

DUST CONTROL

SPECIAL ISSUE

AMERICAN WOODWORKER[®]

#80
June 2000

www.americanwoodworker.com

No More Dust!

**Dust Collectors
Tested and Reviewed**

**Dust Control with a
Shop Vacuum**

Build an Air Scrubber

PLUS

- A No-Fuss Picnic Table
- Craft a Queen Anne Stool
- Master the Cabriole Leg

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February 1998



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- DISCS: 12" CAST IRON
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Popular Woodworking
Magazine!*

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Tool Test: Dust Collectors

You've got lots of choices. Let us help you sort out the best machines.

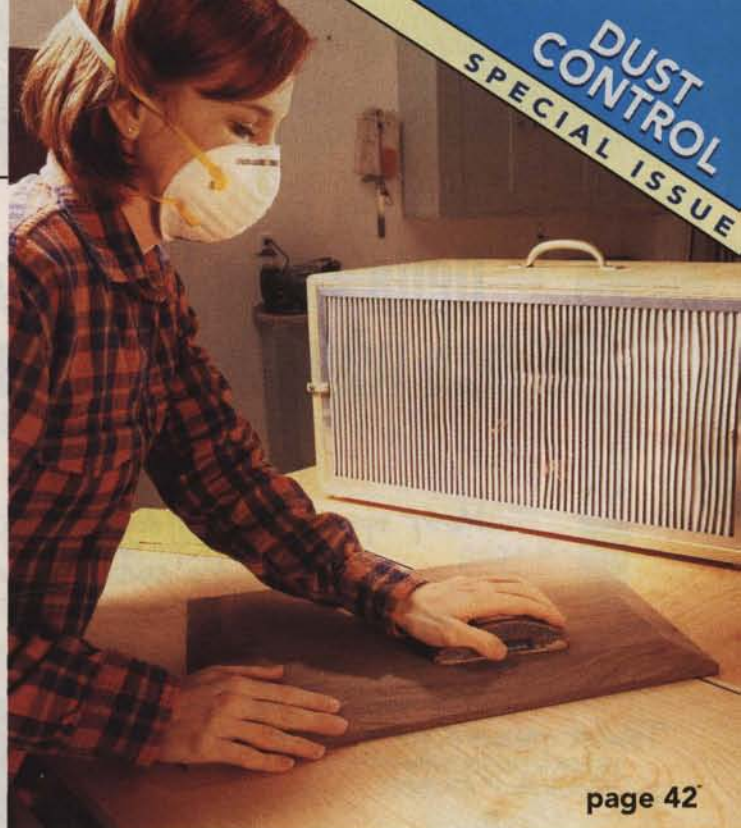
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Queen Anne Footstool

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Combine your machine and hand tool skills in this graceful stool.

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Learn the tricks to this classic from a master.

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Cook up this table in a weekend and enjoy it for a month of Sundays.



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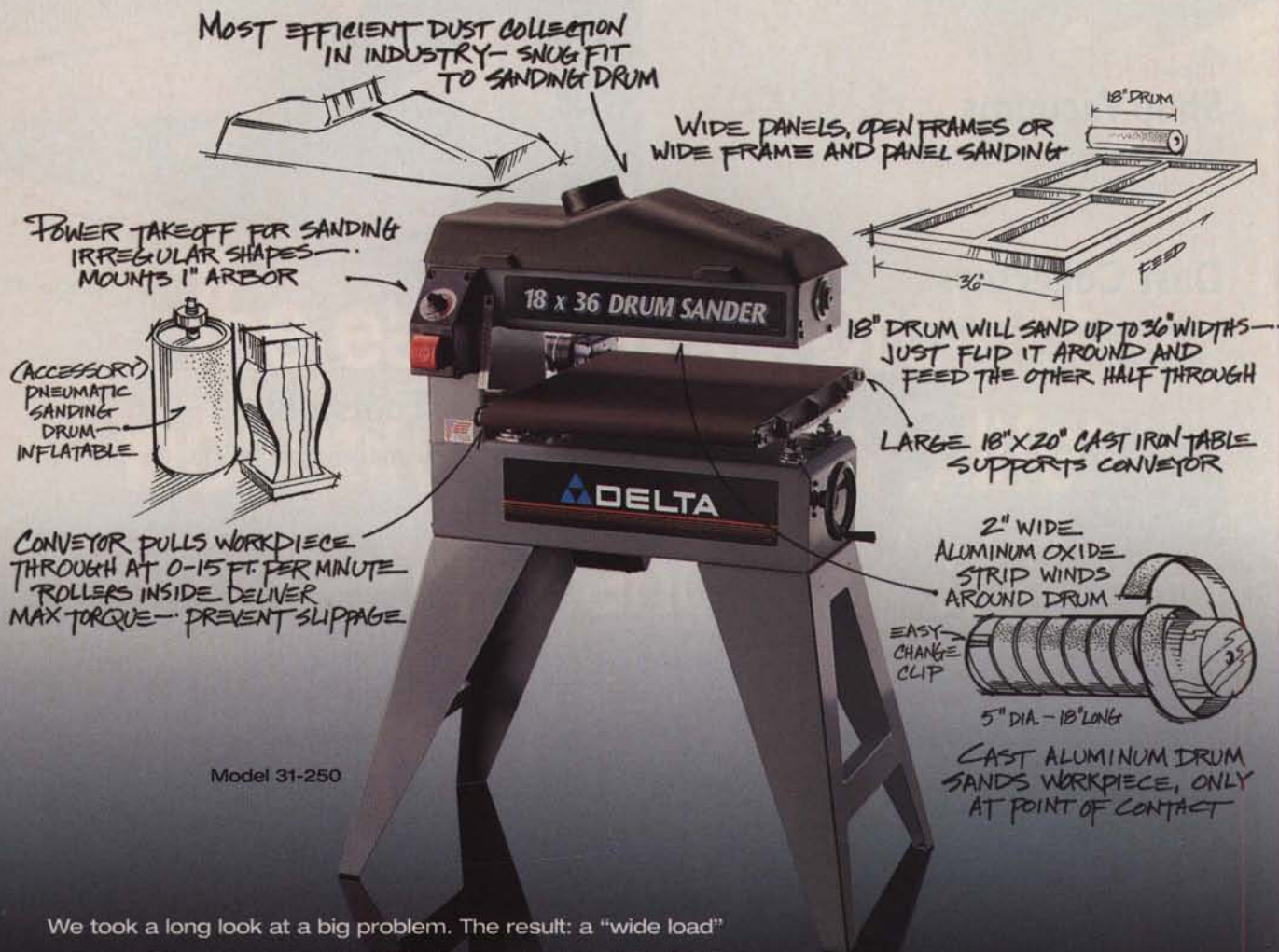
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AMERICAN WOODWORKER

DELTA TAKES A SERIOUS LOOK AT WIDE SURFACE SANDING.

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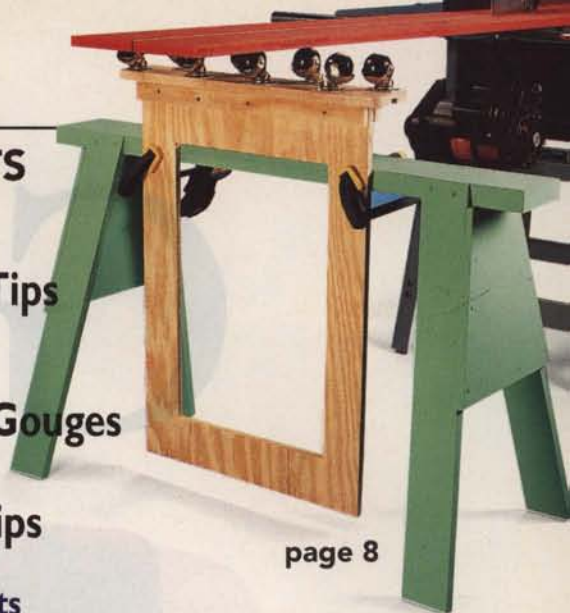
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Grand slam slam slam slam.



Dodge Dakota has been a big hit, having been ranked "Most Appealing Compact Pickup" three years in a row by J.D. Power and Associates.* And now, with the addition of two more full-size doors, the new Dakota Quad Cab™ looks like a solid home run. Look at the stats: the rear doors open almost 90°, for easy access to a remarkably roomy interior. You still get best-in-class cargo room, too.**



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*J.D. Power and Associates 1997-1999 Automotive Performance, Execution, and Layout (APEAL) Studies™ 1999 study based on 87,639 consumer responses. www.jdpower.com **Comparisons vs. compact crew cab pickups. †230 HP in California and northeastern states with special emission standards. Always use seat belts. Remember a backseat is the safest place for children.

Small Shop Tips

Perf-Board Shelving

I use a perf-board over my bench to keep tools organized and within easy reach. These shelves take the concept one step further and remove the clutter that tends to build up on a workbench. Use 2x4s and 1/4-in. L hooks to make the shelves. Chamfer the top back edge so the shelf can be tipped in and tighten the L hooks for a snug fit against the perf-board. These shelves are surprisingly strong and can be sized to fit your specific needs.

Myron S. Levy



Floor Drawer

Here's a great space-saving tip. I first made "floor drawers" like these for under-the-bed storage. They worked so well I decided to use them in the shop. Floor drawers work great for storing scrap wood or infrequently used tools and supplies. Make the drawers long but shallow so the contents are easy to get at. I made mine with non-swiveling wheels and an oversize handle so I can push them in a straight line with my foot.

Mike Fillipi

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another Revolution...

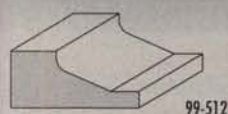


Freud has always been first in cutting tools technology. **First** with anti-kickback design. **First** with Teflon® coatings. **First** with Super micrograin carbide. Now, in their never ending quest for superior cutting tools, Freud engineers have designed another "**first for the industry**". A four-wing raised panel cutter that will revolutionize the way you make raised panel doors. Freud's patented 2+2 Raised Panel Router Bits produce glass-smooth cuts, even on cross grain! This new design has an ingenious configuration of both positive and negative shear angles that eliminates the fuzz on the top edge of the profile. Available individually and in sets. Once you've tried Freud's 2+2's, you'll see all others are second class.

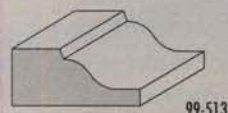
- **Anti-Kickback Design*** chip limitators restrict tooth bit reducing the effects of kickback.
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- **DuPont Teflon® Coatings** reduce friction, heat and resin build-up and protects from corrosion.
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- **Shear Angle** Lets the bit slice through the wood, producing a superior finish on all materials.
- **Computer Balancing** eliminates vibration and chatter resulting in clean, smooth profiles.
- **Advanced Tri-Metal Brazing** creates a stronger, more impact resistant bond between the carbide and the bit.

Patented Design

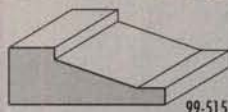
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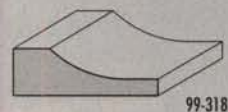
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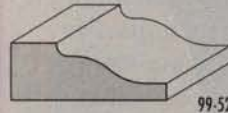
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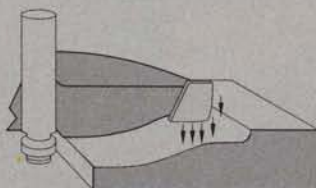


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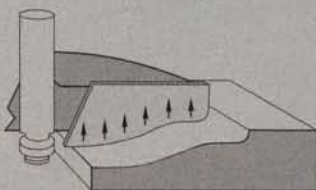


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The small wings cut downward on the wood fibers to shear the top edge off for a perfect splinter free edge.



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Sawing Rack

My shop is simply too small to cut full-size sheets of plywood on the tablesaw. After many a bitter battle using a circular saw to cut floppy sheet stock perched on sawhorses, I developed this handy rack for cutting those full-size sheets down to size. One side is designed for cross-cutting while the other is used for ripping. The rack makes a sturdy platform for supporting the plywood while rough cutting with a circular saw.

To build the rack: Rip scrap 3/4-in. plywood to 3-in. Cut 1-in.-deep dadoes every 12-in. or so to create the half-lap joints. Assemble with glue so there are no metal fasteners to ruin a misguided blade. Topped with a sheet of plywood, the rack can also serve as an assembly table.

Henry Scott

Swiveling Outfeed Roller

Here's an outfeed roller designed to support long boards behind the saw for ripping or alongside the saw for crosscutting. When not in use, the roller can be hung on the wall or otherwise stored out of the way.

To build: Screw swivel-ball casters to a piece of 3/4-in. stock in a zigzag pattern, so they swing freely. Screw the caster platform to a 3/4-in. plywood frame and clamp it to a sawhorse to make it level with the saw's table. This swiveling support also works great behind a bandsaw when you're cutting curves in long, wide boards.

Fran Olsen



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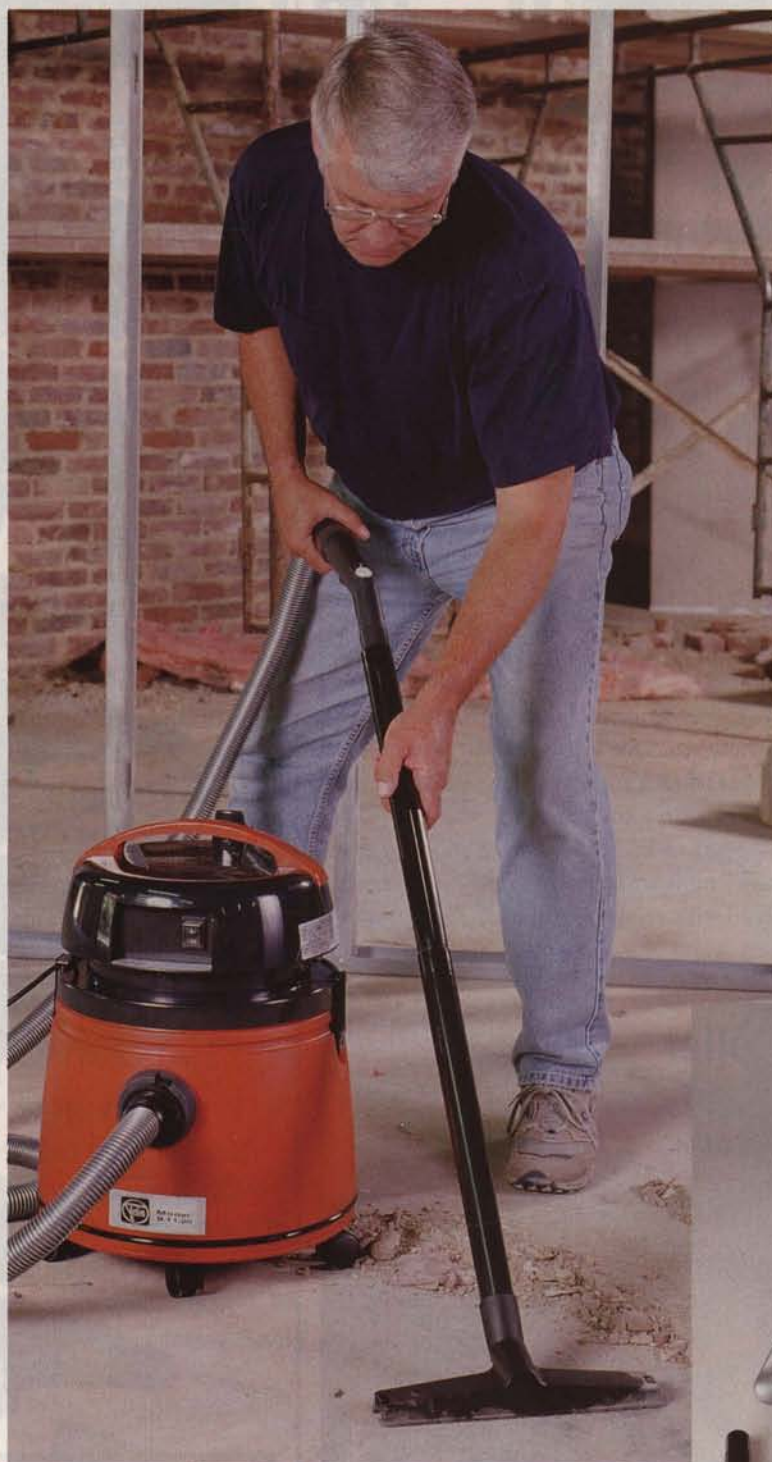
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The NEW Mini-Turbo Portable Vacuum from FEIN.

