2.8 (46)	16", 18", 20"	9.9	\$200	1 year	USA
 (800) 235-5878	358-351161	2.4 (40)	16"	11.5	\$170	1 year	USA
 (800) 521-7733	488	2.8 (48)	16", 18", 20"	10.1	\$390	1 year†	Japan
 (800) 467-8445	025	2.7 (44)	16", 18"	10.3	\$270	1 year†	Germany
 (800) 467-8445	029	3.5 (57)	16", 18", 20"	13.2	\$300	1 year†	Germany

* Bold numerals indicate standard bar length.

** Dry weight = saw head only; less bar, chain, fuel and oil.

• Prices shown may vary from one retailer to another and may not reflect seasonal promotions or other discounts.

† Lifetime warranty on ignition.



Felling a Tree Safely

Last October, the Midwest got an unwelcome reminder that winter hadn't forgotten about its scheduled return trip. An early snowstorm blew across the region, randomly downing

power lines for hundreds of miles. It wasn't wind that wreaked the havoc, though. It was trees and gravity, or maybe that old physics rule that two objects can't occupy the same space at the same time. Until that weekend, the fall weather hadn't been cool enough to coax the trees into their annual leaf-shedding ritual, and when the heavy wet snow descended it clung to all the foliage like spit on a dry sidewalk.

The weight proved too much for a lot of stately old hardwoods. They groaned complaints for a while, then let go huge branches suddenly with loud cracks that penetrated the snowfall like rifle shots. Some weakened trees literally split through their trunks and fell, inflicting enough damage to cars and homes in my town to make an insurance claims adjuster teary-eyed.

There was no mistaking the lesson of that day — trees have power, and pushed hard enough they will move. When they do, that potential energy becomes very dangerous.

Storms bring trees down, but so do people, and there's no less room for caution and respect when you're felling a tree deliberately. Here's a look at some basic tools and methods to make it a safe experience.

Suit Up for Safety

Chain saws are today's weapon of choice for felling trees, and wearing protective clothing while using one is essential. Quick, aggressive cutting is what these tools are designed for, so you have to think

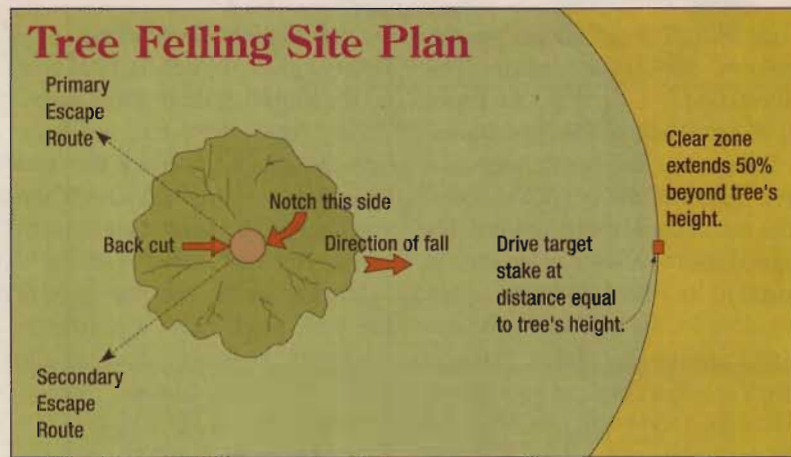


of safety items as necessities, not luxuries. When you buy a tool, you often need to buy accessories that protect you from it.

Starting at the top, you'll need a hard hat. The \$35 model I chose has hearing-protection earmuffs that lock out of the way when not needed, plus a flip-up screen face shield. Even with the screen, safety glasses are recommended.

A long-sleeve shirt helps guard against poisonous plants, burns from hot saw parts, and abrasions from leaves and limbs. Leather gloves protect your hands from the same hazards. Padded logger's gloves cost about \$25, but standard leather work gloves cost less and still offer decent protection. Gloves must fit well so you can work the saw's controls with a firm grip.

The most specialized item I wear are the logger's chaps. If you accidentally cut through the cloth outer layer, the long nylon fibers inside jam a running chain almost instantly. You can also purchase pants, a vest, or a shirt with similar built-in protection. At about \$65, the chaps seem pricey only until



you think about the alternative — a serious injury they could have prevented. The most expensive apparel item — leather work boots with a non-slip tread pattern and steel toes — may already be part of your D-I-Y wardrobe.

