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#82 October 2000

Tool Tests:

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- Oscillating Spindle Sanders

Farm Table

You don't need huge tools to build this huge table

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3-Way Adjustment for Trouble-Free Doors

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Ultimate TOOL STAND

From planer stand to router table to chop saw stand – plus six other uses!

A READERS DIGEST PUBLICATION

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Do more woodworking in your shop than you ever thought possible.

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Oscillating Spindle Sanders

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They're portable, storable and surprisingly useful.

Tool Test:

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We put the squeeze on this workshop essential.



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AMERICAN WOODWORKER

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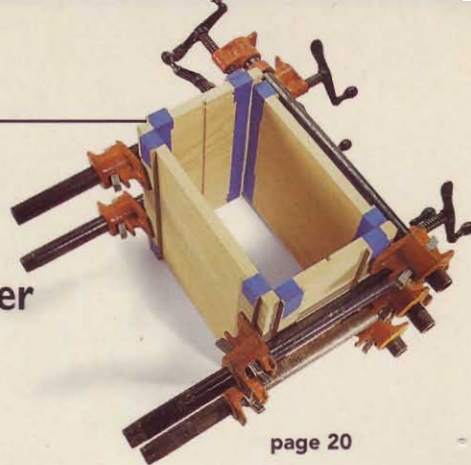
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Phone: (651) 454-9200 Fax: (651) 994-2250
e-mail: amwood@concentric.net



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Question & Answer

Ask Us

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.** Sorry, but the volume of mail prevents us from answering each question individually.

Final Rubout

Q. I always have problems getting a smooth finish. I sand the wood with 220 paper, wipe it with a tack cloth, apply three coats of high-quality varnish, and still get a rough surface! What can I do to get that "professional" look?

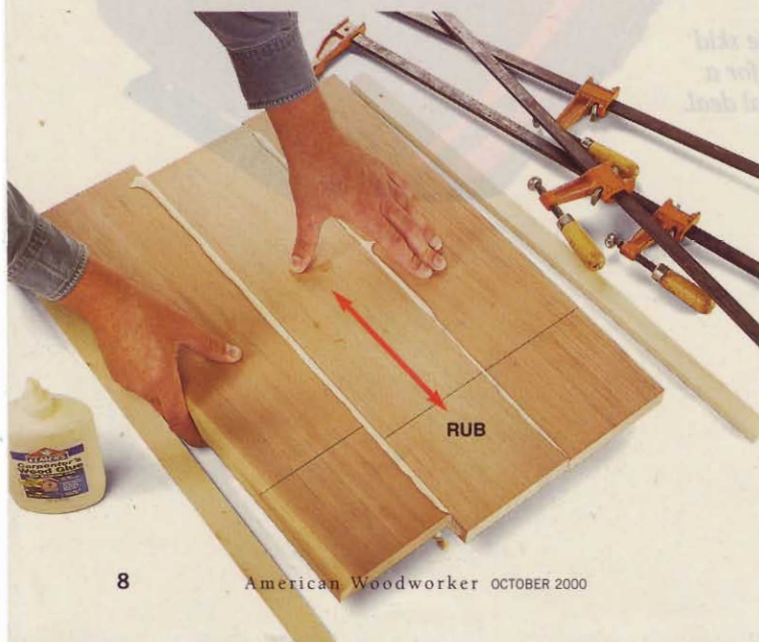
Jim Salas
Harlingen, TX

A. You've got dust problems, like everybody else. Even if you carefully tack the wood prior to finishing, the air (and you!) are full of small dust particles that settle on your finish right after you've laid it down. To get rid of the "nibs," rub out the last dried coat with a dab of wax and extra-fine steel wool. This will polish the last coat and scrape off the nibs leaving a silky smooth finish.



GIVE YOUR WORK a final rubdown with wax and extra-fine steel wool.

Rub-Joint Gluing



Q. My panel glue ups drive me nuts because the boards slide around whenever I clamp them together. Then I end up beating them back into position. What's going on?

Brian Morgan
Rockford, IL

A. Most likely you're putting too much glue on the joints and your boards are simply "swimming" around on the excess glue. Try the rub-joint gluing method instead.

Apply glue to only one edge of the joint, slide the two boards back and forth until the glue becomes tacky, and *then* clamp the boards. Bonus: rubbing the boards together distributes the glue evenly and produces a strong, thin glue line.

BEFORE CLAMPING, rub the boards back and forth for a no-slip glue up.

Truing a Framing Square

Q. I just inherited my grandpa's framing square. It's big and heavy and I'd like to use it but it isn't square! How on earth can I fix it?

Sam O'Donnel
Peabody, MA

A. Get yourself a hammer and a center punch. Then:

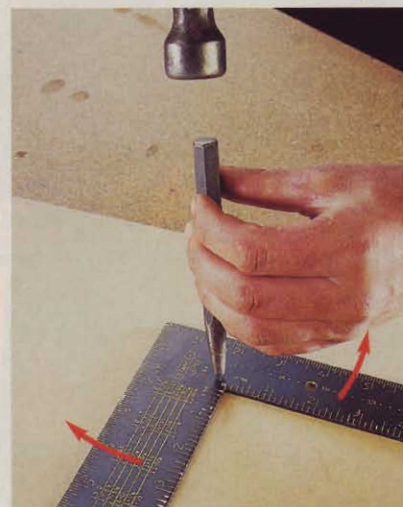
1. Draw a line on a straight-edged board (MDF works great) using the square.
2. Flip over the square and draw another line just to the right of the first.
3. If the lines diverge, peen the inside corner of the square with a hammer and center punch.
4. If the lines converge, peen the outside corner.
5. Repeat steps 1 through 4 until the lines are parallel.



TO TEST A SQUARE, draw a line on an MDF sheet. Flip over the square and draw another line next to the first.



PEENING THE OUTSIDE CORNER
"closes" the square.



PEENING THE INSIDE CORNER
"opens" the square.

Rusty Router Collets



CLEAN rusty router collets with a dowel and synthetic steel wool.

Q. Returning to my shop after working outside this summer, I noticed a rusty film on my router collets and bits. What's the best way to remove the rust without damaging the collets and bits?

Gary Hutchinson
New Haven, CT

A. Use a synthetic steel wool or 3M Scotch-Brite pad. To clean a 1/2-in. collet, wrap the pad around a 1/4-in. dowel and spin it inside the collet. Clean the rust off the bit shanks by rubbing the pads around them. *Do not* use an emery cloth or sandpaper; you don't want to remove any metal that could cause the bit to wobble later. Wipe the collet's inside and the bit's shank with a light, general-purpose grease, then wipe off the excess. A thin film of grease will remain in the surface to slow future rusting.

Board Feet Calculation

Q. I used to buy planed and jointed lumber (S4S) at a home center where it was sold by the lineal foot. Now that I have a planer and jointer, I want to buy my lumber in the rough but I'm confused. It's sold by the "board foot." What does board foot (bd. ft.) really mean and how do I calculate it?

George Robison, Horicon, WI



One board foot is 1-in. thick x 12-in. wide x 12-in. long.

A. Lineal feet is a measure of length. Board feet is a measure of volume. In the same way that sand is sold by the cubic yard, rough lumber is sold by the board foot.

Calculating board feet for 4/4 (1-in. thick) lumber is easy. Simply figure out the board's surface measure:

Full width in inches times length in feet divided by 12.

"Full width" is rounded up or down to the nearest whole inch. "Length in feet" is a whole number, too. Board feet are rounded to the nearest whole foot.

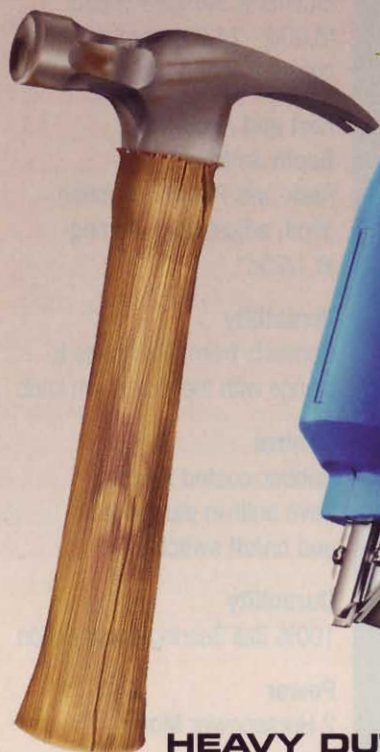
To calculate the number of board feet in a thicker board, multiply the surface measure by the thickness of the board. Here's an example for a 6/4 (1-1/2-in. thick) board that's 7-3/8-in. wide and 8 ft. 3-in. long:

$$\begin{aligned}\text{Board feet} &= (W \times L \times TH)/12 \\ &= (7 \times 8 \times 1\text{-}1/2)/12 \\ &= 7 \text{ board feet}\end{aligned}$$

For your calculations, be sure to ask your lumber supplier if their 3/4-in. planed boards are considered 1-in. thick. Some are, some aren't.

For more information you can order a copy of "Rules for the Measurement and Inspection of Hardwoods and Cypress" from The National Hardwood Lumber Association, P.O. Box 34518, Memphis, TN 38134; (800) 933-0318; \$7 plus shipping. **AW**

Prototype



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Finished Product



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The ET100™ provides nail driving muscle without the burden of an air compressor. It shoots 3 different size brads.

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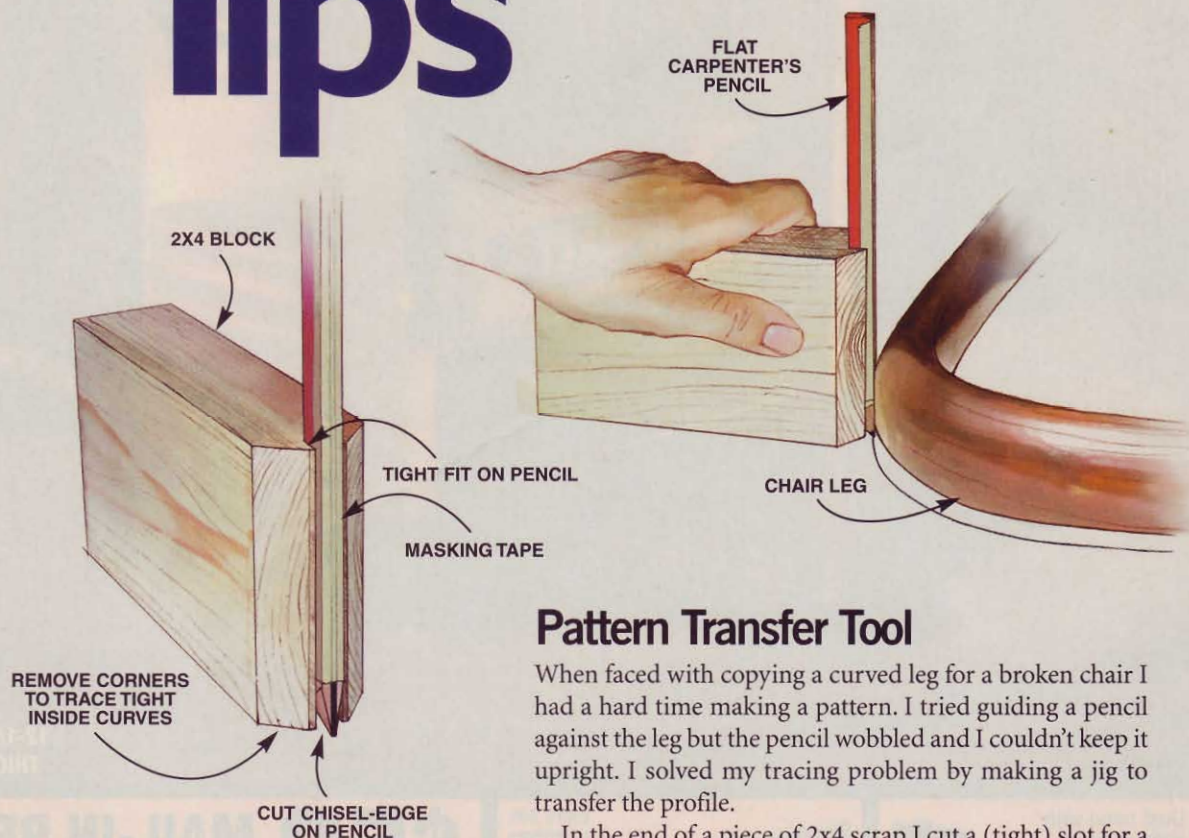


The ET100™ is available wherever fine tools are sold.

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United Kingdom: Arrow Fastener (U.K.) Ltd., 14 Barclay Road, Croydon, Surrey CR0 1JN
www.arrowfastener.com

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WorkShop Tips



Sandpaper File

Sorting through my sandpaper pile to find the right grit was a pain in the neck, so I bought a file folder case and hanging files, wrote the grit number on the tabs, and filed the grits in the proper folders. It's also great for carrying around in and out of the shop.



*Elizabeth Sawyer
Portland, ME*

Pattern Transfer Tool

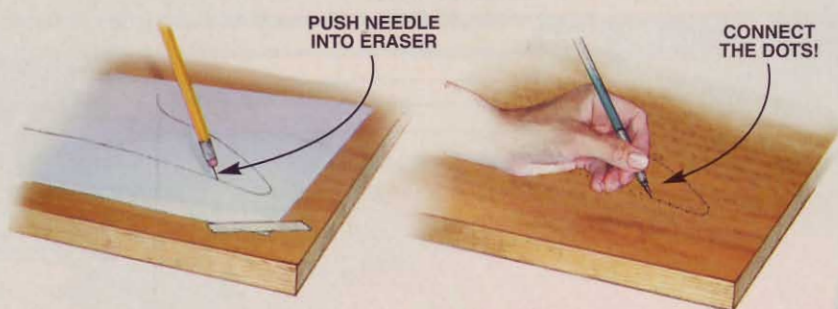
When faced with copying a curved leg for a broken chair I had a hard time making a pattern. I tried guiding a pencil against the leg but the pencil wobbled and I couldn't keep it upright. I solved my tracing problem by making a jig to transfer the profile.

In the end of a piece of 2x4 scrap I cut a (tight) slot for a flat carpenter's pencil. I cut away the pencil's edge to expose the lead. Then I sharpened the pencil, beveling only one side. Finally, I added a strip of masking tape to protect the leg. With the pencil in the block and pressed against the leg I can trace any profile onto paper.

*Julian McFowl
Tyler, TX*

If you have an original Workshop Tip, send it to us with a sketch or photo. We pay \$200 for each one we print. Send to: **Workshop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121.** Submissions can't be returned and become our property upon acceptance and payment.

Workshop Tips



Stipling Tool

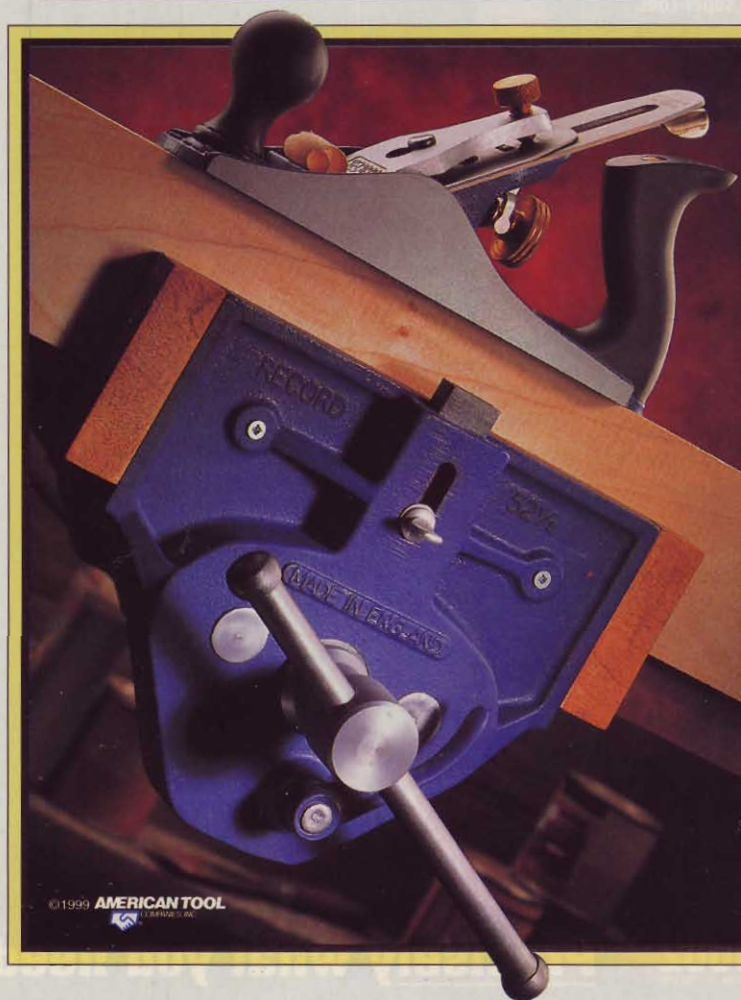
I came across an old pattern my grandfather drew many years ago on a big sheet of paper. I was itching to build the piece but I couldn't figure out how to transfer the pattern onto boards so I could cut them out on a bandsaw. I didn't want to cut up the paper because of sentimental value and I don't have access to a big copier. Borrowing from my wife's sewing expertise, I made a stipling tool by snipping off the head of a needle and pushing it into the eraser of a wooden pencil, sharp-pointed end out. I taped the pattern on my board and pricked through the paper into the wood. I removed the pattern and connected the prick marks with a pencil line. Slick!

Mike Huber
Fenton, MO

Jointer Push Pads

My next-door neighbor borrowed my jointer push blocks (he lost his...) and he never returned them. I was under the gun to finish a job and I needed to joint the faces of some boards. I scrounged the garage for something and came up with some great alternative push blocks: concrete float pads. They've got a comfortable handle and a solid, wide, no-slip pad on the bottom—even larger than my original push blocks. Heck, now my neighbor can keep my old ones!

Eric Hoffstad
Stevens Point, WI



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Wallpaper Knife Sander

After cleaning up glue squeeze out with a damp rag I've always had a real tough time sanding inside corners to remove the raised grain. A sanding block is too bulky to sand completely up to the joint. I wanted something stiff and controllable. The solution is quite simple: I lay one 150-grit, self-adhesive sandpaper disk on one side of a flexible wallpaper knife and trim to fit. On the other side goes 220-grit, self-adhesive paper which gets trimmed too. Now I can sand cleanly to all inside corners. I just peel off and replace the sandpaper when it's worn.

*Matt Weathers
Athens, OH*

Quick Screw Pockets

I don't own a jig for making screw pockets but I wanted to use pockets to fasten a plywood tabletop to a skirt. Here's my simple way of making the pockets: First I drill a 1-in. hole inside the skirt. I ground the tip short on the 1-in. spade bit so it wouldn't blow through the other side. I followed that with a 5/32-in. bit in the edge of the hole. The pocket is large enough to accommodate a countersink bit for a flat-head screw.

*Mike Burton
Ogden, UT*

START 1" BIT
AT 90 DEGREES, THEN
TILT 30 DEGREES

DRILL 5/32" HOLE

1 5/8" DRYWALL SCREW



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Workshop Tips

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2 FT.

METAL SHOWER
CURTAIN RINGS



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Evenly!

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Leave Uneven,
Blotchy Color
Tone.

ZAR's controlled penetration allows you to apply the same stain to different species of wood and get matching color tones.



Match Color Tone on
Different Kinds of Woods.

Extension Cord Hanger

I've got a small garage shop but I use every square inch if it. That means pulling an extension cord from my *one* outlet to all my projects. I was always tripping over the cord and getting it snagged on stuff. Then I came up with this ingenious, simple cure. I hang the extension cord from the ceiling! A steel cable runs from one end of my garage shop to the other. The extension cord (I use a very flexible, outdoor cord) is hung from the cable using metal shower curtain rings. Now I pull the cord to where I need it and it stays out of the way. Best yet, it cost me under \$25, including the cord.

Jerry Glazman
Winstead, CT



Dust Bag Hangers

When it came time to rehang the bag on my dust collector I always wished I had five hands. One day I had an idea: I made five hooks out of a wire coat hanger. I simply pull the bag over the dust collector's flange, slip the hangers through the bag's belt loops and then adjust and tighten the bag belt. **AW**

John King, Jr.
Thomasville, GA



EDITOR: DAVE MUNKITTRICK • ART DIRECTION: JOEL SPIES • ILLUSTRATION: FRANK ROHRBACH • PHOTOGRAPHY: MIKE KRIVIT PHOTOGRAPHY

Portable Food Safe

No more smashed frosting, cracked crusts or capsized casseroles. You can take your culinary creations anywhere with this portable food safe. You can adapt the design to accommodate two pie plates, a deep casserole dish or a 9 in. by 13 in. baking pan. If you're a bread baker, size the safe for two loaf pans with a pull-out cutting board on the bottom. Whatever you're toting, it will arrive in style and in one piece!

This safe features two sliding doors and two removable trays.

Pine's a good choice for wood because it's easy to work and light in weight. Acrylic doors allow for peeking and the brass handle is an easy grip. Total cost: around \$35. (Note: The fol-

lowing how-to contains specific instructions for the food safe pictured here.)

The four sides are wide so you may have to glue up some stock. Plane the material to 5/8-in. thickness and mill to width and length (Fig. A). I like to cut the parts about 1/16-in. long so each box joint protrudes about 1/32 in. It's better to sand the pins flush to the sides than the sides flush to the pins! Once the box joints are milled (Photo 1), take

One-Day Project

the two side panels and make the dados for the two sliding doors. The acrylic I used came a little under thickness so it worked well to make the dados right at 1/4 in. Next make the dado for the upper sliding tray. Now is a good time to finish sand the inside surfaces.

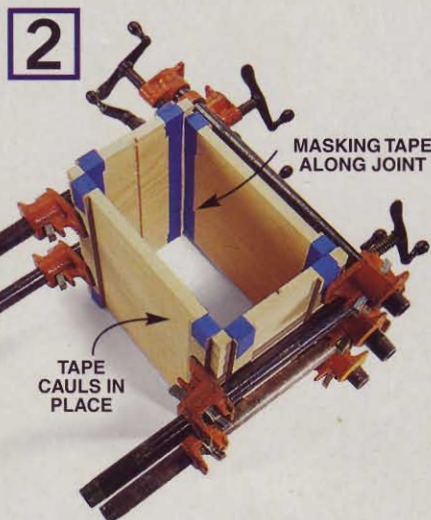
Gluing and clamping all four sides at once takes four hands; here's a better



Routing box joints with a dovetail jig is very fast (this one is by Keller). The jig is easy to set up, reliably accurate and can also be used to make dovetails.

way: Dry clamp the four sides, pull the top off the sides and brush glue onto the mating surfaces of the exposed pins. Replace the top and clamp (Photo 2). Make sure the top is square to the sides. When dry, flip over and repeat the gluing process with the bottom panel. When the glue is dry, you can sand the joints flush. Cut the tray bottoms from 1/8-in. hardboard. The upper tray bottom is wider than the lower tray because it needs a lip to slide in the side dado. Cut and attach the rim boards.

Your hardware store can cut the acrylic doors for you. If you choose to cut them yourself, use an 80-tooth, carbide-tipped triple chip design or a fine-tooth steel plywood blade. To remove saw marks on the edges of the acrylic, use a sanding block. The wood trim on the doors serves as a finger grip and is attached with epoxy. Scuff the acrylic with sandpaper and tape off any place you don't want smeared with epoxy.



Clamp up the box using cauls to clear the protruding pins. Taping the cauls in place makes the job easier. For easy cleanup, line the corners with masking tape to catch glue squeeze out.

Peel off the tape when the epoxy is still semisoft.

Stain and finish to your liking. Add the handle and you're ready to go.

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System

New Age Routing Tools with Replaceable Tips

Patent Pending #129720



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FIG. A

Cutting List*

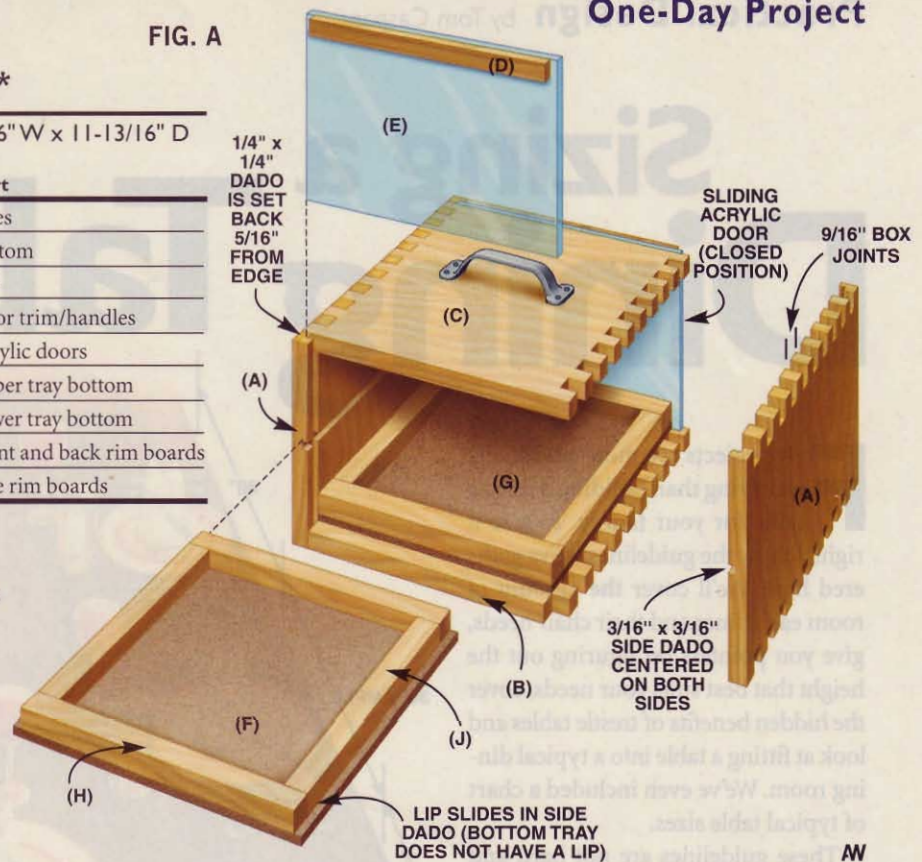
Overall Dimensions 7-1/2" H x 11-13/16" W x 11-13/16" D

Ref.	Qty	Dimensions	Part
A	2	5/8" x 11-13/16" x 7-9/16"***	Sides
B	1	5/8" x 11-13/16" x 11-7/8"***	Bottom
C	1	5/8" x 10-11/16" x 11-7/8"***	Top
D	2	5/16" x 5/8" x 10-5/8"	Door trim/handles
E	2	1/4" x 11-1/8" x 6-7/8"	Acrylic doors
F	1	1/8" x 11" x 10-5/8"	Upper tray bottom
G	1	1/8" x 10-5/8" x 10-5/8"	Lower tray bottom
H	4	3/4" x 7/8" x 10-5/8"	Front and back rim boards
J	4	3/4" x 7/8" x 8-5/8"	Side rim boards

*Designed for two 9-in. pie plates, Corning Ware P-309 9" x 1-1/4". Box joint pins are 9/16" wide.
**Includes 1/16" extra (1/32" each end) for sanding pins flush after box is assembled.

Sources

Woodworker's Supply
(800) 645-9292
Brass handle: Item # 941-183; \$7
Keller 15" journeyman dovetail system:
Item # 934-385; \$140.



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- Jackscrew knife adjustment
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- Enclosed stand
- 1 HP motor
- Rabbeting table and ledge
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- Pushbutton switch
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BW-15P Planer...

economically priced yet built like big professional planers, it offers absolutely vibration free finishes

- 3 HP motor
- 3 v-belt drive from motor to cutterhead
- Table moves up and down - cutterhead stationary for smoother cuts
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- Magnetic switch
- Heavy cast iron construction
- Jackscrew knife adjustment



BW-002A Dust Collector...

portable, compact unit can solve your dust collection problems at a very low cost.

- 1 Micron, 16.2 sq. ft. filter bag
- Two 4" dia. hose inlets
- 43.5 gal. see-through collection bag attached with quick release metal straps
- 2 HP single-phase motor
- Metal impeller (not plastic)

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Sizing a Dining Table

Few projects are more personally satisfying than building a dining table for your family. To size it right, follow the guidelines we've gathered here. We'll cover the amount of room each diner and their chair needs, give you pointers on figuring out the height that best suits your needs, cover the hidden benefits of trestle tables and look at fitting a table into a typical dining room. We've even included a chart of typical table sizes.

These guidelines are not hard and fast rules. Your *personal* preferences come first, so here's how to test the guidelines in order to figure out the dimensions of a dining table that's just right for you and your family.

Elbowroom

Let's start with the overall size of the tabletop. Answer these questions first: how many people will usually sit at the table?; how much elbowroom does each person need? The first question is easy, unless your kids are like mine and you never know if they'll be home for dinner! But let's assume that you'll want a table for four or six or eight people and tackle the harder question of making room for everybody.

Take your choice of two commonly agreed upon numbers for determining the size of a place setting (Fig. A). Two feet for each diner is considered a bare minimum, but you can allow more if your room can accommodate it.

Consider your family's dining style. If your place settings are minimal and informality rules, use the two-foot standard. But if your table is going in a for-

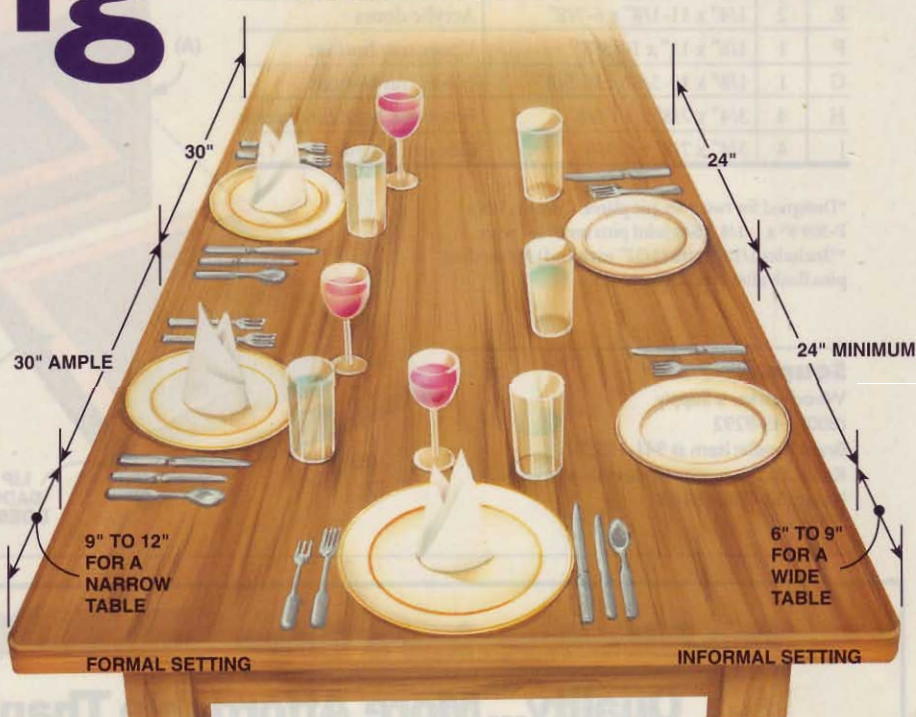


FIG. A

Size your tabletop based on the amount of elbowroom you're comfortable with. If you don't mind sitting close to your neighbor, allow 24 in. for each person. If you like lots of room, or plan to use the table for formal dining, you'll need up to 30 in.

