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Simple jigs are the secret to these classic frames.

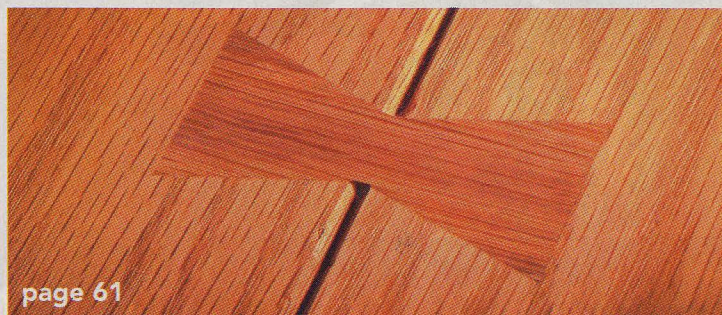
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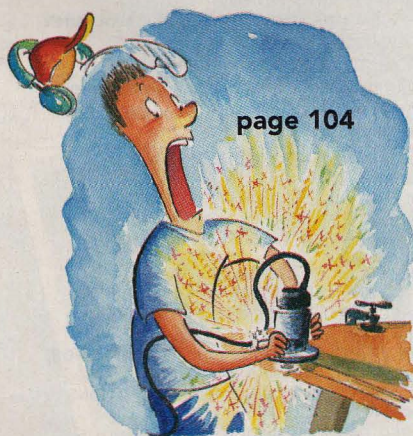


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Editor's Letter

Casual-Friday Woodworking

My family owns a little vacation place on the Mississippi River in Minnesota. There's good canoeing, fishing and swimming, but best of all for a woodworker, there's plenty of trees. We've got ash, birch, maple, lots of oak, and even a few walnuts. So last summer, inspired by rustic-furniture artist Daniel Mack (www.danielmack.com), I decided to try a little back-woods woodworking.

What an eye-opener! I built a bench, a peg-rack, an armchair and a side-table, all in a couple days. Talk about immediate gratification! This is fast, fun, loose and casual woodworking, more like woodturning than normal furniture building. Don't get me wrong; I love a perfect joint, a flawless finish, and careful attention to design details. But it sure was fun to do some casual-dress-Friday woodworking.

In the world of rustic furniture, you eyeball the design, you try whatever comes into your head, you go with the flow of the wood (it isn't boards, after all), and you end up with furniture. And did I mention that the wood is free? Can't beat that with a stick, as my grandmother used to say.

What makes all this possible is a marvelous little tenon-cutter from Veritas Tools, shown below. Chuck it in your drill, and it cuts a perfectly sized tenon in the end of a branch. Pair it with the appropriate spade or Forstner bit, and you can create perfect joints in about one minute. And it's FUN! I used the 5/8-in. tenon-cutter (\$65), although they come in sizes for everything from doll furniture to Paul Bunyan-size stuff.

There's one trick to this informal joinery: If you want your joints to last, have the hole be in green wood, and the tenon in dry wood. That way the green wood shrinks around the tenon and keeps it tight, rather than having the tenon shrink in the hole, loosening the joint. Aside from that, the sky's the limit!



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Subscription Questions? See page 5

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Question & Answer

What's the Deal with Climb-Cutting?

Q. I've often heard that "climb-cutting" with a router gives tear-out-free results. Shouldn't I always rout that way?

Troy Ludewig

A. Climb-cutting isn't suitable for most routing operations because it's too dangerous. When you make a climb-cut, you move the router in the "wrong" direction, from right to left (on an outside edge), instead of left to right. This backward feed direction is dangerous, because it makes the router very hard to control.

A climb cut allows the spinning bit to kick away from the workpiece. As a result, climb-cuts must be very shallow. The bit's kickback can have surprising force—enough to wrench the router right out of your hands. The only time to consider climb-cutting is when you have to rout directly into the grain. For

Climb-cutting reduces tear-out when you have to rout into the grain. To ensure success, minimize your risk. First, rough-cut as close to the line as you can. Then rout as much as possible using the proper feed direction. When you make a climb-cut, keep a firm grip on the router, make sure it's well-supported and be careful!

example, when you rout an arch or a rounded shape, you can't avoid routing into the grain half of the time (photo, at left). In these situations, a climb-cut is likely to produce much less tear-out than a regular cut (photo, below). But before you decide to try climb-cutting, consider sanding to the line as a safer, can't-lose alternative.

NORMAL
ROUTING
DIRECTION

CLIMB-CUT

ROUTING
INTO GRAIN
CAN CAUSE
TEAR-OUT
HERE

BIT
ROTATION

NORMAL LEFT-TO-RIGHT FEED

GRAIN CHANGE

FIRST CUT LEFT TO RIGHT (NORMAL)

SECOND CUT RIGHT TO LEFT (CLIMB-CUT)

CLEAN EDGE

A climb-cut on the right side of the arch eliminated almost all of the tear-out that was caused by a continuous left-to-right feed.

Question & Answer

What's all that Chatter?

Q. I'm having a hard time turning smooth spindles on my lathe, even though my tools are sharp. Near the tailstock, my turnings always look like they've been whittled. What do you suggest?

J. Carlos Desio

A. Your problems are caused by vibration, and the faceted result is called chatter. Most often, chatter-producing vibration is indicated by a telltale audible hum that occurs while you cut. Chatter can be the result of your cutting technique, flex in the turning blank, or worn-out bearings in your lathe.

You'll get chatter if:

- the tool extends too far beyond the tool rest
- you hold the tool at the wrong angle
- you push the tool too hard
- you hold the tool too lightly

- you don't hold the tool firmly enough against the tool rest
- you use tools that aren't sharp.

If you can stop the hum by supporting the blank with your free hand while making a light cut, the blank is flexing. To be safe, support the blank on its back side, opposite the tool rest.

A "steady rest" (an accessory that mounts to the lathe bed, see Sources, page 98) stops this vibration by supporting the blank near the cutting action.

If the problem isn't cutting technique or flex in the blank, it's your lathe. Because chatter only occurs near the tailstock end of your machine, the



most likely culprit is your live center. Be suspicious if it doesn't spin freely or if you can detect play between the tip and the shaft. For a conclusive test, install a different center. A "dead" center (no moving parts) is best. If the hum disappears, your old live center was the problem.

Many inexpensive lathes come equipped with live centers of dubious quality. A better-quality replacement (\$75) is a worthwhile upgrade (see Sources, page 98).

Sources

See page 98

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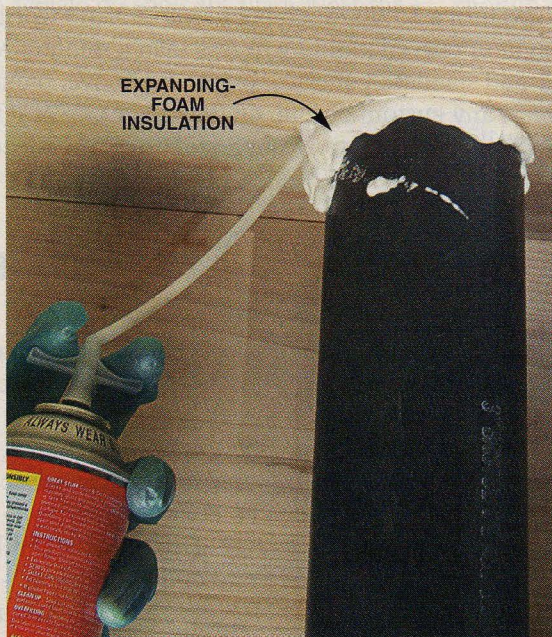
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Hush-Hush Woodworking

Q. I'm planning to build a woodworking shop in my basement. What can I do to keep it quiet for my family upstairs?

Willie Dixon-Kaiser



A. Sound travels freely through even the tiniest gap. Insulating your basement for sound is just like insulating your house against the weather. First, you have to plug all the leaks. Before you jump to add insulation and install drywall, take a weekend to seal all the gaps through which shop noise can escape. These improvements alone may solve your noise problem (100 little gaps add up to one gaping hole) and they're guaranteed to make any further improvements more effective.

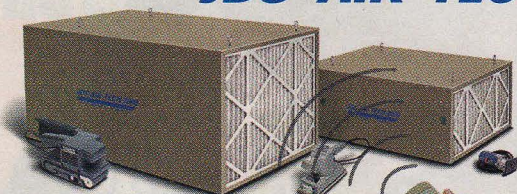
First, treat your basement door like it's an exterior door (if there is no door, install one!). If you have a hollow-core door, cover the back side with sound-deadening material such as acoustical ceiling tile, or replace it with a solid-core door. Fasten vinyl weatherstripping around the door jamb and install a threshold with a vinyl seal on the floor. Finally, mount a floor sweep at the bottom of the door.

Fill every hole you can find in the basement ceiling with expanding foam insulation or silicone caulk. You'll find gaps around pipes, wiring, electrical boxes and ductwork.

Here's another tip to confine noise: When you work in your shop, always close any vents in the ductwork. Sound can travel upstairs through the ducts.

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Question & Answer

Square Up a Large Tabletop

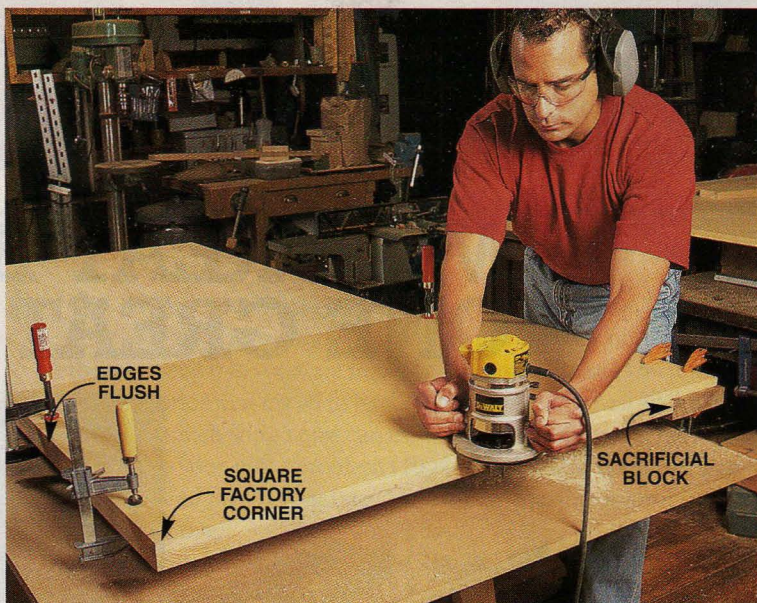
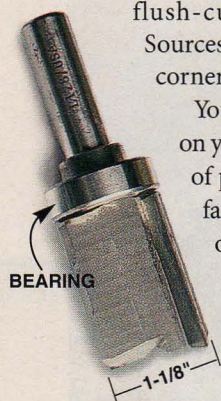
Q. How do I square up the ends of a tabletop that's too big for my tablesaw?

Russ Solberg

A. Use a router with a large-diameter flush-cutting bit (photo, at left and Sources, page 98), a fence with a square corner and a sacrificial block.

You can guarantee square corners on your tabletop by using a large piece of plywood or particleboard with a factory corner as your fence. Clamp one side flush with the long edge of the tabletop. Make sure the "fence" side extends past the other edge by at least the diameter of the router. Leave as little of the end of the table exposed as possible.

A hefty, large-diameter bit makes a much smoother cut in tough end grain than a 1/2-in.-dia. bit. A top-mounted bearing makes setup easier. It allows you to clamp the fence on top of the workpiece.



When you rout the end grain, you'll blow out the back edge every time, unless you support it. Clamp a sacrificial block to the fence, making sure it bears firmly against the back edge of the top and is flush with the edge. Use two clamps, so the block won't slip back or to the side. When you rout, simply extend the cut into the sacrificial block. Your fence and block have to be large enough so the clamps won't interfere with the router's path.

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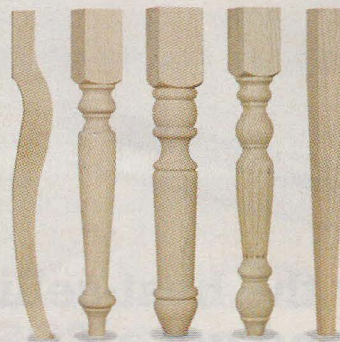


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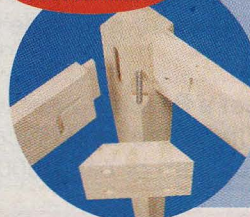


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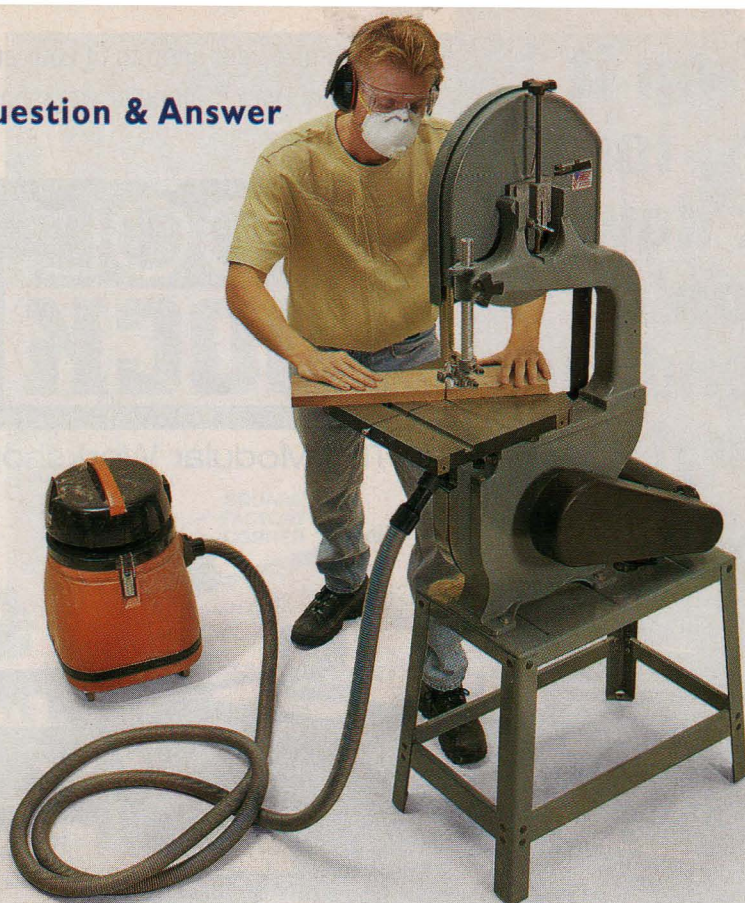
Variable speeds (2,000 – 3,450 rpm) and an induction motor allow this grinder to tackle anything including sharpening cutting-tools and bits, while its cast-iron base minimizes operating vibration.

For complete product specifications on these and other Delta innovations visit deltamachinery.com.



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Question & Answer



Can Wood Make You Sick?

Q. I got my hands on some rosewood recently, but I wish I hadn't. After cutting and sanding several pieces, I had to stop because my eyes were burning and I'd gotten all stuffed up. Then I noticed that my hands and face were covered with a rash. I'll never go near that stuff again. Is there some sort of warning label for woods that can make you sick?

Pat Vennewitz

A. According to OSHA, exposure to wood dust is a legitimate health hazard that can cause allergic dermatitis, chronic bronchitis and nasal cancer. As you discovered, some woods can cause intense reactions with very little exposure. Of course, everybody is different; immediate reactions like yours are only experienced by a small percentage of woodworkers.

It's more common for allergic reactions to wood dust to develop and intensify over time, as the result of repeated exposure. Woods known to cause toxic allergic reactions are called "sensitizers." Some woodworkers become so sensitized that they have to give up the craft.

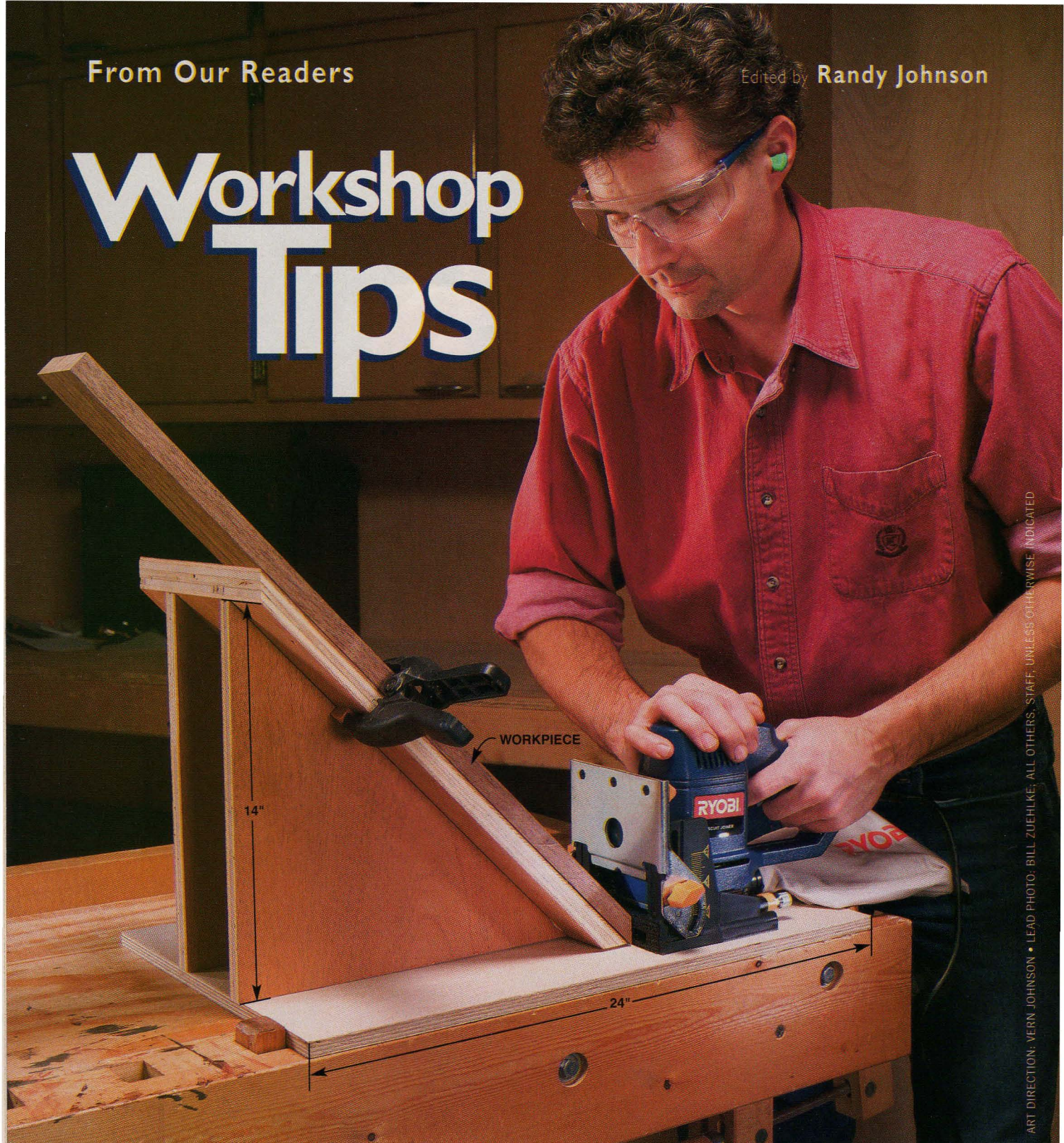
You might not notice any tears or sniffles today, but why take chances? It's smart to protect your health by installing dust collection on your machines and wearing respirators designed to filter out wood dust (see photo above and Sources, page 98).

Lists of species known to cause problems are easy to find on the Web (see Sources, page 98). Species identified as "irritants" cause all the symptoms, but haven't yet been shown to produce chronic illness; "sensitizers" have. It may come as a surprise that western red cedar, birch, maple and walnut are all classified as "sensitizers." **AW**

Sources See page 98

If you have a question you'd like answered, send it to us at: **Question & Answer, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121 or e-mail to qanda@readersdigest.com.** Sorry, but the volume of mail prevents us from answering each question individually.

Workshop Tips



Angled Biscuit-Cutting Jig

We all love biscuit joints, but making them in the angled ends of narrow boards can be a challenge. It's so tricky to balance the biscuit joiner's fence on the end of the small miter. The results can be inaccurate and even dangerous. That's why I built this jig. It not only holds the workpiece but also allows me to use my biscuit joiner in a comfortable horizontal position.

Kevin Lind

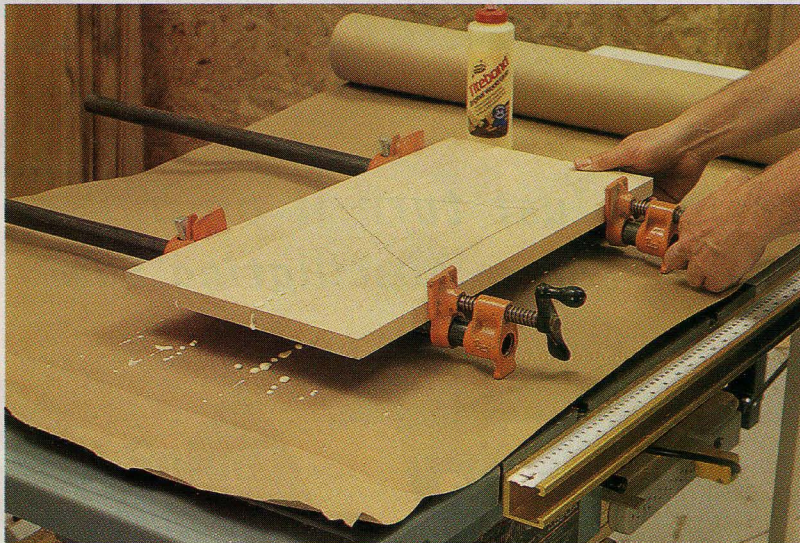
No-Stick Caps

It had been a couple of months since I last used my oil finish and when I went to use it the cap was a bear to get off. Drips of finish around the spout had dried like glue. My neighbor suggested that next time I try putting Teflon plumbing tape (available at home centers, \$1 for a roll) around the spout before closing it up. Sure enough, a few months later when I needed more oil finish, the cap came right off.

Ramon Moreno



Sources See page 98



BILL ZUEHLKE

Do-It-All Shop Paper

You may think I'm crazy for getting excited about a roll of paper, but if you ask me, this product should be in every shop. If it's brown it's called builder's paper and if it's red it's called rosin paper. You'll find it at home centers for about nine bucks for a roll 144-ft. long by 36-in. wide. I originally bought it to save my tablesaw

from glue drips but it has tons of other uses around the shop, for example:

- Making full-scale drawings
- Laying out templates
- Masking off the back of picture frames
- Testing spray patterns before turning the spray gun on a project.

Dave Munkittrick

Sources See page 98

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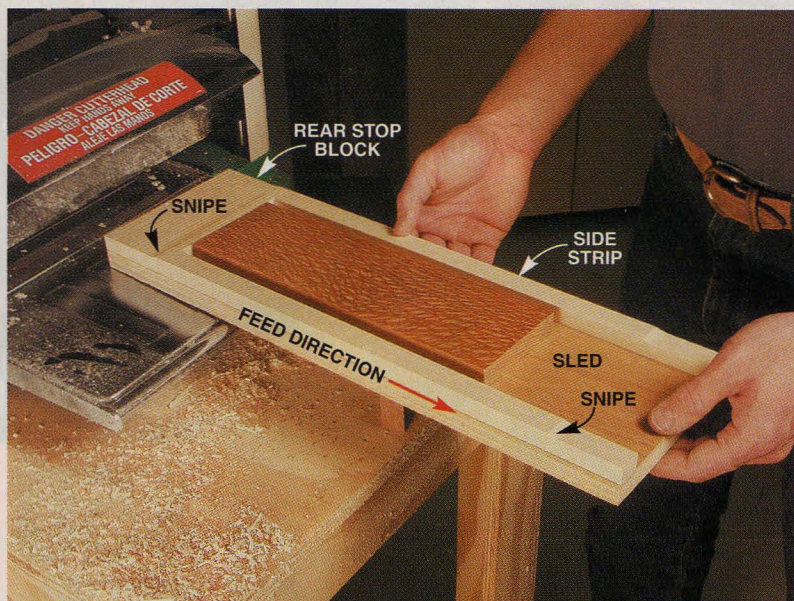
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Tom Caspar



Anti-Snipe Solution for Small Boards

I can't stand planer snipe. Especially when I'm planing small (and expensive!) boards of exotic wood for the boxes I build. To prevent planer snipe I send my boards through on a sled. I make the sled at least 6-in. longer than my workpiece. Then I glue a rear stop block and side strips to the sled. The side strips and stop block need to be at least as thick as the final thickness of

the board you're planing. This ensures that the side strips and stop block get sniped instead of your good wood.

Safety note: The length of the workpiece that you place on the sled must be as long or longer than the minimum recommended length for your planer or you could experience kick back. Check the owner's manual for your planer or call the manufacturer to find out the minimum length. Never attempt to plane boards shorter than the minimum recommended length.

Dan Reeve

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Soda-Straw Pipette

I rarely use a stain or dye right out of the can. I make my own custom mixes in small quantities until I get the color just right.

In order to recreate the perfect mix in larger portions, I have to accurately measure the amount of each stain in the mix. Dipping a teaspoon into a can of stain rarely yields an accurate measurement and I always end up with stained hands. Pouring dye from a bottle into a measuring spoon is equally messy.

So now I reach for a plastic straw and dip it into the stain. I block the top with my forefinger and capture some stain in the straw. Then I carefully lift my finger and I can add just the right amount of stain to fill the measuring spoon. Remember the pipettes we used in high school chemistry?!

Lou Bush



MIKE KRIVIT

Instant Vise for Long Boards

I think hand screws are one of the coolest inventions of all time. When I'm really in a clamping bind, they always come to my rescue. Like when a board is just too long for one vise to handle, I hold the board fast with a couple wooden hand screws. Clamp

one to your board and use the other to hold the first clamp to your workbench. Support the other end of the board in your vise or with another pair of clamps. Hand screws; they're quick, strong and versatile. **AW**

Tim Johnson

If you have an original Workshop Tip, send it to us with a sketch or photo. You'll get \$100 and an AW hat for each one we print! Send to: **Workshop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121** or e-mail to workshoptips@readersdigest.com. Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions, and use them in all print and electronic media.

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Getting started with the new Akedo DC16-V dovetail jig (\$300) is as simple as taking it out of the box and clamping it to a bench. That's all the set-up you'll need to cut variable-spaced dovetails, both half-blind and through, and finger joints.

Joints are laid out by snapping carbon-fiber fingers into an index strip on the jig. No tools are required for tightening the fingers. Material is held in place by clamp bars *inside* the jig. A link ties both ends of each clamp bar together so the bar can be fully tightened by turning only one knob.

A unique design holds the material and traps the sawdust between the front and back of the jig. This way, the base of the router is fully supported. Other dovetail jigs support only half of the router base, making it easy to rock the router as you cut.

With the addition of a dust-collection kit (\$30), Akedo says you'll get nearly 100-percent dust collection. No other dovetail jig makes this claim.

Standard equipment included with the jig allows you to cut through dovetails and half-blinds in material 3/4-in. thick. Additional kits (\$15 to \$35, purchased separately) allow you to cut through and half-blind dovetails in material from 1/4- to 1-in. thick.



Innovative Router for Router Tables

Triton designed this 3-1/4-hp variable-speed plunge router (\$320) with a keen eye toward router-table use. The collet extends past the base, making it simple to change bits from above the table. All you need is one wrench, because the spindle has an automatic lock.

Setting the bit height on the router table is easy. You simply push a button and turn one handle to move the motor up and down. Then you fine-tune the bit height with a micro-adjust knob. Disengaging the button allows you to use this router like other plunge routers.