Think Before Cutting

Before you even fuel up your chain saw, study the tree and its surroundings very carefully (see *Tree Felling Site Plan*). Examine it from all sides to determine the natural direction of lean, and make sure you have enough clear space for

the tree to fall. (See *Gauging a Tree's Height* for a reliable method to check that clearance.)

Also, check the wind speed and direction. Individually, a tree's leaves or needles appear small, but multiplied by the thousands they represent the surface of a giant sail. If there's a wind strong enough to sway the treetop — especially against the desired direction of the fall — postpone the felling until the air calms.

Look up into the canopy of the tree for dead branches that are broken or snagged on lower limbs.

Gauging A Tree's Height: Walk and Carry a Big Stick

A logging instructor recently showed me a clever method to gauge the height of a tree.

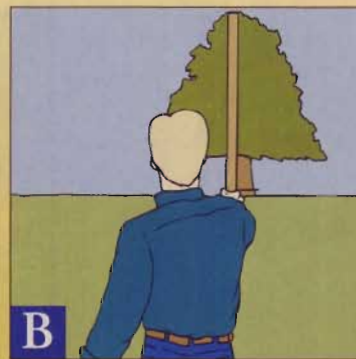
Here's a quick rundown of the technique. First, you have to make a gauge stick, marking its

length the same as your reach (**Figure A**). When you hold the stick in front of you, you create a triangle with a base and height that are identical (**Figure B**). Then you walk forward or back

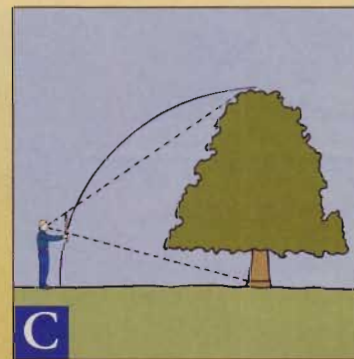
until the sighted height of the tree (from the cut line up) matches the gauge stick. That makes a proportional triangle, and you're standing about where the top of the tree will hit (**Figure C**).



Extend your arm and nest an end of the gauge stick in your armpit. Mark on the stick where your thumb and palm meet.



Sight the tree, holding your arm level and the stick vertical. Align the gauge mark with the cut line of the tree.



Move forward or back to match the tree to the stick. You're now standing at a distance equal to the tree's height.

Loggers call these snags “widow-makers” with good reason. The vibration from cutting can travel up the tree and shake them loose.

Limbs may also break loose as a tree falls, and the trunk’s momentum can catapult them forward. It’s a good idea to allow a clear zone in addition to the minimum space required for the tree itself. The site plan drawing also shows that you need to clear two escape routes when the tree begins to fall. (Use the secondary route if the tree falls in a direction you didn’t expect).

Clear a comfortable working radius around the tree — six feet should be enough. Chop through any vines clinging to the tree, and remove them from the trunk at least 6" above and below the notch height. Otherwise, the vines could interfere with the intended direction of the fall. And while you’re cleaning up the trunk, cut away any low limbs that are in your way.

A Quick Overview

Before I get to the details, I can sum up the steps that bring a tree down.

First, you’ll drive a target stake into the ground to mark the spot where the tree top will land. Then you’ll make two angled cuts, creating a notch that faces the stake.

Moving to the opposite side of the tree, you’ll make a horizontal back cut, stopping short of the notch to create a wood “hinge” that folds over as the tree falls.

The hinge is at the heart of the entire technique because it keeps the tree tethered. Without it, you have almost no control over the direction of fall nor any way to keep the end of the trunk from bouncing violently sideways or up. The notch created also provides clearance for the trunk to close in on itself as the hinge bends. You get the tree moving by driving a wedge into the back cut. Gravity does the rest.

Notching the Tree

When your site’s prepared and you’re in your safety gear, you can start the chain saw and make the two notch cuts in the trunk. Remember, the notch weakens the trunk and must face the direction you intend to fell the tree.

Stand next to the tree and rest the bar on the trunk (**Figure 1**). Many saws, like the Stihl I used, have a felling sight that runs across the saw’s housing at 90° to the bar. If your saw doesn’t have a sight, you can create one with a felt-tip marker or some tape. Align the sight with your target stake, tilt the bar forward 45°, then rev the engine and pull the saw into the trunk (**Figure 2**). Stop when you are about $\frac{1}{3}$ of the way into the tree.