The head of the table requires additional space. The wider the table, the less additional space may be needed because there's more room at each corner.

FIG. B Typical sizes for rectangular, square and round tables.

Number of People	Rectangular	Square	Round
2	24" x 30"	30"	30"
4	30" x 48"	36"	36"
6	36" x 60"	—	48"
8	42" x 86"	48"	62"

mal dining room where you'll set it with your best china, expand to a 30-in. space for each diner.

To really settle the matter, take a tape measure along the next couple of times you eat out. See where you and your family settle naturally at different-sized tables and jot down some numbers.

Hundreds of table designers doing

this fieldwork have come up with a set of standard sizes for square, rectangular and round tables (Fig. B). We've assembled these numbers from many different sources, none of which exactly agree with one another, so use them as a reality check against your own calculation of the perfect table size.

Practical Design

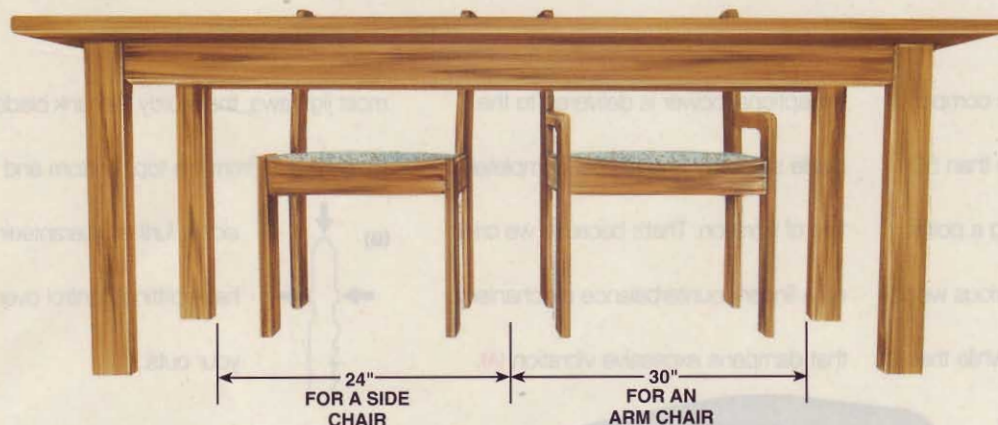


FIG. C

Base the distance between the legs of your table on the number of chairs you'll be using. No one wants to straddle a leg, so plan ahead!

Table Widths

Narrow tables, from 30 to 36-in. wide, don't have much room in the middle for serving dishes and centerpieces. You may have to serve from a buffet if you have a lot of dishes to pass. But it's a practical width for an average dining room and brings everybody closer together. Wider tables (from 36 to 42 in.) have more room in the middle, of course, but it becomes harder to pass dishes across the table as you add width.

Room Between Table Legs

Have you ever been stuck straddling a leg at a dining table? You can avoid subjecting anyone to that torture by basing the distance between the legs of your table on multiples of two feet (Fig. C). That is the bare minimum for side chairs. Thirty inches is a more generous distance and also a minimum for armchairs. Use these numbers for the distance between the legs at the end of the table, too.

Does price matter?

Of course it does! And so do things like quality, reliability, and functionality. 'You get what you pay for' has never been more true because often times you get much less than what you pay for. The wrong purchasing decision can leave you with a machine that doesn't cut the mustard.

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Practical Design

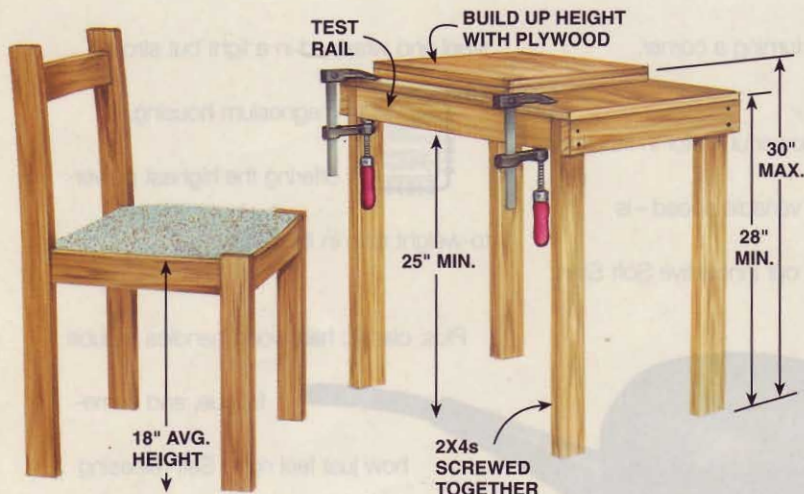


FIG. D

Build a prototype of your table to establish its height. There's no magic height that's right for everyone. It's a very personal decision, and depends largely on the chairs. Buy or make your chairs first, then sit down in front of the prototype and test it out.

Table Height

Factory-built dining tables represent a consensus on comfortable table heights and are typically 29-1/2 in. or 30 in. from floor to tabletop. Experiment to find the right height that best suits your family.

Build a small prototype table from 2x4s and plywood (Fig. D), try it out and you'll have made the best investment you can to be sure your table is well sized.

The height that feels best depends on the chair you're sitting in. *Build or buy your chairs first.* You'll probably find that a top at the lower end of the height range feels more relaxed and informal. You'll definitely notice a difference in how the table feels with every half-inch change in height.

Floor to Rail Clearance

Clamp test rails of different widths to the prototype table to check the clearance above your knees (Fig. D). The bottom of the rail should be no less than 25-in. from the floor. Dining tables with lower rails can feel very confining, especially when sitting in a chair with a high seat.

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FIG. E
Trestle tables have fewer limitations than standard four-legged tables. You can crowd chairs around the table and no one will have to straddle a leg.



FIG. F
A trestle table limits knee clearance at the ends. A large overhang may not look as well proportioned, but it affords plenty of legroom.

Trestle Tables

If you like a low dining table, or the freedom to place chairs anywhere around your table to handle a crowd, consider a trestle table (Fig. E).

There's plenty of knee clearance under a trestle table because there's no rail under the top. You can have a thick top that's fairly low to the ground and still have room to cross your legs. And you can squeeze in an extra chair along the side of a trestle table without asking some poor soul to straddle a leg.

In designing a trestle table, you don't have to worry about fitting chairs in between legs, but the person sitting at the end faces a new problem. They will bump their knees and feet into the trestle base of a table with a small overhang (Fig. F). (Many trestle tables are designed this way and don't work well for diners at the end of the table, but they're fine if everybody sits along the sides.) Although it changes the proportions of the table, one answer is to

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Practical Design

increase the length and the overhang of the ends, so your knees have plenty of room.

The Dining Room

Finally, size your dining table to fit the dining room. There should be enough

room to pull out chairs and you should be able to walk around the table when people are seated (Fig. G).

Draw a one-quarter scale plan view of your room and include the doors, windows, ceiling light and other furniture. Try centering your ideal table with

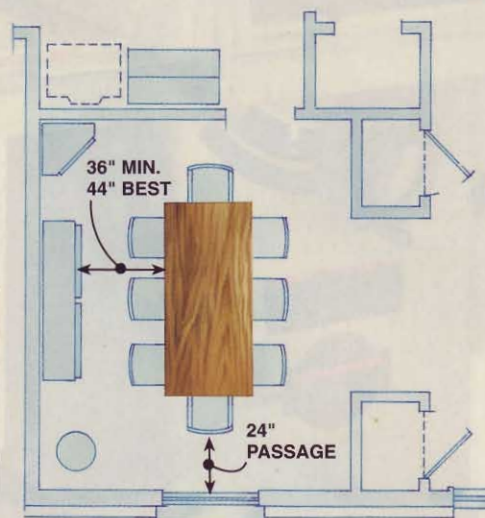


FIG. G

Plan for clearance around your dining table before you settle on the dimensions of the top. Adequate space around your table is just as important as the theoretical amount of elbowroom.

the light and a window and see if it works. Do you have three feet of clearance all around? You may have to resize your top.

Dining rooms are often not large enough for a spacious table, which is why most traditional tables are built to expand with additional leaves. Size your table without leaves so it fits in the room with adequate clearance. With leaves added, don't get too hung up on clearance. Come Thanksgiving, with lots of guests milling about and all the leaves groaning under the weight of a big feast, everyone expects a tight fit!

Bon appetit! **AW**

Note: Most of the measurements in this article have been collected from a standard reference book used by architects. "Architectural Graphic Standards" is published by the American Institute of Architects and is available at www.barnesandnoble.com; \$50 paperback.

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Small Shop Tips

Old Door Workbench

I thought I didn't have enough room for a second work surface, until I made this one from a salvaged pre-hung door. Look for a flush, *solid-core* door with the jamb (door frame) attached. A solid-core door is sturdy, provides strong attachment for the bench legs and is heavy enough to take a pounding. I reinforced the jamb with screws and added stock where the threshold used to be. Then I screwed a 1 in. x 4-in. flange onto the back edges of the jamb with #8 x 2-in. screws. The jamb is hung on the wall at a comfortable working height with #10 x 3-in. screws. For convenient tool and accessory storage, screw

perf-board to the flange that's inside the door opening. Make two legs from 3/4-in.-threaded pipe and screw them into two 3/4-in. pipe flanges to support the workbench when it's down. Support the bottom jamb with angle brackets and add a hasp to hold the door shut.

*Joseph Pickwell
Camloops, B.C.*



Power Drill Station

My drills, chargers and all their wires took up too much precious bench space. This wall-hung drill station really cleared the clutter. Now all my drilling needs are within easy reach in one location. With the power strip I only use one outlet for all my chargers and I don't have to mess with an extension cord when I'm using power tools at my bench.

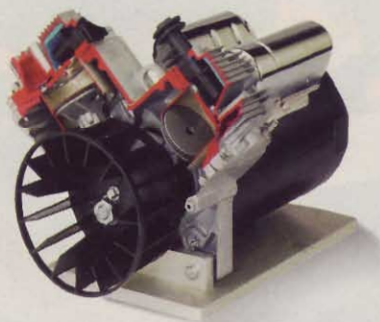
*Pat Grant
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Small Shop Tips

Heads-Up Shop Rag Storage

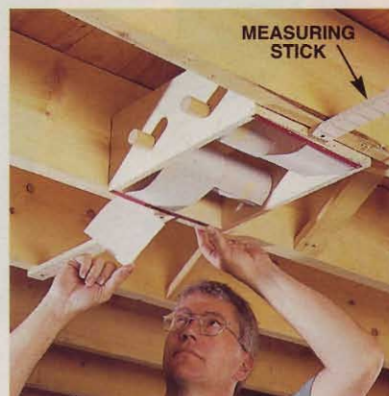


I could never find a rag when I needed one until I discovered those boxed rags. But I got tired of kicking the box around the floor and I sure didn't want it to take up valuable bench space. I was changing a light bulb when the solution hit me. I built a simple plywood box, mounted it between the floor joists and added a couple of retainer clips to keep the box of rags from falling out. Now a rag is at my fingertips whenever I need it.

*Ben Downey
Plainfield, IL*

Tuck-Away Sandpaper Dispenser

This sandpaper dispenser holds four rolls of self-adhesive paper. Mount the box 3/4-in. below the joists, put measuring sticks out from either end, and fasten a pair of old hacksaw blades with a single screw on one end. Slip the paper through the blade and pull it to the desired length. Clamp the blade down with your thumb and tear off the paper.



*Bill Schmoll
Sioux Falls, SD*

Bridge Your Radial-Arm Saw Table

My radial-arm saw table was a handy place for my benchtop power tools. Unfortunately, I had to move a tool or two whenever I needed to cut a long board. I solved the problem by building a bridge over one side of the table. Now when I go to cut a long board I simply slip it under the bridge without having to touch my benchtop tools. If I ever need to cut anything really thick, which rarely happens, I can easily remove the tools and the bridge.

*Peter Lundebjerg
Greeley, CO*



Small Shop Tips

Turn Your Dust Collector on Its Head!

I use my 2-hp dust collector as a central unit. Turning the collector upside down and hanging it from the ceiling allows me to hook up my trunk line without any elbows. It also saves on floor space and because the barrel handles the chips, there's no loss of CFM from a full bag. But best of all,



RUBBER STOPPER



Think Jig.



this system eliminates the dust storm created when removing a full bag.

Replace the metal base with 3/4-in. plywood sized to span your floor joists. (The old base makes a great shop cart!) With the help of a couple friends, bolt the whole assembly to your floor joists. To help dampen vibration, drill out the centers of six 1-1/2-in.-thick rubber stoppers to use as washers between the base and the bottom of your joists. Finally, remove the fabric bottom of one bag and use a cinch strap to attach it to a barrel with an approximately 20-in.-diameter top.

Rubber stoppers are available at most hardware stores for about \$4 apiece. You can pick up used barrels for \$6 to \$10. Look under "barrels" in the Yellow Pages. **AW**

Ross Peterson
Hanover, MN

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Turning Table Legs



FIRST, turn a prototype leg. Place your prototype leg directly behind the blank for each final leg. By sighting along the upper horizons of both pieces, you'll simplify the process of repeating specific shapes.

Turning four table legs that match may sound impossible, but it's not. With these tried and true tips, and a little practice, you can successfully turn even the largest legs. And these same techniques apply when you're copying a broken chair spindle or producing a set of balusters.

Here's what we'll show you:

- Safer ways to mount large stock. (This reduces some of the intimidation if you're new to turning on this scale.)
- How to work pommels (areas left square).
- How to mark the blank for key details and diameters.
- How to accurately and quickly size diameters.
- How to repeat the same shape from one leg to another.

Before you start turning table legs, here are some insights on making multiples that I've picked up over the years:

- Perfection can be very boring and needlessly tedious when making matching parts! I used to obsess about making an exact copy. Now I settle for similarity. If you get the layout right and the diameters and shape close, you'll do fine. As duplicated pieces get further apart (such as with table legs), approximate diameters and shapes start looking identical to the eye. Plus, slight variations add warmth and a human element that machine-made parts lack.
- Learn to trust your eye. After making the first leg to your satisfaction, place it immediately behind the next

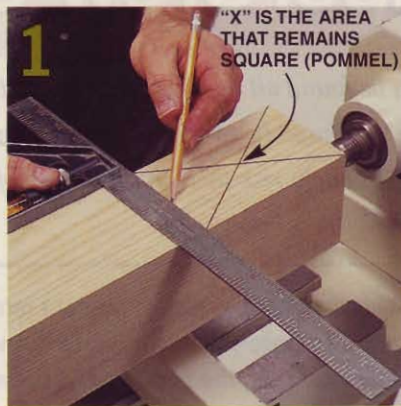
blank on the lathe. Learn to look at the upper horizons of the prototype leg and blank and not the wood itself. This helps you to really "see" and duplicate the form (see photo above).

- Make at least one prototype before you commit to four legs. Even if you have an accurate drawing to scale, the transition from two dimensions to three will surprise you.

- As you make the prototype leg, remove it often from the lathe and view it in an upright position, as it will be viewed mounted on the table. The transition from horizontal viewing to vertical is also astonishing, and may lead you to changes in design.

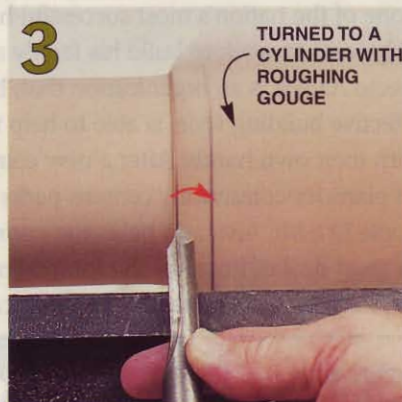
Woodturning

LAY OUT the pommel (area to remain square) with a square and pencil. Only one line is necessary at the shoulder of the pommel because the spinning wood will show the line clearly.



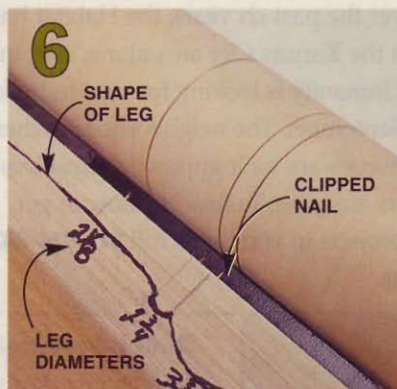
CUT 1/8 in. to the right of the layout line with a parting tool. Make sure the edge is keen; the handle is low; take only light cuts; and widen the cut as you go deeper to prevent binding. Cut to the left until you reach the layout line.

TURN the area to the right of the pommel to a cylinder. If you're making rounded shoulders, turn the corners of the pommel with a 1/2-in. detail gouge. The line to the left of the shoulder indicates the top of the rounded portion.



YOU CAN ALSO use a skew chisel to do both square-shouldered or rounded pommels. The long point (toe) of the skew is down and leading the cut. Skews leave the best surface, but require more skill and practice to use.

USE a layout board with cut pins to accurately lay out the placement of elements below the pommel. Securely place the board on the tool rest and push it into the cylinder below the pommel.



THE PINS are simply brads or finish nails driven into the edge of a 3/4-in.-thick board at the critical points and clipped off about 1/4 in. from the surface. On longer work it's often easier to manipulate the layout board by making it in two or three sections.

TIP: Driving with a Dead Center

Although normally used in the tailstock, the dead center is a good alternative to a spur center for driving the work at the headstock. By controlling the pressure on the tailstock handwheel, you can determine the amount of slippage in driving the work—a real benefit in case of a catch or if you are intimidated by a large spinning square. You also can remove and accurately remount the leg several times, which is important for viewing the leg vertically during the design process.



To use the dead center for driving, file the shoulder of the dead center to a sharp edge. You can cut several shallow scallops along this edge to increase its grip on the wood. This shaping is easily done with a rotary tool and a small stone or a chainsaw file. Prior to mounting turning stock on the lathe, drive the center into the headstock side of the blank with a deadblow mallet to make an indentation.



Woodturning

USE a calipers and parting tool to size critical diameters. The calipers *must* have rounded edges and make contact *only* on the side opposite the cutting tool. There must be no gap between the wood and tool rest. Hold the parting tool handle low, tucked under your forearm.



ROUND the ends of the outside calipers with a fine mill file or rotary tool before using on the spinning wood. I finish off the process with 220-grit sandpaper. The goal is to eliminate any sharp edges or corners that might catch on the wood.

CUT details with the detailing gouge. For long, gradual curves, cylinders or straight tapers, use the roughing gouge. After turning the pommel, work from the headstock toward the tailstock until the leg is finished. Control the shape by watching the upper horizon of the piece rather than the tool tip.



USE the skew chisel (long-point down) to add shadow lines, crispness and emphasis to beads, shoulders, fillets and other details. Be sure to check the leg by removing it from the lathe and examining it in a vertical position. Complete the leg with final sanding.

Wood to Turn

You'll need four pieces of 3-1/2 in. by 3-1/2 in. by 30-in. *squared stock cut exactly to the same length*. (Note: We used two pieces of 8/4 ash, glued and squared on the jointer.) Having squared stock is critical when leaving pommels on the finished piece. Cutting all the blanks the same length greatly simplifies leveling the table.

Tools and Supplies

- A spur or modified dead center (highly recommended if you are a novice turner) for the headstock side, and a live center for the tailstock side.
- An outside calipers, at least 4-in. capacity. (I keep a number of pairs sized and labeled for the different diameters. For a project of this kind even three pairs would suffice

to speed the process along.)

- A double-posted 24-in. tool rest. (This is optional, but very convenient if you plan to do longer spindle work on a regular basis. This rest also requires an additional tool rest base or banjo.)
- Turning tools: a roughing gouge (any size); a 1/2-in. detailing gouge ground to a fingernail shape (see AW #80, June 2000, page 16); a 1/2 in. or larger skew chisel; and a parting tool (any size).
- A square and a pencil.
- Layout board materials: 6 in. wide by 28 in. long 3/4-in. poplar, 1-in. brads or finish nails, a hammer and a nipper.
- Sandpaper; four sheets each of the following grits: 100, 120, 150, 180, and 220. **AW**

Sources

Dead center, #2 Morse taper, #1 146-439, \$22, plus shipping.
24-in. Double-posted tool rest (for bases that hold 1-in. stems and lathes with 12-in. swing), #1 146-694, \$93, plus shipping.
Tool rest base (banjo) to use with 24-in. rest. Check with suppliers of your brand of lathe.

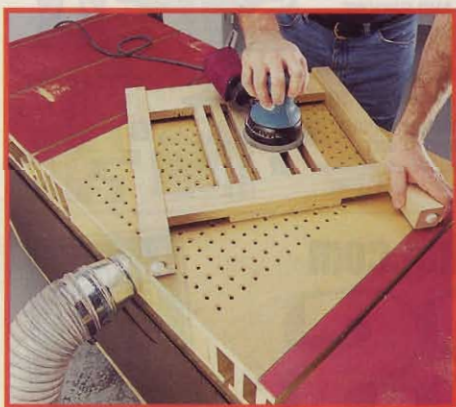
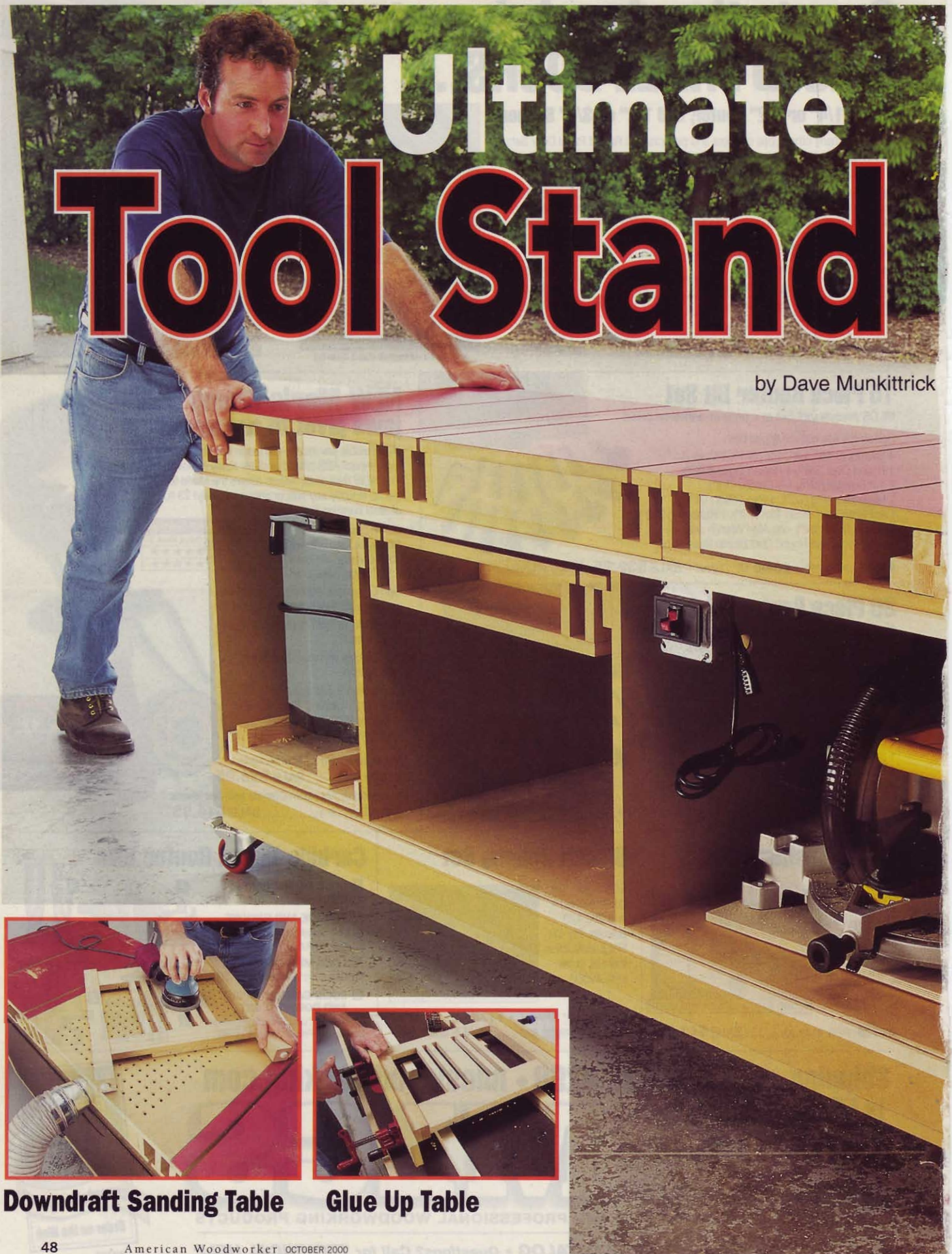
(Packard Woodworks sells a tool rest base for lathes with a 1-1/2-in. gap in ways, and a 12-in. swing-on lathe, item #1 146-707, \$73, plus shipping.)

Packard Woodworks, (800) 683 8876;
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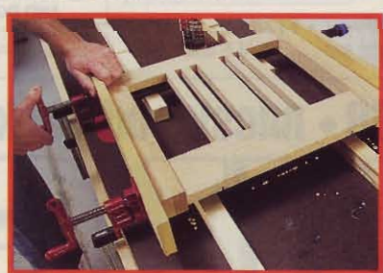


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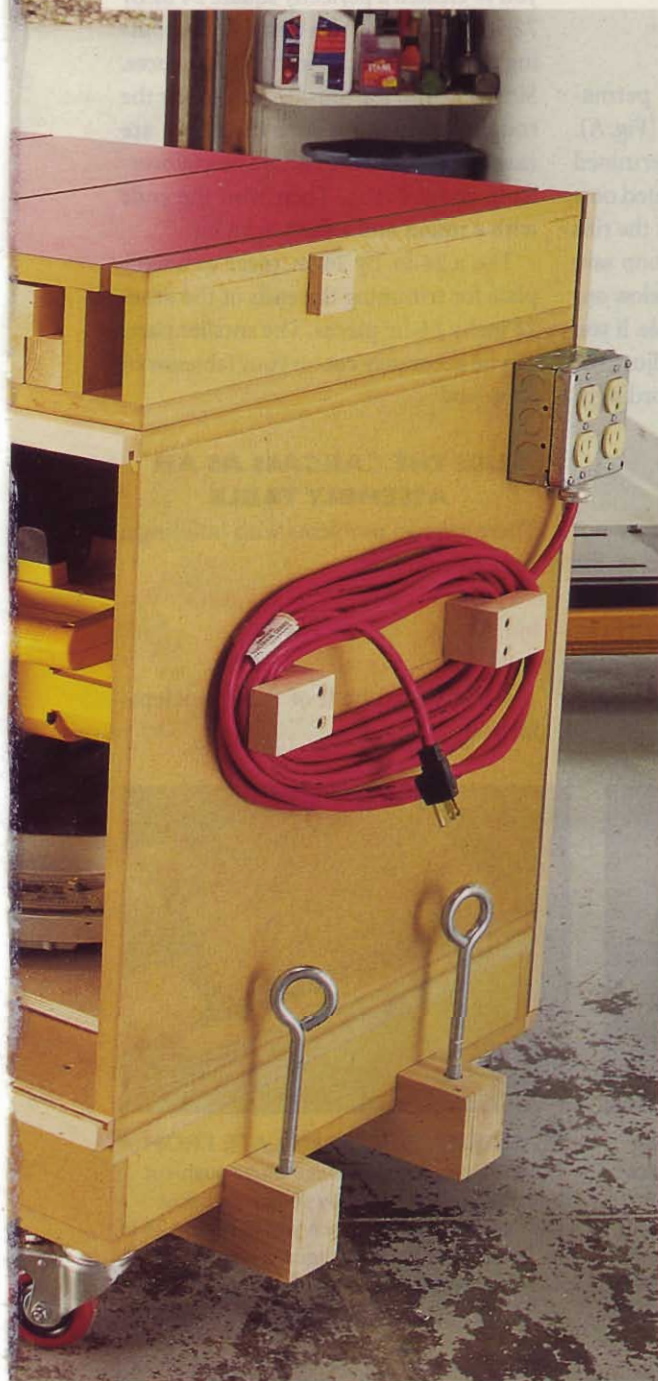
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For those of us who share shop space with a car or a washer and dryer, elbow-room is always a problem. This tool stand is the answer. A 2 ft. by 6-ft. section of floor space is all you need to store it. When you're ready to work, just roll it out, lock it down (these casters won't budge) and plug it in. It not only stores three benchtop power tools, it provides a working platform that actually improves their performance. In seconds you can

shift from a chop saw station to a huge router table and then to a portable planer stand with infeed and outfeed support.

A dead-flat torsion box is the foundation of this tool stand. This torsion box is a sandwich made from two skins of medium-density fiberboard (MDF) and a grid core (Fig. A). It offers incredible strength and resistance to sagging. It simply won't twist out of shape no matter how uneven your shop floor is.

ART DIRECTION: JOEL SPIES • PHOTOGRAPHY: KRIVIT PHOTOGRAPHY • ILLUSTRATION: BRUCE KIEFFER

Chop Saw Stand

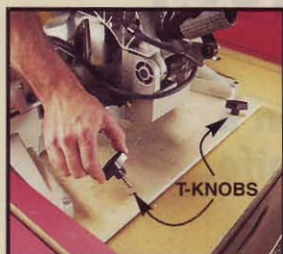


The chop saw stand handles long stock with ease.

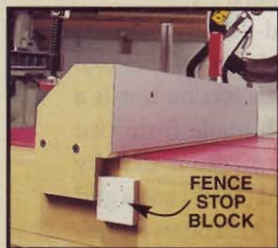
A portable chop saw begs for additional bed support and fence extensions. The ultimate tool stand does both, and set-up is as simple as ABC.



A. Pull the saw from its compartment and set it in the well.



B. Align the front edge of the base with the front edge of the tool stand and secure with T-knobs.



C. Butt the fences up against the stop blocks and secure with clamps.

Elapsed time: 55 seconds!

GETTING STARTED

\$300 buys all the material you need to construct the ultimate tool stand. We used 3/4-in. MDF to build ours.

The only tools you need are a circular saw, a router, a drill, a tablesaw and an accurate straightedge. A pneumatic nail gun makes assembly a lot easier.

Butt joints, screws and glue make for simple, sturdy construction.

DIMENSIONING THE TOOL STAND

There are two things to consider when dimensioning your tool stand:

1. The height of the bed on your chop saw.
2. The height of your tablesaw.

The tool stand consists of two boxes permanently fixed to the top to form a tool well (Fig. A). The 4-1/2-in. height of each box was determined by the height of our chop saw's bed mounted on a 1/2-in. plywood base. Adjust the width of the ribs (C5) to match the height of your own chop saw. The 34-in. height of the tool stand is just below our tablesaw so it can be used as an outfeed table. If you need a different height for your saw, adjust the length of the sides and dividers (C2) accordingly.

ACCURATE MACHINING OF PARTS

Any part that's a little bit out of square or not exactly the right size will have a ripple effect on the outcome of this project. Sides and dividers that are not square or exactly the same size will result in an uneven top. Out-of-square tops and bottoms make for poor-fitting inserts.



- 1** **ROUGH CUT** sheet stock down to a manageable size with a circular saw. A piece of 1-1/2-in. foam board makes an excellent backer. Make sure the blade is set to cut only slightly deeper than the thickness of the stock you're cutting! Remember, MDF is dusty stuff, use dust control whenever possible.

THE SQUARE TEMPLATE

Here's a recipe to guarantee square, perfectly sized parts:

First, rough cut the tops, bottoms and sides about 1/2-in. oversize with a circular saw (Photo 1). Then rip all the pieces to finish width on your tablesaw. *Organize your work so the fence is set just once for each dimension.* This guarantees that every piece is exactly the same width.