The Triton is a little top heavy compared to other routers in its class, due to the handle position. Hand-held routing takes a little getting used to, and is not what this machine is best at.

This router is at the top end of the price range for 3-hp routers, but for router-table use, it's as convenient as a fixed-base router. However, the Triton doesn't seem as powerful as some other large routers. Heavy cuts, such as you'd make with a panel-raising bit, may require more than one pass and may cause the Triton to work harder than other 3-hp routers.

opped Shop

by George Vondriska

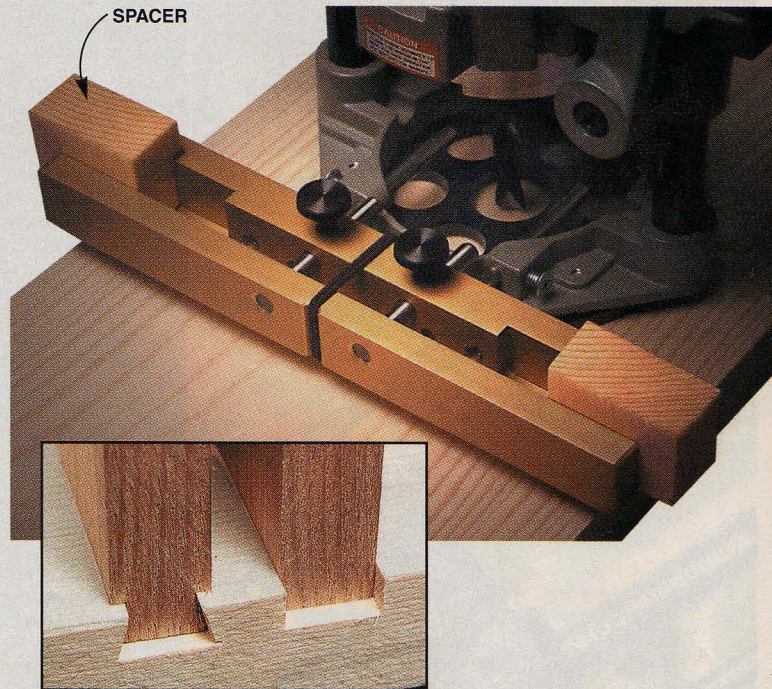
New Tools, Supplies and Materials

Easier Dado Routing

Do your dados fit your plywood? Standard router bits are usually too large to cut the right-size dado, and even with specialty undersized plywood bits, you don't always get the fit you want.

The Accurate Guide (\$60) from Accurate Wood Tools offers a unique solution. It's a guide fence that uses a scrap piece of your workpiece as a spacer to virtually guarantee the fit between part and dado. The most you may have to do to custom fit the joint is add a piece of paper as a shim. Once the fit is fine-tuned, you cut all the dados in two passes. The Accurate Guide can also be used to cut sliding dovetails.

The Accurate Guide requires a 1/2-in. straight bit to make 3/4 in. to 1-1/2-in. dados, and a 1/4-in. bit for 1/2-in. dados. It fits most routers from Bosch, Makita and Porter-Cable, with more versions on the way.



Plywood Edging Solution

If you use plywood, you know how difficult it is to hide ugly edges with banding. Here's a new solution that makes a nearly invisible joint, but is more durable than edge tape. It's a matched set of router bits called The Burgess Edge System (\$145). Sure, it's expensive, but you can crank out a ton of high-quality banding very quickly and accurately with these bits.

Machining is pretty simple with a router table. One bit shapes the plywood and the other creates a matching profile in solid wood. Shims are included to adjust the cutters to match the exact thickness of your plywood.

It's easy to glue the banding to the plywood because the pieces are self-aligning. You can make thick banding if you want a radiused edge or rip the banding after gluing if you want a sharp edge. Either way, you get the protection of solid wood without a visible glue line.



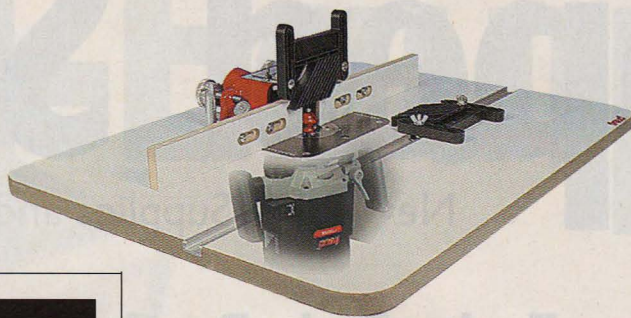
Sources for all products

See page 98

The Well-Equipped Shop

Router/Table Combo

Freud has rolled their 3-hp router and router table top, fence and table insert all for \$390. You'll have to build your own base cabinet, but this is a good deal considering that it's easy to spend \$150 to



ROUT With The BEST



Amana Tool®, the world's most respected maker of premium-quality cutting tools, offers more than 1,200 different router bits for every conceivable routing job. Every Amana Tool® router bit is precision-machined from a single rod of virgin tool steel and tipped with high density micro-grain carbide, then ground to the highest tolerances in the industry, on state-of-the-art grinding equipment.

The result? Amana Tool® bits stay sharp longer and cut smoother than any other bit on the market, at prices that seem too low to be true! And, every Amana Tool® bit over 5/8" diameter meets the rigid European "BG" specifications for anti-kick-back safety. No fancy point colors or misleading claims—just quality engineering and superior performance!



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\$400 on a router table alone. And this table has many of the features of the best ones available.

The Freud router is a fine 3-hp machine. We gave it our Best Buy award in AW #78, February 2000. It's got variable speed—a real must for shaping panels on a router table. It's also comfortable for hand-held cuts. It has a micro-adjust knob that simplifies bit-height adjustments, especially in a router table. However, a downside to using most plunge-base routers in a router table is changing bits, and this machine is no exception. It's awkward to change bits with the router hanging upside down in the table.

The table top is 24 in. x 32 in., ample real estate for anything you want to do. It includes a track for a miter gauge.

The fence has independently adjustable infeed and outfeed halves, which is both good and bad news. On the plus side, if you want to use your router table like a jointer, it's easy to dial a slight offset into the fence. But on the negative side, you'll need to realign the fence faces for cutting profiles and dados. You can adjust the replacement faces to make zero-clearance cuts. The fence includes a dust-collection port.

The table insert is predrilled for the Freud router, and includes a starter pin and snap-in reducer rings. The black featherboards pictured above are not included.

Sources

See page 98

The Well-Equipped Shop

Multi-Tip, No-Drip Glue Bottle

It's nice to have the right tool for the job, even when it comes to dispensing glue. GluBot from FastCap is a versatile glue bottle with a variety of tips available, ranging from tiny needles to biscuit-slot tips. A 16-oz. bottle costs \$5, and a 4-oz. bottle is \$3.50. (Add your own glue.) Tips cost about 50 cents each. Old mustard bottles are less expensive, but don't offer the variety of tips GluBot does nor do they have GluBot's unique, no-drip feature.

The GluBot prevents glue drips with a clever two-chamber design. Squeeze the large chamber and glue gently comes out the spout of the small chamber. Relax your grip, and a slight vacuum pulls glue back into the bottle.

Here's good news if you hate clogged glue spouts. The GluBot spout is self-cleaning. When the glue is sucked back, it leaves a clear passage.

Filling the large chamber is easy and GluBot's large cap has a nib for storing the spout cap when you're squeezing out glue.



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Big New Jointer

A new jointer from Grizzly (G0500, \$795) has set the bar a little higher for 8-in. jointers. The bed is aircraft-carrier long, a full 75-in. This is 8- to 10-in. longer than many other 8-in. jointers. The cutterhead has four knives, while many jointers in this category have three.

Bed length on jointers is a big deal because it determines how long a piece of wood you can accurately joint. You should easily be able to straighten 8-ft.-long stock on this machine.

A four-knife cutterhead produces a smoother finish than a three-knife head. Think of it in terms of cuts per minute (cpm). The G0500 produces 22,000 cpm, while many other 8-in. machines produce as few as 16,500 cpm. The more cpm you have, the easier it is to get a smooth surface.

When it comes to setting the knives, you have your choice of jack screws or springs. Both are included on the cutterhead.

The heights of the infeed and outfeed tables are controlled by handwheels. In our tool tests, many of our testers preferred the precision of handwheels over the coarser but faster adjustments of levers.

Sources See page 98



The cutterhead is driven by a 2-hp motor that can be run on 120 or 240 volts. Expecting this machine to run on 120 volts is unrealistic, because the motor will draw 24 amps. Plan on running it on 240 volts.

American Woodworker MARCH 2003

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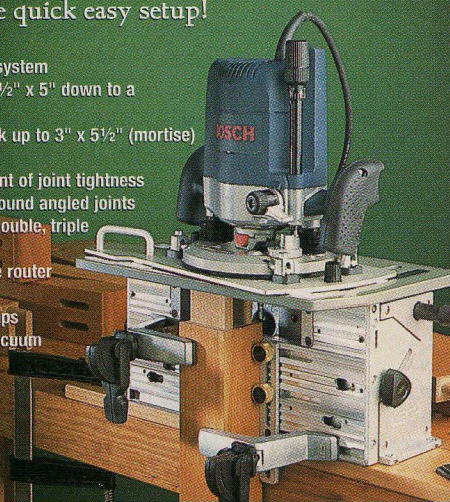
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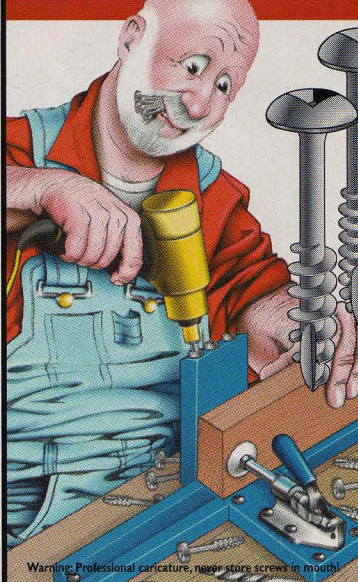


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The Well-Equipped Shop

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(\$6, including six pencils). Using two razors, it makes a chiseled point so you can make thin lines for layout marks and thick lines for part identification.



STAFF

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Free Wood Information

Here's a woodworking tool that won't cost you a dime. It's a CD (Mac or PC compatible) full of information about 21 different North American hardwoods. Open the files and you'll find information on working characteristics of each species and a guide to what to expect in three different hardwood grades: Firsts and Seconds, #1 Common and #2 Common. This guide is the coolest part of the CD, and includes photos of what a typical board in each grade will look like.

The CD also contains general information about finishes, from dyes to stains to sealers, and advice about avoiding blotchy finishes on woods such as maple and cherry.

In addition, the CD offers tips for installing built-in cabinets, crown moldings, and a handful of other do-it-yourself projects.

If you don't have a computer, most of the CD information is also printed in traditional brochure format. Ask for the Tips #11, Finishing Touch brochure.

AW

Sources

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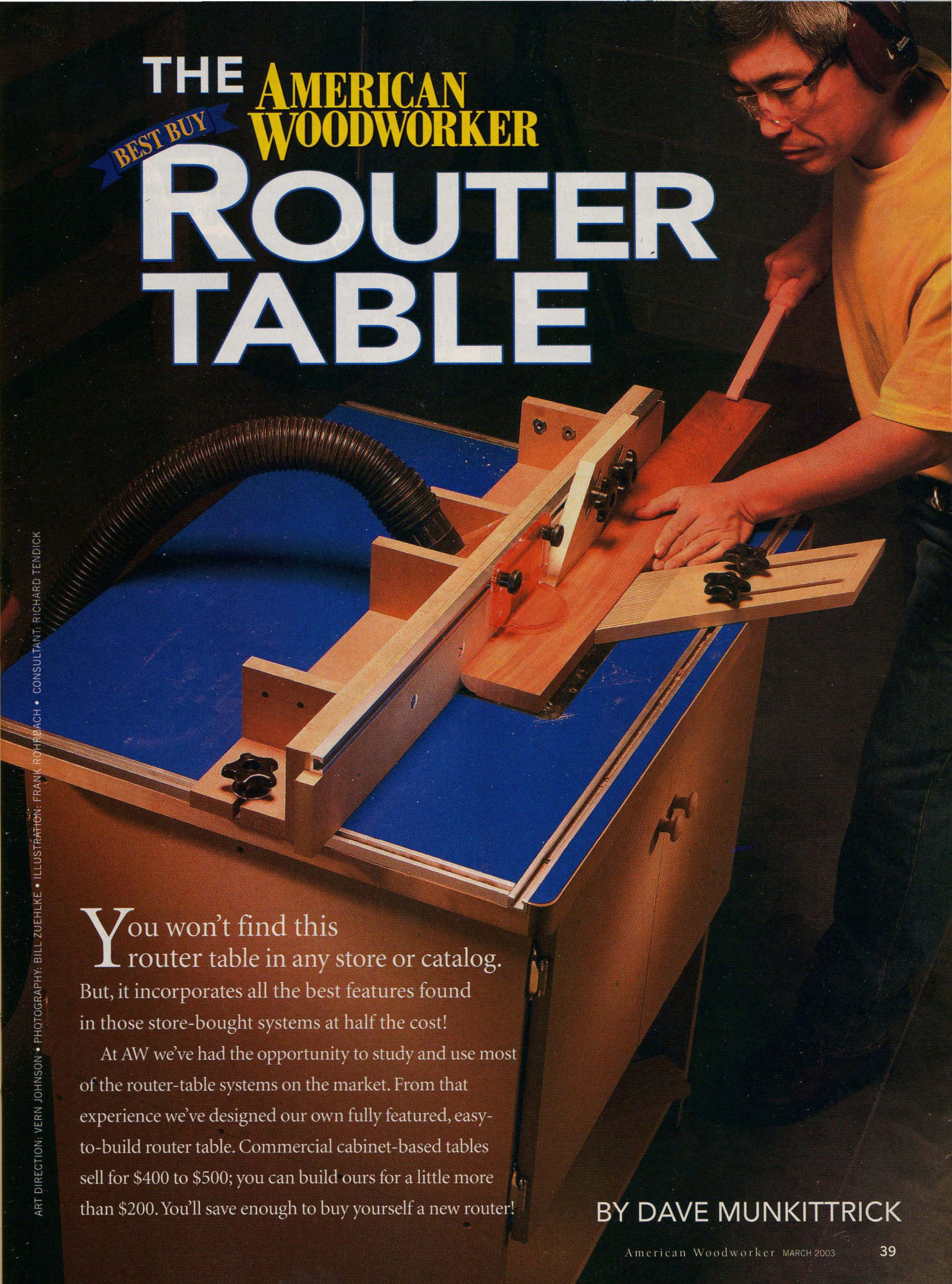


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THE **AMERICAN**
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BEST BUY

ROUTER TABLE



You won't find this router table in any store or catalog. But, it incorporates all the best features found in those store-bought systems at half the cost!

At AW we've had the opportunity to study and use most of the router-table systems on the market. From that experience we've designed our own fully featured, easy-to-build router table. Commercial cabinet-based tables sell for \$400 to \$500; you can build ours for a little more than \$200. You'll save enough to buy yourself a new router!

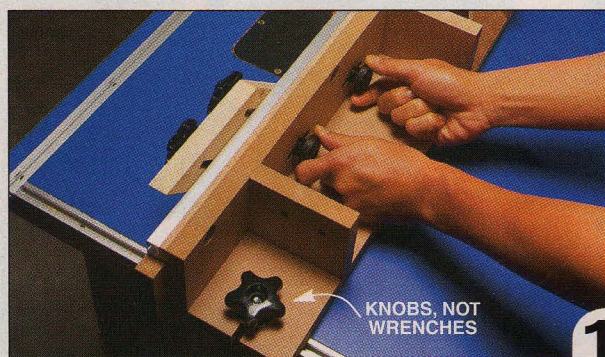
BY DAVE MUNKITTRICK

Check Out These Great Features

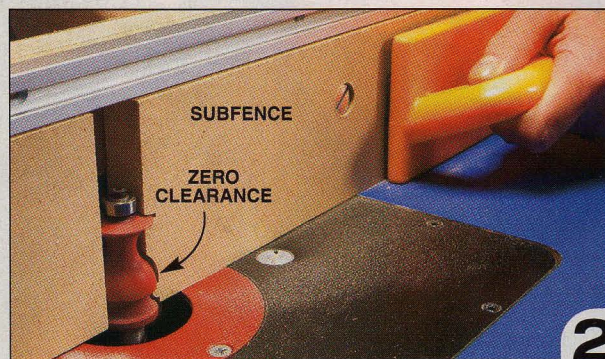
The All-Important Fence

At the heart of any great router-table system lies a well-designed fence. Ours offers all the best features identified in our router table tool test (AW #92, February 2002, page 64):

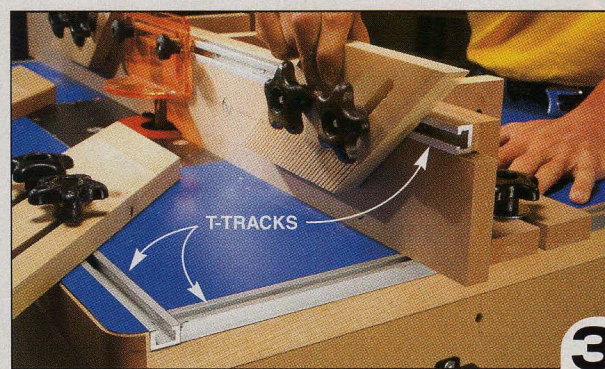
- **An easy-to-use, tool-free fence** can be set and adjusted in an instant (Photo 1).
- **Easy-to-make sacrificial subfences** can be adjusted for any size bit or used to create zero-clearance openings (Photo 2). They're easy to make from plain old 3/4-in. MDF.



A totally tool-free fence. Forget about wrenches, screwdrivers or clamps for fence adjustments.



Easy-to-make, sacrificial subfences allow you to make a zero-clearance opening for super-clean, super-safe cuts. Simply slide the infeed fence slowly into the spinning bit.



T-tracks provide slide-and-lock adjustments for maximum versatility. They make for super-smooth fence adjustments and convenient attachment points for accessories.

- **Quick, rock-solid fence settings** are made possible by T-tracks in the table (Photo 3). For fine adjustments, leave one hold-down tight to create a pivot point for the fence.
- **Fence-mounted T-track for attaching accessories** (Photo 3).
- **A dust port** for picking up the debris that routers kick out.

The Sag-Free Top

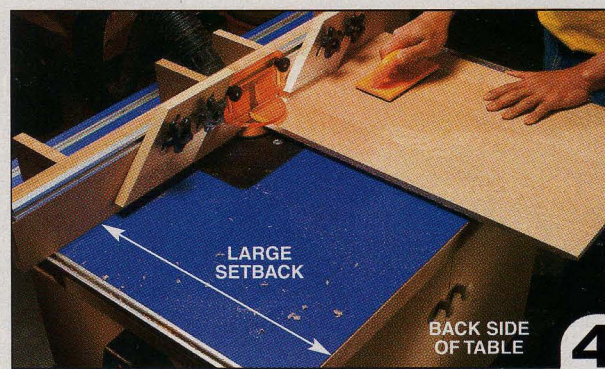
In this article we'll show you how to build flatness into your top and keep it there. Our top's features include:

- **A dead-flat top that will never sag** because it's supported by braces built into the cabinet (Fig. A).
- **A versatile offset router mount** puts the router near the front edge for easy access and easy stock feeding. This is where you'll do 90 percent of your routing. The other 10 percent will be at the back of the table, which offers more table support for routing large stock, such as door panels (Photo 4).
- **Plastic laminate for a slick, durable top.** We put the laminate on both surfaces to protect and stiffen the top.
- **Our Best Buy router-mounting plate** (from AW #85, February 2001, Tool Test: Router Table Plates, page 86) allows easy removal of the router for bit changes and hand-held work.

A Large, Easy-to-Build Cabinet

Made from heavy, vibration-absorbing MDF, the cabinet goes together with butt joints and screws. There's plenty of storage plus the following features:

- **The capacity to handle the largest routers on the market** for a router table that approaches the capabilities of a shaper.
- **A pair of doors** on the front and back cut noise while giving you access to the router from either side of the table.
- **An external power switch** (no wiring required) makes routing easier and safer. Easier because there's no fumbling under the table to turn on your router. Safer because who wants to be opening doors and groping for the power switch in an emergency?



You can work at the back of the table to take advantage of the large setback to support big stock, like this door panel. That way you're not having to divide your attention between feeding the stock and keeping it from falling off the table.

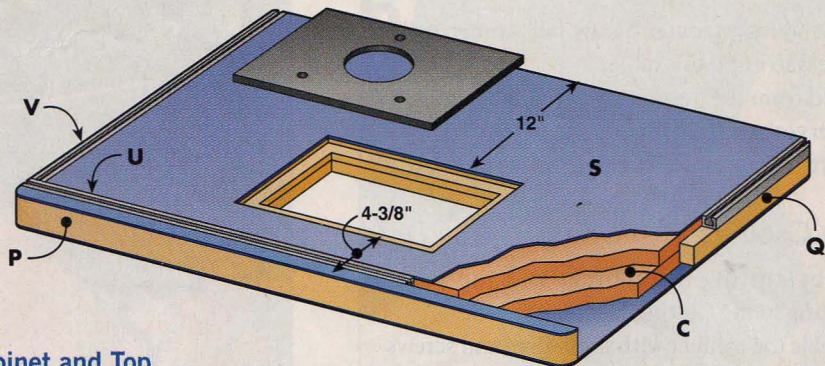
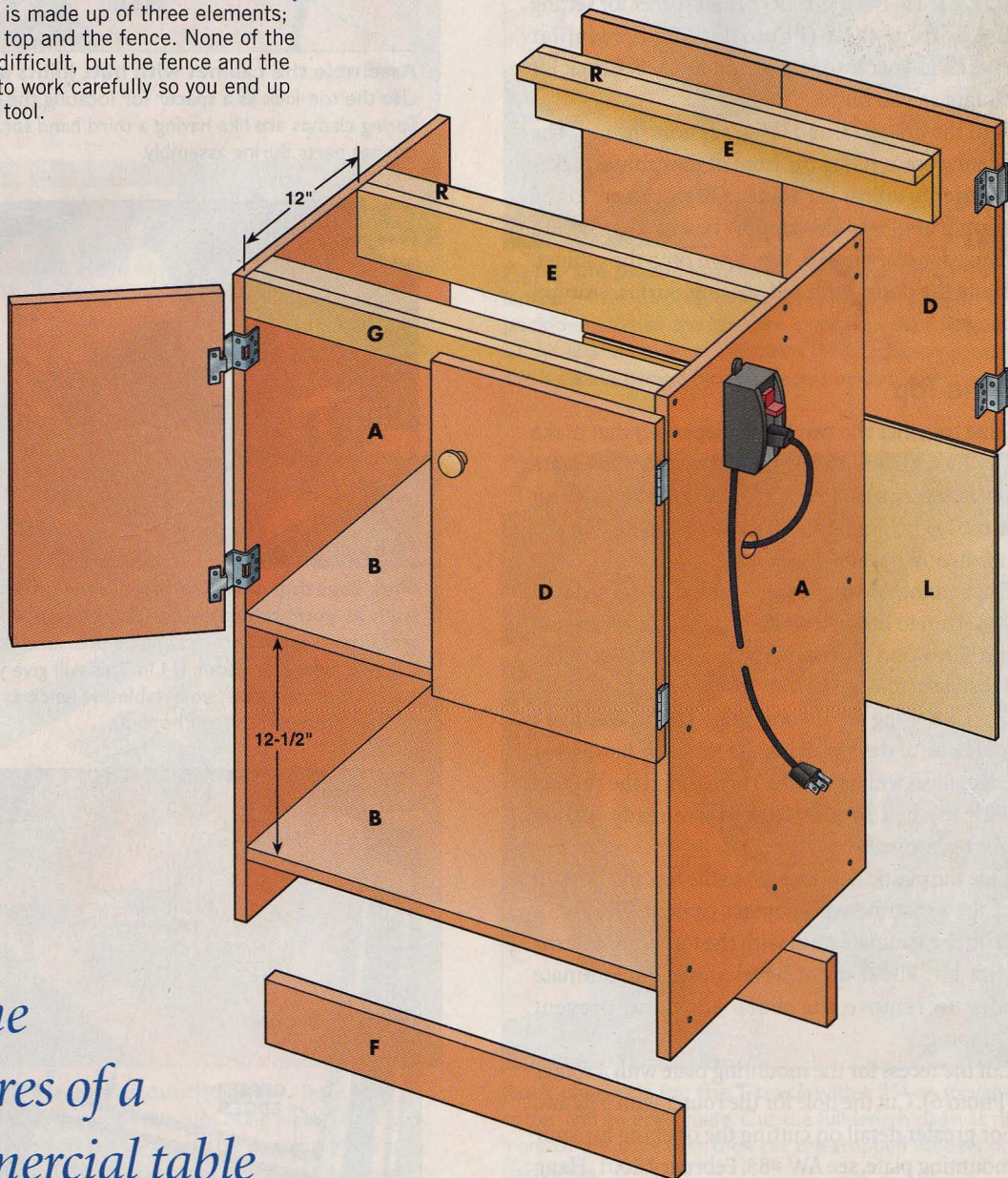


Fig. A Exploded View of Cabinet and Top

The router table is made up of three elements; the cabinet, the top and the fence. None of the woodworking is difficult, but the fence and the top require you to work carefully so you end up with a precision tool.



*All the
features of a
commercial table
at a fraction of the cost*

Build the Base and Top

You'll need a tablesaw, router, jigsaw, belt sander, drill and drill press to build this table.

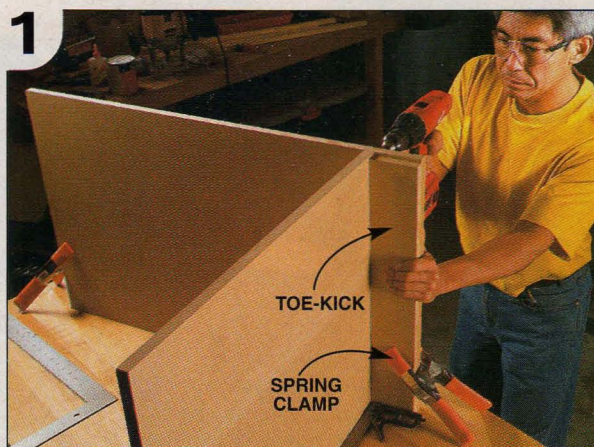
We'll build from the bottom up, starting with the cabinet. It serves as a solid foundation for the working parts of our table. Ready? Here we go:

Build the Cabinet

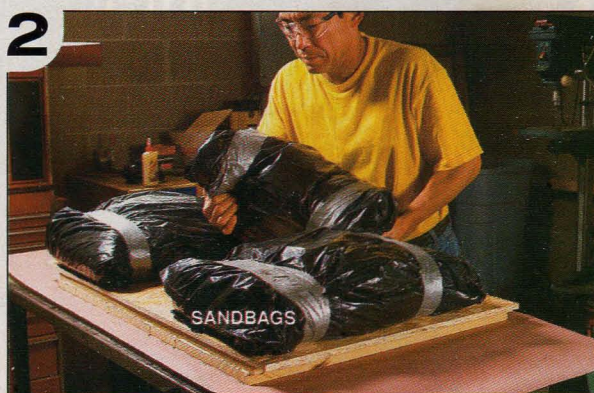
1. Start by cutting the cabinet and top parts according to the Cutting List on page 45.
2. Assemble the cabinet with butt joints and screws (Fig. A). Use the toe-kick (F) as a spacer for setting the bottom shelf (Photo 1). Make a similar 12-1/2-in. spacer to set the middle shelf. Check for square as you build.
3. Add the braces (E and G) to support the top. The narrow brace (G) at the front of the cabinet makes it easier to adjust the router. Cleats (R) are glued at right angles to the support beams to provide a flange for screwing the top down onto the cabinet.
4. Hang the doors with self-closing, surface-mount hinges.