Listen carefully. You can hardly hear FEIN's brand-new wet/dry vac. At 63 decibels, the FEIN Mini-Turbo is one of the quietest vacuums on the market, yet weighing less than 18 pounds, it's surprisingly portable. And this compact package, with its dual fan motor, produces an impressive 90 inches of static water lift. It is remarkably powerful for its size.

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is just the
beginning.*

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Fein



Expandable Pipe Clamp

Here's an oldie but a goodie: Save space *and* money by using short pipe clamps that are threaded on both ends. On those rare occasions when you need a longer clamp, hook two or three shorter lengths of pipe together using pipe couplings. You'll need fewer pipe clamp fixtures, which saves money, and a smaller clamp rack, which saves space. The extra lengths

of pipe can be bundled together for compact storage.

Double-threaded pipes and couplers are available at hardware stores and home centers.

Bruce Frank



Remote Compressor Drain

To save precious floor space, I mounted my air compressor up high. This works great except when the time comes to drain the condensation from the tank. To solve the problem, I replaced the original drain cock with a safety release valve available wherever compressors are sold. Then I attached a cord to the drain valve to put it within easy reach. To drain the tank I get to play train engineer and pull the cord to blow the whistle. When I release the cable, the valve closes automatically. (Don't forget to wear your safety glasses and hearing protection.)

Walter Colton



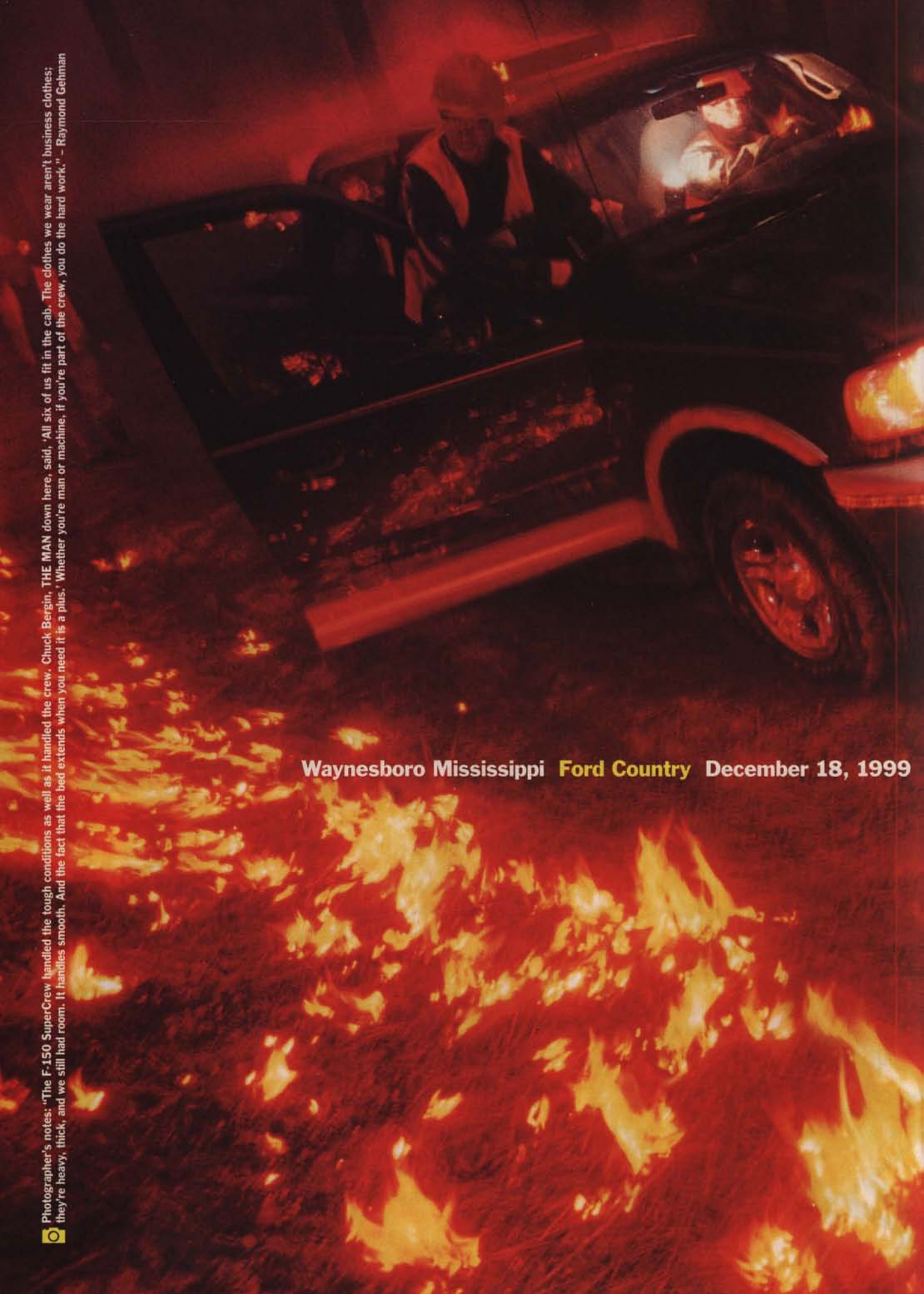
Belt Sander/Grinder

Getting one tool to do the work of two is a great space saver. I've discovered that my belt sander and a 120-grit belt make an excellent substitute for a grinder. I use a Black & Decker Workmate to hold my sander, but any set-up that holds the sander firmly to a benchtop will work. Grinding produces a shower of sparks, so be sure to remove the dust bag to avoid any fire hazard. The tool rest is made from two pieces of scrap wood. Cut the bottom piece to clamp to the benchtop. The top piece is bevel-cut at whatever angle the particular tool requires. The tops are interchangeable, so I keep a 25-degree and a 30-degree handy. It's easy to make specialized tops with V-grooves for holding carving or turning gouges. **AW**

Joseph Spilwell

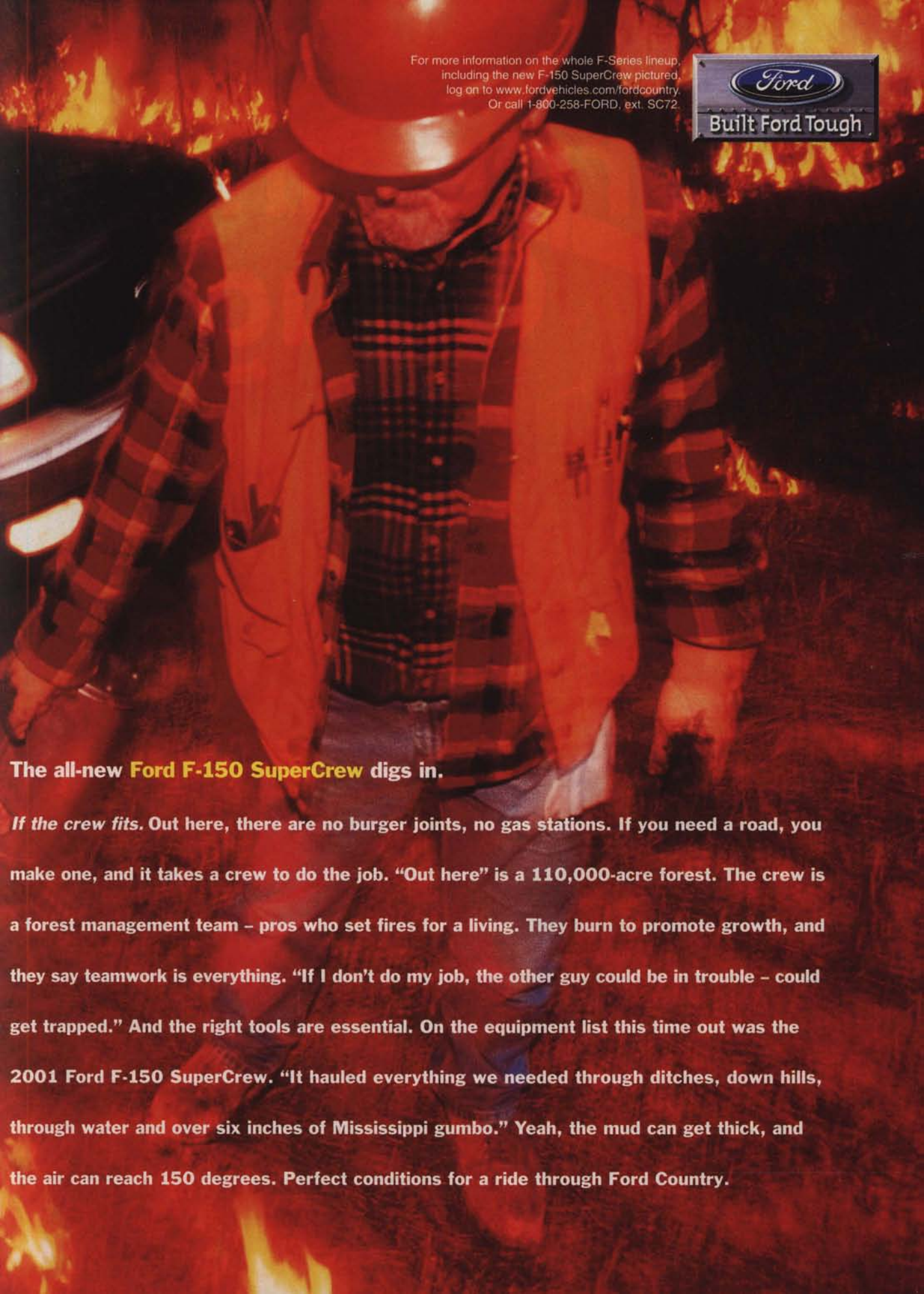


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Photographer's notes: "The F-150 SuperCrew handled the tough conditions as well as it handled the crew. Chuck Bergin, THE MAN down here, said, 'All six of us fit in the cab. The clothes we wear aren't business clothes; they're heavy, thick, and we still had room. It handles smooth. And the fact that the bed extends when you need it is a plus.' Whether you're man or machine, if you're part of the crew, you do the hard work." - Raymond Gehman

Waynesboro Mississippi **Ford Country** December 18, 1999



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Sharpening Gouges

Perhaps no other aspect of lathe work is a bigger stumbling block to new turners than the process of shaping and sharpening the tools. Even new tools often require reshaping and tuning to make them truly serviceable. A poorly shaped or dull tool is hard to control and leaves a damaged surface that requires extensive sanding. On the other hand, a sharp tool, ground properly for its intended use, is almost effortless to handle and leaves a fine finish on the wood. The following is my suggested strategy for a sharp and user-friendly spindle-roughing gouge and detailing gouge—two of the most common turning tools.

SHARPENING EQUIPMENT

Here's what you'll need:

- A slow speed (1,725 or 1,800 rpm) wheel grinder with 8-in.-dia. wheels. The tool rests must be rock solid, with no flex whatsoever. If your rests are flimsy or too small, consider adding an aftermarket support (see Sources, page 23).
- A 1-in. wide, 60-grit wheel of friable (easily crumbled) aluminum oxide (white, pink or blue) in a J or K hardness. Although 60 grit may be too coarse for carving tools, chisels and plane irons, it is a good choice for the heavier turning tools. It removes material more efficiently and grinds cooler than finer grits, while still leaving a fine edge on the tool. In addition, have a coarser wheel (36 or 46 grit) on the other side of the grinder for those times when heavy stock removal is necessary.
- A dressing tool is *essential*. Use it to true (make the wheel round), clean, sharpen and level the wheel. Gray dressing sticks, star-wheel and diamond dressers are the choices. They range in price from a few dollars to almost \$50. Each leaves a different surface on the wheel, but any one can fit the needs of most woodturners.
- You also need a medium India slipstone for refining the ground edge and for maintaining a sharp edge between trips to the grinder. See Sources, page 23, for a mail-order source for all of the equipment.



SPINDLE-ROUGHING
GOUGE

DETAILING GOUGE

BOWL GOUGE

1

THE THREE BASIC TYPES OF GOUGES are the spindle-roughing gouge (English style), the detailing gouge and the bowl gouge.

TYPES OF GOUGES

Turners use three basic gouges: the spindle roughing gouge, the detailing gouge and the bowl gouge (Photo 1). In this article, we'll cover how to sharpen the first two. Sharpening bowl gouges is a subject all to itself, which we'll cover in a future issue.

The spindle-roughing gouge is used for between-center work to remove the corners from square stock, turn cylinders, tapers and long shallow curves. It is a poor choice for detailing or bowl work because it does not maneuver well in tight turns and is subject to breakage at its tang.

The detailing gouge (sometimes called a spindle, shallow or fingernail gouge) is a workhorse for between-cen-

ter work, readily suited to concave and convex details, and sometimes used in bowl work for fine detailing.

GENERAL GRINDING STRATEGY

1. Begin by dressing the wheel. A level and sharp grinding wheel is essential to proper grinding. Keep your dressing tool beside the grinder and use it frequently to remove build-up of metal (glazing) and to maintain the flatness of the wheel. For safety, protect your eyes and lungs with safety glasses or a face shield and dust mask. Position the tool rest as close to the wheel as possible.

2. Shape the tool first. Set the tool rest at 90 degrees to the coarse wheel and begin shaping. See Figs. A and B (pages

2

A PROPERLY DRESSED WHEEL is essential. Hold the dressing tool firmly and move side to side across the wheel until it is flat and clean of all metal particles.