Each piece must be crosscut perfectly square. One surefire way to get a square end is to use a straightedge and a router with a flush-trim bit (Photo 2). Once you've created a perfectly square 24 in. by 72-in. piece, use it as a template for routing the other three 24 in. by 72-in. pieces. Simply clamp the finished piece over the rough one making sure the edges are exactly flush and the ends to be cut overhang about 1/4 in. Then trim the ends with a router and a flush-trim bit.

Use a 24 in. by 24-in. piece as a template for trimming the ends of the other 24 in. by 24-in. pieces. The smaller parts can be accurately cut on your tablesaw or chop saw.

USE THE CARCASS AS AN ASSEMBLY TABLE

There are two problems with building a large torsion box:

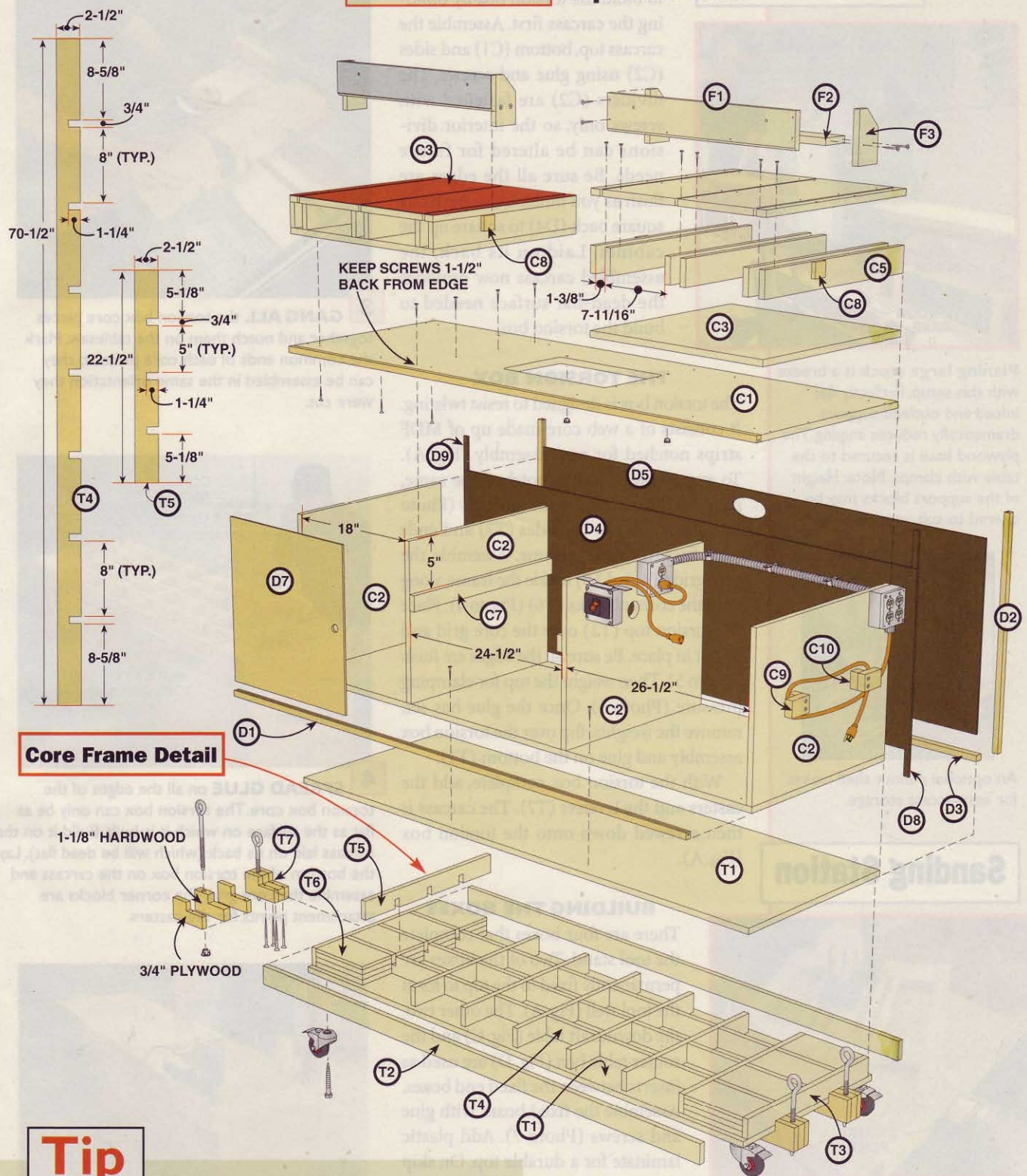
1. It will only be as flat as the surface you build it on.
2. It can be a bear to clamp up.

We've solved both of these problems for you.



- 2** **MAKE A PART TEMPLATE FROM MDF.** Square a straightedge on a rough-cut end, then rout a perfectly square crosscut with a flush-trim bit. Once you have one 24 in. by 24-in. piece perfectly square you can use it as a template for making other square cuts.

FIG. A Exploded View



Core Frame Detail

1-1/8" HARDWOOD

3/4" PLYWOOD

Tip

MDF is prone to splitting when screws are driven into it. To minimize the problem, keep the screws in about 1-1/2 in. from the front and back edges of the top and bottom. This keeps the sides and dividers from splitting. Also, the pilot holes should be made a little deeper than usual and countersunk for the screw heads.

Planer Stand



Planing large stock is a breeze with this setup. Perfectly flat infeed and outfeed support dramatically reduces sniping. The plywood base is secured to the table with clamps. Note: Height of the support blocks may be altered to suit your machine.



An optional pullout shelf makes for easy-access storage.

Sanding Station



The downdraft table insert captures fugitive dust and keeps your shop and your lungs clean. Flip it over and you have a continuous top with slotted channels for machining and gluing.

Create a flat surface on which to build the torsion box by building the carcass first. Assemble the carcass top, bottom (C1) and sides (C2) using glue and screws. The dividers (C2) are fastened with screws only, so the interior divisions can be altered for future needs. Be sure all the edges are flush as you build. Use a perfectly square back (D4) to square up the cabinet. Laid on its back, the assembled carcass now provides the dead-flat surface needed to build the torsion box.

THE TORSION BOX

The torsion box is designed to resist twisting. It consists of a web core made up of MDF strips notched for easy assembly (Fig. A). To ensure each piece is notched the same, gang cut the notches on the tablesaw (Photo 3). Glue and screw the sides (T2) and ends (T3) first to create a frame. Assemble the core grid (T4 and T5) inside the frame along with the corner blocks (T6) (Photo 4). Place the torsion top (T1) over the core grid and tack it in place. Be sure all the edges are flush (Photo 5). Then weight the top for clamping pressure (Photo 6). Once the glue has set, remove the weights, flip over the torsion box assembly and glue on the bottom (T1).

With the torsion box complete, add the casters and the levelers (T7). The carcass is then screwed down onto the torsion box (Fig. A).

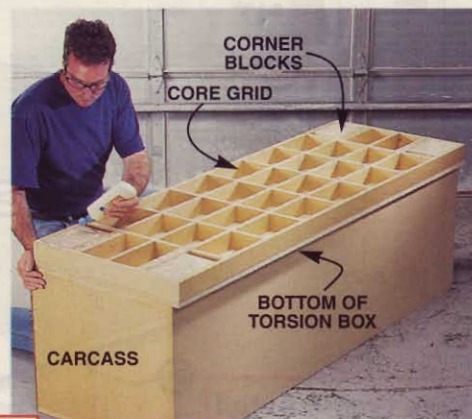
BUILDING THE BOXES

There are four boxes that complete the tool stand. Two of the boxes are permanently fixed to the top to form the tool well (Fig. A). The other two, the downdraft table (Fig. C) and the router table box (Fig. D) are used as inserts between the fixed end boxes. Assemble the fixed boxes with glue and screws (Photo 7). Add plastic laminate for a durable top. Or, skip this step and simply treat the surface with a couple coats of polyurethane (it's a great way to use up that old can that's been opened a few too many times).

Cut the 3/8-in. T-slots in the top with a dado blade on your tablesaw. Attach the fixed



3 GANG ALL the torsion box core pieces together and notch them on the tablesaw. Mark the common ends of each core piece so they can be assembled in the same orientation they were cut.



4 SPREAD GLUE on all the edges of the torsion box core. The torsion box can only be as flat as the surface on which it is built. Build it on the carcass laid on its back (which will be dead flat). Lay the bottom of the torsion box on the carcass and assemble the core grid. The corner blocks are attachment points for the casters.



5 TACK THE TOP onto the core grid. Be sure all the edges are flush.

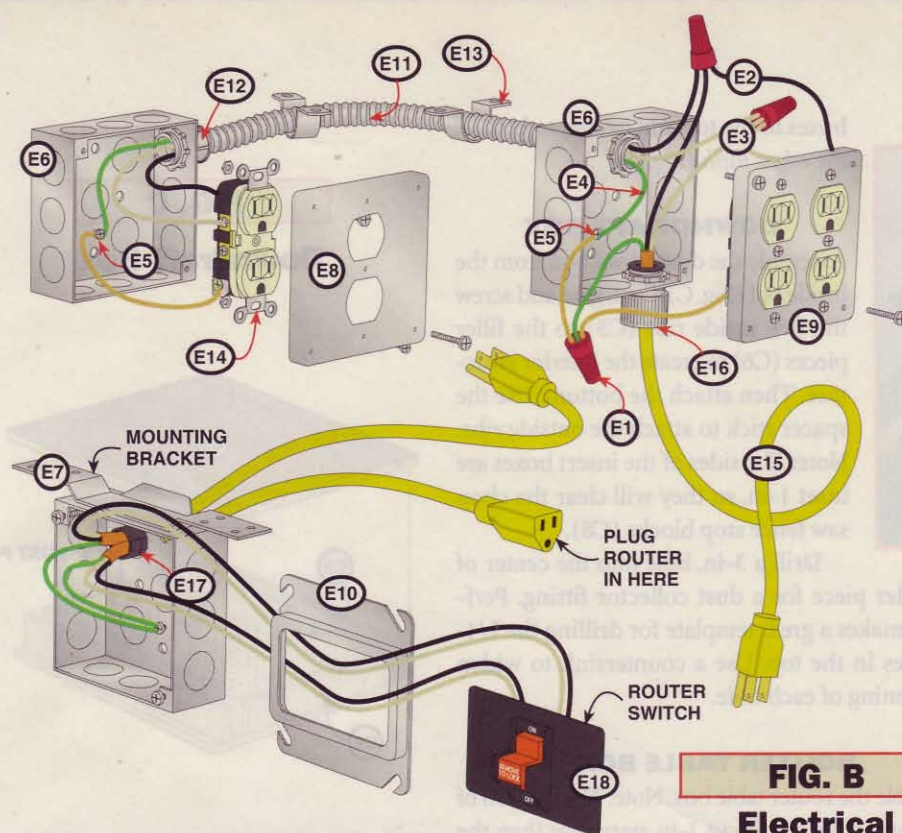


FIG. B
Electrical Connections



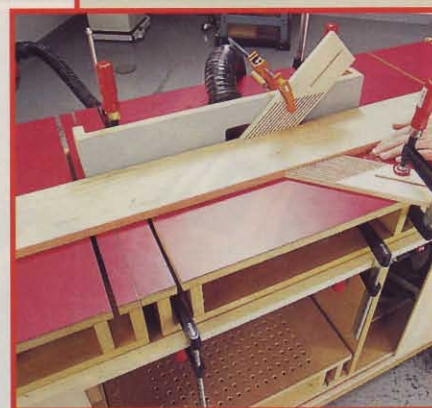
6 CLAMP THE TOP onto the grid with weights and extra sheet stock. The extra sheet stock helps distribute the weight of the blocks evenly.



7 USE A 1-3/8 IN. BY 1 IN. BY 24-IN. SPACER STICK to help lay out the ribs on all the boxes. Use the 1-3/8-in. side to space the double ribs on all the boxes and the 1-in. side for the overhang on the two inserts (Figs. C and D).

Part	Description
E1	Red wire connectors
E2	#12 THHN black wire, stranded or solid
E3	#12 THHN white wire, stranded or solid
E4	#12 THHN green solid wire
E5	Ground screws, #10-32
E6	4-in. square x 1-1/2-in. deep metal junction box
E7	4-in. square x 1-1/2-in. deep metal junction box with an attached mounting bracket
E8	4-in. sq. raised cover for one-duplex receptacle
E9	4-in. sq. raised cover for two-duplex receptacle
E10	Single-gang plaster ring, raised 1/2-in.
E11	1/2-in. flexible metal conduit
E12	1/2-in. flexible conduit connector
E13	1/2-in. flexible conduit straps
E14	Duplex 15-amp 120-volt receptacle
E15	12/3 SJ cord set, round cord (remove female end)
E16	Strain relief cord connector
E17	Plastic push-in connector for two cords
E18	Router switch

Router Table



This router table is huge! The router table insert can be set up or stored in seconds without having to remove the router. Just slide it out (see below), drop it into the well and clamp it to the top. The slotted top allows the fence and featherboards to be clamped with ease. The router is plugged into a convenient power switch below (Fig. B).

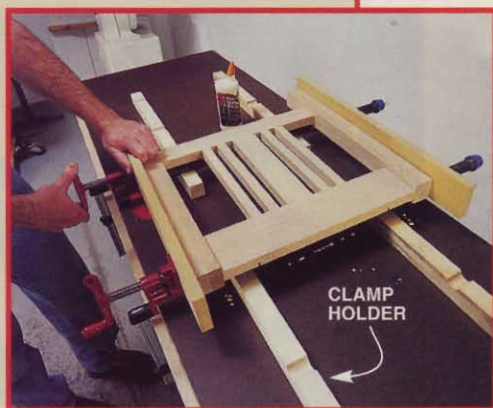


Crosscut Well



Cut sheet stock down to size over the open well. No more wrestling with large stock on the tablesaw or trying to cut it down on a pair of wobbly sawhorses.

Glue Up Table



Accurate glue ups are guaranteed on this dead-flat surface. Say goodbye to twisted assemblies.



A self-storing drip shield keeps your tool stand clean.

Clamping System



Slots in the top allow you to clamp anything, anywhere on this table. Machining has never been easier. Here the clamps hold straightedge guides and the piece being machined for cutting multiple dados.

boxes to the top and be sure to keep all the edges flush (Fig. A).

DOWNDRAFT BOX

Assemble the downdraft box from the inside out (Fig. C). First, glue and screw the two inside ribs (C5) to the filler pieces (C6) to create the interior structure. Then attach the bottom. Use the spacer stick to attach the outside ribs. Note: The sides of the insert boxes are inset 1-in. so they will clear the chop saw fence stop blocks (C8).

Drill a 3-in. hole into the center of one filler piece for a dust collector fitting. Perforboard makes a great template for drilling the 1/4-in. holes in the top. Use a countersink to widen the opening of each hole.

ROUTER TABLE BOX

Assemble the router table box. Note: The bottom of the router table box is cut 2-in. narrower than the top, making it flush with the outside ribs (Fig. D). This allows the router table to be lifted in and out of the well with the router attached.

The router is mounted onto a table insert that sits flush to the top. This allows you to lift the entire router out of the table for changing bits. Make two 8 in. by 16-in. access holes, one in the bottom of the router table and the other in the top of the carcass. These holes allow room for a pair of hands to adjust the router.

TOOL BASES

The chop saw is screwed to a piece of 1/2-in. plywood sized to fit into the well. To make positioning of the saw and the auxiliary fences easier, line up the front edge of the saw base with the front edge of the tool stand well. Behind the saw, drill two 1/4-in. holes through the base and the carcass. Mount T-nuts to the underside of the carcass top (Fig. A) and secure the saw with T-handle knobs. Clamp a straightedge to your saw's fence and position the chop saw fences against it. Nail the stop blocks to the fixed boxes. The planer base is made from a piece of 3/4-in. plywood. The two 1-5/16 in. by 24-in. supports bring the planer bed up to the same height as the fixed end boxes. Your planer bed may vary, so size the supports accordingly.

That's it. You're done! Now your shop will seem two sizes larger without moving a single wall!

FIG. C

Downdraft Box

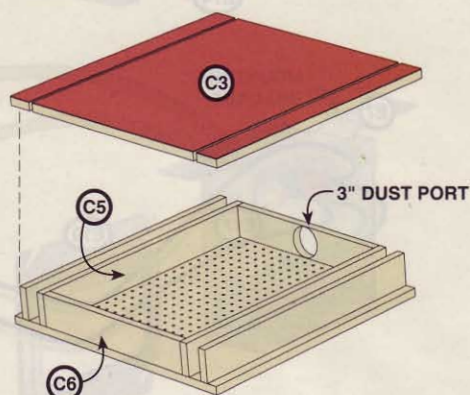
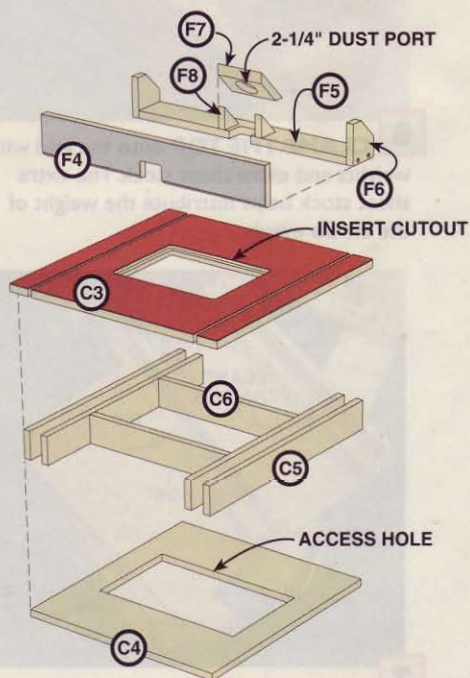


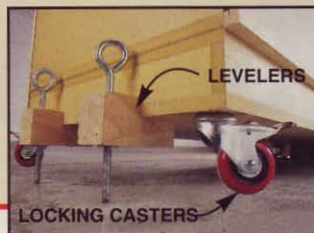
FIG. D

Router Table Box



Outfeed Table

A rock-solid outfeed support that sets up in minutes is like having a second set of hands at the table saw.



Heavy-duty casters and levelers can handle uneven shop floors and make this tool stand mobile and stable. **AW**

CUTTING LIST

Overall Dimensions: 34-1/4" H x 72" W x 25-3/4" D

Part	Description	Qty.	Dimensions
CARCASS and BOXES {C} 3/4" MDF			
C1	Top and Bottom	2	24" x 72"
C2	Sides and Dividers	4	24" x 20"
C3	Box Tops and Bottoms	7	24" x 24"
C4	Router Box Bottom	1	22" x 24"
C5	Ribs	20	3" x 24"
C6	Fillers	4	3" x 16-1/4"
C7	Router Box Slides	2	2" x 24"
1/2" sheet stock			
C8	Chop Saw Fence Stop Blocks	4	1-3/4" x 1-3/4"
1"-thick squared up 2x4 stock			
C9	Cord Cleat Face	2	2" x 3"
C10	Cord Cleat Base	2	1-1/4" x 2"
TORSION BOX {T} 3/4" MDF			
T1	Top & Bottom	2	24" x 72"
T2	Sides	2	2-1/2" x 72"
T3	Ends	2	2-1/2" x 22-1/2"
T4	Long Core	3	2-1/2" x 70-1/2"
T5	Short Core	7	2-1/2" x 22-1/2"
3/4" plywood and hardwood sandwich			
T6	Corner Blocks	8	2-1/2" x 5-1/8" x 8-5/8"
T7	Leveler block	4	3" x 6"
CHOP SAW FENCES {F} 3/4" MDF			
F1	Faces	2	4" x 25-1/2"
F2	Bases	2	3-1/4" x 24"
F3	Brackets	4	3-1/4" x 5-3/4"
ROUTER TABLE FENCE 3/4" MDF			
F4	Face	1	4" x 25-1/2"
F5	Base	1	3-1/4" x 24"
F6	Brackets	2	3-1/4" x 4"
F7	Dust Port	1	4-5/8" x 5"
F8	Blocks	2	2-3/16" x 2-3/16"
DOOR AND DRIP SHIELD TRACKS {D} 3/4" hardwood			
D1	Door Tracks	2	3/4" x 72"
D2	Drip Shield Track	2	3/4" x 29-1/4"
D3	Drip Shield Bottom Stop	1	1" x 72"
BACK, DOORS and DRIP SHIELD {D} 1/4" sheet stock			
D4	Back	1	21-1/2" x 72"
D5	Drip Shield	1	24" x 71"
D6	Door	1	20-1/2" x 28"
D7	Door	1	20-1/2" x 19-1/4"
D8	Back Track Fill Pieces	2	3/4" x 3-1/4"
D9	Back Track Fill Pieces	2	3/4" x 4-1/2"
TOOL BASES {B} Sheet stock			
B1	Chop Saw Base	1	19" x 24"
B2	Planer Base	1	12" x 24"
Squared up 2x4 stock, 1-3/8" thick			
B3	Support Blocks	2	1-5/16" x 24"

*Adjust for your planer bed height

SHOPPING LIST

Sheet goods

4	3/4 in. x 4 ft. x 8 ft. MDF	\$80
1	1/4-in. x 4 ft. x 8 ft. hardboard	\$8
4	1/2-in. x 6-in. eye bolts	\$27
4	1/2-in T-nuts	\$3
4	1/2-in. x 3 in. lag bolts	\$2

Electrical

3	Red wire connectors	
5 ft.	#12 THHN black wire, stranded or solid	
5 ft.	#12 THHN white wire, stranded or solid	
5 ft.	#12 THHN green solid wire	
3	Ground screws, #10-32	
2	4-in. square x 1-1/2-in. deep metal junction box	
1	4-in. square x 1-1/2-in. deep metal junction box with an attached mounting bracket	
1	4-in. sq. raised cover for one-duplex receptacle	
1	4-in. sq. raised cover for two-duplex receptacle	
1	Single-gang plaster ring, raised 1/2-in.	
3 ft.	1/2-in. flexible metal conduit (or length as needed)	
2	1/2-in. flexible conduit connector	
2	1/2-in. flexible conduit straps	
3	Duplex 15-amp, 120-volt receptacle	
25 ft.	12/3 SJ extension cord set, round cord	
1	Strain relief cord connector	
1	Plastic push-in connector for two cords	
TOTAL COST OF ELECTRICAL		\$35

HIGHLAND HARDWARE (800) 241-6748

1	Router Switch with Cord Set	
	Item #W2001	\$13
1	Router Table Insert, Item #RM-3509	\$33
1	Insert Template, Item #10.20.23	\$15

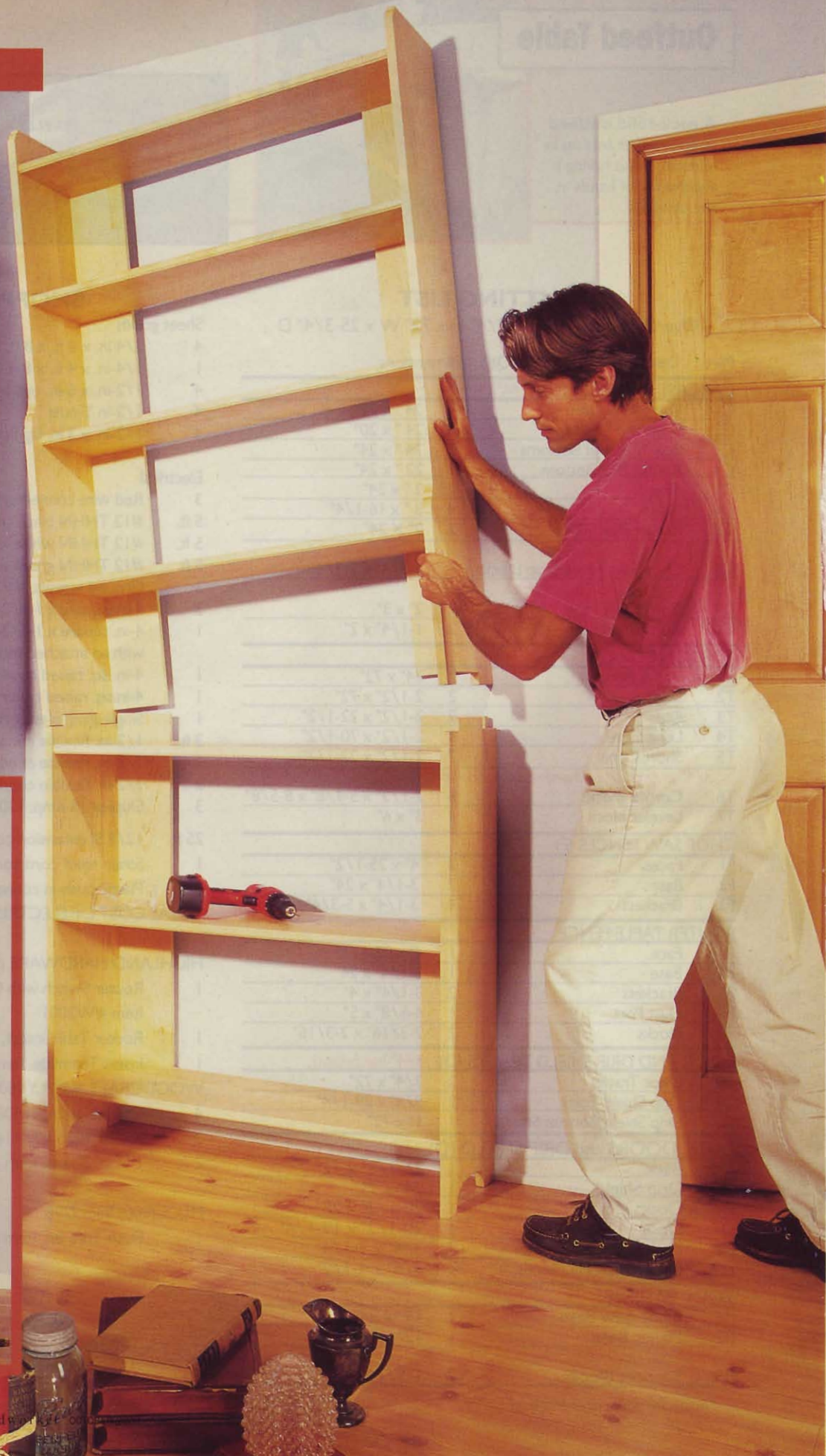
WOODCRAFT SUPPLY (800) 225-1153

4	Castors, Item #140639	\$58
2	Knobs, Item #27R16	\$4
2	1/4 in. T-nuts, Item #130226	\$2

MLCS (800) 533-9298

1	Flush-Trim Bit, Item #7808	\$15
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By Tom Caspar

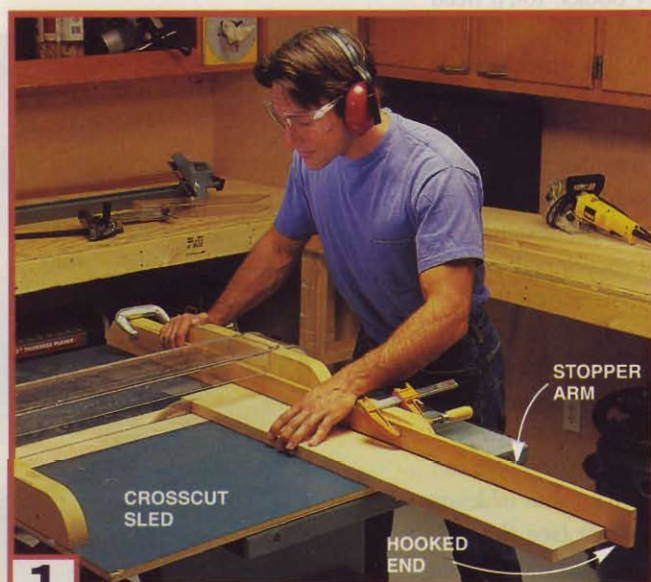


TWO-PART BOOKCASE

*Here's a **big** bookcase that you can build in a **small** shop.*

Building a tall bookcase can stretch the limits of a small shop. We all know that big boards can be a bear to handle and glue up, so I've taken an old Scandinavian design and sliced it up into bite-size pieces. My solution is to break the bookcase into two interlocking sections that require only short and narrow stuff. Not to mention, that's the only way I could get it out of my shop and up the basement stairs!

Biscuits join the shelves and sides. It's a snap to put together wide boards at right angles with a plate joiner. But biscuits alone aren't enough to make a stiff case, so I've added backboards that lock the whole bookcase into a rigid unit.



1

TRIM LONG AND WIDE BOARDS on your tablesaw with a crosscut sled. A sled is easier to use and more accurate than a standard miter gauge. Clamp a hooked stick onto the fence to act as a stopper arm. This ensures that all your boards come out the same length.

SIDE
VIEW OF
BOOKCASE



2

RIP THE STEPPED BOARD (C) on the bandsaw. A simple fence helps you make a straight cut. Stop the cut at the top of the ogee curve and withdraw the board. Remove the fence and cut out the ogee.



3

GLUE THE UPPER CASE SIDES from 1-in.-thick rough boards that are planed to 7/8-in. thick. This leaves some untouched low spots, but that's OK. Align the outside boards so their bottoms are even.

Materials and Tools

Rather than splurge on the best quality lumber simply to make shelves, you can save money on this project by using a lower grade of hardwood, No. 1 Common. You'll find many good boards that are too short or narrow to make the best grade but are perfect for this bookcase. I used No. 1 Common birch because it's inexpensive (about \$1.75 per bd. ft.), a light color (the case looks less massive) and stiff enough to support heavy books. You'll need about 75 bd. ft. for a total cost of \$130.

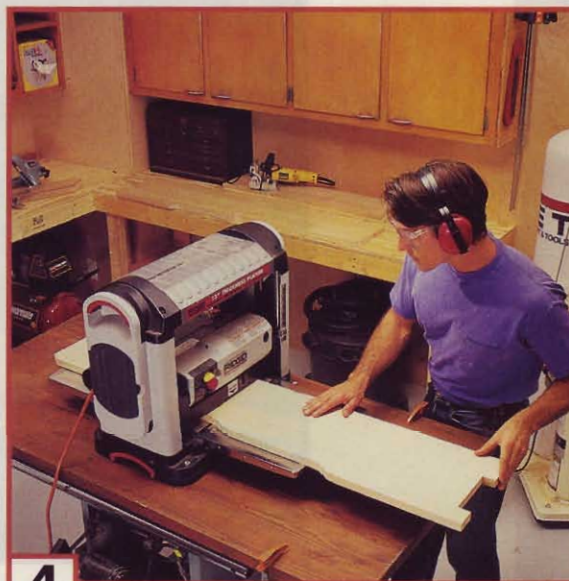
As an alternative you can use 3/4-in.-thick boards from a home center. Pick straight ones, glue them together and plane them to 5/8 in. I built a prototype bookcase this way and it worked just fine. To tell the truth, I preferred its slim look to one made of thicker wood. However, I found that 5/8-in. thick shelves bend under a lot of weight, so they wouldn't be suitable for a set of encyclopedias. (For more on designing strong shelves, see Practical Design, AW #75, October 1999, page 75.)

You'll need the three basic machines for processing solid wood to make this bookcase from rough lumber: a tablesaw, a jointer and a planer. (If you build with pre-planed, 3/4-in. boards that have one straight edge, you can get by without a jointer.) A crosscut sled for your tablesaw isn't required but it sure makes life easier (see AW #75, page 38 for plans). In addition, you'll need a router, plate joiner, bandsaw or jigsaw, an accurate framing square (see Q&A, page 10) and eight pipe clamps to hold the case together during glue up.