Build the Top

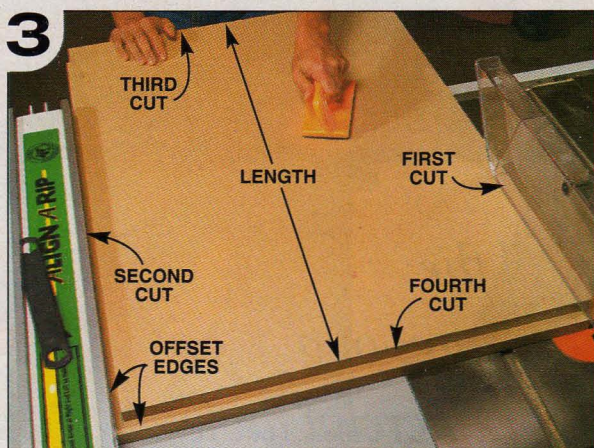
5. Glue together the two MDF pieces (C) that make up the top (Photo 2). Then, trim the substrate flush and square (Photo 3). Important: leave an extra 1/2 in. on the width to be trimmed after the hardwood edges are applied.
6. Glue on the two short pieces of hardwood edging (Q). Trim to finished width on the tablesaw leaving the hardwood flush with the front and back of the substrate (Photo 4).
7. Glue the long hardwood edge (P) to the front and back of the top. Trim and sand the hardwood edges flush with the MDF. Then, round the corners with the belt sander. Now you're ready for the plastic laminate.
8. Glue the plastic laminate (S) to the top and bottom of the substrate with contact cement (Photo 5). Trim the laminate flush with the top using a flush-trim bit. File a slight bevel along the laminate edge to remove the sharp edge and prevent chipping.
9. Cut the recess for the mounting plate with a router (Photo 6). Cut the hole for the router with a jigsaw. For greater detail on cutting the opening for your mounting plate, see AW #85, February 2001, Hang a Router...Perfectly, page 90.
10. Rout the channels for the T-tracks (Photo 7).



Assemble the cabinet with butt joints and screws. Use the toe-kick as a spacer for locating the bottom shelf. Spring clamps are like having a third hand for supporting cabinet parts during assembly.

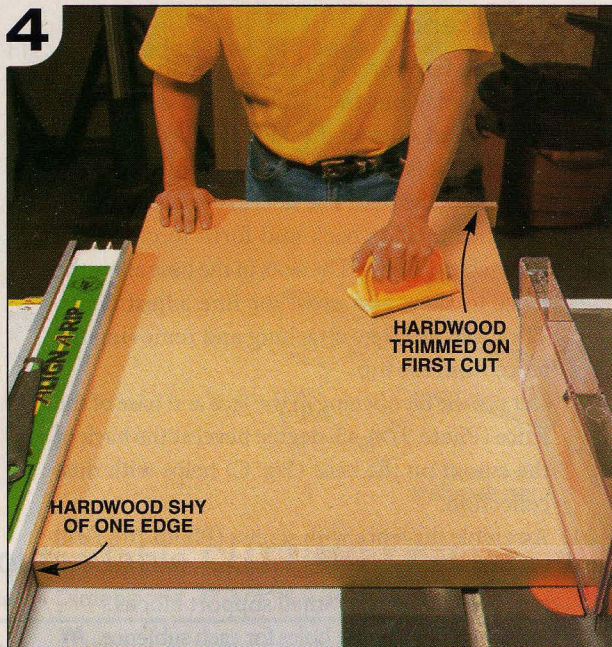


Glue together the two top pieces on a flat surface, such as your tablesaw. Sandbags (wrapped in plastic to avoid spills) provide the clamping pressure. Be sure to offset the two pieces by about 1/4 in. This will give you two clean edges to place against your tablesaw fence as you cut the top to final dimensions (see Photo 3).



Trim the built-up top on the tablesaw using the two offset edges against the fence. You'll have to make four cuts to get the whole top square with flush edges. Leave an extra 1/2 in. on the width for trimming the hardwood edges (see Photo 4).

4



Cut the top to final width with the hardwood edging glued onto the sides. The hardwood is placed just shy of one edge on the MDF core. This leaves a clean edge to reference against the tablesaw fence for the first cut. The second cut is made to final width and leaves the hardwood perfectly flush with the edges of the MDF.

5



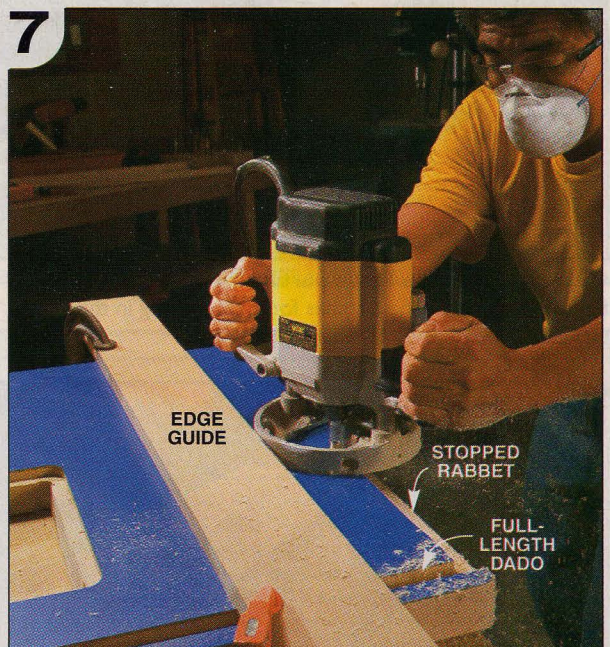
Apply the plastic laminate. Slip sticks prevent the plastic laminate from sticking to the top before you have it properly positioned. When the laminate evenly overlaps all four edges of the top, slip one stick out at a time and apply pressure to the laminate using a block of wood or a roller.

6



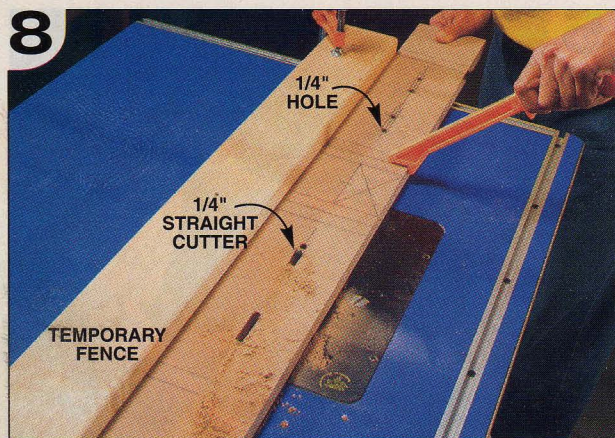
Rout the recess for your mounting plate. Build the template to fit snugly around your mounting plate. Use a top-bearing flush-trim bit to cut an exact-size opening. Make sure the template is deep enough to accommodate the bit length. Use a jigsaw to cut a hole in the center of the recess, leaving a 1/2-in. ledge for the mounting plate (Fig. A).

7

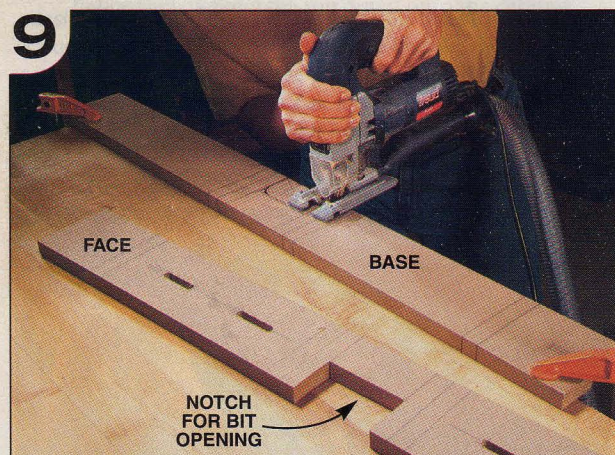


Rout channels for the T-track with a 3/4-in. straight cutter and an edge guide. Cut the full-length dado at the front of the table first; then cut the stopped rabbets on the two edges.

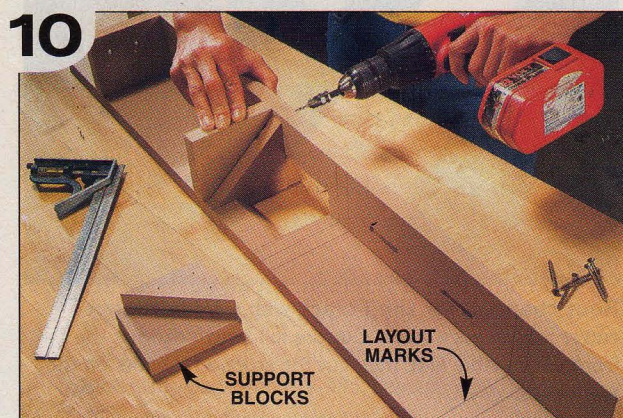
Build the Fence



Rout slots in the fence parts using your newly built table and a temporary fence. Drill a 1/4-in. hole at the beginning and end of each slot. With the router turned off, set the blank against the fence so the 1/4-in. straight cutter protrudes through the first hole of the slot. Hold the blank firmly and turn on the router. Push the blank forward until the bit reaches the second hole.



Cut notches in the fence parts with a jigsaw. Once the fence is assembled, the notches form an opening in the fence to accommodate the router bit.



Assemble the fence with screws. Check each support block for square before you use it. Perfectly square support blocks ensure a perfectly square fence.

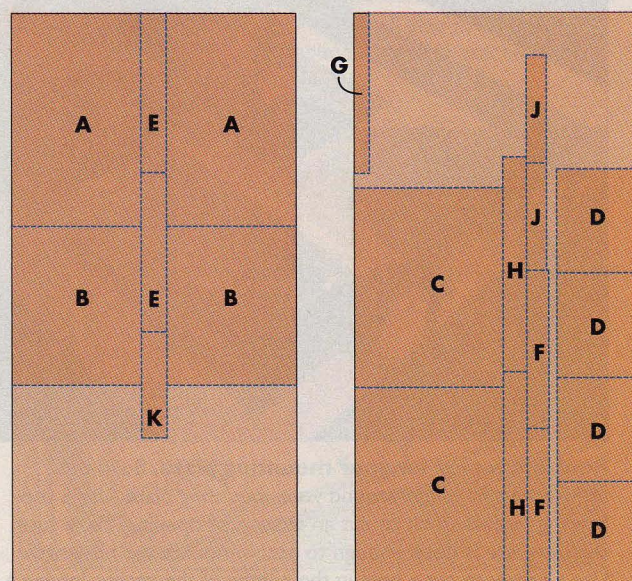
Build the Fence

11. Cut the MDF parts for the fence (H through K). Carefully lay out the location of the supports, cutouts and slots on the base and face pieces.
12. Rout the slots in the fence face (Photo 8) and at the ends of the base. The slots in the face allow the subfence to slide back and forth to create the adjustable opening. The slots in the base allow the fence to skew and pivot for fine adjustments. They also facilitate attaching and removing the fence from the top.
13. Cut out the bit opening in the face and base of the fence (Photo 9). A 45-degree bevel at the back of the cutout on the base (Fig. C) helps with dust collection.
14. Assemble the fence with screws (Photo 10). Drill your pilot holes a little deeper than the screws to prevent splitting the small support blocks.
15. Drill and countersink holes for each subfence. **AW**

Tip

As long as you're making two subfences, you may as well make a dozen. That way you'll always have a fresh one when you need it and you won't be tempted to "make-do."

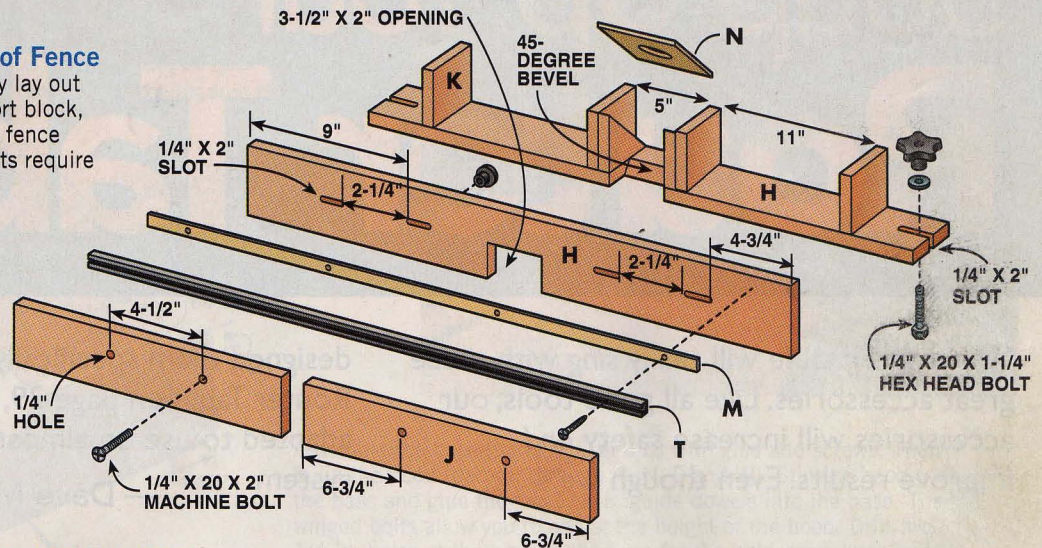
Fig. B Cutting Diagram for Base, Top and Fence



Special thanks to Richard Tendick for his help in engineering this router-table fence and accessories.

Fig. C Exploded View of Fence

Take the time to accurately lay out the position of each support block, slot and screw hole on the fence base and face. Moving parts require precise construction.



Router Table CUTTING LIST

Overall Dimensions: 37-1/4"H x 34"W x 25-1/2"D

Part	Name	Qty.	Dimensions	Material	Notes
A	Base Sides	2	22" x 35-1/2"	3/4" MDF	
B	Base Shelves	2	22" x 26-1/2"	3/4" MDF	
C	Top Top	2	24" x 32-1/2"	3/4" MDF	Add 1" to length and width and trim to final size after lamination.
D	Base Doors	4	13-3/8" x 17-1/2"	3/4" MDF	
E	Base Top Brace	2	4" x 26-1/2"	3/4" MDF	
F	Base Toe-Kick	2	3-1/2" x 26-1/2"	3/4" MDF	
G	Base Top Brace	1	3" x 26-1/2"	3/4" MDF	
H	Fence Face & Base	2	4" x 36"	3/4" MDF	
J	Fence Subfence	2	3-3/16" x 18"	3/4" MDF	Make a dozen while you're at it.
K	Fence Support Blocks	5	3-1/4" x 4"	3/4" MDF	Cut one block in half diagonally to create supports for dust port.
L	Base Back	1	13-1/2" x 28"	1/4" Hardboard	
M	Fence Shim	1	3/4" x 36"	1/4" Hardboard	Use to shim out fence T-track.
N	Fence Dust Port	1	5" x 5-1/8"	1/4" Hardboard	
P	Top Maple Edging	2	1-1/2" x 34"	3/4" Solid Wood	Rough cut 1/16" over in width and 1" in length. Trim to final size after gluing to the top.
Q	Top Maple Edging	2	1-1/2" x 24"	3/4" Solid Wood	Rough cut 1/16" over in width and 1" in length. Trim to final size after gluing to the top.
R	Base Pine Cleats	3	1-1/2" x 26-1/2"	3/4" Solid Wood	Edge glue to top of each top brace.
S	Top Surface	2	25-1/2" x 34"	Plastic Laminate	Cut 1" oversize in all dimensions and flush trim to substrate after glue down.
T	Fence T-track	1	36"	T-track	Cut to fit from 48" stock.
U	Top T-track	1	34"	T-track	Cut to fit from 48" stock.
V	Top T-track	2	24"	T-track	Round the exposed ends with a file to eliminate catch points.

Accessories (See Soup Up Your Router Table, page 46)

A	Stop Block	Block	2	3" x 4"	3/4" MDF	
B	Guard	Base Bottom	1	5" x 5"	3/4" MDF	
C	Guard	Base Sides	2	2" x 4-1/4"	3/4" MDF	
D	Guard	Base Front	1	5" x 5"	3/4" MDF	Cut half circle in top of front for 2-1/4" vacuum hose.
E	Guard	Hood Back	1	3-3/4" x 5"	3/4" MDF	
F	Guard	Bit Box Sides	2	3-5/8" x 5"	3/4" MDF	
G	Guard	Bit Box Back	1	2-7/8" x 3-1/2"	3/4" MDF	
H	Guard	Bit Box Front	1	1-7/8" x 3-1/2"	3/4" MDF	
J	Sled	Base	1	5" x 6-1/4"	3/4" MDF	Cut parts J, K and L from a single 5" x 16" board.
K	Sled	Vertical Support	1	3" x 5"	3/4" MDF	
L	Sled	Fence Block	1	2" x 5"	3/4" MDF	
M	Sled	Bottom	1	9" x 16"	1/4-in. Hardboard	
N	Guard	Hood Sides	2	3-3/4" x 9-1/2"	1/4-in. Hardboard	
P	Guard	Dust Port	1	3-3/4" x 5"	1/4-in. Hardboard	
Q	Featherboard	Fence	2	4" x 11"	Solid Wood	Use poplar or pine. Cut angled ends to measure 10-3/4" long point to long point.
R	Featherboard	Table	2	4" x 18"	Solid Wood	Slots are 6-1/2" long and angled ends are 17" point to point.
S	Tall Fence	Top	1	5-1/2" x 36"	3/4" MDF	
T	Tall Fence	Sides	2	4" x 7-1/2"	3/4" MDF	
U	Tall Fence	Brackets	1	2" x 2"	3/4" MDF	Cut in half diagonally to form the two brackets.
V	Stop Block	Wood Runner	2	1/8" x 5/16" x 3"	Solid Wood	
W	Guard	Guard Shield	1	3-1/2" x 5"	1/4-in. Polycarbonate Plastic	

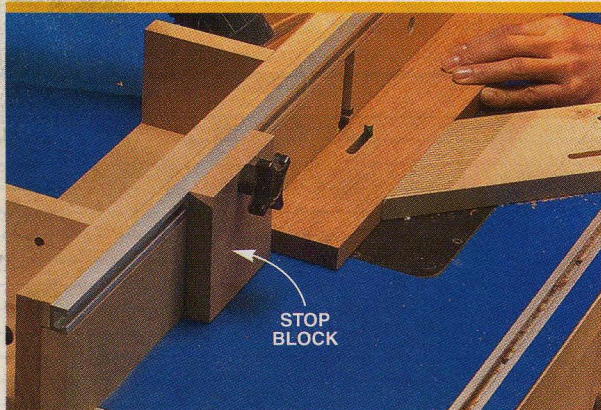
Sources

See page 98

Soup Up Your Router Table

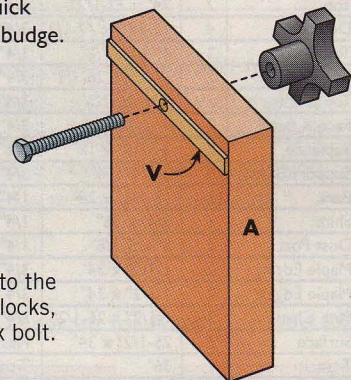
Your router table will really *sing* with these great accessories. Like all good tools, our accessories will increase safety *and* improve results. Even though we

designed them specifically for the Best Buy Router Table on page 39, they're easily adapted to use on almost any router-table system. — Dave Munkittrick



Stop Blocks

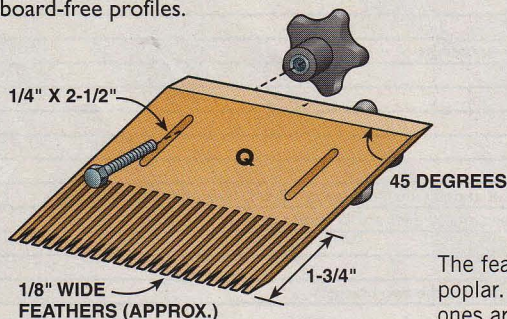
A stop block is indispensable for cuts that don't go the entire length of the board. Ours mounts on the fence T-track for quick settings that won't budge.



Cut hardwood runners (V) wide enough to just fit into the T-track slot, but not as deep. Glue the strips on the blocks, and drill out for the 1-1/4-in. 1/4-20 hex bolt.

Featherboards

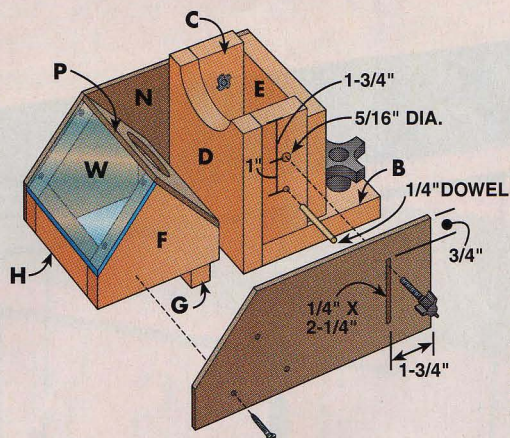
Featherboards make routing safer and better. Safer because they hold the work against the table and fence instead of your hands. Better because the constant pressure holds the piece on both sides of the bit for smooth, washboard-free profiles.



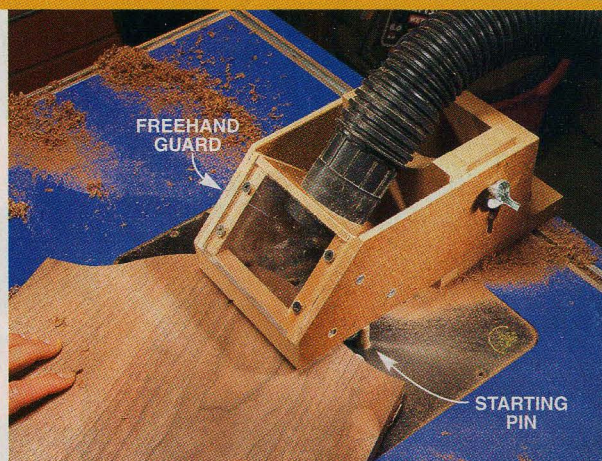
The featherboards are made from clear, solid-wood stock like pine or poplar. There are two sizes (see Cutting List, page 45). The longer ones are mounted on the table and the shorter ones on the fence. Cut the 45-degree angles first. The 1/4-in. slots can be cut on the router table and the feathers are cut using a bandsaw.

Freehand Guard

A freehand guard and a starting pin are a must for routing curved profiles, such as this arch-topped door panel. Dust collection isn't perfect, but it keeps the bit area clear.

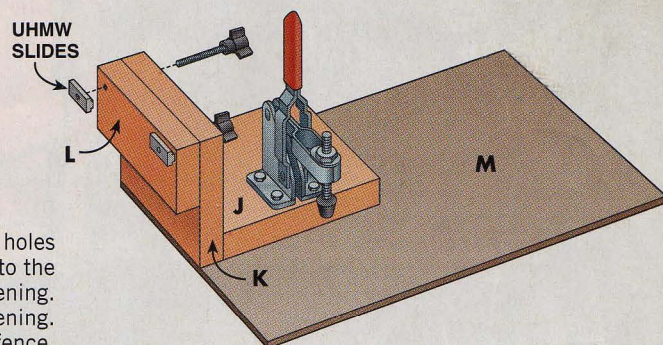


Assemble the base (parts B, C and D) with glue and screws. Then build the hood (parts E through H, N, P and W). Slip the hood over the base and glue the two 1/4-in. guide dowels into the base. The winged bolts allow you to adjust the height of the hood. Drill two 1/4-in. holes at the back of the base for the hold-down knobs.



Router-Table Sled

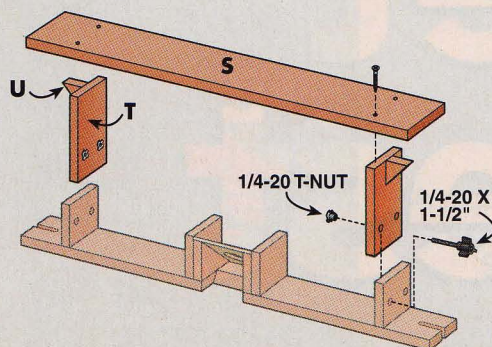
A router-table sled replaces the miter slot found on many commercial tables. It allows you to safely perform end-grain cutting, such as the cope cut on this rail, without having to set your fence perfectly parallel to a miter slot.



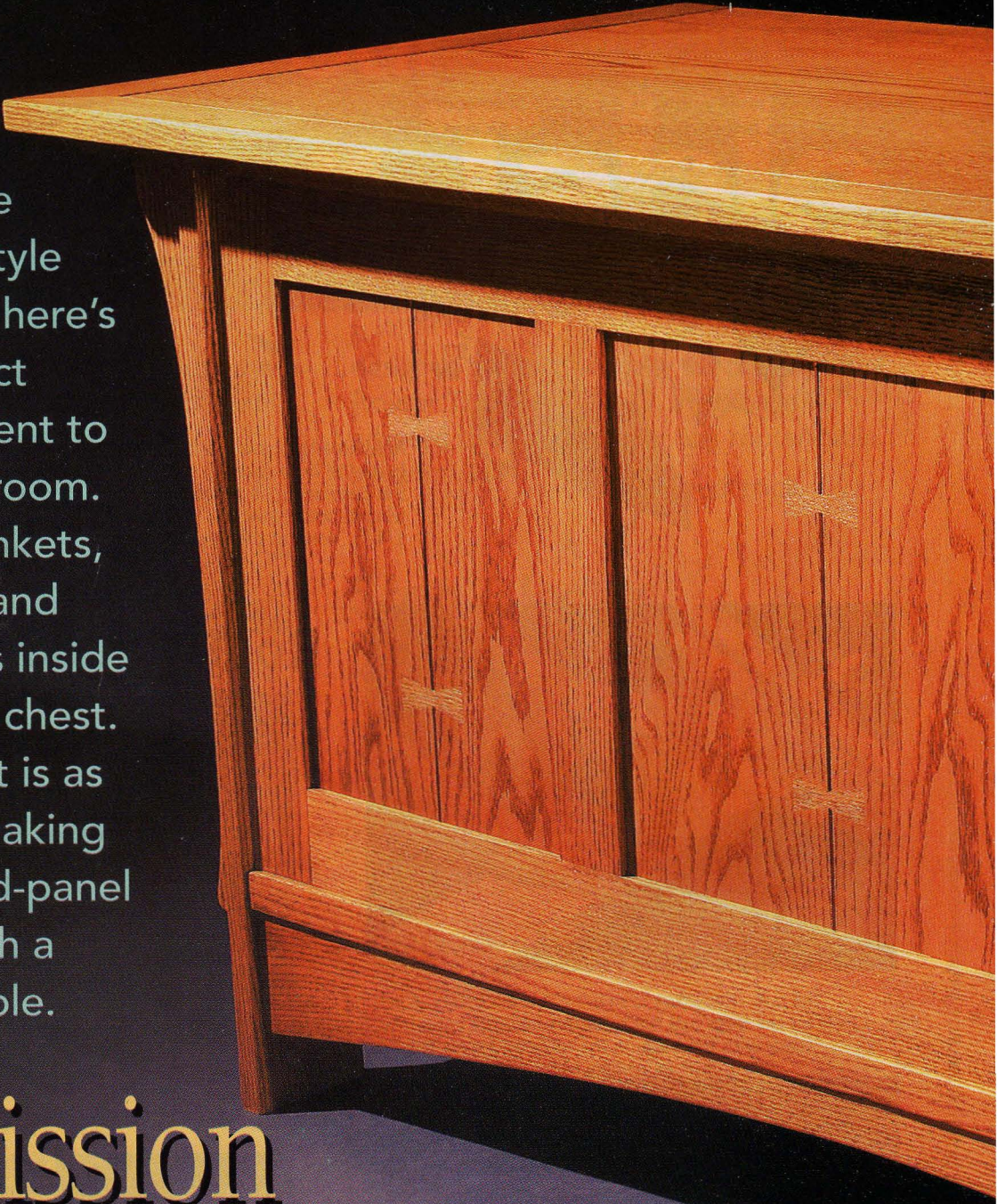
The only tricky part to making this accessory is getting the holes for the bolts just right. Simply hold the completed jig up to the fence with the base on the table and mark the T-track opening. Then, drill your holes in the center of the marked opening. UHMW T-track slides guide the sled along the fence.