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Woodturning

20 and 21) for suggested shapes and bevel angles of the spindle-roughing gouge and the detailing gouge.

3. Begin the sharpening process. Set the tool rest at the desired angle for the finished bevel on your 60-grit wheel. Always begin at the heel (Photo 5). The process proceeds in stages until the entire bevel is in full contact with the wheel. In reality, you are grinding the bevel and not the edge. As experienced turners say, "If you grind the bevel properly the edge will take care of itself!"

4. Use light pressure, be slow and deliberate and maintain a relaxed grip (and attitude!). Maintain a solid stance with elbows against your body. Use only the force required to eliminate any tool bouncing.

5. Leave the tool on the stone, checking your progress only occasionally. Use the spark trail as the indicator of where

ORIGINAL
SHAPE



CORRECT
SHAPE

you are grinding. When sparks begin to lightly run over the top of the tool, stop grinding in that area—otherwise you will burn away the steel and produce a "saw-toothed" edge.

6. Avoid heating the tool to such a temperature that you see temper colors developing (yellows, purples, and blues). Such overheating does not harm high-speed steels (usually so stamped on the tool or its handle), but bluing an edge on a high-carbon tool creates a tool too soft for turning wood. A clean and sharp wheel, light pressure and even movement should not overheat

3

THE FIRST STEP in sharpening any gouge is to create the shape of the tool. Detailing gouges, for example, come from the factory square, triangular or slightly domed (left). The correct shape is like a fingernail (right).

the steel. With carbon-steel tools that must be heavily ground, are thin or delicate (like the points on skew chisels), quench the tool in water often to keep the steel temperature low. For high-speed steel tools, do *not* quench in water. Quenching these tools may create micro cracks that affect the quality of the edge. For these tools, simply do heavy grinding in stages, allowing the tool to air cool between sessions.

7. The objective of sharpening is to produce a keen edge with a bevel that is single-faceted with a slight hollow grind.

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10" x 40 T x 1/8" or 1/32"	115	107	95
10" x 30 T x 1/8" or 1/32"	95	89	79
9" x 40 T	105	98	87
9" x 30 T	95	89	79
8 1/2" x 40 T x 3/32"	95	89	79
8" x 40 T x 3/32"	95	89	79
8" x 30 T x 3/32"	85	80	71
7 1/4" x 30 T x 3/32"	65	62	55
7 1/4" x 40 T x 1/2"	85	80	71
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9" x 80 T Delta & Others	125	116	103
10" x 80 T Delta, Bosch, Mitachi, Makita, Ryobi, AEG, & All	125	125	111
12" x 80 T Dewalt, Hitachi, Makita, B-D, Sears, & All	145	134	119
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8" Set	269	260	245
10" Set	249	249	237
12" Set	449	404	382

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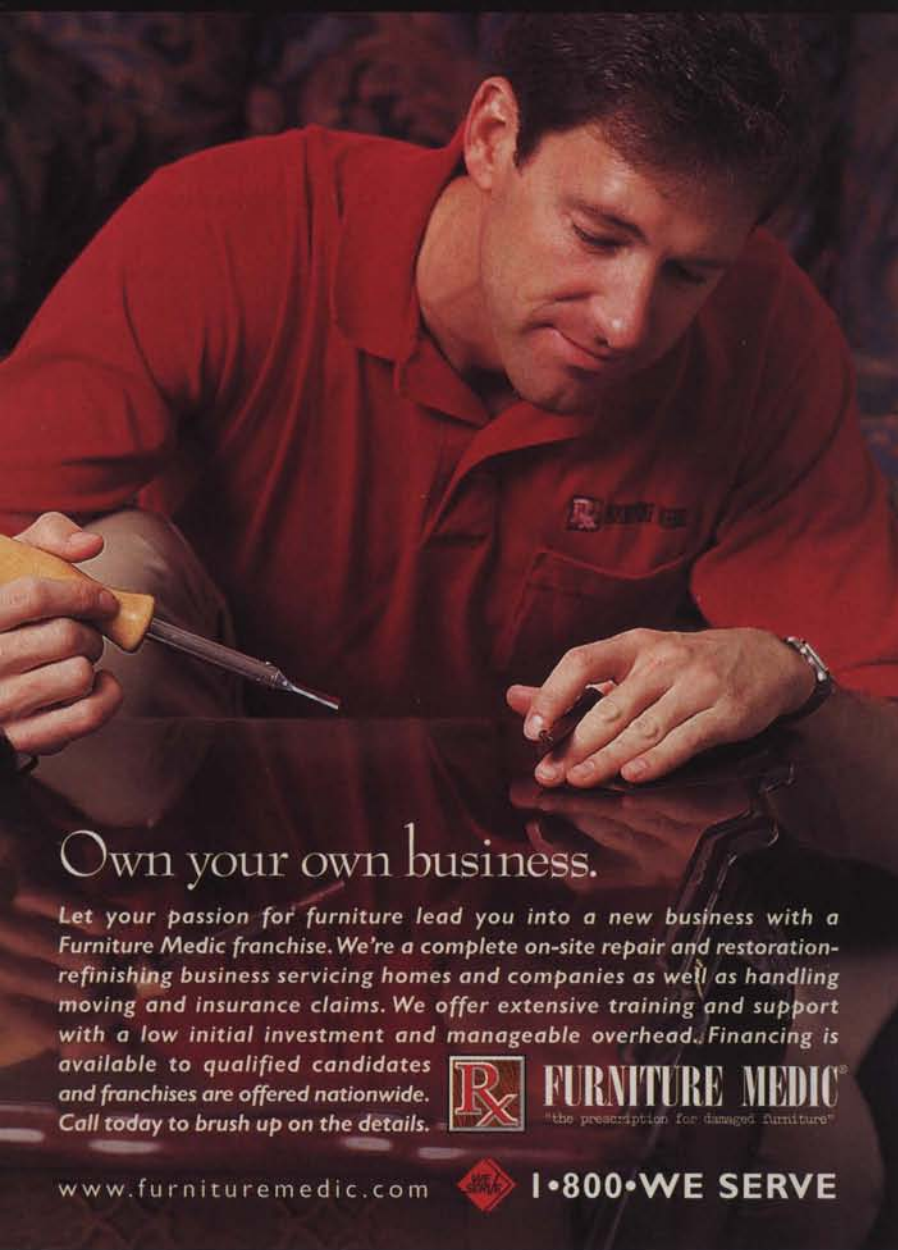
Woodturning

THE SPINDLE-ROUGHING GOUGE

Probably the easiest gouge to grind is the spindle-roughing gouge. Shape the tool as recommended in Fig. A. After setting the rest to 45 degrees, start at the back of the bevel (heel) and rotate the

tool side to side along the full length of its edge. Grinding is complete when the full bevel is in contact with the wheel and sparks appear over the top of the edge (Photos 5 - 7).

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ROTATE THE TOOL slowly along the full length of the edge, progressing until the entire bevel is in contact with the wheel. Maintain a comfortable grip, keep the tool rest set to 45 degrees and the heel of the bevel resting on the wheel.

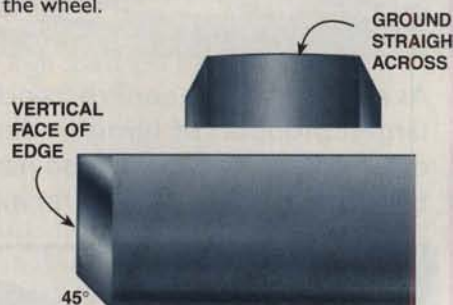


Fig. A

THE SPINDLE-ROUGHING GOUGE is generally ground straight across (as viewed from above), with a vertical or near-vertical edge (as viewed from the side) and with a 45-degree bevel angle.



As seen from the side, the roughing gouge's first contact should be at the back of the bevel (heel).



As the rotation continues, the mid-section of the tool is ground.



The bevel is now in full contact with the wheel and sparks are just beginning to appear over the top of the edge.

THE DETAIL GOUGE

If you sharpened this tool with the same technique used for the roughing gouge, you would produce a spear-pointed shape, instead of the desired fingernail shape.

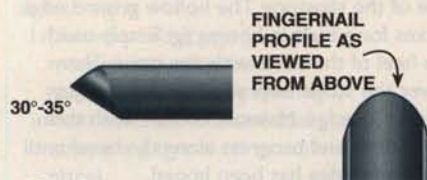


Fig. B
THE DETAILING GOUGE is commonly formed into a fingernail shape (as viewed from above) and with a 30- to 35-degree bevel angle.

Start with the gouge in the middle of the stone with the heel of the bevel touching the wheel.



Grind the left half of the tool by slowly pushing the tool up the stone and rotating to the left.



Reverse this action to return the tool to the starting position.

Grind the right half of the tool by slowly pushing the tool up the stone and rotating to the right.

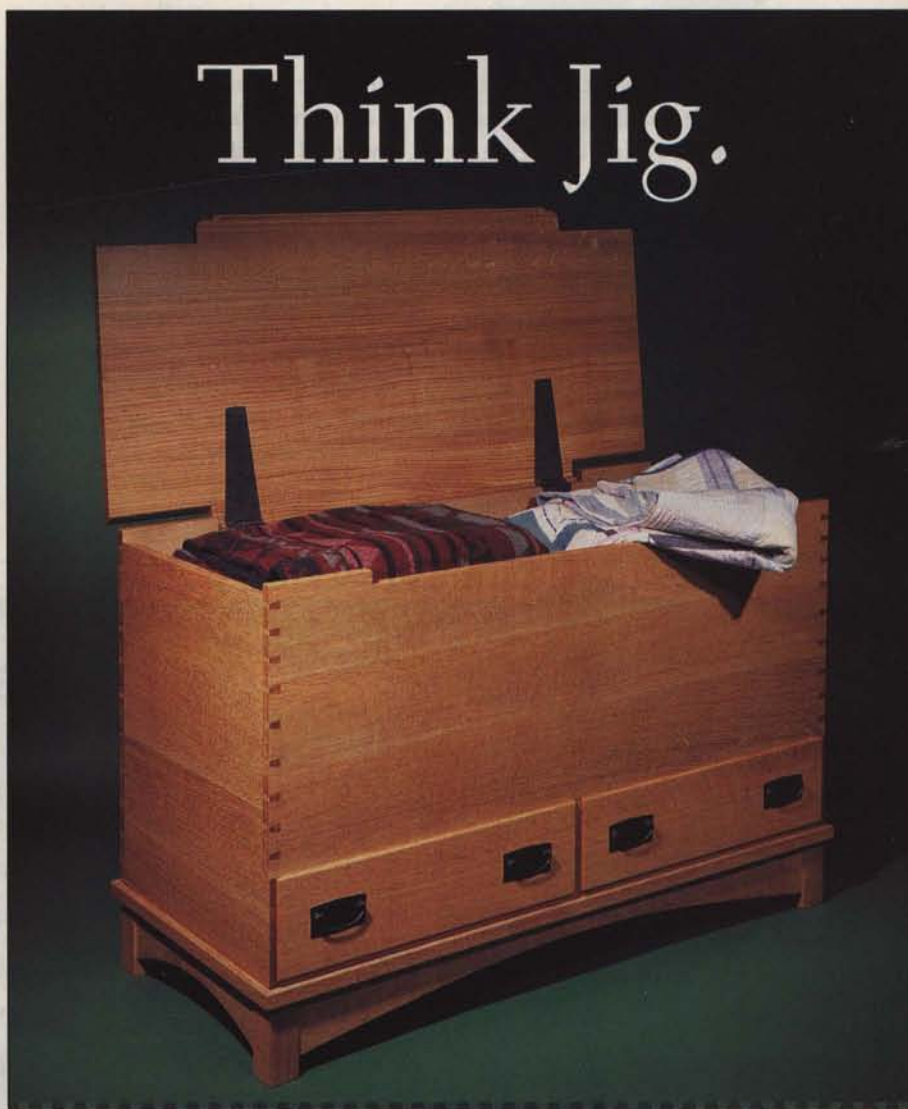


Then reverse this movement to return the tool to the starting position. This sequence may have to be repeated several times to achieve a sharp edge. When the bevel is in complete contact with the wheel and sparks just begin to trail over the top of the tool, you're done.

shape (Fig. B), because most of these gouges are thinner on the sides and thicker in the middle. Set the tool rest to 30 to 35 degrees, and follow photos 8 through 10. Start at the heel of the bevel,

with the flute upright. Do each half of the tool by pushing upwards with a slight twist. When each half has been ground, blend them together in the middle of the tool.

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Woodturning

IS IT SHARP?

Here's how to tell if your tool is sharp:

- **By sight:** If you can see the edge, there is no edge! A sharp edge reflects no light, but simply disappears into a black line. Angle the tool edge under your shop lamp to see if you pick up any glints of light.
- **By effort to remove wood:** A sharp edge, with the tool at the proper angle, makes turning wood feel effortless. A dull tool requires more pressure to make the cut.
- **By sound:** A sharp tool makes a hissing sound (reminds me of a sharp hand plane) while a dull tool sounds flat or makes a scraping sound.
- **By shavings:** A sharp tool makes curls and ribbons (even if short at times). A dull tool makes very short chips or even dust.

TO HONE OR NOT TO HONE?

Not every turner hones their tools, either after grinding or when in use. Over the years I have found honing helpful in several regards: To refine an edge for a finishing cut; and to maintain a sharp edge, rather than returning to the grinder at the first hints of dullness. Honing only works on properly ground tools. Bevels that are multi-faceted or lack a hollow grind are difficult or impossible to hone. For gouges I use the flat side of my India slipstone to hone the ground bevel, and finish with the curved edge of the slipstone in the flute of the gouge (see Fig. D). Take great care not to round over the edge when honing. Hone the bevel and flute of the gouge and never the edge itself.