Any white or yellow glue works fine for the biscuit joints, because both glues contain the water needed to

Do you have a portable planer?

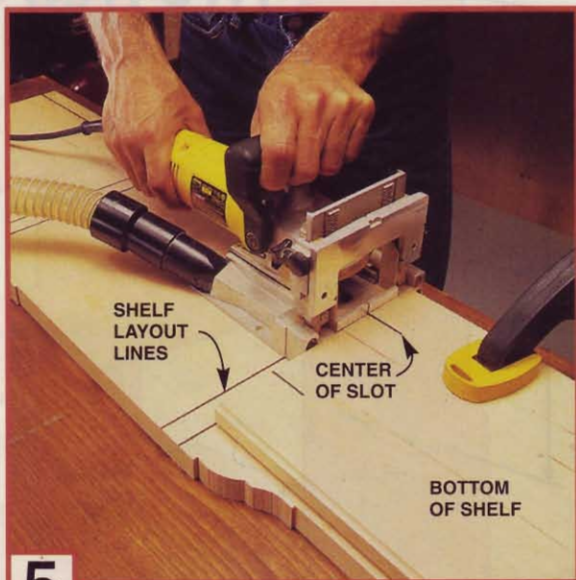
Great, because we've kept every part less than 12-in. wide. That means you can flatten the sides and shelves with your planer.



4

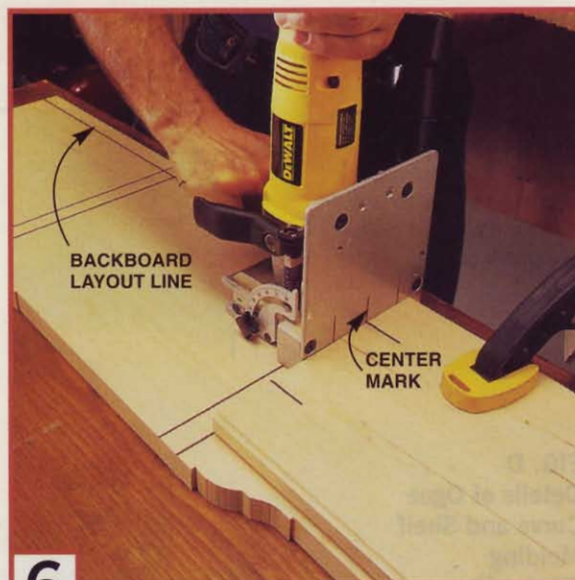
PLANE THE GLUED-UP CASE SIDES until there are no low spots left. All the parts of this bookcase should be the same thickness, which can be anywhere from 3/4 in. to a minimum of 5/8 in.

BOOKCASE



5

CUT BISCUIT SLOTS in the ends of the shelves. You can't go wrong if you clamp each shelf in position, right above the double lines. Set the shelf in from the back edge by the thickness of one backboard.



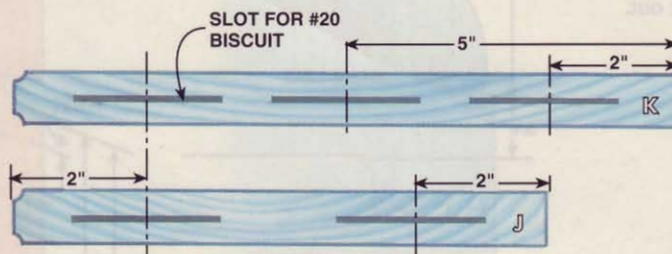
6

CUT MORE BISCUIT SLOTS in the case side. Stand the plate joiner up on end and butt it against the end of the shelf. Align the center mark on the bottom of the machine with the pencil mark on the bottom of the shelf.

FIG. A

Biscuit Placement

#20 biscuits are plenty strong to hold a shelf's weight. They won't shear off under a load because the grain of a biscuit runs diagonally.



swell the biscuits. Use a special yellow glue with a long open time (see Sources, page 63) if you're going to glue up the cases by yourself and don't like working like a speed demon!

Preparing Rough Lumber

For the sides and backboards, select boards that don't have a pronounced twist. Twisted wood isn't worth the hassle. Rough cut your boards 1 in. over final length and 1/4 in. over final width. Set your jointer to remove 1/32 in. Run one face over the jointer only a couple of times. It's OK if this doesn't clean up the whole board.

Run the other face of the boards through a portable planer until most of the rough spots are gone and the boards are all about 7/8-in. thick. Don't sweat it if they end up a bit thinner. Then joint one edge, rip the boards 1/32-in. over final width and joint the second edge. Pay attention to boards B and F—they've got to be exactly the same width. Square one end and trim the boards to exact length using a crosscut sled and a stopper arm (Photo 1).

Do you buy lumber at a home center?

Go ahead and buy pre-thickened 3/4-in. boards. Our plans work fine with this time-saving wood or with No. 1 Common rough lumber.

Gluing the Sides

The upper and lower sides are composed of three boards that form a tongue and notch (Fig. F). There's no trick to getting the sides to nest together perfectly. It's simply a matter of being careful at glue up.

Start with the upper sides. Lay out the ogee curves on boards C and the cutouts on the top end of boards B (Figs. C and D). Cut out the curves on the bandsaw (Photo 2).

Dry clamp boards A, B and C together. Boards A and B are flush at the top. Boards A and C are flush at the bottom. Check both ends with a straightedge, then draw an alignment mark across all three boards (Photo 3).

Glue the upper sides together. Getting a perfect alignment end-to-end drove me nuts until I adopted the method of rubbing the boards together first, before clamping (see

(text continued on page 62)

FIG. C

Detail of Top Cutout

It's easier to cut this with a jigsaw than a bandsaw because it's hard to balance the board on a bandsaw's table.

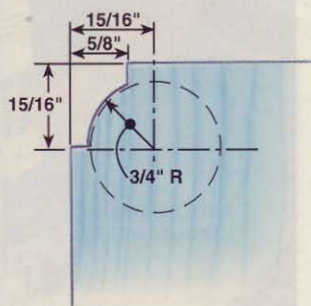


FIG. D

Details of Ogee Curve and Shelf Molding

This is a 50-percent reduction. Make a copy, double its size on a photocopy machine, paste it onto an index card and cut it out.

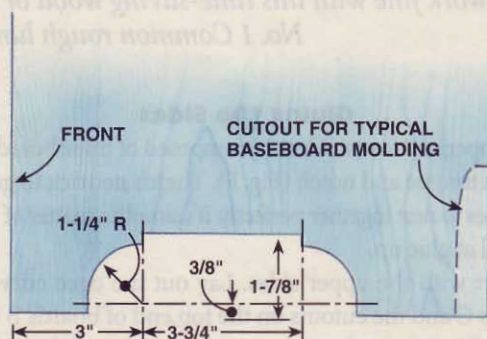
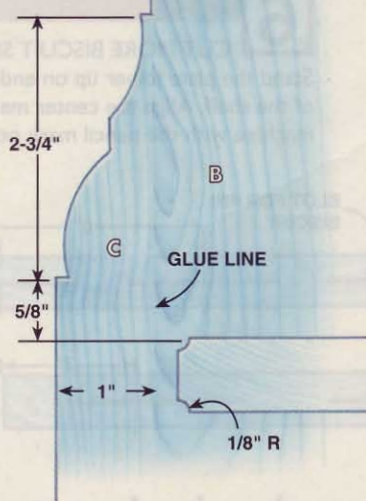


FIG. E

Detail of Bottom Cutout

Scribe the back of your bookcase to fit around your baseboard molding. The back of the bookcase should fit tight against the wall so the bookcase can be firmly anchored.

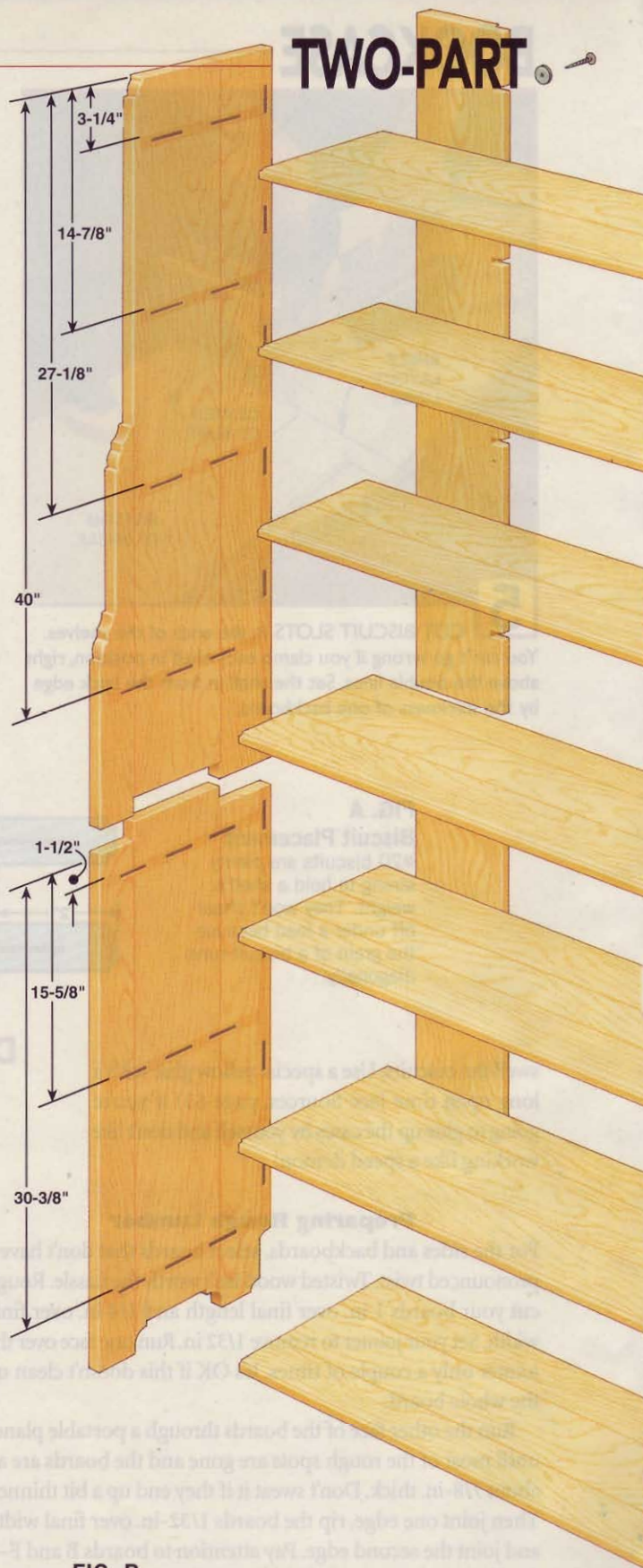


FIG. B

Exploded View of Tall Bookcase

Safety Note:

Anchor this bookcase to the wall with screws through the backboards so it can't accidentally tip over.

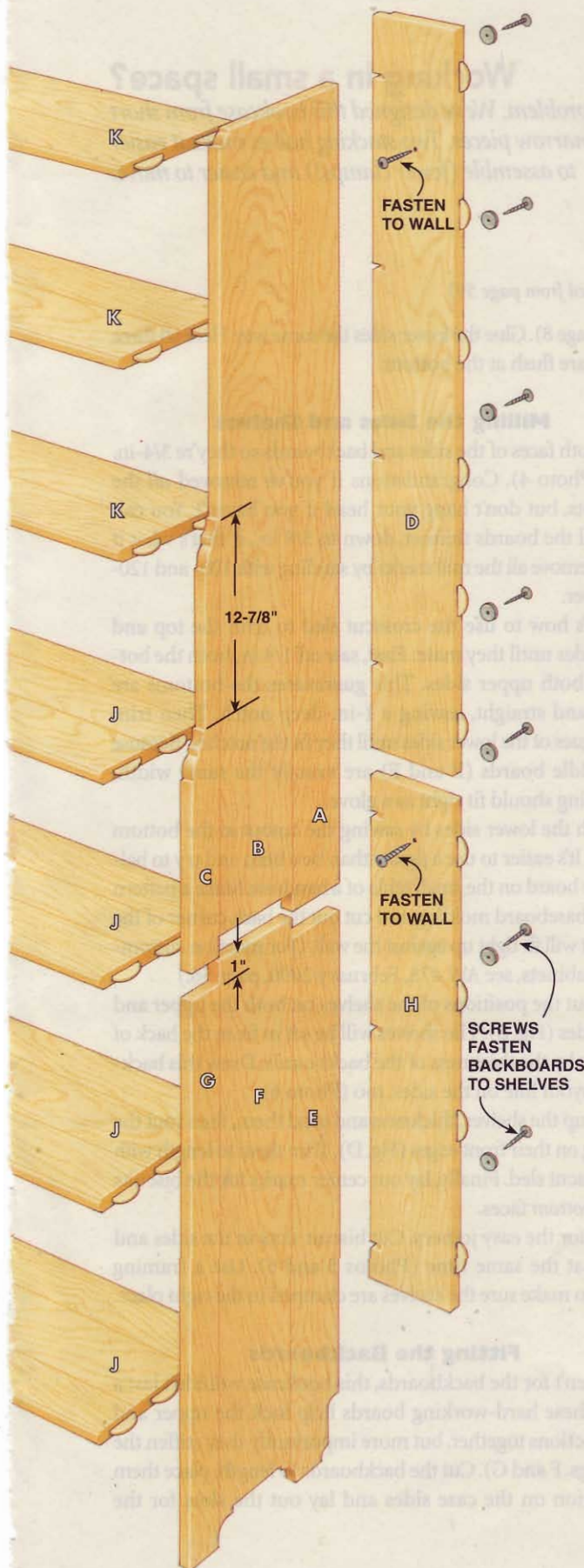


FIG. F
Connection Between Top and Bottom

The top half of the bookcase fits snugly onto the bottom half. The lower backboards (H) prevent the top half from shifting side-to-side, and the notched sides lock in the top, front-to-back.

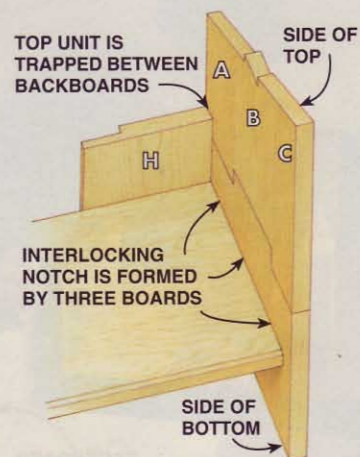
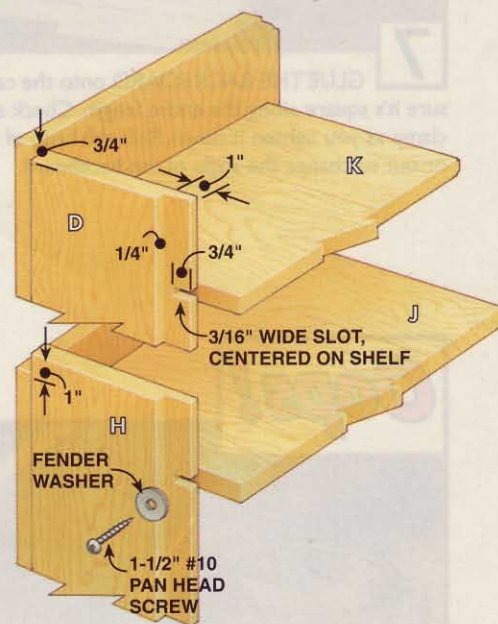


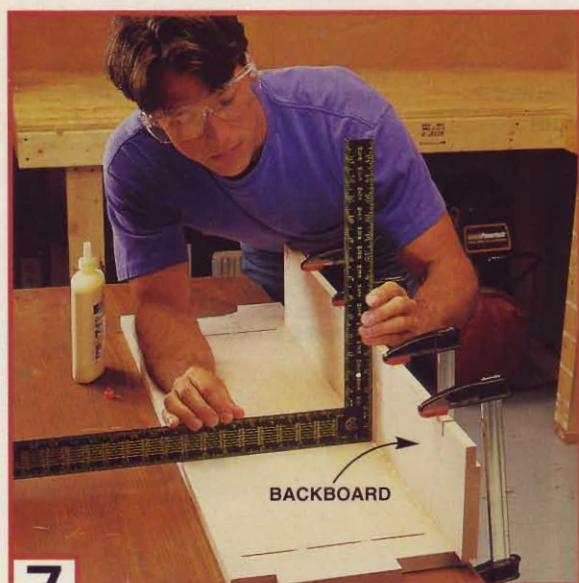
FIG. G
Detail of Shelf Slots

Screwing the backboards to the shelves stiffens the bookcase, but an allowance must be made for the backboards to shrink and swell in width with the seasons. That's why the screw passes through a slot rather than a hole. The backboard is dadoed so the head of the screw doesn't stick out.



CUTTING LIST
OVERALL DIMENSIONS: 88" H x 36" W x 11" D

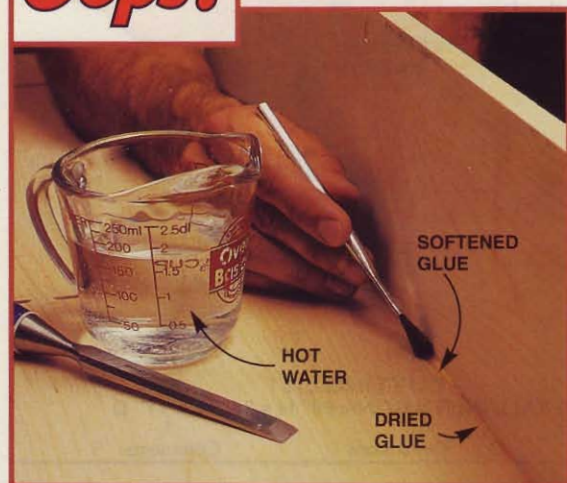
Part	Name	Qty.	Dimensions	Comments
Upper Unit				
A	Rear Board	2	7/8" x 3-1/2" x 52-1/4"	Glue together, thickness to 3/4" and trim bottom end so overall length is 52."
B	Middle Board	2	7/8" x 5-1/2" x 51"	
C	Front Board	2	7/8" x 2" x 28-1/2"	
D	Back	2	3/4" x 5-1/2" x 50"	
Lower Unit				
E	Rear Board	2	7/8" x 3-1/2" x 36"	Glue together, thickness to 3/4" and trim middle board to fit notch in upper unit.
F	Middle Board	2	7/8" x 5-1/2" x 37-1/4"	
G	Front Board	2	7/8" x 2" x 36"	
H	Back	2	3/4" x 5-1/2" x 32-1/2"	
Shelves				
J	Wide Shelves	4	3/4" x 1" x 34-1/2"	Glue up from 7/8" boards, thickness to 3/4" and trim to length.
K	Narrow Shelves	3	3/4" x 8" x 34-1/2"	



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GLUE THE BACKBOARD onto the case side. Make sure it's square along the entire length. Check opposite each clamp as you tighten it down. Shift the head of the clamp in or out to change the angle of the backboard.

Oops!



Nuts! We forgot to remove some squeezed-out glue before it dried!

Finish won't stick to it, so the glue has to be removed before we can move on. Fortunately, yellow glue can be softened with hot water and scraped off with a sharp chisel days after it has dried. Hot water turns the clear glue back to its original yellow color, so it's easy to see what must be removed. After scraping, wash the area with a rag dampened with hot water, let the wood dry and sand off the raised grain.

Working in a small space?

No problem. We've designed this bookcase from short and narrow pieces. Two stacking halves make it easier to assemble (fewer clamps!) and easier to move.

(continued from page 59)

Q&A, page 8). Glue the lower sides the same way. Here all three boards are flush at the bottom.

Milling the Sides and Shelves

Plane both faces of the sides and backboards so they're 3/4-in. thick (Photo 4). Congratulations if you've removed *all* the low spots, but don't hang your head if you haven't. You can plane all the boards thinner, down to 5/8 in., if that's what it takes. Remove all the mill marks by sanding with 100- and 120-grit paper.

Here's how to use the crosscut sled to trim the top and lower sides until they mate: First, saw off 1/4 in. from the bottom of both upper sides. This guarantees the bottoms are square and straight, leaving a 1-in.-deep notch. Then trim the tongues of the lower sides until they fit the notches. Because the middle boards (B and F) are exactly the same width, everything should fit tight as a glove.

Finish the lower sides by sawing the cutout at the bottom (Fig. E). It's easier to use a jigsaw than be a hero and try to balance the board on the small table of a bandsaw. Make a pattern of your baseboard molding and cut out the back corner of the side so it will fit tight up against the wall. (For more on custom-fitting cabinets, see AW #78, February 2000, page 56.)

Lay out the positions of the shelves on both the upper and lower sides (Fig. B). The shelves will be set in from the back of the sides by the thickness of the backboards. Draw this backboard layout line on the sides, too (Photo 6).

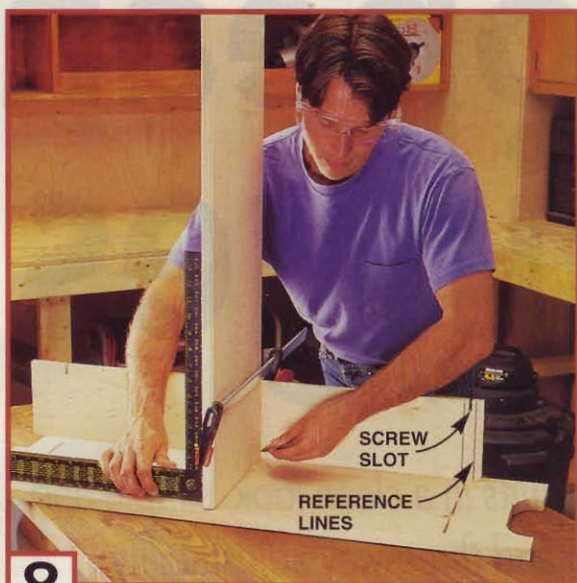
Glue up the shelves, thickness and sand them, then rout the molding on their front edges (Fig. D). Trim them to length with the crosscut sled. Finally, lay out center marks for the biscuits on the *bottom* faces.

Now for the easy joinery. Cut biscuit slots in the sides and shelves at the same time (Photos 5 and 6). Use a framing square to make sure the shelves are clamped in the right place.

Fitting the Backboards

If it weren't for the backboards, this bookcase wouldn't last a week. These hard-working boards help lock the upper and lower sections together, but more importantly they stiffen the case (Figs. F and G). Cut the backboards to length, place them in position on the case sides and lay out the slots for the

BOOKCASE



8

MARK THE POSITION of the shelves on the backboards with light pencil lines. These reference lines help you glue up the entire case square. Clamp each shelf in place, without glue, and adjust it until it's square to the case side.

screws (Fig. G). Cut the slots on the tablesaw. Stand the backboards on edge against a miter gauge and make two overlapping cuts with a standard saw blade. Then cut the dados for the screwheads.

Cut biscuit slots to join the backboards and case sides. These biscuits align the backboard flush with the side, but do not add strength. Glue the backboards to the sides (Photo 7).

Final Assembly

The backboards also help you square up the whole bookcase when you glue the sides and shelves together. Thank goodness! You can get into lots of trouble by gluing things out of square, but this system is slick. Dry clamp each shelf in place with the biscuits loose in the slots and mark the shelf's position on the backboard (Photo 8). Make the pencil lines very light because you won't be able to get into the corners with an eraser after the glue up. That's the one downside of this easy method.

Take your time and walk through a dry run of the glue up before you attempt the real thing (Photo 9). Here's the best way to do the glue up, alone, without going crazy: Support one side with a narrow (7-in.), wooden box that leaves room for the clamp heads. Insert one shelf at a



9

GLUE THE LOWER UNIT TOGETHER with cauls and pipe clamps. The thick cauls distribute clamping pressure over the entire width of the side. Use short clamps to pull the shelves tight against the backboards. Align the shelves with the reference lines. Then tighten the pipe clamps.

time, align it with the reference lines on the backboard and clamp it in place. Once all the shelves are upright, place the other case side on the ends of the shelves, clamp the shelves tight to the backboard and finally add the pipe clamps.

Finishing and Installation

After gluing both cases, sand them with 150-grit paper. Avoid dyeing or staining birch, because it has a tendency to unevenly soak up color and become blotchy. Even an oil finish can look bad, so stick with shellac, brushed-on varnish or lacquer.

This tall bookcase stands quite well on its own, but for safety, fasten it to the wall through the backboards. Then there'll be no chance for it to tip if a pet or rambunctious kid tries to climb the shelves! **AW**

Sources

Garrett Wade
(800) 221-2942
Special Slo-Set Glue, 62J04.01, 1 pt., \$7.

European Hinges

By Jim Grandbois

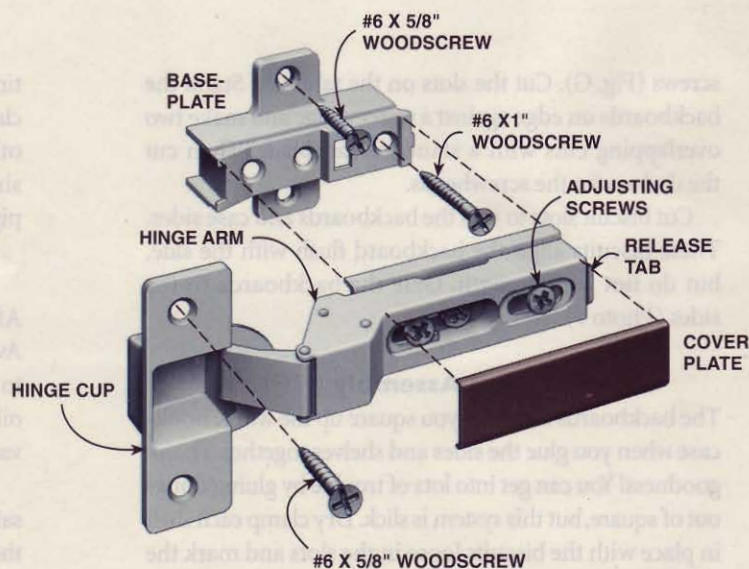
German engineering results in a clean look, simple and predictable installation and three-way adjustability.

Once I discovered the simplicity of hanging doors with European hinges, I was hooked. Unlike butt hinges, European hinges are totally adjustable and very easy to install.

With the help of a simple drill press table and a marking jig, you can hang a door in just a few minutes. Sound good? Read on.

FIG. A Parts of a European Hinge

These sophisticated hinges allow complete adjustment of a door after installation. In addition, doors can be quickly released from the cabinet without removing a single screw! The hinges keep their settings when reattached—a wonderful feature.

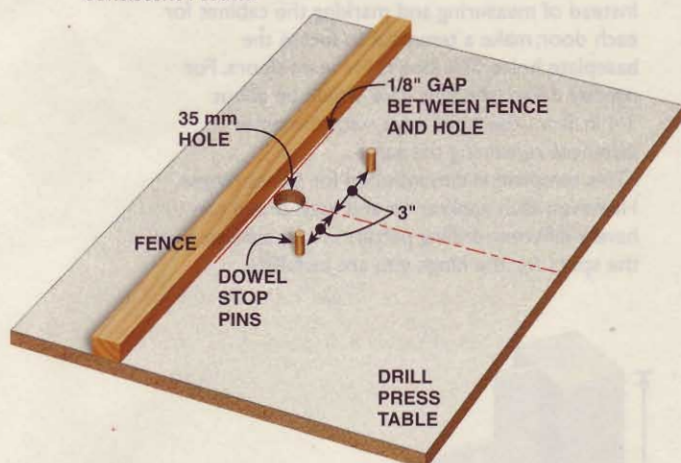


Background

European hinges are part of a standardized construction system developed over 50 years ago in Germany. It radically changed cabinetmaking by streamlining production and reducing costs. The resulting European hinge is a beautifully engineered precision product (Fig. A). There's a hinge for nearly every application. I've used Grass brand hinges for years with flawless results. Major brands such as Grass, Blum and Mepla make a great product that lasts for years. Expect to pay about \$8 to \$13 per pair.

FIG. B Drill Press Table

This easily made jig saves time and helps you achieve consistent results.



Tools Required

Setting up for European hinges is very simple and quite inexpensive. You only need a drill press, a boring bit and a screwdriver. The drill press is a must for drilling a straight hole. While you could drill the holes by hand, it's riskier. A drill press ensures success.

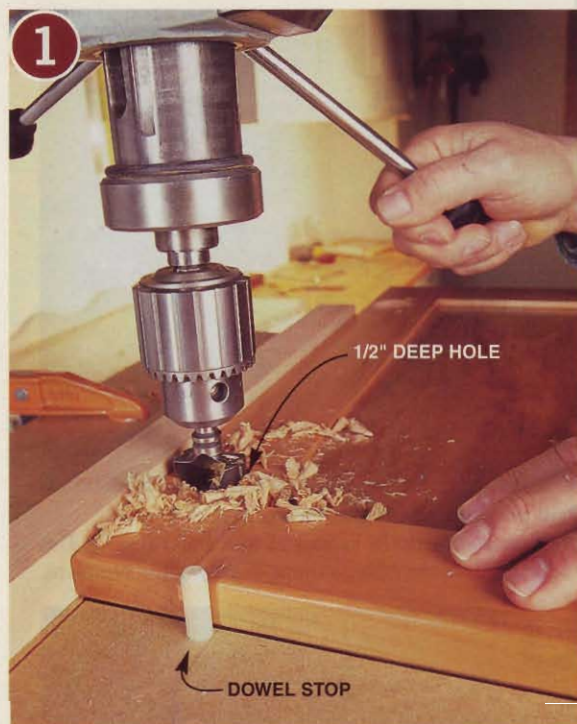
If you have a lot of doors to hang, I recommend a 35 mm carbide bit, a self-centering drill bit and a magnetic-tipped screw bit. A \$25, 35 mm carbide bit keeps a sharper edge and outlasts steel bits, especially in tougher materials such as MDF. An \$8, self-centering drill bit, such as a Vix bit, is great because it centers the screw hole and controls the drilling depth. In addition, the bit's outer housing protects template holes from damage. A magnetic-tipped screw bit (\$4 to \$5) holds screws so well it's the next best thing to an extra hand. Finally, consider spending \$10 on a PoziDrive screwdriver for the adjusting screws. It delivers much better control than a standard Phillips screwdriver.

If you have only a few hinges to install, you can save some money. Use a 1-3/8-in. Forstner bit or a 35 mm, high-speed steel bit (costs less than half the carbide). A Phillips screwdriver is fine for installing a few screws and adjusting the hinges.

Installation

I always apply finish to the cabinet and doors *before* I install hinges. For an inset application (as shown in these photos), cut the doors leaving a 1/8-in. gap at the top, bottom, sides and at the center division between two doors.

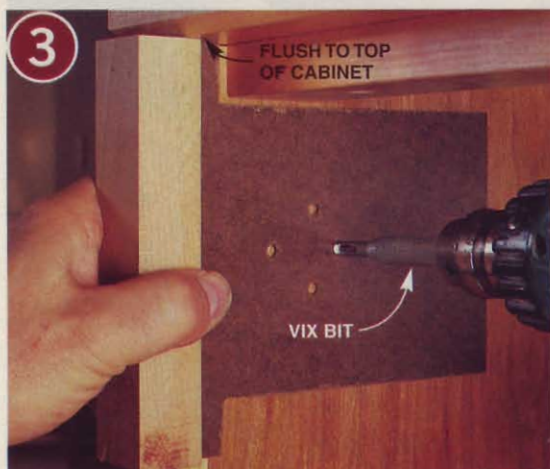
Just follow Photos 1 through 8. With all the parts ready to go, installation of European hinges is as easy as eins, zwei, drei!