Tall Fence

A tall fence makes vertical routing safe and accurate. It provides plenty of support for work that must be stood on end to rout, such as drawer joints, lock-miter joints and vertical panel raising.



The tall fence fits between the two outside supports of the main fence. Build the two supports (U and T) and attach them to the main fence. Use a square to align the top (S) with the face of the main fence and secure with screws or winged bolts. AW



If you love Mission-style furniture, here's the perfect complement to your bedroom. Store blankets, bedding and memories inside this huge chest. Building it is as easy as making frame-and-panel doors with a router table.

Mission Blanket Chest

By Tom Caspar



ART DIRECTION: PATRICK HUNTER • PHOTOGRAPHY: BILL ZUEHLKE • ILLUSTRATION: FRANK ROHRBACH

Mission Blanket Chest

Home-Center Materials

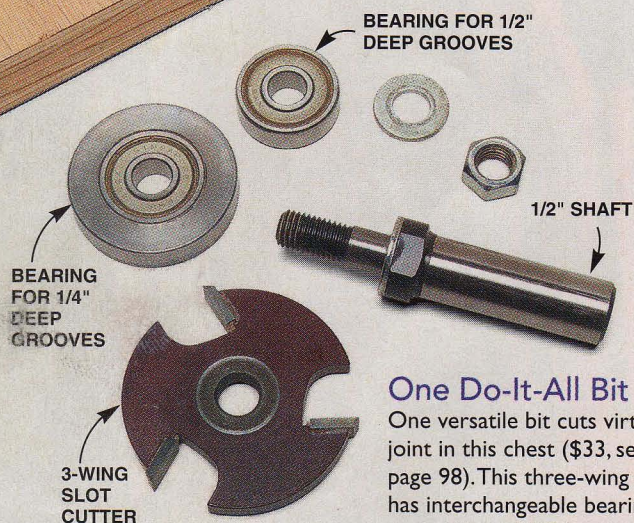
All you need to build this blanket chest is ordinary 3/4-in. red oak lumber and red oak plywood.

Tools and Materials

If you've ever built a frame-and-panel door before, this blanket chest should be familiar territory. You'll need a bandsaw or a jigsaw to cut out the parts from rough boards and a jointer to straighten edges. You'll need a tablesaw to rip and crosscut the pieces and a router table to cut all the joints. The chest's panels are 1/2-in. thick, so you'll need access to a planer to bring them down to the right size. Finally, you'll need a router with a fence.

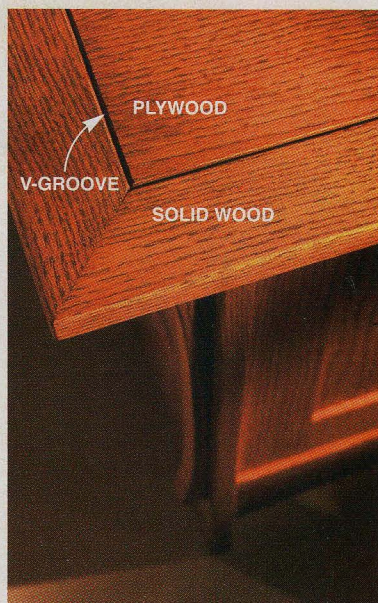
As for router bits, you'll need a 1/4-in. three-wing slot cutter (\$26) and a 1/4-in. straight bit (\$20) to make grooves on the router table. We recommend a slot cutter with interchangeable bearings to make grooves of two different depths. You'll also need a flush-trim bit (\$15) and a small V-groove bit (\$11). See Sources, page 98, for all four bits. Finally, you'll need an inlay set (\$39, see Sources, page 98) if you want to make the optional butterflies on the front panels of the chest (see Butterfly Inlay, page 61 for details).

We built this chest from garden-variety plain-sawn red oak. You'll need about 50 bd. ft. (about \$175), but look for a few boards that are over 8-in. wide. Wide boards generally give you the most choices in selecting the best grain patterns for different parts of the chest. You'll also need one sheet of 3/4-in. plainsawn red oak plywood (\$75). It can have either a veneer or MDF core. You could substitute less-expensive, rotary-cut oak plywood, but it's harder to find a sheet that will make as nice a top for the chest.



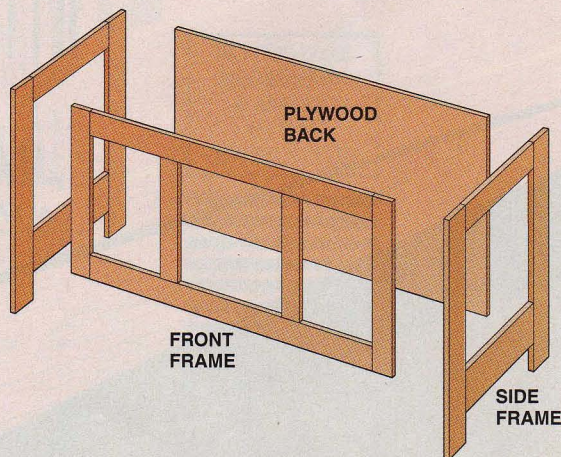
One Do-It-All Bit

One versatile bit cuts virtually every joint in this chest (\$33, see Sources, page 98). This three-wing slot cutter has interchangeable bearings to make both 1/4- and 1/2-in.-deep grooves. The bit also has a sturdy 1/2-in.-dia. shank so you can cut every groove cleanly and accurately in one pass.



Labor-Saving Design

V-grooves on the top and panels save you a ton of extra work. Plywood can be tricky to sand because it's all too easy to go through its thin veneer. This top has a V-groove that separates the plywood center from the solid-wood edges. After you glue the edges to the plywood, you'll barely have to sand the plywood at all, because it doesn't have to be perfectly flush with the solid wood.



Simple Construction

Three frames and a plywood back make up the basic structure of this chest. All the other parts are added on, one by one.

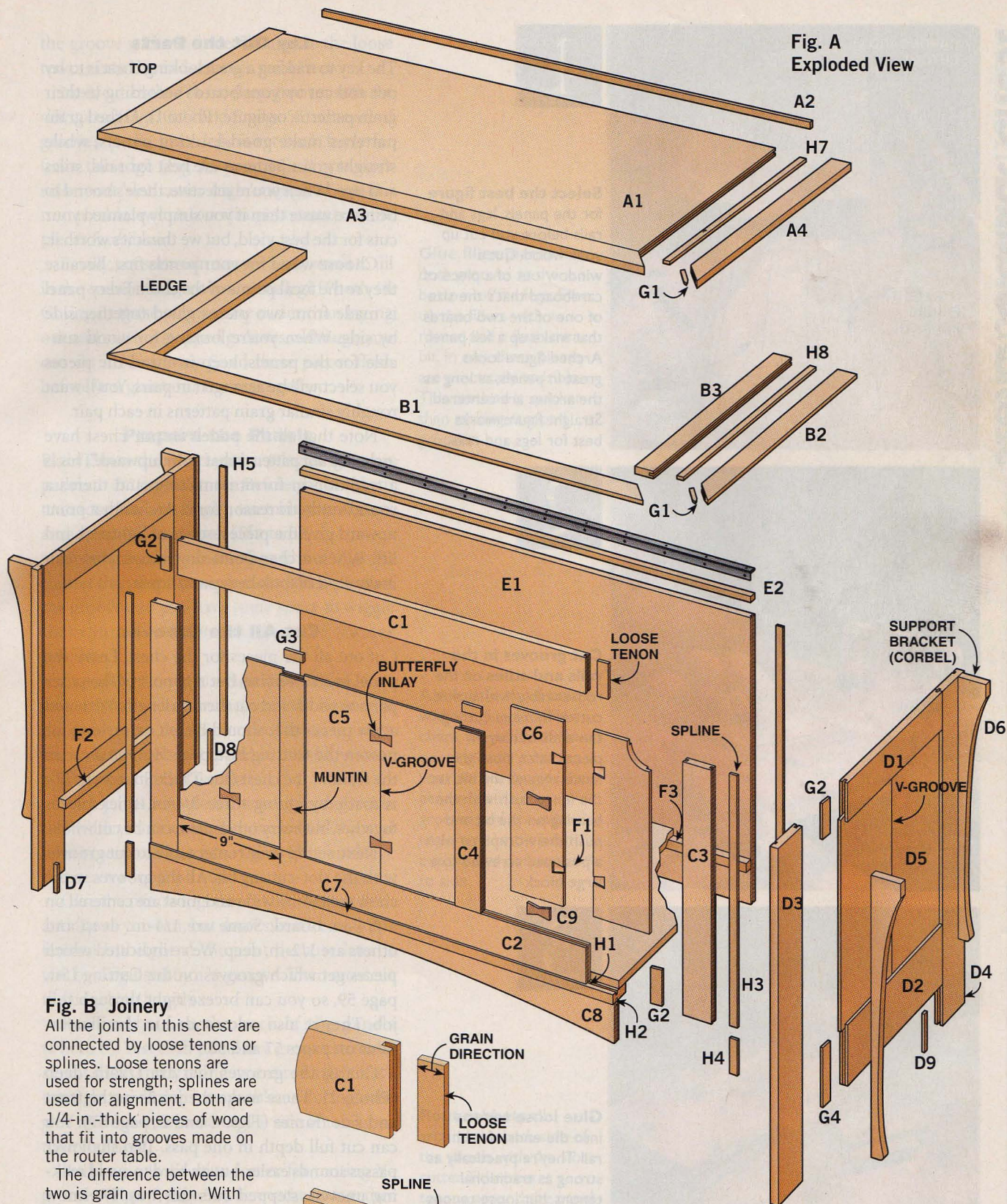
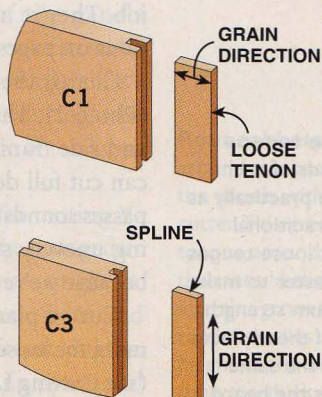
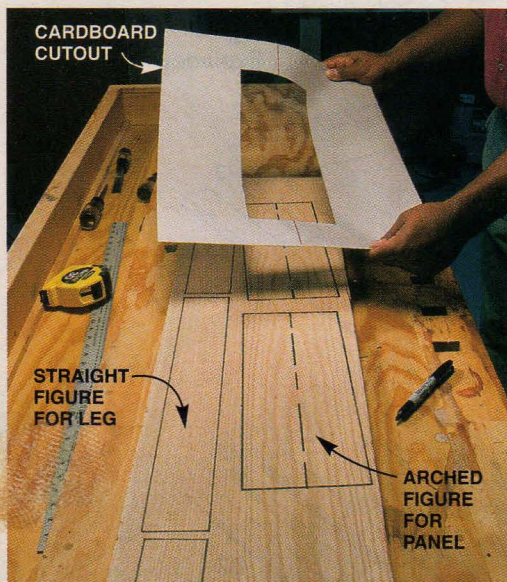


Fig. B Joinery

All the joints in this chest are connected by loose tenons or splines. Loose tenons are used for strength; splines are used for alignment. Both are 1/4-in.-thick pieces of wood that fit into grooves made on the router table.

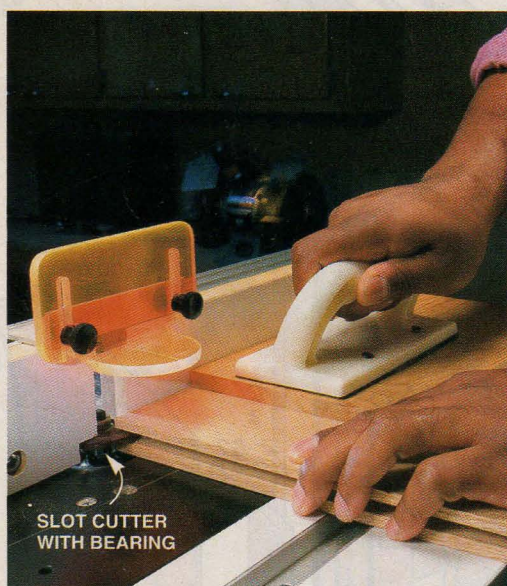
The difference between the two is grain direction. With loose tenons, the grain runs the short way, from edge to edge. With splines, the grain runs the long way, from end to end.





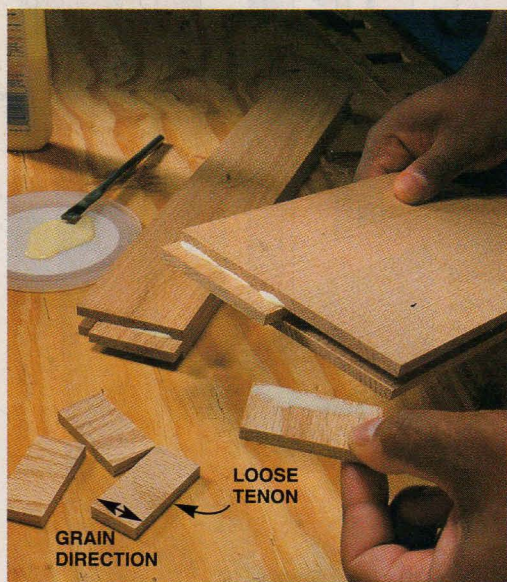
1

Select the best figure for the panels, legs and rails before you cut up your wood. Cut a window out of a piece of cardboard that's the size of one of the two boards that make up a full panel. Arched figure looks great in panels, as long as the arches are centered. Straight figure works best for legs and rails.



2

Cut grooves in the rails and stiles on the router table with a slot cutter. To make cutting the ends of narrow pieces safer, close the fence around the bit, set the fence flush with the bearing on the bit and push the workpiece with a push pad screwed to a large block.



3

Glue loose tenons into the ends of each rail. They're practically as strong as traditional tenons, but loose tenons are much faster to make. For maximum strength, the grain of these pieces should run the same direction as the board they're glued into.

Lay Out the Parts

The key to making a great looking chest is to lay out and cut up your boards according to their grain patterns, or figure (Photo 1). Arched grain patterns make good-looking panels, while straight grain patterns are best for rails, stiles and legs. When you're selective, there's bound to be more waste than if you simply planned your cuts for the best yield, but we think it's worth it.

Choose wood for your panels first, because they're the focal points of the chest. Every panel is made from two pieces glued together side by side. When you're looking for wood suitable for the panels, keep in mind the pieces you select will be arranged in pairs. You'll want roughly similar grain patterns in each pair.

Note that all the panels in our chest have arched grain patterns that point upward. This is a tradition in furnituremaking, and there's a sound aesthetic reason for it. Arches that point upward give the piece a sense of lightness and lift. When arches point downward, they can make a piece look heavy and squat.

Cut All the Grooves

Cut out all the pieces for the chest. Leave the panel parts oversize, but rip most of the other parts to width and cut them to length. We noted a few pieces that should be left extra-long for now in the Cutting List, page 59. One piece in the front of the chest (the Thick Stretcher, C7), is made by gluing three 3/4-in.-thick pieces together, but every other piece can be cut whole.

Next, set up your router table to cut grooves with the slot-cutting bit. All the grooves in the chest are 1/4-in. wide and most are centered on a 3/4-in. board. Some are 1/4-in. deep and others are 1/2-in. deep. We've indicated which pieces get which grooves on the Cutting List, page 59, so you can breeze right through this job. They're also color-coded in the illustrations on pages 57 and 58.

Cut all the grooves that are 1/2-in. deep (Photo 2). These make the joints in the front and side frames (Figs. C and E, page 57). You can cut full depth in one pass. Two shallower passes sounds easier, but it's hard to avoid making uneven, stepped cuts this way. We know because we've done it!

Cut or plane some wood 1/4-in. thick to make the loose tenons that fit into these grooves (see Cutting List, page 59 and Fig. B, page 51). The tenon stock should be thickened to slip in

the groove without force. Then glue the loose tenons into the ends of each rail (Photo 3).

Next, cut all the 1/4-in.-deep grooves with the slot cutter (Figs. C, D and F, page 57). One set of grooves in the front legs is set back fairly far from the edge (Fig. C, page 57). If you can't raise your slot cutter high enough above the router table, switch to a straight bit and cut the pieces face down.

Finally, cut some narrow pieces of wood to fill in the ends of the grooves on the legs (Photo 4). Gluing in these pieces is far easier than laying out and cutting stopped grooves, although you can do it either way. Sand these pieces flush before you glue your frames together.

Prepare the Panels

Plane down the wood you've selected for your panels to 1/2-in. thickness. Before you cut them to exact width and length, assemble your frames and do some measuring (Photo 5).

In length, the panels should be 1/16-in. shorter than the distance between the bottom of the grooves, so you have some space to wiggle them in place when you glue the frames together.

In width, the panels should be 1/4-in. narrower than the distance between the bottom of the grooves, so there's plenty of room for even the widest panels to expand in humid weather and contract in dry weather.

Each panel is made from two pieces. Divide the width you calculated above in half. Rip and joint your panel pieces to this width, but leave them extra-long for now.

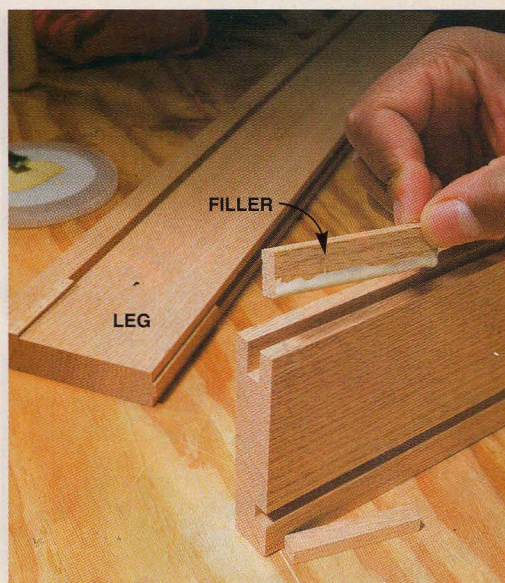
Glue the panels together. Make them as even and flat as you can, but don't sweat a small difference in height at the joint because later it will be disguised by a V-groove. Then crosscut the panels to length.

Rout rabbets on the back of the panels (Photo 6). Test each panel in a groove to make sure it slides freely along its entire length. If it's too tight, you'll run into problems during your glue up. It's better to err on the side of too loose than too tight.

Build a jig to fit your router for cutting V-grooves (Fig. M, page 58). Screw the jig together around one of your panels to ensure a tight fit. You can use the same jig for both front and side panels, although they're different lengths. After routing one set, take the jig apart and resize it to fit the other set. Rout a V-groove

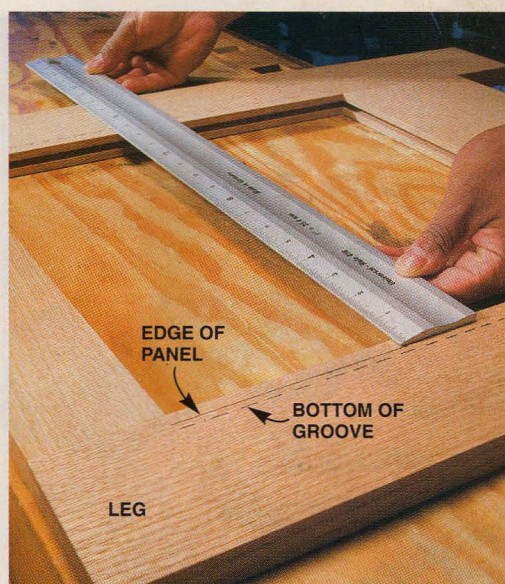
4

Glue filler pieces into both grooves at the bottom of the legs. Even up the fillers with a router and a flush-trim bit. In oak, these pieces are practically invisible. This method is quicker than making stopped grooves.



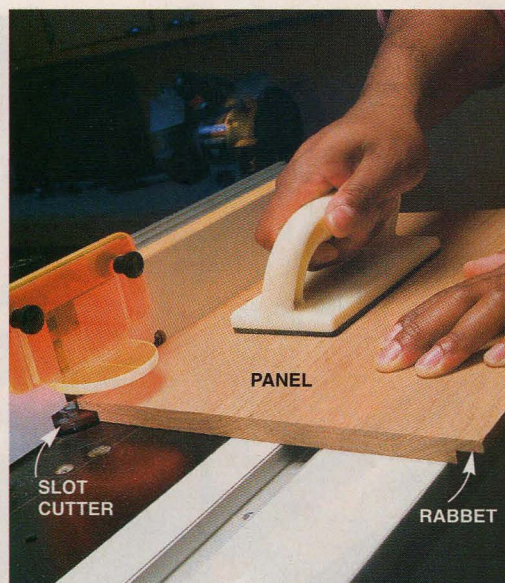
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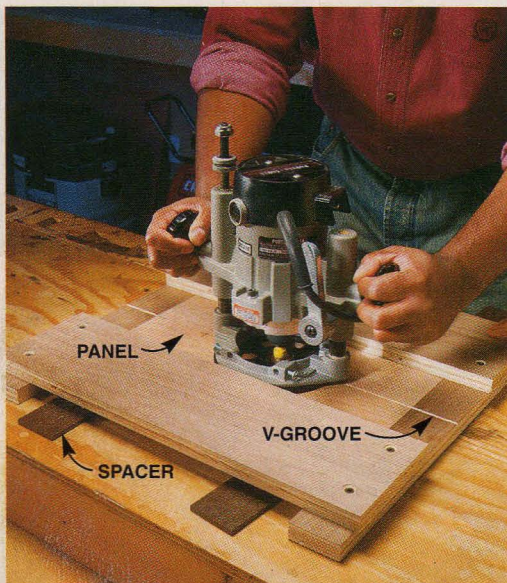
Assemble the frames without glue. Double-check the width of the opening before cutting your panels to size. The panels float in the grooves and are cut undersize so they can expand and contract side to side.



6

Rout rabbets all around the back side of the panels with the slot cutter. This creates a tongue around the panel that should slide easily into the grooves of the rails and stiles. Adjust the height of the bit to fine-tune the thickness of the tongue.





7

Rout a v-shaped groove down the glue joint in the middle of each of the panels. Build a simple jig to ensure the V-groove is perfectly straight and centered on the glue line. Support the panel with 1/4-in. spacers.



8

Stain all the panels before gluing the case together. If you stain the panels after the whole case is assembled, you can't get stain all the way to the outer edges. These edges will show as unsightly bare wood when the panel shrinks in dry weather.

For complete information on how to inlay the butterflies in the panels, see Butterfly Inlay, page 61.



9

Glue the case together. Use flat 2x4s to spread out the pressure of the clamps. While you're tightening the clamps, make sure the case is square with a carpenter's framing square. You can also measure from corner to corner and adjust the clamps until the diagonals are within 1/16 in. of each other.

down the center of each panel (Photo 7). If your glued-up panels were slightly uneven, now they'll appear to be perfectly flush!

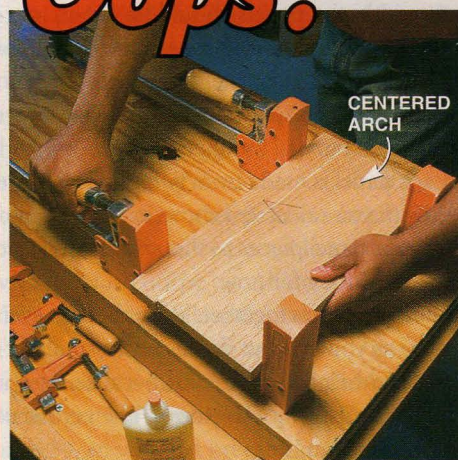
The panels in our chest are dressed up with butterfly inlay (Fig. K, page 58). They're strictly decorative, so you can omit them if you wish. For the complete how-to, see Butterfly Inlay, page 61. Sand the panels to 120 grit.

Finally, stain the panels on both sides (Photo 8). Staining before assembly prevents unsightly stripes of bare wood showing at the edges when the panels shrink in dry weather. After staining, apply a top coat of oil or varnish to both sides of the panels. If your chest will not be stained, apply a top coat anyway to prevent unfinished wood from showing later.

Assemble the Case

Glue the side frames together. Then glue the front frame together, all in one shot. (See Fig. A, page 51 for the position of the muntins. These are the short, upright pieces on either side of the central panel.) Sand the joints flush.

Oops!



Wouldn't you know it, I ran out of good wood for making panels! I used up every piece that had beautifully centered arches, so I had to make the best of the leftovers.

I did have an attractive board left, but the arches were off-center. So I cut a narrow strip from further down that board and glued it to the edge. The result: a perfectly centered arch. Cutting the narrow piece so its grain is at the same slight angle as the wider board makes the joint invisible.

Cut the thick stretcher (C7), arched stretcher (C8) and plywood back panel (E1) to exactly the same length as the assembled front frame. If you don't have a tablesaw with 50-in. rails to crosscut a big sheet of plywood, rough cut the plywood with a jigsaw and then trim it to exact length with a router, flush-trim bit and a straightedge (See Q & A, Square-Up a Large Tabletop, page 16).

Cut grooves in the end of the arched stretcher on the router table (Fig. F, page 57). Cut grooves in the ends of the plywood back with a straight bit or slot cutter in a hand-held router (Fig. D, page 57). Either way, use a fence with your router.

Make all the spline pieces (see Cutting List, page 59 and Fig. B, page 51). Unlike the loose tenons, their grain runs the long way. You can make either short pieces or one long piece of spline.

Cut the curve in the arched stretcher (C8, Fig. P, page 59). Glue the thick stretcher (C7) and the arched stretcher to the front frame. Be sure that their ends line up with the frame.

Now for the big glue-up (Photo 9). Assembling the whole case isn't hard because there are only four parts to put together, but an extra set of hands is useful.

Add the Bottom

Screw and glue three ledger strips (F2 and F3) inside the case (Fig. L, page 58). The ledgers support three sides of the bottom. Mount the ledgers flush with the thick stretcher (C7), which supports the front edge of the bottom.

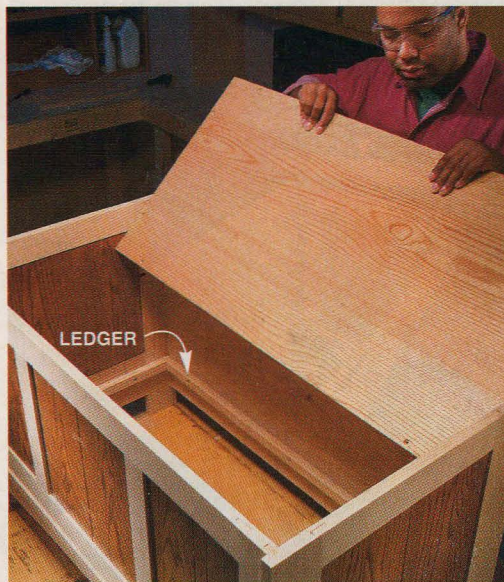
Cut the bottom to size, drill holes for screws to fasten it to the ledger strips and install it in the chest (Photo 10). When you're done building the entire chest, remove the bottom to make staining and finishing easier. Mask off the top of the ledgers, and the bottom, where it sits on the ledgers. When you reinstall the bottom, put glue on the ledgers before installing the screws.

Build the Ledge

The ledge is a three-sided frame that is screwed and glued to the top of the case (Fig. A, page 51). With the case of the frame assembled, you can now cut the pieces (B1, B2 and B3) to exact length and width. Each outer piece has a large bevel on its lower edge (Fig. J, page 58). Rip this bevel on the tablesaw and sand it smooth. Then cut the miters.