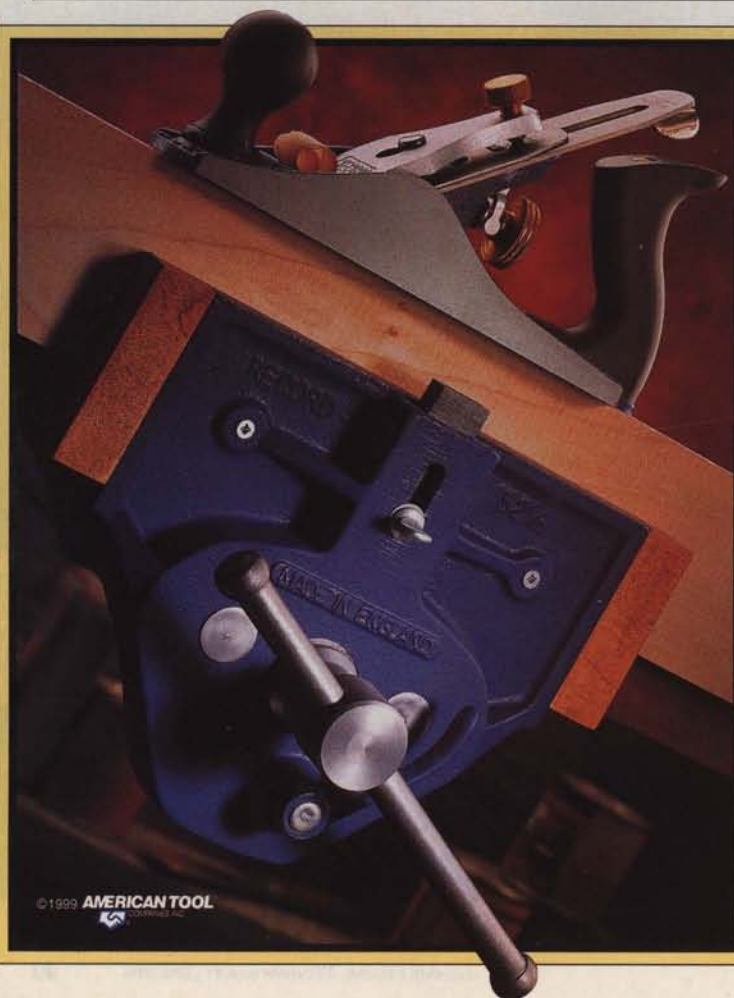
Fig. C

HONE THE BEVEL of a gouge with the flat side of the slipstone. The hollow ground edge makes for a built-in honing jig: Simply touch the heel of the bevel with the stone. Then lower the stone until you feel the area just below the edge. Maintain contact with those two points and progress along the bevel until the entire edge has been honed.



Fig. D

HONE THE FLUTE of the gouge by using the curved edge of the slipstone. Hold the stone completely flat inside the flute and progress along the edge until the full length has been honed.



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GOUGE GRINDING PITFALLS

Rookie attempts at grinding often produce these problems, from left to right:

1. Multi-faceted gouge (uneven movements and pressure, removing tool too frequently from wheel to examine and attempting to return to same place).
2. Spear-pointed detailing gouge (failing to grind to the shape of the edge).
3. Tool bluing (dull or loaded grinding wheel, excessive pressure, grinding in one place too long), and a saw-toothed edge (over grinding of the edge, usually indicated by a stream of sparks over the top of the tool). **AW**

MULTI-FACETED
EDGE

SPEAR-POINTED
DETAIL GOUGE

OVERHEATED AND
SAW-TOOTHED
EDGE

Sources

Gouges and sharpening equipment are available from many mail-order sources.

For example:

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8-in., slow-speed grinder, #127255, \$90.
60-grit aluminum oxide white wheel,
#01V48, \$25.
36-grit aluminum oxide blue wheel,
#129760, \$25.
Grinding tool rest, #03B35, \$33.
Dressing stick, #11N51, \$10.
Diamond wheel dresser, #124670, \$18.
Medium India slipstone, #07B05, \$10.



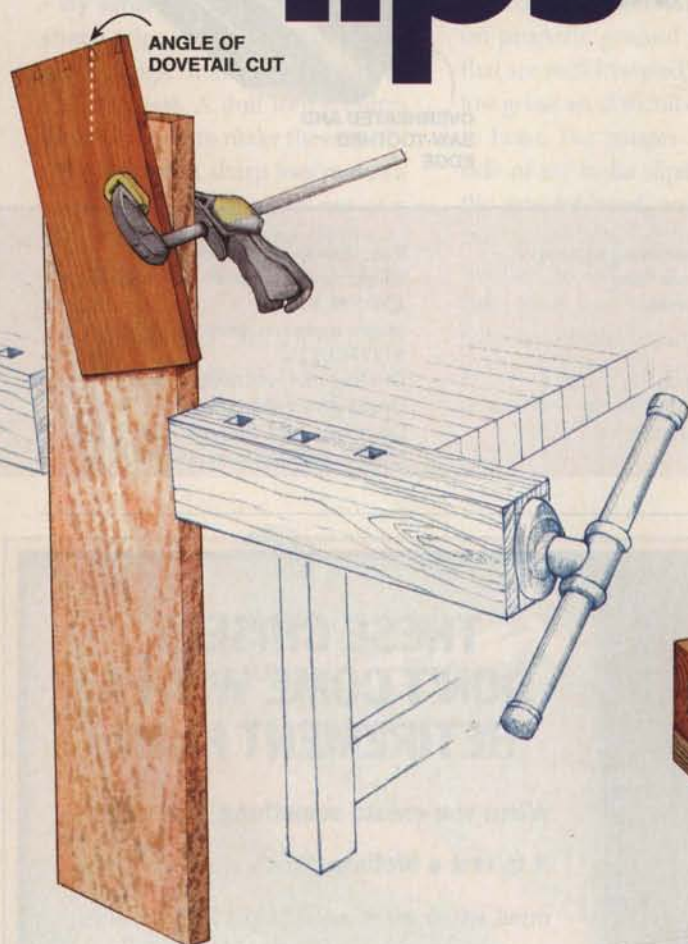
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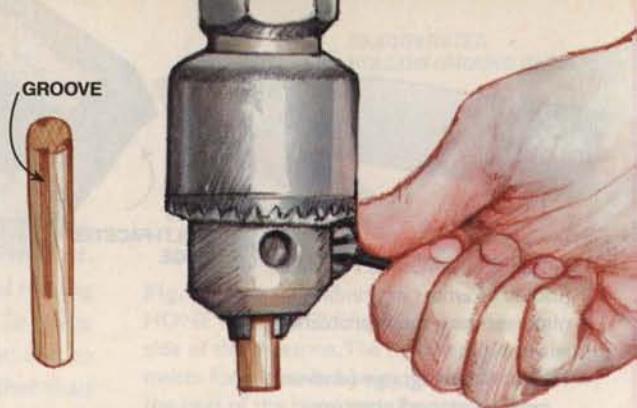
WorkShop Tips



Comfortable Dovetails

Like the majority of workbenches, mine is fine for planing but too low for cutting dovetails without prolonged stooping. My answer is to clamp a heavy backing board, as shown in the sketch, and clamp the workpiece to it. I usually tilt the work so half the dovetail-cutting lines are vertical and then, after sawing, tilt it the other way for the second set. A refinement is to draw layout lines on the backing board for reference.

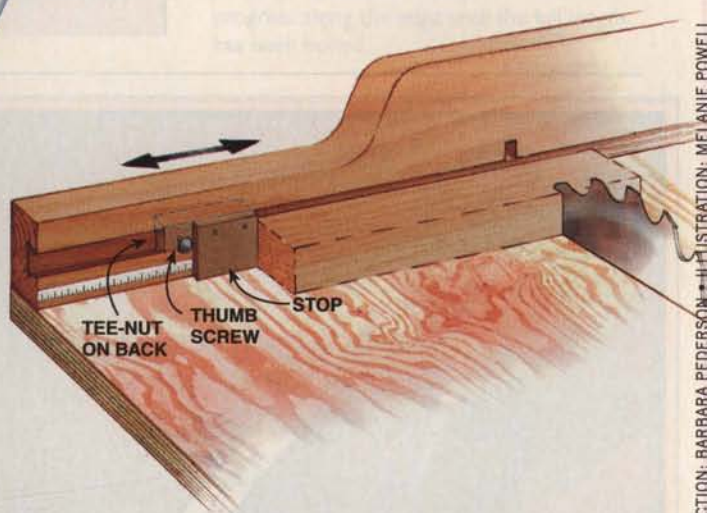
MIKE ZASLAV
CHERRY HILL, NJ



Groovy Dowels

Have you ever tried gluing a pin made from dowel rod in a blind hole? If so you've probably encountered the nasty air pocket that forms at the bottom of the hole and makes insertion difficult. I've got a solution: tighten the dowel in a drill press chuck to create three grooves in the dowel. The grooves allow the air to escape and also hold any excess glue. Remember to spread glue into the hole first and not onto the dowel. The dowel can swell quickly from the moisture in the glue.

ARTHUR HERRMANN
BECKET, MA



Tablesaw Sled Cutoff Block

My sliding cutoff sled gets lots of use for repetitive cuts. In the past, I clamped a board to use as a stop, but moving it for different cuts became cumbersome. To make a quickly adjustable stop, I routed a dovetail slot into the back edge of the sled and made a matching, but loose fitting, shuttle that rides in the slot. A thumbscrew locks the shuttle into the groove and a small piece of 1/4-in. plywood attached to the shuttle acts as the stop. A tee-nut, epoxied in from the back of the shuttle, provides solid threads for the thumbscrew. I added an adhesive-backed rule to the back piece to aid in measuring the cutoff.

PAUL LEE
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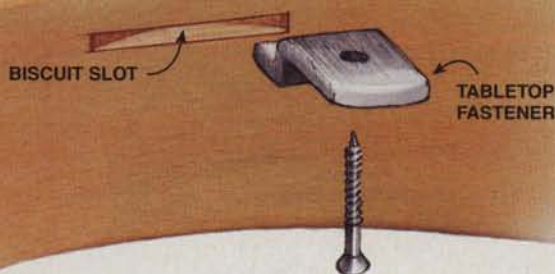
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Workshop Tips



Tabletop Connection

Steel tabletop fasteners are a great way to attach a tabletop to its base while still allowing for seasonal changes. On a table with straight aprons, it's easy enough to saw a kerf to hold the connectors with the table saw, but on a curved or molded apron that's not feasible. Instead, I've found that my biscuit joiner cuts these slots quickly and accurately.

JIM KUCHERA
PLANO, TX

Dust Pipe Grounding

Wood dust speeding through ducts can quickly build up enough static electricity to cause a spark. To avoid this I stretched grounding wire down my collector ducts but the wire tended to snag shavings and cause blockage. I recently discovered that stained glass shops sell rolls of adhesive-backed, bare copper tape. This tape lies flat inside the pipe, sticks to the metal walls and guarantees obstruction-free flow. To attach a grounding wire to the tape, simply drive in a screw from outside the duct.

ALEXANDER GALVIN
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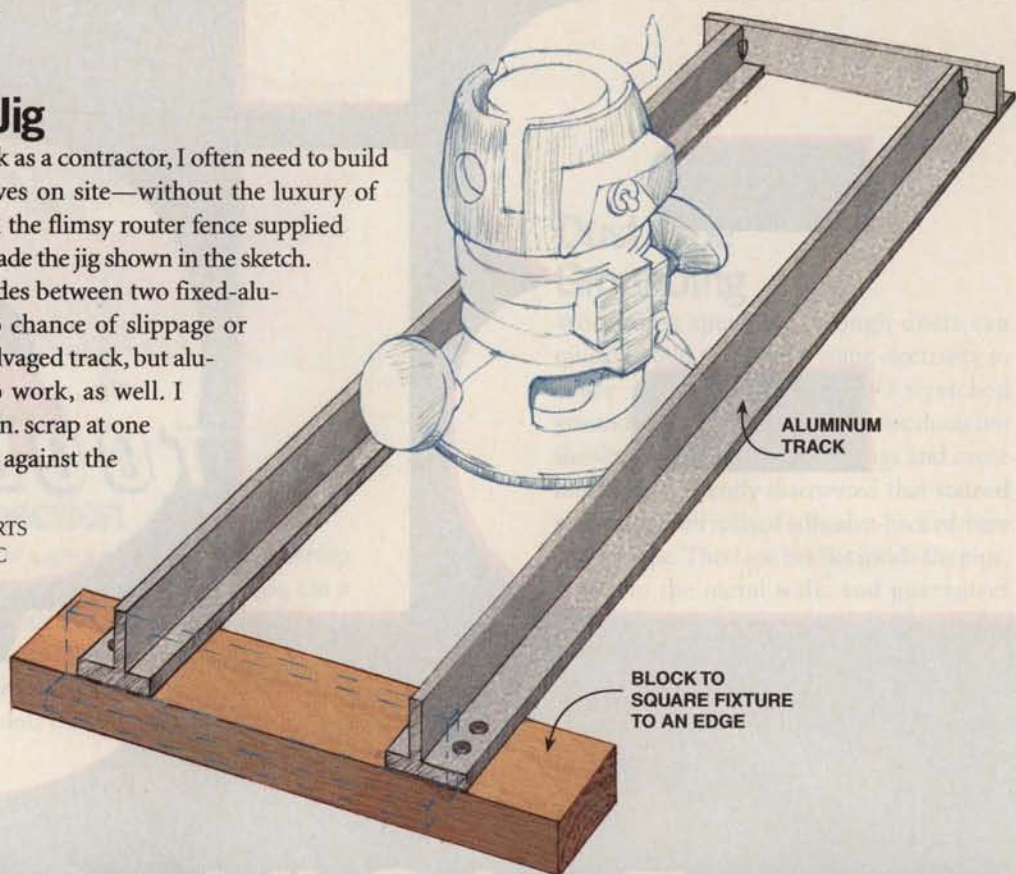
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Workshop Tips

Router Dado Jig

In the course of my work as a contractor, I often need to build cabinets and bookshelves on site—without the luxury of shop tools. I gave up on the flimsy router fence supplied with the machine and made the jig shown in the sketch. The router base now slides between two fixed-aluminum guides with no chance of slippage or accident. I used some salvaged track, but aluminum angle ought to work, as well. I attached the piece of 1-in. scrap at one end to square up the jig against the cabinet sides.

ANTHONY ROBERTS
CANDLER, NC



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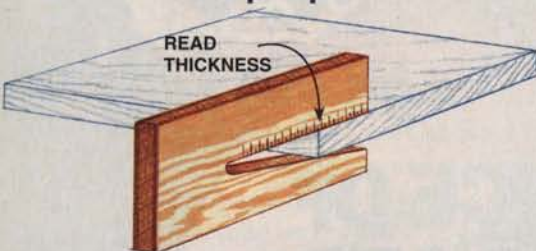
The National Flood Insurance Program is part
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INSURANCE
PROGRAM

SM

Workshop Tips



Thickness Gauge

I use this handy device constantly to check and compare thickness on a variety of projects. Slide the gauge over the edge of the stock, keeping the graduated edge flat on the surface of the board, and read the thickness. You'll have to make the graduations yourself, based on a board you gradually plane thinner and thinner. If you want to record some odd size, make a pencil mark on the lower edge. The more gradual the taper of the opening, the more accurate the gauge.

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Veneer for Edging

Instead of buying veneer or edge-banding material for plywood, make your own from scrap left over from the project. This is not only inexpensive, but the edge banding will match exactly.

First install a zero-clearance throat plate on your tablesaw. Take a long piece of scrap plywood and rip pieces 1/8-in. wider than the thickness of the plywood. Turn the strip on edge and move your tablesaw fence towards the blade until the plywood face veneer is just to the left of the blade. Rip the face veneer from the plywood. Repeat the process for the other side of the plywood strip. Glue on and trim to fit.

GREGG KERBER
REDMOND, WA

Caution: This is difficult to do with the guard in place. Watch it!

