

PRO Furniture Repair TIPS

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WORKBENCH™

WOODWORKING TO IMPROVE YOUR HOME

Storage Solutions for home and shop



PLUS:

- Built-In Closet Conversion
- Dado Blade Basics

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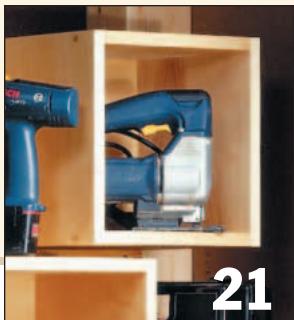
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EDITOR'S NOTES

Keeping up with all the changes on the Internet can be as challenging as figuring out the difference between a pin and a tail on a dovetail joint. So last March we created *Workbench Interactive*, a new department to help sort out what you can really learn about home improvement and woodworking on the Internet — and what is just plain hype.

We knew we wanted this department to be something other than simply a few pages in each issue about using a computer. It had to be filled with practical content. But the challenge was how to make it truly interactive.

Recently we've made some upgrades to the department to do just that. First is a slight name change to *WorkbenchInteractive.com*. It's a small change — but an important one — because we've done more than just change the name. We've built an entire Web site around this section of the magazine.

We'll also be adding features to the Web site like discussion forums, opinion polls, and free screen savers.

And, when you're online, you'll be able to click straight through to the Web sites we talk about in the magazine.

What if you don't have Internet access? Even if you've never surfed the Web, you can still pick up some of the valuable woodworking and home improvement tips we've found just by reading these pages in *Workbench*.

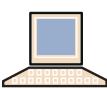
WIN A FREE ROUTER

Speaking of being online, I have a special request for those of you who do have Internet access. I've put up an online survey just for *Workbench* readers. (You can find it by typing in surveys.WorkbenchMagazine.com.) I'm interested in hearing what you think about the issue you're holding in your hands, and how we can improve *Workbench* in the future. If you answer a few questions, I'll enter your name for a chance to win a Porter-Cable 690 router. So, let me hear from you today.

HOW TO REACH US



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Questions & Answers



Cutting to the Core of Plywood

Q During a recent visit to my local lumberyard, I ran across some plywood that looked like it had a solid core rather than veneer layers. Isn't all plywood made with layers?

Anthony Brant
via the Internet

A No, not all plywood is made like the traditional veneer-core style, which uses sheets (plies) of thin veneer glued together (see top photo). The grains of these plies run perpendicular to each other, giving it strength and stability. Another reason for veneer-core's popularity is its superior screw-holding ability. I still use veneer-core ply most often for home improvement and woodworking projects.

Although veneer-core ply remains the standard, plywood is also produced with other types of core materials. Each has its own characteristics as shown in the chart below.

Even though medium-density fiberboard (MDF) and particleboard have been around for years, many woodworkers don't consider them true "plywood." And they may be right when you consider that those

materials are simply engineered panels with veneer applied to both faces (see middle two photos).

The biggest advantage to using MDF or particleboard plywood is that they're usually uniform and flat. This makes them a good choice for built-ins and other projects that feature large panels.

However, I wouldn't recommend using MDF or particleboard ply for free-standing furniture that gets moved around a lot because of their weight. Another problem with these two core materials is that they aren't very stiff or strong. And they don't hold screws very well.

Another type of plywood known as lumber-core uses narrow strips of solid wood (either softwood or hardwood, but not both mixed) edge joined to build up the core (see bottom photo).

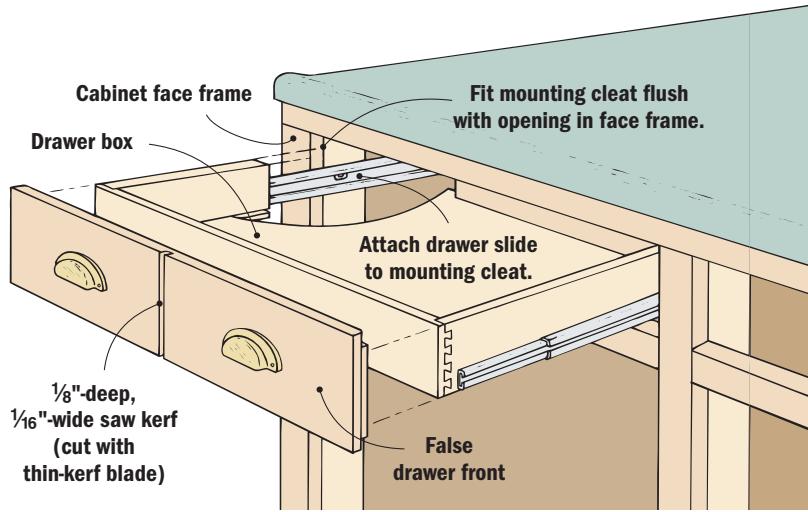
Lumber-core plywood is a good choice for projects where the edges will be exposed because you won't see the contrasting layers like you do with veneer-core ply. You may still get a little chipping along the edges, but the solid core accepts paint and stain better than other types of plywood. Lumber-core plywood isn't widely available.

CHARACTERISTICS OF DIFFERENT CORE PLYWOODS

Core Type	Flatness	Visual Edge Quality	Surface Uniformity	Dimensional Stability	Screw-holding	Bending Strength	Availability
HARDWOOD VENEER	F	G	G	E	E	E	READILY
SOFTWOOD VENEER	F	G	F	E	E	E	READILY
PARTICLEBOARD	E	G	E	F	F	G	READILY
MDF	E	E	E	F	G	G	READILY
LUMBER-CORE	G	G	G	G	E	E	LIMITED

SOURCE: Hardwood Plywood & Veneer Association

F = Fair, G = Good, E = Excellent



One Drawer is Better Than Two

Q It appears there are two drawers on the lefthand side of the base cabinet of your kitchen cabinets (Sept./Oct. 2000). How did you attach the drawer slides without dividers or stiles?

Jerry Post
via the Internet

A That's an interesting question. But I'll let you in on a little secret. What you're actually seeing is an extra-wide *single* drawer.

Take a look above at the false drawer front. Notice how the thin

kerf down the center gives the illusion of two separate drawers. It was designed to echo the twin doors below it, similar to the drawer that's built into the pantry cabinet.

You'll also notice above that the drawer slides were mounted flush with the opening in the cabinet face frame. To do this, I made some mounting cleats from 2x4 stock, and planed them down until they fit flush with the face frame. Then I screwed the cleats to the cabinet side and mounted the drawer slides to the cleats.

Removing Mold and Rust Spots

Q We have a bay window made of oak that got wet and now has black areas — possibly mold — on it. How can I remove the blackened areas and refinish?

Kathy Rasmussen
via the Internet

A Your first step should be to strip the window of any finish if the water damage hasn't already done this for you.

Then I'd start by treating a small spot first with a commercial mildew remover or a solution of 1 part bleach to 3-4 parts water. I always add a little powdered detergent to the bleach solution.

Don't use liquid detergents. They can react with bleach to produce toxic fumes.

If bleaching doesn't work, you may be dealing with rust marks caused by water and metal residue. In this case, dissolve some oxalic acid crystals (available at pharmacies and many paint stores) in warm water. Brush the solution over the stained areas. Let it dry, then wash the surface with a sponge or cloth. As a final step, add some borax and a small amount of household ammonia to clean water and wash once again to neutralize the acid.

This treatment may bleach the wood just slightly. And you may need a second or third application.

CAUTION: Oxalic acid is highly toxic, so be sure to follow the manufacturer's instructions carefully. And always wear gloves and goggles when using it.



Drywall Tape: Paper vs. Fiberglass?

Q Could you tell me and all of the other first-time drywallers what the difference is between compound joint tape made from paper and fiberglass mesh tape?

Forrest Kozul
Fairmont, WV

A The main difference between the two is that fiberglass tape has a self-adhesive mesh backing to it. Paper tape doesn't, which means you have to lay down a basecoat of joint compound that the tape can be laid into. Fiberglass tape can be applied directly to the wall without any basecoat.

I think paper tape is the best choice if you're a beginning drywaller for a couple reasons.

First of all, when applied properly you'll have fewer problems with it wrinkling and bubbling. This means fewer repairs later on.

Another reason I prefer paper tape is because how easily it folds around corners. Finally, I like the fact that paper tape can be cut simply by using the edge of your taping knife. Fiberglass tape doesn't cut as easily.

Unless you have a lot of drywalling experience, I wouldn't recommend using fiberglass tape. The big advantage to mesh tape is that it's self-adhesive and can be applied quickly. But I found it's more likely to crease and bubble when compound is applied over the top of it. Another drawback to mesh tape is that it doesn't form to corners as easily as paper tape.

There's a third type of tape you can purchase — flexible corner tape. It's similar to regular paper tape, except that it has two metal strips in the center where it's perforated. These metal strips give the tape a little extra strength on inside and outside corners.

Designing Shelves to Avoid Potential Sagging

Q What is the maximum length you'd suggest for shelving before it starts sagging?

Beverly Larson
Madison, WI

A Anytime you're building shelves, you have to deal with the issue of sagging. I wrestled with it when designing the built-in bookcase (Nov./Dec. 2000). After talking with our shop manager and doing a little experimenting, I recommend a 2-ft. maximum span for shelves made from

3/4" particleboard. You can increase this to 30" by using 3/4" plywood and a full 3 feet if you use solid stock (see chart below).

However, the amount of sag will always vary depending on the load and how it's distributed, the material used for the shelves, and what type of reinforcement (if any) is used. Here are some steps you can take to help reduce sag when building any type of shelves:

1. Reduce the Span. A rule of thumb is if you cut the span in half, the sag will be 1/8 as much.

2. Increase Shelf Thickness. A thicker shelf will be more rigid. Again, you can reduce the sag to 1/8 of the original by doubling the thickness of the shelf.

3. Reinforce the Shelf. One of the best ways to reduce sag is to add support to the edges of the shelf or underneath it.

For minimal sag, I used 3/4" plywood with hardwood edging on the bookcase project. The edging not only helped reinforce the shelves but also improved their overall appearance.

MAXIMUM RECOMMENDED SPAN: 10"-WIDE SHELF LOADED W/ BOOKS

3/4" PLYWOOD REINFORCED WITH:

1 1/4"-WIDE FACE STRIP ON SIDE **32"**

1 1/4"-WIDE FACE STRIP ON EDGE **36"**

MOLDING STRIPS UNDERNEATH **36"**

WITHOUT REINFORCEMENT:

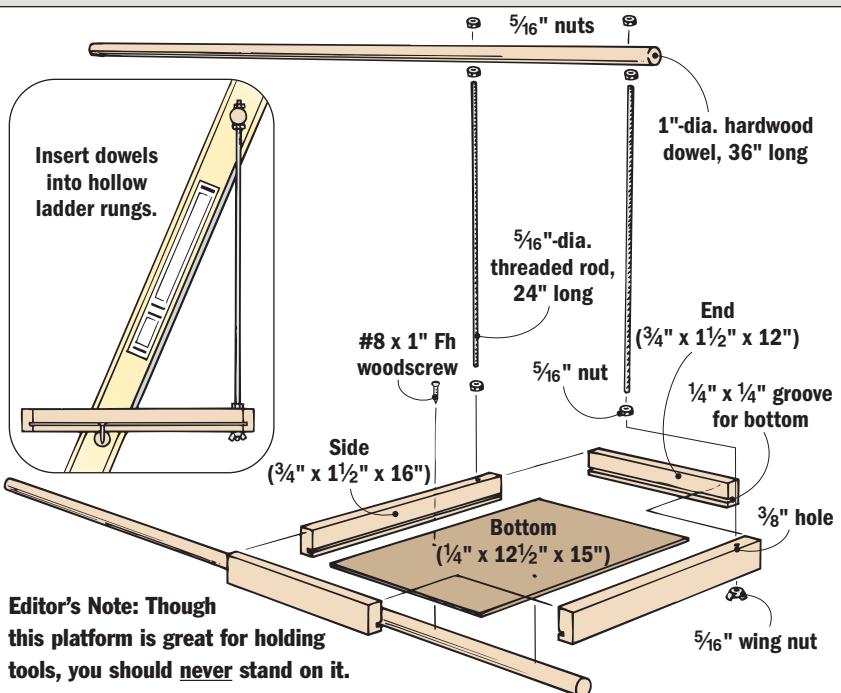
3/4" PARTICLEBOARD **24"**

3/4" PLYWOOD **30"**

3/4" SOLID STOCK **36"**

Tips & Techniques

FEATURED TIP



Extension Ladder Caddy

After spending a good deal of time repainting my two-story house, I got tired of climbing up and down an extension ladder to get the tools or supplies I needed.

Then I realized the rungs were hollow and it gave me an idea for a removable shelf platform. The platform sits to the side — not behind the ladder. It's supported by a couple of 3-ft. lengths of 1" dowel that slip inside the ladder rungs.

Built like a shallow drawer, the platform's 1x2 sides and ends form a lip so tools won't fall out. The rear of the platform is suspended from the top dowel by two lengths of threaded rod (see the drawing above). The front part of the platform rests on top of the dowel extending from a lower rung.

To assemble the platform, you need to actually install it on the ladder. Start by setting up the ladder at the proper angle (look for a label on the side of the ladder). With the ladder set, insert the dowel with the threaded rods in one of the ladder rung holes, letting the rods hang down. Insert the other dowel into the ladder two rungs down from the first one.

After threading a nut a couple of inches up each rod, slip the rods through the holes drilled in the platform. Let the platform rest on top of the second dowel. Now thread a wing nut onto each rod, turning the wing nuts until the platform sits level. Then, to lock it in position on the rods, tighten the nuts above the platform.

To attach the platform to the dowel drill two countersunk screw holes through the plywood directly above the lower dowel, then drive screws.

The great thing about the platform is that you can hang a paint can from a hook on the upper dowel and store tools on the platform. Even if you have to stand the ladder at a slightly flatter angle to work around shrubbery, the bucket still hangs straight.

Benjamin Farbaniec
Elizabeth, NJ

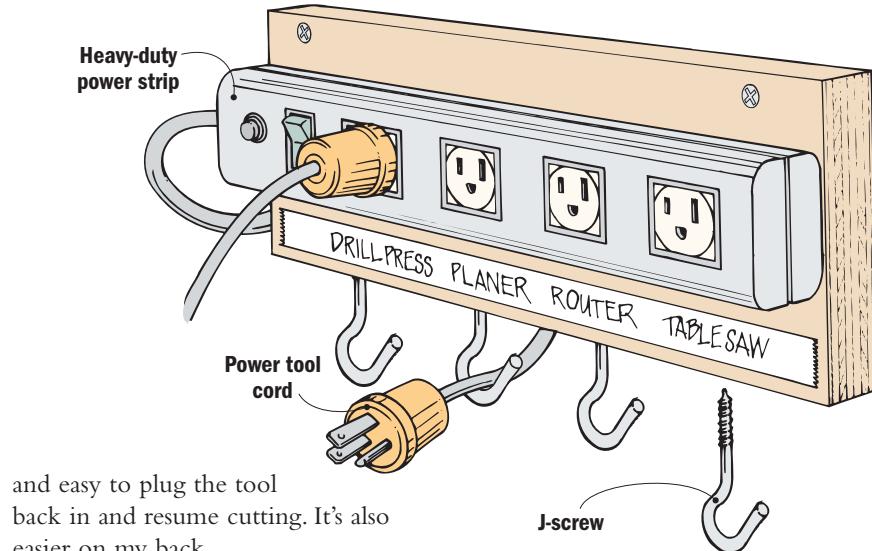
Workbench congratulates Benjamin Farbaniec for submitting this issue's Featured Tip. In recognition, he will receive \$250 worth of tools from The Stanley Works.

Keep Plugs Handy

I've always unplugged any power tool when changing a bit or blade. The problem with stationary tools is having to retrieve the tool's cord, which always seems to disappear under a bench or behind another tool.

To help keep cords where I can reach them, I mounted a heavy-duty power strip to a board. Next, I mounted the board to the wall in a central location, then added some J-screws along the bottom edge of the board under each of the strip's outlets.

Now, when I unplug a tool, I hang the cord on the J-screw. After changing the blade or bit, it's quick



and easy to plug the tool back in and resume cutting. It's also easier on my back.

*Arthur Chism
Hot Springs Village, AR*

Door Closer Holds Resaw Stock Firmly

When resawing some thick stock on my band saw, I tried using the standard featherboard I normally use with my table saw. The problem was, it only kept the bottom of the stock against the fence.

One of the main advantages of a featherboard is reducing kickback. And since kickback isn't much of a problem with a band saw, I looked for another way to hold the stock against the fence. The answer was a spring-loaded screen door closer.

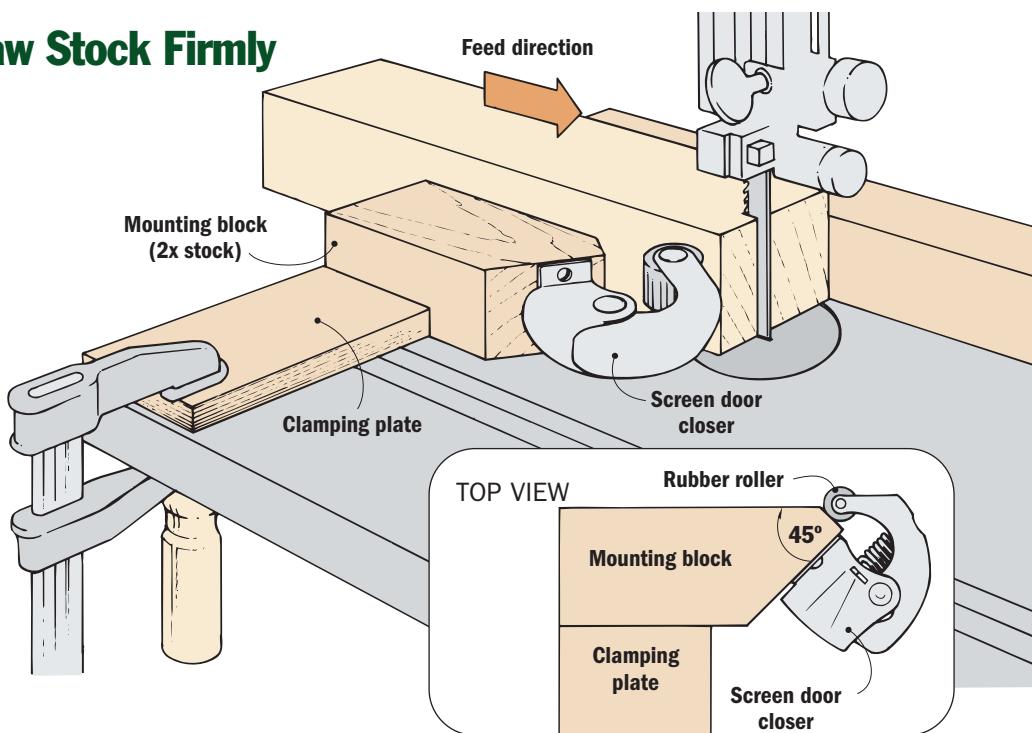
By mounting the closer on a mitered piece of 2x stock (see the drawings at right), the spring keeps tension against the stock being resawn. The rubber roller turns as the stock advances through the cut.

To make it easier to clamp the jig to the table, I glued and screwed a plywood clamping plate to the 2x mounting block.

If I want the stock tensioner to run higher for wide (tall) resawn stock, I shim it up with pieces of scrap under the clamping plate.

Be sure to position the tensioner so it's safely away from the blade. And because of the steel closer, I wouldn't recommend using this jig with a table saw.

*Dr. Donald Bahner
Ardmore, OK*



Share Your Tips, Jigs, and Ideas

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

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Des Moines, IA 50312.

Please include your name, address, and daytime phone number.
If you prefer, e-mail us at:
Editor@Workbenchmag.com

You'll receive \$75-\$200 and a Workbench hat if we publish your tip.

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

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



Appliance Cart Doubles As A Sheet Goods' Helper

On a recent trip to the lumber yard to buy some plywood, I had to wait quite a while for one of the yard hands to help me load up. I'd also left a hand truck in the bed of my pickup from a previous chore and had to unload it to get it out of the way.

As I stood there waiting I decided to try loading the plywood by myself. Placing the hand truck on the tailgate with the wheels up, I lifted one end of a plywood sheet onto the wheels.

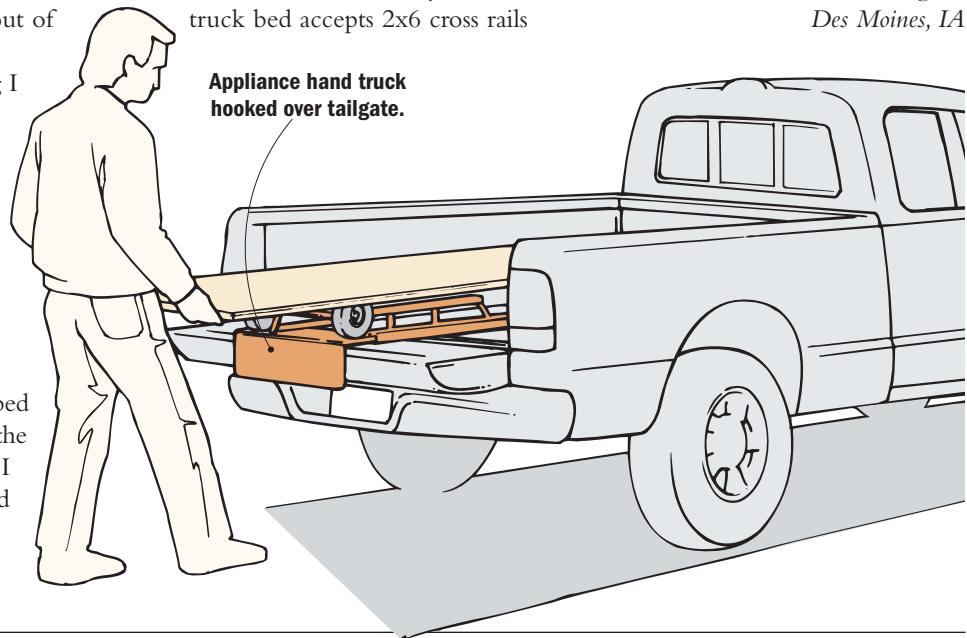
Then I picked the other end up off the ground and "rolled" the sheet into the bed of the pickup. By the time the yard guy finally showed up, I had the plywood loaded and was ready to go.

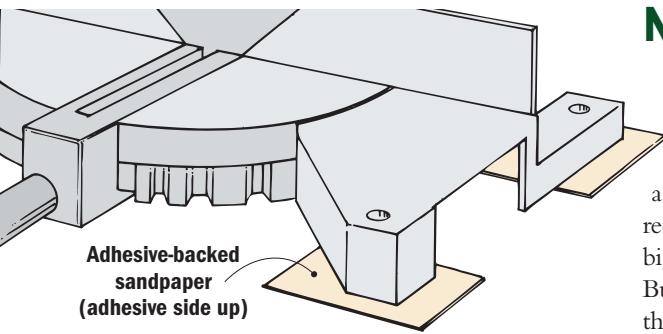
While this tip works great for exterior sheet goods, I wouldn't suggest it for hardwood plywood unless you want tire tracks running down your wood.

It works even better if your truck bed accepts 2x6 cross rails

to hold sheet goods above the wheel wells. That way, the handles of the hand truck don't get caught under the stack of plywood and you can close the tailgate.

*Mark Higdon
Des Moines, IA*





Non-skid Feet for Benchtop Power Tools

When working on a job site, I usually clamp a piece of scrap plywood to a sawhorse and use that as a stand for my miter saw. On a recent job, the only scrap I could find big enough was a piece of melamine. But the miter saw wanted to slide on the slick surface of the melamine.

I solved the problem by tearing off some pieces of adhesive-backed sandpaper and sticking them to the bottom of the miter saw's base. The saw stayed put and I simply threw the sandpaper away when the job was finished.

*Vince Nielsen
Chicago, IL*

Use Gasket Sealer for Cooktop Install

As part of my kitchen remodeling job, I planned to install a new glass cooktop. When I slipped the cooktop into position, I discovered that the ceramic tile counter wasn't perfectly flat. The cooktop was resting unsteadily on a couple of high points.

I thought about using silicone caulk under the cooktop, but was concerned about exposing the caulk to heat. So I used a sealant that can stand up to heat — an RTV automotive gasket sealer (such as Permatex).

The RTV sealant formed a custom "gasket" between the cooktop and the ceramic tile and prevented the cooktop from wobbling.

*George Wilson
Whitesboro, NY*

Polish Marks The Spot

When I recently installed a deadbolt lock, I wasn't quite sure where to drill the hole for the bolt. So I used a tiny dab of nail polish centered on the end of the bolt. Then I closed the door and turned the knob so the bolt touched the jamb. The wet polish left a mark on the jamb exactly where I needed to drill.

*Lloyd McGowen
Wilmington, NC*

WORKBENCHinteractive.com



Workbench Interactive Goes “Dot-com”

Since March of last year, this space in the magazine has been dedicated to telling you about the best woodworking and home improvement Web sites and software we can find. And in all that time, we've hardly even mentioned our own site (www.WorkbenchMagazine.com).

So this time out, we decided to tool

our horn a bit and talk about a brand new site that we've just launched: www.WorkbenchInteractive.com.

Of course, our original site will still be there with all the great articles, tool reviews, and links you've come to expect. The purpose of this new site is to really live up to the name *Interactive*. We're going to do that by giving you several new ways to contribute to the site.

SPEAK YOUR MIND

One of the most interesting ways you'll be able to participate in the site is through the “Write Your Own Review” feature. What we're hoping for here is that, after using a program or visiting a site that we've reviewed, you'll write up your own experiences, good or bad.

On the other hand, if you just want to take issue with something we wrote, there's an area for that also. In the “Comment on Our Reviews” area you can tell us what you think of our latest efforts. For instance, several readers commented that we should have spent more

time talking about the privacy policies of the online retailers we reviewed last issue. That's exactly the kind of thing we need to hear so we can be sure we're giving you the information you need.

On the lighter side, we're also going to be putting up some quick polls and quizzes on the site. We'll ask a few serious questions for sure, but mostly we're just hoping to have some fun with this feature.

Another interactive feature of the new site will be the “Site Swap Forum.” This forum will be different from the forums already running on our other site because it has the express purpose of sharing online resources. For instance, if you're looking for a site that has holiday scroll saw patterns on it, and you can't find it among the links we already have on the site, pop into the forum and put up a note about what you're looking for. Chances are, it won't be long before someone can point you to just what you're looking for.

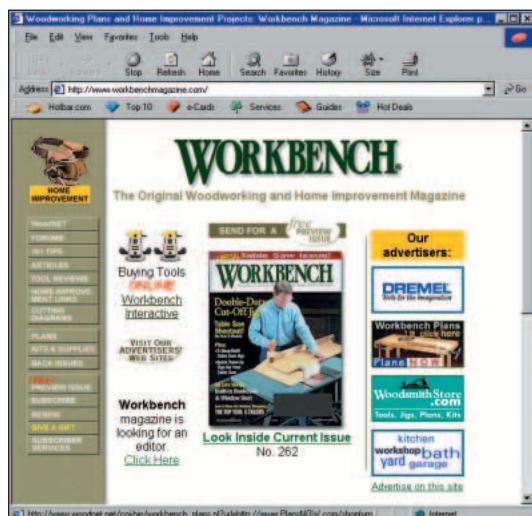
WORKBENCH FREEBIES

Of course, we wouldn't think of launching a new site without giving something away. In fact, we're going to try to make sure there are always a couple freebies available on the site.

First off, we're offering *Workbench* screensavers and screenshots that you can download to your computer.

And occasionally we'll be giving away tools or materials we've featured in recent articles. Right now we're offering a chance to win the *Workbench* “Essentials” Toolkit. See page 56 to learn more about the toolkit and page 60 for instructions to enter the drawing.

Of course, these are just the things we're doing for this issue. Look for more changes with every issue.



The original *Workbench* Web site (above) will still have all the content you're accustomed to. The new site (below) will have some unique interactive features.



BEST Tool Sites Whether you're looking for the best deals on tools, techniques for using them, or just want to appreciate some tool history, this is where you'll find links to the sites you want.

BEST Wood Sites This area will point you to our favorite sites for chatting with other woodworkers, picking up some free plans, or learning new shop techniques.

BEST Home Improvement Sites Seems like everyone has a home improvement site these days. Not all of them are good, though. Find out which ones we like and dislike in here.

BEST Software Programs Reviewing home improvement and woodworking software is one of our favorite pastimes. The ones we found to be particularly useful are in this area.

Complete Home Software From Sierra Inc., Is A Total Design Package

If you've ever considered purchasing one of those "home design" computer programs, you know there are plenty to choose from. And at first glance, it's kind of hard to tell them apart. Most of them come from reputable companies and they're all priced about the same. But recently, SierraHome, a major publisher of interactive software, released a package that includes eight programs for the DIY home designer and improver.

The package includes eight pieces of software that were originally sold in three different packages. The total cost for all eight pieces would have been over \$100. Now they've bundled all eight pieces together for a suggested retail price of \$69.95.

BUT DOES IT WORK?

Of course, a great deal is only a great deal if you get something useful from it. And from everything I've seen so far, this is a great deal.

First of all, you don't have to be a computer whiz or an architect to run this software. The instructions that come with the bundle explain each program thoroughly. More complicated programs like the Home Architect and Deck Designer also have interactive demonstrations to help you get started.

One of my favorite features of the Home Architect is that it allowed me to work with a floorplan I had already drawn on paper. I scanned the drawing in and resized it to fit on the computer screen in just a few minutes. Then I traced over the floorplan using the room drawing tool in the program. The rooms "snapped" together as I drew them — all I had to do was get them close together and the computer would join them seamlessly.

You can also see the floorplan in 2D and 3D at the same time (right). That's nice for those of us who draw in 2D (like a regular blueprint) but want to see what things will look like once they're built.

INTERACTIVE REFERENCE TOOLS

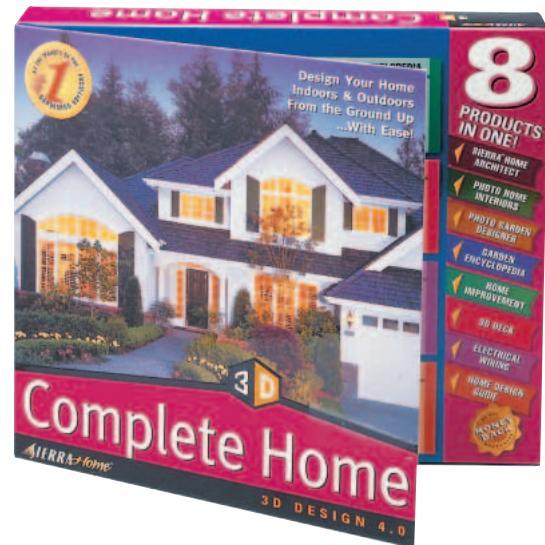
The Home Improvement Encyclopedia is another feature I really like about this program. Just about every question you could have about working on your home is answered here.