10

Slide the plywood bottom into the case. Fasten it with screws to ledger strips that go around the inside of the case. Fastening the bottom stiffens the case, so it can withstand getting pushed across the floor. Remove the bottom later to make staining the case easier; then glue and screw the bottom back in place.



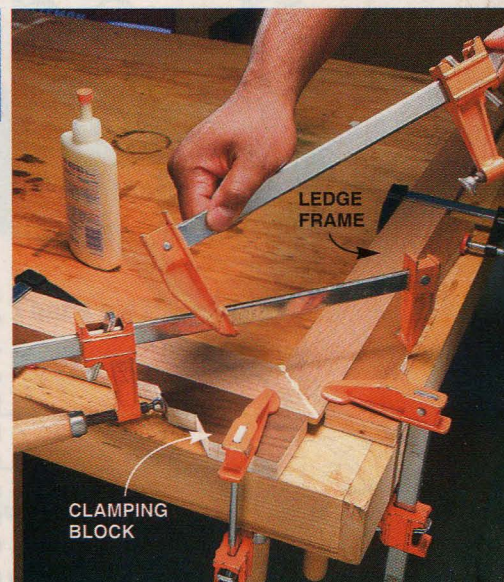
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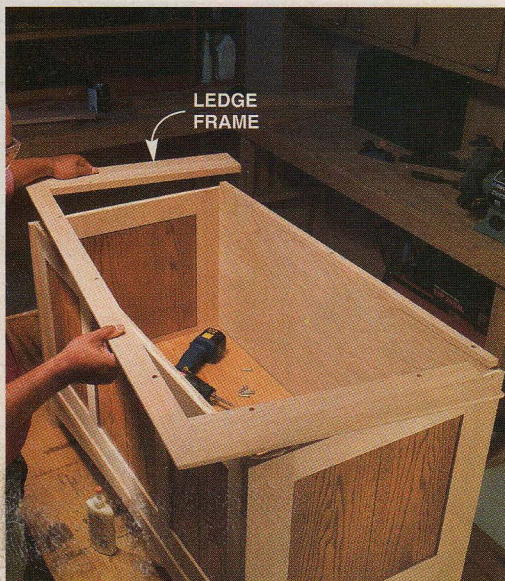
Cut shallow grooves into the mitered ends of the pieces that form a ledge on top of the case. These grooves receive a loose tenon that aligns and strengthens the joint. Guide the workpiece into the cutter along a mitered block.



12

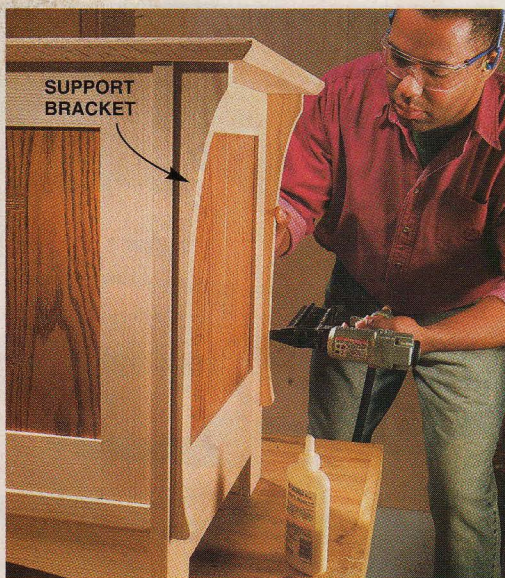
Glue the mitered pieces together with shop-made clamping blocks. Drawing a miter tight can be tricky, and these frame pieces have a large bevel on their lower edge that complicates matters. The clamps nearest the miter touch both the clamping blocks and the frame pieces to keep the assembly flat.





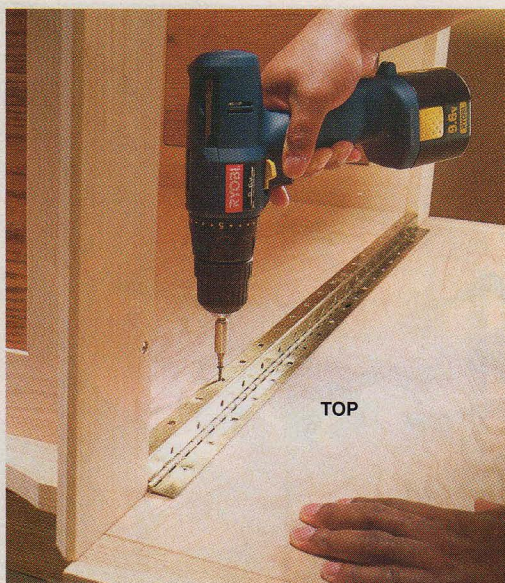
13

Add the ledge frame to the case. The ledge covers all the grooves, splines and any uneven joints along the top of the case.



14

Add support brackets onto the ends of the case. Attach them with glue and pin nails, and clamp them with long pipe clamps. These brackets, or corbels, support the overhanging ledge on the top of the case.



15

Attach the hinge to the top and case. A long continuous hinge is easy to align and install. We liked this particular hinge because it wraps over the plywood back, allowing you to run screws into the back's face and edge for extra strength.

The miter joints are reinforced with short loose tenons that are glued into 1/4-in.-deep grooves. Cut grooves in the miters on the router table with the slot cutter (Photo 11). Then cut grooves on each pair of side pieces (B2 and B3) for a long spline (Fig. J, page 58). This spline aligns the two pieces when you glue them together later.

Make a pair of clamping blocks (Fig. N, page 58) and glue together the outer members of the frame (Photo 12). This kind of clamping block tends to slip a bit as you tighten the clamps across the miter, but if you wet the edge that contacts the frame, it'll stay put.

Glue the inner sides (B3) to the frame and sand the joints even. Counterbore holes for screws (Fig. J, page 58) and glue and screw the frame to the case (Photo 13).

Glue and screw a narrow strip of wood (E2) to the top of the back (Fig. J, page 58). The purpose of this piece is to raise the hinge so it's flush with the top of the ledge. This strip holds hinge screws more securely than plywood.

Build the Top

The top (A1) is a piece of plywood framed with solid wood on all four sides for durability (Fig. A, page 51). There's a thin piece of solid edging on the back (A2) and wide, mitered pieces on the front and sides (A3 and A4). The mitered pieces should be planed to the same thickness as your plywood, which is often a bit less than 3/4 in.

Cut the plywood to final width, but leave it 1 in. longer in length. Glue the thin edging on the back, sand it flush and trim the top to final length.

Cut the mitered pieces to length. With a V-bit, rout a shallow bevel along the top edge of these pieces and the plywood (Fig. H, page 58). Then cut grooves for splines in each piece.

Glue the front piece (A3) to the plywood top. Be sure to remove the glue squeeze-out from the V-groove before it hardens. Then glue on the side pieces and sand the miters even.

Final Assembly and Finishing

The overhang of the ledge is supported by arched support brackets, called corbels (D6, Fig. A, page 51). Cut the corbels to size (Fig. G, page 58) and glue them onto the sides of the case (Photo 14). Both corbels are set back the same distance from the edge of the side frame

(Fig. D, below). Attach the corbels with pin nails and long pipe clamps.

Install the hinge on the chest's top. We recommend a special wrap-around continuous hinge made for storage chests (see Sources, page 98). Lay the chest down to attach the hinge to its back (Photo 15). Finally, install two child-safe lid supports to prevent the top from slamming shut on your fingers when you close it (see Sources, page 98). These supports also prevent the top from opening too far.

Once all is working well, remove the top and bottom and apply stain and finish to the whole chest (Photo 16). We used one quart of Zar oil-based wood stain, #120 Teak Natural (see Sources, page 98). This produced a color that was pretty close to commercially made Mission oak furniture.

16

Stain the entire case.

Raise the case off your worktable with blocks of wood that have screws driven through them. Now you can apply stain all the way around the bottom of the legs without smearing.



Fig. C
Grooves for the Frames

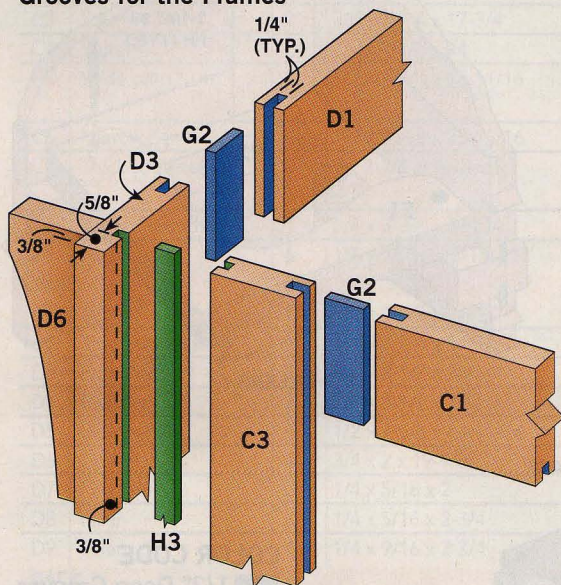


Fig. E
Grooves for the Muntins

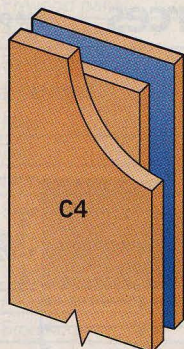


Fig. D
Grooves for the Back

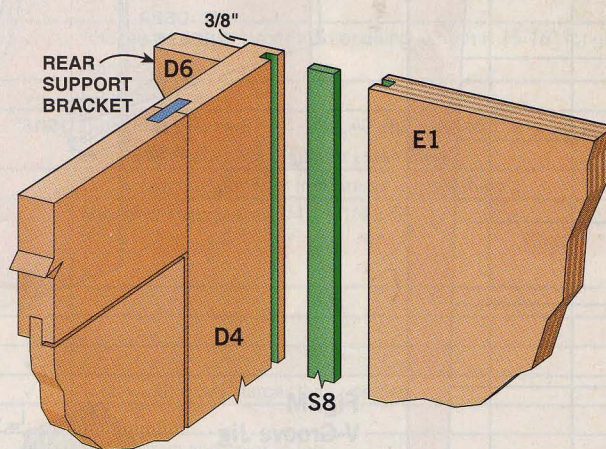
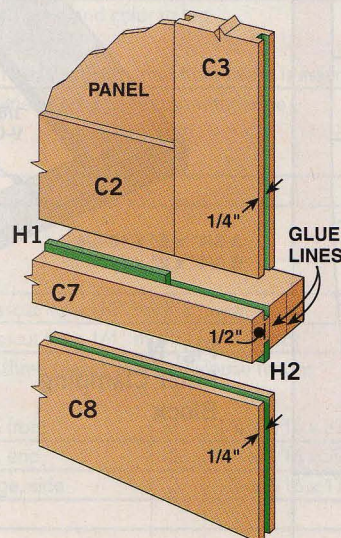


Fig. F
Grooves for the Front Rails and Stretcher



COLOR CODE

- 1/2" Deep Grooves
- 1/4" Deep Grooves

Fig. G
Pattern for Support
Brackets

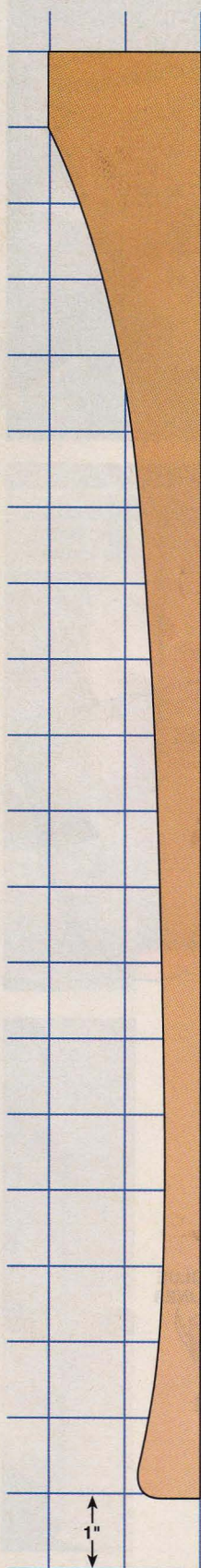


Fig. H
Top Details

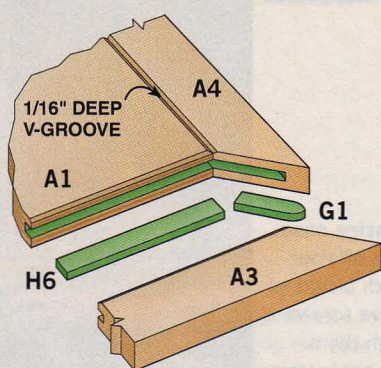


Fig. K
Panel Details

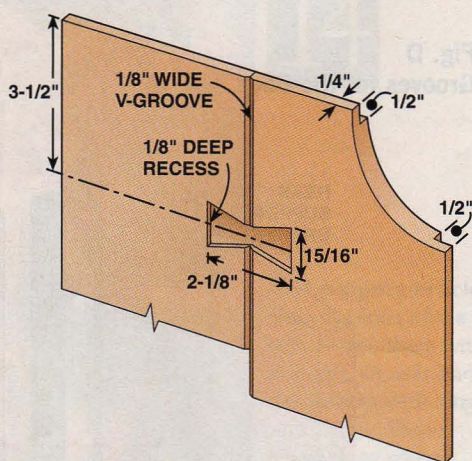


Fig. M
V-Groove Jig
for the Panels

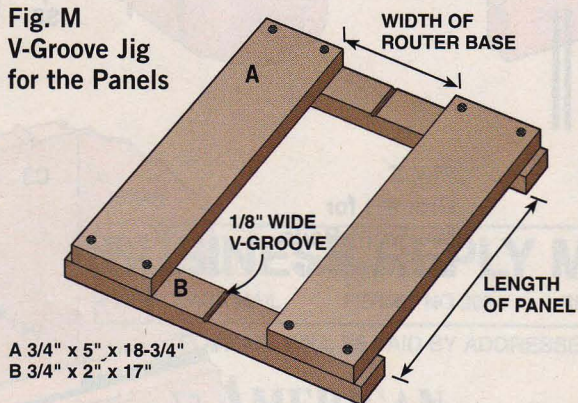


Fig. N
Miter Clamping
Block

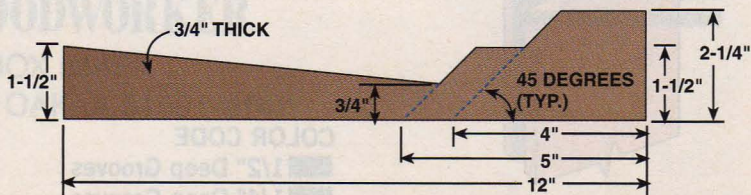


Fig. J
Ledge and Hinge Details

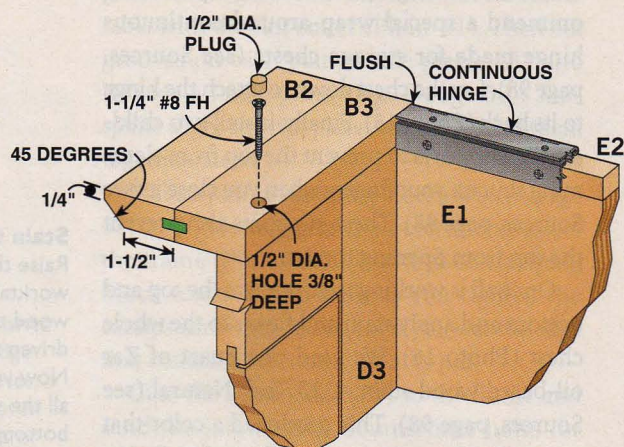
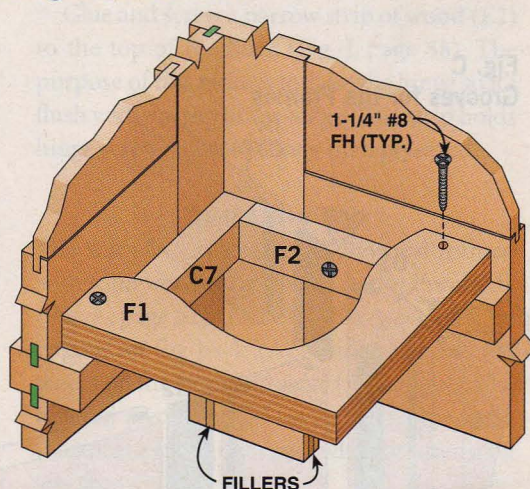


Fig. L
Ledgers and Bottom



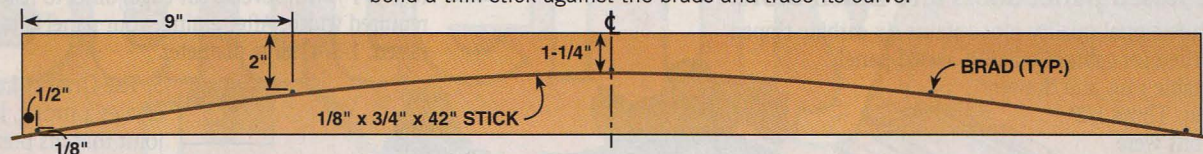
COLOR CODE

- 1/2" Deep Grooves
- 1/4" Deep Grooves

Sources

See page 98

Fig. P Pattern for Arched Stretcher To draw the arch, nail five brads on the back side of the stretcher. Then, bend a thin stick against the brads and trace its curve.



CUTTING LIST

Overall Dimensions: 25-3/4"H x 48-1/4"W x 23-5/8"D (all dimensions are in inches)

Part	Name	Qty.	Dimensions	Groove Depths		Comments
				1/4-in.	1/2-in.	
TOP						
A1	Plywood panel	1	3/4 x 21-1/2 x 44-1/4	✓		
A2	Edging	1	3/4 x 1/8 x 44-1/4			Plane to same thickness as plywood
A3	Front	1	3/4 x 2 x 48-1/4	✓		Plane to same thickness as plywood
A4	Side	2	3/4 x 2 x 23-5/8	✓		Plane to same thickness as plywood
LEDGE						
B1	Front	1	3/4 x 2 x 47-1/4	✓		Cut to exact length after case is assembled
B2	Outer side	2	3/4 x 2 x 22-1/4	✓		Cut to exact length after case is assembled
B3	Inner side	2	3/4 x 2 x 20-1/4	✓		Cut to exact width and length after case is assembled
FRONT						
C1	Top rail	1	3/4 x 2-1/2 x 34-3/4		✓	
C2	Front bottom rail	1	3/4 x 2-1/2 x 34-3/4	✓	✓	1/4" groove on bottom edge
C3	Stile	2	3/4 x 2-1/4 x 17-3/4	✓	✓	
C4	Muntin	2	3/4 x 2 x 12-3/4		✓	
C5	Wide panel	2	1/2 x 6-3/4 x 13-11/16		✓	Total width is 3/4" larger than opening, length is 15/16" longer than opening
C6	Narrow panel	4	1/2 x 4-7/8 x 13-11/16		✓	Same as above
C7	Thick stretcher	1	1 x 2-1/4 x 39-1/4	✓		Glue three pieces 3/4 x 1-1/4 x 40, thickness to 1" and cut to exact length after front frame is assembled
C8	Arched stretcher	1	3/4 x 3-3/8 x 39-1/4	✓		Cut to exact length after front frame is assembled
C9	Butterfly	6	1/8 x 15/16 x 2-1/8			Make from two pieces 3/4 x 1-1/4 x 16
SIDES						
D1	Top rail	2	3/4 x 2-1/2 x 14-1/2		✓	
D2	Side bottom rail	2	3/4 x 5-1/4 x 14-1/2		✓	
D3	Front leg	2	3/4 x 3-1/2 x 24-1/4	✓	✓	
D4	Back leg	2	3/4 x 3-1/2 x 24-1/4	✓	✓	
D5	Side panel	4	1/2 x 7-5/8 x 14-11/16		✓	Total width is 3/4" larger than opening
D6	Corbel	4	3/4 x 2 x 19-1/8			
D7	Filler	2	1/4 x 5/16 x 2			Match grain and color to leg
D8	Filler	2	1/4 x 5/16 x 2-3/4			Match grain and color to leg
D9	Filler	4	1/4 x 9/16 x 2-3/4			Match grain and color to leg
BACK						
E1	Plywood panel	1	3/4 x 21-1/2 x 39-1/4	✓		Cut to exact length after front frame is assembled
E2	Spacer	1	3/4 x 9/16 x 39-1/4			Thickness so hinge is flush with ledge
BOTTOM						
F1	Plywood panel	1	3/4 x 19-1/2 x 39-1/4			
F2	Side ledger	2	3/4 x 1 x 17-1/4			
F3	Back ledger	1	3/4 x 1 x 39-1/4			
LOOSE TENONS						
G1	Miter	4	1/4 x 2 x 7/16			
G2	Rail	20	1/4 x 2 x 15/16			Crosscut from 1/4" thick, 2" wide stock
G3	Muntin	4	1/4 x 1 x 15/16			Crosscut from 1/4" thick, 1" wide stock
G4	Side bottom rail	4	1/4 x 4-3/4 x 15/16			Use three pieces of G2-size loose tenons
SPLINES						
H1	Lower front rail	1	1/4 x 7/16 x 33-3/4	H6	Top, front	2 1/4 x 7/16 x 33-3/4
H2	Arched stretcher, top	1	1/4 x 7/16 x 39-1/4	H7	Top, end	2 1/4 x 7/16 x 39-1/4
H3	Front leg	2	1/4 x 7/16 x 17-3/4	H8	Ledge, side	2 1/4 x 7/16 x 17-3/4
H4	Arched stretcher, end	2	1/4 x 7/16 x 3-3/8			
H5	Back leg	2	1/4 x 7/16 x 21-1/2			

AW

Butterfly Inlay

By Tom Caspar

Make a perfect fit with a shop-made template.

Don't you just love it when something that looks extremely difficult turns out to be oh-so easy? Making butterfly inlay with a plunge router is a good example. The technique is very easy to learn. All it takes is \$40 for a set of router accessories and some 1/4-in. plywood or hardboard to make your own template.

Butterflies are a prominent feature of our Mission blanket chest, page 48. They appear to bind two pieces of wood together, but they're really just for show and are only 1/8-in. thick. Few pieces of authentic Mission-style furniture were dressed up with butterflies, but in recent years they've become a common decorative theme in reproduction Mission furniture, adding a light touch to heavy-looking pieces.

Your Router

The easiest way to make inlay is with a plunge router, but it's possible to use a fixed-base router instead. The only problem with using a fixed-base router is that you'll have to tip it into the cut by hand, which takes some practice. This technique may also put a good deal of stress on a fragile, \$16 router bit.

Whatever kind of router you use, its base must accept a Porter-Cable-style template guide. This is a stationary ring that screws onto the router base. If your router's base doesn't have a hole sized for a Porter-Cable-style template guide, you can buy an adapter base (\$16, see Sources, page 98).

The Inlay Kit

Inlay kits are available from several manufacturers, but they're all very similar (see Sources, page 98). You get a template guide, a 1/8-in.-thick collar that snaps onto the guide and a 1/8-in. solid-carbide bit. The bit is usually a spiral downcut that cuts exceptionally clean, chip-free edges.

The inlay set we used also includes a centering pin for installing the template guide in your router base. If the guide isn't centered, the inlay may not fit well in the recess.

The complete kit for making inlay and the recess it fits into costs about \$40.

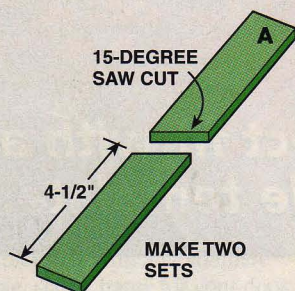


Butterfly Inlay

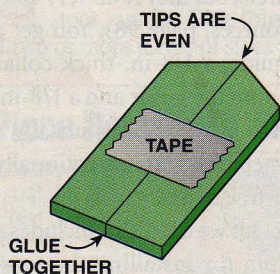
1 Make the Template

All you need is one template to make both the inlay pieces and the recesses they fit into. Our shop-made template produces perfectly symmetrical, straight-sided butterflies, but you can modify the template for any shape or size butterfly you want. You can also buy a template that has six different sizes of butterflies (\$25, see Sources, page 98).

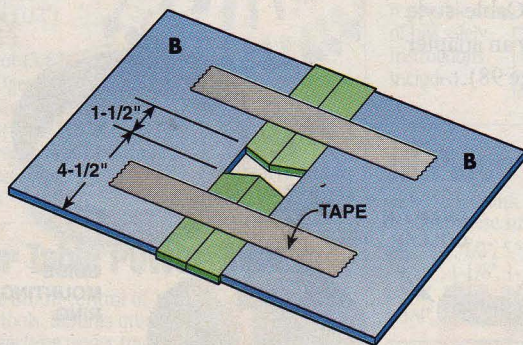
The material you make the template from should be 1/4-in. thick. If it's thinner, the router's template guide will bottom out on your workpiece. Most of the material you probably have on hand, such as plywood or hardboard, is actually less than 1/4-in. thick. You can use it, however, if you add a shim, as shown in Step 4, at right.



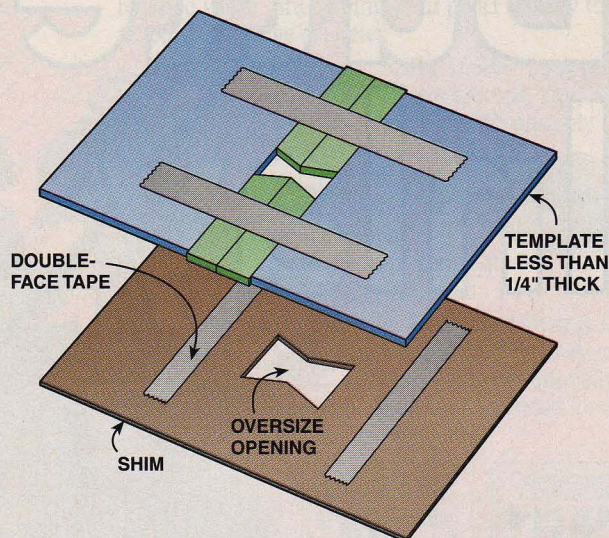
Make two rectangles of 1/4-in. material (A) and cut them in half at a 15-degree angle.



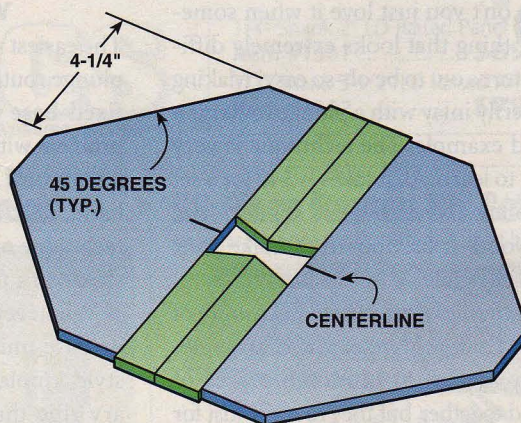
Flip one half of each rectangle over and glue it to the other half. You don't have to clamp them. Simply apply a thin bead of glue to one edge and rub the two pieces together. Pull the joint tight with a piece of masking tape and set them on a flat, non-stick surface, such as a piece of melamine or waxed paper.



Cut two larger rectangles (B) from the same material and glue all four pieces together. Use the same rub-and-tape technique. Make sure all the top surfaces are even.



If your material is less than 1/4-in. thick, shim the template with cardboard, plastic laminate, mat board or whatever you have on hand. The total thickness of the template and shim should not exceed 5/16 in. Cut a hole in the shim that's about 1/8-in. larger than the hole in the template. Glue or tape the shim to the template.



Draw centerlines on the template. (If you're using dark hardboard, first apply a dab of white correction fluid to make these lines more visible.) Cutting the corners off the template makes it easier to clamp the template to a workpiece.