(continued on page 32)

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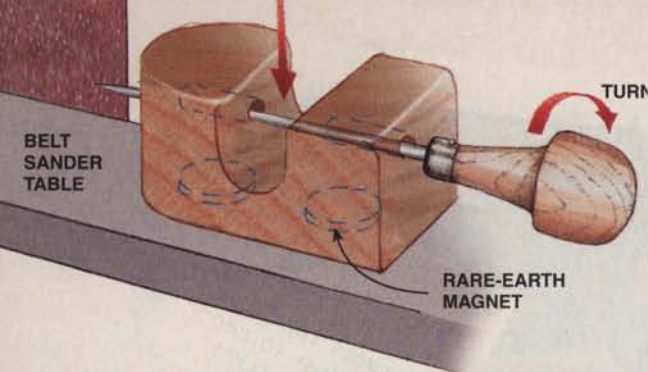
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Workshop Tips

Getting the Point

I frequently use awls in my work and like to keep them needle-sharp. This little jig takes only a few minutes to make and guarantees a fine, tapered point. The magnets keep the jig securely in place while in use.

JAY WALLACE
ASHLAND, OR



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Micro Flap Sander

Most of my work involves small, intricately shaped pieces that need sanding after assembly. It's difficult to sand these

pieces by hand so I devised my own small flap sander. With a 1/8-in. drill, I drill out the center of a 3/8-in. dowel. I cut 1-in.-dia. circles of 180-grit sandpaper with four radial slots and a hole in the center.

The four sections of the sandpaper circle are twisted up and the circle is attached to the dowel's end with a #6 screw and washer. The dowel is chucked into a drill and I slowly spin the flap sander against the wood. **AW**

BRUCE JEEFER
DEFIANCE, OH



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mounted screws to securely engage the hangers.

Now you're ready to shape the rest of the shelf. The gently curved and beveled ends can be cut on a bandsaw. Don't think too hard about how each piece should look. I've had good results simply letting the grain figure determine the shape of the shelf. Just remove the loose or broken stuff and smooth out any rough edges with a carver's gouge.

Finish with a couple coats of oil, hang it up and you've got a conversation piece that will wow your houseguests.

Free-Form Wall Shelves

Here's a versatile shelf that allows for a creative, one-of-a-kind edge treatment. Hung on the wall without any visible means of support, these shelves are real eye catchers.

Choose boards that are at least 1-1/4-in. thick and no more than about 7-in. wide. Wood with wane, bark pockets or end checks is a perfect candidate. (You guessed it—this is a great way to use reject boards that are just too pretty to throw away or burn.)

First, true up the top and back edge with a hand plane or jointer. The back edge of the board is planed a degree or two less than perpendicular to keep objects from rolling off the shelf. Next,

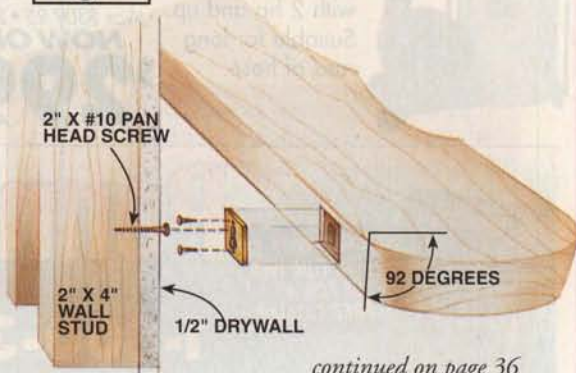
position the keyhole hangers out towards the ends of the shelves. Try to space the hangers every 16-in. so the shelves can be mounted directly to wall studs. The keyholes are mounted either horizontally or vertically and placed near the top edge to provide a bearing surface below the attachment point. Mark the profile of the hangers with a sharp knife and carefully chisel out the mortises to the exact depth of the hangers. Next, drill a recess at the bottom of each mortise (approx. 5/16-in. deep) to allow the wall-

John Nasset
Minneapolis, MN

Sources

Keyhole hangers are available from Woodcraft Supply, (800) 225-1153; # 125505, \$.99 each.

Fig. A Wall Mount



continued on page 36

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A desktop file holder is a great office accessory. It provides easy and immediate access to the files you're currently working with so you don't wear a path between your desk and your file cabinet. Our desktop file holder is strong, portable and a snap to make. The only technique that may be new to you is cutting threads with a die. If you've never done this before, you're in for a treat. It's fun and easy and it's one of those techniques you'll wonder how you ever got along without.

- Start by selecting your wood. We chose 1/2-in. ApplePly (see Sources, p. 38) because it's stable, free of voids and it looks cool with the exposed cap nuts.
- Cut the two 10-1/4-in. by 13-5/8-in. end pieces.
- Lay out and drill the four holes for the steel rod.
- Use a quarter to lay out the corner radius.
- Round over the edges on a router table with a 3/16-in. round-over bit.
- Cut the stainless steel rod (brass works well too) into 8-in. lengths.

continued on page 38



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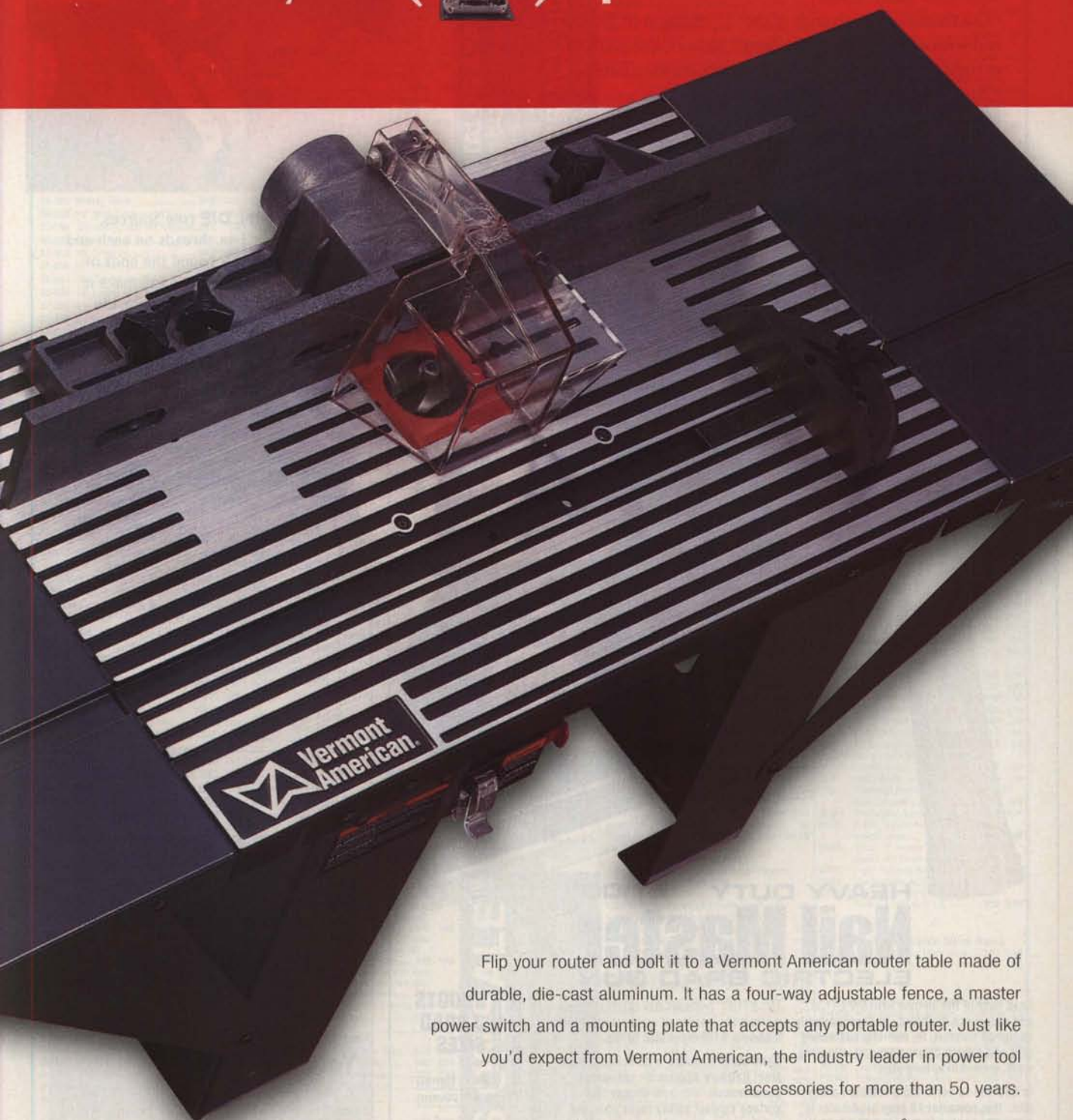
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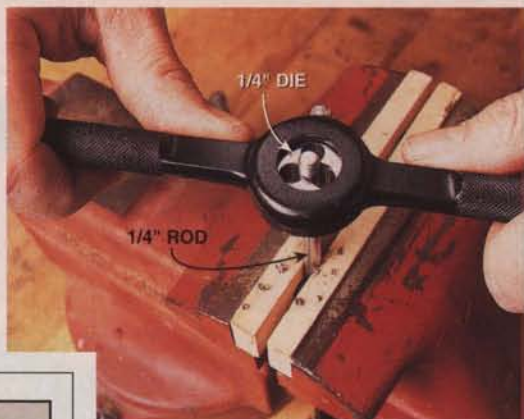
continued from page 36

Desktop File Holder

- Cut threads on both ends of the rod with a 1/4-in. die (see photo at right).
- Sand and finish the sides and assemble.

Bring your finished file holder to work and you'll soon be taking orders for more!

Bruce Campbell,
Worcester, MA



USE A 1/4-IN. DIE (see Sources, below) to cut 1-in. threads on each end of the rod. Slightly round the ends of the rod to remove burrs and make it easier to start the die. Keep the die level and use slight downward pressure to start the cut. Once the die begins to cut it will guide itself. Keep the cutter lubricated with a little light machine oil like 3-In-One.

Prototype



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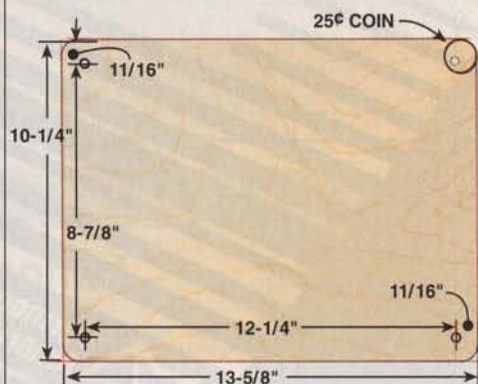
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www.arrowfastener.com © 1999 Arrow Fastener Company, Inc.

Fig. A Plywood Layout



Sources

Find an ApplePly distributor near you at www.statesind.com/appleply.htm or call (800) 626-1981. Expect to pay about \$45 to \$55 per 4 ft. x 8 ft. sheet. 1/4-in. dies, stainless steel or brass rod and the hardware is available from most hardware stores and home centers. **AW**

Your Ideas

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37-195	6" Professional Jointer	625

Model	Description	List Sale
50-850	1-1/2 HP, 1200 CFM	395
50-851	2 HP, 1500 CFM	588

MILWAUKEE TOOLS

6527-6	Sawzall with case	343
6537-226527	w/quick lock blade change	362
6521-21	Variable speed orbital Super Sawzall	375
0224-1	3/8" Drill 4.5 amp magnum	240
0234-6	1/2" Drill 4.5A mag 0-850 rpm	254
0235-6	1/2" Drill w/keyless chuck	255
0244-1	1/2" Drill 4.5A mag 0-600 rpm	255
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	221
0228-6	3/8" Drill 3.5 amp 0-1000 rpm	214
0375-6	3/8" close quarter Drill	255
6176-20	14" Chop Saw	340
6546-6	Screwdriver 200 & 400 rpm	150
6547-6	6546-6 w/bits, 1/4" chuck & cs190	115
6390-21	7-1/4" Circular Saw w/ cs...	267
5397-6	3/8" v/spd Hammer Drill Kit	275
5371-6	1/2" v/spd Hammer Drill Kit	364
6145	4-1/2" Grinder 10,000 rpm	182
6494-6	10" Compound Miter Saw	595
6256-21	Top Handle Jig Saw w/ case	319

Item	Description	Teeth	List Sale
LU82M010	Cut-off 10"	60	93
LU84M011	Comb 10"	50	78
LU85R010	Super Cut-off 10"	60	114
LU85R012	Super Cut-off 12"	96	185
LM72M010	Ripping 10"	24	69
LU87R010	Thin Kerf 10"	24	72
LU88R010	Thin Kerf 10"	60	88
LU89R010	Ultimate 10"	60	128
LU91M008	Cmpnd Mtr 8-1/2" 48	89	40
LU91M010	Cmpnd Mtr 10" 60	88	54
F410	Quiet Blade 10"	40	95
SD308	8" Carbide Dado	230	119
SD506	6" Carbide Super Dado	279	154
SD508	8" Carbide Super Dado	344	175
FB100	16 piece Forstner Bit Set	338	194
94-100	5 pc. Router Bit Door System	320	169

Model	Description	List Sale
CFB82	8-1/2" Slide Compound Saw	1169
C10FS	10" Slide Compound Saw	1627
C15FB	15" Miter Saw	1346
C10FCD	10" dual bevel Compound Miter Saw	550
NV45AB	Coil Roofing Nailer	935
NT50AE	Pinner 3/4" 2"	561
EC12	2 HP, 4 gallon Compressor	512

Model	Description	List Sale
5090WD	3-3/8" Saw Kit 9.6 volt	213
DA391D	3/8" angle Drill 9.6V	142
DA391DW	3/8" angle Drill Kit 9.6V	216

Model	Description	List Sale
6095DWE9	6 volt Drill Kit w/ 2 batt	240
6095DWE12	6095DWE w/flashlight	263
632007-4	9.6 volt Battery	55
632002-4	7.2 volt Battery	45

Model	Description	List Sale
6343DWA6	1/2" Drill Kit	458
95240DW	3/24" Circular Saw Kit	458
DK1016	1/2" Drill & 6-1/2" Saw combo kit	698

Model	Description	List Sale
DK1021BL	1/2" Combo Kit Includes drill, 6-1/2" Circ. Saw, Recipro Saw, and flashlight	698

Model	Description	List Sale
9900B	3"x21" Belt Sander w/bag	332
99240B	3"x24" Belt Sander w/bag	333
9190B	3-1/4" Planer with case	268
9120B	4-3/8" Planer	360
N9514B	4" Disc Grinder 4.6 amp	106
DA3000R3/8"	Angle Drill	328
6013BR	1/2" Drill Rev. 6 amp	268
9401	4" x 24" Belt Sander w/bag	416
5007NBK7-1/4"	Circ Saw w/ case	238
LS1011	10" Slide Compound Saw	807
LS1211	12" Slide Compound Saw	1370
3901	Plate Joiner Kit	310
3612C	3 HP Plunge Router	503
LS1040	10" Compound Miter Saw	474
LS1013	10" Dual Compound Slide Miter Saw	1087
B05010	5" Random Orbit Sander	121
LS1220	12" Compound Miter Saw	678
9227C	7/9" Polisher	338
2702	8-1/4" Table Saw	538
2703	10" Table Saw	568