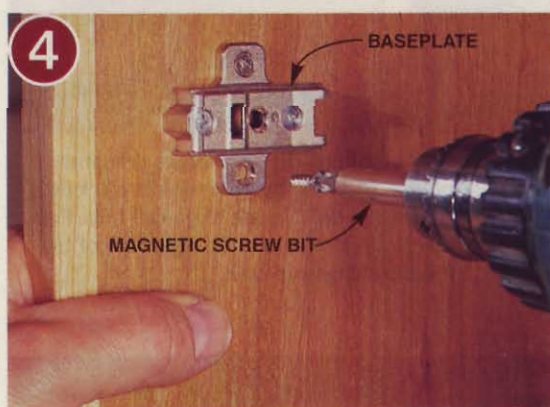
Drill a hole for the hinge cup. Clamp the drill press table in position (Fig. B). Hold the door against the fence, butt it up to the pin and drill the left hinge-cup hole. Pull out the dowel pin and insert it into the right hole of the jig. Then drill the right hinge-cup hole.



Screw the hinge to the door. First, insert the hinge and use a square to align the hinge's arm perpendicular to the door. Drill pilot holes into the door using a 7/64-in. Vix bit. (A Vix bit automatically centers the pilot holes at a fixed depth, so you won't accidentally drill through the door.) Install the screws. The soft pad under the door protects the finish.



Drill pilot holes for the baseplate. A simple template automatically locates all four holes (Fig. C). The Vix bit centers the hole, without damaging the template.



Fasten the baseplate to the cabinet. Install the baseplate with all four screws. A magnetic bit makes it easier to hang on to such a small screw!



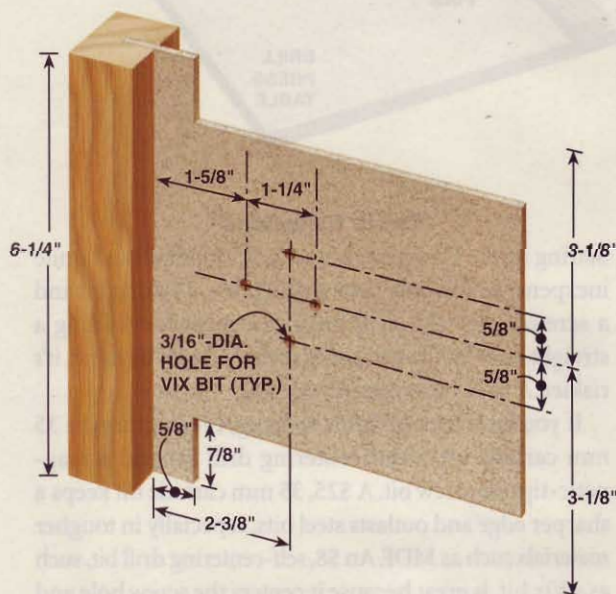
Clip the door onto the baseplates. Attach the upper hinge first. This allows the door to hang so it's easier to handle.

FIG. C

Baseplate Template for Inset Doors

Instead of measuring and marking the cabinet for each door, make a template to locate the baseplate holes. This one is for inset doors. For overlay doors, the first hole would be about 3/4 in. from the front edge, with the other distances remaining the same.

This template is dimensioned for Grass hinges. However, each application and each brand can have a different drilling pattern, so be sure to read the specs for the hinge you are installing.



Engage the front of each hinge first. Then push on the back of the hinge arm until it clicks in place.

7

European hinges make on-site adjustments a snap. Uneven floors and walls can move doors out of line when cabinets are installed. Imagine trying to fix these misaligned doors if they had butt hinges!

Side to Side

Adjust the door left or right with the front screw. This changes the gap between the door and the cabinet side.

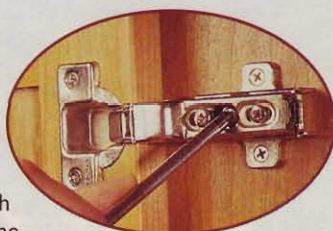
This is a direct-action screw, moving the door 1/16 in. per turn. Clockwise rotation decreases the gap between the door and cabinet.



Up and Down

Loosen the middle screw. This adjusts the gap between the door and the top and bottom of the cabinet.

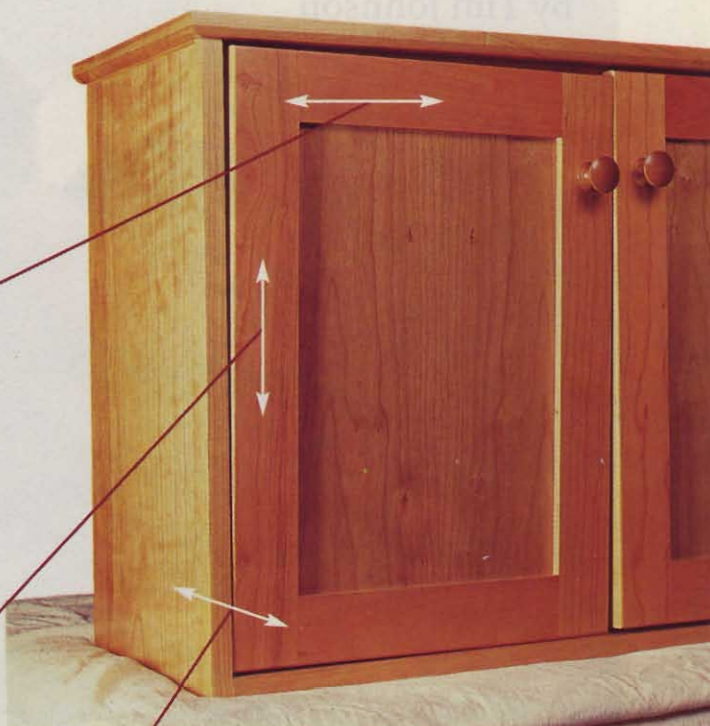
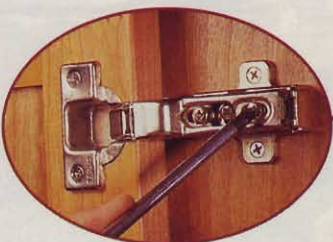
Loosen this screw on both hinges. Move the door to the desired location. Retighten both hinge screws.



In and Out

Loosen the back screw. This adjusts the door so it will be even with the side of the cabinet.

Move the door in or out, then retighten the screw.



Sources

European hinges are available in 110-degree openings and 165-degree openings. The hinge used in this article is a 110-degree Grass 3704 clip-on hinge with a winged baseplate (Constantine's Item # CH3700). This hinge and its overlay versions, along with the other necessary items, are available at Constantine's, (800) 223-8087.

110-degree opening hinges:
CH3700, full overlay, \$3.75 each;
CH3701, half overlay, \$3.95 each;
CH3702 (Inset), \$4.20 each.

165-degree opening hinges:
CH3900, full overlay, \$5.95 each;
CH3901, half overlay, \$6.20 each;
CH3902 (Inset), \$6.40 each.

All include hinge and baseplate.

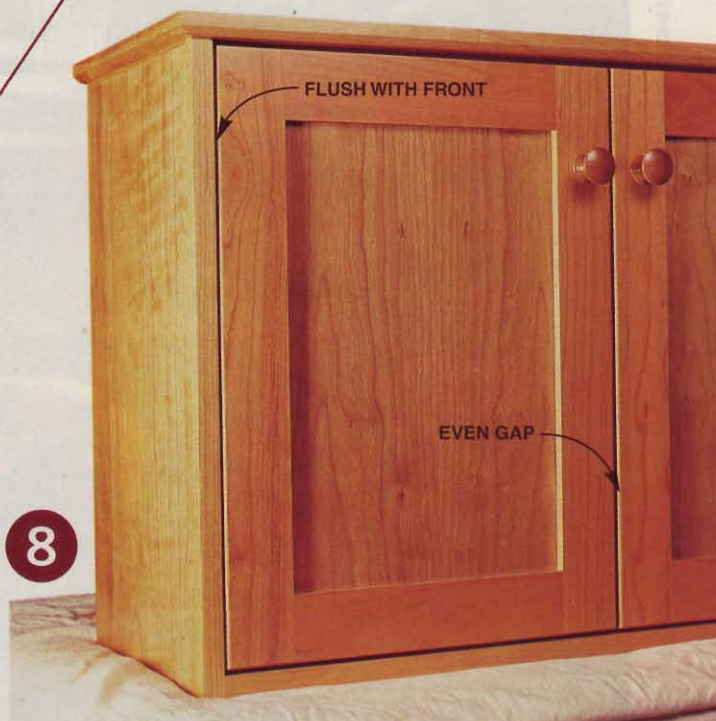
35 mm drill bits: DB35, high-speed steel, \$10.75; CDB35, carbide, \$24.

PoziDrive screwdriver: CH9800, \$10.

Self-centering hinge bit: VIX1, 7/64 in., \$8.25.

Other sources for European hinges and hardware: Mepla brand, McFeely's, (800) 443-7937; Blum brand, Woodworker's Hardware, (800) 383-0130.

8



Ganz getan (all done!). AW

By Tim Johnson

ART DIRECTION: JOEL SPIES • PHOTOGRAPHY: MIKE HABERMANN AND BILL ZUEHLKE • ILLUSTRATION: FRANK ROHRBACH





Farm Table

*You don't need a
dream shop to
build this
dream
project.*

Aside from feeding the occasional flock (when's the last time you had eight dinner guests?), a big surface where you can spread things out is invaluable, for computing, writing, hobbies or for kids' activities. A large table is the perfect gathering place for today's open kitchens and great rooms, and you can build this one even if you don't have a dream shop with lots of huge machinery.



You don't have a battleship-sized jointer?

Fine! Get perfect edge joints on these long boards using a router instead.

This table is made from white ash, a hardwood that's beautiful, durable and affordable. The top floats on a base that's built to last. Strong joinery between the legs and aprons is accomplished using an innovative and inexpensive commercial jig. Internal supporting rails are dovetailed to stiffen the structure, yet you can make and install them in minutes. And don't worry about the huge top. I'll show you how to manage gluing it all together, but only after I've shown you how to edge-joint its long boards perfectly *without* using a jointer!

WHAT IT TAKES TO BUILD

You'll need a tablesaw, a router that accepts 1/2-in. bits, four router bits, an electric drill (a drill press is very helpful, but not absolutely necessary), a BeadLOCK doweling jig (see Sources, page 77), a jig for ripping a straight edge on rough lumber, sawhorses and assorted clamps. In addition to the lumber (\$450), buy two 4x8 sheets of 3/4-in. medium density fiberboard (MDF) (\$50). One serves as a work surface and the other provides the straightedges for jointing and squaring operations (see Fig. H, Photos 3 through 5 and 10). You won't need a

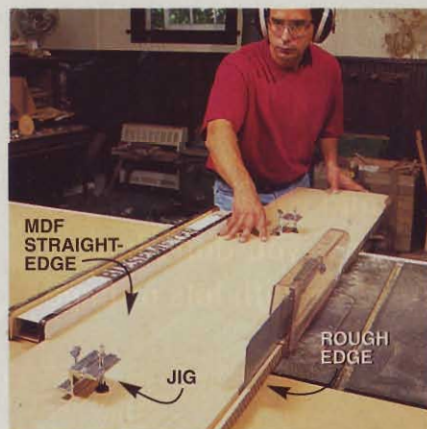
jointer. You don't have to own a planer either, because most hardwood lumberyards will mill rough lumber for you. You'll need a lathe if you want to turn your own legs. There are ready-made alternatives if you don't (\$35 to \$75 each, see Sources, page 77).

CHOOSING AND USING YOUR LUMBER

The top, aprons and internal support rails are made from 8-ft. long 5/4 boards, about 80 bd. ft., milled to 1-in. thickness. If you're having your lumber milled at the yard, have them also make a straight cut on one edge (called SL1E or "straightlining"). Milling and straightlining cost only about 30 cents per ft. and save you the trouble of doing it yourself (Photo 1).

If 5/4 boards aren't available, substitute 100 bd. ft. of 6/4. You could also use 4/4 stock and rework the dimensions for 3/4-in. material. A 3/4-in.-thick top will be lighter in weight and appearance (maybe too light for your taste), and the splines will have to be no wider than 3/16-in. The thinner, 6-ft.-long aprons will be more likely to sag. You'll also have to use smaller loose tenon

(continued on page 72)

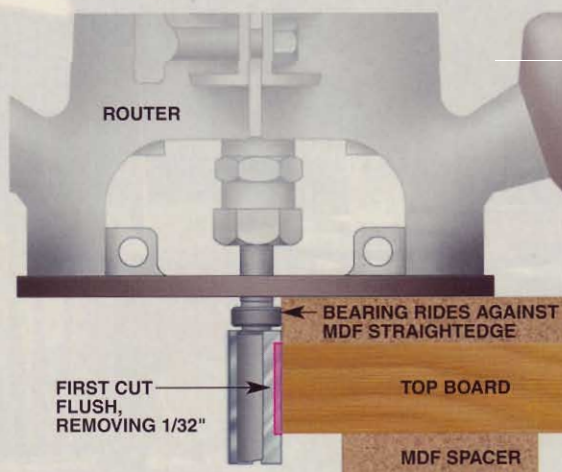


1 RIP STRAIGHT EDGES easily with inexpensive straightlining jigs (see Sources, page 77). One thumbscrew on each jig holds the rough-edged board, the other grips an 8-ft. long by 7-in. wide MDF straightedge. After straightlining one edge, remove the board from the jig and rip the other edge parallel. (You can also have straightlining done for you at the lumberyard.)

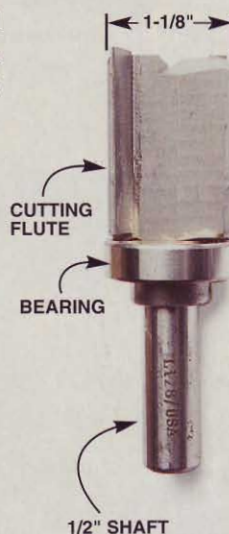
FIG. A

JOINTING WITH A ROUTER

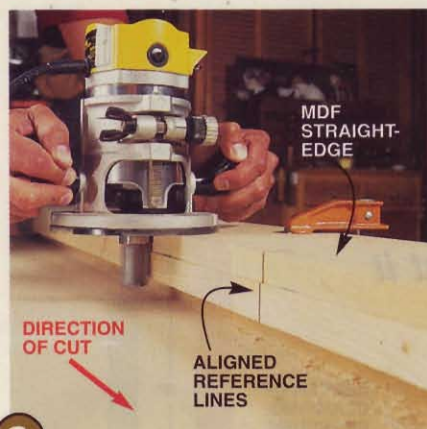
Step 1: Flush Trim Cut



THE FIRST CUT is an ordinary flush trim (Photo 3). The trick is that both edges of the joint are routed from a single straightedge set-up. That way, the two edges will mate perfectly, even if the straightedge isn't perfectly straight.



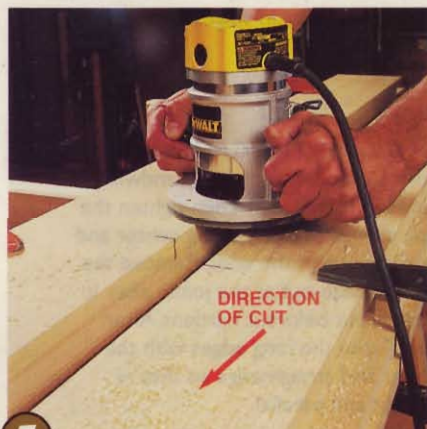
2 A BIG PATTERN-CUTTING BIT works best for jointing edges. Its large cutting diameter leaves smooth, chatter-free surfaces.



- 3 ROUT THE FIRST EDGE** of each joint, using the pattern-cutting bit and an 8-ft.-long MDF straightedge. After laying out the boards for the top, draw a line across each joint, halfway from the end. Aligning these lines with a similar line at the midpoint of the MDF guarantees that the jointed edges will fit together.



- 4 USE THREE SPACER BLOCKS** to position the second board for routing and clamp it in place. Make the spacers 1/32-in. narrower than the cutting diameter of the pattern bit, so the second routing pass will remove only 1/32 in. from the board.

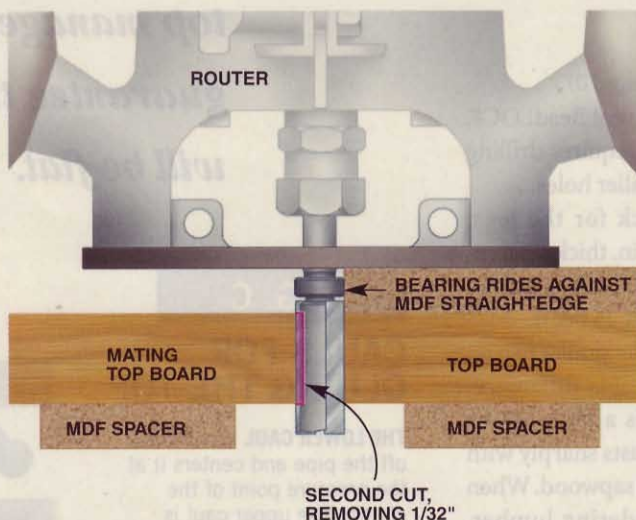


- 5 ROUT THE MATING EDGE** of each joint, while keeping the router firmly held against the straightedge. Because the cut is made opposite the bearing point, the edge will be ruined if the bit wanders away.

FIG. B

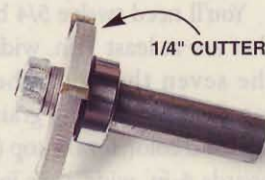
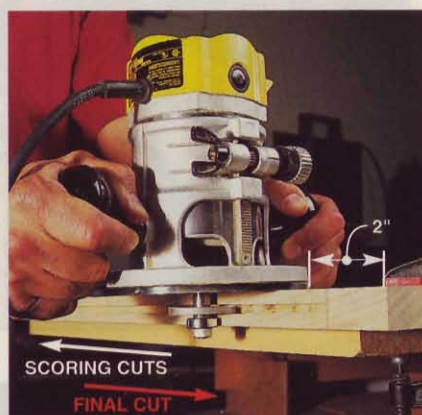
JOINTING WITH A ROUTER

Step 2: Cutting the Mating Edge



WHILE MAKING the second cut, the pattern bit bears against the same straightedge, but it cuts the second board, which has been moved into position on the opposite side (Photo 5). Keep in mind that jointing the top boards reduces the width of the top about 1/16 in. per joint, so lay it out oversized.

Splines align the boards in the top, so you don't spend hours sanding the joints flush later.



- 6 ROUT THE 1/2-IN.-DEEP GROOVE** for the spline in several passes, using a 1/4-in.-wide slot-cutting bit (above). Tip: To avoid tear-out, make a couple light scoring cuts, about 1/8-in. deep, moving from right to left. Then move left to right, full depth. Stop the cut 2-in. from each end of the board, so it won't show.



- 7 TEST FIT** the spline. It should slip into the groove freely, but without being loose. It can be one long piece or several short ones. Rounded ends match the ends of the slot. Dry fit each joint to make sure the spline fits inside without binding.



Three pairs of cauls make gluing the huge top manageable and guarantee that it will be flat.

(continued from page 70)

stock and a different BeadLOCK drilling jig that requires drilling more, albeit smaller holes.

Use 8/4 stock for the legs, milled to 1-3/4-in. thickness, cut into 30-in. lengths, and glued up. You'll need about 25 bd. ft.

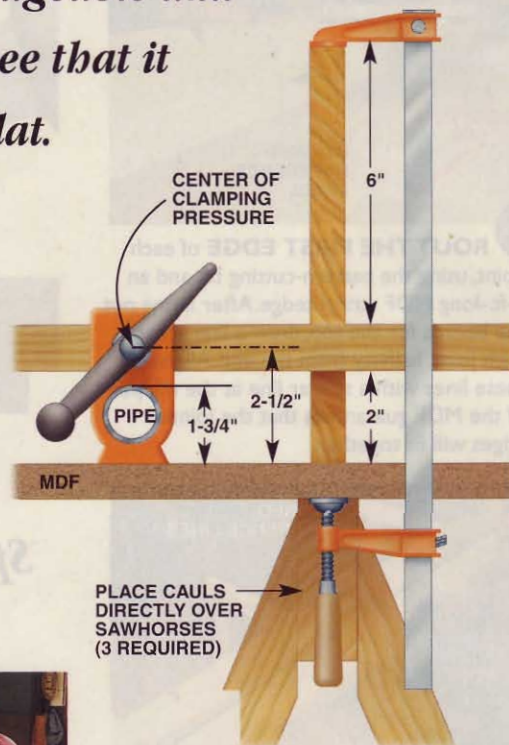
White ash looks similar to oak, with one noticeable difference. Its heartwood is a dark brown color that contrasts sharply with its light-colored sapwood. When choosing or ordering lumber, look or ask for pieces that are all sapwood, especially the 8/4 stock for the legs. The 5/4 stock must have one good sapwood face. Heartwood on the back side won't show, except on the edges of the top.

You'll need twelve 5/4 boards that are at least 7-in. wide. Use the seven that look the best together, considering grain pattern and color, for the top (seven boards 6-in. wide after jointing will make a 42-in. wide top). The four aprons, including their add-on half-round details, require three of the remaining boards (you can get the four pieces for both short aprons from one board). Use one of the two remaining boards for the internal rails and the other for splines and test pieces.

Make the top first. Don't worry about making it to exact dimensions. Just use your best-looking boards and come as close as you can. (My top turned out to be 41-1/2-in. wide). Then adjust the size of the base, changing the lengths of the aprons to maintain the overhang of the top.

FIG. C CAULS FOR GLUING THE TOP

THE LOWER CAUL lifts the top off the pipe and centers it at the pressure point of the clamp. The upper caul is extra wide so it's stiff enough to hold the top flat as the pipe clamps are tightened.



8 STACK THE BOARDS as you glue them. Put a bead of glue at the bottom of the groove of the first board and add the spline. Roll a layer of glue onto the edge of the adjacent board, add a bead in its groove and assemble the joint. *Don't put any glue on the splines.* The glue causes them to swell and make the joint impossible to fit. Glue the top together in stages, two to four joints at a time.

9 CLAMP THE CAULS to the work surface with the top sandwiched between (see Fig. C). Then tighten the pipe clamps, starting at the center and working out to the ends. Remove the glue squeeze-out at the joints after it sets up, but before it hardens. After gluing, trim the long edges with the router and straightedge so they're straight and parallel.

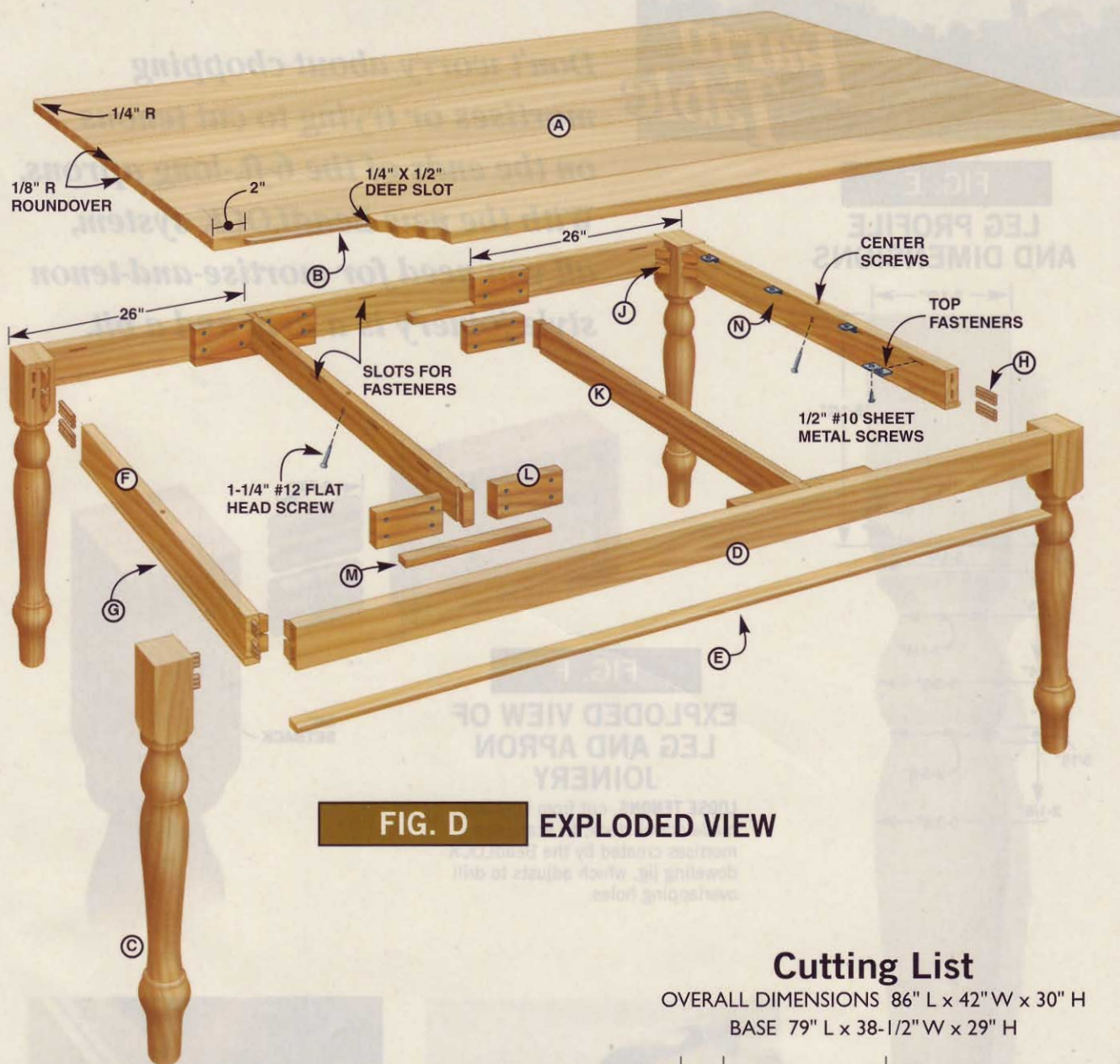


FIG. D EXPLODED VIEW

Cutting List

OVERALL DIMENSIONS 86" L x 42" W x 30" H

BASE 79" L x 38-1/2" W x 29" H

Part	Qty.	Name	Dimension
A	1	Top	1" x 42" x 86"
B	6	Splines	1/4" x 15/16" x 81-1/2"
C	4	Legs	3-1/2" x 3-1/2" x 29"
D	2	Long Aprons	1" x 3-1/2" x 72"
E	2	Long Beads	1/2" x 1-1/4" x 72+"
F	2	Short Aprons	1" x 3-1/2" x 31-1/2"
G	2	Short Beads	1/2" x 1-1/4" x 31-1/2+"
H	16	Loose Tenons	1/2" x 1-1/4" x 2-7/8"
J	16	Corner Blocks	1-1/4" x 1-1/2"
K	2	Internal Braces	1" x 3-1/4" x 35-3/4"
L	8	Mounting Blocks	1" x 3-1/4" x 5"
M	4	Runners	1/2" x 1" x 10-3/4"
N	22	Metal Top Fasteners	



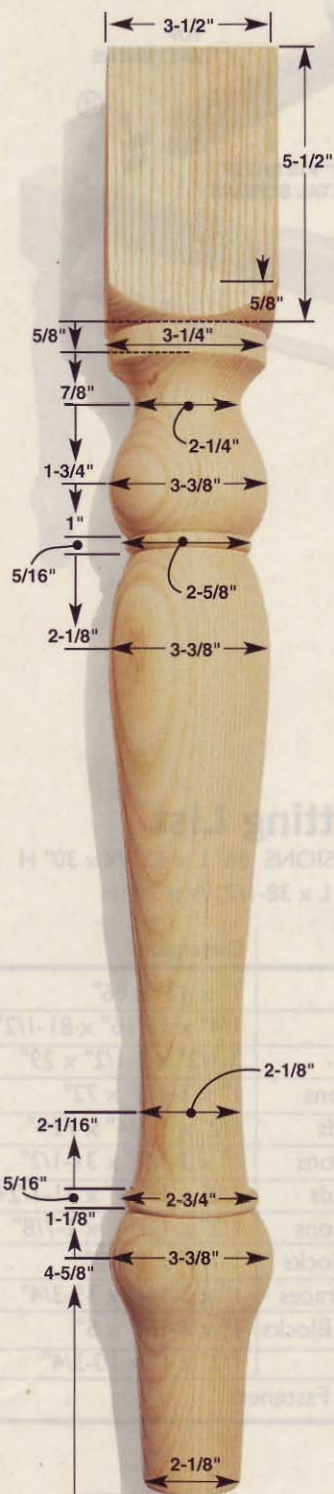
10 SQUARE THE END

of the top, using a piece of MDF with a factory corner as a template. If you have more than 1/4 in. to remove, use a saw first, to get close. Align one edge of the MDF with the long side of the top. Clamp a block against the opposite edge of the top to avoid blowout. Then trim the edge square, making shallow passes with the pattern-cutting router bit.



Farm Table

FIG. E
LEG PROFILE
AND DIMENSIONS



Don't worry about chopping mortises or trying to cut tenons on the ends of the 6-ft.-long aprons. With the new BeadLOCK system, all you need for mortise-and-tenon style joinery is a drill and a bit.

FIG. F
EXPLODED VIEW OF
LEG AND APRON
JOINERY

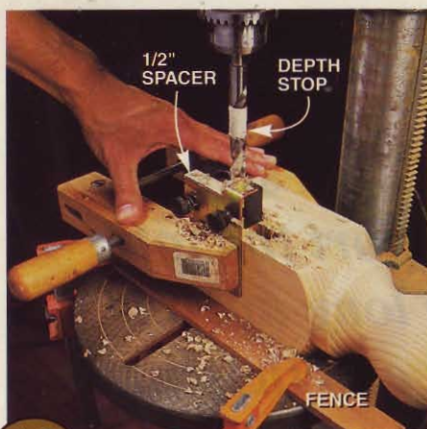
LOOSE TENONS, cut from specially made dowel stock, fit scalloped mortises created by the BeadLOCK doweling jig, which adjusts to drill overlapping holes.



11 **TURN THE LEGS** from laminated 3-1/2-in. square blanks, using the dimensions from Fig. E, or order the legs through the mail (see Sources, page 77). If you want to turn them yourself, see "Turning Table Legs" on page 42.



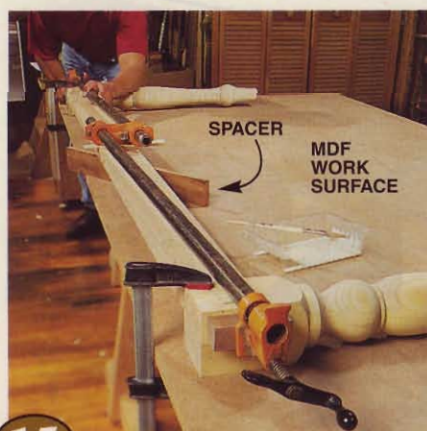
12 **MARK REFERENCE LINES** for the BeadLOCK jig on the legs and aprons. Offset the centerlines on the leg by the thickness of a credit card. This slightly raises the rail above the top of the leg, allowing you to plane the apron flush after assembly (see Photo 16).



13 DRILL THE LEGS. Use a shop-made 1/2-in.-thick spacer in the BeadLOCK jig to locate the holes properly. A drill press works great for this operation. It's easier, faster and more accurate than drilling by hand.



14 DRILL THE APRONS from the end so you can be sure the holes go in straight. If the holes aren't straight, the tenons will be angled and the joint won't fit. Center the drill on your body and sight down the apron while drilling.