Most topics are explained in still pictures and text, others have a series of short videos to watch. All of them include links to more information on the subject. Some of the links will take you to other areas in the program while others send you to Web pages.

That's just one of the ways that the program really goes the extra mile to make sure you have all the information you need for your project. There are several others.

For instance, when I needed some instructions to fix a leaky hose bibb on my house, I found them under "Plumbing" in the encyclopedia. But what I didn't count on was the tip on reusing the worn out washer to stop the leak temporarily. That came in real handy while I ran to the hardware store to get parts for a permanent fix.

Tidbits like this usually show up as a "Rule of Thumb," "The Pros Say...," or "Penny Pinchers."



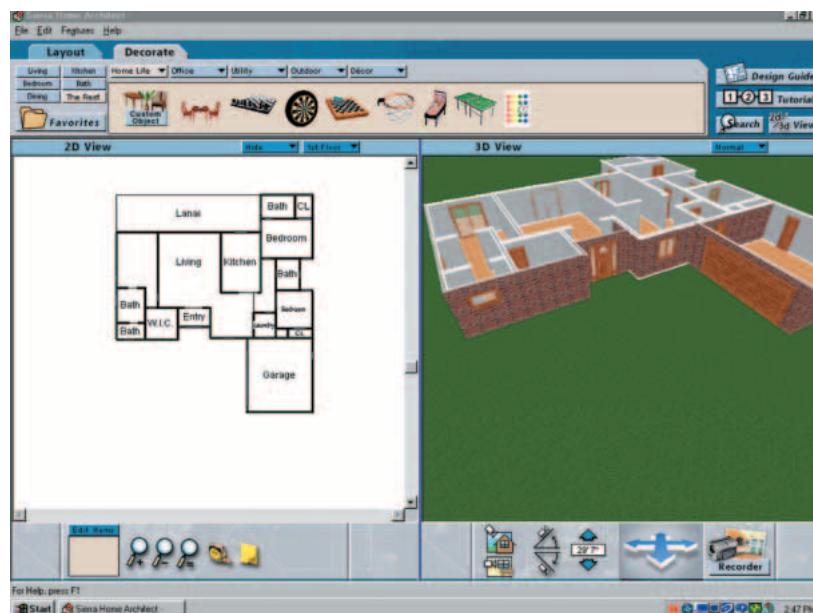
HOW TO BUY IT

The software is available directly from SierraHome on their Web page (www.SierraHome.com) or by calling their toll-free number (800) 757-7707. You might also be able to find it at a local computer store or an online retailer.

Personally I found the best price at Amazon.com (item number B00004XSHS), though there's no guarantee that their price will last.

MONEY BACK GUARANTEE

If for some reason you're not happy with this program, you've got 90 days to send it back to SierraHome for a full refund.



Forum Advice for First-Time Builders

A visitor to our Home Improvement forum (www.WoodNet.net) recently asked for advice that he could pass on to his daughter, who was just about to build her first home.

Not surprisingly, there were some pretty typical answers. Things like: Hire an architect. Don't let your payments get ahead of the actual construction. Hold at least 5% of the contract amount back until closing.

But scattered among the usual answers were a few I found really interesting — things not everyone might think of. The original question is below along with the responses I thought had some unique insight.

My daughter and son-in-law are building their first house. Please give them your three best suggestions of things to do or watch out for.

— tuxedo

Don't skimp on the basic floorplan. If they need to save money, tell them to look at cheaper floor and wall coverings, light fixtures, and kitchen cabinets. Over time, they can replace these things more easily than altering the footprint of the building.

— badwhiskey

These are three items that we find very helpful and are much cheaper to install while the house is being built than to add later.

1. Intercom, phone, and cable outlets all over the place.
2. Central vacuum system
3. Trashmaster

— Ron Smith

Take pictures and video of walls just prior to sheetrock so you know where pipes, wires, etc. are at a later date.

— Gah@home

If they live in a cold part of the country, they should consider in-floor radiant heating. The initial cost is higher, but the comfort level of the home is wonderful — there are no drafts, no noisy fans, and no large fluctuations in room temperature.

— HarryO

1. Plan the basement for an 8-ft. ceiling.
2. Sketch the floorplan out on the lot and walk around in it. Our house was built before we noticed there was only one way to get furniture inside.
3. Pay attention to the traffic pattern. Even though this is our third house, we goofed on the kitchen layout and wound up remodeling it two years later. The traffic is still bad through there.

— MikeC

Have them make up a gift list. This is something one of my friends did and it was an incredible idea. They created a list of things they wanted for a house that was three years down the road. My wife and I made our own list about a year ago. The rest of the family thought I was goofy when I bought my wife a water pump for Christmas, but she shrieked for joy. I'm hoping for GFCI circuit breakers this year.

— Tsunde

Free Board Feet Calculator

The Internet is overrun with "free" downloads of all kinds. As often as not, they turn out to be worth every dime you pay for them. Occasionally, though, some little gem pops up that actually turns out to be worthwhile.

One good example of that is the Woodbin Board Foot Calculator. I use this program all the time while figuring out materials for magazine projects. As long as my computer is turned on, this program works even quicker than my regular calculator.



And it certainly couldn't be any easier to use. Just type in the dimensions of the material you need, with the thickness expressed in terms of quarters (4/4, 5/4, 8/4, etc.). Then click the "Calculate" button and the program tells you how many board feet the dimensions equal.

It also keeps a cumulative total so you can enter all the pieces of a project to find the total board feet you'll need. You can even save the totals and refer back to them later.

The program is free and downloads quickly. To get your copy, go to www.WoodBin.com and click on the "Freebies" button on the left side of the home page.

Plans NOW

Try a Free Plan

PlansNOW offers four complete sample woodworking plans that you can download at www.PlansNOW.com.

Available are a shelf, planter, sunflower frame, and a cheeseboard.

Flexible Wall Storage

This wall-mounted storage system combines moveable, modular components with the efficiency of built-in furniture. And it easily adapts to fit any room.

Every time I shop around at my local woodworking store, I marvel at all the neat tools and products. But I also admire the way they're displayed. The store's walls are filled with horizontal slots

that hold all kinds of bins, shelves, and racks. Finally, I decided I needed some of that stuff on my shop's walls.

But when I went out to shop for material and supplies I ran into a

couple of problems. First, this stuff, known as "slot wall," was tough to find in my area. When I did locate some, the cost per 4 ft. x 8 ft. sheet seemed awfully high. Second, most of the accessories that hang in the



slots are only available through commercial supply houses. And the accessories are even higher priced than the slot wall itself.

The solution? Make your own slot system, and the modular components and hangers that go with it.

As you can see below, I came up with a system that works just as well in a kid's room or by the back door as it does in the garage or shop. You

might not be able to see how easy it is to build. All it takes is 1x6 pine boards, some birch plywood and solid wood, and a few tools. I used a table saw and dado blade set, my router, a drill, and a few clamps and basic hand tools to make everything you see here.

And to simplify the construction even more, I made a lot of the component parts the same or similar.

Once you have the machines set up to cut pieces it's easy to make multiples of the same component.

You'll understand more as you read on. But look at the photos below for examples. The triangular shelf ends also work as desk supports. And the cabinet doors, note-board, and pegboard are all built exactly the same way. But it all starts with the wall cleats.

WORKSHOP OR GARAGE



SHOP AND GARAGE - This system is perfect for a shop (left) since it allows you to rearrange as you add tools and accessories.

BACK DOOR - An erasable message board is the center of the system when it's used by the back door (right).

KID'S ROOM - Painted in bright colors, kids will love all the nooks and crannies for storing their toys (below).

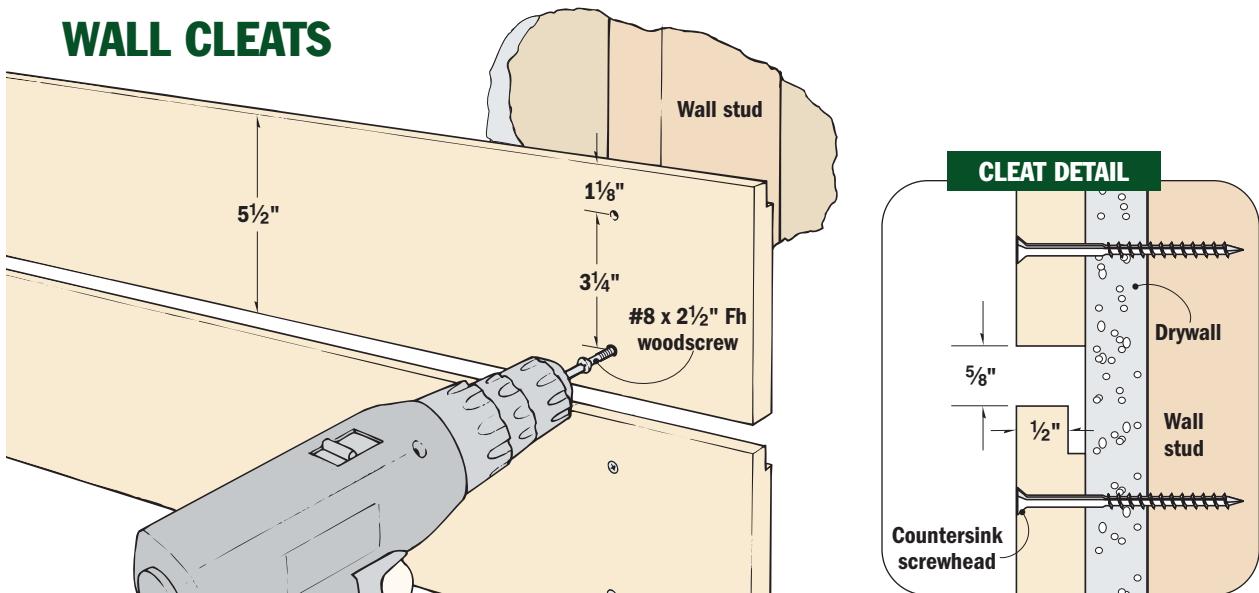
KID'S ROOM



BACK DOOR MUD ROOM



WALL CLEATS



WALL CLEATS

The key to this whole project is the cleat-and-hanger system. You can see the cleats above, and the hangers on the [next page](#). This system supports all the components as they hang on the wall. So making the cleats is the place to start.

The process starts at the lumberyard or home center. I know, that seems really obvious. You've got to *buy* the lumber before you can *build* anything. What I mean is you need to be selective when picking out stock for the cleats. All the cleats shown on the previous two pages (both painted and natural finished) are made from 1x6 pine.

To get the boards I needed, I probably spent 45 minutes digging through the stack at the home center. The goal is to get boards that are flat and straight as an arrow from end to end. If the wall cleats will be painted, or if you're after a "rustic" look, some tight knots are fine. In any case, try to avoid boards with knots on the edges.

If you can't find good 1x6 lumber, check out the 1x12s. You can rip a 1x12 in half and get two cleats. Note: Remember that a 1x12 is actually $11\frac{1}{4}$ " wide. A 1x6 is $5\frac{1}{2}$ " wide, so you don't have much leeway

when ripping them in half if you want to end up with cleats of the right width.

ROUTING THE RABBETS

The good news is that picking out your lumber may take more time than turning the raw pieces into cleats. First measure your wall to determine the lengths you need. And then all you need to do is cut the cleats to length and rout a rabbet along one edge of each.

As you can see in *Figures 1* and *1a* below, I used a $\frac{3}{4}$ "-dia. straight bit and an edge guide on my router to cut these rabbets. Of course, I could have used my table saw and a dado blade for this. But there were a couple of reasons why I didn't.

First, even though I selected fairly good boards, they still had some warp and twist. The warp will disap-

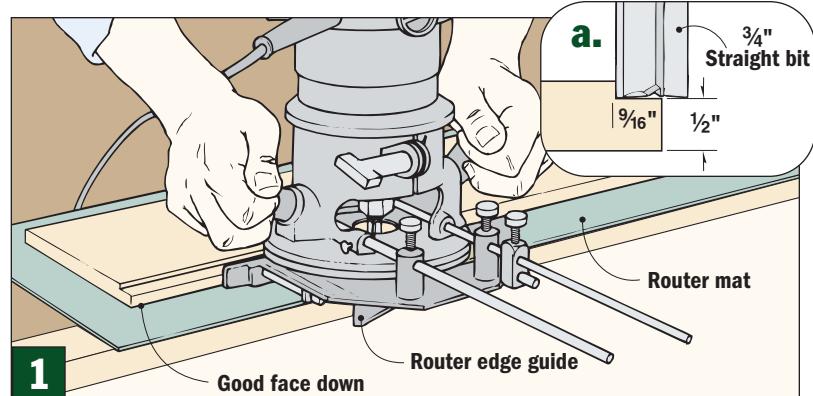
pear when the cleats are screwed to the wall. But trying to press the long boards flat against a table saw while cutting the rabbets would be tough. In the end, you'd get inconsistent cut depth. Since the hangers slip over the cleats, it's important the rabbets are all consistent. A router's small base will track over the "hills and valleys" in the boards, yielding a much more consistent rabbet.

My second reason for routing had more to do with convenience. I bought 10-ft. boards which would be tough to handle on the table saw, even with featherboards and outfeed supports. Using a router and a router pad underneath it was easy to reposition the board as I worked. This method worked great, even on a 6-ft. long workbench.

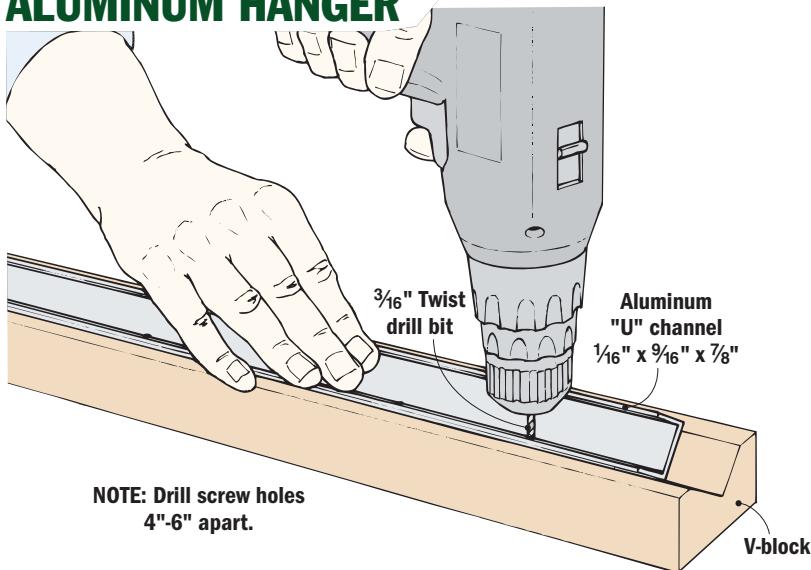
There is one more thing to consider before routing the rabbets. The



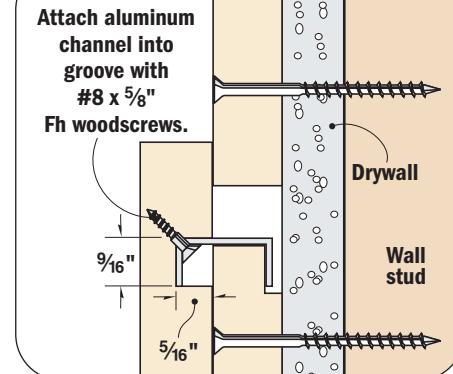
To securely attach the cleats to the wall, the screws should always hit wall studs.



ALUMINUM HANGER



HANGER CROSS SECTION



rabbets are cut on the back face of each board. So take a look at all of the boards to make sure the best surface will face to the front.

After a rabbet is cut on the back face of each board, the boards can all be cut to length.

HANGING THE CLEATS

Now the cleats can be hung on the wall. There are three important things here. First, as shown on the [opposite page](#), be sure you screw them securely into the wall studs. With the various boxes, bins, coat racks, and shelves, the cleats will be holding a lot of weight.

Next, use a level to keep them horizontal and parallel.

And, finally, as shown in the *Cleat Detail* on the [opposite page](#), leave a consistent $5/8"$ -gap between cleats as you screw them to the wall.

ALUMINUM HANGERS

With the cleats mounted on the wall, you can turn your attention to the components and the hangers. A hanger is mounted in a $9/16$ "-wide groove that's cut into the back of each of the components.

After a little experimenting, I settled on using aluminum "U" channel to make the hangers. The aluminum I used has an inside dimension of $3/4$ ", an outside dimension of $7/8$ ", and is sold at most home centers (see [page 59](#) for more information).

The drawing above (*Hanger Cross Section*) shows how the system works. The part of the hanger that sticks out from the back of the component fits in the gap between two of the cleats. Then it slips right over the rabbeted section of the cleat. It's a simple and strong system.

MOUNTING THE HANGERS

I'd advise cutting each of the aluminum hangers to fit each component *after* you've built it. The aluminum channel is easy to cut to the correct length with a hacksaw.

The next question was how to screw the aluminum channel into the back of each component.

After a little studying, I figured out that I could just barely sneak a flat-head screw at an angle right into the corner of the channel (*photo at right*).

To hold the channel while drilling the holes for the screws (*Aluminum Hanger* drawing above), I used a V-block I cut on the table saw. The distance between holes can vary, but I'd recommend a screw at least every 4 to 6 inches.

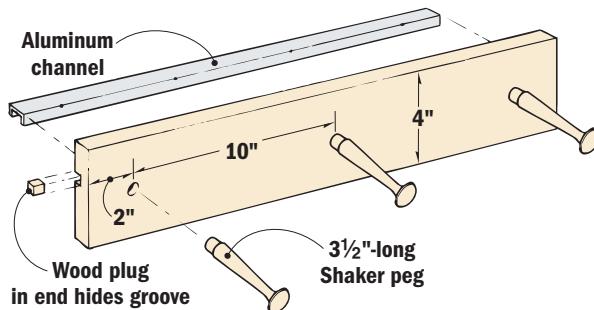


There's just enough room to get a long screwdriver bit at an angle into the aluminum channel.

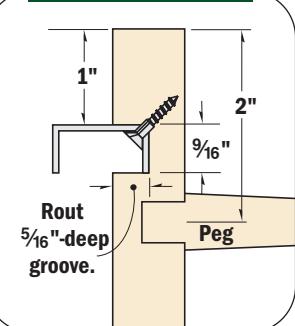
HAT OR COAT RACK ASSEMBLY

The easiest component to construct is a coat rack. It's simply a 4"-wide piece of $3/4$ " stock with wooden pegs. The length can vary. (Note the short, square "one peg" version in the kid's room photo on [page 16](#).)

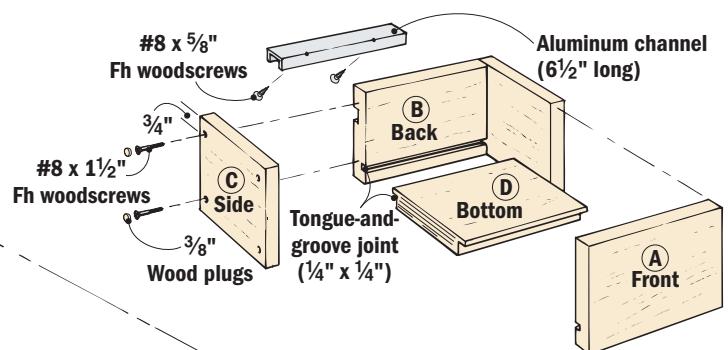
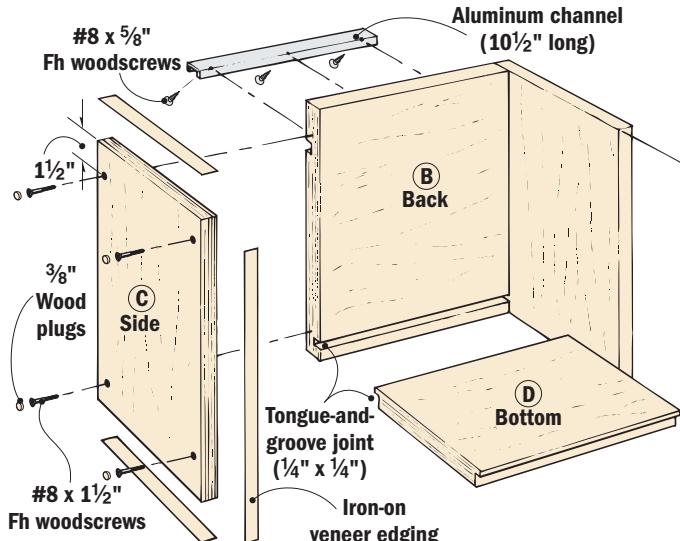
After cutting the groove in the back of the workpiece for the aluminum channel, I filled the end of the groove with small wooden plugs.



COAT RACK DETAIL



LARGE & MINI BIN ASSEMBLIES

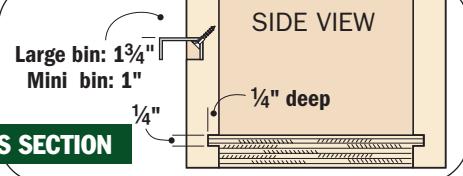


MATERIALS LIST

MATERIALS LIST

A (1) Front	3/4" ply. - 11 ⁵ / ₈ " x 10 ¹ / ₂ "
B (1) Back	3/4" ply. - 11 ⁵ / ₈ " x 10 ¹ / ₂ "
C (2) Sides	3/4" ply. - 10" x 11 ⁵ / ₈ "
D (1) Bottom	3/4" ply. - 9" x 10 ¹ / ₂ "

A (1) Front	3/4" x 4" x 6 ¹ / ₂ "
B (1) Back	3/4" x 4" x 6 ¹ / ₂ "
C (2) Sides	3/4" x 4" x 6"
D (1) Bottom	3/4" ply. - 5" x 6 ¹ / ₂ "



LARGE BINS

After figuring out the basic cleat and hanger system, the real challenge was designing all of the different components.

The first thing that came to mind was a bin. It's just a big plywood box that will hold a lot of stuff. And in a kid's room it becomes an easy target when putting away toys. It also can be used as a built-in waste basket.

To begin building a bin, cut out all the pieces from 3/4" plywood (I

used birch). One thing to note here is the grain direction. I made the decision up front that the grain on the fronts and backs of most of the components would run horizontally and vertically on the sides.

Using plywood makes these bins easy to build, but it does present a problem. You need to figure out a way to cover the exposed edges. I decided to use iron-on veneer tape as shown in the photo at left. You don't have to tape all the edges, just those that will show.

Once the taping is complete, the next step is to cut the joinery. The

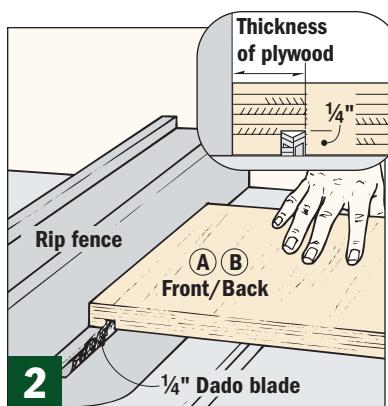
bottom is held in place with tongue-and-groove joints. Start by cutting a 1/4" x 1/4" groove near the bottom edge of the front (A) and back (B) pieces as shown in Figure 2.

With the grooves cut, the fence can be moved and the blade raised to cut a rabbet that will form a tongue on the front and back edges of the bottom piece (D) (Fig. 3). I cut this on a test piece of plywood first, sneaking up on the height until the tongue just fit into the groove. Then I cut it on the actual pieces.

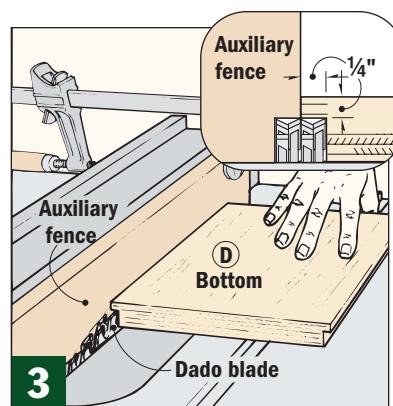
The last step before assembly is to cut the groove in the back for the



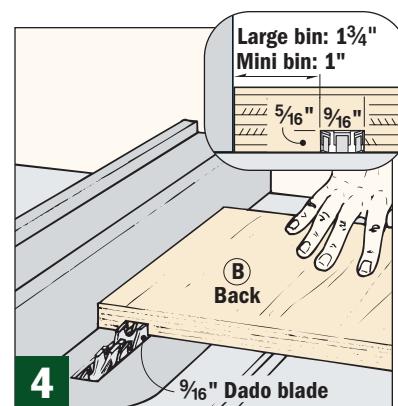
Iron-on veneer tape is an easy way to cover plywood edges.



2



3



4

SHELF ASSEMBLY

hanger (Fig. 4). Then the bin can be glued and screwed together.

I used a countersink/counterbore bit and pre-drilled all of the shank holes in the side pieces (Fig. 5). Then I clamped up the bin and drilled through the shank holes to form the pilot holes in the fronts and backs (Fig. 6).

Finally, the bins can be glued and screwed together with #8 x 1½" flathead woodscrews (Fig. 7). I filled the counterbores with putty for the painted kid's room version and used wood plugs for the shop version.

The final step is to cut the aluminum channel to fit the groove in the back and screw it in place.

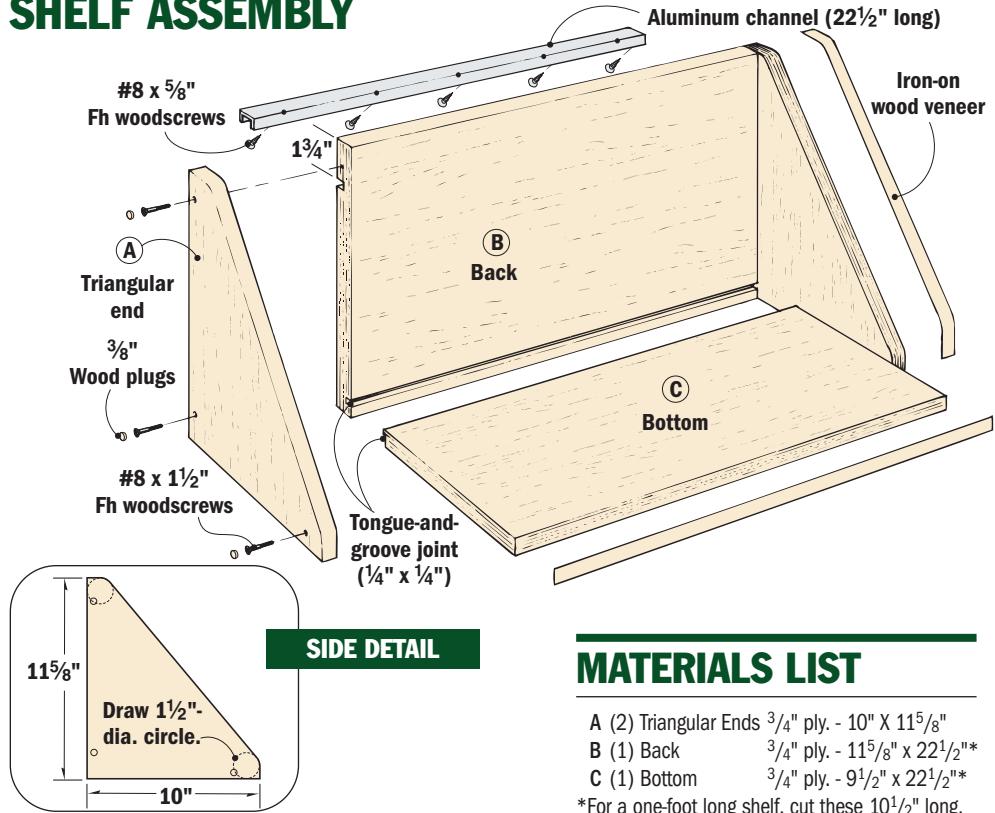
MINI BINS

The large bins worked great for holding large items, but I also wanted some "mini" bins in my shop for nails and screws. And in the kid's room they're perfect for crayons, Legos, and small toys.

The construction and joinery is very similar to the larger bins, but there are a couple differences you should be aware of.

First, the front (A), back (B) and sides (C), of each mini bin are made from ¾" solid wood, not plywood. I figured with pieces this small it would be easier to use solid wood than to edge all of the pieces. I did use plywood for the bottom piece (D) because its edges aren't exposed.

And, when using solid wood, it's best to keep the grain running the same direction. So I ran the grain horizontally on the front and sides of all the pieces.



MATERIALS LIST

A (2) Triangular Ends	3/4" ply. - 10" X 11 5/8"
B (1) Back	3/4" ply. - 11 5/8" x 22 1/2"**
C (1) Bottom	3/4" ply. - 9 1/2" x 22 1/2"**

*For a one-foot long shelf, cut these 10 1/2" long.

ONE OR TWO-FOOT SHELVES

Right from the start I knew I wanted some one-foot and several two-foot long shelves. I also began thinking about the other components I might want to add to the system later. That's when the idea for the triangular end support (A) you see above developed.

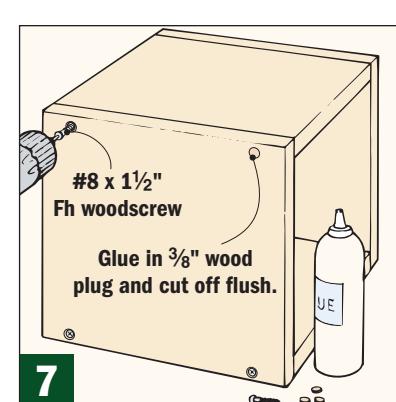
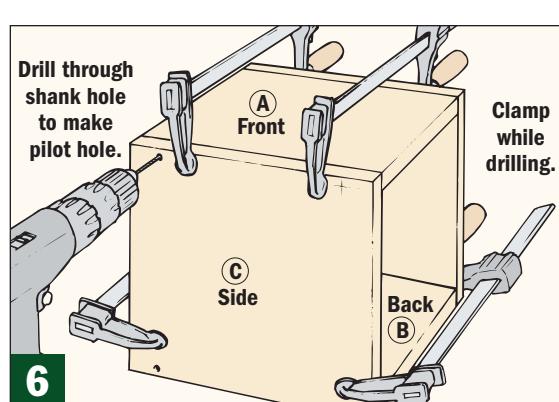
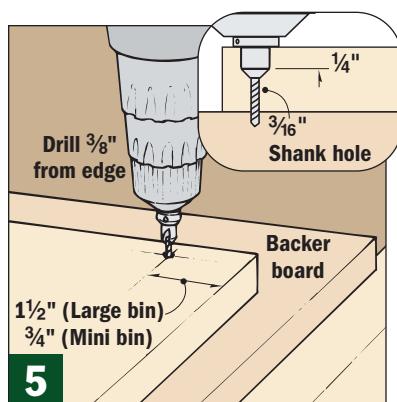
Not only does the triangular end add a lot of support, I figured it would be a nice design element if I could use this same shape on some of the other components. (You can see it on the desk on page 24 and the slanted shelf on page 25.)