For the lower cut, tilt the bar up at 45° (**Figure 3**). Make sure that this cut meets the upper cut precisely, creating a straight front edge for the hinge (**Figure 4**).



1 Align the saw’s felling sight (black line on housing) with the target stake. Use tape or a pen to add a sight if your saw lacks one.



2 Prepare to cut the notch by standing next to the tree and facing the target stake. Hold the saw at a 45° downward angle.



3 The lower cut of the notch slopes upward at about 45°. Make sure that the ends of the upper and lower cuts meet exactly.



4 From the front, the notch is about 80% of the tree’s diameter. From the side, its depth is about $\frac{1}{3}$ of the tree’s diameter.



A horizontal line scored into the bark joins the two tips of the notch. This line helps you guide the saw during the felling cut.

Make the Back Cut

Prep the back cut by scoring a horizontal guideline around the tree (Figure 5). This line, an inch or two above the crease of the notch, helps you keep the back cut level.

Move to the side of the tree and begin the back cut directly opposite the notch. Refer continually to the scored line to keep this cut level. Advance the saw straight toward the notch so the hinge's width decreases evenly across the tree. Stay alert — the tree can start falling at any time.

As soon as the trailing edge of the chain saw's bar is an inch or two into the trunk, insert a plastic felling wedge into the back cut and give it a couple of healthy whacks with a mallet or a sledge hammer (Figure 6). (Don't use a metal splitting wedge — it will dull your saw's chain instantly if you hit it.)

Advance the back cut until the hinge width is approximately $\frac{1}{10}$ of the tree's diameter, then turn off the saw and remove it from the



Drive a wedge in the back cut as soon as you can. Finish cutting the hinge, remove saw, then pound the wedge to drop tree.

cut. Put the saw out of the way so it won't block either escape route.

Hammer the wedge until the tree starts to drop. For a large tree, you may want to alternate hits on two wedges. When the tree starts to move, get out of the way. The trunk can split or bolt backward if the canopy hangs up, so don't linger. Drop your mallet and walk 15 or 20 ft. down your escape route. You'll be safer and have a clearer view of the falling tree.

A tree that doesn't fall completely creates a potentially hazardous situation, because it can move unpredictably and without warning. You may need a professional, who will probably use a winch to pull it down. Until help arrives, never leave the tree unsupervised.

Cut It Up, Move It Out

When the tree is safely on the ground, remove the limbs, working from the bottom of the tree up. Stand uphill of the trunk and cut limbs on the opposite side.




When the tree is down and you're trimming a limb that will fall free, cut partway through from the bottom up to prevent a split, then finish with a top cut.



Reverse the procedure when a log is supported at both ends. This time, cut $\frac{1}{3}$ into the top, then finish from below. This will keep the bar from binding in the kerf.

You can buck (crosscut) logs with a top cut (Figure 7) or a bottom cut, but most of the time you'll use both. For example, when the waste piece can fall away cleanly, cut $\frac{1}{3}$ of the way with a bottom cut, then finish from above. When a log is supported at the ends (Figure 8), avoid pinching the bar by cutting $\frac{1}{3}$ of the way from the top, then finish with a bottom cut.

Remember — first think, then cut. That's the key to safety. 

Knowing Your Tree (and Your Limits)

If you ever stacked logs from a freshly cut tree, you know how heavy green timber is. So it won't surprise you to learn that even a modestly sized tree can outweigh a car. And with no steering wheel to guide its fall and no brakes to stop it, a tree can be more dangerous.

So if you're not absolutely confident in your ability to fell a tree

safely and drop it where you want it, call a professional tree service.

Trees close to buildings or power lines are obvious pro jobs. The same goes for large dead or hollow trees (a bell-shaped flaring of the root base is often a telltale sign).

Trees that lean heavily or grow on slopes may be the most deadly, because they conceal enormous

uneven stresses that keep them standing. Cutting into one can unleash those forces explosively. Even fallen trees sometimes harbor these "spring-loaded" stresses.

Finally, if you're a beginner, limit yourself to trees with a diameter smaller than your chain saw's bar length. Felling larger trees is possible but requires more expertise.



Stow-Away Storage

This storage system takes advantage of the last unused space in my basement shop — between the exposed floor joists overhead — giving me over five more cubic feet of convenient storage where I

previously had none. The simple system consists of $\frac{3}{4}$ "-thick birch plywood frames that hold clear plastic lidded tubs that keep their contents clean and visible. (I used Sterilite 15-qt., #1754, purchased at a local department store.) The frames swing on spring-loaded hinges for easy access, and are

held in the closed position by 2" barrel bolts.