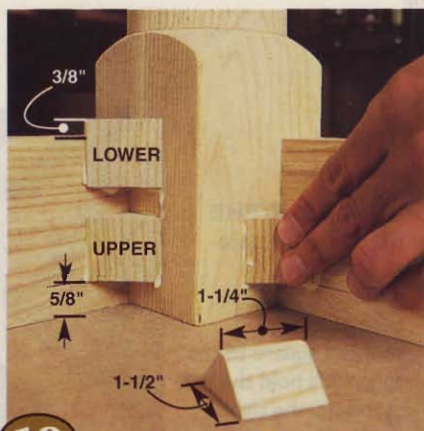
15 GLUE THE LONG SIDES FIRST. Avoid a twisted glue-up by clamping the legs flat to the MDF before you tighten the pipe clamps. Use a spacer to keep the apron from sagging under the weight.



16 PLANE THE APRONS flush with the top of the legs, working from each end to the center. It's OK to leave the apron slightly crowned at its center, so the top doesn't appear to sag.



17 APPLY A TOURNIQUET to square the base after final assembly. Do this before the glue sets. Shorten the longer side by adding tension until both diagonals measure the same.



18 TWO SHORT BLOCKS reinforce each joint. The upper blocks leave room for top fasteners. The lower blocks extend and serve as stops for the half-round detail.

Oops!

DON'T ASK!

Somehow I drilled holes in the wrong leg face.



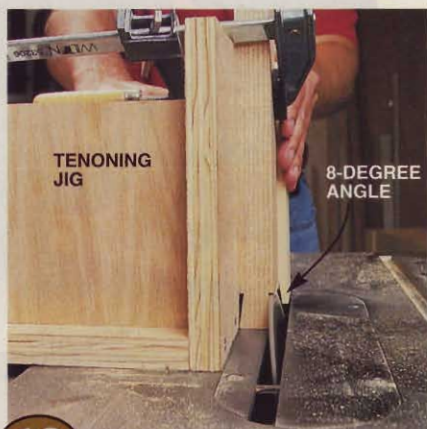
FIT AND GLUE PATCHES into the holes so that their grain matches the grain direction of the legs. Then plane or sand them flush. Glue a block on top, slightly wider than the leg. If you match the end grain, the face grain on the repair will match the rest of the leg. After gluing, plane the sides of the block flush with the leg.



SAW OFF THE WASTE, leaving a fresh face of thick veneer. Make two passes, one from each direction, with the blade set at half depth. Then trim the ends of the veneer and plane or sand the surface. No one will ever know!



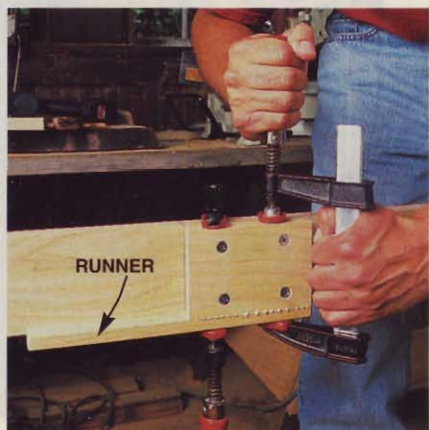
Dovetailed braces strengthen the base, support the top and keep the long aprons from bowing and twisting.



- 19** **MAKE ANGLED CUTS** on the end of the rails, using a tenoning jig, with the blade height slightly less than the thickness of the mounting block. Then raise the blade and crosscut the mounting blocks at the same angle.

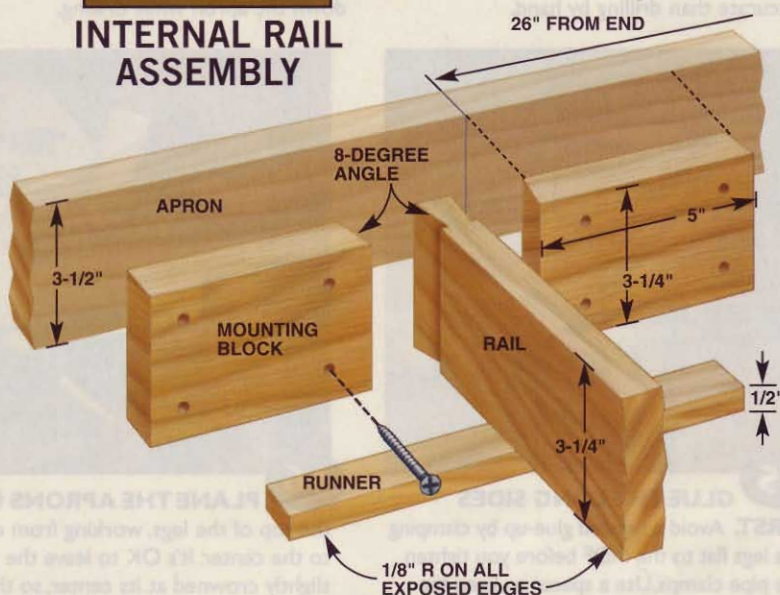


- 20** **LOCATE THE SHOULDER** of the rail's dovetail by using the mounting block. Then cut the shoulder square, keeping the blade low enough so it doesn't cut into the dovetail.



- 21** **GLUE THE RUNNER** in place after the first mounting block has been glued and screwed square to the apron. It'll hold the rail at exactly the right height. The runner extends below the apron, just like the corner blocks.

FIG. G
INTERNAL RAIL ASSEMBLY



- 22** **CAPTURE THE DOVETAILED RAIL** between the mounting blocks. After applying glue, set the rail on the runner and snug it against the first block. Then slide the second block tight against the rail and fasten it.



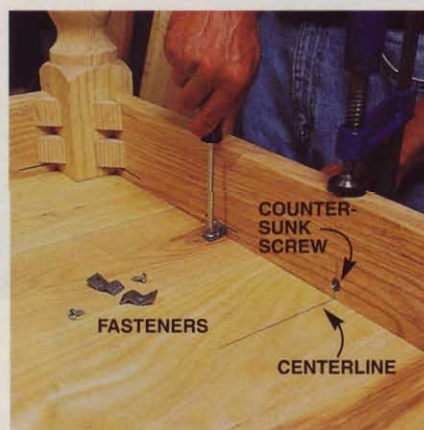
23 MAKE HALF-ROUND molding for the aprons. Round the edges of 1/2-in.-thick stock with a 1/4-in. round-over bit. After routing, rip the stock into separate 1-1/4-in.-wide pieces.



24 GLUE THE HALF-ROUND MOLDINGS to the aprons. Cut them slightly long and spring them between the legs, pressed against the corner blocks and runners that hang below the apron. They'll stay in place while you reach for the clamps.



25 ROUT SLOTS for the tabletop fasteners, using a 1/8-in. slot cutter (see Sources, below). Make a wider surface to support the router by clamping a second board to the apron.

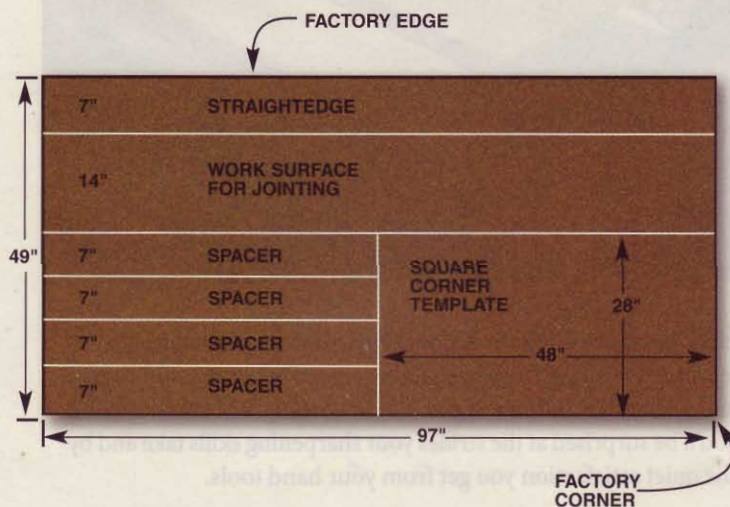


26 ATTACH THE BASE. Allow for seasonal movement of the top by using screws at the center of each short apron and support brace and S-shaped metal fasteners everywhere else (see Sources, below). To position the base for fastening, align centerlines drawn on each of its sides with corresponding lines drawn on the top. Then clamp the base in place.

FIG. H

CUTTING DIAGRAM FOR MDF

One sheet yields both straightedges needed for jointing and squaring the top, as well as spacers and a work surface for jointing.



SOURCES

White Ash (Ask for light color.)
Steve Wall Lumber Company
(800) 633-4062;
www.walllumber.com

Groff and Groff Lumber, Inc.
(800) 342-0001
e-mail: wood4u@epix.net

AW Farm Table Legs
turned in white ash;
\$75, plus shipping.
Also available in other woods.
Alan Lacer
(651) 592-4421

Factory-turned legs
(similar size but shaped differently)
Available in several woods,
but not ash. \$30 to \$60 plus
shipping.
Adams Wood Products
(423) 587-2942
www.adamswoodproducts.com

Jigs and Hardware
Woodcraft Supply
(800) 225-1153

BeadLOCK doweling system:
For 1/2-in. tenons, #140354, \$33.
For 3/8 in. and 1/2-in. tenons,
#140355, \$47.
Extra 1/2-in. tenon stock,
#140357, \$6 (need one extra pack).
Tabletop Fasteners, #27N10,
\$1/bag of 10 (3 bags required).
Joint-R-Clamp Straightlining Jig,
#15J50, \$15.

Router Bits
MLCS
(800) 533-9298;
www.mlcswoodworking.com

1-1/8 in. pattern cutting, #8809, \$24.
1/4-in. slot cutter with 1/2-in. shank
arbor and assembly, #7648, \$16.
1/8-in. slot cutter, #305, \$12.
1/4-in. radius round-over, #6602, \$17.

by Ed Krause

12 TIPS FOR BETTER SHARPENING



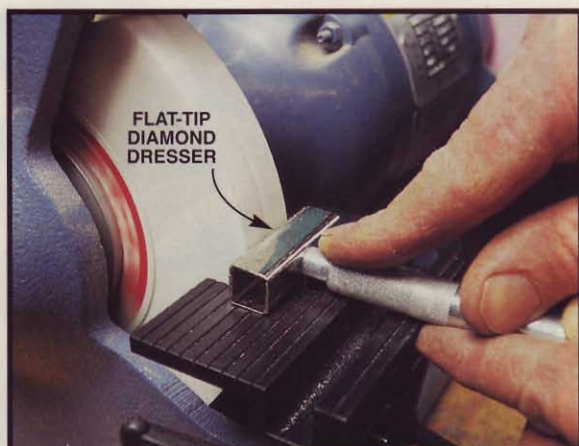
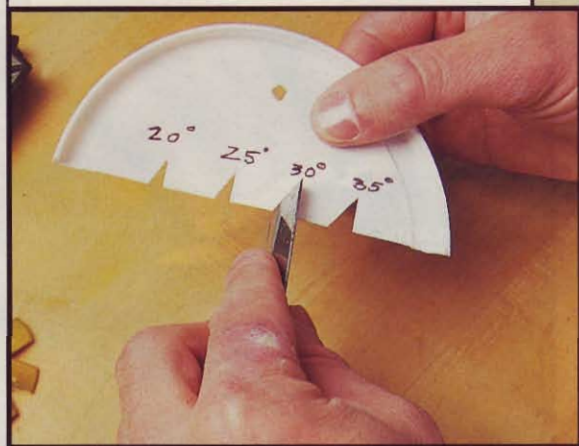
Get better results in
less time with these
great tips.

Hand tools are a joy to use, but only when they're sharp. Just as learning to walk is the prerequisite to running, successful sharpening is the key to "unplugged" woodworking. Try these tips and you'll be surprised at the strides your sharpening skills take and by the quiet satisfaction you get from your hand tools.

This angle checker, made from a plastic lid, is a simple (and free) way to check the bevel on your chisels and planes. It only takes a few minutes to make.

Simply cut a 4- to 6-in. diameter plastic lid in half. Then, using a protractor, mark the desired angles on a piece of paper. Cut out the triangles and use them as a template to mark the angles on the lid. Cut out the angles on the lid with a pair of scissors. Drill a hole at the top and hang it on the wall near your grinder.

Homemade Angle Checker 1



Dress for Success 3

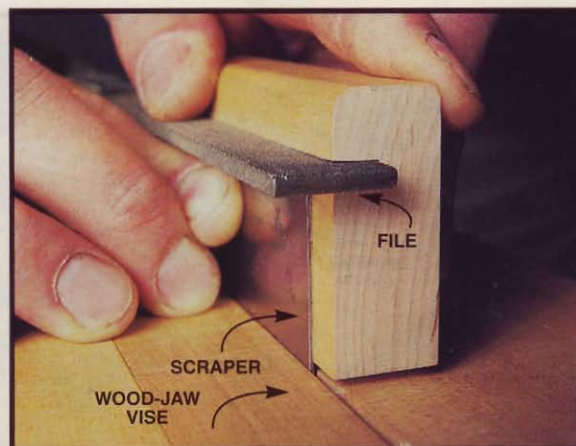
Ever lose your temper? I mean your chisel's temper. Don't get burned by a clogged, uneven grinding wheel. Dressing your grinder wheels periodically to keep them clean and flat helps prevent the excess heat that leads to bluing and loss of temper(s).

Single-point diamond wheel dressers do a great job but they're difficult to use freehand. Try a flat-tip diamond dresser instead. It has 36-grit diamond stone particles imbedded in a 1/2-in. wide by 3/4-in.-long face. Simply place it on your grinder's tool rest and make contact with the wheel.

Flat-tip diamond dressers are available from Woodcraft Supply, (800) 225-1153, #124670, \$18.

There's no getting around it—waterstones are messy. Here's a simple tip for keeping that mess contained: Pick up a heavy-gauge, 13 in. by 19-in. cookie sheet (about \$7) at the grocery store, hardware store—wherever. It's large enough to easily hold three stones. Use a 3/4-in. board pushed against the stones and clamp down the board and the cookie sheet on your bench. When you're done, just wipe the cookie sheet dry and hang it on the wall.

No More Waterstone Mess 2



Surefire Scraper Filing 4

You've probably heard other woodworkers talk about what a great tool the scraper is, but maybe you've never had much luck with one yourself. Using them is easy; getting a good edge on them is the tough part. The hardest step in sharpening a scraper is the first one—filing the edge square and flat. Start off right with this easy-to-make file holder:

Cut a kerf equal to the thickness of an 8-in. mill file in a 1-1/4-in. thick by 4-in. wide by 6-in.-long piece of wood. The kerf should be a little deeper than half the width of the file. This allows you to set the file at different depths to avoid dulling it in one spot. Clamp the scraper in a wood-jaw vise. Push the scraper firmly against the holder while filing for a perfectly square edge.

Getting a mirror finish on the contoured profiles of carving gouges can be a real hassle. The curved surfaces don't lend themselves to polishing on a flat stone or strop. Making a custom strop is easy. Use the chisel to cut its own contour in a piece of poplar or basswood. Rub chromium oxide polishing compound in the contour and you have a custom-made strop.

Chromium oxide is available from Lee Valley & Veritas, (800) 871-8158, #05MO8.01, \$7.

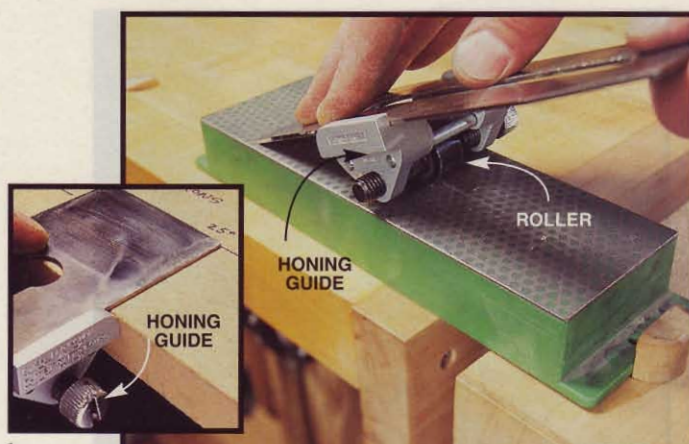
Custom Gouge Strop

5



Easy Knife Sharpening

6



Spend Less Time Sharpening

7

Less time sharpening means more time woodworking. Isn't that what we all want? Honing guides get the job done fast, but setting the blade in the guide to get the right bevel angle can be time consuming.

Here's a quick trick: Mark the appropriate blade extension for each bevel angle on your benchtop, or a wood scrap, for convenient reference. Hold the edge of the blade to the desired bevel mark, butt the guide to the edge of the bench and tighten. The side-clamp honing guide, shown above, automatically squares the blade and prevents it from rocking or shifting in the jig. This guide is available from Garrett Wade, (800) 221-2942, Item # 10M0701, \$12.



The Right Angle Every Time

8

Chisels and planes have bevel angles from 25 to 35 degrees depending on their intended use. You can buy a jig for grinding these angles, or make your own angle blocks at no cost!

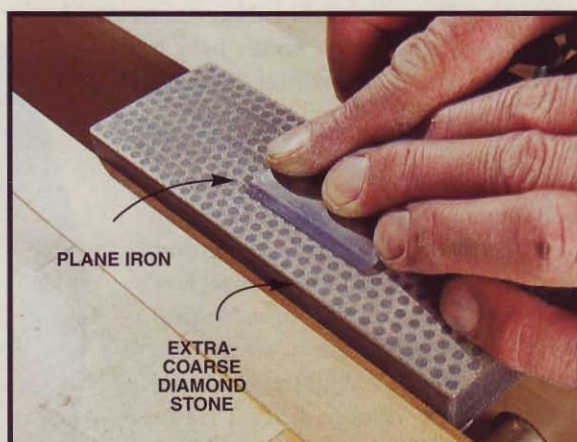
Make one block for each angle. Glue up a block 2-1/2 in. deep by 4-in. wide by 10-in. tall. Mark the desired angle on the top of one side. Drill a 1-in. hole through the side of the block at the halfway point of your angle mark. Then cut the angle on your tablesaw. The remaining groove makes an excellent guide for your fingers. Cut the block to length so the top is equal to the center height of your wheel. To secure the block, drill a 1-1/4-in. hole near the bottom of the block for a bar clamp.

The edge left after filing a scraper is a little rough for fine work. Use a piece of wood to align the scraper when moving it against the stone and you'll retain the square edge you achieved with your file jig.

An extra-fine (1,200) diamond stone is a good choice for this because the scraper won't wear a groove in the stone. You can get one from Trend-lines, (800) 767-9999, Item # DM6E, \$45.

Fine Edge On Your Scraper

9



Flatten Blade Backs Fast

11

It would be great if chisels and planes came from the factory ready to use, but they don't. A perfectly flat, mirror-like finish on the back is essential for a truly sharp edge. Flattening always requires a large dose of elbow grease and patience. The fastest method is to use an extra-coarse diamond stone. It won't dish out the way oilstones and waterstones do and it can easily be clamped in a vise.

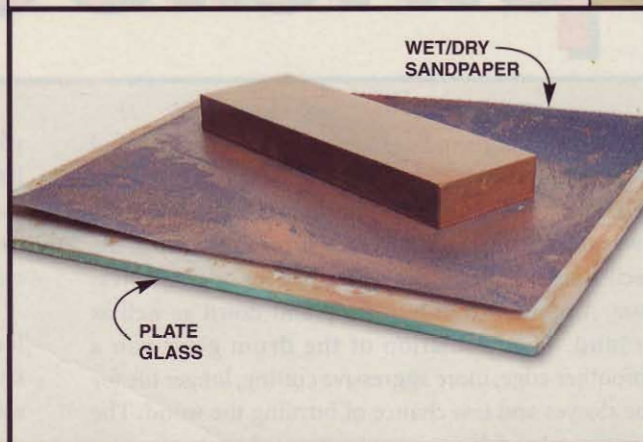
Once you have a flat surface, move on to finer stones until your chisels and planes shine like a mirror.

Extra-coarse diamond stones are available from Lee Valley & Veritas, (800) 871-8158, 8" x 2-5/8," Item #70M04.01, \$66.

Waterstones are great for sharpening bench tools, but their soft binder makes them prone to dishing out and grooving. Fortunately, flattening them is no big deal. An 11 in. by 12-in. piece of 1/4-in. plate glass and a sheet of 180-grit wet/dry sandpaper provide a cheap, perfectly flat abrasive surface for flattening all your waterstones. The glass will cost you about six bucks (be sure to have the edges sanded) and the wet/dry sandpaper about 70 cents a sheet. Both are available at hardware stores. Use water to hold the paper on the glass and to flush away the slurry.

Keeping Waterstones Dead Flat

10



3 Ways to Test for Sharpness

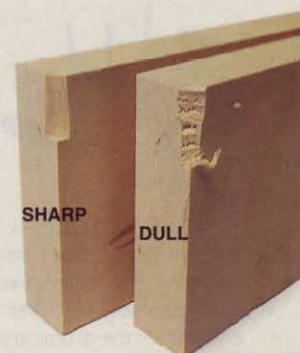
12

1. If you can see light on the edge, it's not sharp. A sharp edge is too fine to reflect light.



2. A sharp edge catches easily on the side of a plastic pen barrel. A dull edge slides right off.

3. A sharp blade slices softwood end grain cleanly (left). A dull blade tears the end grain (right).



Oscillating Spindle Sanders

An oscillating spindle sander may not be the first tool you buy for your shop, but if you do a lot of curved work the time you'll save sanding is well worth the investment. Unlike a drum sander on a drill press, the oscillating spindle sander is designed for sideways pressure. Also, the drum moves up and down as well as around. The oscillation of the drum gives you a smoother edge, more aggressive cutting, longer life for the sleeves and less chance of burning the wood. The benchtop models are easy to store when not in use. Oscillating spindle sanders are fun to use, too. The wood seems to melt away as you sand precisely to a line. The feeling of control you get with these machines is impressive.

Some tool tests reveal noticeable differences in tool performance and quality. Not so with these sanders. All the machines we tested performed well; producing a smooth, even surface without scorching. But, there were differences in other areas, and each machine had at least one outstanding feature that may form the basis for your buying decision. Here are the features we considered most important:

DRUM CHANGES

A drum that's easy to change makes for more enjoyable and productive work (see photo below). For best results

you should always use the largest possible drum for each curve. It's much easier to follow a shallow curve with a large drum. For pieces with different-sized curves, this requires changing drums frequently. The Clayton had the best system for quick and easy drum changes.

We preferred the simplicity of the fixed spindle system found on all but two of the machines. However, the replaceable spindle system on the Jet and the Bridgewood (even with its spline, clips, and three wrenches) had an advantage; namely the smallest diameter (1/4-in.) sleeve available.

Tip: Occasionally we found the rubber drums would stick onto the metal spindles. A little baby powder sprinkled into the inside of the drum eliminates this problem.

DUST COLLECTION

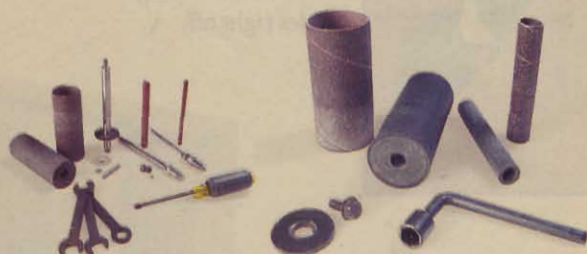
Power sanding is a dusty business. The health and housekeeping issues surrounding wood dust make effective dust collection an important feature. If nothing else, it's annoying to be blowing sawdust off your piece in order to see the line you're cutting to. We tested all the machines using a standard shop vacuum with a 2-1/2-in. hose. The Clayton, Craftsman, Delta and Ryobi were the best at dust collection.

AGGRESSIVENESS OF CUT

This is more or less a function of motor power. The Bridgewood, Clayton and Jet were the clear winners in this category. The exception was the 3.5-amp induction motor on the Delta B.O.S.S., that seemed far more powerful than the 3.5-amp universal motor on the Ryobi and the Craftsman.

STORAGE

With all the drums and parts that go with spindle sanders, self-storage is a welcome convenience and is offered on all the machines except the Bridgewood and the Jet.



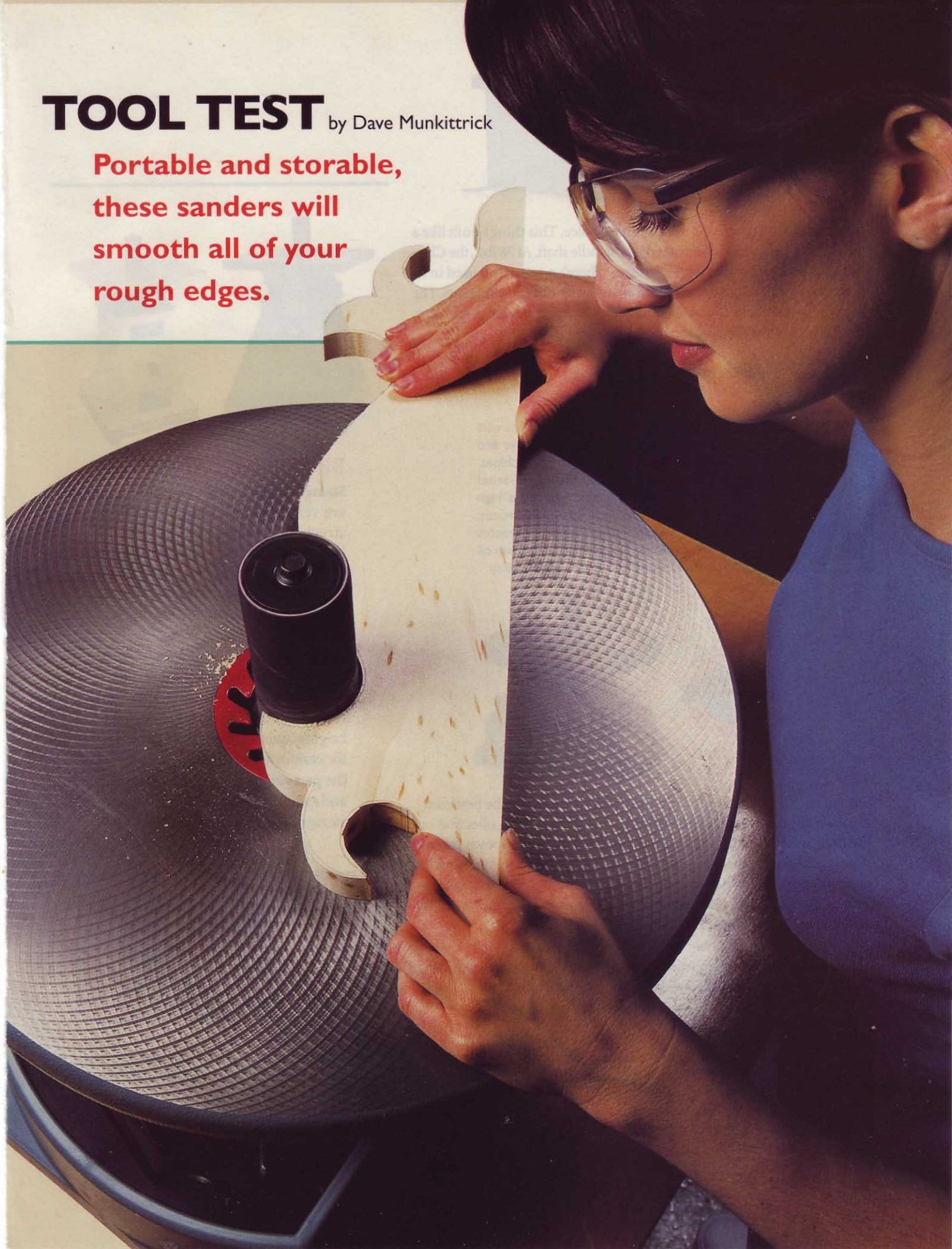
Bridgewood/Jet

Typical single-spindle system

We found the three spindle, three wrench, screwdriver, clip and spline system used by the Bridgewood and Jet a bit cumbersome. The other machines all have a fixed spindle onto which the drums are fastened with a single bolt or nut.

TOOL TEST by Dave Munkittrick

**Portable and storable,
these sanders will
smooth all of your
rough edges.**





CLAYTON

Strengths: The Clayton was our Editors' Choice. This thing's built like a truck. In fact it uses truck bearings on its spindle shaft. At 78 lbs., the Clayton provides a very stable work platform. There's no cast iron used in its construction so most of its heft is due to its heavy-duty components. The Clayton has excellent dust-collection and changing drums is a breeze. Clayton also offers the best range of accessory drum sizes.

Weaknesses: It's too heavy to be truly portable.

Outstanding Feature



Built for heavy-duty, continuous use, the Clayton offers the power and durability of large industrial machines. Heavy-duty V-belts, machined-steel pulleys, large ball bearings and a high quality, 7.6-amp American-made motor. A cam-and-follower assembly creates the oscillation and is sealed in its own oil bath housing for maximum durability.



DELTA

Strengths: The Delta is our choice for Best Buy. It offers the best combination of performance, features and price (\$208). Dust collection on the Delta was unbeatable. Its 3.5-amp motor is surprisingly powerful and drum changes are quick and easy. Its large, round, cast iron top provides good support and is heavy enough for stability but light enough for portability. Complete onboard storage for accessories comes with the optional accessory drum kit (\$50).

Weaknesses: The dust collection fitting is too small for a standard 2-1/2-in. shop vacuum. Universal adapters cost about \$10.

Outstanding Feature



An internal fan boosts the dust collection capability of the Delta B.O.S.S. ahead of all the others. Hook up a shop vacuum for unsurpassed dust collection.

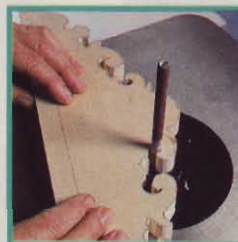


BRIDGEWOOD/JET

Strengths: The Bridgewood and the Jet are very similar in design and construction. These are the machines to buy if you need extra-small spindle size or a tilting table. They both feature a powerful 7.5-amp motor that can cut aggressively without bogging down.

Weaknesses: Dust collection seemed to be an afterthought in these sanders. The dust port is too far from the drum to be effective. The 18-1/2-in. table height requires an unusually low bench for comfortable operation. Despite all the parts and tools required for drum and spindle changes there is no built-in storage for accessories.

Outstanding Features



The only machines that offer a 1/4-in. spindle for small-diameter work, the Bridgewood and the Jet also feature tables that tilt from 0 to 45 degrees allowing for beveled contours.

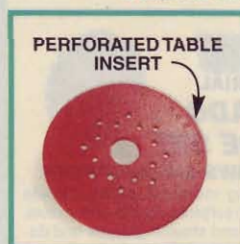


RYOBI/CRAFTSMAN

Strengths: If you want a machine to pull out of storage for occasional use and you don't expect to be sanding a lot of 8/4 stock, then the Craftsman and the Ryobi are hard to beat. They are the lightest and least expensive of all the machines and their dust collection systems are very effective.

Weaknesses: The universal motor is noisy and bogs down in a heavy cut.

Outstanding Features



At 26 lbs., the Ryobi and the Craftsman offer exceptional portability at a most affordable price. Perforated table inserts help both machines achieve excellent dust collection.



RIDGID

Strengths: The Ridgid comes with an oscillating belt sander attachment that makes this machine the most versatile of all the sanders. It's light and easy to move and includes onboard storage for all its accessories. Drums are fastened to the spindle with rubber-knobbed bolts eliminating the need for a wrench. Be careful not to overtighten the knobs or you'll be reaching for the pliers to get them off!

Weaknesses: The tilting table is designed for the belt sander attachment not the spindle sander. Drums tighten down onto a snap ring on the spindle rather than a welded plate. The dust collection was a little weak. **AW**

Outstanding Feature



The oscillating belt sander attachment expands the Ridgid's capabilities to include convex curves and straight edges.