The front two corners on the triangle are softened by drawing 1 1/2"-diameter circles and then cutting and sanding to the line (*Side Detail* above). Then the iron-on veneer edging can be rolled right around this softened corner.

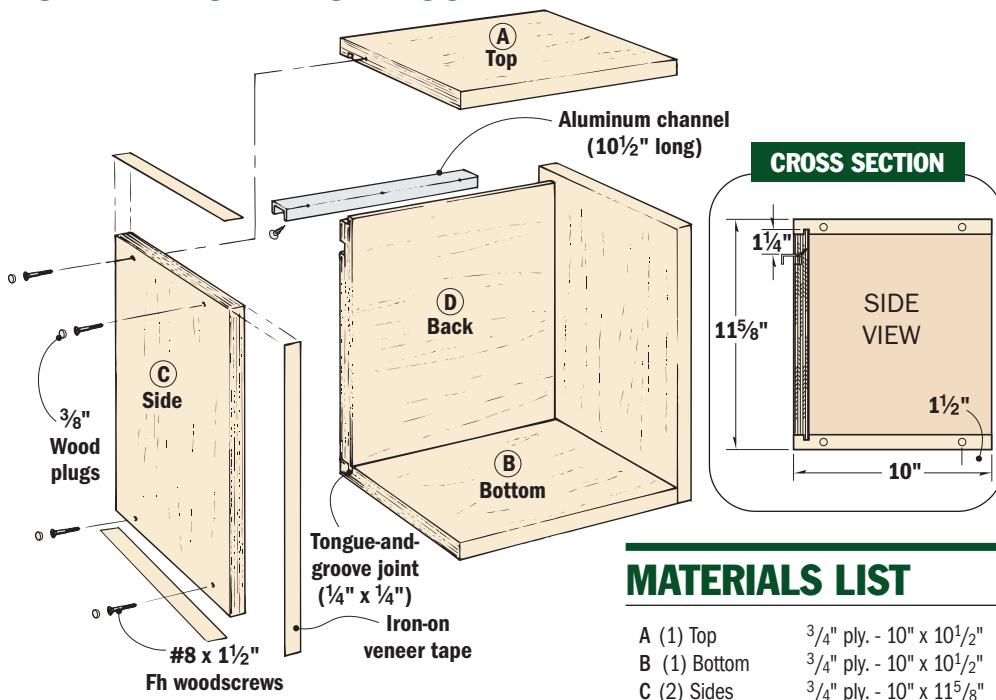
The construction of the shelf is similar to the bins, but you only need a tongue on the *back* edge of the bottom piece (C). The front edge is covered with iron-on edging.



Dowels or wood plugs fill screw-holes and are trimmed flush.



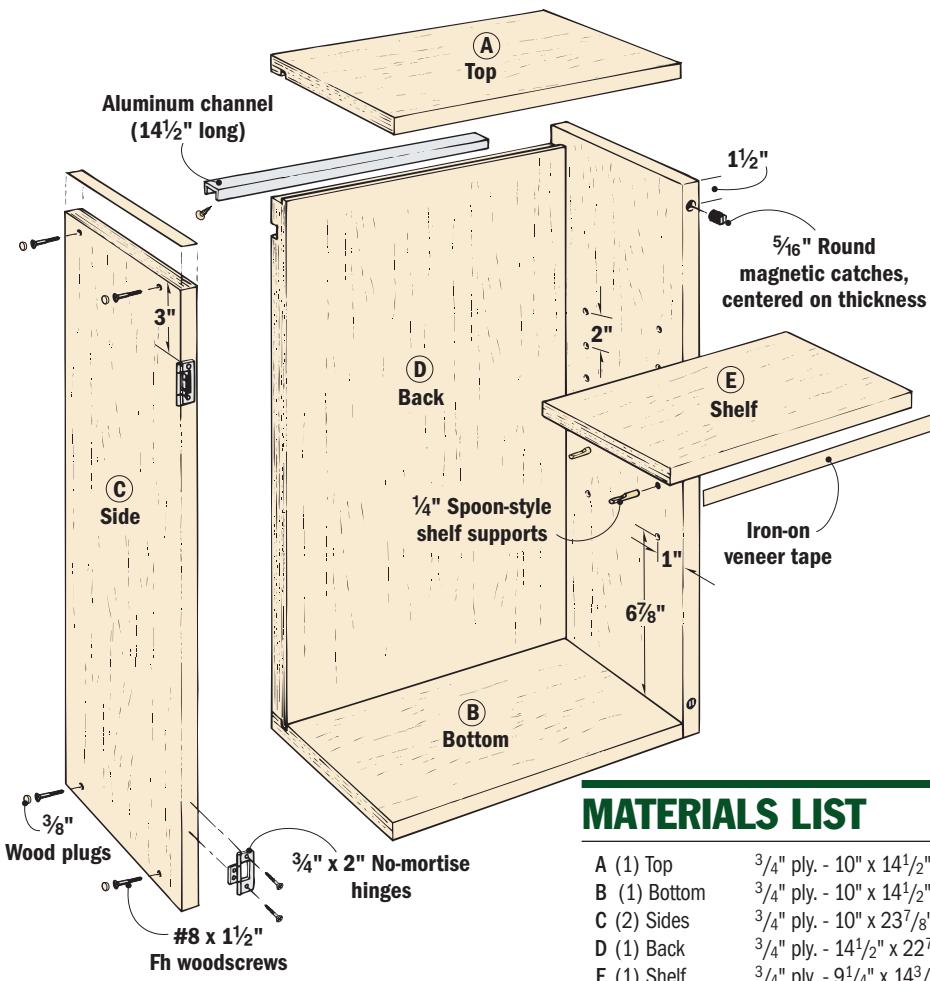
OPEN-FRONT BOX ASSEMBLY



MATERIALS LIST

A (1) Top	$\frac{3}{4}$ " ply. - 10" x 10 1/2"
B (1) Bottom	$\frac{3}{4}$ " ply. - 10" x 10 1/2"
C (2) Sides	$\frac{3}{4}$ " ply. - 10" x 11 5/8"
D (1) Back	$\frac{3}{4}$ " ply. - 10 ⁵ / ₈ " x 10 1/2"

CABINET ASSEMBLY



MATERIALS LIST

A (1) Top	$\frac{3}{4}$ " ply. - 10" x 14 1/2"
B (1) Bottom	$\frac{3}{4}$ " ply. - 10" x 14 1/2"
C (2) Sides	$\frac{3}{4}$ " ply. - 10" x 23 7/8"
D (1) Back	$\frac{3}{4}$ " ply. - 14 1/2" x 22 7/8"
E (1) Shelf	$\frac{3}{4}$ " ply. - 9 1/4" x 14 3/8"

OPEN-FRONT BOX

When I was building some of the large bins shown on page 19, one of the guys came into the shop and said, "If you turn that box on its side, it would make a great cubby."

At first I thought he was talking about a Mouseketeer who played opposite Karen. (I guess that shows my age.) "No," he said. "It's short for cubbyhole. They have them in day care centers and school classrooms these days. Kids love to store their stuff in them."

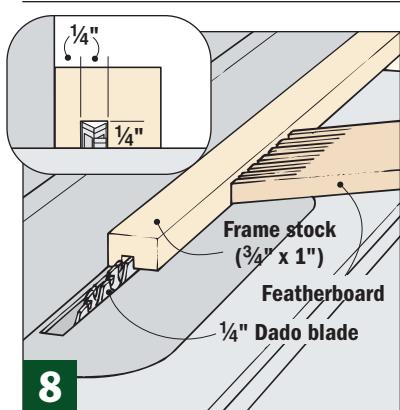
Okay, I've got stuff. Lots of stuff. It's just that most of my stuff is in my shop. So, that's where I decided I needed some of these open-front boxes. (Of course, they're also great "cubbies" for kids' rooms as shown on page 16.)

As you can see in the drawing at left, building these boxes is almost identical to building the large bins. The parts are cut to slightly different sizes. But the major difference is that the bottom of the bin becomes the back piece (D) on these boxes. So the tongues on the back fit into the grooves in the top (A) and bottom (B) pieces.

TALL CABINET

By now you should have a good idea of the design behind most of the components of this wall system. You can make the bins, boxes, and shelves just about any size once you understand this basic construction.

So it seemed only logical that the next component to make might be a cabinet. It's simply a tall, open-front box (*Cabinet Assembly*).



One thing you might want to add is a shelf (E). To make it adjustable, I drilled a series of $\frac{1}{4}$ " holes on the inside faces of the sides (C) to hold spoon-style shelf supports. Be sure all the holes are aligned across from each other or the shelf won't sit flat.

To determine the length of the shelf, measure the distance between the sides and subtract $\frac{1}{8}$ ". This will allow the shelf to fit with a $\frac{1}{16}$ " gap on each side.

CABINET DOOR

One of the problems with an open cabinet in a shop is that it becomes a dust collector. So after I had built a couple of these cabinets for my shop, I decided to add doors.

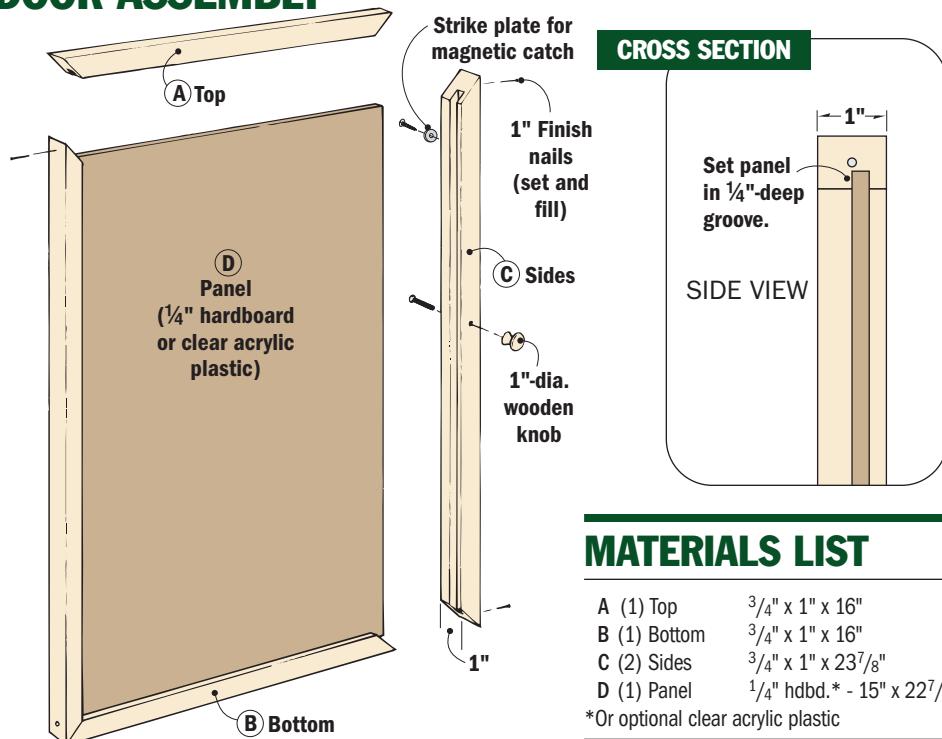
Doors not only can keep out dust, but they can hide things. I started by building one door with a hardboard panel that I could hide cans of finish and tools behind.

But I also have some fancy hand tools that I like to show off. So I built a door for the other cabinet with a piece of $\frac{1}{4}$ " clear acrylic plastic. You can see that one in the photo in the right-hand margin.

Both of the cabinet doors are built the same way. Start by cutting frame blanks from $\frac{3}{4}$ " stock to a width (depth) of 1". Then cut a $\frac{1}{4}$ " x $\frac{1}{4}$ " groove for the panel, $\frac{1}{4}$ " from the front face (Fig. 8).

After the grooves are cut in the blanks, miter the frame pieces to length (Fig. 9). The top (A) and bottom (B) pieces are cut the same length as the width of the cabinet. The sides (C) are cut the same as the height.

DOOR ASSEMBLY



MATERIALS LIST

A (1) Top	$\frac{3}{4}$ " x 1" x 16"
B (1) Bottom	$\frac{3}{4}$ " x 1" x 16"
C (2) Sides	$\frac{3}{4}$ " x 1" x 23 $\frac{7}{8}$ "
D (1) Panel	$\frac{1}{4}$ " hdbd.* - 15" x 22 $\frac{7}{8}$ "

*Or optional clear acrylic plastic

With the frame pieces cut to length, lay them on the front of the cabinet and check them for fit. Then measure for the hardboard or acrylic panel and cut it to fit.

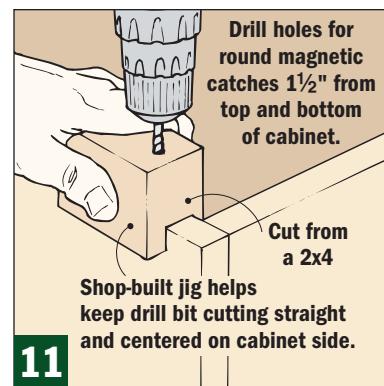
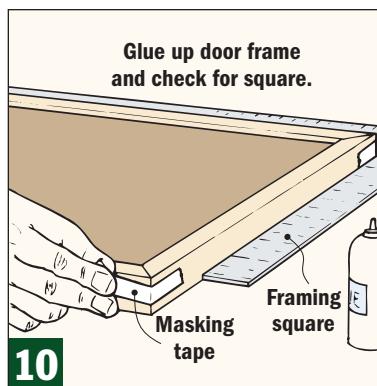
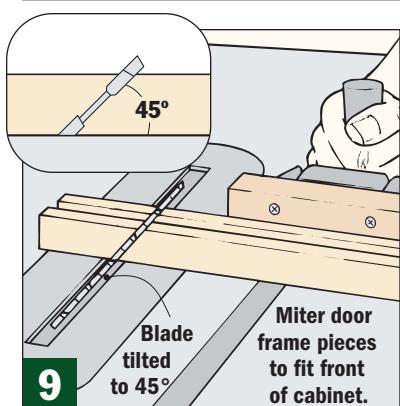
Now the frame can be glued around the panel. I used masking tape to hold it while drying and checked for square with a framing square (Fig. 10). Once the glue dried I reinforced the joints with 1" finishing nails driven in from the sides.

The door is held to the cabinet with special "no-mortise" hinges that you can see in the Cabinet Assembly view on the opposite page.

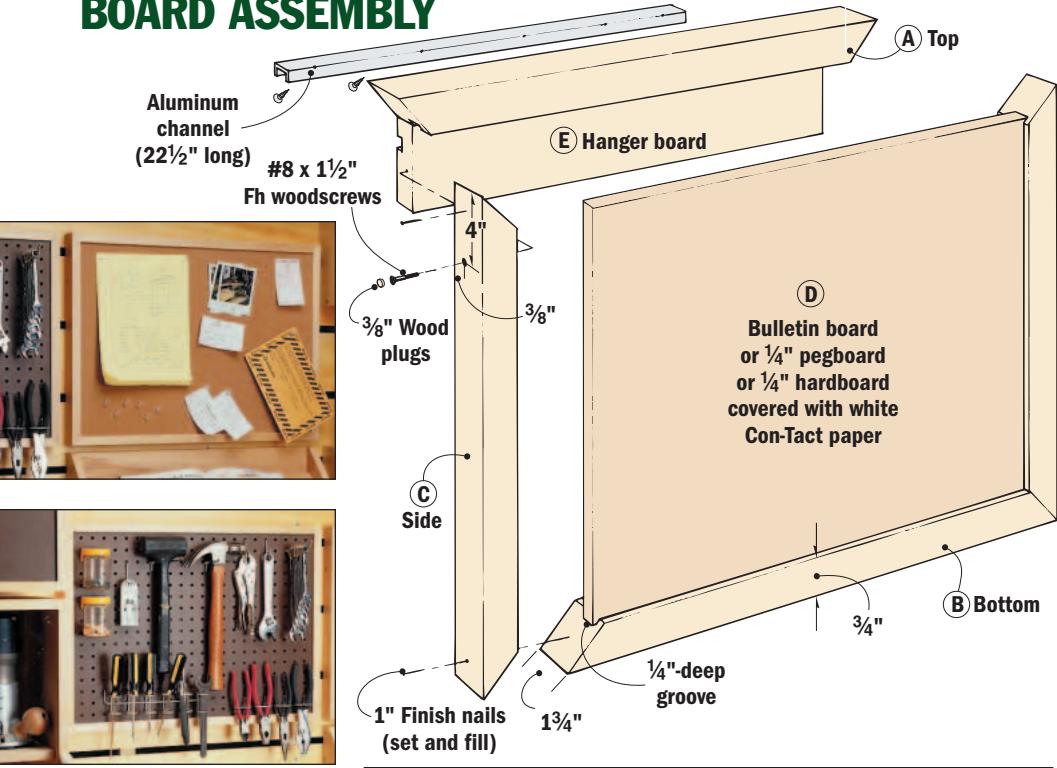
The final step is to add the door catches and a pull. I used a pair of small barrel-type magnetic catches that fit into holes in the front of the cabinet sides. To make sure they're drilled in straight and centered on the thickness of the cabinet side, I built a little jig from a block of 2x4 (Fig. 11).

With the catches in place, the strike plates can be added to the back of the door, and a wooden knob screwed to the front.

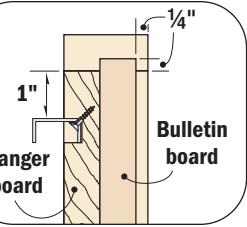
A door with $\frac{1}{4}$ " acrylic panel keeps out dust and still lets you see inside.



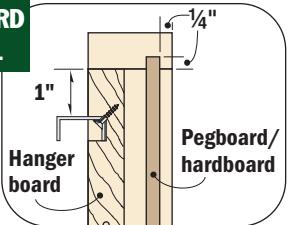
BOARD ASSEMBLY



BULLETIN BOARD DETAIL



MESSAGE/PEGBOARD DETAIL



MATERIALS LIST

A (1) Top	$3/4" \times 13\frac{3}{4}" \times 24"$
B (1) Bottom	$3/4" \times 13\frac{3}{4}" \times 24"$
C (2) Sides	$3/4" \times 13\frac{3}{4}" \times 17\frac{3}{4}"$
D (1) Bulletin Board*	$3/4" \times 16\frac{3}{4}" \times 23"$
E (1) Hanger Board	$3/4" \times 4" \times 22\frac{1}{2}"$

*Or optional 1/4" pegboard or hardboard

BULLETIN BOARD

It seems like I'm always looking for somewhere to stick up something in my shop. "To Do" lists, plans, and shopping lists end up taped to the walls or stuck up on those little yellow "sticky" notes. So I decided to add a bulletin board to the system.

My first thought was to buy some thin cork board and glue it to the front of a piece of Styrofoam. But when I priced all the material it became obvious that it was less expensive to just buy a pre-made bulletin board.

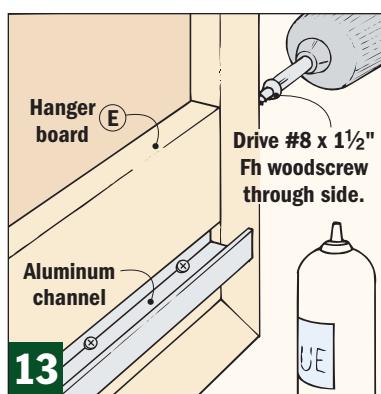
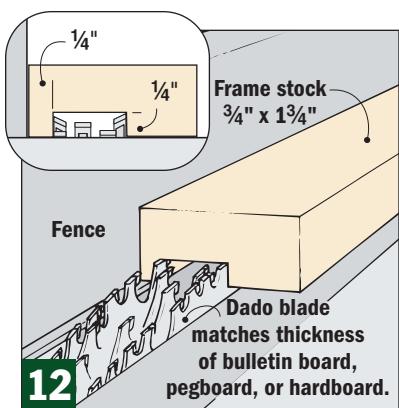
The same frame design can be used for a bulletin board, pegboard, or message board.

The bulletin board I bought came with an aluminum frame. Since I wanted it to match the rest of the wall system, the first thing I did was to remove the aluminum frame and build a $3/4"$ wooden frame.

You have to do some figuring to determine the depth of the frame. What I wanted was for the frame to stick out $1/4"$ beyond the front of the bulletin board and room behind it for a $3/4"$ -thick hanger board (E) (see *Bulletin Board Detail* above).

With a $3/4"$ -thick bulletin board I ended up with a $1\frac{3}{4}$ "-deep frame.

Next cut a $1/4"$ -deep groove on the inside faces of the frame pieces to accept the bulletin board (*Fig. 12*).



After the grooves are cut, miter the pieces to length. To keep the wall system modular, I cut the top (A) and bottom (B) pieces 24" long and the side pieces (C) $17\frac{3}{4}"$ long.

Next dry clamp up the frame and measure the opening for the bulletin board. Then cut the bulletin board to fit. And glue and nail the frame around it.

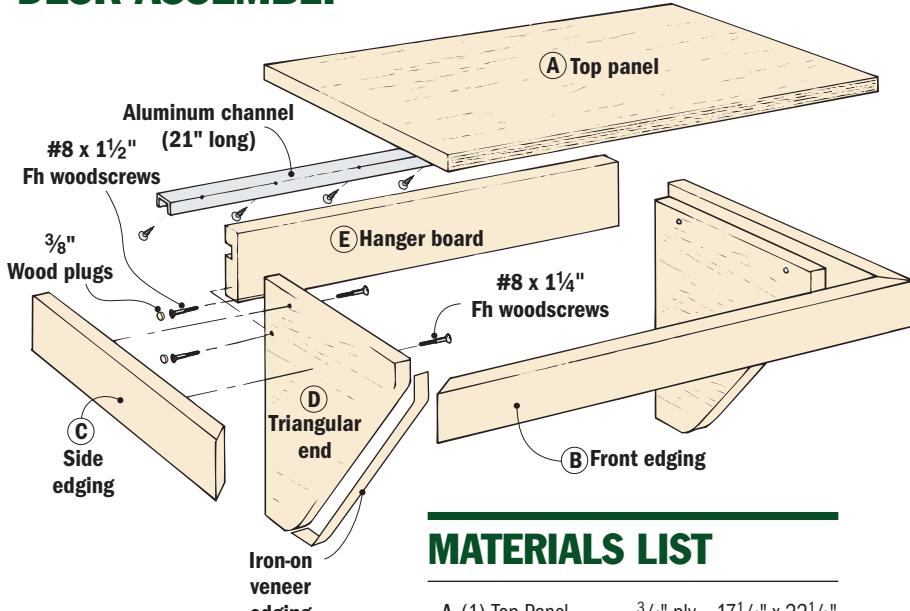
The last step is to add the hanger board (E). First, cut a groove in the back of it to accept the aluminum channel and then screw the channel in place. Then, glue the hanger board to the top of the frame. For additional support, I added a screw through the side of the frame (*Fig. 13*).

PEGBOARD AND MESSAGE BOARD

Once I finished the bulletin board, I used the same design (but a narrower groove) to make a pegboard and a message board (see *Detail* above).

For the message board, I used a special Con-Tact brand paper (the sticky-backed stuff used for lining shelves) over a piece of $1/4"$ hardboard. It's designed for use with dry-erase markers. This is perfect for use by the back door as shown in the photo on [page 16](#).

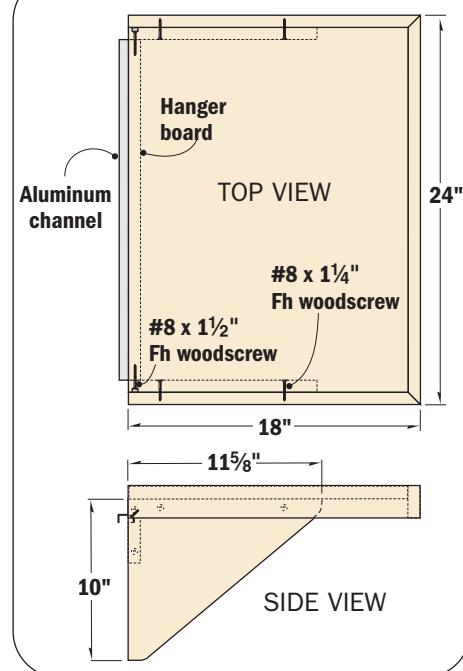
DESK ASSEMBLY



MATERIALS LIST

A (1) Top Panel	3/4" ply. - $17\frac{1}{4}'' \times 22\frac{1}{2}''$
B (1) Front Edging	3/4" x 2" x 24"
C (1) Side Edging	3/4" x 2" x 18"
D (2) Triangular Ends	3/4" ply. - 10" x $11\frac{5}{8}''$
E (1) Hanger Board	3/4" x 4" x 21"

DESK DETAIL



DESK

Though the cleat-and-hanger system is surprisingly strong, I wouldn't try to hang a large workbench on it. But I did build a small desk that's perfect for a kid's room.

The top of the desk is made from 3/4" plywood edged with solid stock. Since I wanted to keep everything in the wall system modular, I decided the desk would be 24" wide. That meant the plywood top panel (A) had to be cut 1 1/2" less than this to allow for the edging.

The next step is to cut the 2"-wide edging. It's mitered around the plywood top panel. Start by measuring and then cutting the front edg-

ing (B) to fit across the front. The side edging (C) is mitered at the front, but cut straight at the back.

Once all the pieces are cut, the edging can be glued to the panel as shown in *Figure 14*.

The support for the desk uses the same plywood triangular ends as was used on the shelf on [page 20](#). But take a look at the drawing above and you will notice an important difference. The grain runs horizontally so that the length of the piece reaches out from the wall and better supports the desk.

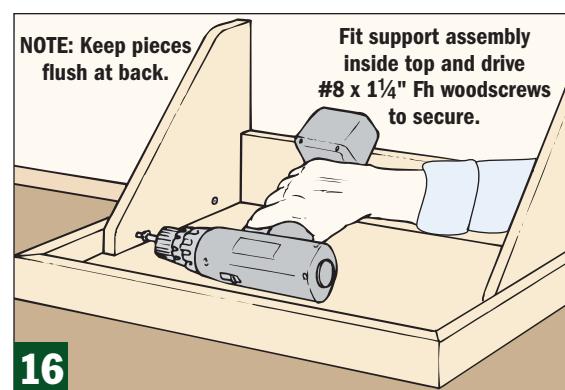
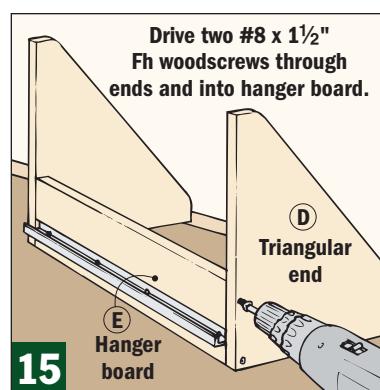
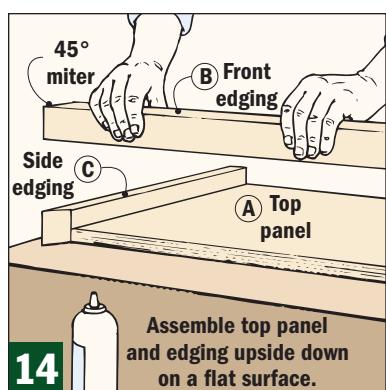
After cutting the triangular ends (D) to size, the front edge of each can be covered with veneer tape.

Next, a hardwood hanger board (E) is cut to fit between the ends. To determine its length, turn the top panel upside down and measure the inside distance between the two pieces of side edging (C). Then subtract the thickness of the two triangular ends (D). After cutting it to size, cut the groove for the hanger. Then screw the aluminum hanger into the groove. And screw the hanger board between the triangular ends (*Fig. 15*).

Finally, the desk can be screwed together with everything flush at the back (*Fig. 16*).



A small desk and chair are perfect for a kid's room.

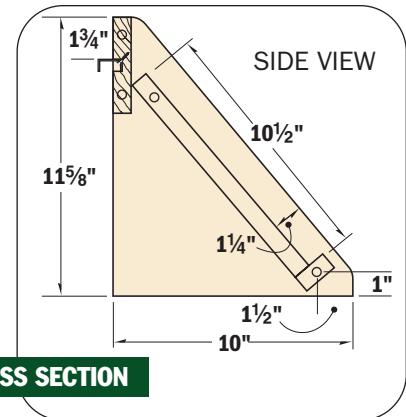
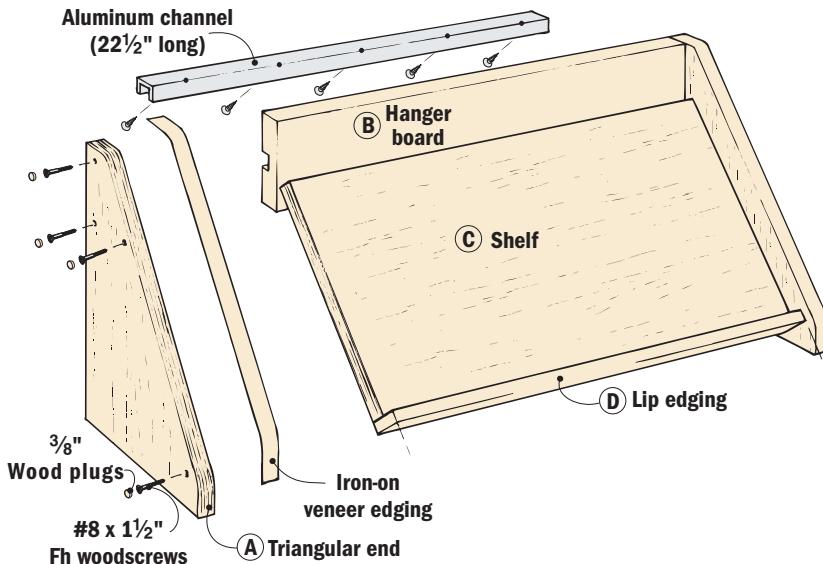


14

15

16

SLANTED SHELF ASSEMBLY



MATERIALS LIST

A (2) Triangular Ends	$\frac{3}{4}$ " ply. - 10" x 11 5/8"
B (1) Hanger Board	$\frac{3}{4}$ " x 4" x 22 1/2"*
C (1) Shelf	$\frac{3}{4}$ " ply. - 10 1/2" x 22 1/2"**
D (1) Lip Edging	$\frac{3}{4}$ " x 1 1/2" x 22 1/2"**

* For a one-foot long shelf, cut these 10 1/2" long.



A slanted shelf holds plans while you're working in the shop.

SLANTED SHELF

The last component I decided to build for the wall system was a slanted shelf. I'm always looking for a spot in my shop to prop up a magazine, book, or project plan.

Once again, I used the plywood triangular shapes for end support (A). Start by cutting them to shape and ironing on veneer to their front and bottom edges. This time position the grain on these pieces so it runs *vertically*, the same as the other shelves.