Model	Description	List Sale
SNF30	Finishing Nailer w/ case	459
SN54S	Stapler 7/16" crown, 1" - 2"	540
SLP20	Pinner w/cs 5/8 - 1-5/8"	422
SKS	Stapler 5/8 - 1-1/2"	390
SN70	Framing - Clip Hd 2 - 3-1/2"	725
SN65	Framing - Full Hd 2 - 3-1/2"	709
SN600	NEW Framing 2 - 3-1/2"	699
SNF40	Finish Nailer 1-1/4 - 2-1/2"	569

Model	Description	List Sale
N80S-1	Stick Nailer	255
RN45	Coil Roof Nailer 3/4 - 1-3/4	845
N60FN-2K	Finishing Nailer w/ case	557
BT35-2K	Brad Tacker 5/8" - 1-3/8" with case, oil, & brads	279
MIIFS	Finishing Stapler 15 gauge	902
S32SX-1K	Finish Stapler 1-1/2" - 1-3/8" with case & oil	269

Model	Description	List Sale
JORGENSEN ADJUSTABLE HANDSCREWS		
Item#	Length Capacity	List Sale of 6
#0	8" 4-1/2"	20.35 12.95 69.95
#1	10" 6"	23.30 14.50 79.50
#2	12" 8-1/2"	26.75 16.25 92.55
#3	14" 10"	33.85 20.25 114.95

Model	Description	List Sale
PNY CLAMP FIXTURES		
50	3/4" Black Pipe	15.45 8.95 94.00
52	1/2" Black Pipe	12.65 6.95 79.00

Model	Description	List Sale
PANASONIC CORDLESS		
EY6431NOKW	1/2" 15.6V drill kit with two 3 amp-hr Ni-Mh batteries, 45 minute charger, & case	372 205
EY6431FKQW	1/2" 15.6V drill kit with two 2 amp-hr Ni-Cad batteries, 30 minute charger, & case	342 189
EY6407NOKW	1/2" 12V drill kit with two 3 amp-hr Ni-Mh batteries, 45 minute charger, & case	339 189
EY6406FKQW	3/8" 12V drill kit with two 2 amp-hr Ni-Cad batteries, 30 minute charger, & case	305 169
EYC13	5-3/8" 15.6V Wood Cutting Saw and Drill Kit	650 379

Model	Description	List Sale
BIESEMEYER FENCES		
B-50	50" Commer. Saw	443 325
T-SQUARE 52	52" Homeshop	360 275
T-SQUARE 40	40" Homeshop	335 245
T-SQUARE 28	28" Homeshop	325 245

Model	Description	List Sale
AIRY AIR NAILERS		
0241SKB	Brad Nailer 3/8" - 1-9/16"	180 79
0626SKS	1/4" Crown Stapler 3/8" - 1-1/4"	89
ABOVE nailers come w/case, fasteners, oil & wrenches		
STABILA LEVELS		
25010	10" die cast Topo Level	321 195
24640	24" Level w/ hand holes	547 295
24670	48" Level w/ hand holes	549
03050	Compact Laser Level	592 299
03100	Compact Laser Level with prism	592 359

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Model	Description	List Sale
DW124K	1/2" right angle Drill	590 329
DW321K	Top Handle Jigsaw Kit	300 164
DW364	7-1/4" Circ. Saw w/broke	294 155
DW378G	7-1/4" Framers' Saw	210 149
DW610	1-1/2 HP 2 handle Router	266 149
DW411K	1/4 sheet Palm Sander w/ cs88	58 58
DW682K	Biscuit Joiner with case	448 169
DW705	12" Compound Miter Saw	734 339
DW621	2 HP Plunge Router	400 199
DW677K	3-1/4" Planer with case	268 155
DW431	3 x 21 v/spd Belt Sander	338 188
DW421	5" Palm Ran. Orb Sander	144 75
DW423	Palmgrip Random Orbit Sander - variable speed	170 92
DW272	Drywall Gun, 0-4000, 6.3 amp	160 95
DW276	Drywall Gun, 0-2500, 6.5 amp	160 99

Model	Description	List Sale
DW972K	2-3/8" variable speed w/ two 12V XR batteries	362 175
DW991K	2-3/8" variable speed w/ two 14.4V XR batteries	415 199
Above drill kits come w/ charger & steel case!		
DW991KS-2	DW991K Drill, DW935 trim saw, 2 XR batteries & case	546 345
DW911	Jobsite Radio & Charger	139

Model	Description	List Sale
DW933K	Jigsaw Kit	468 275
DW938K	Recipro Saw Kit	520 269
DW995K-2	1/2" Drill Kit w/ 2 batt	259 259
DW997K-2	1/2" Drill/Hammer Drill Kit	445 249
DW936K	5-3/8" Saw Kit	458 249
DW995KS-2	DW995K Drill, DW936 Saw and case	546 345
DW995KC-2	DW995K 18V drill kit, DW938 18V reciprocating saw, & case	399

Model	Description	List Sale
DW006K	1/2" Drill/Hammer Drill Kit	560 299
DW007K	6-1/2" Circular Saw	560 299
DW008K	Reciprocating Saw	560 299

Model	Description	List Sale
DW078	12" Slide Miter Saw	546 649
DW788	20" Scroll Saw	546 649
DW733	12" Planer w/ extra blades	546 649
DW744	10" Portable Table Saw	546 649

Model	Description	List Sale
DAVID WHITE INSTRUMENTS		
LP6-20A	Sight Level package-20x	329 245
LP6-20XLA	LP6-20A with 9056 tripod and 7620 rod	409 275
LTB-300P	Level Transit - 26x	739 579
LTB-300P	above Level with optical plumb	869 649
ALT6-900	Automatic Level - Transit - 18x	669 519
ALTP6-900	Automatic Level - Transit - 18x	669 519
ALP6-22	Automatic level - 22x with tripod and rod	355
ALP6-26	Automatic level - 26x	355
ALP6-28	Automatic level with tripod & rod	355

Model	Description	List Sale
BOSCH		
1587VS	Top Handle "CLIC" Jig Saw	292 139
1587AVSC	1587VS Saw Kit with case and Progressor blades	350 155
1584VS	Barre "CLIC" Jig Saw	288 164
Bosch Metal Case for above Jig Saws		24
Bosch 30 blade assortment for Jig Saws		29.99

Model	Description	List Sale
1295DH	5" Random Orb Palm Sndr	155 89
1274DVS	3"x24" v/spd Belt Sander	262 175
1278VSK	1-1/2"x12" Belt Sander	242 129
1275DVS	3"x24" v/s Belt Sndr	410 219
1276DVS	4"x24" v/s Belt Sndr	443 229
1194VSRK	1/2" v/spd Drill w/ case	256 159
1613EVS	2HP v/s Plunge Router	374 189
1634VSK	Recip Saw 10.5 amp	355 185
3315K	12V T-handle Drill Kit	298 159
3615K	14.4V Drill Kit	340 174
3107DVS	5" Random Orbit Sander	211 118
3107DVS	5" Random Orbit Sander	211 118
3725DVS	5" Random Orbit Sander	272 145
3725DVS	6" Random Orbit Sander	283 145
3915	10" Slide Compound Saw	960 499
3912	12" Compound Miter Saw	959 329
11224VSR	7/8" SDS Rotary Drill	434 229
1703AEVS	5" Grinder - 8.5 amp	264 145
1347AK	4-1/2" Grinder with case	159 92
1638K	Drywall Cut-out Unit	181 105
1617	1-3/4 HP Router - 2 handle	307 159
1617EVS	2 HP Router with variable speed, 2 handle	349 189
1618	1-3/4 HP Router - "D" handle	349 179
1618EVS	1618 router w/ var/speed	360 215
1640VS	Power Tenon Saw	200 115
3850K	18v cordless Drill Kit	395 255
4000	NEW 10" Table Saw	900 495
3960K-CC	NEW 24V Drill Kit	540 299

Model	Description	List Sale
750	12"x24"x28" 1/4 hp 200 CFM - 750 CFM	249
8-12	20"x24"x44" 1/3 hp 800 & 1200 CFM	479

Model	Description	List Sale
JET TOOLS		
JJ6CSXW	6" Jointer - closed stand and extra knives	499
JJ8CS	8" Jointer - closed stand	516

Model	Description	List Sale
JWB5140S	14" Band Saw 3/4 HP - open stand	546 495
JWB514CSK	14" Band Saw 1 HP - closed stand with rip fence and mitre gauge	579
JWTS10CW2PF	10" Contractor Table Saw with 30" Exacta fence 1-1/2 HP & cast iron wings	789
JTAS10X501	10" Tilting Arbor 3 HP Table Saw, table and legs	1399
JDP17MF	16-1/2" Drill Press 3/4 HP 16 speed with bits and mortise attachment	429
DC-650	Dust Collector, 1 HP, 650 CFM	319 199
DC1100	1-1/2 HP, 1100 CFM Dust Collector w/ access kit	425 299

JWTS10CW2P	10" Contractor Table Saw with 30" Exacta fence 1-1/2 HP cast iron wings	Sale 579 699
JTAS10X501	10" Tiltling Arbor 3 HP Table Saw with 50" Exacta fence, table, and legs	Sale 1399 1499
JDP17MF	16-1/2" Drill Press 3/4 HP - 16 speed with bits and mortise attachment	Sale 429 499
DC-650	Dust Collector, 1 HP, 650 CFM	319 199
DC1100	1-1/2 HP, 1100 CFM Dust Collector w/ access kit	425 299

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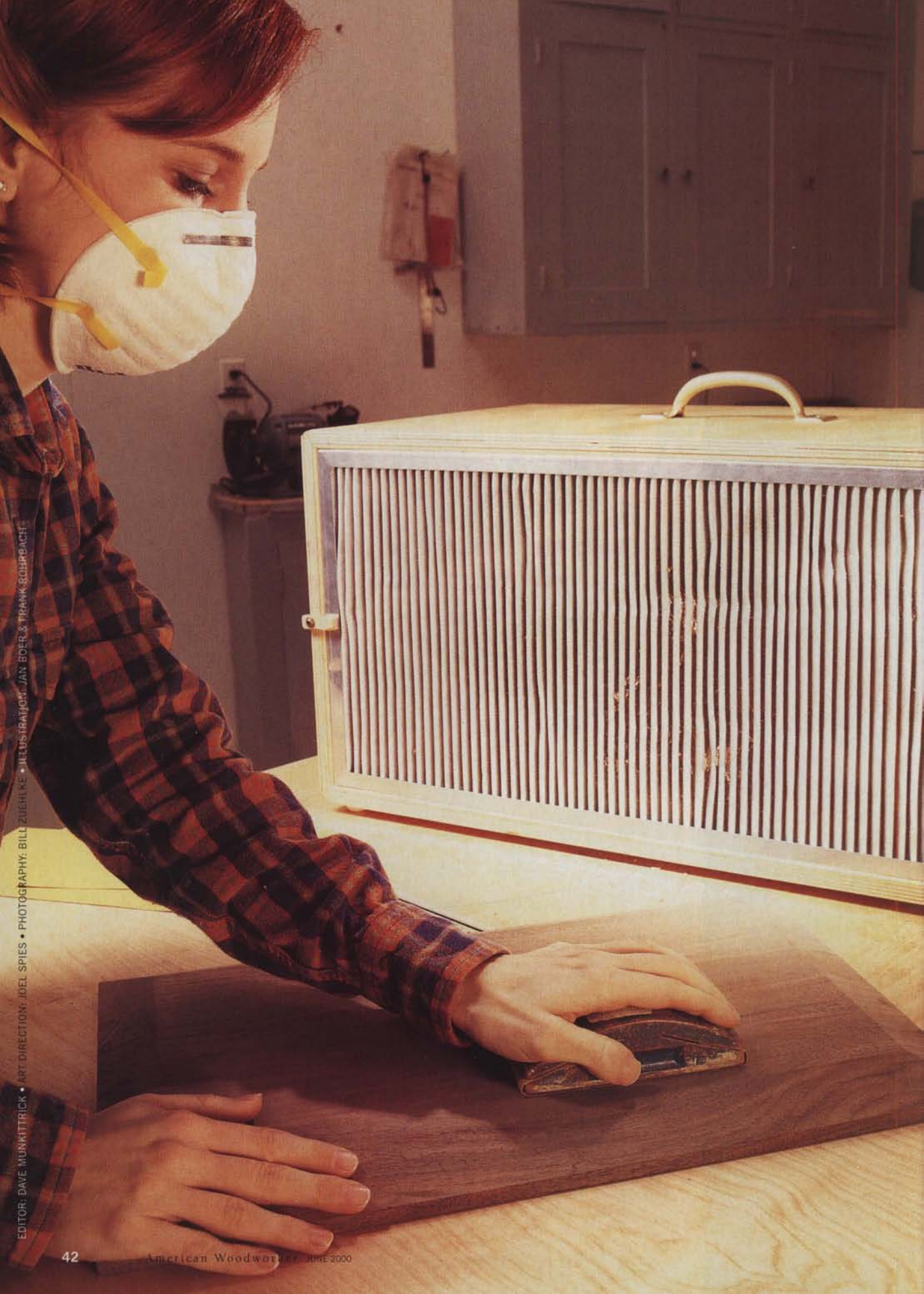
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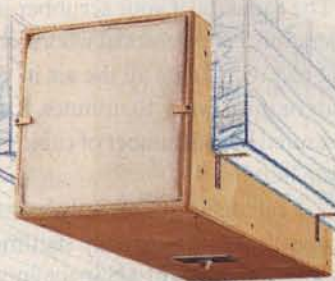
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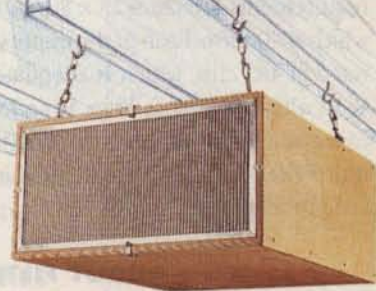
Air Scrubber Trio

by Ed Krause

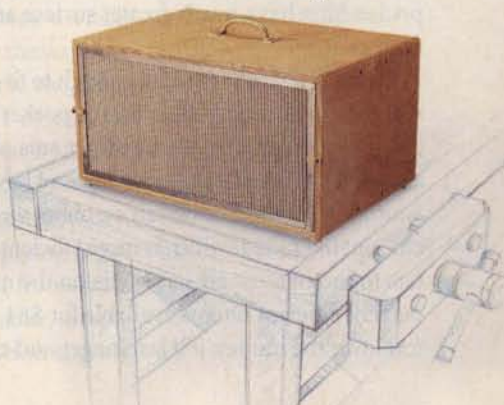
between-the-joists



hanging



benchtop



THREE SHOP-MADE MACHINES THAT CLEAR THE AIR.