CUTTING LIST

Part	Qty.	Dimensions
A	2	1/4" x 1-1/4" x 9-1/2"
B	2	1/4" x 6" x 10-1/2"
Shim	1	1/32" to 1/8" x 10-1/2" x 14"

Sources

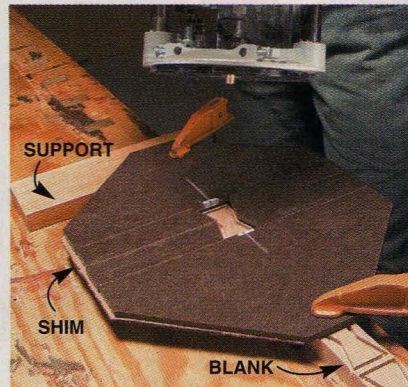
See page 98

2 Rout the Butterflies

Prepare some straight-grained blanks $\frac{3}{4}$ in. x $1\frac{1}{4}$ in. x 16 in. It's a good thing to have a little bit of contrast in color or grain pattern between the butterflies and the surrounding panels. Butterflies made of white oak go well with panels made of red oak, for example.

Attach the template guide to your router base and install the bit. Adjust the plunge depth of your router so it cuts $\frac{1}{8}$ -in. deeper than the template and shim.

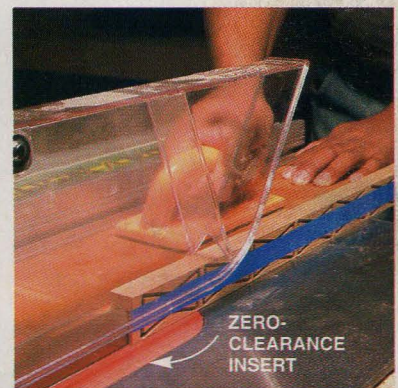
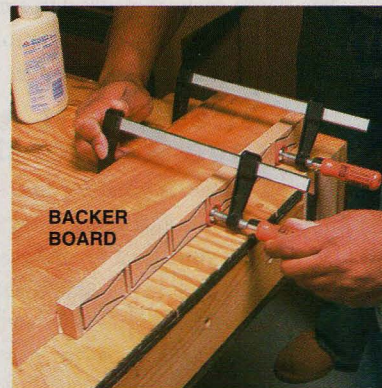
Clamp the template to a blank. You can center it by eye. To cut butterflies near the ends of the blank, support one side of the template with another piece of $\frac{3}{4}$ -in. wood. Set the router on the template and butt the guide against one of its inside edges. Plunge the bit and follow the pattern clockwise.



To make butterflies, just use the template guide alone.

3 Cut the Butterflies

Stand the butterfly blank on edge and glue it to a backer board about 6-in. wide. Run a piece of tape along the top of the butterfly blank. Then put a zero-clearance insert in your tablesaw, which is essential to make this cut safely. Rip a $\frac{1}{8}$ -in.-thick strip from the blank, remove the tape, and you've got six identical loose inlay pieces.

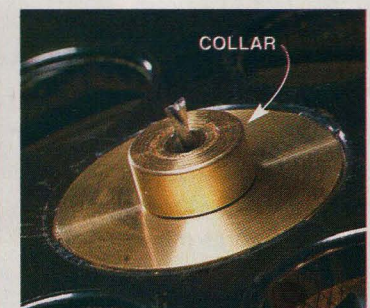
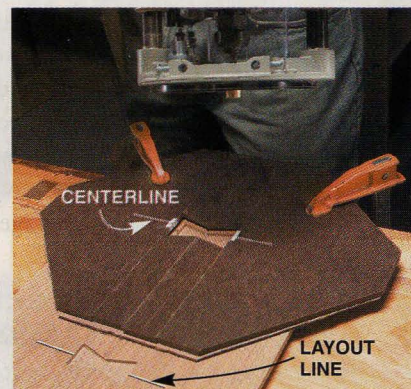


4 Rout the Recess

Put the collar on the template guide. Adjust the plunge depth of your router to cut a recess $\frac{1}{32}$ in. to $\frac{1}{64}$ in. shallower than the thickness of the butterfly inlay.

Clamp the template to the workpiece. For vertical alignment, match the template's center glue line with a centerline drawn on the workpiece. For horizontal alignment, match the centerlines on the template with layout lines on the workpiece.

Rout the recess. Take it easy, because the $\frac{1}{8}$ -in. bit is fragile.

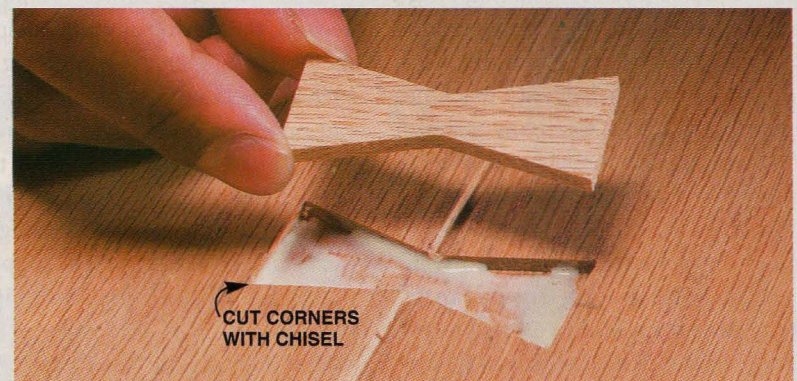


To make recesses, add the collar to the template guide.

5 Glue the Butterflies

Cut the corners of the recess with a chisel or knife. They'll be rounded after routing, but they must be cut to acute angles so the inlay fits.

Spread a thin layer of glue in the recess, put in the inlay, scrape off any glue squeeze-out, and cover the inlay with a small piece of white paper. Clamp a thick board over the inlay and let the glue dry. The paper will absorb any further glue squeeze-out. After the glue dries, remove stuck pieces of paper by lightly wetting them. Level the inlay with a block plane or by scraping and sanding. **AW**



Do-Everything Routers

While some woodworkers have the luxury of changing routers instead of bits, most of us start off with one machine, and we want it to do as much as possible. This leaves many woodworkers asking, "Should I buy a fixed-base or plunge-base router?" With the tools we tested here, the answer is "Yes!"

We tested four brands of routers with interchangeable fixed and plunge bases, from Porter-Cable (who pioneered this category), Bosch, DeWalt and Makita.

These are Fantastic "Regular" Routers

Leaving aside their use as plunge routers, these machines are hard to beat as day-in-day-out, general-purpose, fixed-base routers. They have variable speed and plenty of power, convenient features such as self-releasing collets and easy bit changing, plus excellent balance and comfortable handles. For common everyday router operations such as edge-profiling, template work, trimming, and so forth, they are ideal. These are all top-of-the-line, professional-quality machines that will serve you for many years of woodworking. We know, because we've used them for years in our own shops.

Electronic variable speed is an important feature of these tools. It's essential for safely using larger diameter bits, such as big round-overs and panel-raising bits, which need to be run at lower speeds. It's also very useful to use a low

rpm with smaller bits. The low rpm gives you a feeling of greater control over the router. In some situations it also reduces burning of the edge.

Do They Cut it as Plunge Routers?

A plunge router is great for mortises, stopped dados and inlay work; any place where you need to make a cut with a distinct starting and stopping point. The question is, how well do these machines stack up against dedicated plunge routers?

The answer is: just fine. In fact, the turrets and depth-stop rods on these machines are better than on some dedicated plunge routers. All of these routers permit fine-depth adjustment and smooth plunging. Although some are better in these regards than others (see chart and descriptions, pages 68 through 71).

(Almost) Perfect for Router Tables

Routers like these are great for router table use. First off, it's easy to change bits because you can remove the motor. Second, the powerful variable-speed motors allow them to handle big bits such as panel raisers. And finally, you can purchase a second fixed base for \$40 to \$70 and mount it in your table permanently. That way, you can jump from hand-held routing to using the router table in seconds, just by swapping the motor. Not essential, but mighty handy.

The only reason that these routers aren't perfect for router table use is that

they're not powerful enough for prolonged heavy use.

The Perennial Issue of Power

The horsepower ratings given by the manufacturers of these machines show a range from 1-3/4 hp to 2-1/4 hp. Don't get caught up in these numbers, however. If you compare the amperage draw for these machines (see chart, pages 70 and 71), you'll see they're very close. As part of our tests, we made oak raised-panel doors using each router and found that all four are up to the job, as long as you use the lowest speed and make several passes. (In oak, we took three.) We could detect no difference in power between the different brands.

Although these routers are plenty powerful, if you want to make doors in large quantities or very quickly, none of these machines is the best choice. You'll be better off with a 3-hp router or a shaper. (For a review of 3-hp routers, see AW #78, February 2000, page 75.)

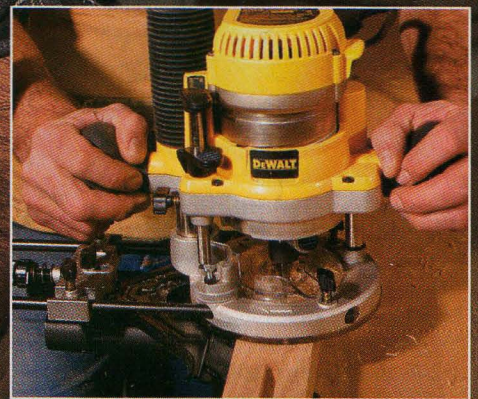
Look at the Whole Package

Each of these routers is available as a package with at least the motor, a fixed base and a plunge base. Accessories may or may not be included (or even available) and the prices for them vary. We've listed two prices for you: the basic price and the "package" price that includes major accessories. This gives you a second way to compare the cost of these machines. Note: Manufacturers could change these packages or prices at any time.

*High-tech
routers with
interchangeable
bases can do
just about
everything*



fixed base...



plunge base...



and router table

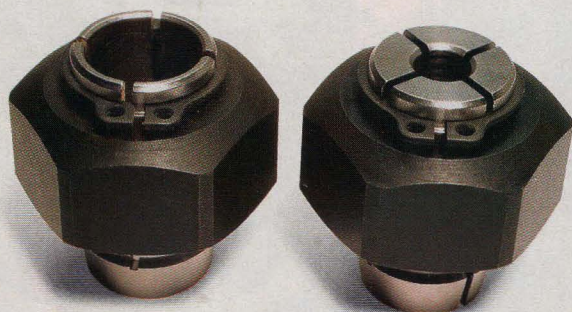
By George Vondriska

Features of All Four Brands



Variable Speed and Soft Start

Electronic variable speed (EVS) allows you to dial the router to a given speed, while the circuitry monitors the motor to ensure it maintains that speed. With a heavy load, the circuit sends more juice to the motor so it can maintain the speed you selected. Along with EVS comes "soft start," which ramps the router up to speed slowly instead of instantly accelerating from 0 to full rpm. This makes hand-held cuts less unnerving.



1/2-in. and 1/4-in. Collets

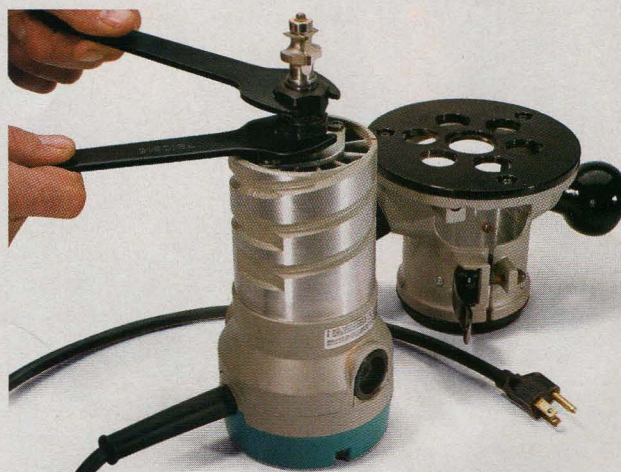
These collets allow you to handle both large bits, which are only available with 1/2-in. shanks, and small bits, which might be difficult or impossible to find with the larger shank. Whenever you can, though, you should buy bits with the 1/2-in. shank; they're stiffer and stronger.

All of these routers have a self-releasing collet. When you loosen the collet, it pops the bit free. Very handy.



Cam-Lever Base Clamp

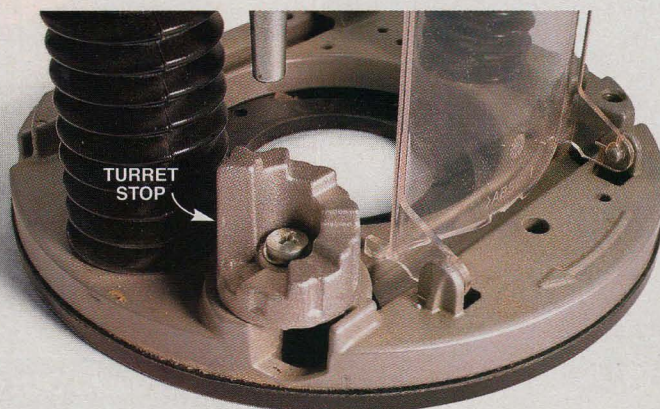
A lever-operated clamp on the fixed base makes it easy to adjust the motor and lock it in position. Snap it open, snap it closed, and you're good to go. This is a huge improvement over the threaded locks found on many older fixed-base routers.



Easy Bit Changes with Removable Motors

Obviously, in order to change bases, you have to be able to remove the motor from the base. This feature is found on all four of these routers, but not on fixed-base routers in general.

A removable motor makes it much, much easier to change bits, especially in a router table.



Standard Plunge Features

When in their plunge mode, all four routers have all the plunge-router features. They have turret stops for making cuts of increasing depth, and an adjustable depth stop.

Differences Between the Brands



Tool-Free Base Change is Handy

On the Bosch and DeWalt routers, you can change from fixed-base to plunge-base with no tools. The same cam-lever clamp used on the fixed-base is on the plunge-base. This is the system we prefer. The Makita and Porter-Cable machines require a screwdriver and Allen wrench, respectively, to lock the motor in the base. The process is especially cumbersome on the Porter-Cable machine because of the awkward location of the locking bolt.

While you won't be changing bases every time you handle the router, the easier it is to make the switch, the better.



Below-Base Dust Collection

Routers make dust, and being able to capture it at the source is an important feature.

All four of these machines have excellent dust collection during plunge-base applications. When a shop vacuum is connected to the dust shroud, little or no dust will be left in a dado or mortise.

For fixed-base applications, two systems are used for dust collection. One involves a shroud that fits above the base (DeWalt and Makita). In our experience, this system is less than effective. The approach we prefer is a basket that attaches to the base and surrounds the bit. It is available on the Bosch and Porter-Cable systems, although the Bosch version is the easier of the two to attach.



Sub-Base Systems Vary

The plastic sub-bases on routers must perform two functions. They must have an opening for the bit—even a very wide bit—to pass through, and they must be able to hold screw-in template guide bushings. Three models, DeWalt, Makita and Porter-Cable, have two interchangeable sub-bases, one with a large opening, one with a smaller opening that accepts guide bushings. The Bosch system is simpler: One sub-base, with a large opening, and guide bushings that fit this opening with an adapter. No changing of sub-bases required.



Does the Switch Rotate?

On two of the routers, the Bosch and DeWalt, the switch stays in the same position relative to the handles as you change the depth of cut. This is the system we prefer, for safety and convenience. On the Makita and Porter-Cable routers, depth-of-cut adjustments are made by rotating the motor. You're basically screwing it in and out of the base, and because the switch is on the motor, it may end up at any position, including places where you have to remove one hand from the tool to turn it off.

Centering the Router

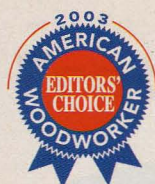
Few router motors are perfectly concentric with the router base. Is this a big deal? Sometimes, maybe; usually not.

Concentricity is not a factor when using router bits with bearings. It does come into play if you're using a template guide bushing, or guiding the router by running the edge of the base against a fence. In these cases, if the motor and base are not perfectly concentric, any rotation of the router base during the cut can slightly shift the position of the bit in the cut.

You can learn to keep the handles and the base in a consistent position during a cut, but why take a chance?

Bosch, DeWalt and Makita routers do away with this problem altogether by allowing you to center the sub-base on the motor. It's easy to do and once done, you don't have to think about it. This is a secondary feature, but it's worth considering.





Bosch 1617EVSPK

Pros

- Very comfortable plunge-base handles, and big, comfortable wooden handles on the fixed base.
- One of only two machines in this category that offer a below-the-base dust collection basket (\$40). It's very effective at grabbing the dust made when you're doing edge forming.
- The cursor on the plunge-base is very easy to read and use, and is head and shoulders above others in this class.
- The on/off switch stays in a fixed position as depth-of-cut is changed.
- The Bosch router has the largest diameter base. This makes it easier to keep the router flat on your work.
- Tool-free design makes base swapping easy.
- This is one of only three machines that allow centering the sub-base on the router.
- This is the only plunge base with dust shields on the columns. They prevent dust from clogging the plunge mechanism.
- This router has the only fence (\$40) that also performs as a circle-cutting jig. The fence includes a micro-adjust for fine-tuning position.
- The Bosch accessory fixed-base (\$60) includes extra-long screws for router-table mounting. It also comes with an extension handle for the micro-adjust.
- Sub-base with large opening, which accepts template guide bushings, even other brands, with an \$8 adapter.

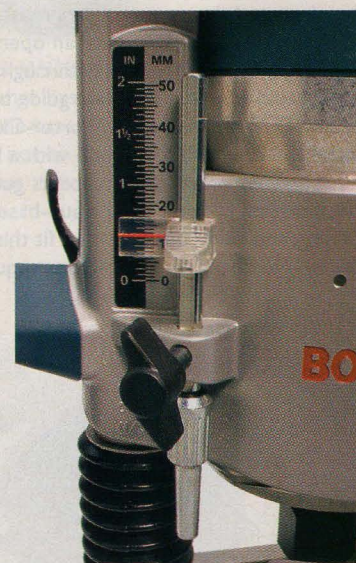
Cons

- The base-centering cone (\$8) is not included with the router package.

Bosch 1617EVSPK	\$240
Motor, fixed base, plunge base	included
Sub-base with large hole	included
Fence	\$40
Extra base for router table (RA1164-includes extension handle)	\$60
Dust-collection kit (RA1173)	\$40
The whole package	\$380



An accessory fixed base (\$60) is designed for router-table use, with extra-long screws and an extension knob for easier adjustments to cutting depth.



The depth-of-cut cursor on the Bosch plunge-base is extremely easy to read and adjust.

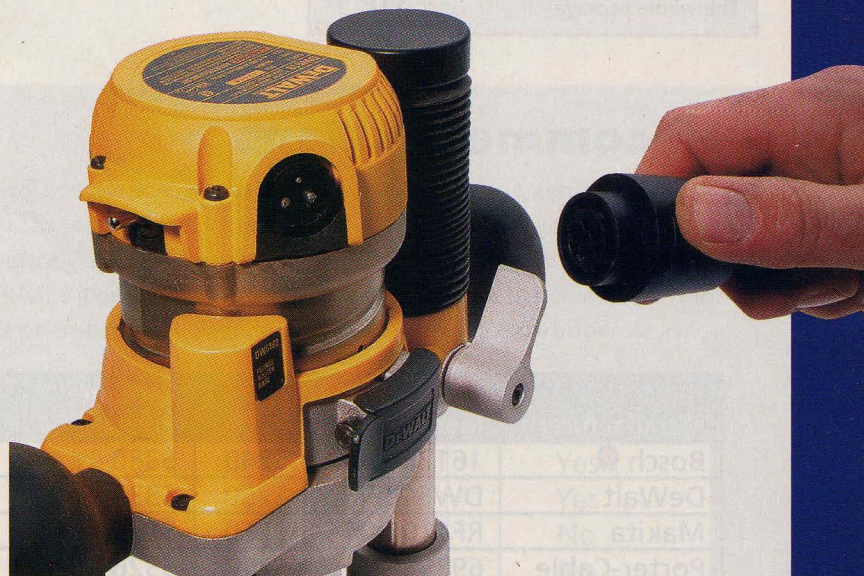
DeWalt DW618PK

Pros

- This machine is the newest entry in the category. The removable cord is an innovative convenience, especially when disconnecting power for bit changes.
- Setting depth-of-cut in the fixed base is easy, and the on/off switch is easy to reach while keeping both hands on the handles.
- All the sub-bases are clear, making it easy to watch the cutting action.
- This machine allows sub-bases to be centered on the motor.
- Tool-free base changes make base swapping easy.
- The fence includes a micro-adjust to simplify fine-tuning the fence position.

Cons

- No below-the-base dust shroud available.
- Plunge-base cursor is somewhat hard to read and use.



DeWalt DW618PK

Motor, fixed base, plunge base	\$250
Sub-base with large hole	included
Fence (DW 6913)	\$45
Extra base for router table (DW6184, avail. Feb. 2003)	\$45
Dust collection for plunge base	Included
Below-the-base dust collection	N/A
The whole package	\$335

The cord on the DeWalt machine can be removed. Unplugging the router for adjustments and bit changes can be done right at the motor. A lock guarantees the cord won't fall out when the router is being used.

Makita

RF1101KIT

Pros

- This is the quietest motor in the bunch, but, as with all others, you'll still need hearing protection when using it.
- The fence is included.

Cons

- Swapping the motor in and out of the plunge-base requires a Phillips screwdriver to lock it in place.
- The sub-base can be adjusted to center it, but there is no centering cone available from Makita.
- No below-the-base dust shroud available.



Makita RF1101KIT

Motor, fixed base, plunge base	\$260
Sub-base with large hole	included
Fence	included
Extra base for router table (193103-8)	\$70
Dust collection for plunge base	Included
Below-the-base dust collection	N/A
The whole package	\$330

Recommendations

These machines are remarkably similar in features, high quality and price, more so than any group of tools we have tested in the last five years. A woodworker would be

extremely well served by any of them. Given that they're all expensive, if you can get a great deal on any of them, go for it. With that said, if you pushed us to the wall

and said "Choose one!," it would be the Bosch system. We find it a very comfortable, convenient machine, with many thoughtful design details. We liked the feel of the wide base

Manufacturer	Model	Price	Package Price ¹	Horsepower	Amps	RPM Range
Bosch	1617EVSPK	\$240	\$380	2-1/4	12	8,000-25,000
DeWalt	DW618PK	\$250	\$335	2-1/4	12	8,000-24,000
Makita	RF1101KIT	\$260	\$330	2-1/4	11	8,000-24,000
Porter-Cable	693VSPK	\$210	\$326	1-3/4	11	10,000-27,000

1. Package Price includes fence, extra fixed base, sub-base with large-opening, and below-base dust collection (where available) See pages 68 through 71 for details.

2. Centering cone used to center sub-base not available from Makita. Cones available from Bosch and DeWalt will work.

⬢ = Editor's Choice

Porter-Cable 693VSPK

Pros

- This machine has a long history of reliability.
- The included fence is easy to use. It has a great micro-adjust for fine-tuning the fence position.
- Lowest cost of basic machine.
- One of two brands with below-the-base basket (\$45) for dust collection.

Cons

- Swapping the motor in and out of the plunge base is made tedious by requiring an Allen wrench in a slightly awkward position.
- Dust collection kit is the most cumbersome to put on.

Porter-Cable 693VSPK	\$210
Motor, fixed base, plunge base	included
Sub-base with large hole	\$14
Fence	included
Extra base for router table (1001P)	\$57
Dust collection for plunge-base and below-the-base dust-collection kit (39690P)	\$45
The whole package	\$326



and handles, the easy-to-install dust-collection basket, and the superior depth-of-cut indicators in plunge mode. It also had some nice small features, such as the ability to accept

widely available Porter-Cable-style guide bushings without removing the sub-base, and the ability to center the sub-base. The only real drawback is that the total package, with all the

accessories, is \$50 more than the other three. **AW**

	Tool-Free Base Change	Micro-Adjust Fence	Below-Base Dust Shroud	Sub-Base Centering	Switch Position Constant
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	No	Yes	Yes
	No	No	No	Yes ²	No
	No	Yes	Yes	No	No

Contacts

Bosch: (877) 267-2499, www.boschtools.com
DeWalt: (800) 433-9258, www.dewalt.com

Makita: (800) 462-5482, www.makitatools.com
Porter-Cable: (800) 487-8665, www.porter-cable.com

Oval Picture Frames

By Randy Johnson

Oval frames are delightful eye-catchers, evoking images of days gone by and giving a unique setting for that very special photo. At first glance these frames may look tricky, but we've figured out an easy way to make them and you don't even have to know how to draw an oval. Simple-to-make jigs and patterns are all it takes. In fact, this method can be used to make almost any size oval or round frame.

Oval Frames in Four Easy Steps

The four basic steps to making an oval frame are:

1. Create a frame pattern using a piece of oval glass, some 1/4-in. plywood and a couple of washers (Fig. C and Photos 1 through 5).
2. Prepare the frame parts for routing. This involves cutting the miters to size, gluing them together and rough sawing the oval shape (Fig. B and Photos 6 through 9).
3. Make the router jigs and rout the frame to final size and shape (Figs. A, E, F, G and H and Photos 10 through 13).
4. Finish your frame and install the glass, mat, picture and an oval screw ring (see Sources, page 98) and it's ready for the wall.

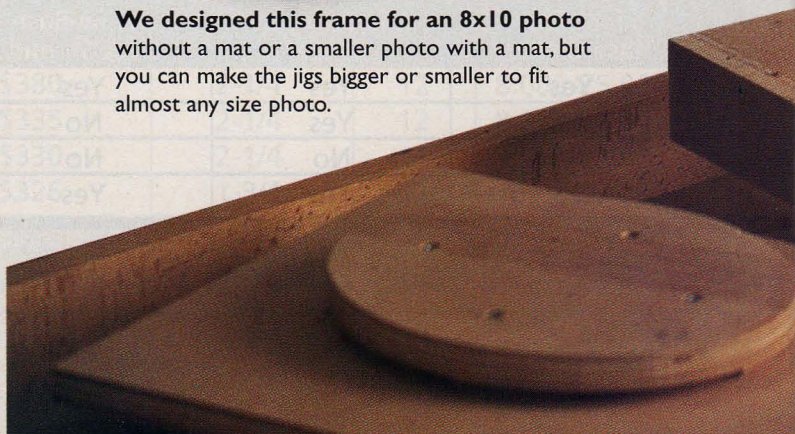
Materials and Tools

It takes only 2 bd. ft. of 1-1/8-in.-thick lumber to make one of the frames shown here. The jigs can be built from scrap 3/4-in. plywood or medium-density fiberboard (MDF). You can buy oval glass from a picture-frame shop or by mail order for \$15 to \$25 for an 8 x 10-in. piece (see Sources, page 98). Your framing shop should be able to make you an oval mat as well for around \$20. You can also cut your own glass and mat and save a bunch of money (see Cutting Your Own Ovals, page 78).