Next, cut the hanger board (B) from $\frac{3}{4}$ " stock and groove it for the aluminum channel. The length of the hanger board and shelf can vary, but I cut them the same (22 1/2") as the other shelves. That's enough room for most of my favorite books and magazines to easily lie open.

Now cut the plywood shelf (C) to a width of 10 1/2" and the same length as the hanger board. Then iron veneer onto the top edge only.

To keep magazines, books and plans from sliding off, I added a lip edging (D) along the bottom edge of the slanted shelf. It's simply a piece of $\frac{3}{4}$ " hardwood that's ripped to a width of 1 1/2". Then it's glued on flush with the back face of the shelf (*Cross Section*).

With the pieces cut out, assembly can begin, see *Assembly View* above. Start by screwing the hanger board between the two triangular ends.

After all of the screws are in place, the holes can be plugged and the plugs cut off and sanded flush. Then the aluminum channel can be mounted in the back.

FINISHING UP

Before applying any finish to the wall system components, I gave every-

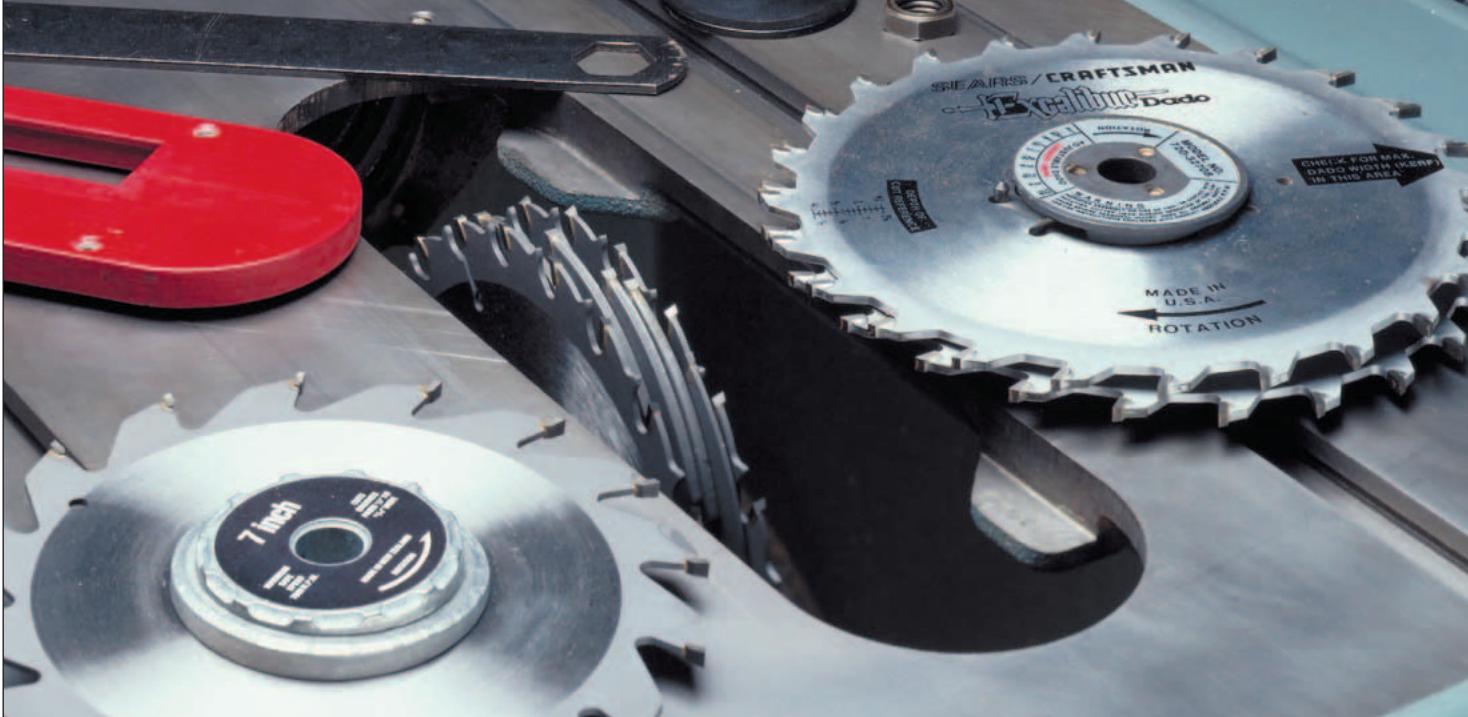
thing one last sanding with 180 grit paper. I also softened all the edges slightly with sandpaper.

I wanted the shop/garage system to be durable, so I applied two coats of polyurethane varnish, sanding lightly between coats with 220 grit.

For the components in the kids' room and by the back door, I started off with a coat of primer and finished up by spraying on a couple coats of enamel from an aerosol can. It added a touch of color to both settings.



Dado Blade Basics



Dead-on dadoes, grooves, and rabbets — cut each of them when you know how to set up and use a dado blade.

While one of the most useful tools for cutting joints is a dado blade, selecting which type to buy can be a little bit confusing. To simplify it, all you need to know is that dado blades fall into three distinct categories: "wobble" blades, "V-blades," and "stack" sets.

Wobble blades have a single blade that rides on a hub. The hub has a couple of wedge-shaped adjusters in it. As you adjust the position of the wedges, the blade actually tilts at an angle to the saw's arbor. And, when you turn the saw on, the blade "wobbles" back and forth to make a wide cut — a dado, groove, or rabbet.

I know this sounds a little strange, but it works. And by changing the amount of tilt, you can vary the width of the cut.

One downside of a wobble blade is that it may leave a cut with a concave bottom. This can be reduced by using a V-blade. It's still a wobble-style, but instead it has two blades mounted on a hub. Adjusting the hub pushes the blades apart at one edge, creating a "V" that cuts a wide kerf.

Okay, now let's get to my favorite: a stack dado set. It's made up of two $\frac{1}{8}$ "-thick outer blades (trimmers) with additional chipper blades that can be sandwiched between the trimmers to make wider cuts.

Stack sets take a little more care in setting up, but the dadoes and grooves they cut will have clean, flat bottoms with little chipout. If there's a downside, it's the cost. They're more expensive, but if you want quality dadoes, I prefer a good 8" carbide-tipped stack set.

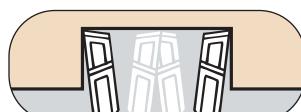
WOBBLE DADO

A single blade riding on a hub.
It adjusts for different widths.



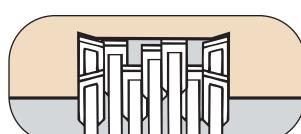
V-BLADE DADO

Two blades riding on a center hub, also adjustable.

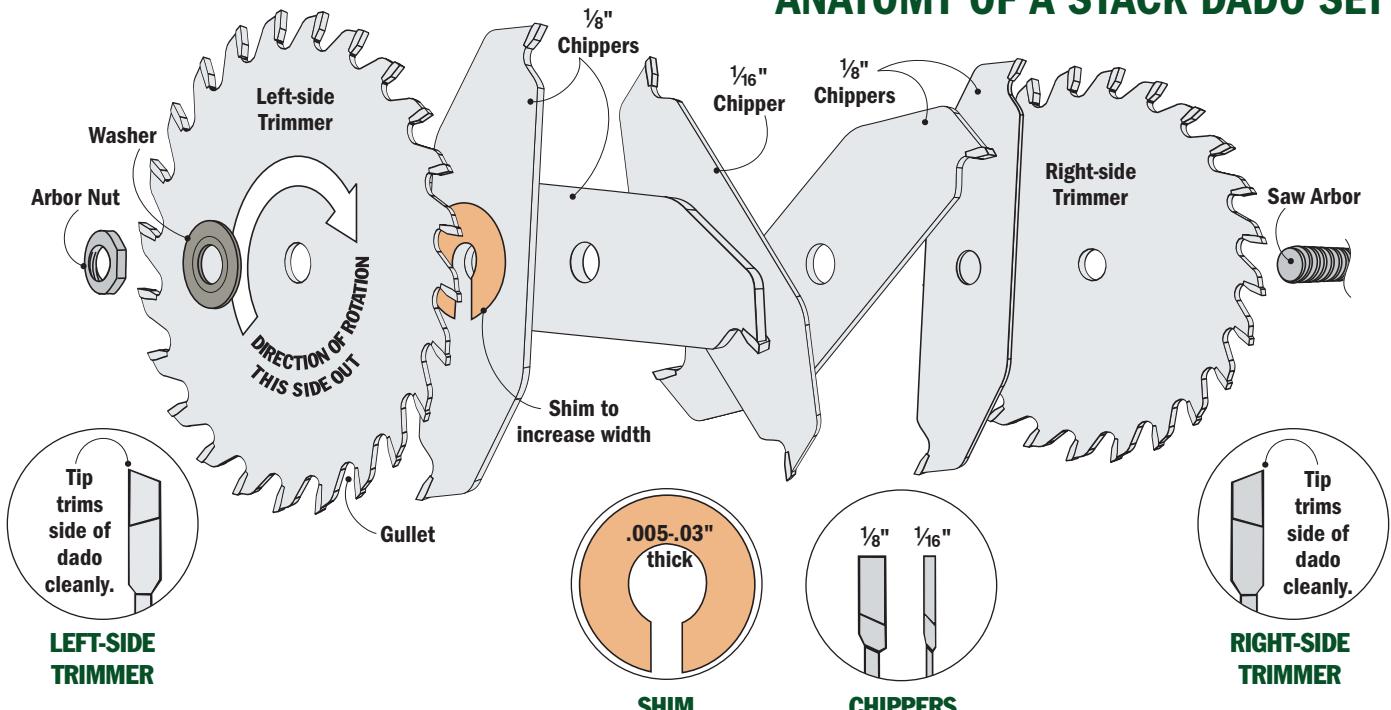


STACK DADO

Outer blades with chipper blades in between.



ANATOMY OF A STACK DADO SET



TRIMMERS AND CHIPPERS

To get the best performance from a stack set, it's important to understand how each part of the set works.

The job of the trimmer blades is to create the sides of the dadoes or grooves. You'll notice in the drawing above that these blades look pretty much like standard table saw blades. Each cuts a $\frac{1}{8}$ "-wide kerf. That means if you put both trimmers on the saw at once, and make a cut, you'll end up with a $\frac{1}{4}$ "-wide dado.

Now take a close look at the inset drawings above. Notice that most or all of the trimmer blade's teeth are bevel ground with the bevels slanting toward each other. That means

there's a right- and a left-side trimmer blade. As long as you get the two trimmer blades oriented this way (and the blades are usually marked "This Side Out"), the teeth will cut crisp, square corners.

Placed between the two trimmers are the chippers. Depending on the manufacturer, these blades have two or four teeth each. Their job is simply to clear away the waste left between the trimmer blades.

All stack sets come with multiple chippers. You can put in just the number you need to get the desired width dado. If, for example, you stack four $\frac{1}{8}$ " chippers, and one $\frac{1}{16}$ " chipper with the two $\frac{1}{8}$ " out-

side trimmers, you can cut a $\frac{13}{16}$ "-wide dado. (Not so coincidentally, that's the standard finished thickness for 1" hardwood — sometimes called 4/4 or "four-quarter.")

INSTALLING A STACK DADO SET

There are a number of things to know about installing a stack set. First, when the blades are in place in the saw, the carbide teeth of one blade shouldn't touch the teeth of the blade next to it. Not only is this hard on the teeth, but the plates of the blade won't fit together tightly.

This means the chippers should be staggered around in relation to each other as shown above. And the

MICRO-ADJUST USING SHIMS

When using a stack dado set you can get close to the width you want to cut (within $\frac{1}{16}$ "), but that may not be quite precise enough. One way to increase it just a hair is by slipping one or more shims in between the trimmer and chipper blades.

For years, I've made my own shims by cutting up playing cards, business cards, thin poster board, or kraft paper (*upper left in photo*).

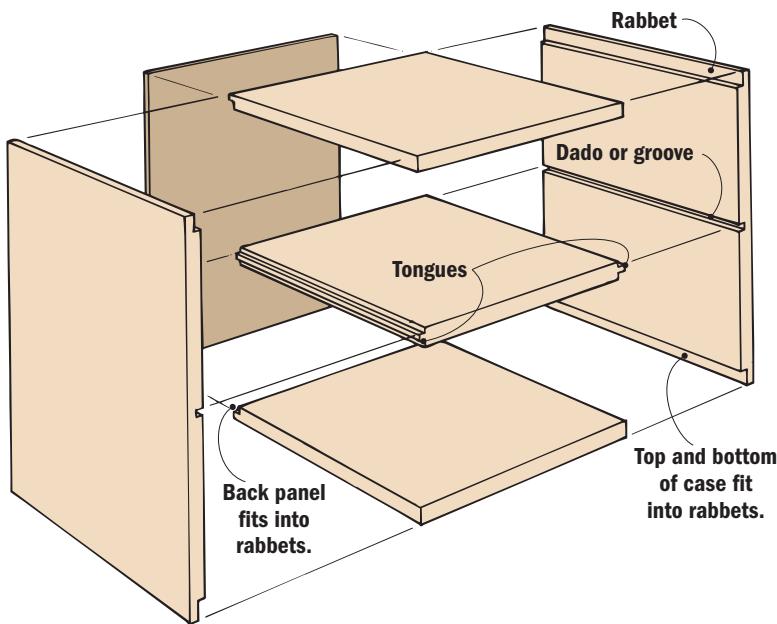
Recently, I've bought some shims that are precision manufactured for thickness (see sources on [page 59](#)).

They come in two styles. Plastic shims are color-coded for thickness, with a slot cut out that allows you to fit it on the saw arbor without completely removing the blades from the saw.

Magnetic shims stick to the blades so they won't fall into the saw or between the threads on the arbor.



TYPICAL BOOKCASE OR CABINET



CLASSIC JOINTS MADE WITH A DADO BLADE



DADO JOINT



RABBET JOINT



LAP JOINT



BOX JOINT



TENON (MORTISE AND TENON)

teeth on the chippers should be positioned next to the gullets (area between the teeth) on the trimmers.

The next thing to consider is how many blades will safely fit on the saw. When you put all seven blades on at once, you have a lot of heavy steel flying around. So you want to make sure everything is secure.

To fit all the blades on your saw's arbor, you may have to remove the large washer. Even with it removed, the arbors on some small saws may still be too short. So for safety reasons, I never use a stack set unless I can get the *entire* nut onto the arbor.

Adjusting the exact width that you want the stack set to cut can be a challenge. (For a useful jig, see [page 54](#).) You can add (or remove) one chipper at a time, but since the thinnest chipper is usually $1/16"$ (.0625") thick, that only gets you into the ballpark. To fine-tune the dado width, you'll need to use shims. See the box at the bottom of [page 27](#).

Adjusting the width of the dado is only half the battle. You're usually also concerned with the depth of cut. I like to start with the blade set a little low. Then I sneak up on the final height, making a test cut in a piece of scrap.

There's one last thing to consider — the throat insert. I've always found it frustrating that most saws don't come with a metal dado blade insert. It's an optional accessory you have to buy, so I usually end up making my own. But that's not all bad since you can make an insert that will fit tight around the dado blades you're using. (For more on this, see [page 52](#).)

ONE BLADE, LOTS OF JOINTS

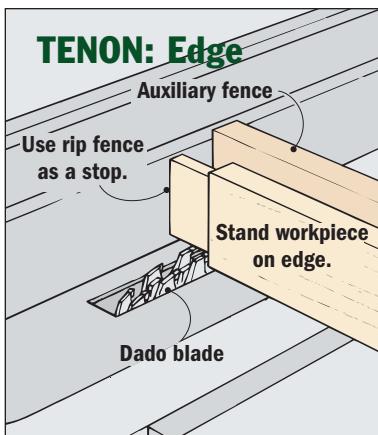
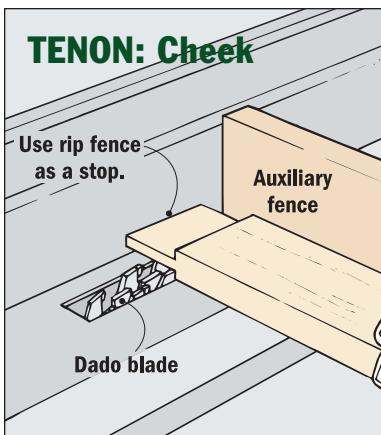
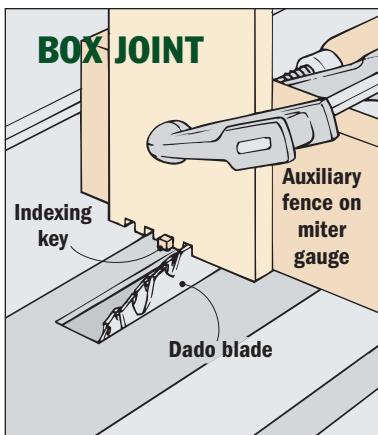
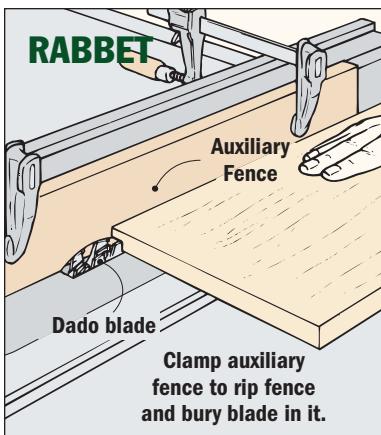
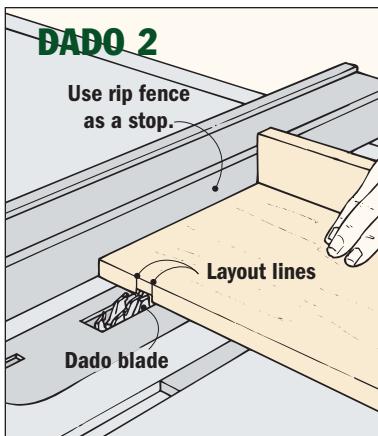
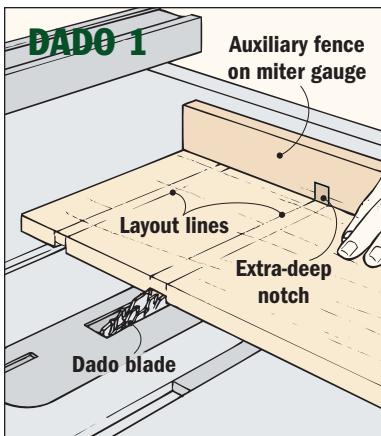
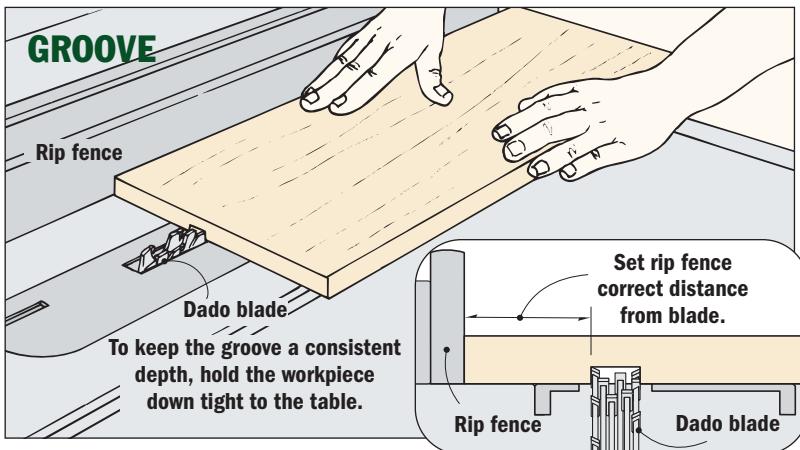
Okay, once you have the dado blade set up, what can you do with it? Cut dadoes, grooves, and rabbets, right?

Maybe I should back up a minute and explain the difference between these terms. Both dadoes and grooves are channels cut out of a workpiece. The difference between them is that a dado runs *across* the grain. And a groove runs *with* the grain.

If the cut falls right at the end or edge, it's called a rabbet.

Now, take a look at the photos at right. These joints are all variations of a dado, a groove, or a rabbet and were cut with a dado blade.

Finally, take a look at the exploded view drawing above. It's a typical bookcase or cabinet with dadoes, tongues, and rabbets. They're all made with a dado blade.



MAKING THE CUTS

Each different cut made with a dado blade requires a little different setup — and a slightly different technique.

GROOVE: Probably the simplest cut is a groove. It runs the length of a board as shown at left. The critical thing here is that the rip fence be set the correct distance from the blade.

Also, when cutting a groove be sure you're working with flat stock and the workpiece is held down tight to the table. Otherwise the groove will be an inconsistent depth.

DADO: A dado is cut across the grain of a board using the miter gauge. An auxiliary miter gauge fence screwed to the front of the miter gauge helps support the board and prevents chipout.

I use a couple of different methods to get the dado located in the correct position. One way is to raise the blade to cut an extra-deep notch in the auxiliary fence. Now the notch can be used to locate the path of the blade in the workpiece (*Dado 1*).

Another method is to use the rip fence as a stop. To do this, lock down the fence so the layout lines align with the blade (*Dado 2*).

RABBET: Cutting a rabbet (or rabbits to produce a tongue) on the edge of a board requires using the rip fence (see drawing). To prevent damaging my rip fence, I usually clamp an auxiliary fence, made from a piece of scrap, to "bury" part of the blade. The amount of blade that sticks out determines the width of the rabbet.

BOX JOINT: To produce a box joint, the workpiece is stood on end and passed over a dado blade (see drawing). (Note: Never cut with a workpiece standing on end unless it's supported with a box joint jig or a tall miter gauge fence.)

TENON: One way to cut tenons for mortise and tenon joints is with a dado blade, using the rip fence as a stop (*Tenon: Cheek*). A long tenon requires a couple passes, moving the workpiece laterally between each.

After cutting the tenon faces (cheeks), the workpiece can be turned on edge and the two remaining shoulders cut (*Tenon: Edge*). ■

DADO BLADE TROUBLESHOOTING

Problem	Solutions
Chipout on the face of the workpiece when cutting across the grain	<ol style="list-style-type: none"> 1. Be sure blade is sharp. 2. Make a light ($\frac{1}{32}$" deep) scoring pass first, then raise blade for full cut. 3. Check that trimmers are facing the correct direction. 4. Use zero-clearance insert. 5. Place masking tape over layout lines before cutting. 6. Use a stack set, not a wobble blade.
Chipout on the edge of the workpiece	<ol style="list-style-type: none"> 1. Back up cut with an auxiliary fence attached to the miter gauge.
Depth of dado/groove is inconsistent from one end of cut to the other	<ol style="list-style-type: none"> 1. Hold workpiece down tight on top of dado blade with push stick when cutting. 2. Use a featherboard on top of workpiece. 3. Be sure workpiece is flat, not warped. 4. Support long boards with infeed and outfeed tables.
Dado doesn't have a flat bottom	<ol style="list-style-type: none"> 1. Use a stack set, not a wobble blade. 2. Sharpen all blades of a stack set at the same time to maintain consistent size.
Dado is wider than all blades of a stack set put together should yield	<ol style="list-style-type: none"> 1. Be sure teeth of one blade don't touch teeth of blade next to it. 2. If using thin shims, check if they have fallen between the threads on the saw arbor (or use magnetic shims).
Dado is slightly narrower than needed	<ol style="list-style-type: none"> 1. If using stack set, add shims (see page 27). 2. If using wobble blade, readjust.
Dado blade grabs workpiece and pulls it (especially when using a radial arm saw)	<ol style="list-style-type: none"> 1. If using radial arm saw, push saw through workpiece, don't pull it. 2. Switch to a dado blade with a negative tooth angle. 3. Switch to a special "safety" blade with anti-kickback ridges behind each tooth.
Burning occurs when cutting dadoes	<ol style="list-style-type: none"> 1. Be sure blade is clean and sharp. 2. Check that rip fence is parallel to the saw blade. 3. Cut is too deep. Make repeat passes raising blade between passes. 4. Feed rate is too slow.



A TALE OF TWO BLADES



While I was testing stack dado blades, I came across a couple of sets that were a little unusual. The first one (*left*) only cost \$54.99.

How can they even make a seven-piece carbide-tipped set (with shims) at this price? The answer is with fairly thin carbide tips and lower quality brazing.

Okay, but how does it cut? Actually, I was surprised how cleanly it cut in hard maple — as long as I didn't feed the work too quickly. It chipped out some across

the grain of plywood. But with a slow feed rate, it was acceptable. Order it (No. 141037) from Woodcraft Supply at (800) 225-1153 or at www.Woodcraft.com.

I've been using the \$179 Jesada 8" stack set (*right*) for some time now and it cuts very cleanly and leaves a dado or groove with a perfectly flat bottom.

One of the things I really like about this set is that it comes with six chipper instead of five. The extra $\frac{3}{32}$ " chipper allows you to cut dadoes without shims in increments of $\frac{1}{32}$ " (as opposed to the more common $\frac{1}{16}$ " incre-

ments with most stack sets). This is great for cutting dadoes to accept hardwood plywood that's often a little undersized.

The Jesada 108-240 Joint-Master is available from www.Amazon.com or directly from Jesada Tools at (800) 531-5559 or www.Jesada.com.



S T O R A G E



Closet Conversion

With its great looks and loads of storage, this built-in cherry wardrobe blows the doors off an existing closet.

Closets don't get much respect. Just picture the cartoon image of a closet door holding back an avalanche of unused junk — with a bowling ball perched on top of the pile.

But mostly, closets — particularly bedroom closets — get a bum rap because they just don't work very well. The typical layout of one long shelf above a single clothes rod leads to clutter and wasted space. So the doors stay closed to hide the mess.

Now, this may sound crazy. But instead of hiding it, why not make the closet the focal point of the bed-

room? That's exactly what I did with the built-in cherry wardrobe shown here.

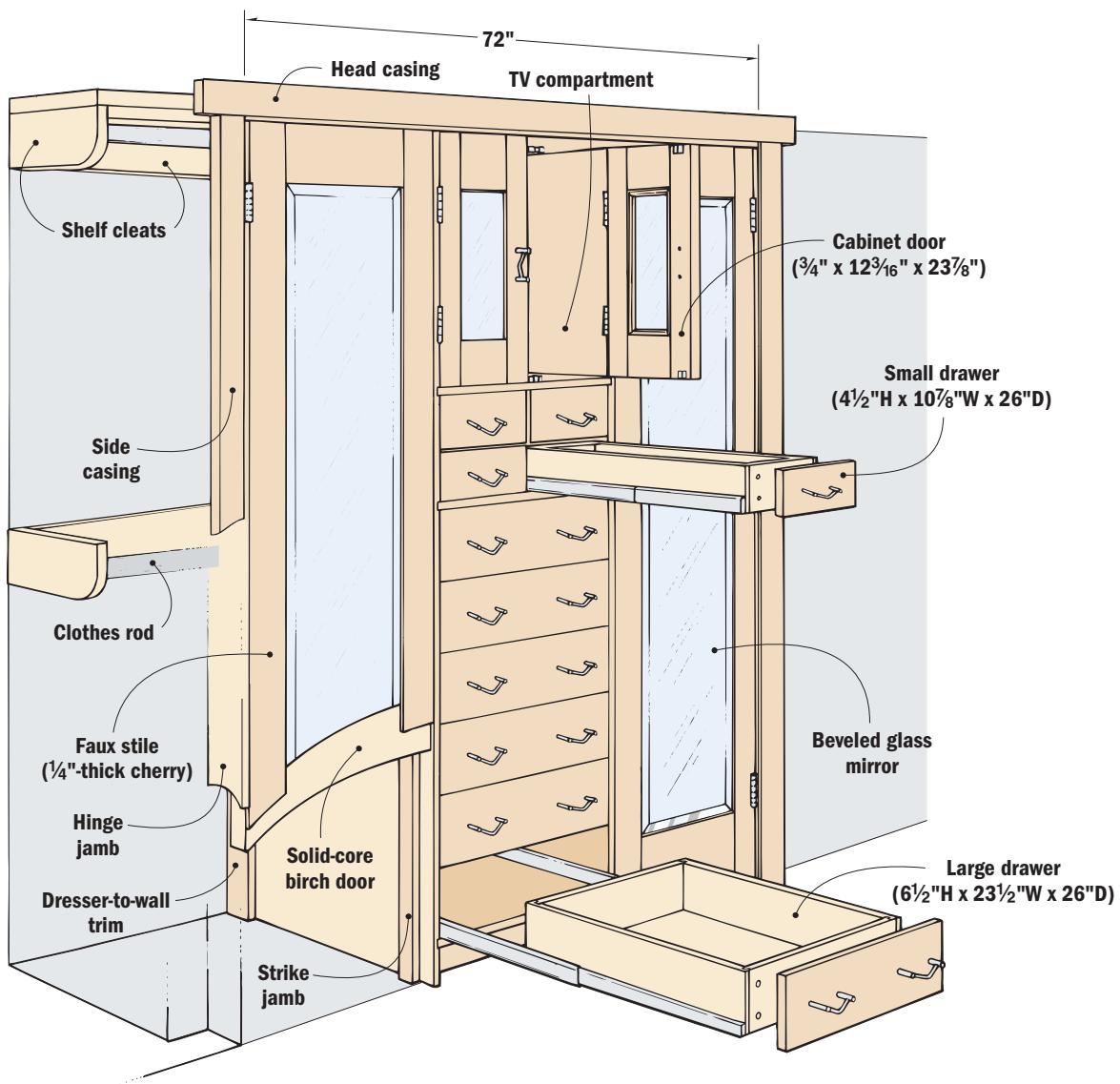
By building a central dresser unit that fills the closet's full depth, I captured valuable space that normally goes to waste. The extra-deep drawers hold loads of folded clothes with space left over for an enclosed television compartment up top.

There's still plenty of room for hanging clothes behind the mirrored doors on either side of the dresser. Plus, there's bonus shelf space above the clothes rods for off-season or long-term storage.



WARDROBE CONSTRUCTION VIEW

OVERALL CLOSET SIZE: 72"W x 82"H x 29"D



USE CHERRY WHERE IT COUNTS

Since I wanted the wardrobe to be the focal point of the bedroom, I designed it to look like a piece of fine furniture. All the exposed surfaces — the case edges, doors, and drawer fronts — are cherry. Even the trim around the outside of the closet opening is cherry.

But cherry, even cherry plywood, is expensive. I also wanted to keep the inside of the closet spaces as bright as possible. So I used lighter-colored and less expensive birch veneer plywood for the

dresser carcase and edgebanded it with $\frac{1}{4}$ "-thick strips of cherry.

Rather than buy or build cherry doors, I trimmed down some passage doors and applied cherry trim to frame the beveled glass mirrors.

As you can see in the *Wardrobe Construction View* (above) and the photo on the previous pages, the closet doors are also birch (solid-core passage doors trimmed to size). I created faux rails and stiles that frame the mirrors by gluing pieces of $\frac{1}{4}$ "-thick cherry to the outer face of the birch doors.