Dust haze. Even if you have a dust collection system you've probably found yourself in the middle of it. This fine dust settles onto all the surfaces of your shop where it is a fire hazard (as well as a nuisance) and can lead to respiratory problems. A strategically placed air scrubber can trap much of this dust, keeping your shop cleaner and safer.

Here are three shop-built air scrubber designs: a between-the-joists design for small shops with limited headroom; a hanging model for larger shops; and a benchtop model to catch dust near its source. Each scrubber is based on a kit available from Penn State Industries (see Sources, page 47).

Once you've gathered your materials, you can build any one of these scrubbers in a day. The benchtop and between-the-joists models can be built for \$150, the larger model for \$220. If you are resourceful enough to find a used furnace blower and use shop scrap, any model can be built for \$60.

Although these designs are similar to scrubbers available commercially, our scrubbers either cost less or have better features. To make it easy for you to find components, we've used kits and filters available through catalogs (see Sources, page 47). Remember that no air scrubber is a substitute for a

dust collector attached to your machines. It is always best to catch dust at its source, before it becomes airborne (see Q&A, page 104). However, an air scrubber can trap much of the fine dust that eludes your primary dust-collection system.

WHICH DESIGN IS BEST FOR YOUR SHOP?

These scrubbers are variations of the same machine, differing in size and where they are placed in your shop. Choose the one that'll work best for you.

The benchtop model is small enough to be used where it's needed, whether it be on your bench when hand sanding, or placed on a stool near your lathe. The between-the-joists model is ideal for a small (500 sq. ft.) basement shop with low ceilings. The larger model has two blower fans enabling it to clean air in a shop twice as large (up to 1,000 sq. ft.) as the other two models.

The capacity of your scrubber is another important consideration. For occasional woodworking you need a scrubber that can recirculate all the air in your shop six times every hour or once every 10 minutes. A scrubber's performance is measured by the number of cubic feet per minute (cfm) of air it can handle.

You can determine exactly how many cfm are required to change the air in your shop six times every hour by measuring the cubic feet of air space in your shop (LxWxH) and dividing that number by 10 (professional woodworkers should divide by 6). For example, if your shop floor space is 25 ft. by 20 feet and your ceilings are 8-ft. high, then your cfm requirements are: $20 \times 25 \times 8 = 4,000$ cubic ft./10 minutes which is 400 cfm. Each of the motors in the Penn State kits are rated at 465 cfm, which is adequate to handle a 500-sq.-ft. shop with 8- to 9-ft. ceilings. For a 1,000-sq.-ft. shop, use two of the single-blower units or build the larger double-blower unit. When in doubt, over do it. This is one case where more is definitely better.

ABOUT FILTERS

There are usually two filters used in an air scrubber: a pre-filter and a pocket filter. The pre-filter prolongs the life of the pocket filter by capturing most of the larger particles first. The pocket filter has a much greater surface area for trapping the finer dust.

To make a scrubber small enough to fit on a bench we substituted a 4-in. pleated filter for the pocket filter. Pleated filters can provide as much or more filter area as pocket filters and are available from Grainger in different levels of efficiency (see Sources, page 47). For our air scrubber we chose a 75-percent efficient filter (\$28) which is more efficient than the pocket filters found in most air scrubbers on the market. A 90- to 95-percent efficient filter is available for \$84. If you're willing to fork over the money, it'll last longer and catch finer dust.

All three models are similarly built.

1. Cut plywood to size. We used Baltic birch, (see Sources, page 47) but any 1/2-in. plywood will work.
2. Cut the cleats to length.
3. Glue and nail cleats to the top and bottom. Be sure to position the cleats precisely, as shown for each model (See Figs. A, B or C), to allow room for the filters, stops and gaskets on the intake end and for the back and gasket on the exhaust end.
4. Glue and nail the long stops at the end of each pair of cleats.
5. Use screws to attach the sides to the cleats on the top and bottom.
6. Glue and nail the short vertical stops on the exhaust and intake ends.
7. Lay out the motor flange location on the inside of the back. Set the motor in place and mark the screw hole locations. Make lines 3/4-in. inside the motor flange outline for the exhaust port cutout. Cut holes for the exhaust port and electrical box with a jigsaw.
8. Drill bolt holes for the motor. The holes need to be countersunk on the outside face of the back to allow for the exhaust louvers.
9. Mount the motor to the back (Photo 1).
10. Mount the electrical box and wire according to your choice of switches (see Figs. A, B or C). (Between-the-joists model must be wired after the back is attached.)
11. Apply gasket to back stops.
12. Fasten the back to the scrubber with screws.
13. Screw the exhaust louvers over the port.
14. Add the filter clips and apply gasket material to the filter stops. Install the filters.
15. Ease the edges with a router and a 1/8-in. round-over bit or sandpaper.

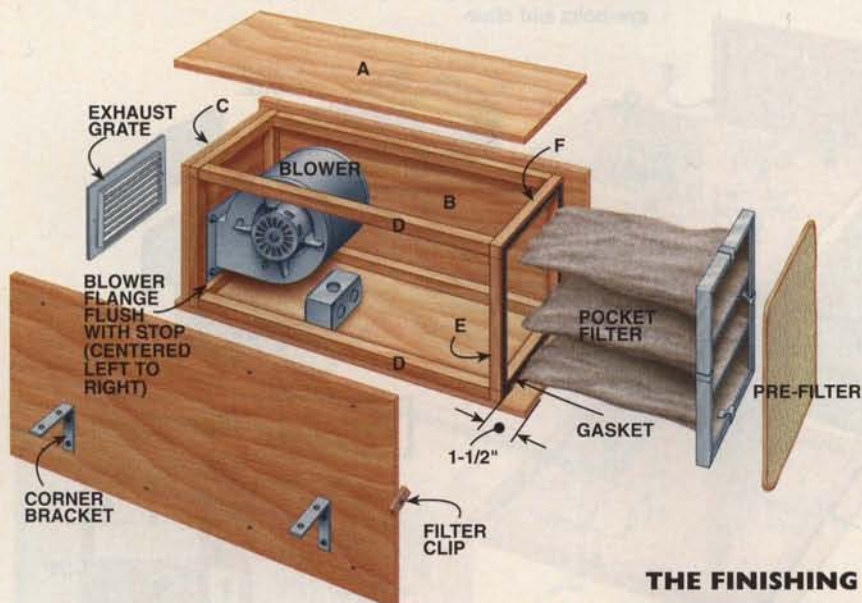


1 **APPLY GASKET MATERIAL** around the cutout after the bolt holes have been drilled. Be sure to countersink the holes on the outside face of the back or the bolt heads will interfere with mounting the exhaust grate.

Fig. A

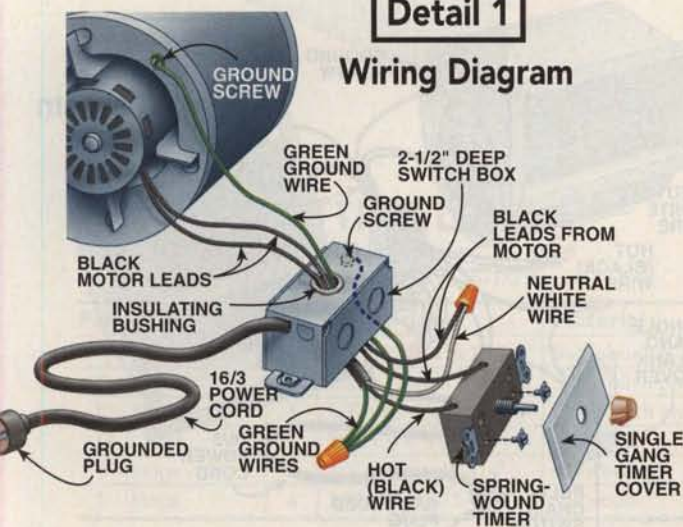
Between-the-Joists Exploded View

The between-the-joists model is especially well suited for small shops with low ceilings. Mount to joists with corner brackets.



Detail 1

Wiring Diagram



CUTTING LIST

Overall Dimensions:
12-3/4"H x 12-3/4"W x 30"D

Part	Name	Qty.	Dimensions	Material
A	Top & Bottom	2	1/2" x 11-3/4" x 30"	Baltic birch ply
B	Sides	2	1/2" x 12-3/4" x 30"	Baltic birch ply
C	Back	1	1/2" x 11-3/4" x 11-3/4"	Baltic birch ply
D	Cleats	4	3/4" x 3/4" x 26"	softwood
E	Stops	4	3/4" x 3/4" x 10-1/4"	softwood
F	Stops	4	3/4" x 3/4" x 11-3/4"	softwood

MATERIALS LIST

ALL MODELS

One sheet of 1/2" plywood
One 1" x 4" x 8' pine board
No. 8 x 1" finish head screws
Four 1/4" x 3/4" machine bolts, washers and nuts
Ten ft. 1/8" gasket material
16/3 SJ power supply cord
Wire nuts
Insulating bushing
Grounded plug
Ribbon

BETWEEN-THE-JOISTS

Penn State Industries kit #ACAW1 (includes motor blower and exhaust grate)
11-1/2" x 11-1/2" pre-filter and pocket filter (see Sources, page 47)
Four 2" corner brackets
2-1/2"-deep switch box with integral cable clamps and plaster ears
Spring-wound timer with hold

HANGING

Penn State Industries kit #AC930 (includes 2 motor blowers, 2 exhaust grates, pre-filter and pocket filter)
3-1/2"-deep switch box with integral cable clamp and plaster ears
Pull-chain switch
Single gang blank cover plate (drill for pull chain)
Four (additional) 1/4" x 3/4" machine bolts
Four 1/4" x 2" eye bolts
Twelve 1/4" nuts and washers
Four 60 lb. ceiling hooks
#2 twin-loop chain
Four connector links

BENCHTOP

Penn State Industries kit #ACAW2 (includes motor blower, exhaust grate and pre-filter)
2-1/8"-deep handy box with 1/2" knock-outs
1/2" chase nipple
1/2" close coupling
3/8" 2-screw cable clamp
In-line rocker switch
Blank handy box cover
Two 6-1/2" handles
Eight rubber feet
12" x 24" x 4" pleated filter

ADD-ONS

10" x 3-1/4" x 4" stack boot
Flexible dryer vent hose
Hose clamp
Remote control
One-hour timer switch with hold

See Sources, page 47.

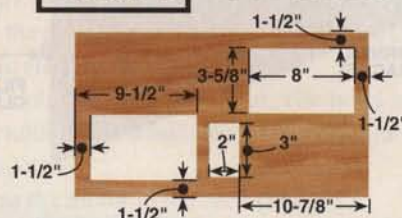
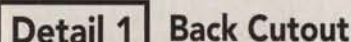
THE FINISHING TOUCHES

Mount the between-the-joists scrubber with corner brackets (Photo 3). The larger model should be hung using eye bolts, ceiling hooks and chain. Add handles and rubber feet to the benchtop model so it can be used vertically or horizontally. It's best to place a scrubber where you make the most dust, and as low as is feasible. None of the three models are heavy, but mounting the overhead models safely is a two-person job.

ADD-ON FEATURES

Add ribbons to the exhaust louvers so you know when it's time to replace or clean your filters (Photo 2). A timer switch enables you to leave the scrubber on when you're not in the shop. The exhaust port of the air scrubber can be ducted outside, like a bathroom fan, to vent low-concentration fumes when brushing or rag-applying finish (Photo 3). The cost for parts is less than \$30. To make, simply cut a piece of plywood slightly

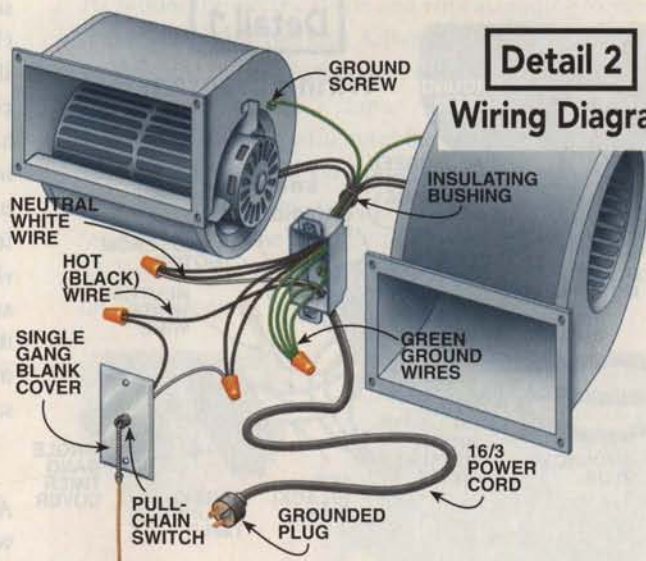
The larger shop model has double blowers for more air volume. Mount below joists using ceiling hooks, eye-bolts and chain.



Overall Dimensions:
12-3/4"H x 24-3/4"W x 30"D

Detail 2

Wiring Diagram



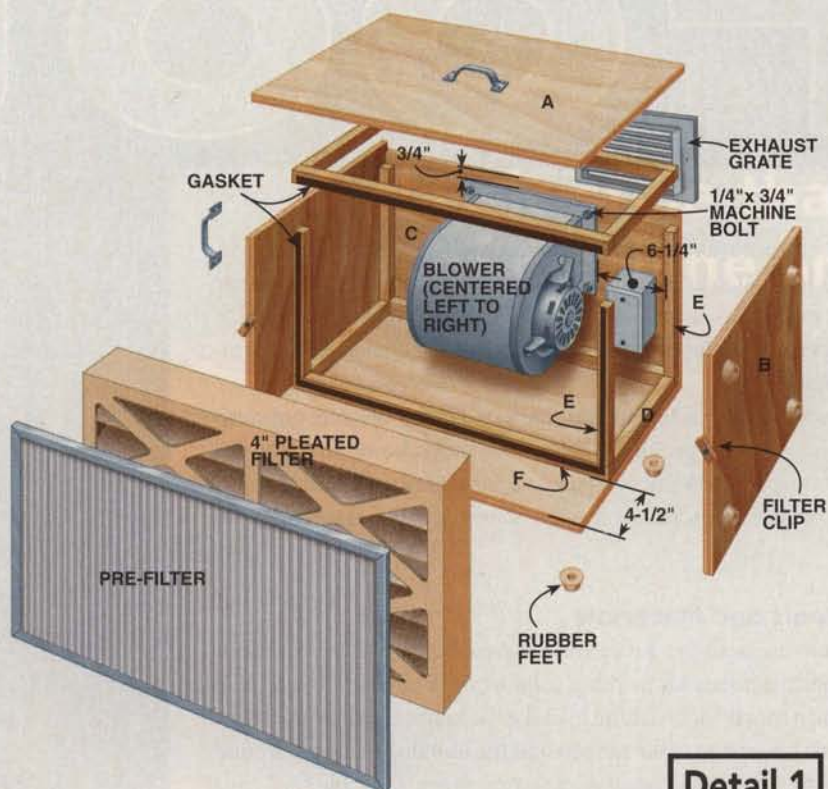
RIBBONS ARE A LOW-TECH way to tell when filters need cleaning or changing. Tie them on long, on the machine and shorten them until they flutter horizontally. When they droop, clean or change the filters.

smaller than the back of the scrubber to use as a mounting flange for the stack boot. Cut an opening in the flange to allow the boot to fit through. Attach the boot to the inside of the cutout with silicone caulk and screws. To hook up the stack boot for outside venting, simply screw on the flange over the exhaust port with a pair of screws. Be sure to remove your pocket filter to help increase airflow when operating your scrubber as a vent. When you're done venting, simply unscrew the mounting flange, replace your pocket filter and you're back to scrubbing the air in your shop. Now you can breathe easier. **AW**

Fig. C

Benchtop Exploded View

Benchtop model pulls in dust where you make it.