I started by cutting the plywood frames to size (**Stow-Away Storage Construction View**). Mine are $14\frac{1}{4}$ " wide to fit between 16" on-center joists. This space dictated the widest tub I could use.

The tubs I chose (and most of the others I saw) have small ledges on each end. Size the frame openings so the tubs slide in to this depth and the ledges rest on the wood frame (**Frame Detail**).

Drill $\frac{3}{4}$ "-diameter holes inside the corners of the layout lines, then cut the openings using a jig saw (**Figure 1**). Next, ease the sharp

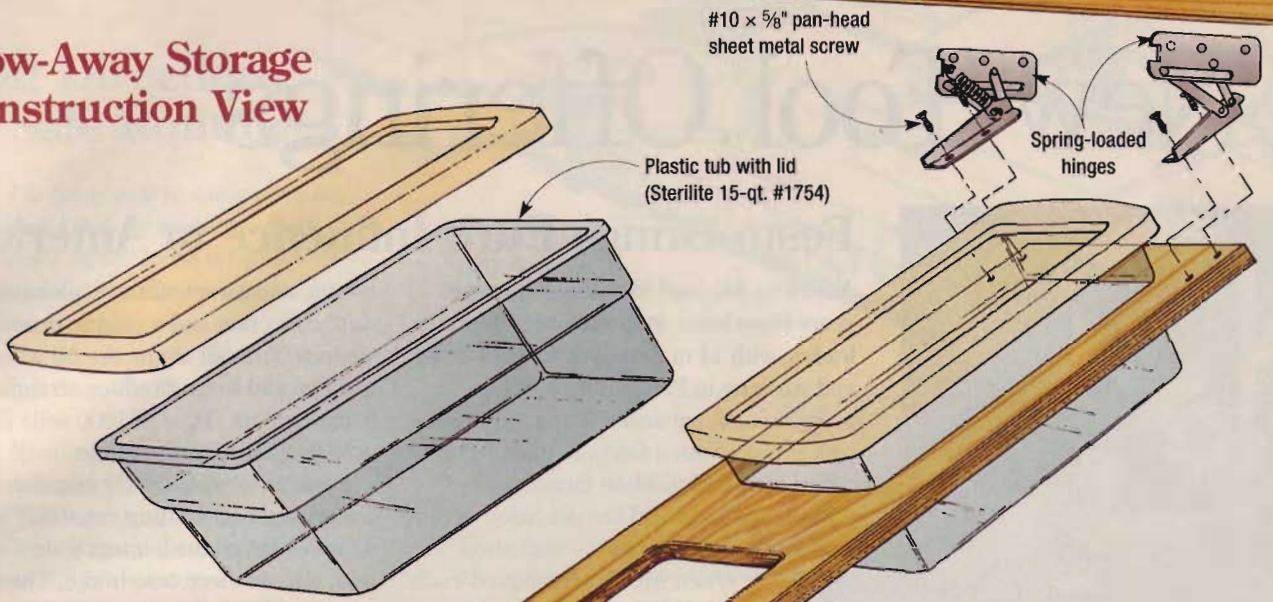
edges by routing a $\frac{1}{4}$ " roundover on all the frame edges.

Mark hinge-mounting locations on each frame, and drill pilot holes for #10 $\times \frac{5}{8}$ "-long pan-head sheet metal screws. But don't mount the hinges to the frames yet. Instead, drive the screws partway into the holes for now. You'll secure the frames to the hinges later, after the hinges are in place on the joists.

Install the barrel bolts near the other end of each frame. Note that they're positioned on the face opposite the hinge screws.