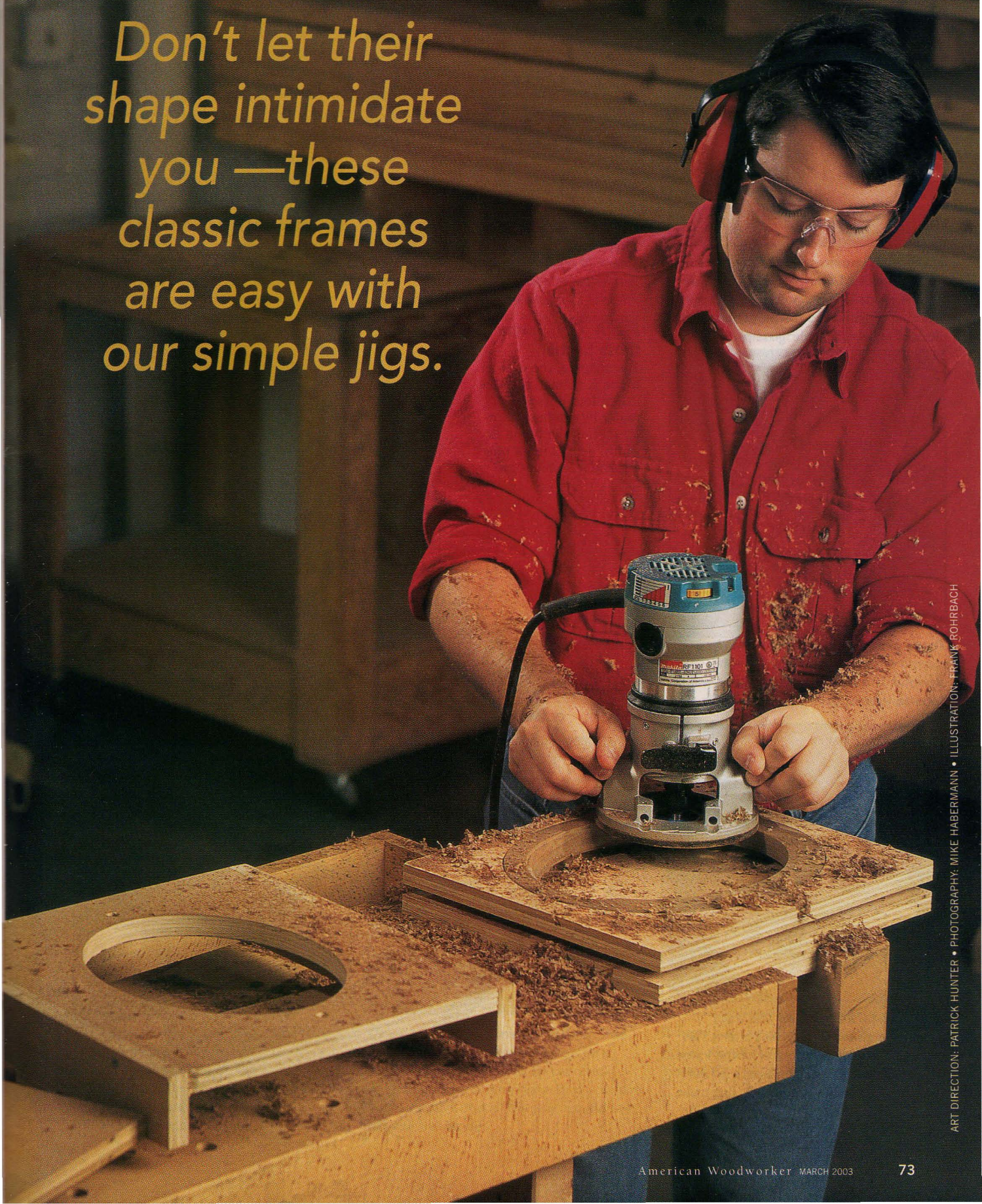
The tools you need to build the jigs and frame are a



We designed this frame for an 8x10 photo without a mat or a smaller photo with a mat, but you can make the jigs bigger or smaller to fit almost any size photo.

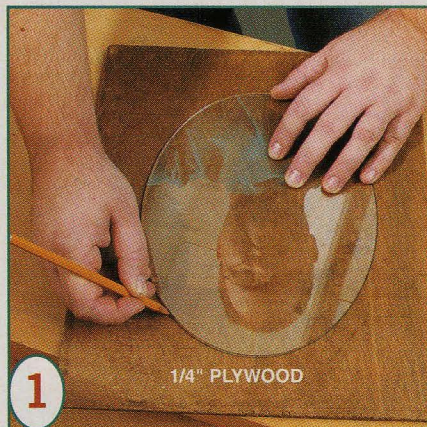


Don't let their
shape intimidate
you —these
classic frames
are easy with
our simple jigs.

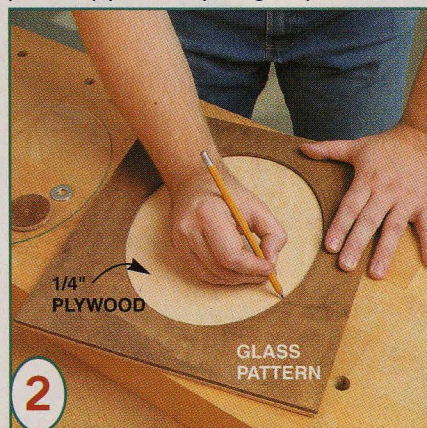


ART DIRECTION: PATRICK HUNTER • PHOTOGRAPHY: MIKE HABERWANN • ILLUSTRATION: FRANK ROHRBACH

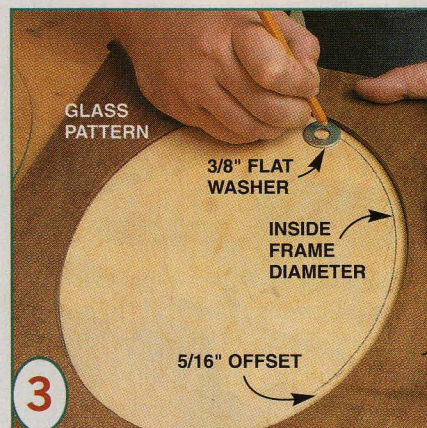
Oval Picture Frames



Start with your oval glass and trace it onto a piece of 1/4-in. plywood. Then saw out the inside with a jigsaw and carefully drum sand right up to the pencil line. This piece of plywood is your glass pattern.



Trace around the inside of the glass pattern onto another piece of 1/4-in. plywood. This new piece of plywood will become your actual frame pattern (Fig. C).



Use a 3/8-in. flat washer and trace around the inside of the glass pattern. This line marks the inside diameter of the frame. Note: Any washer that produces a 5/16-in. or slightly bigger offset will work. Just make sure the offset is not bigger than 3/8 in. or the glass may not fit the final frame.

tablesaw, a jigsaw, a router with a 1/2-in. collet, and a drill press with a drum-sander attachment. You will also need a flush-trim, rabbet, 45-degree chamfer, and Roman-ogee router bit, and a slot cutter (see Sources, page 98). If your lumber is rough sawn you'll need a planer and jointer. A router table and either a belt sander or disc sander are also handy but not absolutely necessary.

Router Table vs. Router Jigs

There are a couple of steps (Photos 12

and 13) that can be done on a router table or with the frame-holding jigs (Figs. G and H). I opted for the jigs because I think they're safer and easier to use. When I tried making these cuts on the router table, I found holding the frame with push blocks awkward because they tended to slip off the narrow frame during routing. I did use the router table to cut the spline slots (Photo 6) because it's quick and accurate, but the slots could just as well be cut on the tablesaw.

Fig. A Oval Frame Cross Section

The shape of the oval frame is created with the use of four different router bits; a flush-trim for routing the frame to width, a chamfer, a rabbet and a Roman-ogee.

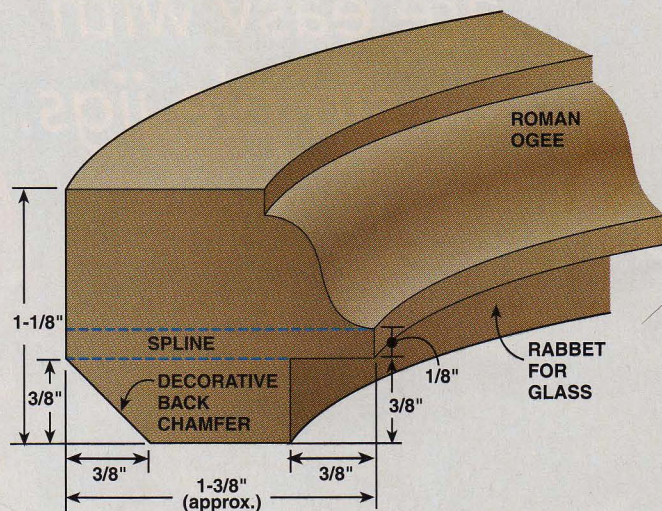
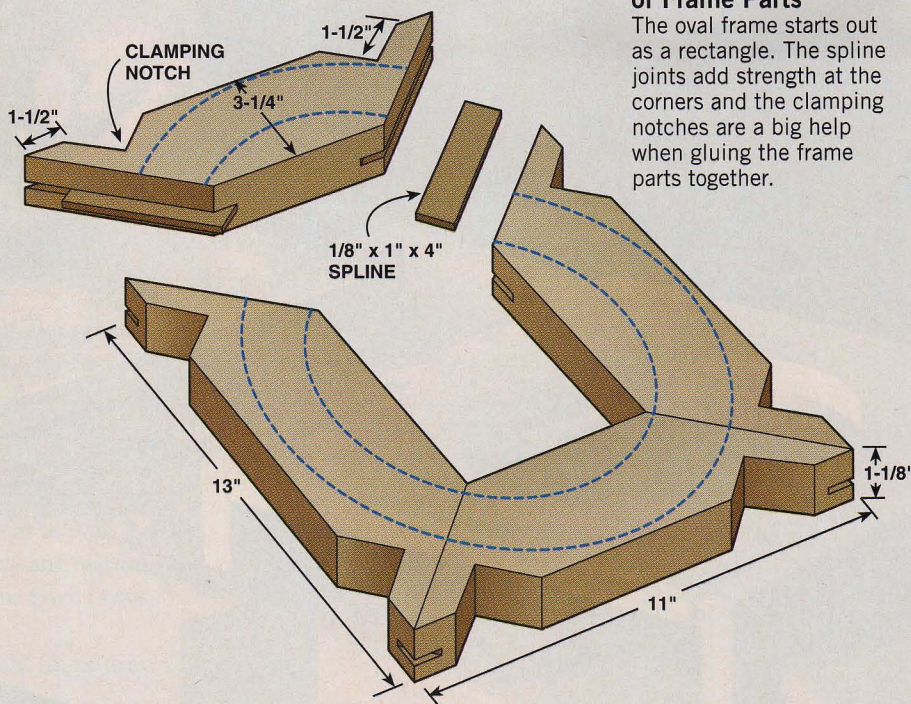
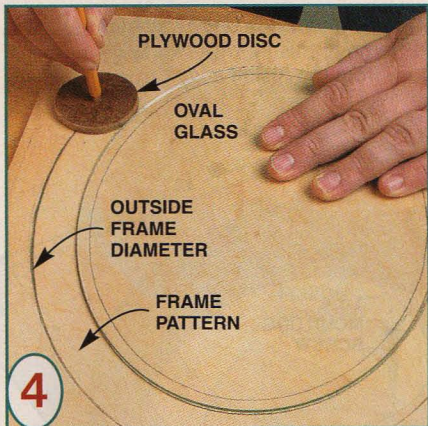


Fig. B Exploded View of Frame Parts

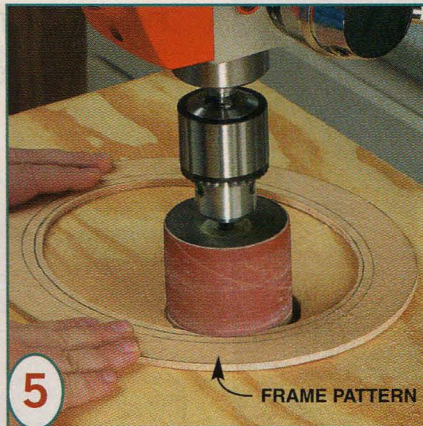
The oval frame starts out as a rectangle. The spline joints add strength at the corners and the clamping notches are a big help when gluing the frame parts together.



Oval Picture Frames



Draw around the glass using a 2-1/8-in.-dia. plywood disc. This marks the outside diameter of your frame. Use your oval glass as a guide by centering it on the line you drew earlier (Photo 2).



Complete the frame pattern by cutting it out and sanding it to final size. Leave the inside and outside diameter pencil lines. Be careful to sand the oval evenly, without any lumps or valleys.



Route the spline slots in the mitered ends of your frame parts (Fig. D). Next make the splines. They should slip easily into the slots, but without a lot of play. For a foolproof way to cut the miters, check out our tablesaw mitering sled on page 84 of *Photo Frames by the Dozen*, AW #96, October 2002, page 81.

Fig. C Oval Frame Pattern

Make this out of 1/4-in. plywood. Photos 1 through 5 show you how.

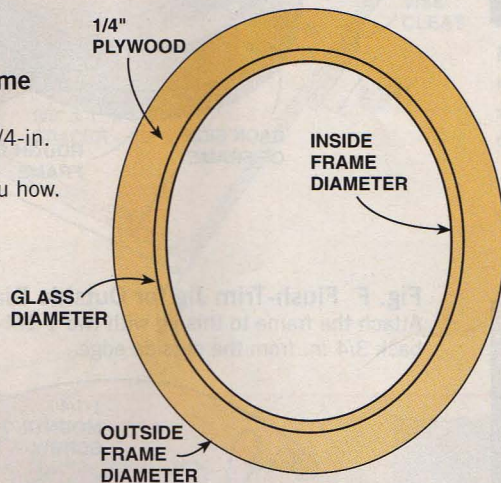
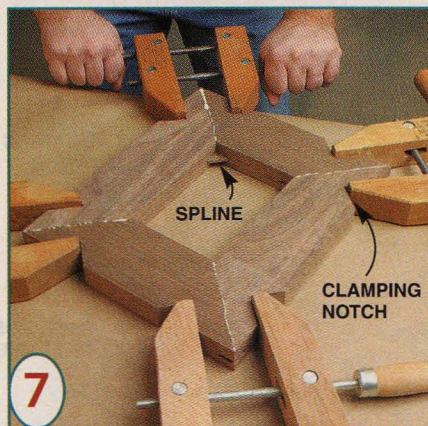
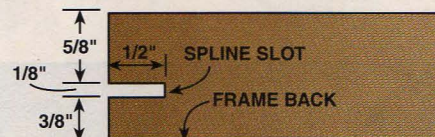
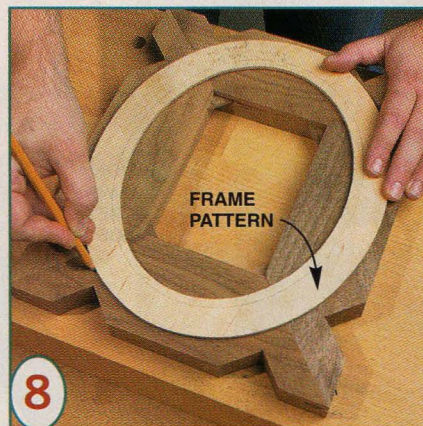


Fig. D Position of Spline Slot

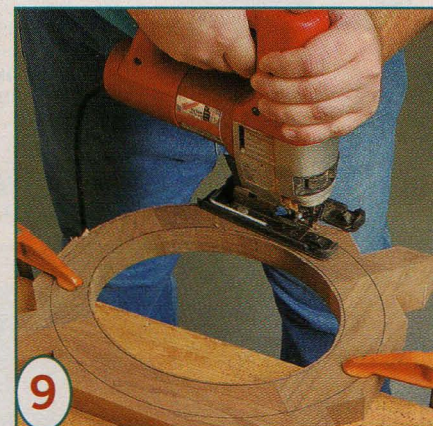
The spline slot is located slightly toward the back of the frame. This keeps the spline from showing up in the Roman ogee (Fig. A).



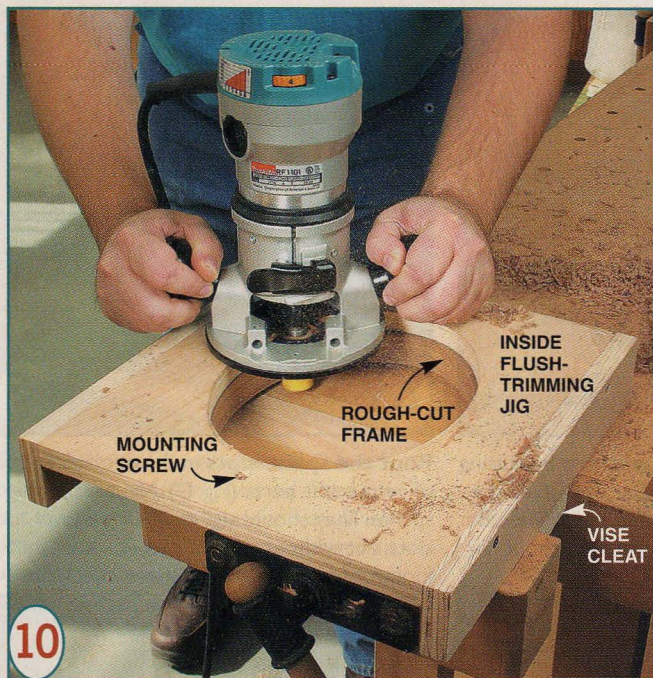
Glue the frame parts together using a clamp at each corner. Use light clamping pressure at first. Increase the pressure once all the parts are correctly aligned. Wipe off any glue squeeze-out while it is still wet or scrape it off later.



Draw around the inside and outside of your frame pattern. The pattern doesn't need to be perfectly centered on the frame material, just make sure you have a little extra wood all the way around the outside and inside.



Rough cut the glued-up frame with a jigsaw. Leave about 1/8-in. extra wood beyond the pencil lines.



10 Flush-trim the inside of the frame using a top-bearing, flush-trim router bit. The rough-cut frame is held to the jig during routing with two screws driven into the back of the frame. The jig is held in the vise by a plywood cleat on the bottom of the jig (Fig. E). If you are only making one or two frames, you could just sand the inside flush using a drum sander and skip making the jig.

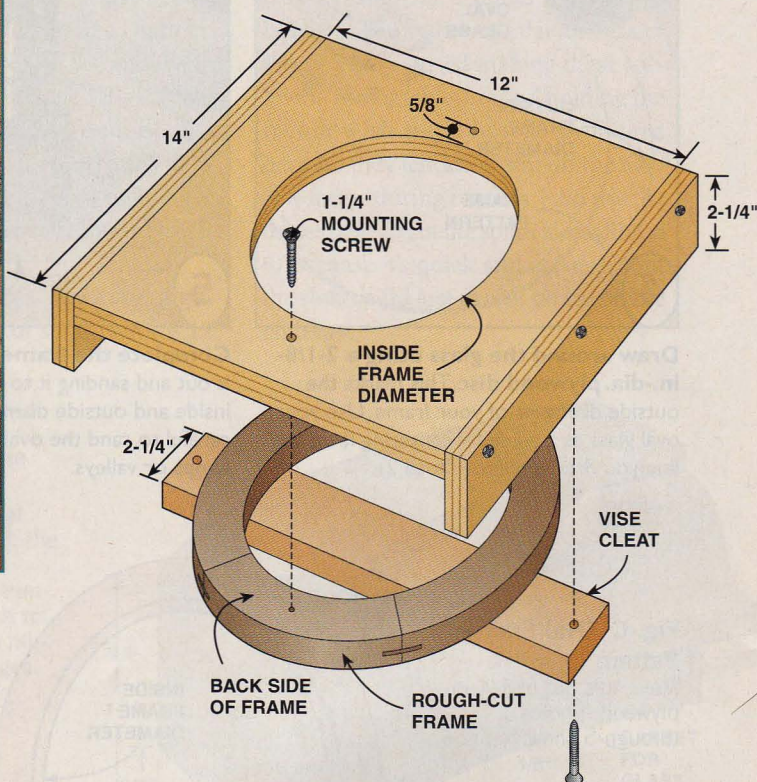
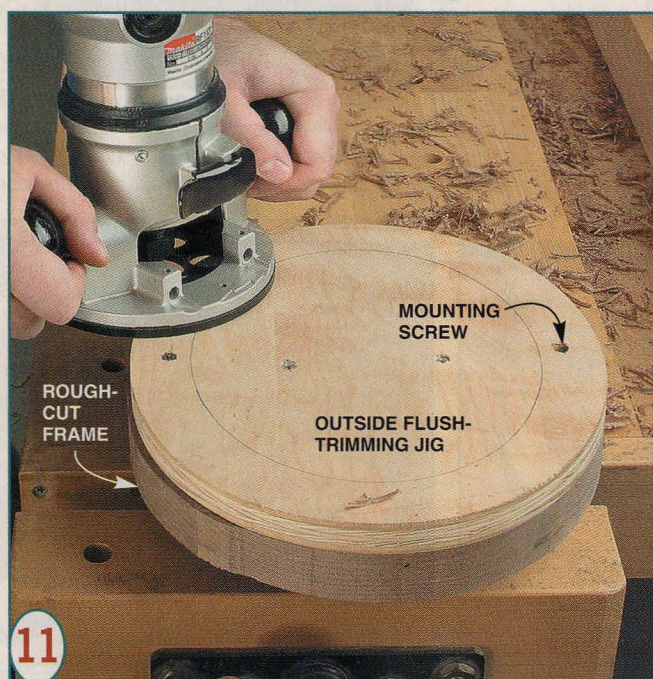


Fig. E Flush-Trim Jig for Inside Diameter
Attach the rough-cut frame to this jig with two 1-1/4-in. screws set back 5/8 in. from the inside edge.



11 Flush-trim the outside frame diameter the same as you did with the inside, except with a different jig (Fig. F). We experienced some chipping when routing a mahogany frame (see Oops!, page 77), but the walnut we used for the frame shown here routed cleanly.

Fig. F Flush-Trim Jig for Outside Diameter
Attach the frame to this jig with two 1-1/4-in. screws set back 3/4 in. from the outside edge.

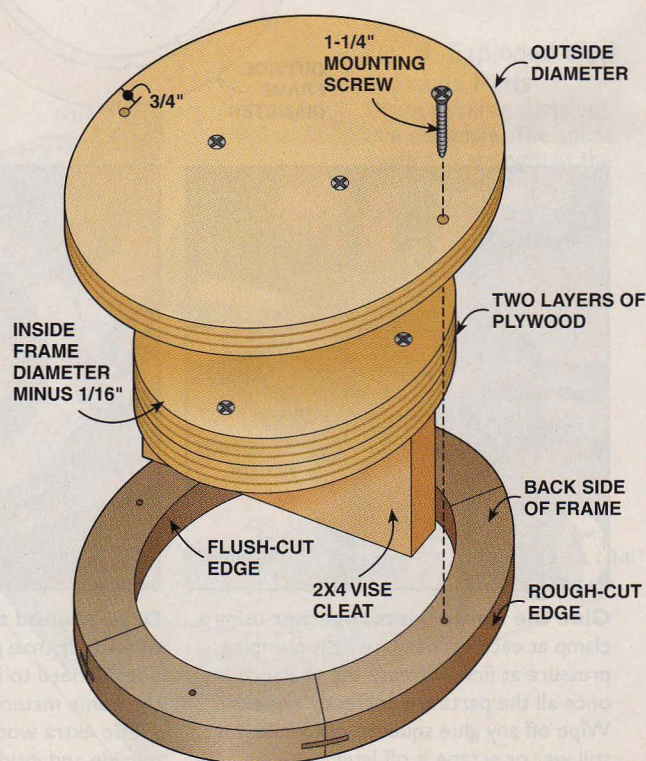
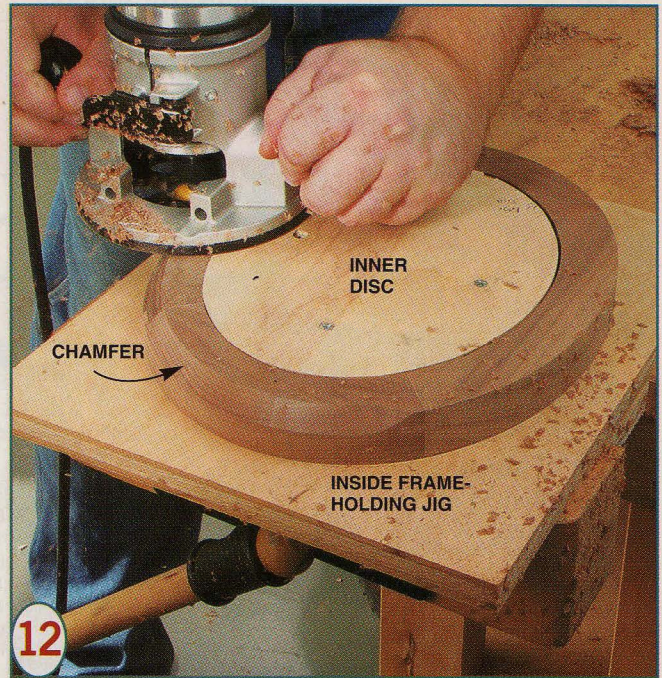
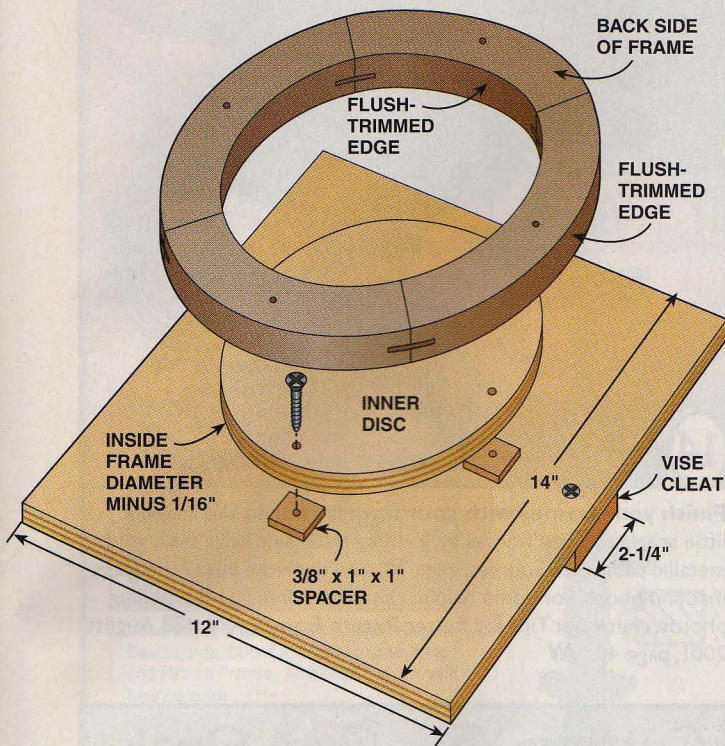


Fig. G Inside Frame-Holding Jig

Use this jig when routing the chamfer on the back of the frame (Photo 12).

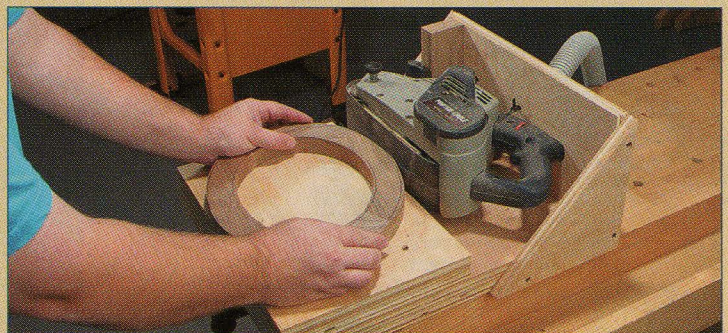
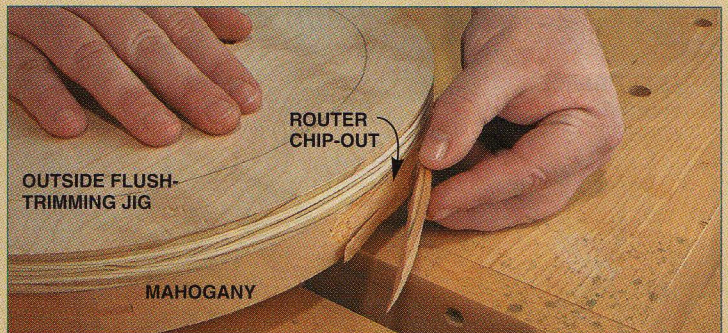


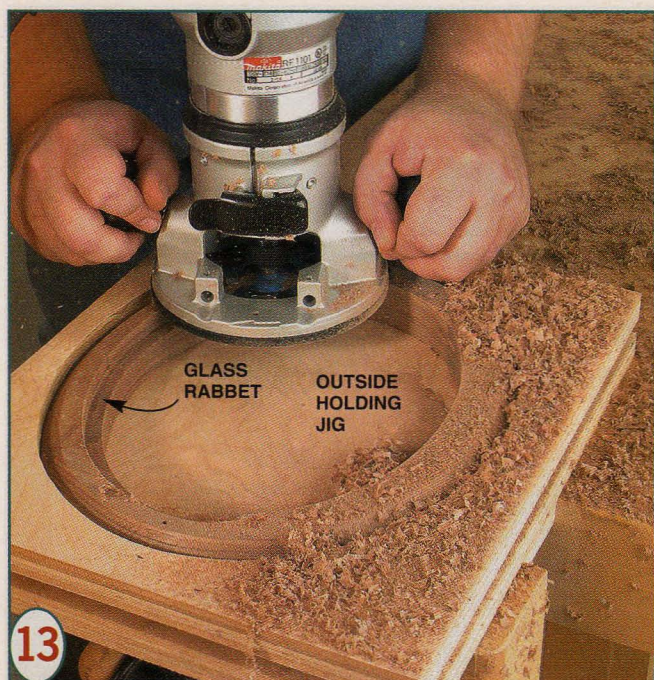
Rout a chamfer on the back outside corner of the flush-trimmed frame. Use the inside frame-holding jig (Fig. G). No screws are needed to hold the frame to this jig, because the inner disc keeps the frame in place.