START FROM SCRATCH

Before starting this project, you need to figure out what you have to work with. The best way to do this is to remove the existing closet doors and any door tracks, jambs, or trim.

This is also a great time to sort through the clothes and "stuff" as you empty out the closet. Keep in mind you're not really going to add space, just take better advantage of the space that's there. So if you haven't worn it in the past year or two, donate it to a local charity — you probably won't even miss it.

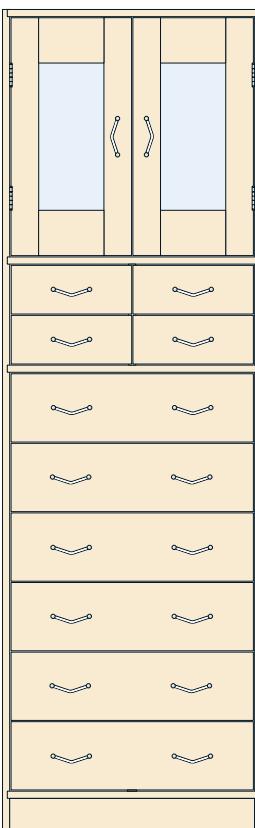
Once you've got the closet stripped completely down, measure the width and depth, and the height from the floor to the bottom of the header. If you look at the *Wardrobe Construction View*, you'll see that the dresser is built to slide in just under the header. In my case, the dresser height was $81\frac{3}{4}$ " to fit under a header that was $82\frac{7}{8}$ " high.

Since standard interior doors are 80", it would be hard to "stretch" this design. You can shorten it easily, however, by changing the height of the TV compartment. That way, you don't have to mess with refiguring all the drawer dimensions. Simply adjust the length of dresser sides (A), the back (C), and door stiles (O) as shown at right. Just be sure to measure from the bottom when laying out the shelf locations on the sides.

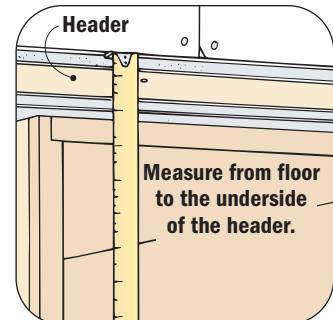
Likewise, you can adjust the dresser's depth to fit your closet. But unless it's significantly deeper than my closet, I'd suggest leaving the dimensions as shown and simply use a wider trim piece between the back wall and dresser. Drawer slides longer than 26" can be hard to find.

VARIABLES TO CONSIDER

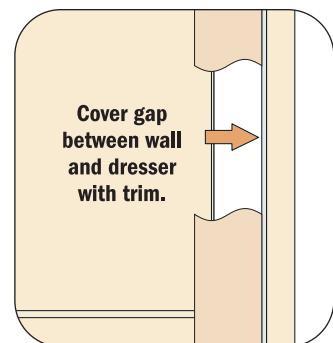
Sides, back, and door stiles as designed.



Sides, back, and door stiles shortened.



Cabinet dimensions remain unchanged from the upper shelf down.



MATERIALS LIST

LUMBER

Dresser Unit

A (2) Dresser Sides*	$\frac{3}{4}$ " x $27\frac{3}{4}$ " x $81\frac{3}{4}$ " (birch ply)
B (4) Shelves*	$\frac{3}{4}$ " x $27\frac{1}{2}$ " x 25" (birch ply)
C (1) Back	$\frac{1}{4}$ " x $25\frac{1}{2}$ " x $78\frac{1}{2}$ " (birch ply)
D (1) Divider*	$\frac{3}{4}$ " x $26\frac{3}{4}$ " x $10\frac{3}{16}$ " (birch ply)
E (1) Toekick	$\frac{3}{4}$ " x $3\frac{1}{4}$ " x 25" (birch ply)
F(12) Lg. Drawer Frts/Backs	$\frac{1}{2}$ " x $6\frac{1}{2}$ " x 23" (birch)
G(12) Lg. Drawer Sides	$\frac{1}{2}$ " x $6\frac{1}{2}$ " x 26" (birch)
H (6) Lg. Drawer Bottoms	$\frac{1}{4}$ " x $25\frac{7}{16}$ " x $22\frac{15}{16}$ " (birch ply)
I (8) Sm. Drawer Frts/Backs	$\frac{1}{2}$ " x $4\frac{1}{2}$ " x $10\frac{3}{8}$ " (birch)
J (8) Sm. Drawer Sides	$\frac{1}{2}$ " x $4\frac{1}{2}$ " x 26" (birch)
K (4) Sm. Drawer Bottoms	$\frac{1}{4}$ " x $25\frac{7}{16}$ " x $10\frac{5}{16}$ " (birch ply)
L (6) Lg. Drawer False Frts.	$\frac{3}{4}$ " x $6\frac{13}{16}$ " x $24\frac{3}{8}$ " (cherry)
M (4) Sm. Drawer False Frts.	$\frac{3}{4}$ " x 5" x $12\frac{3}{16}$ " (cherry)
N (4) Cabinet Door Rails	$\frac{3}{4}$ " x $4\frac{1}{2}$ " x $7\frac{11}{16}$ " (cherry)
O (4) Cabinet Door Stiles	$\frac{3}{4}$ " x $2\frac{3}{4}$ " x $23\frac{7}{8}$ " (cherry)
P (1) Glass Stop Blank	$\frac{5}{16}$ " x $5\frac{1}{16}$ " x 96" (cherry)
Q (2) Hinge Jambs	$\frac{3}{4}$ " x $4\frac{9}{16}$ " x 81" (cherry)
R (2) Head Jambs	$\frac{3}{4}$ " x $4\frac{9}{16}$ " x $23\frac{3}{4}$ " (cherry)
S (2) Strike Jambs	$\frac{3}{4}$ " x $2\frac{15}{16}$ " x 81" (birch)
T (4) Door Stiles	$\frac{1}{4}$ " x 4" x 80" (cherry)
U (2) Door Rails - Top	$\frac{1}{4}$ " x $4\frac{1}{2}$ " x $14\frac{3}{4}$ " (cherry)
V (2) Door Rails - Bottom	$\frac{1}{4}$ " x 8" x $14\frac{3}{4}$ " (cherry)
W (2) Solid-core Doors	$1\frac{3}{8}$ " x $22\frac{3}{4}$ " x 80" (birch)

X (3) Door Stops

$\frac{1}{2}$ " x $1\frac{1}{2}$ " x 84" (cherry)

Closet Interior Components

$\frac{3}{4}$ " x Variable x 84" (birch)

Y (2) Dresser-to-Wall Trim

$\frac{3}{4}$ " x 25" x 42" (birch ply)

Z (2) Shelves*

$\frac{3}{4}$ " x 41" x 144" (birch)

AA(1) Shelf Cleat Blank

* Dimensions do NOT include $\frac{1}{4}$ "-thick edgebanding applied to exposed edges.

Trim

BB(1) Outside Head Casing 1" x $2\frac{3}{4}$ " x 80" (cherry)

CC(2) Outside Side Casing $\frac{3}{4}$ " x $2\frac{3}{4}$ " x 84" (cherry)

DD(1) Inside Head Casing 1" x $2\frac{3}{4}$ " x 80" (birch)

EE(2) Inside Side Casing $\frac{3}{4}$ " x $2\frac{3}{4}$ " x 84" (birch)

HARDWARE: (See page 59 for more information)

(28) #8 x 2" Fh sheet metal screws

(36) 2d box nails

(40) #8 x 1" Fh woodscrews with finish washers

(10) Pair of 26" Accuride 3832A full-extension drawer slides

(2) Pair of $2\frac{1}{2}$ " x $1\frac{11}{16}$ " butt hinges

(2) Pair of $3\frac{1}{2}$ " x $3\frac{1}{2}$ " butt hinges

(4) Three-way cabinet catches $1\frac{15}{16}$ "

(4) Three-way cabinet catches $2\frac{23}{32}$ "

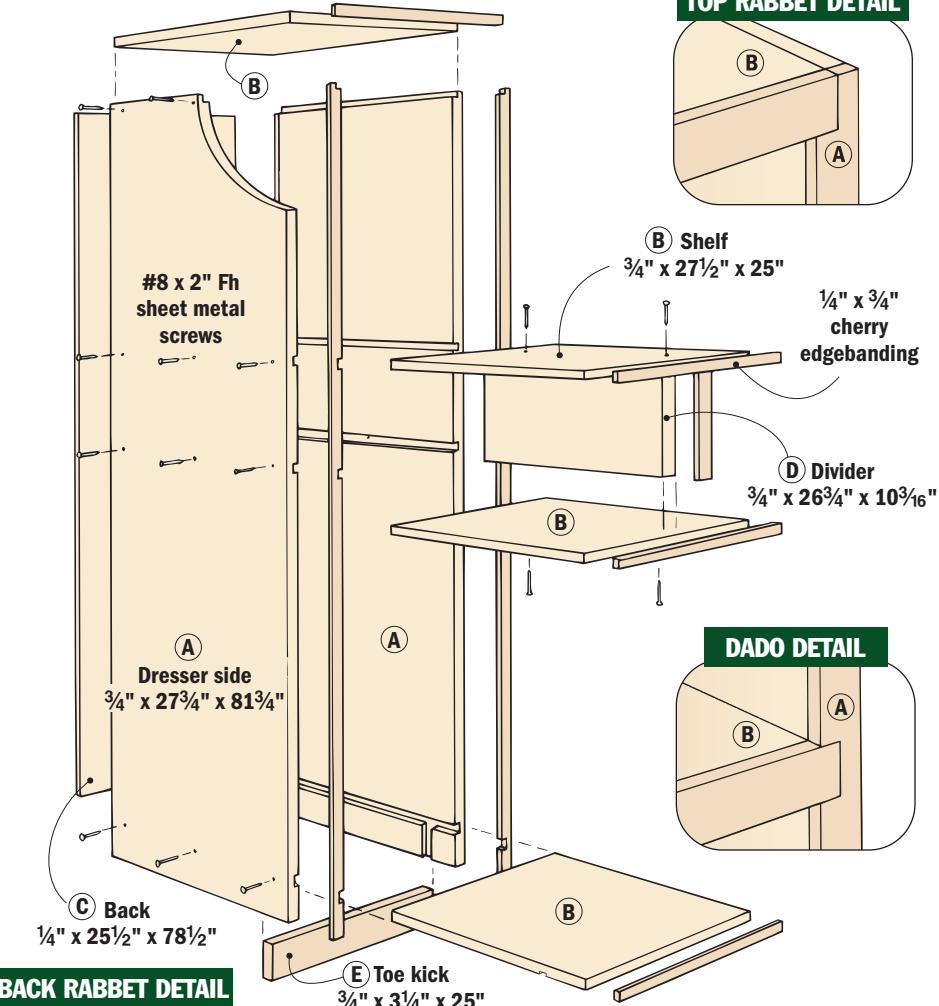
(18) Hafele drawer pulls (no. 155.58.610)

(2) Hafele door pulls (no. 115.58.630)

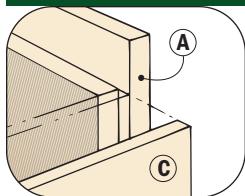
(2) $\frac{1}{4}$ " x $14\frac{11}{16}$ " x $67\frac{7}{16}$ " beveled glass mirrors

(2) $\frac{1}{8}$ " x $7\frac{5}{8}$ " x $15\frac{13}{16}$ " frosted glass

DRESSER ASSEMBLY



BACK RABBET DETAIL



CARCASE CONSTRUCTION

The dresser is the main part of this project so that's where I started. After cutting the birch plywood sides (A) and shelves (B) to size, I glued and clamped 1/4"-thick, 3/4"-wide, cherry edgebanding to the front edges of these pieces.

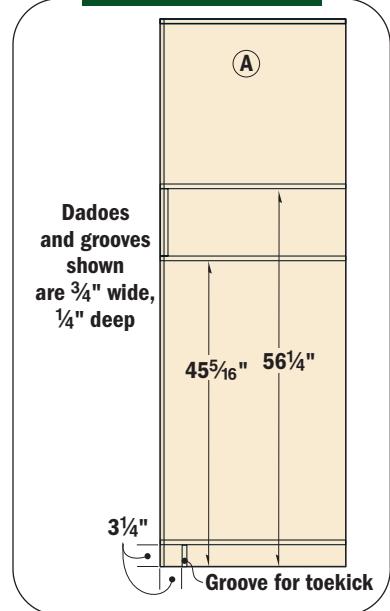
Once the glue dried, I used a

cabinet scraper to trim the banding flush with the faces of the plywood.

The three lower shelves fit into dadoes cut into the sides and the top fits into a rabbet. Since the sides are too big and awkward to wrestle onto the table saw, I recommend using a router and a straightedge to cut these joints.

The sides need to mirror each

DADO LOCATIONS

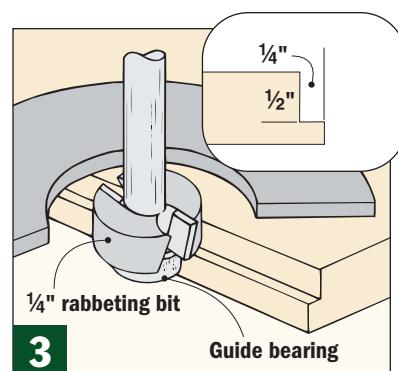
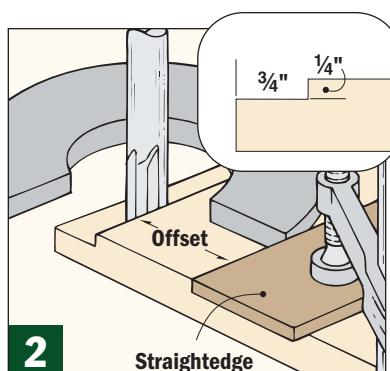
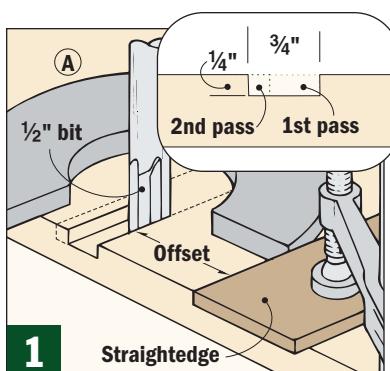


other so start by laying them on a flat surface with their front (banded) edges together and the ends flush. Mark the location of each shelf dado on the sides (*Dado Locations*).

Next, install a 1/2" straight bit in your router and set the bit depth to 1/4". Clamp the straightedge on a piece of scrap and make a test cut with the router, keeping the base riding firmly against the straight-edge. Then measure from the edge of the test cut to the straightedge.

Using this router base offset distance, mark a line to either side of the dado layout lines. Clamp the straightedge on one set of marks and make a routing pass (*Fig. 1*).

Now move the straightedge to the other set of marks and complete the routing of the dado. Then repeat this two-step routing process for the remaining two dadoes.



ASSEMBLY SEQUENCE

Use a similar setup to cut the groove for the toekick (E) in both the sides, in the underside of the bottom shelf, and the rabbet for the top shelf (*Fig. 2*). Then switch to a rabbeting bit and rout the rabbet for the $\frac{1}{4}$ " plywood back (C) (*Fig. 3*).

CARCASE ASSEMBLY

Before you start assembling the carcase, you'll want to line up a helper. It's just too tough to try to glue, align, and clamp a project this size by yourself.

To simplify the assembly, I marked out all the screw locations ahead of time. We also dry-fit the pieces together so I could measure and cut the back (C) to size.

That dry-fitting experience paid off in another way. We decided it would be easiest to assemble the carcase face down on a sheet of plywood so we could drive screws in both sides at once (*Step 1*).

After applying glue to the shelf dadoes on one side, I slipped the shelves in place one at a time while my buddy held the side. With each shelf lined up, I drilled countersunk screw holes and drove the screws. Then we repeated the process on the other side.

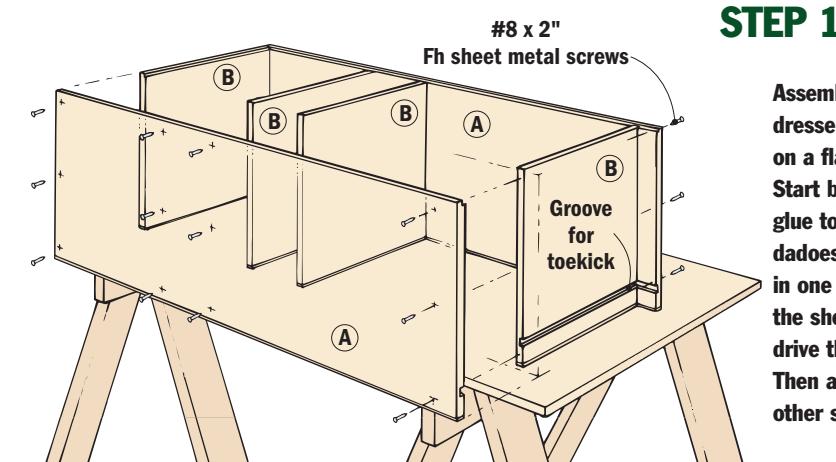
Working quickly before the glue set up completely, we fit the back in place, using it to pull the carcase into square, then nailed the back to the sides and shelves (*Step 2*).

Turning the carcase face up, measure between the shelves and cut a drawer divider (D) to size. This gets edgebanded like the other carcase pieces. To position the divider, I cut a pair of spacers — one on each side. With spacers clamped to the shelf, they kept the divider lined up while I drove the screws (*Step 3* and *Divider Detail*).

Finally, I glued and clamped the toekick (E) in place.

APPLY THE FINISH NOW

On most projects, I'd wait and apply finish to the entire project at once. Because this project will hold clothing, it's important to use a low odor, water-based polyurethane.

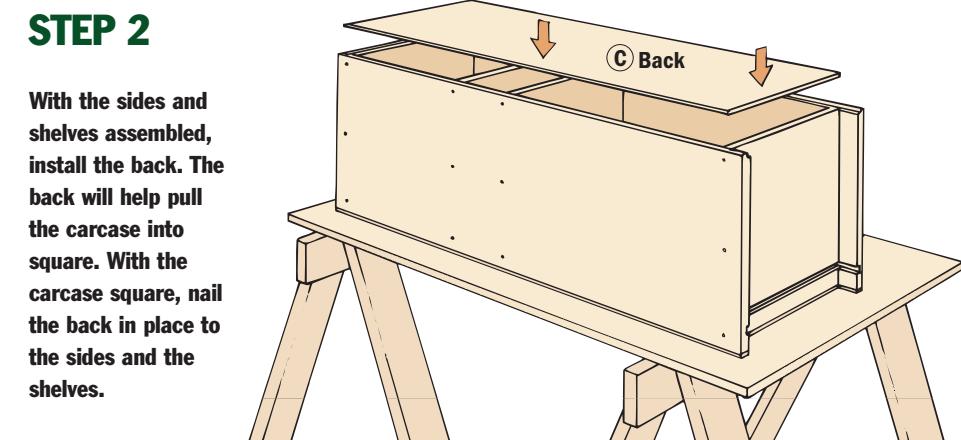


STEP 1

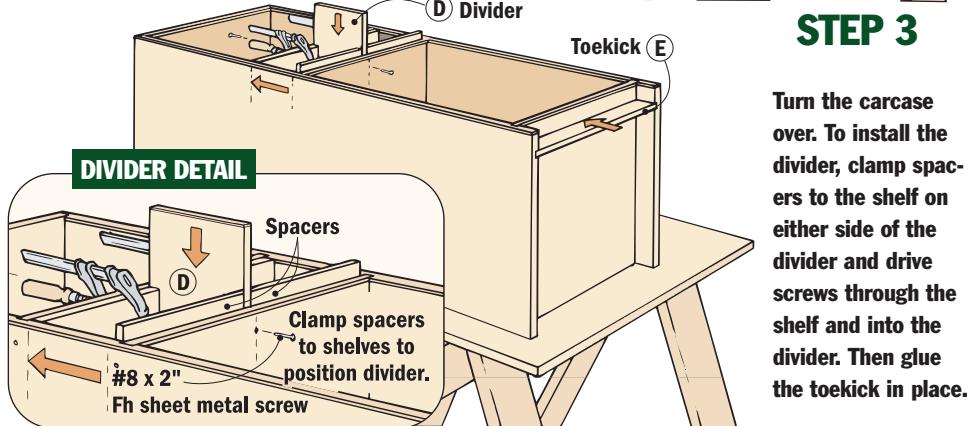
Assemble the dresser face down on a flat surface. Start by applying glue to the shelf dadoes and rabbet in one side. Insert the shelves and drive the screws. Then attach the other side.

STEP 2

With the sides and shelves assembled, install the back. The back will help pull the carcase into square. With the carcase square, nail the back in place to the sides and the shelves.



STEP 3



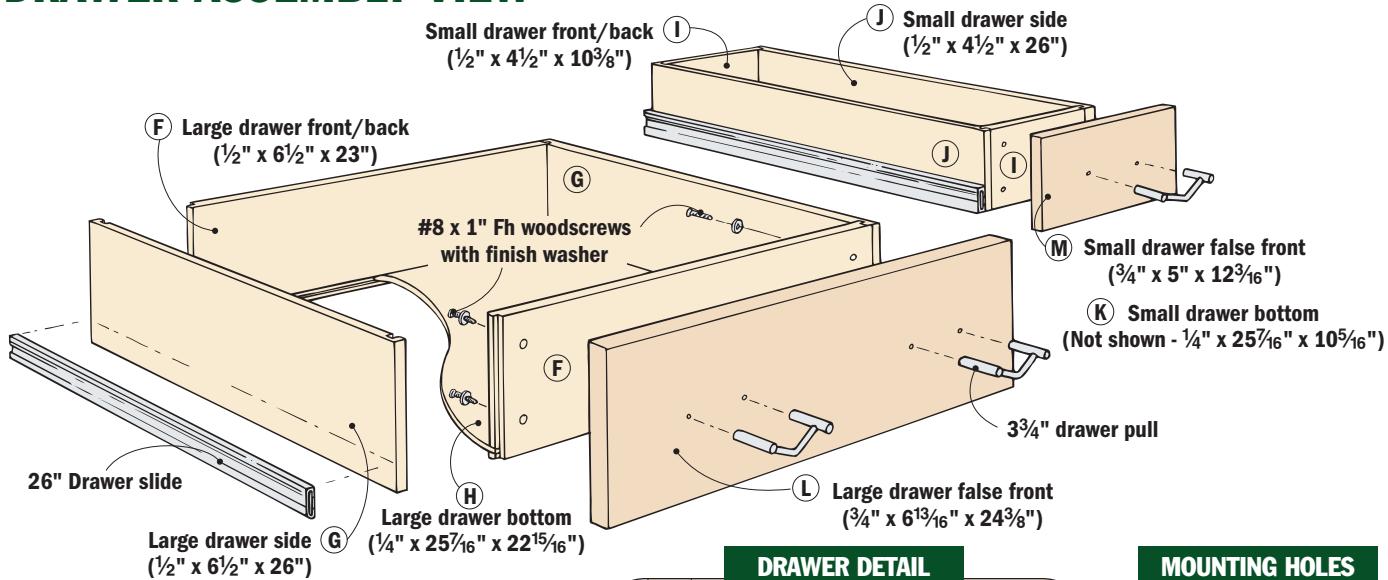
Turn the carcase over. To install the divider, clamp spacers to the shelf on either side of the divider and drive screws through the shelf and into the divider. Then glue the toekick in place.

However, water-based poly just doesn't look good over natural cherry (Find out more on the differences between water-based and oil-based polyurethane on [page 55](#)). So I stained the cherry first to add some color and "warm" up the look of the wood. I used the same stain on the birch plywood inside the TV compartment. Unless you look closely, you can't tell it's not really cherry.

The stain recipe is a mixture of gel and oil stains that we've used on a number of cherry projects in the past. To make it, mix three parts Zar Cherry stain with one part Wood-Kote Cherry Jel'd Stain.

To be sure the water-based poly forms a good bond, I let the stained surface cure for four days. That gave me time to move ahead with the rest of the project.

DRAWER ASSEMBLY VIEW



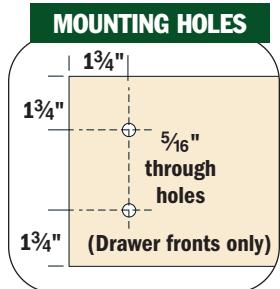
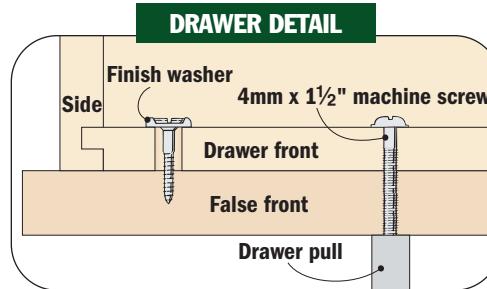
BUILD THE DRAWER BOXES

One great thing about the dresser unit is all the drawer space it has to offer. Although the drawers aren't wide, they're 26" deep — even the four smaller drawers on top.

The six lower drawers are identical in size (as are the four top drawers). This really simplifies cutting out all the parts. The joinery is simple too.

If you study the detail drawings above, you'll see what I mean. Rabbeting each end of the front/back pieces (F and I) creates a tongue. These tongues fit into dadoes cut in the drawer sides (G and J). The resulting joint is strong and resists the forces put on drawers when opening and closing them.

And even though the top drawers are smaller, the joinery setups are exactly the same as the big drawers. So you can make all the cuts at once.



To make the tongue cut, install an auxiliary wooden fence on your saw's rip fence and use a $1/4$ " dado blade (Fig. 4). See [page 26](#) for tips on setting up and using dado blades.

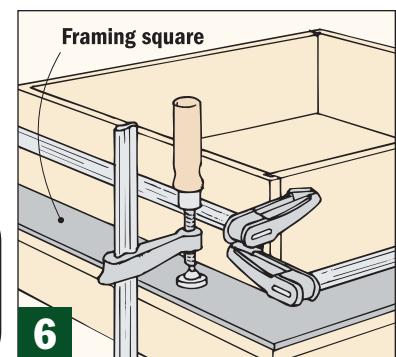
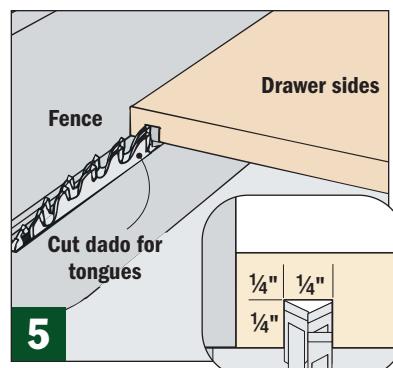
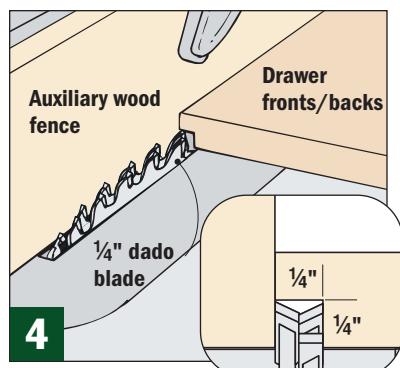
With the tongues cut on all the front/back pieces, shift the fence $1/4$ " away from the blade and cut the dadoes in all the sides (Fig. 5). Without changing the saw setup, cut grooves in all the pieces for the $1/4$ " plywood bottoms (H and K).

The drawers all have false fronts (L and M). This design lets you install the drawer slides and boxes in the carcase first, then position the

false fronts separately to get a uniform gap all the way around.

One trick I use is to drill oversized holes in the drawer box fronts (see *Mounting Holes* above). When I screw the false fronts in place, the oversized holes give me some "wiggle" room to adjust the fit. Finish washers cover the holes and keep the screw heads from centering the holes.

With the mounting holes drilled, glue and clamp the drawer boxes together. A framing square clamped to the bench helped keep the assemblies square and flat (Fig. 6).



INSTALLING THE DRAWERS

Once the drawers are assembled, it's time to mount them in the carcase. Because the drawers are extra deep, I used full-extension, ball-bearing drawer slides (see *Sources and Resources* on page 59 for details).

The drawer portion of the slide gets attached $\frac{3}{8}$ " up from the bottom edge of the drawer. To mount the carcase portion of the slide I used a sacrificial guide board shown in the drawings at right.

The board is a piece of scrap plywood that's initially cut to $34\frac{7}{16}$ " long — the distance from the bottom shelf to the top drawer slide. With the guide board against the carcase side, I set the slide on top of the board and screwed the slide in place. Mark the dresser side to maintain the proper $\frac{3}{4}$ " setback.

Then I moved the board to the other dresser side and repeated the process. With the top pair of slides installed, I cut the board down to the appropriate length for each subsequent pair of slides.

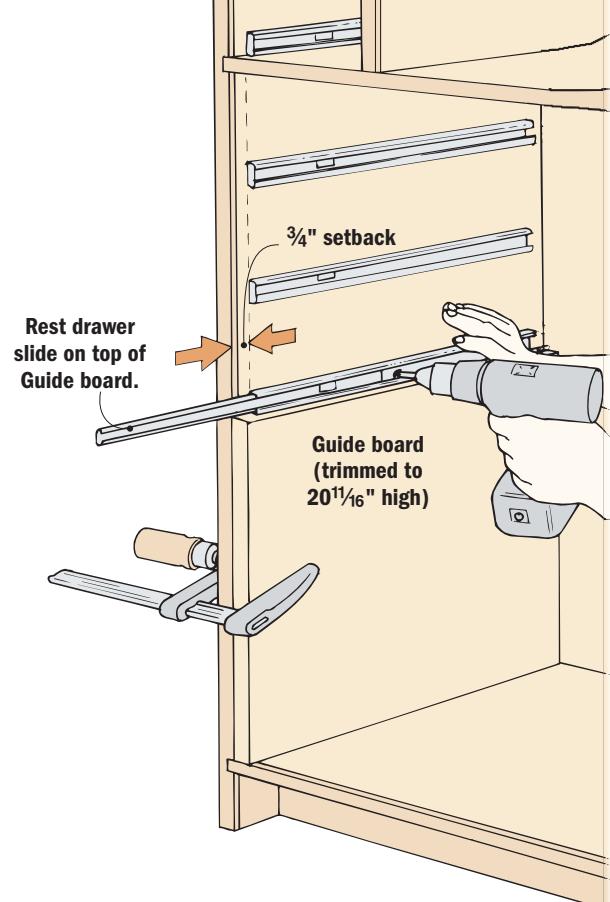
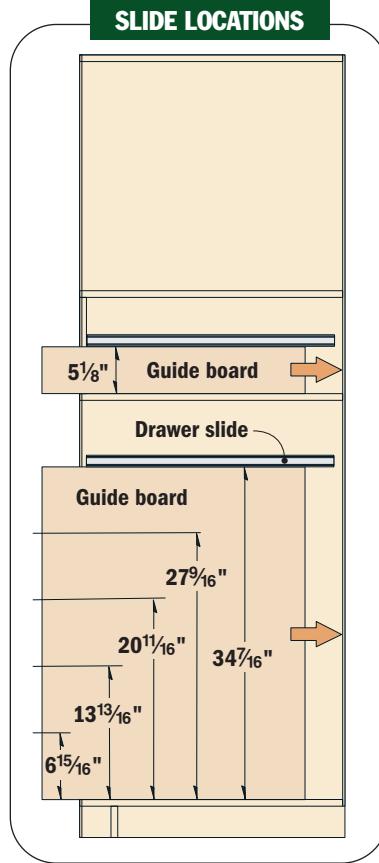
Trim one of the cutoffs to make a guide $5\frac{1}{8}$ "-wide to position the slides for the upper two small drawers. The slides for the bottom drawers (large and small) rest on the shelves (*Fig. 7*).