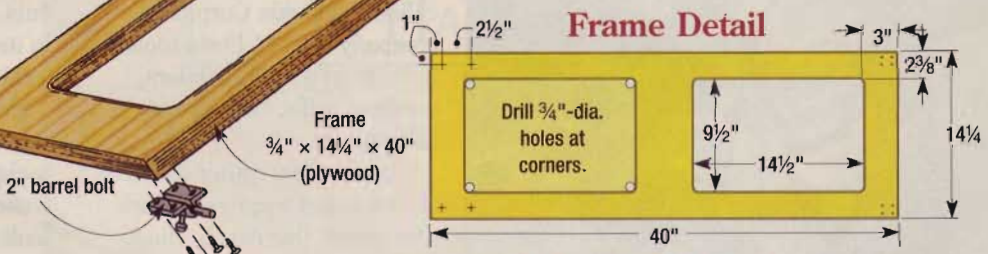
With the frames complete, mark the position of one hinge on a joist (**Mounting Detail**). Use a framing

Stow-Away Storage Construction View



WORKBENCH PROJECT SUPPLIES

STOW-AWAY STORAGE
 A kit has been assembled for this project that includes the spring hinges, barrel bolts, and all mounting screws needed to build one pair of frames.
 Order number 3308100 \$17.95
 To order, call Workbench at (800) 311-3994.



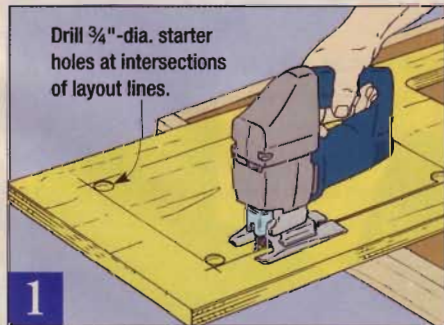
square to transfer this location to the adjacent joist (Figure 2). Then drill pilot holes and fasten the hinges by driving #6 x 1 1/4"-long flat-head sheet metal screws.

Mount the frames on the hinges by slipping the screws you partially drove earlier into the hinge key-hole slots. Swing each frame up to make sure it clears the joists. Adjust the position of the frames as necessary, then fully tighten the hinge screws.

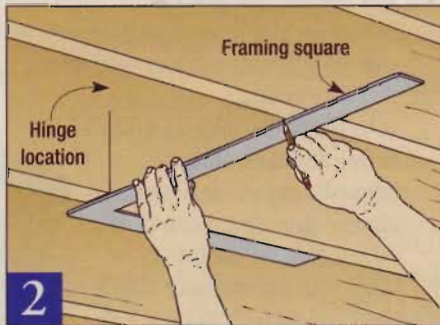
Mark where each barrel bolt contacts the joist, and drill a 3/8"-diameter x 3/8"-deep hole in the joist.

When I started building this simple system, I knew it would help ease my storage problems. As I loaded each tub and stowed it away, though, I was amazed by the amount of stuff the system can hold. Granted, this isn't the place to store an anvil collection — I'd keep the load on each frame under 25 lbs., and make sure to support each frame as you swing it down.

But now in a space that was otherwise wasted, I've stashed the seldom-used stuff that had filled several shelves to overflowing. The system works so well I'm building more for my garage.



1 Lay out the tub openings, then drill a hole at each corner. Cut the openings using a jig saw, then rout a 1/4" roundover on all edges.



2 After marking the hinge location draw a line to the bottom edge of the joist, then use a framing square to transfer this mark to the adjacent joist.



New Tool Offerings



Festo Brings Euro Influence to America

American Michael McGibbon has over 35 years experience in the construction trades, with 14 of those years spent living and working in Paris, France. While there he took particular liking to portable power tools from a German manufacturer called Festo. McGibbon found these portable tools rivaled the precision of the stationary machines in his workshop.

When McGibbon moved back to the U.S. he decided to import Festo tools, forming a company called Toolguide Corp. The company sells 14 Festo tools, including jig saws, sanders, cordless drills, circular saws, and routers.

The OF 1000 router offers all the expected features — variable speed, fine depth adjust-

ments, and turret stops — plus integral dust collection and a unique guide rail system. The rail aligns the bit with a layout line and helps produce straight, accurate cuts. The OF-1000 sells for around \$330 with the guide.

Festo's AT 65 E (7½") circular saw features plunge-cutting capability with depth-of-cut control, integral dust collection, and an electronic brake. The saw works with the same guide system as the router to give accurate, splinter-free cuts. It's not an average saw, as reflected in its \$550-plus price tag (including guide rail).

Prices for some Festo tools might seem high, but if you long for stationary tool performance high performance from portable tools they may be worth a look. Call Toolguide at (888) 337-8600.

Makita Rolls Out Next Generation Ni-MH Cordless Drills

One of the big newsmakers at last year's National Hardware Show was the alliance between Energizer Power Systems (the pink bunny people) and Makita U.S.A. The companies worked together to develop a new generation of battery packs for cordless tools.