Designed for wrench-free drum changes, the Ridgid uses rubber knobs in place of hex nuts.

MAKE	PRICE	MOTOR	AMP/TYPE	WEIGHT (lbs.)	TABLE SIZE (inches) H x W x D	DRUM CHANGE	DUST COLLECTION	AGGRESSIVENESS	BUILT-IN STORAGE	ACCESSORIES INCLUDED	ACCESSORIES AVAILABLE	COMMENTS	SOURCE
BRIDGEWOOD	\$229	7.5 I	68	18-1/2" x 14 5/8" x 14 5/8"	G	F	E	NO		1/4", 1/2", 5/8" spindles plus 1-1/2" and 2" drums		Wide base stance is very stable. Plastic inserts are flimsy.	WILKE MACHINERY (800) 235-2100
CLAYTON model 140	\$638	7.6 I	78	18" x 14-5/8" x 14-5/8"	E	E	E	YES*		1/2", 3/4", 2" and 3" drums	1", 1-1/4", 1-1/2", 2-1/4" and 2-1/2" drums	Counterclockwise spindle rotation eliminates reverse thread on spindle.	HTC (800) 624-2027
CRAFTSMAN	\$160	3.5 U	26	13/34" x 14" x 20"	E	E	F	YES		1/2" spindle plus a 1" drum	3/4", 1-1/2", 2" and 3" drums	Counterclockwise spindle rotation eliminates reverse thread on spindle. Plastic laminate top.	SEARS (800) 377-7414
DELTA	\$208	3.5 I	45	12" x 18" diameter	E	E	G	YES		1/2" spindle plus 3/4" drum and dust bag	1", 1-1/2", 2", 3" drums	Sound design. Looks cool and works well.	DELTA (800) 438-2486
JET	\$279	7.5 I	66	18-1/2" x 14-5/8" x 14-5/8"	G	F	E	NO		1/4", 1/2", 5/8" spindles plus 1-1/2" and 2" drums	3" drum	Metal inserts. Base is narrower than the Bridgewood, not as stable.	JET (800) 274-6848
RIDGID	\$239	4.6 I	43	13-3/8" x 16-5/8" x 19"	E	G	G	YES		1/2", 3/4", 1", 1-1/2" and 2" drums plus oscillating belt sander		Easy to overtighten the spindle knob. Drums tighten down on a snap ring rather than a welded plate.	RIDGID (800) 474-3443
RYOBI	\$160	3.5 U	26	13-3/4" x 14" x 20"	E	E	F	YES		1/2" spindle plus a 1" drum	3/4", 1-1/2", 2", 3" drums	Counterclockwise spindle rotation eliminates reverse thread on spindle. Plastic laminate top.	RYOBI (800) 525-2579

I = Induction motor U = Universal motor

F = Fair G = Good E = Excellent

* Separate benchtop rack

OTHER SANDERS TO CONSIDER: Porter-Cable and Grizzly are bringing new oscillating spindle sanders on the market this fall and winter. See Product Reviews, pages 96 and 98 for more details. Plus, several companies (including Grizzly and Bridgewood) offer floor-model spindle sanders for \$500 and up.

TOOL TEST Vises

By Randy Johnson and Tom Caspar



**Add clamping power
to your workbench.**

A good vise is tool money well spent. It's a solid investment in your workbench that pays off every time you need to hold a piece of wood.

Two Types of Vises

Everybody's familiar with the standard metal-jaw vise, but there's a second type of vise to consider: the wood-jaw vise.

Here's a quick comparison:

Metal-jaw vises are easy to install (Photo 1). To drop the jaws slightly below the top of your bench, make a wooden plate that fits between the bottom of the bench and the vise body. If you want the inner jaw of the vise to be flush with the edge of your bench (the set-up we prefer), you'll have to cut a notch out of your benchtop. In any case, add wood cheeks.

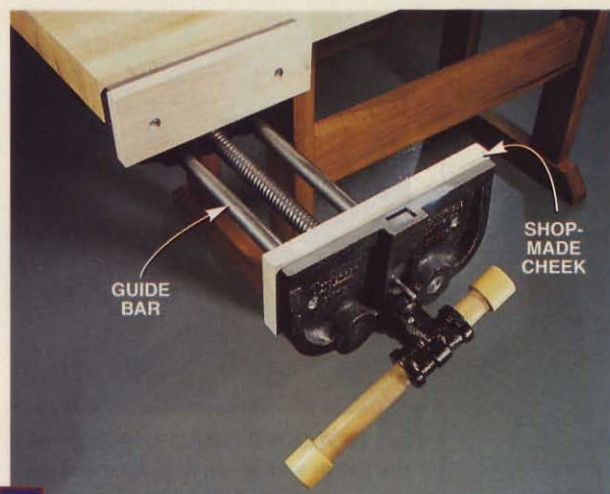
Wood-jaw vises generally come as starter kits (Photo 2). You buy the metal

hardware and make the front jaw, an optional lower rear jaw and turn or buy the handle. If you want a traditional look to your bench, this is the way to go. The front edge of your bench must be straight and square because it serves as the rear jaw.

Features

Vises are built to last. Every vise we tested delivered plenty of clamping pressure and was robust enough to hold up to a lifetime of service. If you're going to

ART DIRECTION: JOEL SPIES AND DAVID FARR • PHOTOGRAPHY: MIKE HABERMANN AND BILL ZUEHLKE • ILLUSTRATION: BRUCE KIEFFER



1 A METAL-JAW VISE is ready to go right out of the box. Add wood cheeks, bolt it to your bench and you're ready to clamp.



2 A WOOD-JAW VISE requires assembly. Make your own jaws and turn a handle of any length (or buy one). The front of the bench doubles as the upper half of the rear jaw.

spend your woodworking career with one vise, it makes sense to buy one that's a pleasure to use. Here are the features we feel make the most difference:

- **Jaw Size.** Large jaws offer more surface area to hold your workpiece. More surface area means more friction to keep your work from slipping. You can increase the effective surface area of any metal-jaw vise by adding oversized cheeks, but we prefer vises that start out with large jaws.

For a wood-jaw vise you can make virtually any size jaws. Use a stiff wood such as hard maple and make the front jaw 3-in. thick.

- **Jaw Opening.** Rarely will you open your vise all the way, but a deep capacity gives you more clamping versatility. The day will come when you'll need it! Some metal-jaw vises have a huge capacity, but wood-jaw vises generally have shorter openings after allowing for the thickness of the jaws.

- **Quick Release.** Sliding the front jaw in and out without turning the handle is convenient but not a feature you're likely to use often. Almost all the metal-jaw vises offer one of two types of quick release. They all work well. It's a matter of personal preference, but we like the lever action best (Photo 3).

Most of the wood-jaw vises do not have a quick release, but two (see the chart, page 92) offer the reverse action type (Photo 4).

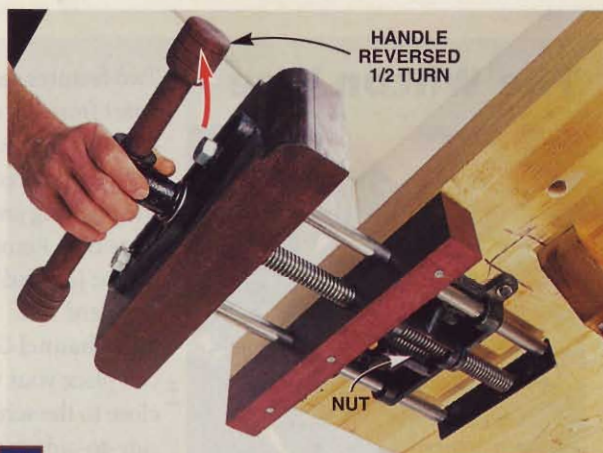
- **Vise Dog.** You can hold work *on top* of your bench with the vise dog that's found on every metal-jaw vise (Photo 5). Friction-fit, spring-loaded dogs are the easiest to use.

You'll have to make your own dog hole in the front jaw of a wood-jaw vise. One pre-made kit includes the dog hole (see the chart, page 92).

- **Handle.** You'll be using it a lot, so a handle ought to be comfortable. Some metal-jaw vises have large-diameter



3 SQUEEZE THE LEVER on this quick-release mechanism to slide the front jaw in or out. The spring-loaded lever is connected to a bar that releases the nut from the vise's screw. We prefer this type of quick release.



4 REVERSE THE HANDLE one-half turn for another type of quick release. This action releases the nut. To engage the nut, turn the handle clockwise. One metal-jaw and two wood-jaw vises have this feature.

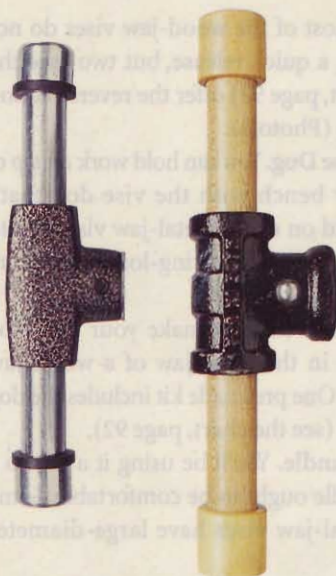
OUR RECOMMENDATION:

Get the largest vise your bench and wallet allows. The essence of a great vise is even pressure applied over a large area.

Types of Handles

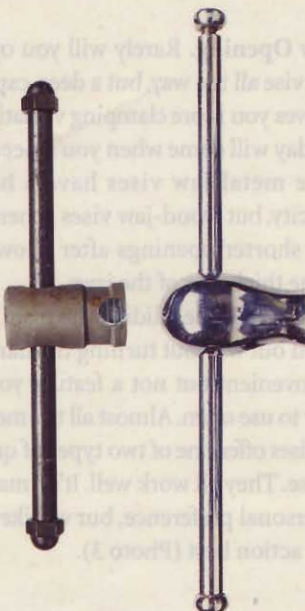
LARGE-DIAMETER HANDLES

are comfortable to grip. One metal-jaw vise comes with a short metal handle (below, left), while two others have longer wooden handles (below, right), similar to what you'd add to a wood-jaw vise.



LONG METAL-ROD HANDLES

give you more leverage and a more sensitive adjustment (below, right). We find short metal-rod handles or those with capscrew ends (below, left) less comfortable.



The Wilton Vise



Two features set this vise apart from the others:

- **Pivoting Jaw.** It's perfect for holding tapered work. Raise up the pivoting jaw to make a huge dog. Remove a pin, slide off the jaw and you've got a standard vise.

- **U-Channel Guide Bar.** You can place your workpiece very close to the screw, minimizing side-to-side racking. The channel also protects the screw from damage.



5 **HOLD A BOARD ON TOP** of the bench with a vise dog. All metal-jaw vises come with dogs. Make your own dog hole in a wood-jaw vise.

handles that are easier to grip than the rod-type handles.

To fine-tune the amount of pressure a vise is exerting, a handle should have a long "throw" (the distance from the center of the screw out to the handle's tip). Regardless of the amount of throw, all the vises have plenty of clamping power.

Choose your own handle length with a wood-jaw vise. The handle must be a fairly large diameter to fit into the socket.

SOURCES

Garrett Wade, (800) 221-2942

Grizzly Tool, (800) 823-4777
(Grizzly brands; Record)

Highland Hardware, (800) 241-6748
(Record; Veritas lg. #01.97.01 and sm. #01.97.02)

Lee Valley, (800) 267-8735
Canada (800) 267-8761
(Veritas; Record)

Sears, (800) 349-4358; (Wilton)

Tools on Sale, (800) 328-0457
(Jorgensen; Pony; Record; Wilton)

Trend-Lines, (800) 767-9999

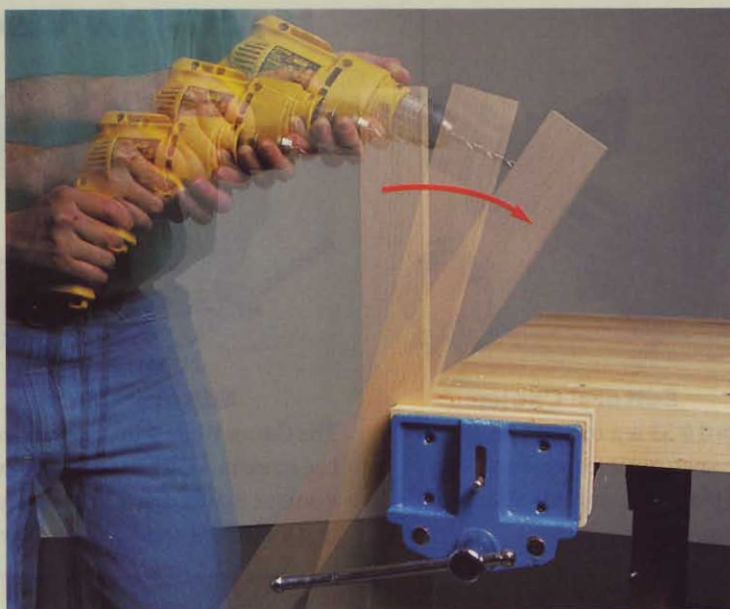
Woodcraft Supply, (800) 225-1153
(Jorgensen; Record; Woodcraft brands; Veritas lg. #01E22 and sm. #01E22; handle for wood-jaw vise #17E52, \$4.50)

Woodworker's Supply, (800) 645-9292
(Jorgensen; Woodworker's Supply brands)

What's the Deal with Racking?

When your workpiece slips in a vise, blame "racking." Before you tighten a vise, the jaws are more or less parallel, but when you apply pressure the front jaw can noticeably tilt or twist. That's called racking, and it results in unbalanced pressure on your work (Figs. A and D).

Some amount of racking is present in every vise, but some suffer more than others. Vise manufacturers have two tricks up their sleeves to combat racking (Figs. B and E). Just as good are the solutions that woodworkers have used since the days of sloppy fitting all-wood vises (Figs. C and F).



Top-to-Bottom Racking

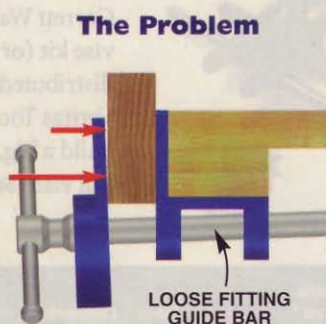


FIG. A Uneven pressure (red arrows) pinches the bottom of your workpiece causing it to slip or vibrate. The culprit is the fit between the guide bars and their supports. The more play there is, the more the vise will rack.

Manufacturer's Solution

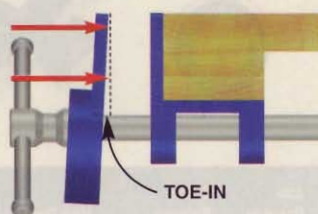


FIG. B "Toe-in" is built into some metal-jaw vises to counteract top-to-bottom racking. The jaws become parallel top-to-bottom when pressure is applied.

Shop Solution

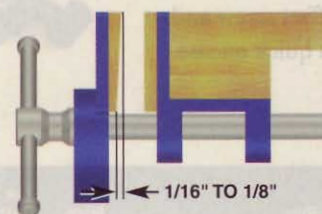


FIG. C Create your own toe-in by making tapered cheeks. Experiment to find the right amount of taper. This solution works for both metal- and wood-jaw vises.

Side-to-Side Racking

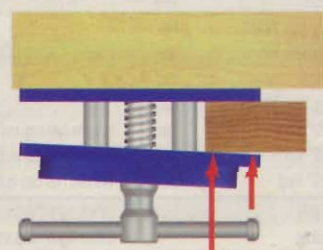


FIG. D Uneven pressure pinches one edge of your workpiece. The more you tighten the handle, the worse the racking gets! This racking is also caused by play in the guide bar system.

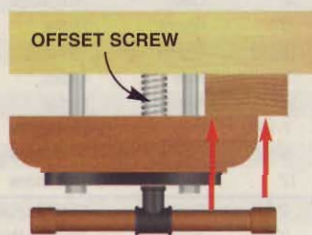


FIG. E Placing the screw closer to the right guide bar is one solution adopted by some wood-jaw vise manufacturers.

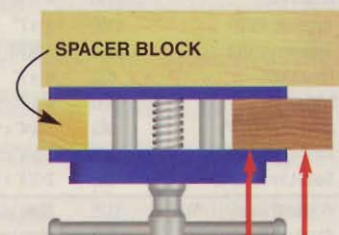


FIG. F Use a spacer block on any vise to defeat side-to-side racking. The block must be the same thickness as your workpiece. Hold it in place with tape.

Metal-Jaw Vises



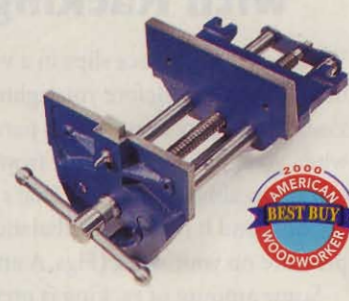
Editors' Choice

Record #53 is a robust vise. It has huge jaws, great features and very little play in its smooth-acting guide system.



Editors' Choice

The Garret Wade 9-in., quick-release vise has an extra-long handle, ample jaws and a unique plastic dog to protect your cutting tools from accidental damage.



Best Buy

Woodcraft's 9-in. vise combines good features, smooth action and an excellent price (\$60).

Wood-Jaw Vises

Editors' Choice

Woodcraft Supply's #17A11 features both an offset screw and a quick release.



Best Buy

Start with the Garrett Wade large vise kit (or the kit distributed by Veritas Tools) to build a big, economical vise (\$65).

	Vise	Price	Jaw Size (HxW)	Jaw Opening	Quick Release	Vise Dog	Handle Throw ^a	Toe-in	Comments
Metal-Jaw Vises	Grizzly (G9850)	\$53	2-1/2x7"	8"	Lever	Thumbscrew	7-1/2" Rod	Yes	Handle has cap nut ends
	Grizzly (G9851)	\$65	2-5/8x9"	10"	Lever	Thumbscrew	7-1/2" Rod	Yes	Handle has cap nut ends
	Grizzly (G2780)	\$80	2-3/4x9"	12"	Lever	Thumbscrew	7-1/2" Rod	Yes	Handle has cap nut ends
	Woodcraft (129849)	\$50	3" x 7"	8"	Lever	Thumbscrew	6-1/2" Rod	Yes	
	Woodcraft (129850)	\$60	3-1/2" x 9"	10"	Lever	Thumbscrew	7" Rod	Yes	
	Woodworker's Supply (817-575)	\$85	4" x 10"	12"	Lever	Thumbscrew	5-1/2" Rod	Yes	Quick release is on/off lever
	Woodworker's Supply (801-801)	\$55	3-1/4" x 7"	10-1/2"	Lever	Thumbscrew	5" Rod	Yes	Quick release is on/off lever
	Garrett Wade Quick Release	\$100	4" x 9"	13-1/2"	Lever	Handle	10-1/2" Rod	Yes	
	Record #52	\$90	3" x 7"	8"	Lever	Thumbscrew	6" Rod	Yes	
	Record #52-1/2	\$125	4" x 9"	13"	Lever	Thumbscrew	8" Rod	Yes	
	Record #53	\$130	4" x 10-1/2"	15"	Lever	Thumbscrew	8" Rod	Yes	
	Jorgensen 40709	\$100	4" x 7"	9"	Reverse	Friction	8" Lg. Dia. Wood	No	
	Jorgensen 41012	\$115	4" x 10"	12-1/2"	Reverse	Friction	8" Lg. Dia. Wood	No	Editors' Choice Runner-Up
	Pony 27090	\$33	4" x 7"	9"	None	Friction	8" Rod	Yes	
	Wilton 78A	\$100	4" x 7"	10"	Reverse	Friction	6" Lg. Dia. Metal	No	
	Trend-Lines (JTJ7)	\$63	2-3/4" x 9"	7-1/2"	Lever	Thumbscrew	7-1/2" Rod	Yes	Handle has cap nut ends
	Trend-Lines (JTJ9)	\$72	2-3/4" x 9"	9-1/2"	Lever	Thumbscrew	7-1/2" Rod	Yes	Handle has cap nut ends
	Trend-Lines (JTJ12)	\$81	2-3/4" x 9"	12"	Lever	Thumbscrew	7-1/2" Rod	Yes	Handle has cap nut ends
Wood-Jaw Vises	Woodcraft Supply (17A11)	\$135	Make your own	8" ^b	Reverse	You Make Hole	Variable		Offset tightening screw
	Woodcraft Supply (17D04)	\$95	Make your own	9" ^b	None	You Make Hole	Variable		Offset tightening screw
	Woodcraft Supply (17D03)	\$65	Make your own	6" ^c	None	You Make Hole	Variable		
	Woodworker's Supply (907379)	\$150	Make your own	8" ^b	Reverse	You Make Hole	Variable		
	Veritas Tools -large	\$65	Make your own	8-1/2" ^b	None	You Make Hole	Variable		Offset tightening screw
	Veritas Tools -small	\$45	Make your own	6" ^c	None	You Make Hole	Variable		
	Garrett Wade (70G04.01)	\$60	Make your own	8" ^b	None	You Make Hole	Variable		Offset tightening screw
	Garrett Wade (70G03.01)	\$40	Make your own	6" ^c	None	You Make Hole	Variable		
	Garrett Wade (10H03.01)	\$170	2-1/4" x 14-3/4" ^c	6-1/2"	None	Hole Provided	10"		Comes with jaws and handle

^a Distance from screw's center to end of handle.

^b Based on 3" thick front jaw and 1-3/4" thick lower rear jaw.

^c Based on 2-1/2" front jaw only.

^d Designed for 1-3/4" thick benchtop

AW

Product Reviews

Hand-Held Oscillating Sander



Yep, that's right—a hand-held oscillating spindle sander. Brand new from Porter Cable and totally unique, this sander can be taken to your work, instead of taking your work to the sander.

The variable-speed, 6-amp motor runs from 2,400 rpm to 3,600 rpm. You'll get 40 to 60 oscillations per minute with a 1/2-in. oscillating stroke.

I really like this hand-held design. Tables on oscillating sanders are pretty small, so when I've tried to use them for bigger work, like aprons or case sides, I've had to build auxiliary tables. This sander eliminates this problem.

Have you ever tried using a portable belt sander to sand a straight edge? It ain't easy. Porter Cable addresses that too. You can use the included edge guide to precisely control how much material you're taking off. The edge guide has two fences that work like infeed and outfeed tables on a jointer. Set one flush with the drum and set the other to the amount of material you want to take off.

If you want the best of both worlds, mount this sander in your router table. You'll need a router table insert just for the sander. The 5-1/4 in. by 9-3/4-in. base fits in your table.

A dust port is included and dust collection is good. A 2-in. drum and optional 1/2 in., 3/4 in., 1 in., and 1-1/2-in. drums are available.

If you only work with small parts, a drum sander in a drill press or a stationary oscillating sander will probably be adequate for you. But if your woodworking includes a mix of big and small parts, you'll like Porter Cable's latest innovative tool. You can buy it for \$250.

Porter Cable, (800) 487-8665



The fences on the edge guide can be offset, making sanding a long, straight edge easy.



Big Sander, Small Price

Grizzly Industrial is working on a new oscillating spindle sander that should be available in January, 2001. It looks like a heck of a deal!

\$175 will get you a floor-model sander with a 1/2-hp, 4.6-amp induction motor. The cast iron table (14-1/2 in. by 14-1/2 in.) tilts to 45 degrees. A 5-1/2-in.-long spindle spins at 3,450 rpm, with 64 oscillations per minute and a 1-in. stroke length.

As we went to press, Grizzly was still finalizing production of this tool, so final specs and pricing could change, but this sounds like a sander that'll be worth a good look!

Grizzly Industrial, (800) 523-4777

Buy Our Best Seller

10" x 40T only \$107
or \$101 on 2nd blade

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Buy a blade or dado and get \$15 worth of sharpening discount coupons from Forrest, good on any make blade or dado set you own. The first 100 customers will receive a FREE Picnic Table Plan and Router poster!

THE ONE BLADE THAT LEAVES A SMOOTH-AS- SANDERED SURFACE

Outperformed 36 other premium blades, both foreign and domestic, WOOD magazine test, Sept. 1998, pg. 45.



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Cuts MELAMINE PERFECTLY. 220 mm & 300 mm available. Our best PLYWOOD blade. 8", 7 1/4" & others available.

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10" x 80 T (1/8" or 3/32" K)	\$159	\$143	\$135
12" x 80 T (3/8" or 1" hole, 1/8" K)	181	163	154
14" x 80 T (1" hole)	197	177	168
14" x 100 T (1" hole)	326	203	192
16" x 100 T (1" hole)	243	219	206

BUY ONE & SAVE - BUY MORE & SAVE MORE

Buy any sawblade or dado in this ad and save 10% off the sale prices. Buy additional sawblade(s) or dado(s) and save even more—15%! Sale good through September 30, 2000.

WOODWORKER II

5 1/8" to 14" diameter available

All purpose—tablesaws and portable circular saws.

Special 10% Discount! Take 15% off second blade of your choice.

EDITOR'S CHOICE AND TOP RATING OVER 18 COMPETING SAW BLADES.

The 10" x 40T earned the Editor's Choice Award for the best performance regardless of the price. See American Woodworker magazine, April 1998, pp. 68-69.

	Sale Price	10% Off 1st Blade	15% Off 2nd Blade
14" x 40 T x 1"	\$148	\$134	\$127
14" x 30 T x 1"	138	125	118
12" x 40 T x 1"	128	116	110
12" x 30 T x 1"	118	107	101
10" x 40 T x 1/8" or 3/32"	118	107	101
10" x 30 T x 1/8" or 3/32"	98	89	84
9" x 40 T	108	98	93
9" x 30 T	98	89	84
8 1/4" x 40 T x 3/32"	98	89	84
8" x 40 T x 3/32"	98	89	84
8" x 30 T x 3/32"	88	80	78
7 1/4" x 30 T x 3/32"	68	62	59
**6" x 40 T x 3/32"	88	80	78
***5 1/8" x 40 T x 10mm	88	80	78

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	Sale Price	10% Off 1st Blade	15% Off 2nd Blade
6 1/2" x 40 T Delta, Sidekick, & Others	\$98	\$89	\$84
8 1/4" x 60 T Sears, Delta, Ryobi	108	98	93
8 1/2" x 60 T Hitachi, Dewalt, Ryobi, FreudTR125	118	107	101
9" x 80 T Delta & Others	128	116	110
10" x 80 T Delta, Bosch, Mitachi, Makita, Ryobi, AEG, & All	138	125	118
12" x 80 T Dewalt, Hitachi, Makita, B+D, Sears, & All	148	134	127
14" x 100 T Makita, Ryobi	188	170	161
15" x 100 T Hitachi, Ryobi	198	179	169

WOODWORKER I

7 1/4" to 14" diameter available

Designed for radial arm or tablesaws—fine crosscut.

	Sale Price	10% Off 1st Blade	15% Off 2nd Blade
8", 8 1/4", 7 1/4" x 60T	\$108	\$98	\$87
10" x 60 T (3/8" hole)	128	116	103
12" x 60 T (3/8" or 1")	138	125	111

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Select one of these items FREE when placing an order for any saw blade or dado purchase from this ad in AW magazine. Choose from the eight book titles shown, imprinted cap, or 16 oz. can of spray blade cleaner. Hurry! This special offer is limited while supplies last on orders placed by September 30, 2000.

FORREST DADO-KING

Unmatched Precision on Every Dado Cut! The Forrest Dado-King gives you flat-bottomed grooves and no splintering—even when crosscutting oak plys and melamine. This award-winning set comes with six 4-tooth chippers (including 3/32" chipper), two 24-tooth outside blades plus shims. Cuts 1/8" to 29/32" grooves.

	Sale Price	10% Off 1st Dado	15% Off 2nd Dado
6" Set	\$269	\$242	\$229
8" Set	289	260	245
10" Set	349	314	297
12" Set	449	404	382

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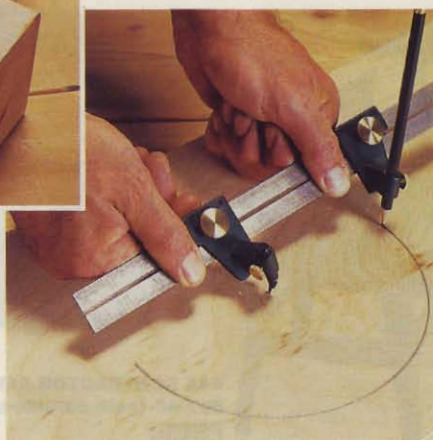
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SEE OUR INTERNET STORE AT woodmall.com OR stores.yahoo.com/forrestman

Product Reviews



Handy Layout Tool

Here's a great tool for only \$16. The Tri Scribe is a well-machined pair of pencil holders that attach to a ruler or square. They can be used three ways: like a pencil gauge, to layout circles, or to make parallel lines.



Both heads come with scribe points, which can be used instead of a pencil if you prefer a scribed line.

Clamp the Tri Scribe to a ruler (2-in. wide or less) using the brass knobs (included). Insert a pencil and you're ready to lay out. My favorite way to use this tool is on a combination square. It's remarkably easy to adjust. You can also use the Tri Scribe to lay out mortise-and-tenon joints.

If you want to use the Tri Scribe like a cutting gauge, get the optional Tri Blade for \$7. It's a small, snap-off razor knife that replaces a scribe point.

Woodcraft Supply, (800) 225-1153,

www.woodcraft.com

Tri Scribe, Item # 141116

Tri Blade, Item # 141541

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• **Consumer Digest:** Buying Guide rates Hydro-Sil "Best Buy" for heating—a product that offers outstanding value for its price.

• **Grant M. (Accountant):** "With no insulation or storm windows, I saved 51% when changing from oil to Hydro-Sil."

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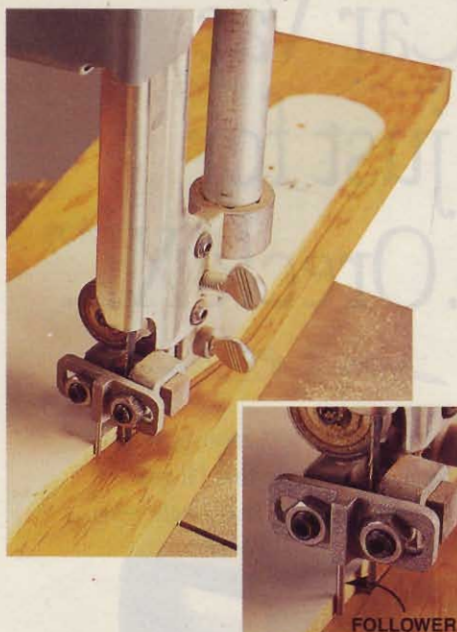
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Product Reviews



Bandsaw Duplicator

Cutting lots of identical curved parts is easier if you use a template and a template follower. This \$20 setup from Woodworker's Haven, is one of those "Geez, why didn't I think of that..?" tools. Attach the duplicator to the upper guide on your bandsaw using the included hardware. The guide pin that projects down off the duplicator follows your template. You can set the pin to the left or right of the saw blade and control how much waste you leave outside the template edge.

Unlike shop-made followers, nothing gets clamped to the table, so your work isn't bumping into a tableful of obstructions. I've been using my shop-made duplicator for years (AW #74, August 1999, page 43), but now I've traded it in for this one.

When you're not using the duplicator you can remove it, or just raise the upper guide so the pin is above your work. To change blades, it only takes a few seconds to pop off the duplicator.

The duplicators are saw-specific and are available for most models.