ADD THE FALSE FRONTS

The only thing left is to cut and mount the solid cherry false fronts. These are sized to leave a $\frac{1}{16}$ " gap on all sides. I like to first cut the fronts to fit the opening exactly, then trim them to fit.

With the fronts trimmed, I went ahead and put stain and finish on them. When the final coat of finish

SLIDE LOCATIONS



was dry, I slid the bottom drawer into the carcase. Applying some double-faced carpet tape to the front of the drawer, I shimmed the false front into position using pennies (*Fig. 8*) and pressed it against the drawer.

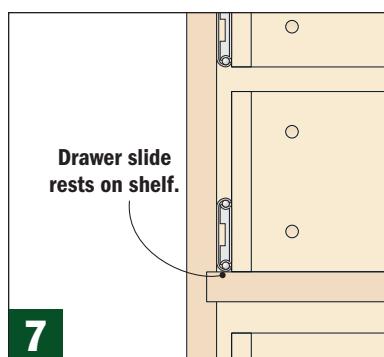
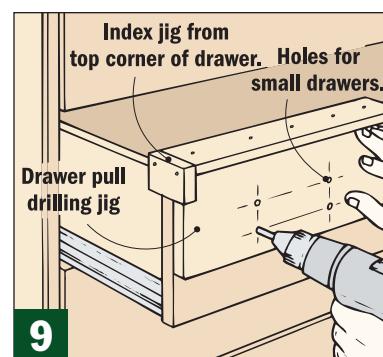
Then I carefully opened the drawer and installed the mounting screws and washers. Finally, I repeated the process for the remaining drawers, shimming off the previously installed false front.

With the fronts installed, I used a simple drilling guide (*Fig. 9*) to locate the mounting holes for the

drawer pulls. Notice on page 34 how the pulls are centered on the small drawers. The pulls on the lower drawers align under these.

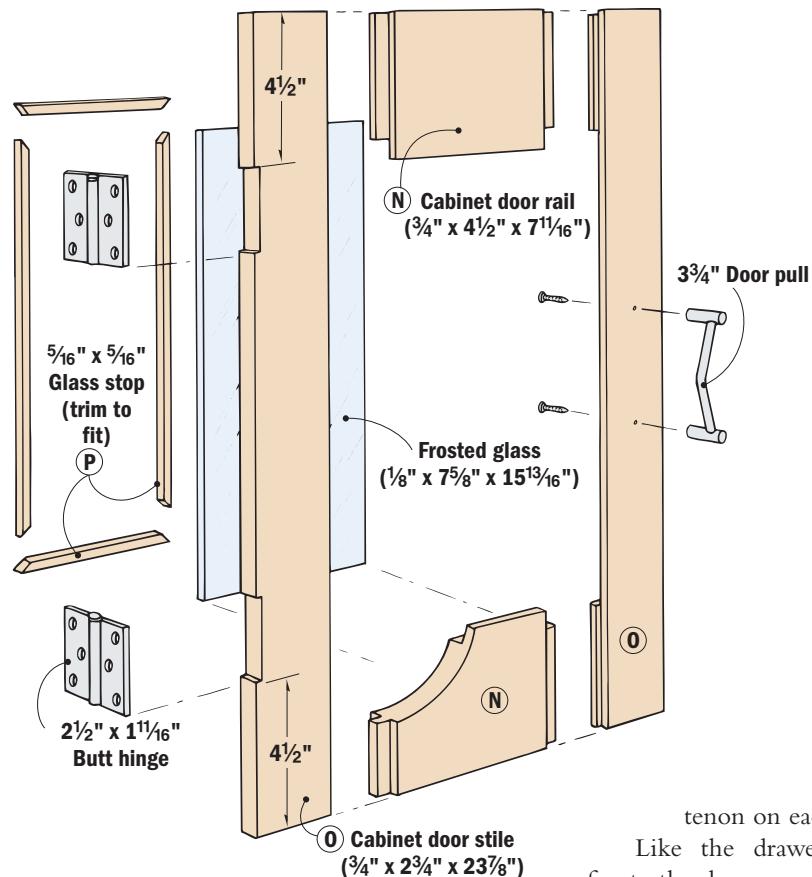
The cleats on the drilling guide make it two-sided — just flip it over to mark the pulls on the left side of the dresser.

The holes go through both the false front and the drawer front. Though it takes longer screws, this gives you access to the screws if they should loosen up.

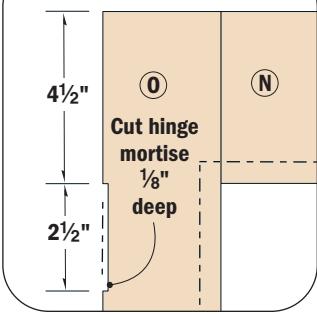


7

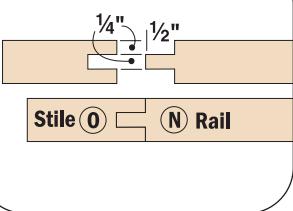
CABINET DOOR ASSEMBLY VIEW



HINGE DETAIL



JOINERY DETAIL



**Needlenose
pliers make it
easier to fasten
the glass stops
to the doors.
Drill pilot holes
to preventing
splitting.**

BUILD THE DRESSER DOORS

The final step in building the dresser is constructing the frosted glass doors for the television compartment. I used stub tenon and groove joinery to build the door frames. These joints are simple but strong and they only take a couple of steps to make.

Start by cutting the stiles (O) and rails (N) to length. The rails are cut 1" longer than the space between the stiles. This allows for a 1/2"-long

tenon on each end. Like the drawer false fronts, the doors are sized so there's a uniform 1/16"-wide gap all the way around.

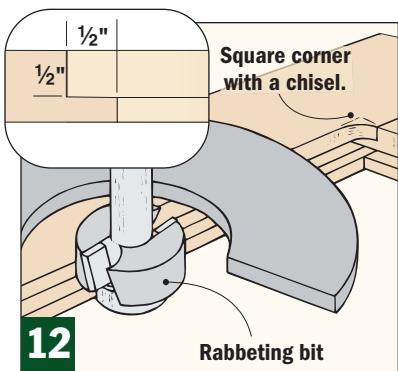
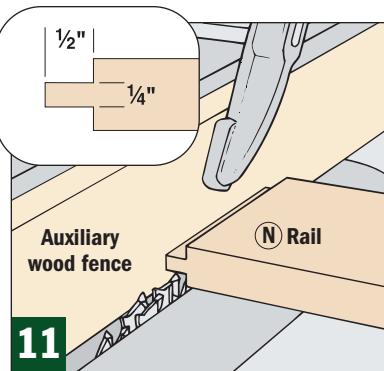
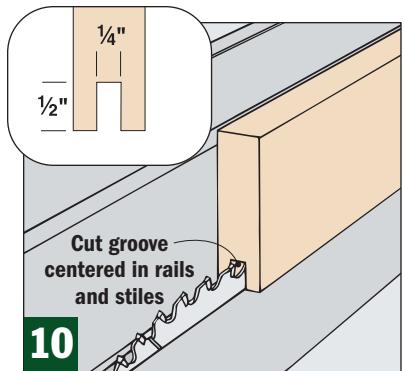
With the parts cut to length, it's time to cut a 1/4"-wide by 1/2"-deep groove in one edge of all the pieces. You could set up a dado blade for this, but I prefer to make the cut in two passes with my regular blade. By making one pass, then turning the stock end-for-end and making a second pass, you're guaranteed that the groove will be centered (Fig. 10).

To fine-tune the width of the groove, make some test cuts in scrap. Adjust the fence toward the blade

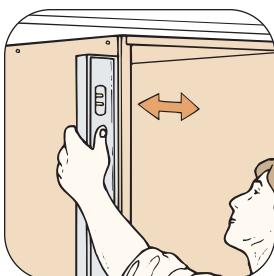
for a wider cut or away from the blade for a narrower cut. But remember when adjusting the fence that you only need to move it half of what's needed because you're making two passes.

Once the pieces are grooved, make the tenons on the ends of the rails. Again, I like to use scrap to make test cuts. Start by setting the fence 1/2" from the blade and adjust the blade height to 1/4" (Fig. 11). Make a couple of passes on each side of the scrap at the end of the stock and test fit the tenon in the groove. If the tenon is loose, lower the blade slightly. If it's tight, raise the blade.

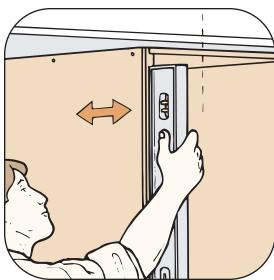
To cut the tenons, position the rail end against the fence and guide it through the blade with the miter gauge. Then nibble away the remaining stock in multiple passes.



INSTALLING THE DRESSER



STEP 2: Plum the dresser side-to-side, using shims to hold it in place.

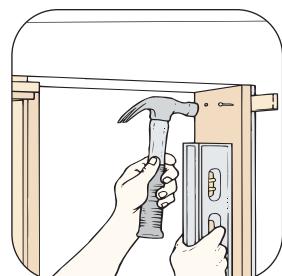


STEP 3: Plum the dresser front-to-back, keeping it flush with outer wall.

STEP 4:
Toenail the dresser to the closet floor. Then place blocking between the top and the header and drive screws. Then install dresser-to-wall trim (Y).



STEP 1: Mark the centerline of the closet opening.



STEP 5: Shim the hinge jambs plumb and nail them to the wall studs.



STEP 6: Shim the head jambs square to the hinge jambs and nail them.

After the tenons are cut, glue and clamp the door frames together, checking them for square.

Now, if you're wondering how the frosted glass will fit into the assembled door frame, I didn't forget to install it. You just need to turn the groove into a rabbet. To do this, I used a bearing-guided rabbeting bit in my router (*Fig. 12*), then squared the corners up with a chisel.

The glass fits into the rabbeted back of the frame and is held in place with glass stops, as shown in the photo at left. Before I installed the glass, I cut the $\frac{1}{8}$ "-deep mortises for the hinges (*Hinge Detail*).

And to keep the frosted glass panels (about \$20 each) clean, I applied stain and finish to the doors and glass stop *prior* to installing the glass.

When the glass is in place, install the hinges on the doors and mount the doors in the dresser opening. With the dresser now complete, you're ready for the installation phase.

INSTALL THE DRESSER

On most projects, you build everything before you install it. But considering the built-in nature of this project, it made sense to install the dresser first, then build the door jambs and doors to fit the remaining openings. This approach also lets you start using the dresser even while you're completing the rest of the project.

Even with the drawers removed, you'll need a hand moving the dresser into position. Mark the centerline of the closet opening, then align the dresser with the centerline mark (*Step 1*, above).

Now, to fine-tune the dresser's position, shim it plumb — both side-to-side and front-to-back (*Steps 2* and *3*). This may take some trial-and-error adjustment so have plenty of shims on hand.

You also want to make sure the front of the dresser winds up flush with the outer surface of the drywall.

Once you're satisfied with the position, toenail or drive screws at an angle through the side and into the closet floor. Then stack up blocking and shims to fit between the top of the dresser and the closet header and drive screws to hold it (*Step 4*). Finally add the dresser-to-wall trim (Y).

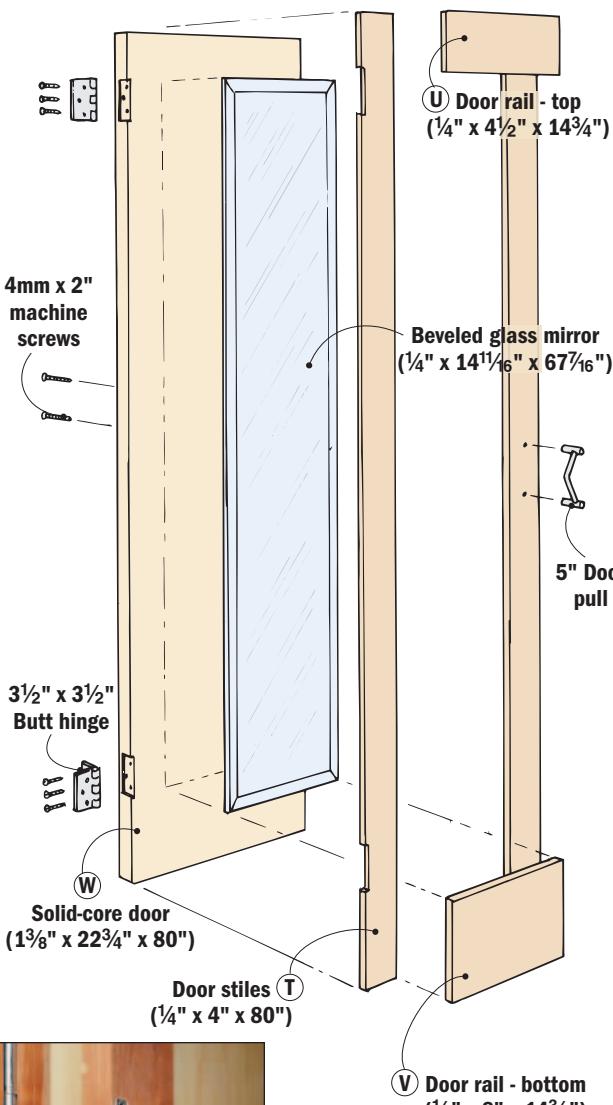
ADD THE DOOR JAMBS

With the dresser installed, you can custom-fit the jambs and doors. To match the dresser, I made the jambs and door stops out of cherry.

Start by cutting the outer jambs to length, then shim them plumb against the wall studs in the closet opening (*Step 5*). Drill pilot holes through the jambs at the shim locations and drive 8d casing nails to attach the jambs to the studs.

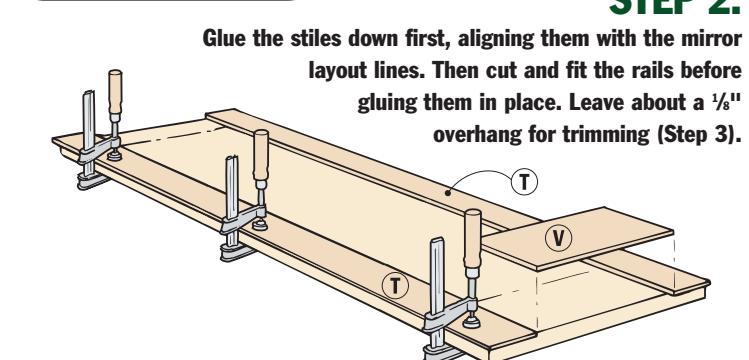
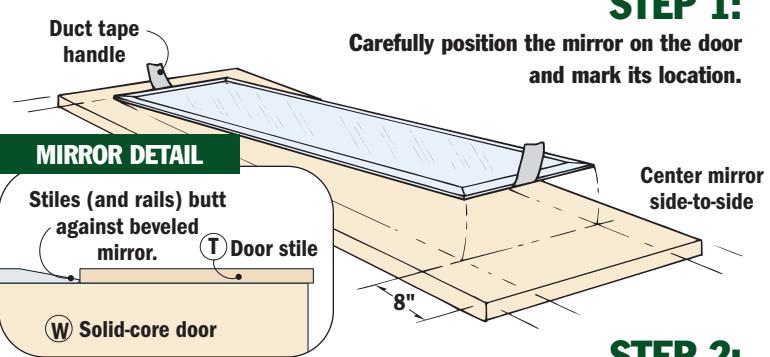
The head jambs get installed square to the outer jambs (*Step 6*). Again, shim them into position if necessary. Then attach the strike jambs to the dresser's sides.

CLOSET DOOR ASSEMBLY

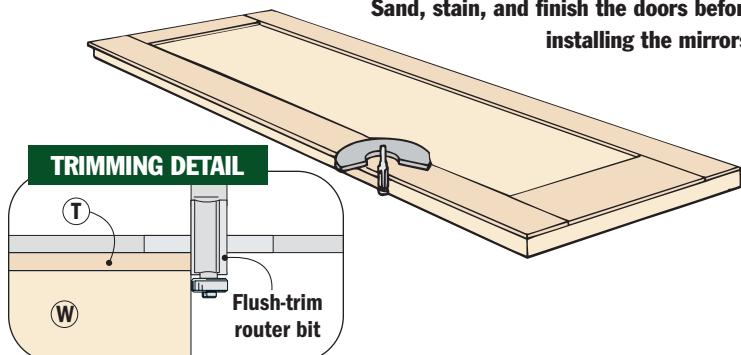


Spring-loaded catches hold the closet doors closed. First, install the catch part on the strike jamb 6" from the top and bottom of the door. Then use the catch to position the tab part on the door.

I trimmed the doors to leave a uniform $\frac{1}{8}''$ gap at the top and on the sides and a $\frac{3}{4}''$ gap at the bottom. To make these doors look like frame-and-panel doors I glued $\frac{1}{4}$ "-thick cherry stiles (T) and rails (U and V) to the outer face. These frame the beveled mirrors (about \$64 each from a local glass fabricator).



STEP 3: Trim the rails and stiles flush with the edge of the doors. Sand, stain, and finish the doors before installing the mirrors.



It's best to have the mirrors on hand to get a precise fit, since glass this large may not be cut perfectly square. Because of this, I also cut the rails and stiles slightly oversized so I could trim them to fit.

Start by positioning the mirror on the door and marking its location around the perimeter (Step 1). Be sure the door is clean of dust and grit so the back (silvered) side of the mirror doesn't get scratched. Even then, don't slide the mirror into position. (Note the duct tape "handles" for lifting the mirror enough to get a handhold on it.)

Next, glue one stile to the door, aligning it with the layout marks (Step 2). Then align the other stile

and glue it in place. You'll probably need to do some trimming on the rails to get them to fit flush against the stiles and mirror layout lines.

Set that door aside and repeat the process for the other closet door.

When the glue dries, use a router with a flush trim bit to cut the rails and stiles flush with the edges of the door (Step 3).

Before installing the mirrors, rout or chisel the mortises for the hinges in both the doors and the jambs. I also went ahead and applied stain and finish at this point so I didn't have to mask off the mirrors later.

When the finish dries, apply mirror mastic to the doors and set the mirrors in place.

FINISHING UP

The closet's interior has room for lots of personal touches. I kept things simple, installing L-shaped shelves (Z) in the upper portion of the closet. These shelves — made from edgebanded $\frac{3}{4}$ " birch plywood — rest on top of the dresser and on cleats screwed to the back and end walls (*Shelf Assembly*).

The cleats (AA) on the end wall also provide a mounting surface for the closet rod cups. Closet rod and cups in a variety of styles and sizes are available at home centers.

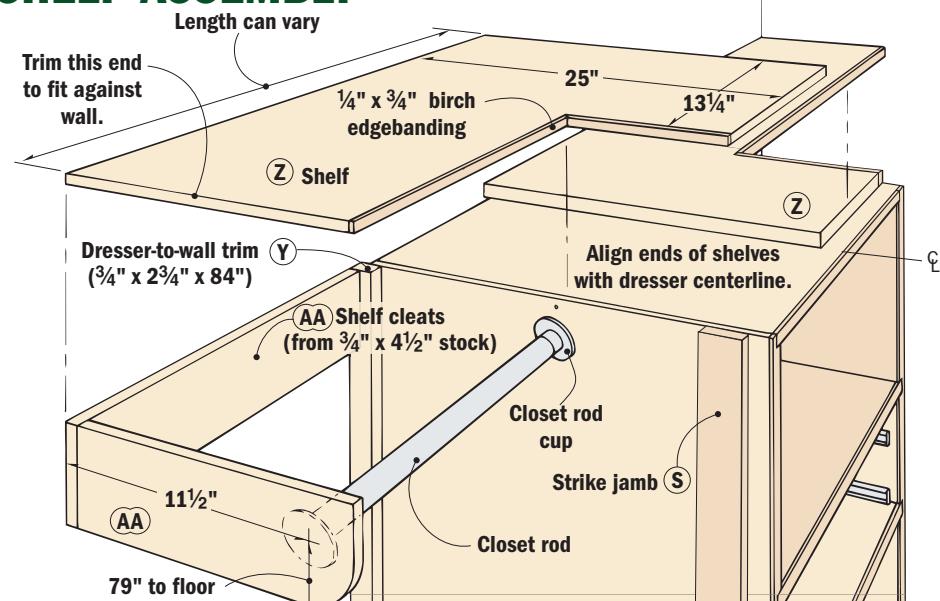
Because the closet rod mounts 79" above the floor, there was room beneath the single bar for a shoe rack, shown in the photo and drawing below. Built as a simple box with two shelves, the rack keeps shoes organized but doesn't use much space vertically.

DISAPPEARING TELEVISION

Not everyone has or wants a TV in the bedroom. But I designed the cabinet compartment with a television in mind. Though the compartment is sized to hold most any 19" model, I wanted to be able to see the screen from a chair or bed.

So I installed a pull-out television stand (see *Sources and Resources* on

SHELF ASSEMBLY



[page 59](#) for details). An edged plywood platform dressed up the metal stand and still allows the TV to swivel (*TV Shelf*).

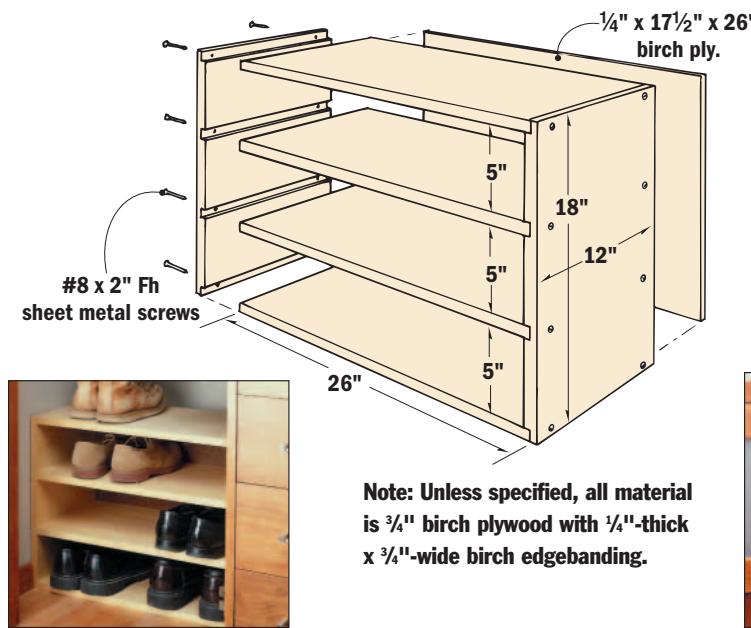
If you don't want a TV in the dresser, you can divide up the space with adjustable shelves. Or build a box similar to the shoe rack that could slide into the compartment, yet allow for a TV in the future.

With the interior completed, hang the closet doors and add the casing. To keep the lines clean, I used $2\frac{3}{4}$ "-

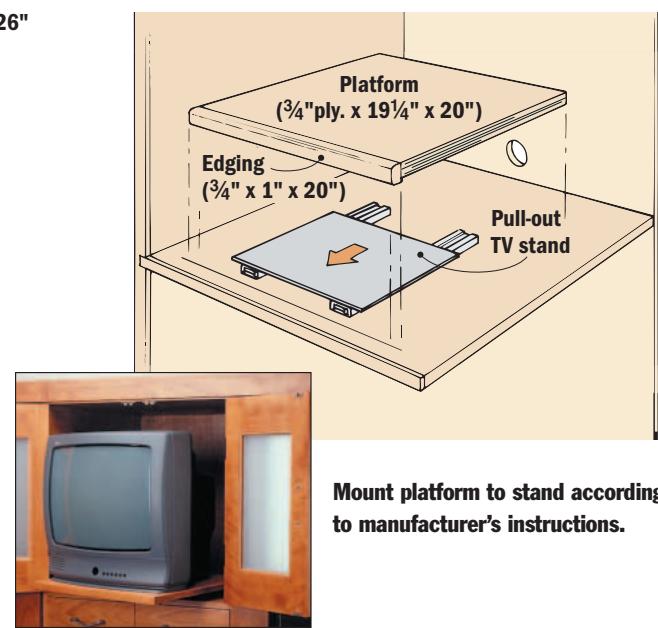
wide cherry — 1"-thick stock for the outside head casing (BB) and $\frac{3}{4}$ "-thick stock for the sides (CC). The closet interior got identical trim (DD and EE) in birch. I also replaced the base molding with birch stained to match the cherry.

With the new trim in place, it's hard to remember what the old closet looked like. It's also hard to believe how much storage this project offers. Maybe I should have kept some of those old sweaters after all. ■

SHOE RACK OVERALL SIZE: (12"W X 18"H X 27"L)



TV SHELF



Mix & Match Moldings



Want to breathe new life into a boring room in a single weekend? It's easy!

All you need is a little creativity and some inexpensive off-the-shelf moldings.

I love the charm of older houses, especially all the elaborate architectural moldings you find in many homes built prior to the 1950s. So when I moved into a more modern house with a boring "clamshell look," I eagerly searched for a way to recreate that charm without spending a fortune. Well, it surprised me how

easy it is to add personality and character to a room using nothing more than some inexpensive stock moldings and your own creativity.

Think of each molding as part of a kit (see below). Alone the pieces don't look like much. But combine cove and dentil molding along the top of a cabinet, or a built-up pedi-

ment above a window or doorway, and you instantly have an impressive piece of add-on architecture.

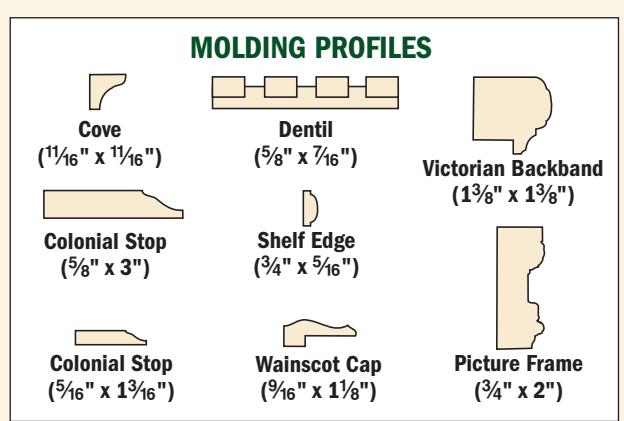
The best part is you don't have to tear your house apart or live with a mess to enjoy the results. The projects shown on the following three pages easily can be completed in a weekend or less. Take a look.

MOLDING CHARACTER



Here are some of the molding pieces used to create the built-up profiles shown on the following pages. All of them were purchased at a local building center. Pine and poplar are two of the most common molding materials available. Although slightly more expensive than pine, poplar is tighter grained and accepts paint more readily.

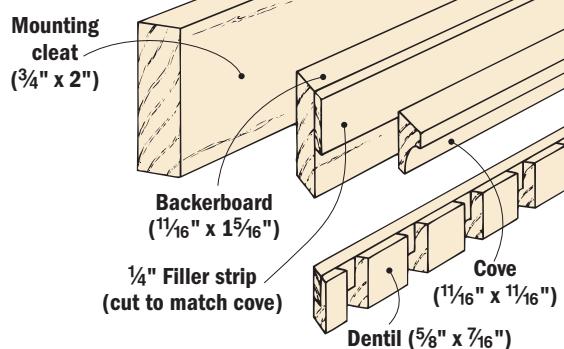
I prefer the look of oak finished with a stain and clear top coat. But oak costs more than twice what pine does. And if you plan on painting your moldings, it's not worth it to spend more for an expensive hardwood.



CABINET MAKEOVER



DENTIL ASSEMBLY



**Combination
of cove
and applied
dentil molding.**



Take a look at the photos above and you'll see what a subtle difference moldings can make when used to trim a cabinet. While working with moldings isn't difficult, it does require patience, plus accurate measuring and cutting skills.

START BY CHOOSING A PROFILE

One of the most enjoyable parts of this project is deciding which moldings to pair up to get the look you want. The place to start is at a local home center or lumber yard.

There are dozens of molding styles available. So experiment with different combinations until you find something you like. Then head to the shop to begin the assembly process.

BUILD IT ONE PIECE AT A TIME

You could measure and cut each molding piece separately and fasten them to the cabinet one at a time. But why bother making multiple cuts and run the risk of the miters not matching when you don't have to. There's an easier way.

For the cove and dentil combination (photo above right), I started by cutting a piece of cove a bit longer than the cabinet. Then I cut the other pieces to match and glued all of them onto a backerboard as seen in the *Dentil Assembly*. The backerboard provides support and helps with attaching the molding to the cabinet.

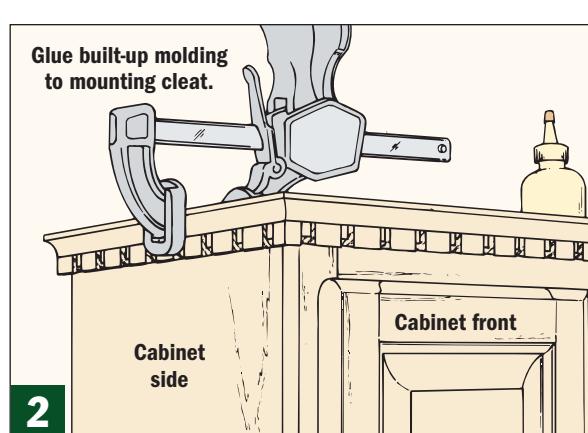
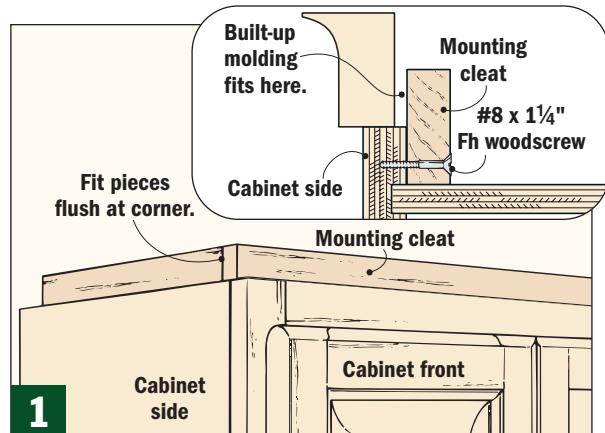
After the glue has dried, go ahead and miter the assembly once. See

page 46 for some mitering tips. Before installing the combination molding, sand it first, then stain or paint. It can be touched up in place.