Made with nickel metal hydride cells (Ni-MH), this battery type could eventually replace today's nickel cadmium (Ni-Cad) batteries as the preferred power source for cordless drills and saws.

Compared to Ni-Cad batteries, Ni-MH cells offer higher power ratings (2.2 amp/hours versus 2.0 amp/hours in the Super High Capacity Ni-Cad cells) at a lower weight. And since they don't contain cadmium, they're also more environmentally friendly.

Now Makita has introduced the first Ni-MH-powered tools — two ¾" drills. Both the 14.4-volt 6233DWBE and the 12-volt 6213DWBE have keyless



chucks, 18-position drive clutches, and each comes with two batteries, a carrying case, and charger. The charger handles both Ni-MH and Ni-Cad batteries.

Makita also offers Ni-MH packs to fit their existing drills in 14.4-V, 12-V, and 9.6-V "pod" and "stick" styles. Prices for the drills and batteries will run 10-20% higher than equivalent Ni-Cad versions.

In tests, the Ni-MH drills drove about 50 more 2" drywall screws on a single charge than the same drill with a Ni-Cad pack (349 vs. 296), a boost of about 17% in total run-time. You can contact Makita at (800) 462-5482 for more information.

Skil Introduces a New Power Plane

These days it seems there's an electric-powered version of almost every tool, including the hand plane. One of the latest power planes is the 1555 Plane from Skil Power Tools (a division of S-B Power Tool Co.). It has a 4-amp, 15,000-rpm motor that turns solid carbide, reversible cutting blades. Other features include $1\frac{7}{32}$ "-wide rabbeting capacity, a support that raises

the shoe to protect the blade while not in use, and on-tool blade wrench storage. The 1555 Plane retails for around \$70. Contact S-B Power Tools at (800) 301-8255, or on the web at www.skiltools.com.



Wolcraft's 5-in-1 Forstner Bit Set



If two heads are better than one, are five heads better still? That's apparently what the folks at Wolcraft believe, as evidenced by the new #7650 Forstner Bit Set. Its single shaft accepts five different Forstner bit heads.

The idea behind this design is that by using less steel than would be needed to make five individual bits, the #7650 set can be produced more economically, and in turn sold at a lower price. Retail cost for the set is around \$40.

The set is made in Germany from high speed steel, and includes heads with diameters of $\frac{3}{4}$ ", $\frac{7}{8}$ ", 1", $1\frac{1}{4}$ ", and $1\frac{3}{8}$ ". Steel quality and machining are good for a lower-priced bit set. The shear angles of the cutting edges are steeper than on some Forstners I've used, but the bits still cut clean, flat-bottomed holes.

A nice touch in the set's design is the round shank atop each drill head that slips inside the hollowed-out lower portion of the shaft. This prevents the head wobble that might occur if only the mounting threads engaged the shaft. You'll find the #7650 Forstner Bit Set in hardware stores and home centers. Or call Wolcraft at (630) 773-4777.

Delta Draws Dust

Delta's newest addition to its line of dust collectors was designed with small shops in mind. To that end, the company put the model 50-840 single-stage collector on swivel casters, making it easy to wheel from machine to machine as needed. Unlike some portables, though, the Delta has a 1-hp motor that runs on 115 or 230 volts. The motor is partnered with a steel impeller to produce 650 cubic feet per minute (CFM) of air velocity. A finned aluminum housing keeps the motor cool during extended periods of use.

The collector's lower bag holds 2.1 cubic feet of dust and shavings, and the upper (filter) bag is rated at 30-microns. Delta also provides a 5-ft. length of 4"-dia. flexible hose.

You can contact Delta at (800) 438-2486, or check their web site at www.deltawoodworking.com. The

model 50-840 should carry a street price of around \$230.



Craftsman Compact Welder

If you've ever wanted to own a welder, but thought you'd have to buy a lot of expensive, complicated equipment, then you'll want to check out the new Craftsman 80-Amp Gasless Wire Feed Welder. This compact unit could make welding practical for us do-it-yourselfers and welder wanna-bes.

Unlike traditional gas-fed welders that require a torch and rod, this unit operates on 110-volts, and welds with wire that's automatically fed through the welding gun as you work. It draws just 15-amps, but produces 80-amps of output power. Four settings allow you to regulate the welder's power to match the needs of your welding job. You can weld steel as thick as 3/16" and as thin as 18-gauge.