Woodworker's Haven, (888) 994-2836,
www.woodworkershaven.com

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Finishing Tips

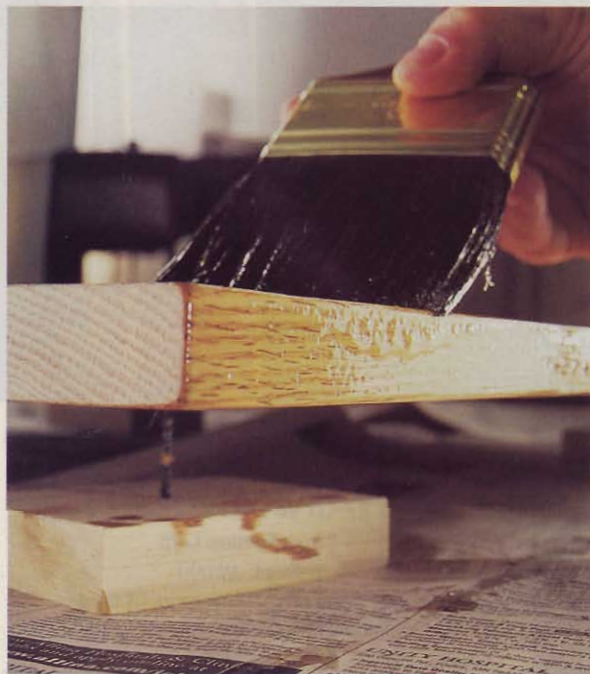
The Best Brush for Waterborne Polyurethane

Read the label on most cans of waterborne polyurethane and it will say to use a synthetic brush. That's because water causes natural bristles to splay, making the brush useless. What they don't tell you is that synthetic bristle brushes are made from either nylon or polyester. Always go for the nylon. These softer bristles are less likely to leave brush marks in a clear finish. Polyester bristles are stiffer than nylon making them better suited for use with latex paint.

Use Two Brushes to Control Drips

A big brush that holds a lot of finish is great for covering a large flat surface. But that same big brush often leaves too much finish on its thin front edge. The remedy: Use two brushes. First, using the big brush, quickly cover the front edge and an adjacent section of the top with finish. Tip off this swath of finish on the top with the big brush. Then switch to a second smaller brush and smooth out the

coat on the edge, removing any sags and drips as you go. Once the edge is finished, switch back to the big brush, feather in where you left off and finish the top.



1 DRIPS AND SAGS on the front edge of a board are hard to clean up with a big brush because it leaves a heavy coat that's likely to sag.



2 USE A SECOND BRUSH—small, disposable foam ones work great—to get rid of drips and sags on edges. The secret is to keep this second brush fairly dry—only dampened with mineral spirits—so it can wick up excess finish. Hold this brush at an angle so it cradles the bottom lip of the edge and make one long end-to-end stroke. If you need to make a second pass, put on a plastic glove and squeeze out the brush with your fingers.

ART DIRECTION: JOEL SPIES AND DAVID FARR • PHOTOGRAPHY: KRIVIT PHOTOGRAPHY • CONSULTANT: MICHAEL DRESNER

Finishing Tips

Applying Bright-Colored Stains

Ground pigment stains can now offer you bright, transparent colors that are clear and colorfast—a combination of the best features of stains and dyes. They're highly concentrated—as the tiny bottles attest.

Here's a trick for evenly applying these concentrated colors to a large surface: First, wet the wood with mineral spirits. This makes it easy to add and spread the color which won't soak in right away because the surface is saturated. Instead the color mixes with the solvent and slowly soaks in as you spread it around. To deepen the color, work in more of the concentrate.

Sources

Woodburst Wood Stains
Six color set, \$23
Emerald City Color Company
3234 Ocean Gateway
Cambridge, MD 21613
(410) 221-8700;
www.woodburst.com



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Remove Water-Soluble Dye

It happens to everybody. On your sample, the color was perfect, but on your piece, it doesn't look right. Don't despair. There's an easy way to remove water-soluble dye color so you can try again. Sponge the surface liberally with regular household chlorine bleach. Almost instantly the color will lighten and begin to disappear. Two coats of bleach may be necessary and the process may slightly change the color of the raw wood. Rinse everything with water, sand the raised grain, and you've got a second chance. **AW**



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Pacific LaserCraft



Simple Tablesaw Sled

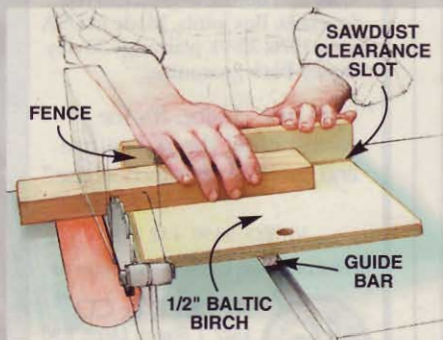


FIG. A Use it for cheek cuts.

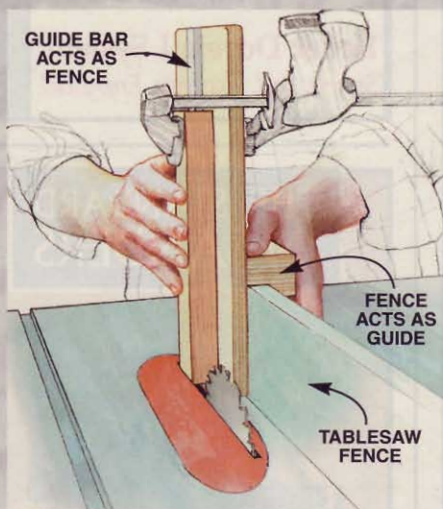


FIG. B Use it for cross cuts.

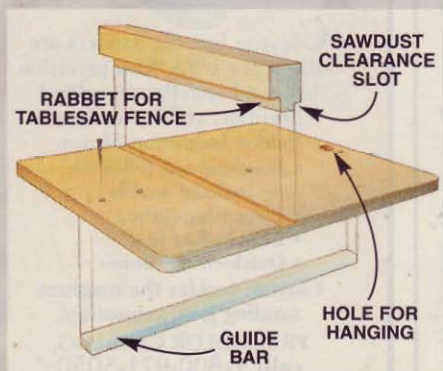


FIG. C Constructed from three simple pieces.

In AW issue #75, October 1999, we showed you how to build the ultimate tablesaw sled. For *small* jobs, build this simple and versatile, scaled-down version of a tablesaw sled invented by Frank Gregg. Frank's sled has five sterling qualities:

1. With only three major pieces, it's easy, fast and inexpensive to build.
2. You can make accurate crosscuts on smaller stock.
3. It doubles as a tenoning jig that uses your rip fence as a rail and guide when making cheek cuts.
4. It can be used without removing the blade guard.
5. It stores easily and compactly.

To build the jig, you'll need:

A flat 14 x 18-in. piece of 1/2-in. plywood (9-ply Baltic birch is ideal); a straight piece of 14 x 2 x 1-1/2-in. hardwood; an 18-in. plastic runner that fits your miter slot (available from Woodcraft Supply, (800) 225-1153, or www.woodcraft.com).

- STEP 1.** Place the plastic runner in the miter slot and attach the oversized plywood base with three countersunk 3/4-in. wood screws.
- STEP 2.** Trim the right side of the jig by running it through the left miter slot, then use the other miter slot to trim the left side.
- STEP 3.** Using your large tablesaw sled, square the ends of your jig.
- STEP 4.** Cut the rabbets (Fig. C) on each side of the push block/rail.
- STEP 5.** Cut a 1/8-in.-deep dado across the plywood base. Make the dado as wide as the narrow shoe of the push block/rail and position it so the jig floats 1/8-in. above the tablesaw table when it's used as a tenoning jig.
- STEP 6.** Attach the push block/rail to the base with 3-3/4-in. countersunk wood screws and trim the ends by running the jig through both miter slots.



Frank Gregg

This year, *American Woodworker* magazine "hit the road" on what we call the Blue Highway Tour. Our goal was to visit the workshops of exceptional woodworkers and bring some of their best ideas to you. One of our stops was Dallas, Texas, where we met Frank

Gregg. In Frank's shop jigs were virtually jumping out of every nook and cranny.

The double-duty tablesaw sled you see here is only one of the hundreds of clever solutions to common shop problems that Frank has invented. Consequently, we gave him the honorary title of "The Blue Highway Tour Jiggernaut." **AW**



Major funding for this special project from Ford Motor Co. To learn more, visit www.ford.com

Flammables Cabinet

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and family safe!*

1-IN. THICK EXTERIOR
PLYWOOD TAKES
LONGER TO BURN
THROUGH THAN 3/4-IN.
PLYWOOD

STRONG JOINTS
DELAY FLAMES
FROM ENTERING
CABINET

Have you got finishing supplies scattered all over your shop? Concerned that they're a fire hazard? Organize them into this cabinet built out of one sheet of plywood and you'll sleep better at night.

The basic purpose of a flammables storage cabinet might come as a surprise to you. I always thought the cabinet was supposed to *contain* a fire. Not so.

The real purpose of a flammables cabinet is to keep fire away from flammable liquids as long as possible, both for your benefit and for firefighters.

**FLAMMABLE
KEEP FIRE
AWAY**

BRIGHT SIGN WARNS
FIREFIGHTERS OF
DANGER

LIP BEHIND DOOR
BLOCKS ENTRY
PATH FOR FLAMES

ADJUSTABLE SHELF
IS DEEP ENOUGH
FOR TWO 1-GAL.
CONTAINERS

FIRE-RETARDANT
PAINT ADDS
ANOTHER LAYER
OF PROTECTION

SELF-CLOSING HINGES
ENSURE THAT THE DOOR
STAYS CLOSED

SHELF BELOW
DOOR CONTAINS
SPILLS



Shop Solutions

FIG. A
Exploded View of Flammables Cabinet 32" H x 32" W x 16" D

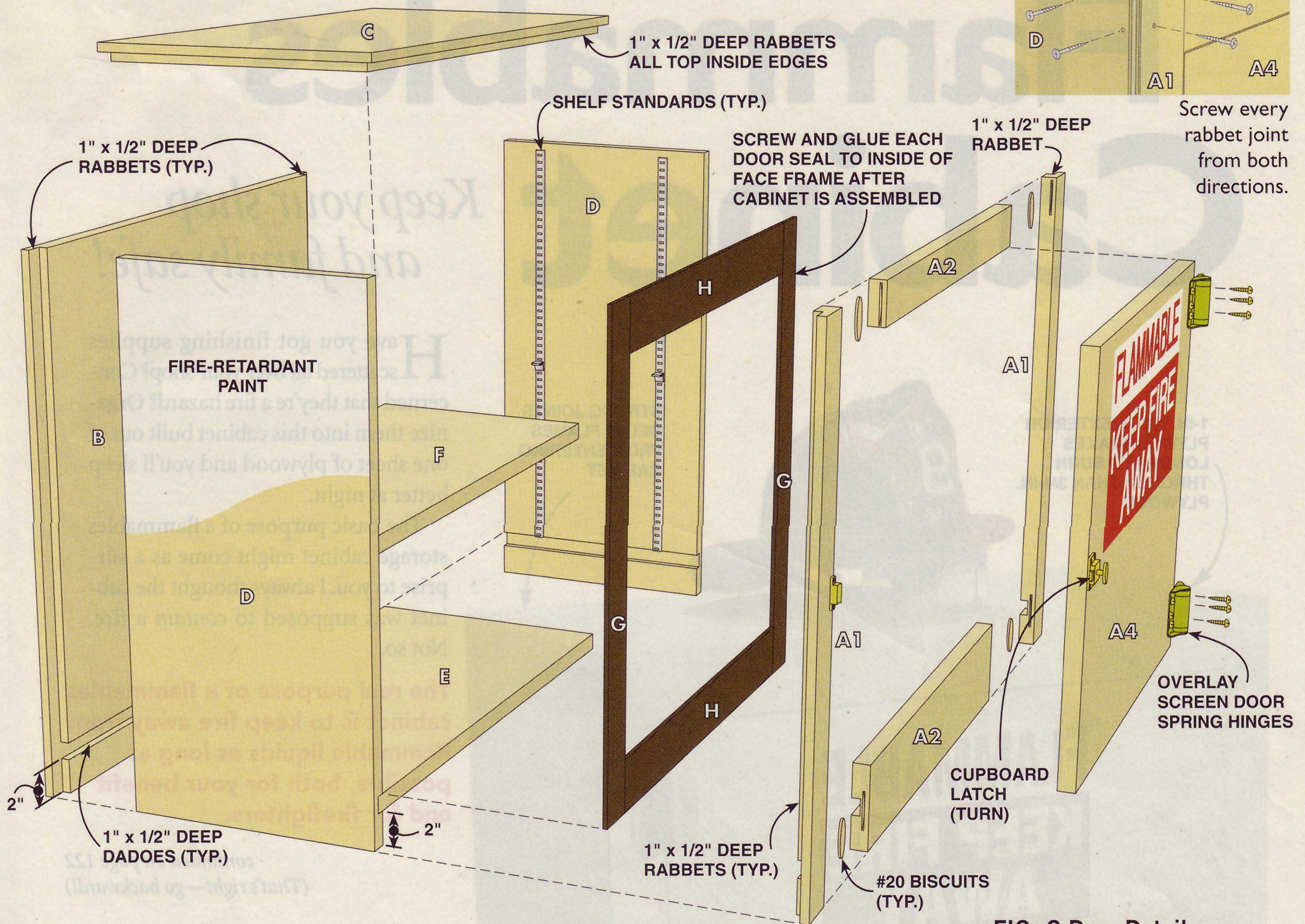


FIG. B Plywood Cutting Diagram

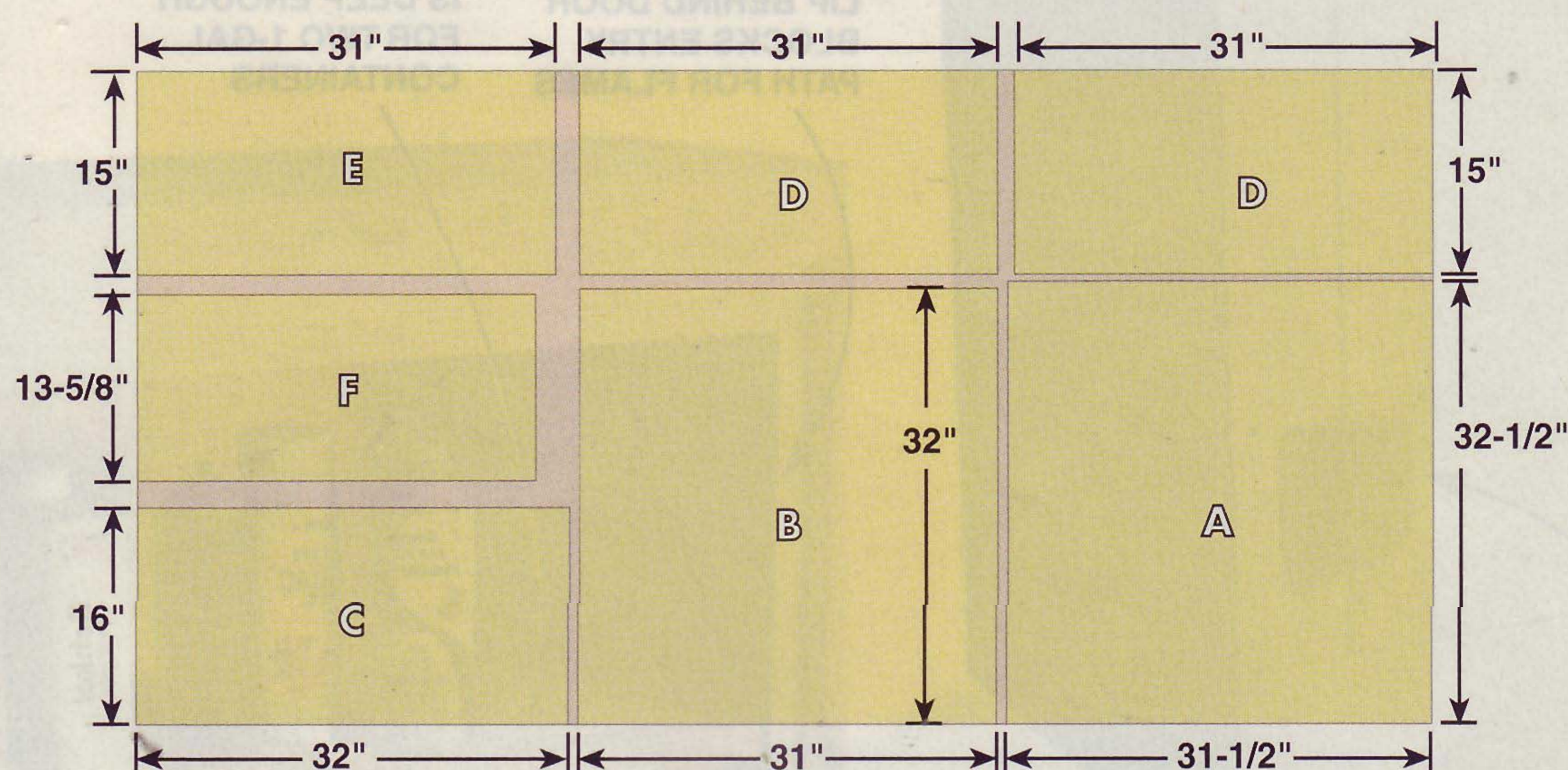
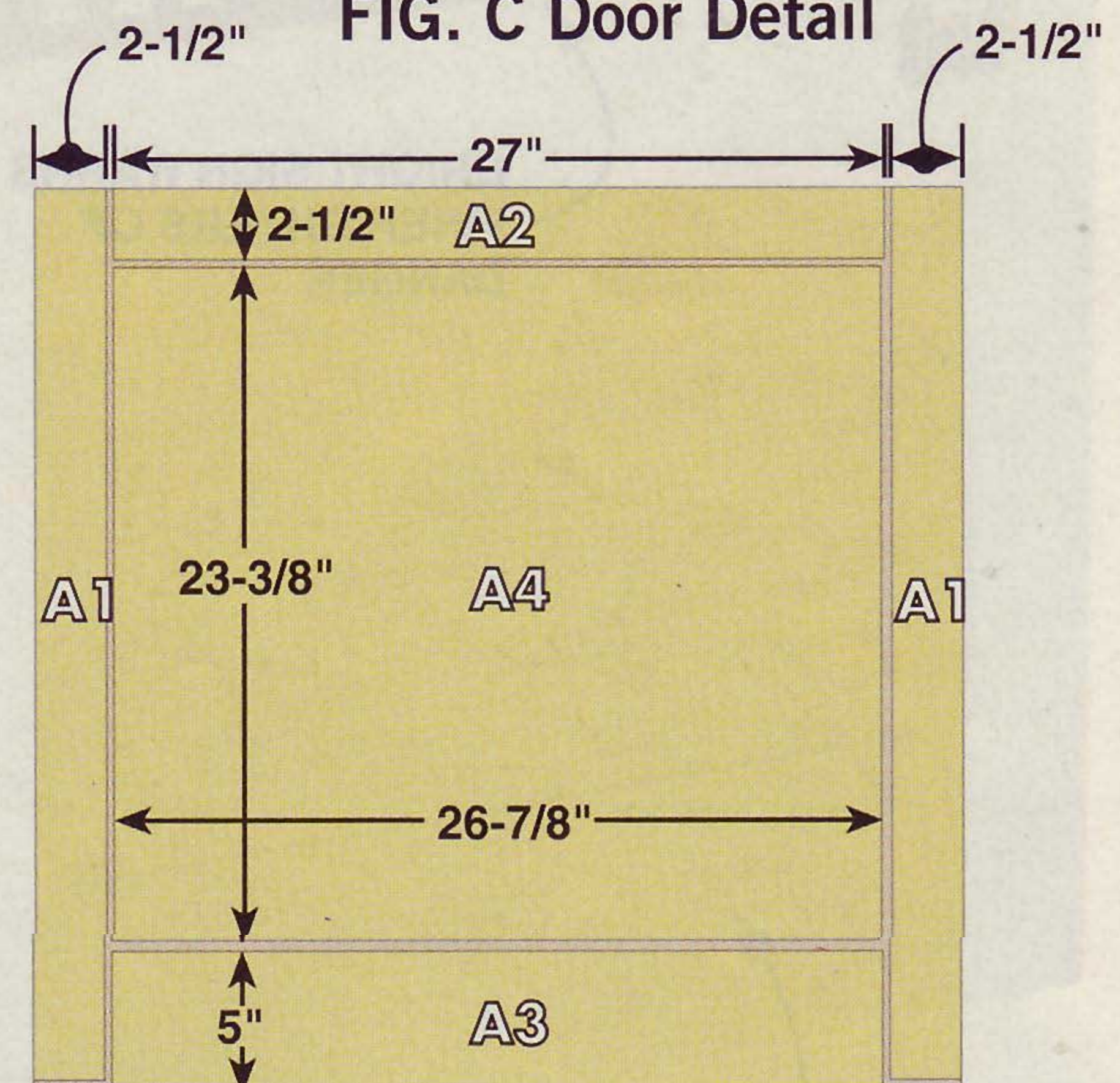


FIG. C Door Detail



Sources

"Flammable-Keep Fire Away" sign:
EMED Co.

(800) 442-3633
#33591-B-VA, \$12.

Fire Retardant Paint:
Your local paint retailer or contact:

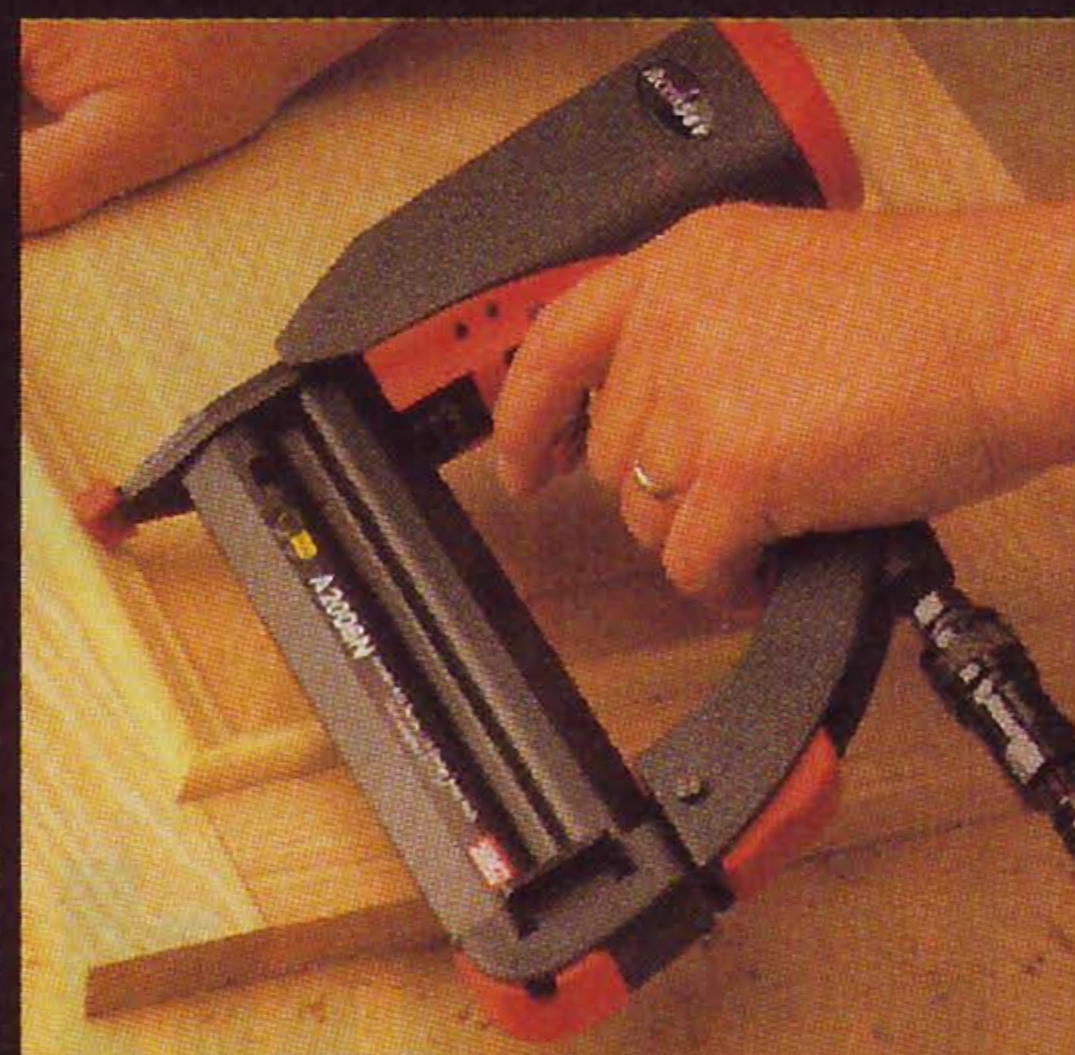
Benjamin Moore (Retardo),
(800) 344-0400; www.benmoore.com

Northwest Protective Coatings, LLC
(877) 486-3388; www.firecoating.com

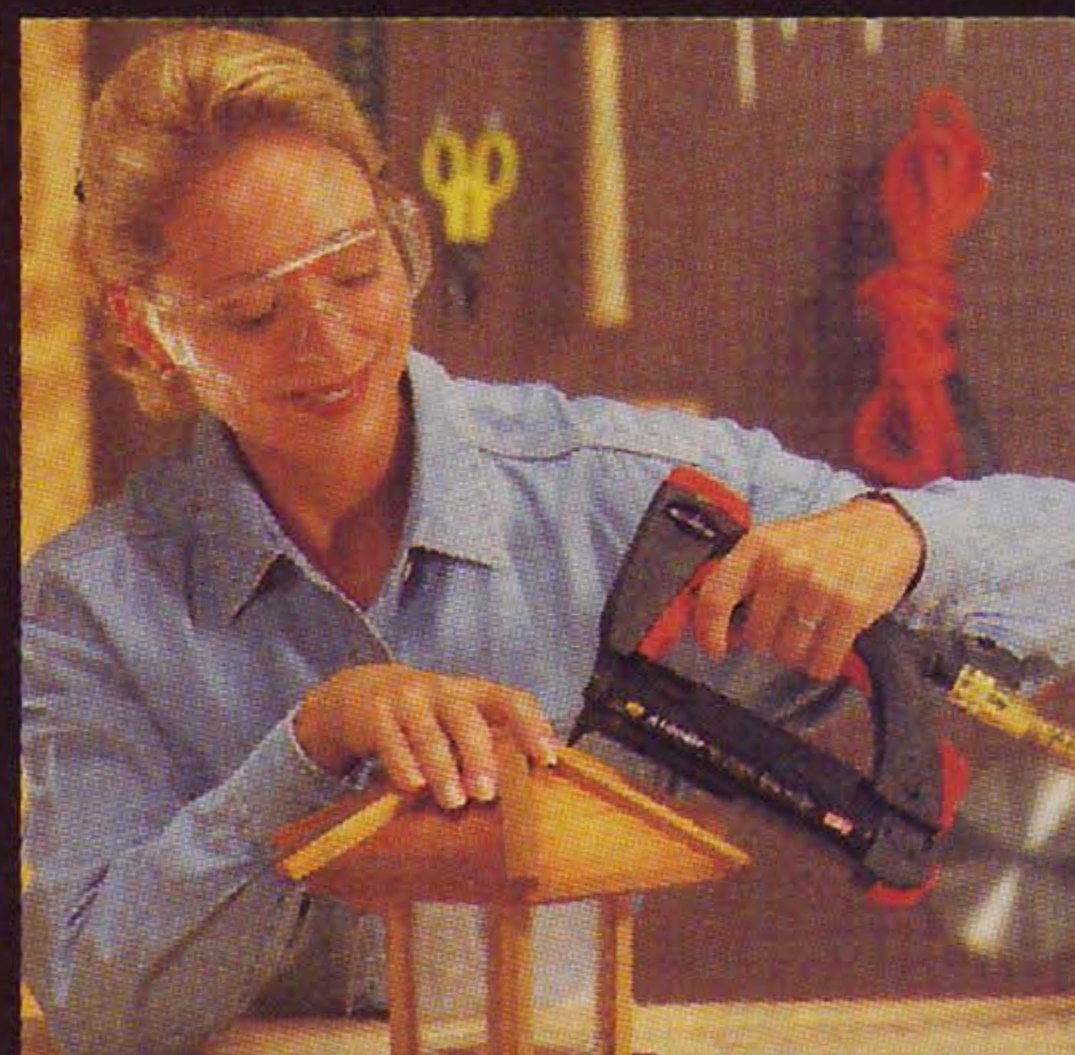
Sherwin Williams
(800) 4-SHERWIN; www.sherwin.com

If you have an original Shop Solution, send it to us with a sketch or photo. We pay \$200 for each one we print. Send to: **Shop Solutions, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121.** Submissions can't be returned and become our property upon acceptance and payment.

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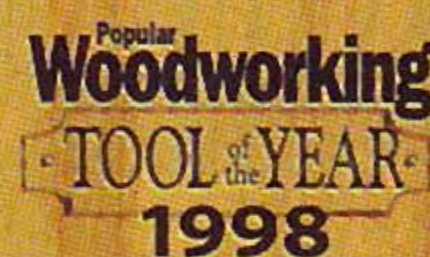
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Shop Solutions

This cabinet is designed to keep flames away from your flammables for 10 minutes so you have time to escape a fire.

Keeping all your finishing supplies in one highly visible spot allows firefighters to quickly isolate a danger zone and have more time to fight the fire.

This cabinet is cheap insurance. While a commercial metal safety cabinet this size could set you back about \$400, the total cost for our wooden version is about \$150, \$75 for the plywood, \$45 for the optional fire-retardant paint, \$12 for the sign, and \$10 for the hardware.

Flammables cabinets are required in most professional shops. Why not set the same standard at home? **AW**

Note: This flammables storage cabinet has been designed to meet the code requirements of the National Fire Protection Association. For more information about fire protection contact the NFPA at (617) 770-3000 or visit www.nfpa.org

CUTTING LIST

Overall Dimensions: 32"H x 32"W x 16"D

Part	Name	Qty.	Dimensions	Material
A	Face frame/door	1	32-1/2" x 31-1/2"	1" Exterior Fir Plywood
Cut pieces A1 - A4 from piece A				
A1	Stiles for Face Frame	2	2-1/2" x 31"	1" Exterior Fir Plywood
A2	Top Rail for Face Frame	1	2-1/2" x 27"	1" Exterior Fir Plywood
A3	Bottom Rail for Face Frame	1	5" x 27"	1" Exterior Fir Plywood
A4	Door	1	26-7/8" x 23-3/8"	1" Exterior Fir Plywood
B	Back	1	32" x 31"	1" Exterior Fir Plywood
C	Top	1	16" x 32"	1" Exterior Fir Plywood
D	Sides	2	15" x 31"	1" Exterior Fir Plywood
E	Bottom	1	15" x 31"	1" Exterior Fir Plywood
F	Loose Shelf	1	13-5/8" x 29-1/2"	1" Exterior Fir Plywood
G	Door Seals- Side	2	2-1/2" x 27-1/2"	1/4" Hardboard
H	Door Seals- Top/Bottom	2	3" x 25"	1/4" Hardboard

SHOPPING LIST

Name	Qty.
1" x 48" x 96" Exterior fir plywood	1 sheet
1/4" x 12" x 28" Hardboard	1 piece
28"-long shelf-standard brackets	4
Shelf support clips	4
#20 biscuits	4
1-5/8" drywall screws	100
Overlay screen door spring hinges	1 pair
Cupboard latch	1
Silicone caulk	small tube
Intumescent (fire-retardant) paint	1 gal. (see Sources, page 123)