ATTACH IT TO THE CABINET

I didn't attach the built-up molding directly to the cabinet. The reason why was because I wanted to be able to replace it later if necessary without damaging the cabinet. So instead, I used a mounting cleat screwed to the backside of the cabinet's top rail. The cleat also helps support the molding.

Once the cleat is secured (Fig. 1), the molding can be glued directly to it as seen in *Figure 2*. If you ever need to remove the molding, simply unscrew the cleat from the cabinet.



1

2



WINDOW VALANCE



A



B

Any window — even one without a great view — can become a focal point if you dress it up. The same goes for doors. Molding treatments are a quick way to make windows and doorways worth looking at, rather than through.

MAKE A WINDOW VALANCE

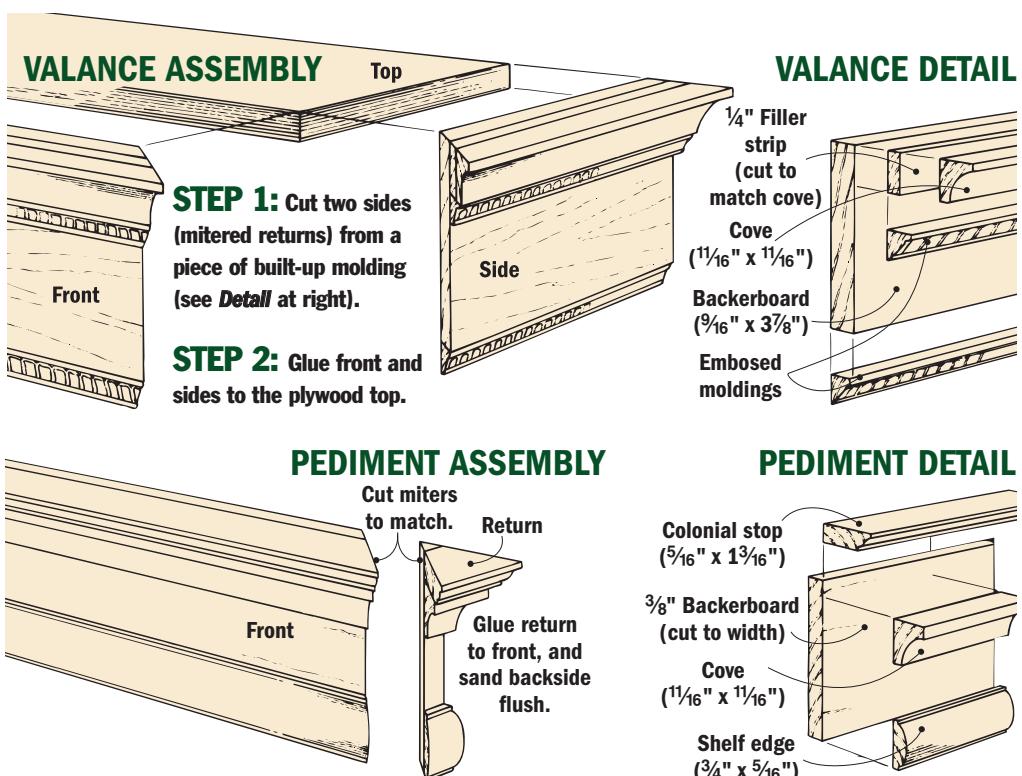
Need to hide the top of an ugly window shade? Why not try a classy-looking valance

(see *Window Valance* above). It's basically a small box trimmed with decorative molding that fits around the existing casing. A piece of plywood for a top provides support and helps with fastening. I'll explain more about the plywood top in a minute.

Similar to the cabinet trim, the valance is made by gluing individual moldings to a $\frac{9}{16}$ "-thick backerboard (see *Valance Detail* above). After gluing the pieces together, measure the distance across the window from the

outside edges of the side casings. Next cut a length of the built-up molding a little long. Now miter the ends so the distance between the inside of the miters equals the measurement you just took from the window casings.

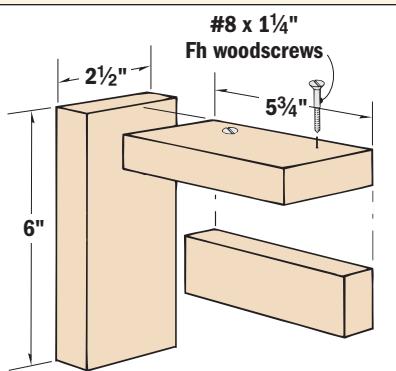
Once you've decided how far you want the valance to project from the wall, go ahead and cut two mitered side pieces. You're just about ready to begin assembling the valance as seen above.



HANDY CASING CUTTING JIG



NOTE:
Cut all
pieces
from $\frac{3}{4}$ "
stock.



make clean, accurate cuts. It's simply three pieces of stock screwed together to create a ledge for a small handsaw (see assembly at left).

There isn't any trick to using the jig, either. To make the cuts, hold the jig flush against the casing (outside edge for lefthand side, inside edge for righthand side). The top of the jig should butt flush underneath the top casing (see photo). This will give you an accurate cut.

You may want to use some painter's tape to protect the wall while you're cutting. Even still, you'll probably have to touch up a few scratches on the wall when you get done cutting.

CREATE A SHELF SPACE

There's one final detail to consider—the plywood top. This makes securing the valance to the existing window casing easier. And as an added bonus, it also creates a small ledge that can be used as a shelf.

First glue the front and sides to the top, making sure the mitered corners match up. With the plywood top snug against the top window casing, nail through the top and sides into the casing to secure the valance.

ADD A BUILT-UP PEDIMENT

Maybe you don't have shades to hide. You can still easily change the look of an entire room using decorative corner blocks or by adding a built-up pediment. But first you'll need to remove the existing casing above the window or door. Check out the handy casing cutting jig at the bottom of the [facing page](#).

Pediments can range from simple to complex, depending on how much architectural detail you want to add to a room. As the photographs of pediment styles show (*Photo A* on page 45 and *Door Pediment* above right), a pediment can be built-up with several different layers (*A*) or just a couple pieces (*Door Pediment*).

But the nice thing is that whatever style you choose, pediments can be built in a shop and attached as a single unit. That means you don't have to attach a lot of individual pieces working above your head for long.

The classical-style pediment in *Photo A* begins with colonial stop molding installed upside down and a piece of cove attached to a backer-board. Shelf edge molding across the bottom edge of the backerboard's face completes the basic elements.

To align the pediment's pieces, fasten them on a flat surface before cutting the mitered returns. For convenience, I cut the returns a little long then sanded the piece flush. You'll find some tips for attaching and sanding mitered returns below.

For a bolder, more stately pediment, try combining a piece of Victorian-style backband with a decorative picture frame molding (*Door Pediment*). Again, the pieces can be assembled as a single unit and returns cut before attaching.

CUT IN CORNER BLOCKS

Like other molding profiles, corner blocks also come in a variety of styles and sizes. You'll notice in *Photo B* on page 45 that the existing casing at the top of the window was left in place, and a new corner block was cut in.

Now take a look at *Photo C* at right. Here, I added a corner block plus new casing treatment above the door. The new casing is a piece of



DOOR PEDIMENT

colonial stop molding with a piece of wainscot cap.

Whatever style of corner blocks you choose to use, make sure they're large enough to extend past the other molding pieces. This adds depth and detail to the surrounding casings.

You can easily recreate any of the built-up looks shown in this article. But why stop there? The real fun comes in using your creativity to design your own molding combinations that match your tastes. ■



C

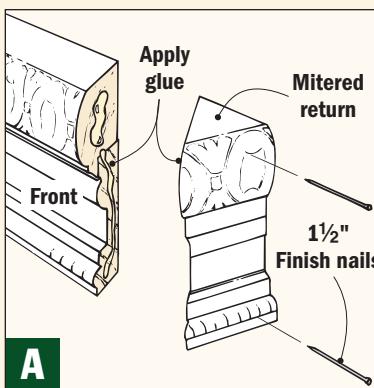
TIPS FOR MITERING RETURNS

The pediments (and the window valance) are mitered at the ends where they turn the corner and return to the wall. These short pieces are called "returns."

It's important that the returns fit tight at the corners where even a slight gap would be noticeable. To create a tight fit, I practiced on a couple pieces of scrap stock until I was satisfied with the way the mitered pieces were matching up.

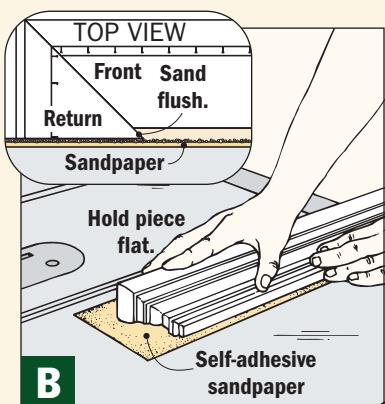
Once you're satisfied with the fit, it's time to miter the actual workpiece and attach the returns. I found it works best to glue and nail larger returns in place with a brad nailer (*Fig. A*). The nails help keep

the miters from slipping while the glue dries. You'll need to predrill if nailing by hand. Some returns are simply too small to nail. In this case, use masking tape to hold them.



A

It's a good idea to cut the returns a little long so you can true up the backside of the piece. This ensures the molding fits flush with the wall. See *Figure B* for a sanding trick.



B

Furniture First Aid

Old beat-up furniture is often a bargain, so don't pass it up. Instead, fix it up with tips from a "furniture doctor."

There are two things that really delight me: antiques and free stuff. So when a friend offered her rickety old table and a couple chairs for free, I didn't waste any time hauling them home. They'd been sitting in a dusty barn for nearly a year and were in need of some serious TLC.

Restoring antique furniture is a lot like emergency room medicine. When faced with a crisis, ER doctors and nurses employ a process called triage. This means life-threatening emergencies are cared for first, followed by less severe prob-

lems. So after dusting off the cobwebs, I rushed my "patients" off to Ron Stookey, a professional furniture refinisher and self-proclaimed "furniture doctor" for some advice.

When I first brought the chair and table into Ron's shop, he took a long hard look at my "bargains," scratched his head, and started his careful diagnosis.

"There are about as many different ways to repair and restore furniture as there are furniture styles," he explained. "But let me get you started with a few tips I use every day in my shop."

EXAMINING AND DIAGNOSING THE PATIENT

Knowing where to begin the repair process can be puzzling. But just like any good doctor-patient relationship, treating furniture with the respect it deserves seems like a good place to start. "It's the difference between tearing something apart to see what's wrong and carefully disassembling it," Ron says. "It's all in your attitude."

Respect for furniture also means making the right diagnosis about what needs to be repaired. Doctors don't put on surgical scrubs without knowing exactly what operations need to be performed and how they're going to approach them. You shouldn't either. So start by carefully examining every part of a piece of furniture.

Look for split panels, loose joinery, signs of rot, cracked veneer, stains in the finish, missing parts, and other defects. "You should also check for signs of previous repair jobs, such as metal straps, excessive nails, or screw reinforcements," Ron cautioned. "These are sure signs of more serious structural problems."

If you apply the triage approach to furniture repair, broken or loose joints should be your initial concern. "But before you jump right into structural repairs, there's one question you must always ask yourself at the outset of any repair job," Ron says. To find out what that is, take a look at the first tip on the [following page](#).



1. DECIDE ON A GAME PLAN

First decide whether you're going to retain the original finish or apply a new one. If you plan to refinish, you'll want to disassemble the piece first. This makes sense because smaller parts are easier to strip. Plus, many strippers soften glue that bonds joints. For more information about available strippers, turn to page 51.

2. DISASSEMBLE WEAK JOINTS

Wobbliness is the most common symptom of structural damage. It's usually due to the failure of one or more glue joints. So if you have a chair or table that's reeling and rolling like a Saturday night drunk, the best remedy is to dismantle it and separate all the weak joints.

Often joints will fall apart in your hands, and sometimes it takes brute force. Never bend or twist a piece to get joints separated. Tenons and dowels break easily when you do this.

Obviously, the first thing to try is to tap gently with a rubber mallet. To protect the spot where you're striking, tape some protective cardboard to the area. Another method is to inject heated vinegar into the joint. At the bottom of the page are three more tips you might find useful.

3. REMOVE FASTENERS CAREFULLY

Sometimes pieces are difficult to get apart because of concealed dowels, screws, or nails holding joints together (Fig. 1). "I removed 27 nails from a chair once," Ron says. "It was worth more as scrap metal."

The trick is removing fasteners without gouging the surrounding wood. Diagonal-cutting pliers come in handy for working nails and small brads loose as shown in *Figure 2*.

"If nails and screws aren't part of the original design, don't use them in your repairs," Ron says.

4. LABEL ALL PARTS AND PIECES

You'll want to develop your own system for labeling parts. For example, Ron always stands in front of a piece of furniture and faces it while labeling. This way his right/left, top/bottom references remain the same.

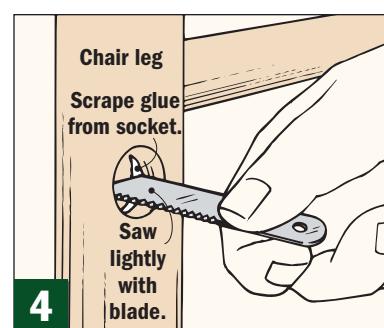
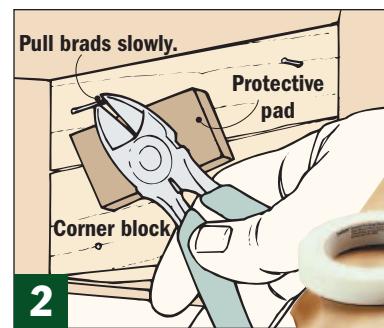
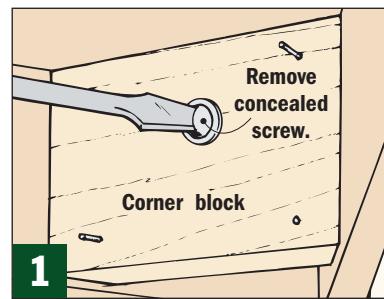
"I label everything, whether it's a chair with a half dozen parts or a rolltop desk with a hundred pieces," Ron says.

Masking tape works good for labeling pieces. When stripping, first use a marker on hidden spots such as on tenons or the undersides of parts. You can always relabel with tape after the piece is stripped. For complicated pieces, a few *before* photos might be helpful.

5. CLEAN JOINTS TO BARE WOOD

Once the pieces are disassembled and labeled, you'll need to clean the joints by removing all of the old glue. An old chisel is a good tool to loosen and scrape away bigger chunks of dried glue as seen in *Figure 3*.

In tight mortises and larger sockets, try using a light sawing motion with a small piece of a hacksaw blade (*Fig. 4*). Old glue can be brittle, so be sure to wear some type of eye protection.



THREE MORE WAYS TO LOOSEN FURNITURE JOINTS



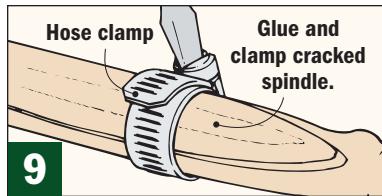
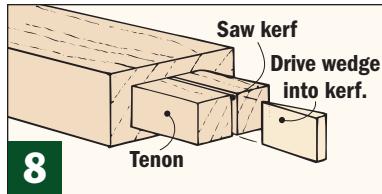
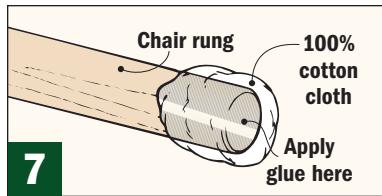
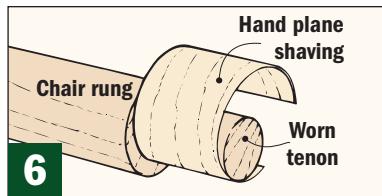
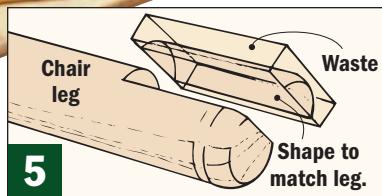
Stuff a rag and a rubber hose into the spout of a hot kettle. Then hold the hose close to the joint for a few minutes.



You can apply gradual pressure with a spreader clamp until the joint comes apart, so there's less risk of damage.



Run a screw into a block of wood, then hold it against a leg. With a drill wedged against the other leg, back the screw out.



6. REPAIR OR REPLACE PARTS?

"I always try to salvage as much of an original piece of furniture as possible," Ron says. "But sometimes you're better off cutting back to solid wood and scarfing on a new piece."

Try to choose a piece of wood that's as close to the original in species and grain pattern as possible. This will make matching the finish easier. As you can see in *Figure 5*, I like to cut the patch so it sits a little proud of the surface. You can always cut it down and shape it later on.

7. REFIT AND TIGHTEN JOINTS

Joints starved of glue, exposed to dampness or overstressed will weaken and probably break apart sometime down the road. Gap-filling glues may help hold them temporarily, but refitting weakened joints is usually your best option.

Sometimes you may have to rebuild part of the mating pieces first. To tighten loose-fitting tenons, you can glue a thin (about $\frac{1}{16}$ ") strip of wood or scrap of veneer to it first. For round tenons, get a curl off of a plane (shaving) as shown in *Figure 6*.

Often you'll enlarge a socket a little bit as you clean out old glue. When this happens, you can size-up a dowel much the same way by "ragging the joint." Simply glue a small strip of clean, 100 percent cotton cloth over the end of the dowel to increase its diameter (*Fig. 7*).

Note: Don't use a cotton and polyester blend T-shirt. The polyester

won't absorb glue very well. Cotton, on the other hand, is porous so glue penetrates it easily.

Spread glue in the socket and clamp the joint. You don't have to wait for the cotton strip to dry first.

8. PUT WEDGES TO WORK

For worn mortise-and-tenon joints, try kerfing the tenon and inserting a hidden wedge as seen in *Figure 8*. Start by sawing a slot (kerf) for the wedge. Then cut a $\frac{1}{8}$ " hardwood wedge to the same width as the slot.

The wedge should reach from the bottom of the mortise to the tenon's shoulder. If the wedge is too long, it will be impossible to set the piece you're repairing in place. A wedge that's too short won't allow the tenon to expand like it should.

Apply glue to the joint and insert the wedge into the slot. Assemble the parts and clamp up. This should force the wedge into the mortise and cause the tenon to spread.

9. SAVE SPLIT SPINDLES

Occasionally you get lucky because repairs don't require a trip to the emergency room. Take a cracked chair spindle for example. With this type of minor repair, simply clean out the crack and reglue. (You'll find some suggestions for forcing glue into small cracks in Tip No. 11 on the [facing page](#).)

A hose clamp will hold the repair tight while the glue dries (*Fig. 9*). A piece of innertube works, too.

A FOUR-STEP METHOD TO FIXING ROUND TENONS



STEP 1: Square off the tenon by sawing through it to remove the broken part.



STEP 2: Drill out the center of the workpiece to match the diameter of a small dowel.



STEP 3: Glue a small piece of dowel into the hole you just drilled.



STEP 4: Drill out a larger dowel and glue it onto the small one. Trim to length.

10. DO A DRY RUN ASSEMBLY

When it's time to reassemble, don't be surprised if you get a case of the "What if's." What if something is labeled wrong? What if the pieces don't fit or the repairs don't hold?

You can avoid the "What if's" by following some simple advice: Stay calm and always do a test run before regluing anything permanently.

Start by placing the items to be reassembled on a table or bench as seen in the photo above right. That way you won't have to work hunched over for the next several hours. To make sure you aren't missing any pieces and to check that everything fits okay, first assemble the furniture pieces without glue.

11. GET GOOD GLUE COVERAGE

Working methodically through the dry-assembled piece of furniture, disconnect the joints individually or in pairs, then reglue. It's a good idea to check subassemblies for squareness before reattaching them. Otherwise, you may end up fighting torque in different directions when you clamp up the entire piece of furniture.

Nothing you've done up to this point will matter if you don't have wood-to-wood contact (see [Tip No. 5](#)) and adequate glue coverage when reassembling. Too much glue can be cleaned up; too little is a disaster. So err on the side of excess.

"Once you've done this a few times, you'll get a feel for how much is just enough," Ron says.

Sometimes the problem you run into isn't how much glue to use, but rather how to get it into the joint. Here are a few suggestions you might want to try:

- Remember those metal feeler gauges mechanics use to set a car's points? They work great for working glue into thin cracks, too (*Fig. 10*).

- Sometimes blowing glue deeper into a joint with a soda straw does the trick, as well (*Fig. 11*). It helps to warm the glue first to thin it.

- If a crack goes all the way through a workpiece, try pulling warmed glue into it by using a vacuum hose behind the crack. Once



you see most of the glue disappear, switch off the vacuum and wipe away the excess.

A final note about reassembling: After you've glued a joint, don't apply too much pressure when clamping and squeeze out all the glue.

12. TRIM LEGS UNTIL EQUAL

About 10 minutes after you've glued, check to make sure the joints haven't opened up. But don't pull at them. Then, let everything set overnight.

If you're fixing a chair, make sure it sits "four square on the floor." To do this, set the chair on top of a surface you're sure is flat. Slide a shim underneath the short leg to raise it up. Then scribe all four legs to a consistent height with a carpenter pencil (*Fig. 12*).

Just be careful you don't saw off too much at a time. You might end up with a really short chair by accident.

FINISHING UP

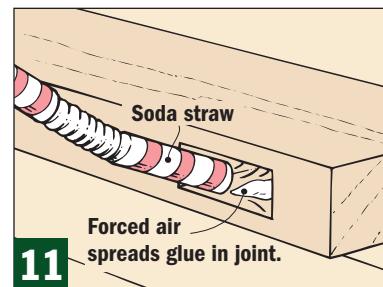
"Remember that Band-Aid fixes might work in the short run, but they won't last once a piece of furniture is put back into use," Ron says. "That's your ultimate goal."

And although the table and chair you see in the photo at right are once again sound and sturdy, they still wouldn't be ready to move into my home. That's because they need refinishing. We'll give you some finishing tips in a future issue. ■

Workbench would like to thank Ron Stookey, owner of Country Caboose Refinishing in West Des Moines, IA, for his assistance with this article.



10



11



12



Choosing a Furniture Stripper

Knowing what to use and how to use it is essential to successful stripping. Here's a rundown of the three basic types of strippers and some tips on using them safely and effectively.

Stripping old paint or finish from a piece of furniture doesn't require any special skills. But it's messy and can be bad for your health. All stripping solvents — even those with the word "safe" in their name — can be harmful if not used properly.

Stripping chemicals range from hazardous to almost-safe. Available

strippers can be broken down into three basic categories: slow and safe; fast but hazardous; and medium-fast, moderately hazardous. A good rule of thumb to follow: The safer a stripper is, the slower it works.

The key to easy stripping is to apply a lot of stripper, persuade it to stay on, and give it time to work.

The safety requirements for different strippers will

vary, so read the labels carefully and always follow directions. Whenever in doubt, err on the side of safety and use these guidelines:

- Work in an area with excellent ventilation — preferably outside.
- Wear a respirator or mask and splash-proof goggles. Use a full face shield with caustic strippers.
- Protect your skin with long pants, a long-sleeve shirt, a solvent-proof apron, and long chemical-resistant gloves. Turn cuffs down.

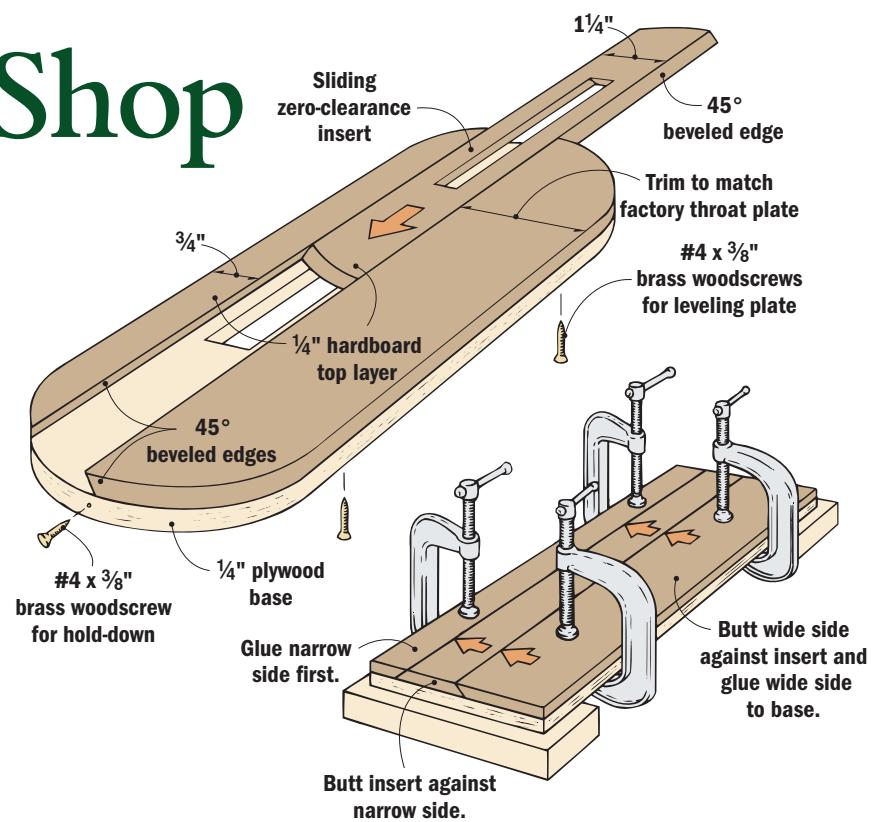


SHOPPING FOR STRIPPERS

Most paint stores and home centers stock dozens of liquid- or paste-type chemical strippers. You'll also find other supplies, including mineral spirits for cleaning up. Except for "refinishers," most strippers will remove just about any finish. Refinishers only work on shellac or lacquer. Choose a stripper based on its speed and safety. The chart below shows the three basic categories of strippers.

CATEGORY	USES & STRENGTHS	PROBLEMS	SAFETY CONCERNs	COMMENTS
SLOW AND SAFE Water-based	Effective on oil-based paints. Least effective on shellac and lacquer. May require overnight.	Will raise wood grain. May blister veneer and warp thin wood.	Can be used inside without ventilation.	They work well on oak and ash. Don't rush. Leave on for several hours or overnight.
MEDIUM-FAST, MODERATELY HAZARDOUS 40-80% N-methyl pyrrolidone (NMP)	Works 2 to 3 times slower than methylene chloride strippers (see below). Removes most paint and finish.	Because it doesn't work as quickly as strippers with methylene chloride, you can't rush it.	A happy medium. Still requires gloves and goggles, plus good ventilation.	Most expensive. They work from the top down, so you may need a second coat for caked on paint.
FAST BUT HAZARDOUS 75-80% methylene chloride (MC)	Will soften almost any paint and finish within minutes.	Contains wax, which must be removed before applying any type of finish.	Nasty stuff. Never inhale fumes. May be a possible carcinogen, and can cause skin and lung irritation.	Use cautiously. They work from the bottom up, so finish comes off in sheets. May not need to use as much.

In The Shop



Zero-Clearance Throat Plate for Any Dado Width

Since most table saws don't come with a throat plate for use with a dado blade, here's a way to build your own. And its replaceable, zero-clearance center section lets you quickly match the insert to the dado blade. (The one shown here works with saws having a throat plate roughly $\frac{1}{2}$ "-thick.)

The plate consists of a $\frac{1}{4}$ " plywood base and a three-piece hardboard top layer. The two outer hardboard pieces are glued to the

base. As you can see, the edges of all three pieces are beveled at 45° , creating a sliding dovetail joint.

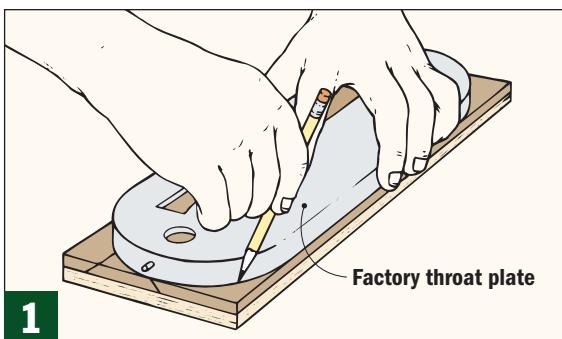
To build the throat plate, start by beveling the edges of the top pieces, then trim them to the widths shown in the drawing above. The center piece is beveled on both edges and you'll want to cut several of these now to make sure they're all exactly the same width.

Now glue the narrow top piece to the base blank, bevel down and

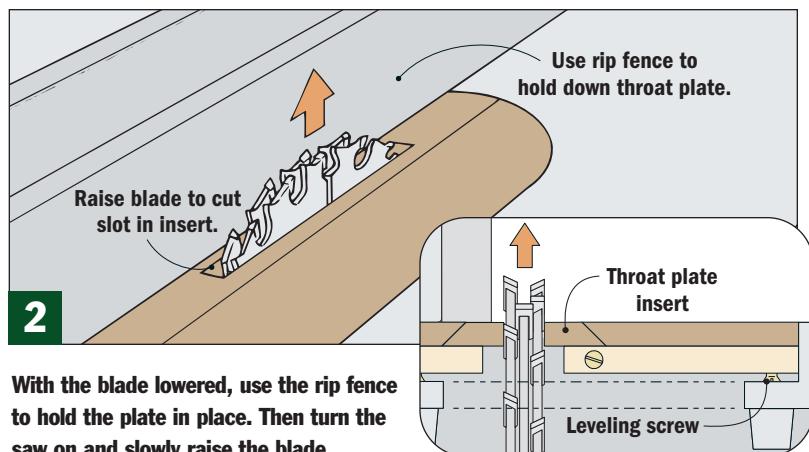
the outer edges aligned. When the glue dries, slide a center piece into place, then glue the remaining piece down (see the drawing above). Now, slide the center piece out to prevent it from getting stuck.

Using the metal throat plate as a pattern, cut the throat plate to shape (Fig. 1). Use the shaped insert as a pattern to trim the other inserts.

For each dado setup, use a new insert and create the zero-clearance slot as shown in Figure 2.



1
Trace the outline of the factory throat plate onto the rectangular blank. Cut the blank to shape and sand it to fit the saw's throat.



2
With the blade lowered, use the rip fence to hold the plate in place. Then turn the saw on and slowly raise the blade.

Strategies for Cutting Up Sheet Goods

When we design projects for *Workbench*, part of the process includes putting together cutting diagrams. The various parts are sketched out on grid paper to determine the best way to get the most parts from each sheet of plywood.

Sometimes, we'll even tweak a project's dimensions so that the parts will fit on a standard 4-ft. × 8-ft. sheet. Take the simple cabinet shown here for example.

The finished size is 24" deep, but if you allow for the saw kerf, there's no way to get two sides from a 48"-wide sheet. So the sides are 23 $\frac{3}{4}$ " wide with $\frac{1}{4}$ "-thick edge banding.