Weighing in at only 31 pounds, the welder is easy to carry and store. All of the accessories you'll need to get start-



ed are included. There's a full face shield, welding gun and tips, a ground clamp, and a spool of flux-core welding wire. A two-year full warranty and five-year limited warranty cover the welder, while the welding gun and cables carry

a one-year warranty. You'll find the 80-Amp Gasless Wire Feed Welder for \$199.99 in the Craftsman Hand and Power Tools Catalog. Call (800) 377-7414.



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Products For Your Home

Home Director Controls Lights, Appliances Via Computer

When home automation systems were introduced, I was intrigued by their ability to run all types of household devices automatically. Unfortunately, many of these early systems were overly complex, expensive, and not always reliable. As technology has improved, how-

ever, home automation hardware and software have become simpler, more dependable, and more affordable.

Home Director from IBM represents this new generation of home automation. This system runs on any 386 or higher Windows-based PC (sorry Mac users), and sends signals to various controllers that operate lights, switches, and appliances using your home's existing wiring.

The basic kit, at around \$100, includes the software, a PC interface, one light controller, an appliance controller, and a multi-function remote control. Additional controllers, switches, and accessories are also available.

Connect the interface to your computer and it stores the commands you program, running

the system even when your computer is turned off (battery backup stores your program if power fails). Plug a light or appliance controller into any wall outlet, and plug the device to be controlled into it. The controller receives high-frequency radio signals from the interface, meaning no additional wiring is necessary.

By clicking on-screen icons you can, for example, turn on, turn off, or dim a lamp. You can do the same using the remote, which will also work with your TV, VCR, and satellite system.

Where the system shines is running routines. You program times for items to turn on and off, dim, etc., then download the information to the interface. The system can even monitor how you use connected devices, then devise a custom program for you. You can also set up dusk-to-dawn running of exterior lights, and control Home Director by telephone using an optional interface. Contact IBM at (800) 426-7235, or on the web at www.pc.ibm.com/homedirector.



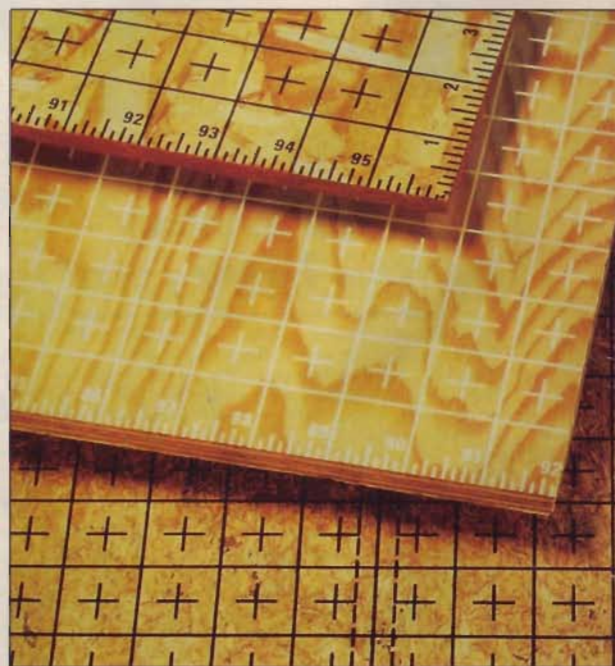
Nail-by-Number Building Panels

Whenever I've installed wall, roof, or floor sheathing, my biggest challenge has been driving a fastener into the studs or joists hidden beneath the sheet. I've either marked guide lines on the sheathing or used a hit-and-miss approach.

To eliminate these hassles, the folks at Louisiana Pacific (L-P) have introduced new Visual Precision plywood and oriented strand board (OSB) panels. Each panel has a grid painted on one surface that divides the sheet into 1" increments, with markings that indicate common construction divisions, such as on-center stud or joist spacing.

Visual Precision panels were originally designed for builders and contractors to reduce labor costs and improve building quality. For us do-it-yourselfers who may not be able to divine proper fastener placement as easily as a professional, L-P also will offer the product at home centers in some areas and may expand availability in the future.

The Visual Precision grid is available on a range of OSB and plywood floor, roof, and wall sheathing panels. Expect prices for Visual Precision panels to be about 10% higher than comparable L-P panels without the grid. Call Louisiana Pacific at (800) 828-8436.