Oops!

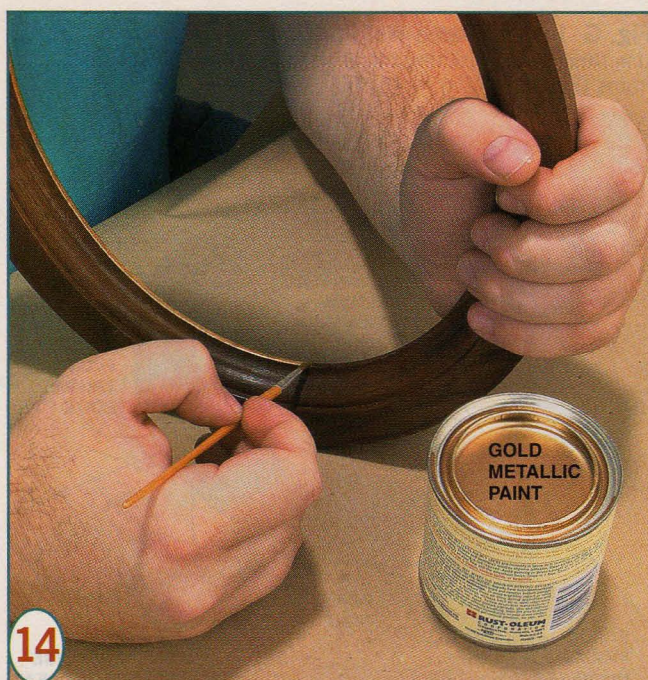
While developing this project we used several types of wood: oak, pine, walnut and mahogany. They all machined nicely except the mahogany. It had a tendency to chip out when flush-trimming the outside diameter. With a curved shape like this you're guaranteed to be routing against the grain somewhere along the edge, making chip-out likely.

If you do experience chip-out, the solution is to sand the outside diameter of the frames rather than rout them. You'll have to do the sanding freehand without the aid of a jig but it does the trick and is almost as fast as routing. So if the wood you choose gives you trouble with chipping, give your belt or disc sander a try.





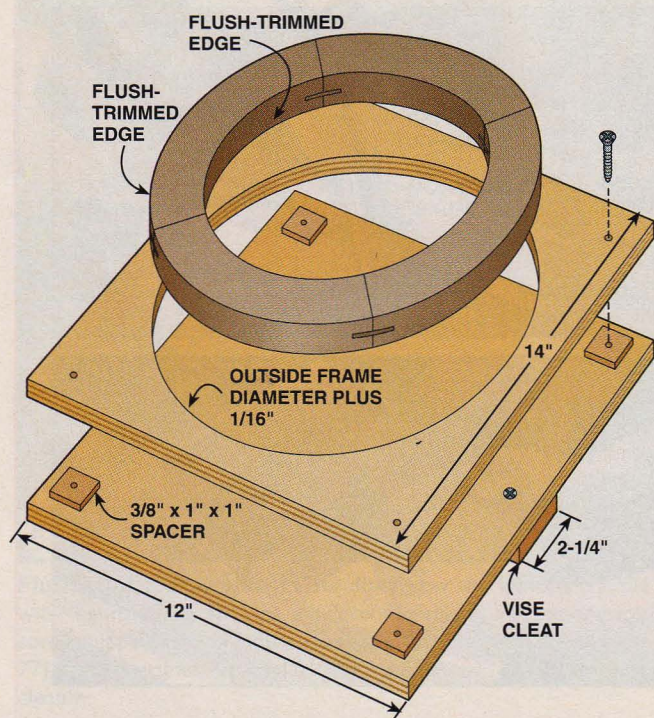
Rout the rabbet for the glass in the back of the frame. This time use the outside holding jig (Fig. H). No screws are needed here either. This jig alone will hold the frame in place while routing. Then flip the frame over and rout the Roman ogee on the front inside edge. When you're done routing, sand the frame and you're ready for finishing.



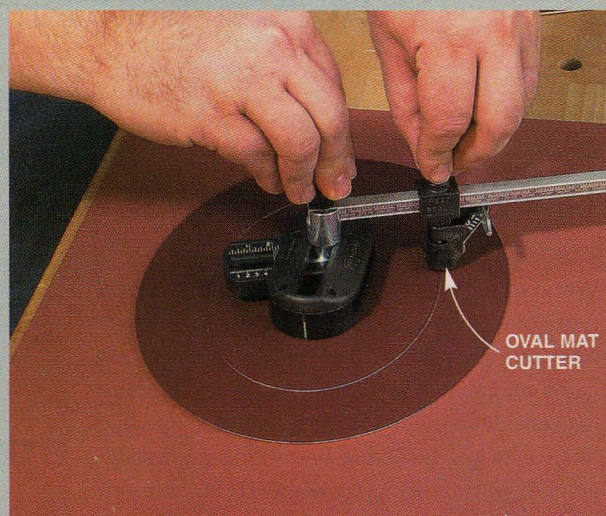
Finish your frames with your favorite finish. We added a little sparkle to our frames by painting the inside edge with gold metallic paint (see Sources, page 98). You can now install the glass, mat and photo. For some helpful tips on mounting and installing photos, check out Tips for Better Picture Frames, AW #88, August 2001, page 48. **AW**

Fig. H Outside Frame-Holding Jig

Use this jig when routing the rabbet for the glass and the Roman ogee.

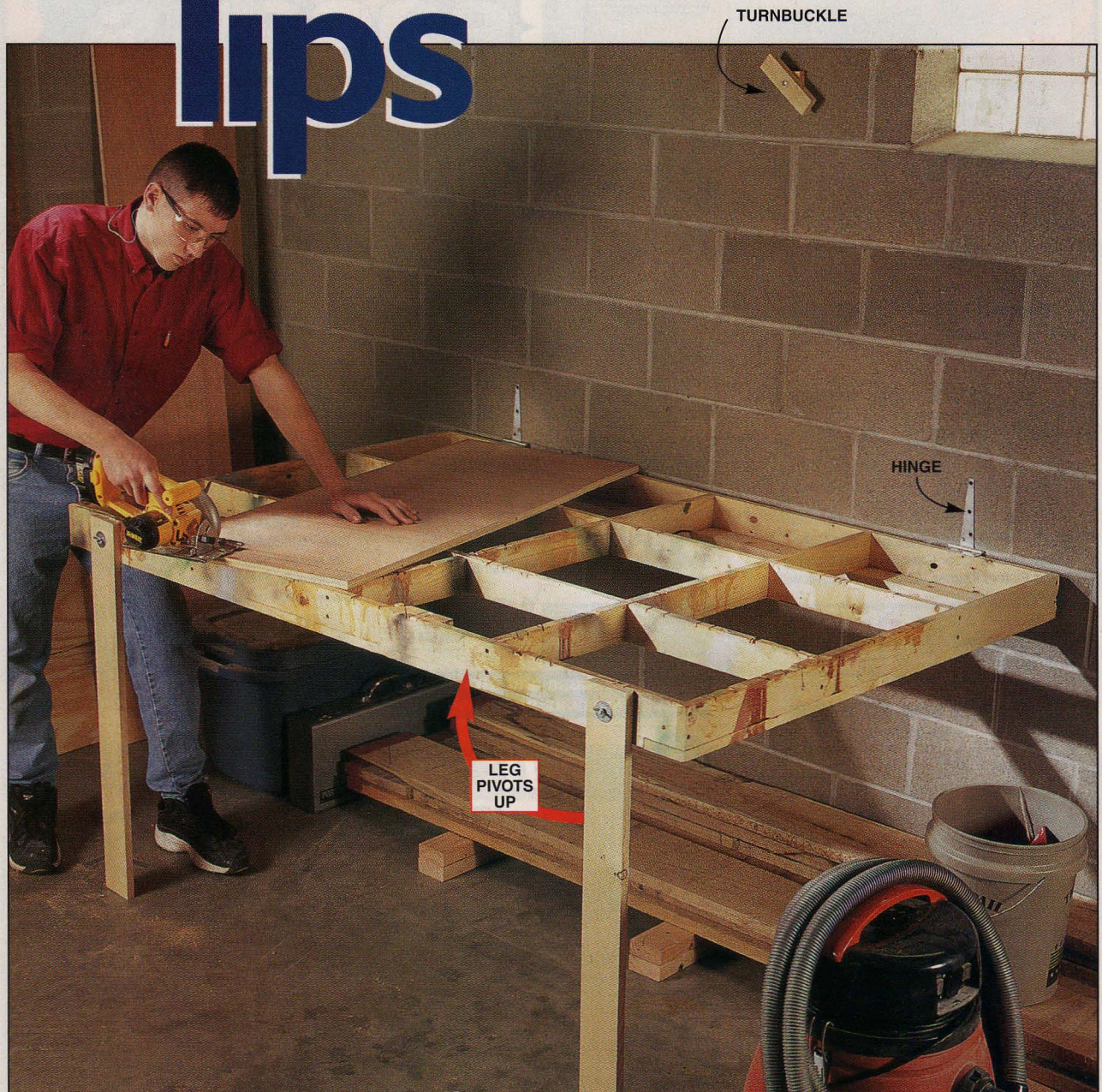


Cutting Your Own Ovals



You can buy oval glass and mats or you can make your own. If you want to make them yourself you'll need to spend about \$140 for two cutters (see Sources, page 98), but they pay for themselves after about a half dozen frames. These cutters cut ovals from as small as 4-1/4 in. by 7-1/4 in. to as large as 21-1/2 in. by 24-1/2 in. They produce excellent results and are easy and fun to use.

Small Shop Tips



Space-Saving Cutting and Finishing Bench

In order to save space and make plywood cutting easier, I made this hinged bench. Laying out and cutting the interlocking joints required some careful work, but slipping them together during assembly was a cinch. The perimeter boards are attached with screws. Keep the screws at least 1/4-in. from the top edge. The legs pivot up for storage and the bench is held to the wall with a wooden turnbuckle. Be sure the

turnbuckle is solidly attached to the wall so the table doesn't flip down and bean someone!

The gridwork provides solid, even support for sawing. I set my circular saw to cut only 1/8-in. into the table. That way I don't hit any of the assembly screws or weaken the table. This bench is also ideal for finishing.

Bob Dawson

Small Shop Tips

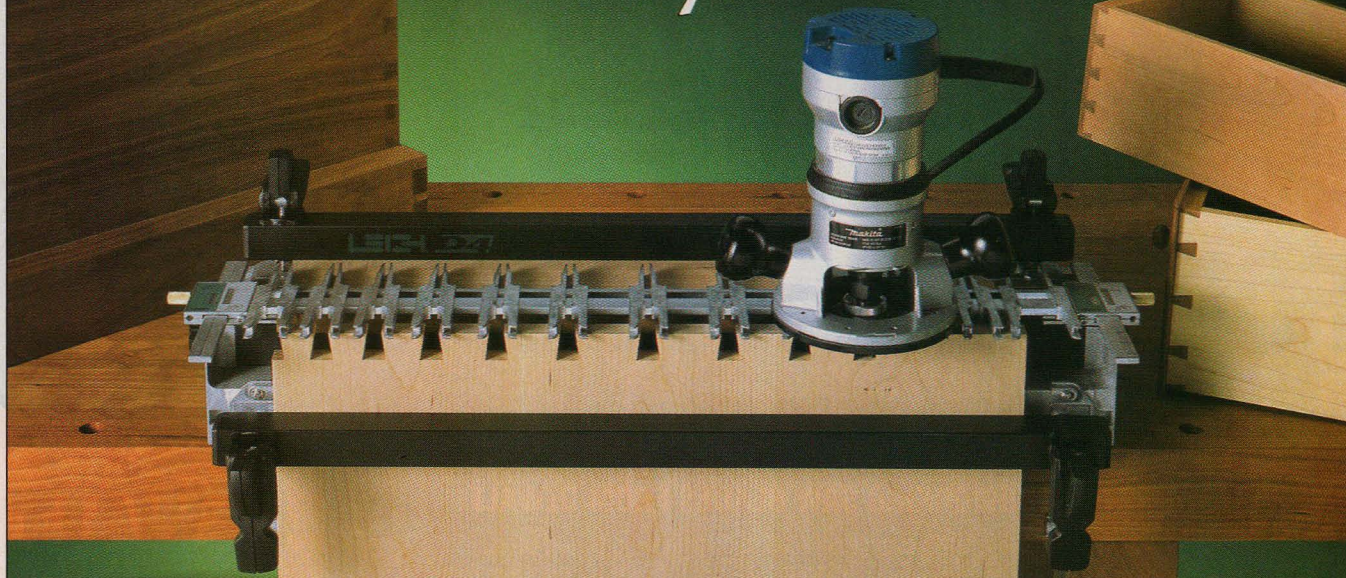
Heavy-Duty Plywood Sawing Support

While crosscutting a full sheet of plywood, I found that I had no way to support the left side as it hung off the side of the tablesaw. I tried a regular roller stand but it just tipped over. As I looked around my shop for a solution, I noticed that the fence on my jointer was almost the same height as my tablesaw. I wheeled the jointer into position and clamped a board to its fence to support the sheet of plywood. It makes a perfect side support that won't tip over.

Tom Caspar



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Small Shop Tips

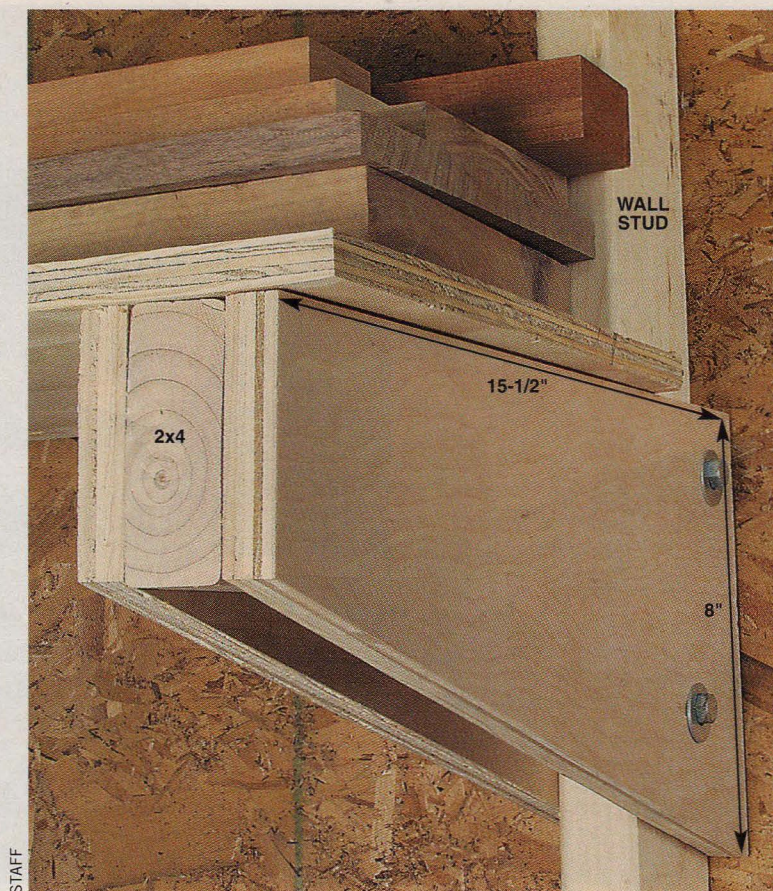
Simple, Strong Lumber Storage

While setting up a shop in my new garage, I needed a way to get my precious lumber off the floor and out of the way. I wanted something quick and strong, so I came up with these simple brackets. I glued and clamped the plywood sides to a 12-in.-long chunk of 2x4. Then I bolted each bracket to a wall stud with two 3/8-in.-dia. x 3-1/2-in.-long bolts. I attached a bracket to each stud at 6-ft. above the floor and topped it off with a 3/4-in. plywood shelf.

Patrick Hunter

AW

If you have an original Small Shop Tip, send it to us with a sketch or photo. If we print it, you'll get \$100 plus an AW hat! Send to: **Small Shop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121** or e-mail to smallshoptips@readersdigest.com. Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions, and use them in all print and electronic media.



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What's Coming Up

in AW #100, May 2003

Install Central Dust Collection

It's the dream of sneezing, dusty woodworkers everywhere: A collection system that fits every tool, grabs every particle of dust, and doesn't cost you a whole paycheck. Dave Munkittrick will show you how to design, buy and install that dream system.

Surface Sander

Have you ogled those beautiful drum sanders—you know, the ones that cost more than a table saw? We're working on a shop-made version that is slower, but does excellent work and costs less than a cordless drill. George Vondriska has built three of them now, and they really work!



Country Clock

Tim Johnson is working on a tall clock that's going to be a great family-heirloom project. It's not the typical formal and fancy model, with turnings and carving, but a more casual country style, in cherry, with some moldings that will warm a woodworker's heart.



PHOTO: COURTESY OF MANUFACTURER

TOOL TEST: Portable Planers

Planers are hot tools, and manufacturers have plenty of innovations to offer. Tom Caspar's testing all 16 brands of 120-volt planers, and he'll give you the lowest-snipe, best-finish, most-convenient, best-value choices.



Classic Bookcase

Our friend Jon Stumbras is working with Randy Johnson on a classy-looking little hanging bookcase. Or CD case. Or display shelf. Or medicine cabinet. It will work in just about any home, in just about any room. A great gift project!

Great Wood!



"QUMRAN POT" AND PHOTO BY DAN KUTKA, WWW.DANKUTKA.COM

Primavera

If you're looking for an interesting, exotic wood, that doesn't cost a king's ransom, consider primavera (*Cybistax donnell-smithii*). It's an abundant, relatively inexpensive tropical hardwood with excellent working and finishing characteristics. Selling for less than \$7 a bd. ft., primavera is a bargain for an exotic, at any rate. It looks similar to light-colored mahogany which has earned it the nickname "white mahogany."

Primavera means "early spring" and refers to the early flowering of the tree. The tree is found along the Pacific coast of Mexico and Central America where it grows to heights of 100 ft. with 3-ft.-diameter trunks that are straight and free of branches. Trees like these yield a ton (literally) of clear lumber.

Primavera dries easily, even when cut into thick boards. Woodturners have long appreciated primavera's availability in huge, thick slabs, ideal for bowl turning.

The wood is cream colored with pale-yellow hues and streaks of light brown. And, like mahogany, primavera's grain runs the gamut from straight to wavy and interlocked.

With the same degree of hardness as yellow poplar, primavera is a very friendly wood to work with hand or power tools. The only exception is where interlocked grain occurs. The alternating grain direction requires sharp tools and a light cut. Even so, you can expect some extra sanding on boards with interlocked grain.

Unlike many tropical hardwoods, primavera is not oily and glues easily with ordinary wood glue. It has a somewhat dull appearance as raw wood but really springs to life with a simple oil finish.

We bought our primavera from Tropical Exotic Hardwoods. They sell 4/4, 6/4 and 8/4 for under \$7 a bd. ft. and bowl stock for \$10 a bd. ft. **AW**

The quartered surfaces found on wide boards of primavera often yield a striped or wavy figure. The wavy figure appears to shift as it reflects light in different planes. It's a phenomenon known as chatoyancy, which, in French, means "to shine like a cat's eye."

PHOTO BY MIKE HABERMANN

Sources See page 98

Know of some Great Wood? We'd love to hear about it.
Write to us at greatwood@readersdigest.com.

Oops!

Edited by **Tim Johnson**

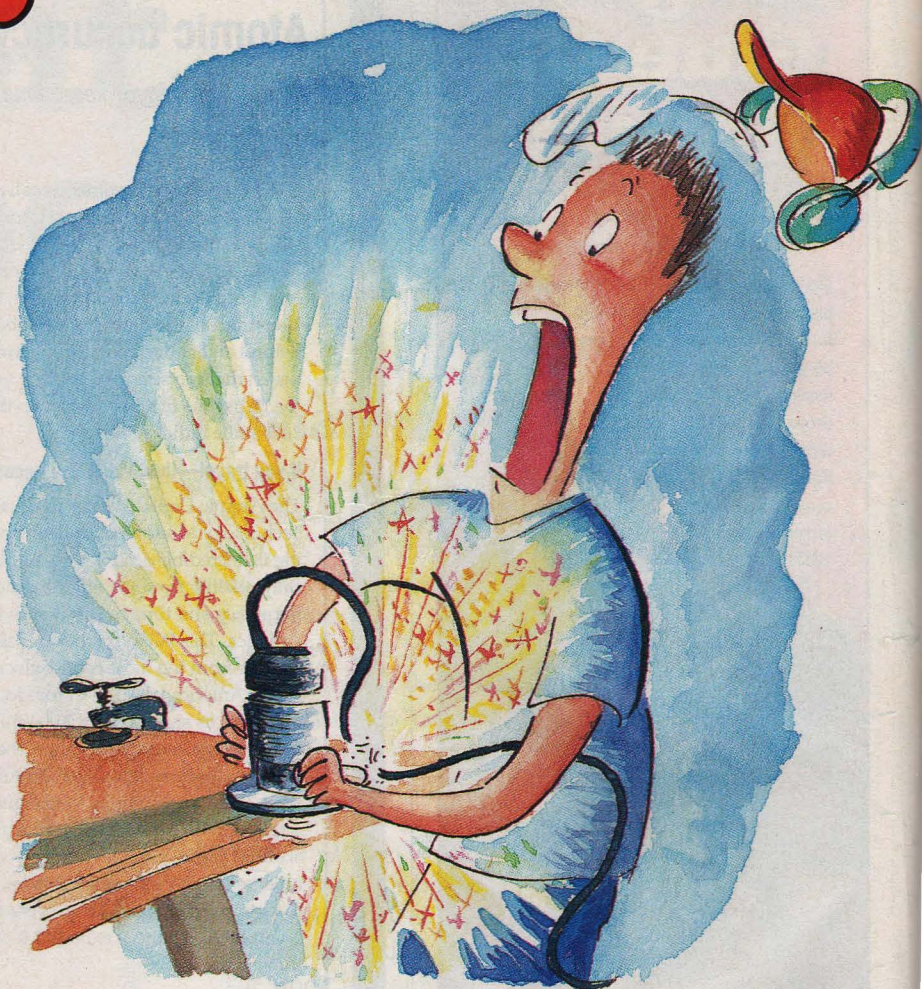
Welded Router

Okay, I'm not the best at tool maintenance. I admit it. The cord on my well-used router was frayed down to the wires about 8 in. away from the motor housing, and occasionally it shorted out. But replacing the cord was too much trouble—if I jiggled it just right, the router ran fine.

Well, I didn't know what trouble was until I started routing the edge of the tabletop I was building. Halfway through the job, BAM! A flash and explosion nearly ripped the router from my hands. Shaken, but unhurt, I stared at the now-dead router. Its frayed cord was fused to the aluminum body of the router!

I was fortunate not to have gotten a nasty shock—thank heaven I was holding the router by its non-metallic handles. My tabletop, however, wasn't so lucky. The explosion was so startling, I'd let the router skate across the top's surface, and the bit left a big, ugly divot. Now I pay attention to the condition of the cords on *all* my tools.

Tim (frayed-nerves) Johnson



Mmm! Sliced Biscuits

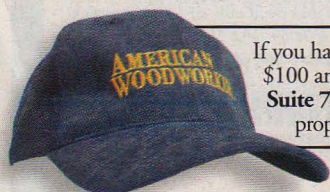
I wanted the cherry chest of drawers I was building to have raised-panel sides. To make each wide panel, I had to glue a couple boards together. I biscuited them to keep the surfaces flush, so I wouldn't have to waste my time sanding.

When I raised the first panel on my router table, my heart sank. The panel-raising bit had sliced right through one of the biscuit joints, exposing the light-colored biscuit and the surrounding glue-filled slot. What

a disaster! I'd installed that biscuit too close to the end of the panel.

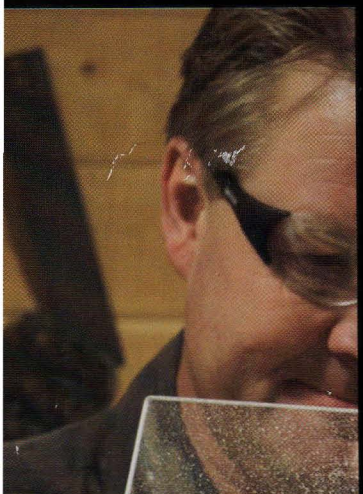
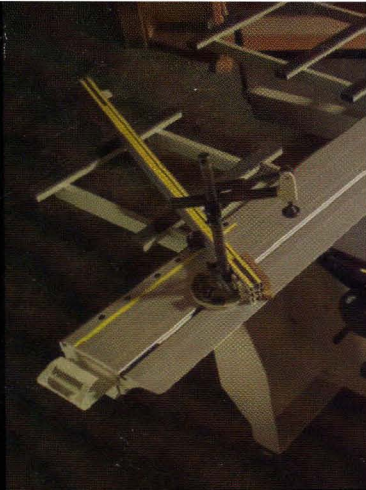
Samuel R. Yoder

Samuel, you could save the panel by dadoing out the damage and gluing in a patch. Cut the dado only as far as the edge of the raised portion of the panel and match the grain of the patch to the surrounding wood. After you reestablish the profile with your panel-raising bit, your patch will be virtually invisible. T.J. AW



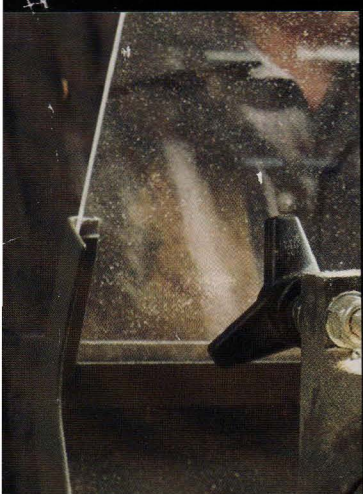
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Free

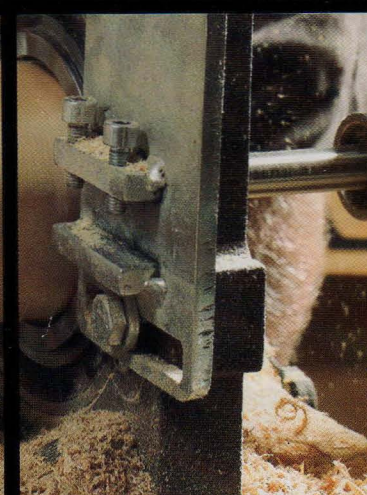


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