The lengths of the sides and shelves are adjusted as well to fit within standard sheet dimensions. The minimal amount of waste comes out between the pieces so you can run the straight, factory edges against the rip fence.

CONSIDER GRAIN ORIENTATION

If you look at the example cabinet, you'll see that the grain on the top, bottom, and sides runs the same direction, "wrapping" around the cabinet. The grain on the shelf and drawer fronts also runs parallel to the grain of the other pieces. In order to do this, the panels must be laid out correctly on the sheet.

You also want to watch for seams in the veneer and position the pieces so visible seams or defects fall on saw kerfs or in waste areas whenever possible.

MACHINING SEQUENCE

Full-sized sheets of plywood are heavy and awkward so it makes sense to break them down into more manageable pieces. Note in the Cutting Diagram how the first and second cuts divide the sheet. In most cases, I like to make these initial cuts using a portable circular saw and an edge guide.

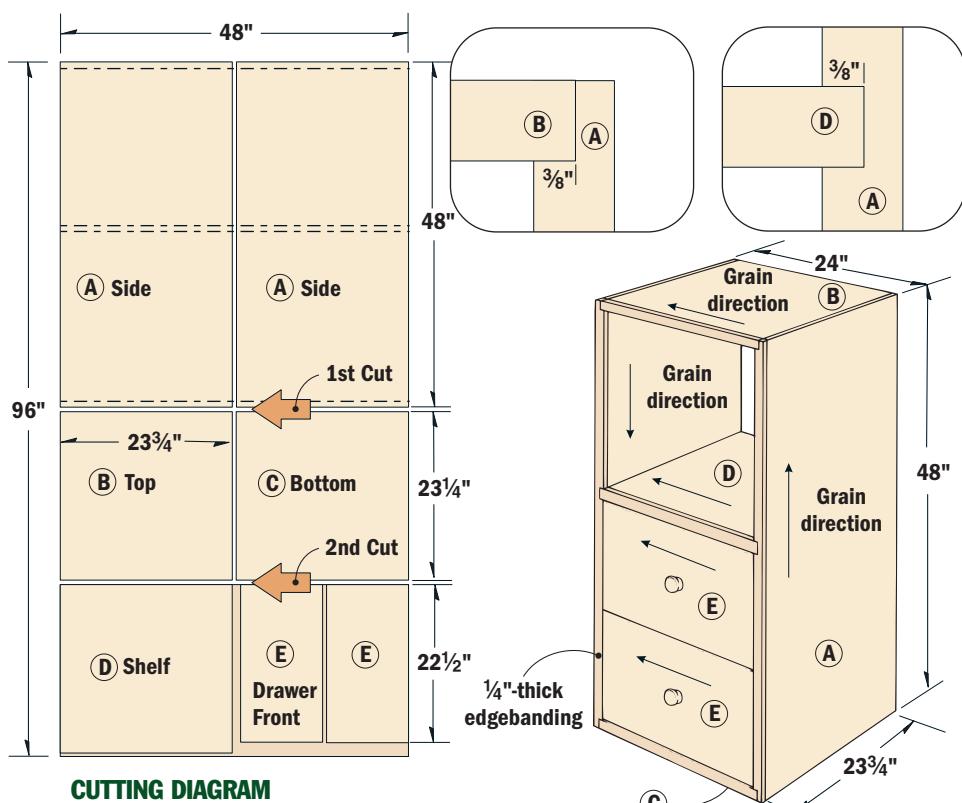
There are times, such as with the cabinet sides, where you need exact mirror images for the joinery to line

up squarely. In this case, you could cut the dadoes and rabbets *before* ripping the sides to width (see the drawings at the bottom of the page).

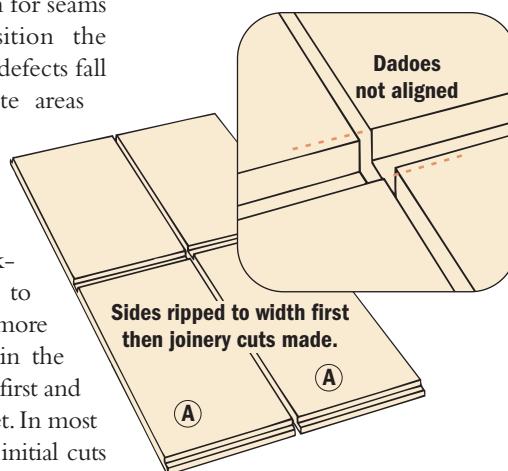
You can map out these cuts in a sketch as well. It's much cheaper to correct an error on paper than to buy another sheet of plywood. To make layout simple, use $\frac{1}{4}$ " grid

paper and scale your drawing so each square is 3" (a 4-ft. × 8-ft. sheet would be 16 squares wide × 32 squares long).

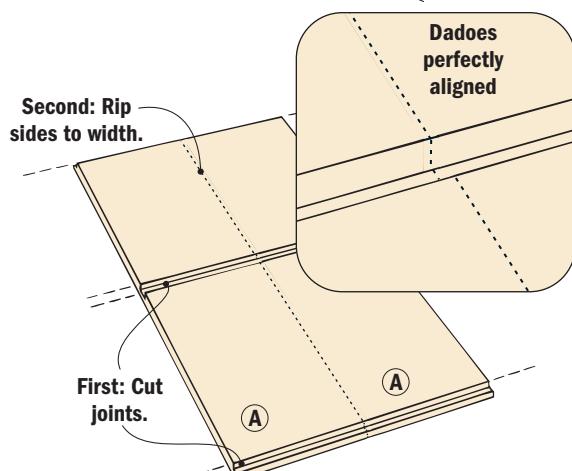
We offer cutting diagrams for many of our woodworking projects at www.WorkbenchMagazine.com. To access them, just click on the Cutting Diagrams button.



CUTTING DIAGRAM



If you separate the two sides (A) before making all of the joinery cuts, the joints may not line up, as shown in the inset.



By making the joinery cuts first, then ripping the two sides to width, you're guaranteed that the joints will be a perfect match (inset).



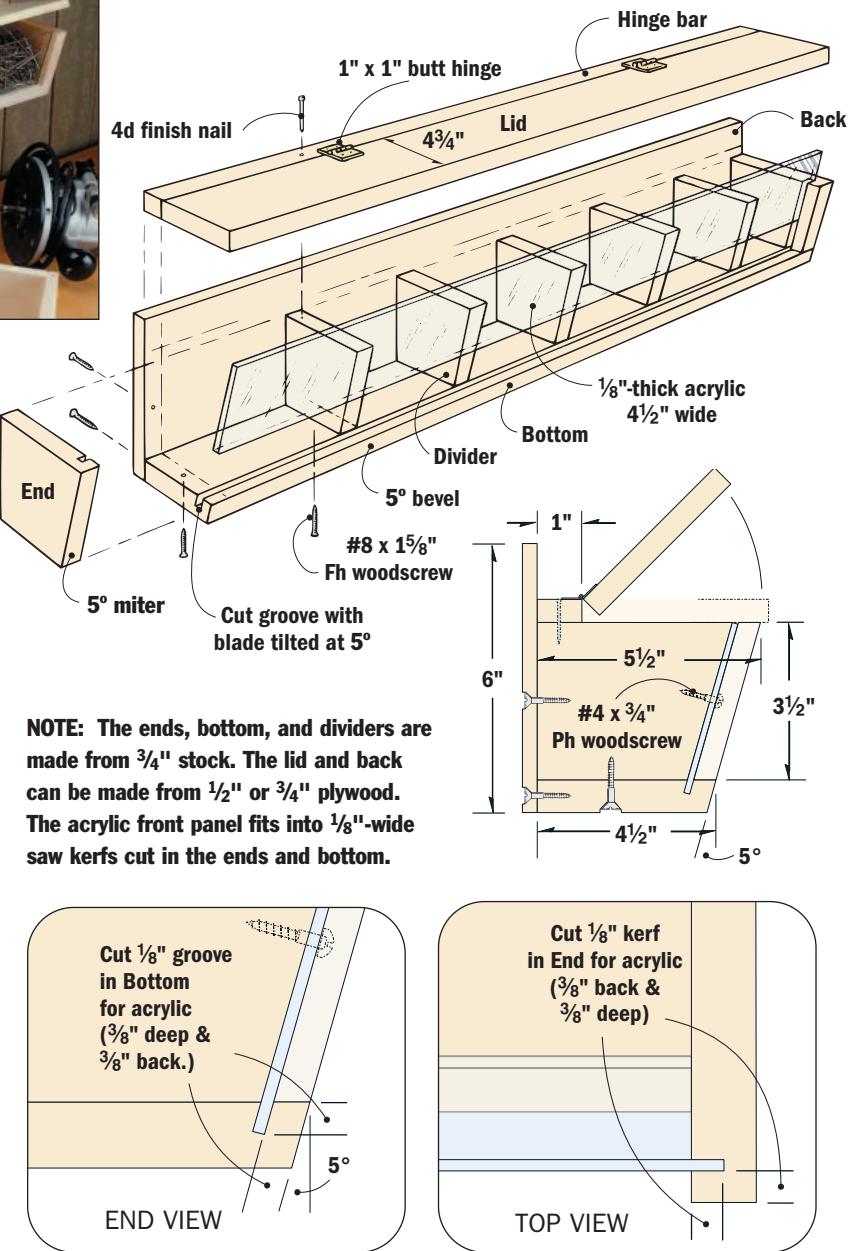
Wall-Mounted Storage Bin Puts Fasteners in View

Storing fasteners in open bins keeps them handy, but the bins collect shop dust. Small drawers solve the dust problem, but then you can't easily see what you're looking for.

This storage rack with see-through bins solves both problems. The slanted acrylic front not only lets you scan the bins for the right fasteners, it makes it easier to get to them. And the hinged lid keeps the bins clean.

The rack's simple construction allows you to build as much storage as you need — just make it longer for more storage. You can position the interior dividers anywhere to create bins of various sizes. And best of all, it can be built from scrap.

Our special thanks go out to *Workbench* reader Tony Lorusso for sharing his design.



Dado Gauge Gets Rid of Guesswork



As pointed out in *Dado Blade Basics* (see page 26), you achieve different widths with a stack dado set by fitting different combinations of chipper blades between two trimmer blades. Though most dado sets come with a chart that tells which blades to use for various width cuts, the actual cuts can vary.

To eliminate any guesswork, I made a simple width gauge like the one shown at left. It takes some time to make initially, but gives you an accurate measure for each setup.

Starting with the two trimmers, make a cut, then reconfigure the chipper before making additional cuts. But before you switch set-ups, write next to the cut which combination of blades was used. This gives you a quick reference for how to reproduce a cut of that particular width.

By holding a sample piece of stock against the gauge (as shown in the photo), you can check the fit and also see how much to shim for an "in-between" width.

Oil or Water: Picking a Polyurethane Finish

The finish aisle in most home centers has dozens of options when it comes to wood finishes. Even polyurethane comes in two main types — oil-base and water-base.

While these finishes share some of the same properties, there are big differences you need to be aware of.

Oil-base polyurethane has been around longer and it's what many people think of as varnish. One of the best qualities of this finish is the warm glow it gives wood, particularly dark woods like cherry (see the board on the left). Two of its worst traits are the strong odor from the solvents and the long time it takes to dry.

Water-base polyurethane is a newer product that produces a clear, hard finish. There's no warming tone here (see the board on the right), so you'll want to stain the wood first.

But unlike its oil-base cousin, this finish dries quickly so you can apply several coats in the time it takes one oil-base coat to dry. It's also relatively odor free and brushes clean up with water.

I consider these factors and take advantage of each finish's properties where it makes the most sense. For



indoor projects, such as hardwood floors or trim molding, where I want low odor and quick drying time, I'll choose water-base poly. For a piece of fine furniture where I can control the finish environment and time's not a factor, I'll pick oil-base.

APPLICATION TIPS

Water-base finish will raise the grain on the initial coat. To minimize this, wet the wood's surface first and sand it lightly once the piece dries.

I like to use a foam brush with water-base finish. It helps the finish

flow out smoothly. But if you brush back and forth too much with water-base poly, the foam brush will leave a trail of small bubbles.

Because it dries quicker, you need to work a little faster when using water-base poly. And also keep an eye out for lap marks.

Since it dries faster, less dust can settle in the wet finish, resulting in less sanding between coats. However, don't use steel wool since particles left behind will rust when exposed to the water in the finish. Instead, use a nylon buffing pad.

Choose Forstner Bits for Precision Drilling

For drilling through-holes in dimensional lumber, it's hard to beat a spade bit. They're fast, easy to sharpen, and cheap to replace.

But for drilling flat-bottomed or overlapping holes, or getting a clean cut in endgrain or hardwoods, you should reach for a Forstner bit.

If you look at the drawings at right, you'll notice that the guide point on a Forstner bit is short, barely protruding below the cutting edges. It guides the bit just until the cutting rim makes firm contact with the surface of the wood. This sharpened rim creates smooth-sided holes.

When you drill overlapping holes, this rim is still supported, while a spade bit will hop around

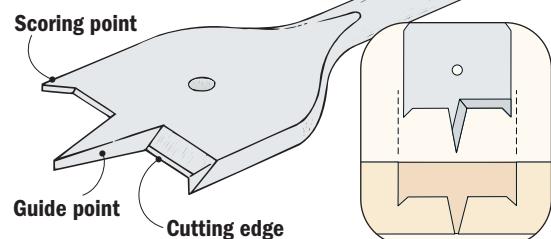
because there's nothing to "steer" its long guide point.

A Forstner bit's two main cutting edges are angled so they cleanly slice through the wood and lift the chips out of the way. By contrast, the spade bit cuts by scraping the wood as it moves through the stock.

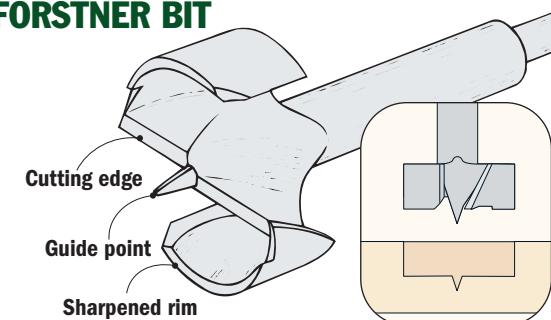
Large diameter Forstner bits (1" and up) typically have multiple spurs or saw-tooth edges to help keep the bit running cooler.

Forstner bits were traditionally expensive, but you can buy an imported set — seven bits ranging from $1/4"$ to 1" in $1/8"$ increments — for less than \$25. Expect to pay \$75 or more for a higher quality set with the same number of bits.

SPADE BIT



FORSTNER BIT



Around The House

The Toolkit for All Occasions

How many times has this happened to you? You start working on what should be a quick fix-it job around the house and end up spending more time running for tools than actually working?

We've all been there. And we've all vowed to one day assemble an under-the-sink toolkit that will end our days of tool fetching.

Well, here at *Workbench* we've finally put our money where our mouth is and gathered up the tools we believe every homeowner should have at the ready.

But rather than take a "one-size-fits-all" approach, we decided to divide The *Workbench* "Essentials" Toolkit into three different levels. Chances are you can start stocking your kit with tools you already have

and then use the lists we've provided here to add to it.

The first kit is what we're calling **The Weekender**. This collection of tools is the foundation for the other two. It includes the obvious tools like a hammer and a pair of pliers and a few others you might not think of, like a carpenter's pencil, a combination square, and a putty knife. The Weekender is intended to meet 90% of the quick fixes most homeowners will encounter.

Next is **The Handyman** toolkit. This bunch of tools is for the person who goes looking for things to fix. There are a few basic tools in here, like the multi-groove pliers and 4-in-1 rasp. But most of the tools in this kit are a bit more specialized, like the wiring pliers.

Finally, **The Job Master** toolkit is just right for homeowners who want to be prepared for any possibility. This kit includes everything from The Weekender and The Handyman, plus a few more tools to really make it versatile.

And while you may rarely need the tools from this kit, including the voltage tester, block plane, and close-quarter hacksaw, when you find yourself needing them, nothing else will substitute.

BUY 'EM OR WIN 'EM

We bought the tools for these kits online at CornerHardware.com.

For information on how to order the tools listed here and to register for a chance to win our kit, turn to *Sources and Resources* on page 60.

Workbench "Essentials" Toolkit



(A) The Weekender \$86.05*

- Carpenter's pencil
- Needle nose pliers
- Adjustable wrench
- Painter's rags
- Claw hammer
- Utility knife
- 4-in-1 screwdriver
- 25-ft. tape measure
- Electrical tape
- Safety goggles
- Pliers
- Flashlight
- Duct tape
- Masking tape
- Bucket tool caddy
- Combination square
- Putty knife
- Pry bar
- Locking pliers
- Gloves
- Toolbox handsaw

(B) The Handyman \$150.19*

- Everything in A plus:**
- Utility light
- Torpedo level
- WD-40
- Spring clamps
- Stud finder
- 16-gauge wire
- Wiring pliers
- Multi-groove pliers
- Tin snips
- Telescoping magnet
- 4-in-1 rasp

(C) The Job Master \$191.63*

- Everything in A & B plus:**
- Voltage tester
- Whisk broom
- Block plane
- Dust masks
- Push drill
- Close-quarter hacksaw
- Drop cloth
- Nailset

* These figures reflect the cost of the tools at the time of our purchase. Prices are subject to change.

A "Can-Do" Cure for Sawdust Mess

This idea originally came to us from *Workbench* reader Charles Mak in the January/February (#257) issue last year. Mak had the idea that putting a simple router table on top of a trash can would help control the inevitable sawdust mess.

We liked Mak's idea so much that we built a router can for our own shop. But as with so many of the good ideas that come in, we thought we could add a little something of our own to improve it. Here's what we came up with.

THE FUTURE IS PLASTICS

The first change we made to Mak's design was to trade his metal trash can for a plastic one. Then we drilled a hole in the bottom to mount an adapter for a vac hose. The universal adapter is available at most home centers. Use a $2\frac{1}{8}$ " hole saw to drill the hole for the adapter.

Mount the adapter to the can as shown in the illustration at lower right using a piece of scrap wood and four screws. Depending on what size vac hose you have, the adapter can be mounted a couple different ways to accommodate your vacuum.

TOPPING IT OFF

We built two tops for our can — a circular router table and a square sanding table. Both are shown below.

To construct the router table, cut two circular pieces of wood. The

first should be $\frac{3}{4}$ "-thick plywood and sized to fit just inside the opening of the can. For the second piece, use $\frac{1}{4}$ "-thick hardboard and make it large enough to overhang the rim of the can. Glue the pieces together with their centerpoints aligned.

The removable router fence is attached with a pin at one end and clamped at the other.

For the sander top, cut a circular hole in a piece of $\frac{3}{4}$ "-thick plywood. Then rout a $\frac{1}{2}$ "-wide rabbet in the opening to hold a piece of pegboard. Cut the pegboard to fit and glue it into the rabbet.

Since this top doesn't fit inside the can like the router top, attach cleats on the underside of the top to position it on the can. Finally, use a couple bungee cords to keep the lid secure.

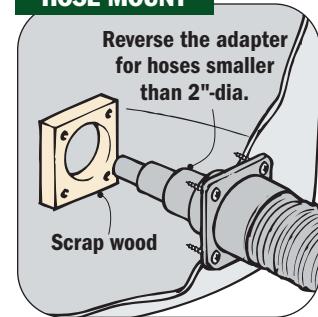
DUST-LESS SANDING TABLE



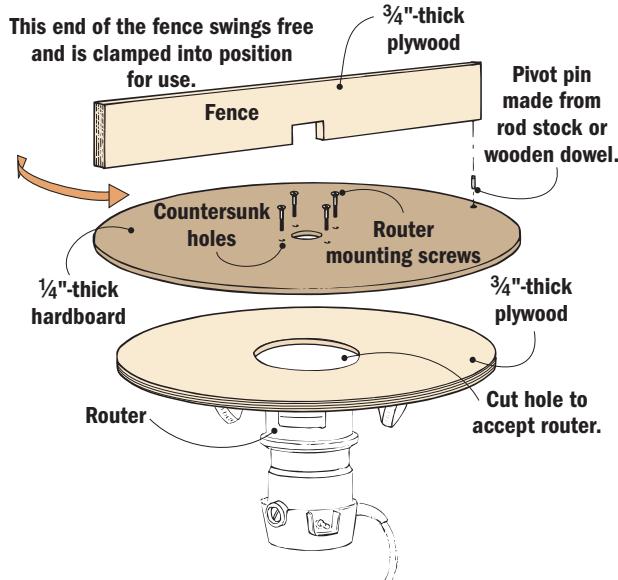
DUST-LESS ROUTER TABLE



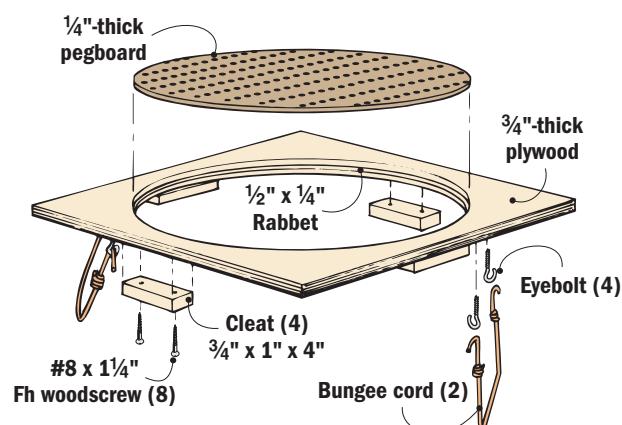
HOSE MOUNT



ROUTER TABLE TOP



SANDER TABLE TOP



Here's an Easy Storage Solution That Shines

When building a big project like the closet organizer on page 31, it's

easy to overlook smaller storage needs like jewelry. That's a shame considering how easy it is to make a jewelry holder like the one shown here.

Start with a small section of 1"-thick



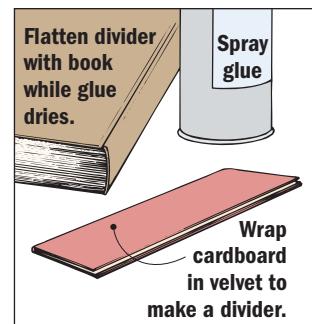
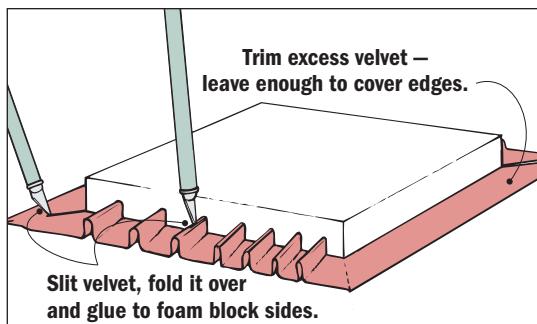
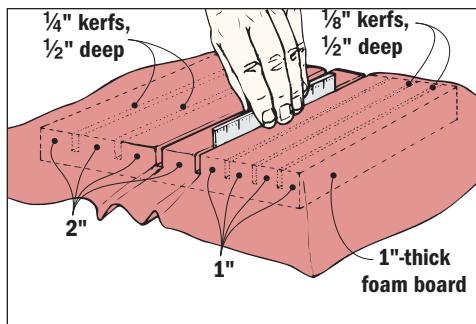
foam board that's cut to fit your drawer. The width should be about $\frac{1}{4}$ " less than the inside dimension of the drawer to allow for the thickness of the material it's going to be covered in. The length can be whatever you want it to be. I decided to make mine square because I thought it looked the best.

Now, use the table saw to kerf the foam in a pattern like the one shown in *Figure 1*. Make some of the kerfs

$\frac{1}{8}$ " wide for small rings. Then make a couple $\frac{1}{4}$ "-wide kerfs to hold rings with thicker bands.

Use some spray adhesive and upholster the foam block with velvet. Press the material into the kerfs using a ruler. Trim away any excess velvet and slit the material at the bottom of the kerfs (*Fig. 2*).

To make dividers that will fit into the kerfs, cover thin strips of cardboard with the velvet (*Fig. 3*).



Sources & Resources

Closet Hardware

The cherry wardrobe on page 31 requires a variety of hardware. You may be able to find what you like locally. But if you'd prefer to use

exactly the same pieces we did, check out the following catalogs and online sources.

The 26" Accuride full-extension drawer slides are available from:

Woodcraft (800) 225-1153
www.Woodcraft.com

Item number: 124921

Rockler Woodworking and Hardware (800) 279-4441
www.Rockler.com

Item number: 21361

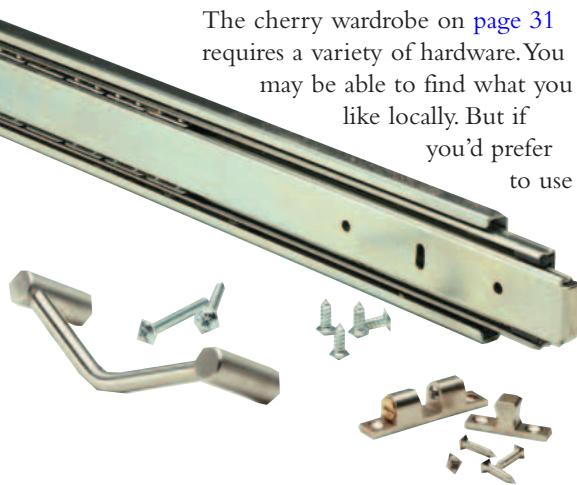
The drawer and door pulls came from Hafele America. The

small pulls are part no. 115.58.610. The larger pulls on the closet doors are part no. 115.58.630.

We mounted the pulls with 4mm machine screws. Item number 022.35.887. Call Hafele for a distributor near you (800) 423-3531.

The TV pullout is also available from Rockler Woodworking and Hardware. Item number: 33571

The cabinet catches came from: McMaster-Carr (630) 833-0300. Chrome 1790A15 ($1\frac{15}{16}$ ") Chrome 1790A17 ($2\frac{23}{32}$ ")



Dado Blades and Accessories

As the article on page 26 points out, a dado blade can be one of the most formidable weapons in your joinery arsenal. In short, if you don't have one, you should. Here's where to find dado blades and shims:

Woodcraft (800) 225-1153
www.Woodcraft.com

Rockler Woodworking and Hardware (800) 279-4441
www.Rockler.com

Tool Crib/Amazon (800) 635-5140
www.Toolcrib.Amazon.com

The Woodsmith Store (800) 444-7002
www.WoodsmithStore.com

Sears/Craftsman (800) 377-7414
www.Sears.com/craftsman

Lee Valley Tools Ltd. (800) 871-8158
www.LeeValley.com

Eagle America (800) 872-2511
www.Eagle-America.com



Mirror Mastic

To mount the mirrors in the cherry wardrobe on page 31, we used Gunther Ultra Bond S-500 mirror mastic. We found it at a local glass and mirror dealer. Look in the Yellow Pages under "Glass."



Another option is Liquid Nails Adhesive For Mirrors (LN-930), available at most home centers.

Aluminum Channel for Wall Storage

The flexibility of the storage system on page 15 is due largely to the channel that connects the components to the wall. We used aluminum channel manufactured

by The SteelWorks Corporation.

Most home centers carry the channel or contact SteelWorks directly at info@SteelWorks.net, or call (303) 355-2344.

Self-Stick Dry Erase Board

To create the dry-erase noteboard in the *Flexible Wall Storage* project on page 15, we used Con-Tact brand Memoboard. It's self-adhesive, and comes in an 18" × 6-ft. roll.

For more information on the product or to find a vendor near you, visit the company's Web site at www.ContactBrand.com or call them at (877) 353-6440.

"Essentials" Available @ CornerHardware.com

As with all of our tool stories, we purchased every tool we recommended for the *Workbench* "Essentials" Toolkit (see page 56). It gave us a chance to see just how big the toolkit would really be and to ensure all the tools would be available from a single source.

In fact, we actually bought two complete kits so we could compare the results between two of our favorite sites. When the dust cleared from all the UPS boxes being dropped on our desks, we were most satisfied with the service and pricing we got from CornerHardware.com.

But we didn't want to just send you to their site and let you find each tool on your own. So we contacted the folks at CornerHardware to see if they could streamline the shopping process a bit. They were happy to help.

Simply visit our Web site at www.WorkbenchInteractive.com and click on the Toolkit Shopping List icon for a list of the tools in the kit. Each tool name will include an item number that, when entered into the search line on CornerHardware.com, will take you directly to the tool.

WIN THE ORIGINAL

Rather than just store all the tools we bought for the prototype *Workbench* "Essentials" Toolkit, we thought we'd do something productive with them. So we're giving them away.

There are two ways you can enter to win the complete toolkit.

Register by mail — Send a post card with your name, age, address, and phone number to:

Workbench Magazine
Toolkit Giveaway
2200 Grand Avenue
Des Moines, IA 50312

Register online — Visit our Web site and click on the Win This Toolkit icon to register.

You must be at least 18 years of age to enter.

One entry per household, please. Mail-in entries must be postmarked no later than 2/28/2001.



Finding Restoration Hardware

An important goal of any good furniture repair project is maintaining the authenticity of the piece with appropriate hardware. Of course, the best option is to use the original hardware, whenever possible. But when pieces are missing or damaged beyond repair, you'll have to settle for replica hardware.

Fortunately, there are several good sources of hardware that should cover all your repair projects. Here are our favorites:

Lee Valley Tools Ltd.
(800) 871-8158
www.LeeValley.com

Rockler Woodworking and Hardware (800) 279-4441
www.Rockler.com

Elliot's Hardware Plus
(888) 653-8963
www.Oldtyme.com

Van Dyke's Restorers
(800) 558-1234
www.VanDykes.com

Whitechapel Ltd.
(800) 468-5534
www.Whitechapel-Ltd.com

Horton Brasses Incorporated
(800) 754-9127
www.Horton-Brasses.com

Wall Storage Hardware

We picked up the no-mortise hinges, wood knobs, and flush-mount magnetic catches we used on the wall storage system (page 15) from our local Woodsmith store.

Here are some other places you can look for the hardware.

Woodworker's Supply
(800) 645-9292

Rockler Woodworking and Hardware (800) 279-4441
www.Rockler.com

The Woodsmith Store (800) 444-7002
www.WoodsmithStore.com

Drilling into the Past

Don't let the simplicity of bow drills fool you. They were once serious tools for cabinet makers and other early craftsmen.

An ancestor of today's cordless drills, bow drills date clear back to ancient Egypt, when furniture makers used them to drill holes for inlays and joints held together with wooden pins. Although later 19th-century models were often more ornate, equipped with ivory or rosewood handles and brass fittings, their concept remained simple.

After wrapping the bowstring once around the drum on the drill's shank, a craftsman "saws" the bow back and forth while holding the drill's shaft by its head to guide the bit. This creates a reciprocating motion that spins the bit in both directions.

Amazingly, bow drills were still used as recently as the 1920s for boring the many holes that hold tuning pins for piano wires. Even stone-carvers used bow drills strung with brass or steel wire for surface cutting granite and marble.

Bow drill courtesy of:
www.globalantiquetools.com