Spiral Stairs in a Kit

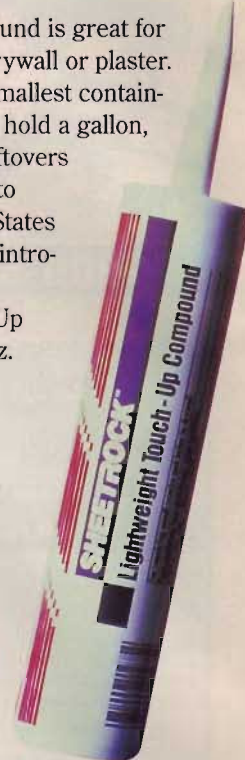
If you'd like to add a second stairway in your home, but conventional stairs just won't fit, spiral stairs offer another option. But if you've ever shopped for spiral stairs, you know that custom-built units can be expensive and difficult to install. Building your own spiral staircase from scratch is a complicated process, but for do-it-yourselfers, there's a new route; Albini and Fontanot Spiral Stair Kits.

Albini and Fontanot, based in Rimini, Italy, has sold stair kits abroad for years, and is now offering three kits in the United States. The one outdoor and two indoor models come ready-to-assemble, with a center support column, stair treads, railing, landing, and balusters. Varying ceiling heights are accommodated by using different numbers of risers and treads, and the stairways install with either a clockwise or counterclockwise rotation.

Kit prices range from around \$1,000 to \$2,200. For more information, or to locate the dealer nearest you, call Albini and Fontanot at (888) 782-4758 or visit their web site at www.iper.net/albini-fontanot.

Mud in a Tube

Drywall joint compound is great for making repairs to drywall or plaster. Unfortunately, the smallest containers available usually hold a gallon, so you often have leftovers that dry out and go to waste. Now United States Gypsum (USG) has introduced Sheetrock Lightweight Touch-Up Compound in 10.5-oz. cartridges. Slip one into your caulking gun, and you can apply the compound exactly where it's needed. Even if you have extra, the small size minimizes waste. Cartridges sell for around \$2 each. Call USG at (800) 874-4968.



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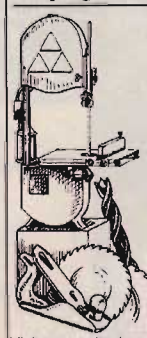
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Product Information Number 181

Troy-Bilt's 2-in-1 Tiller

If you've got a big tilling job there's no substitute for a powerful rear-tine tiller. But for tasks like cultivating or weeding a garden, a front-tine machine is more maneuverable and usually easier to see around. Most of us, though, can't justify owning both types.

Combine them into one machine, and you'd have a versatile tiller.

Garden Way, the manufacturer of Troy-Bilt equipment, has done just that and dubbed the combination machine the VersaTiller.

In rear-tine mode, the tiller is self-propelled, and the tines rotate counter to the wheels for serious digging power.

Deeply treaded pneumatic tires provide additional traction.

Pull a release and spin the handlebars around, and you're set for front-tine operation. The wheels aren't driven in this mode, but the rotating tines pull the tiller along. You can remove the tine cover for a better view during front-tine operation and differential steering allows for precise side-to-side control. Handle height is adjustable to accommodate short or tall gardeners.

In either mode, you can adjust tilling width from 7 1/2"-12", and tilling depth is up to 11". Power is supplied by a 4-cycle, 5-hp Tecumseh engine and a worm-gear transmission. A primer bulb helps ensure easy starting. VersaTiller weighs in at approximately 125 pounds.

Optional accessories include a border edger and an aerator, plus a soon-to-be-released dethatcher. The VersaTiller retails for a suggested \$799. Call Troy-Bilt at (800) 828-5500 for additional information.



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Product Information Number 207



Spenser's Fantasy Garden

The monarchy. Stoic palace guards. The stiff upper lip. These images convey British tradition to the rest of the world, but the garden at York Gate in Leeds, England, offers proof of a lighter side.

The creative playground of British landscape architect Robin Spenser, York Gate boasts an eccentric collection of architectural salvage from demolished churches, homes, and other regional sites. Aside from the baptismal font and stylized lions shown, the garden includes millstones and antique statuary, dolphin fountains and other carved animals, an obelisk, and a maze of cobblestone walls and paths.

English photographer John Glover, who shot these images, describes the scene as a dramatic fantasy landscape, a set for a Lewis Carroll story (of *Alice in Wonderland* fame).

A bit crackers? Quite so.