SOURCES

Grainger, (847) 647-8900;
www.grainger.com
4-in. pleated Filters, #5E894, \$28

Air Filter gasket, #6C523, \$11
Timer switch with hold, #2E270, \$15 to \$20.

Penn State Industries,
(800) 377-7297
www.pennstateind.com
Kit #ACAW1, \$85
Kit #ACAW2, \$90
Kit #AC930, \$180
Lone Ranger II dust collector remote switch, #LR 110, \$60.

Woodworker's Supply,
(800) 645-9292
Woodtek 11. x 11.5 in. pre-filter, #923-852, \$9.
Pocket filter, #923-845, \$20.

Integrity Wood Products,
(800) 831-7374
1/2-in. Baltic Birch, 5 ft. x 5 ft., \$28, plus s&h.

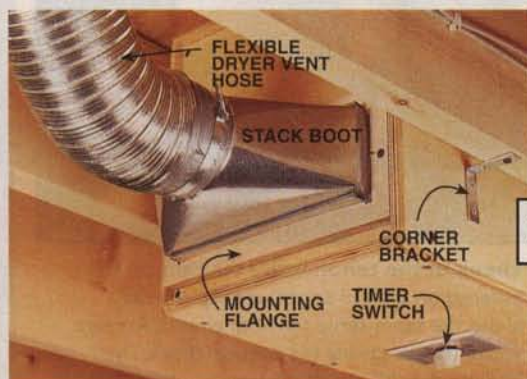
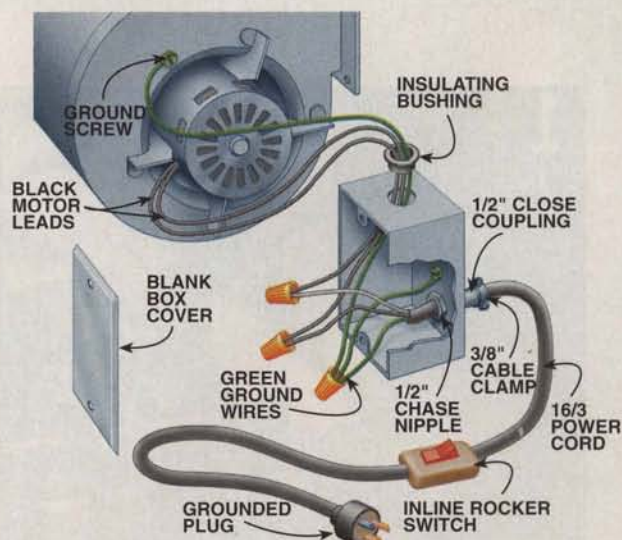
Local home centers carry many of the miscellaneous items.

CUTTING LIST

Overall Dimensions:
12-3/4\"H x 24-3/4\"W x 15-1/2\"D

Part	Name	Qty.	Dimensions	Material
A	Top & Bottom	2	1/2\" x 23-3/4\" x 15-1/2\"	Baltic birch ply
B	Sides	2	1/2\" x 12-3/4\" x 15-1/2\"	Baltic birch ply
C	Back	1	1/2\" x 11-3/4\" x 23-3/4\"	Baltic birch ply
D	Cleats	4	3/4\" x 3/4\" x 8-1/2\"	softwood
E	Stops	4	3/4\" x 3/4\" x 10-1/4\"	softwood
F	Stops	4	3/4\" x 3/4\" x 23-3/4\"	softwood

Detail 1 Wiring Diagram



3

TWO UPGRADES: 1. Your air scrubber can double as a fan for venting fumes from finishing. Mount an easily detachable stack boot to the exhaust port. Add flexible duct and vent through the wall like a clothes dryer. **Never use in place of a spray booth.** 2. A timer switch with a hold feature enables you to continue cleaning the air after you've left your shop.

QUEEN ANNE Foot

Old styles of furniture can still speak to us loud and clear today. The Queen Anne style, popular in America from 1725 to 1760, is an elegant language of flowing lines and reverse curves. This footstool is a small-scale example of a very elaborate style. If you've always wanted to try your hand at cabriole legs, which are one of the defining characteristics of Queen Anne furniture, this project is a great place to begin.

On a historical note, this footstool is not a copy of an authentic antique. Footstools were not common in the 18th century. I've made many copies of genuine Queen Anne chairs, however, so I scaled down some of my favorite cabriole legs and rails and incorporated their best features into this footstool. Making the legs is the hardest part of this project, so I've gone into detail on how to do it in "Cabriole Leg," page 55 in this issue.

Tools and Materials

One appeal of this style is that you get to use both machines and hand tools. You'll need a bandsaw to make the legs in addition to the basic machines for working solid wood: a tablesaw, jointer and planer. I use a tablesaw tenoning jig and a mortising machine to make the joints, but there are many other ways you can do it. You'll also need a router to make rabbets and the molding that runs around the top of the stool. As for hand tools, I turn to a small number of favorites (see "Cabriole Leg," page 56 for details).



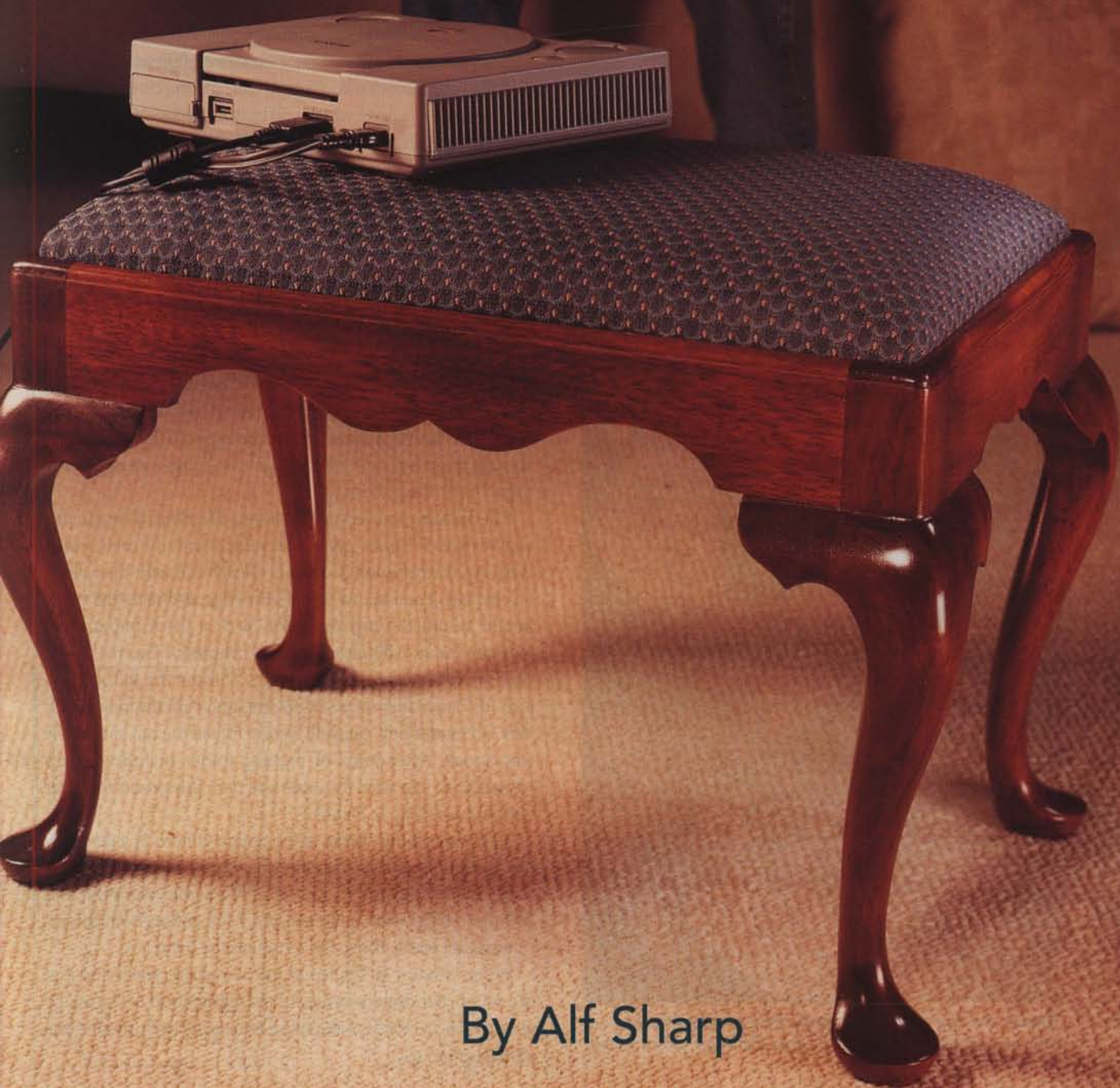
1 **Cut shoulders for the tenons** on both ends of each rail. Insert a thick piece of paper between the stop block and the end of the rail when cutting the top shoulder. With a little bit of paring, all three shoulders line up perfectly with each other (Fig. B, Detail 2).



2 **Saw the cheek of the tenon** with a tenoning jig. The tenon is centered on the rail so you can flip the rail around and use the same setup for both cheeks. Arrange the jig so you're always sawing the outside cheek. The waste piece will safely fall out of the way.

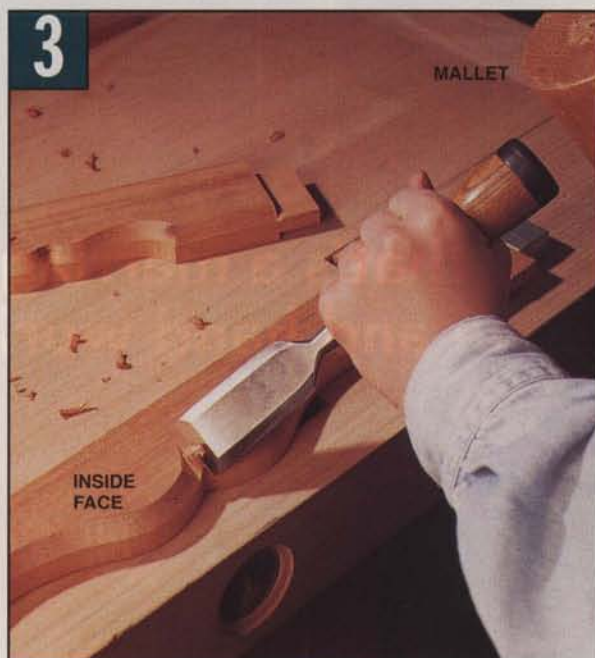
stool

A classic style that's a marriage
of machine and hand work.



By Alf Sharp

Queen Anne FOOTSTOOL



Chamfer the inside edge of the rails. This makes them appear thinner from the outside. Use a router table and chamfer bit to remove most of the wood, then use a chisel to get into the corners. Finally, rabbet the top edge of all the rails.



Shape the leg with hand tools. For complete how-to information, see "Cabriole Leg," page 55.

Mahogany is a natural choice of wood. It's easy to work, quick to smooth and has a muted figure that doesn't interfere with the curving lines of the Queen Anne style. Walnut or cherry are good choices, too.

Cabriole legs require thick stock. It can be tempting to glue up the blanks from less expensive, thinner wood, but that's inappropriate for the Queen Anne style. Unlike a laminated straight leg, the layers always show in a cabriole leg. I think you'll be happier in the long run with a beautiful solid leg rather than one that might have saved you a few dollars but looks pieced together.

Thick wood isn't always easy to get in small quantities, so I've designed a stool you can build entirely from 3-in. turning squares (see Sources, page 54). Resaw two of them to make the rails and wing blocks. You'll need four pieces, 18-in. long and two pieces, 24-in. long which will cost about \$85. Alternatively, you can make the stool from about four board feet of 10/4 lumber (about \$22) and two board feet of 4/4 wood (about \$10).

Make the upholstered slip seat from either plywood or a secondary wood (soft maple, birch or yellow poplar) that holds tacks and staples well. A plywood slip seat will feel firmer than a framed seat with webbing.

Joinery

Mill the rails and leg blanks (see Cutting List, page 53). Note that the legs are 1/4-in. longer than their final size. Later, after turning the legs on the lathe, you'll cut 1/4-in. off the ends that have drive-spur notches. Mortise the legs (see Fig. B, Detail 5) and cut them out on the bandsaw (see "Cabriole Leg," Fig. B, page 59, for the pattern).

Cut the same size tenons on all the rails. Here's a system that enables you to make perfect shoulders around each tenon: First, cut the two long shoulders of each rail with the rail flat on the saw. Then stand the rail on edge and reset the blade height to cut the top shoulder. Stick a thick paper shim between the stop block and the rail (Photo 1). This makes the shoulder a bit proud, just to be safe. Without the shim, there's a good chance this cut could eat into and ruin the long shoulders, no matter how carefully you've milled the rail and set the stop block. After years of making joints, including a few ruined rails, I go with the odds and pare this proud shoulder with a chisel (Fig. B, Detail 2).

Next, saw off the cheeks of the tenons (Photo 2). I generally use my own shop-made tenoning jig (see AW #45, page 96, AW #54, page 57 and AW #73, page 67 for some examples), but commercial jigs work quite well, too. After cutting both cheeks, remove the waste above the tenon on the bandsaw.

When you test-fit the tenon into a mortise, you'll find that the rough, bandsawn surface of the leg is proud of the rail by about 1/16-in. You'll make these two surfaces flush after the stool is glued up.

Shaping the Rails

Rabbet the rails on the tablesaw or with a router (Fig. B, Detail 1). Cut out the curved lower edges on the bandsaw (Fig. A).

Route the large chamfer that goes on the inside face of the rail (Photo 3). There's no structural necessity for this chamfer, but it is a subtle and important part of the footstool's design. I've studied and reproduced a lot of Queen Anne furniture, and I think the most successful pieces strive for the illusion of lightness. This chamfer, which was actually a standard practice of some 18th-century furnituremakers, makes the rail look thinner than it really is. It's a neat trick that can be applied to contemporary styles, too.

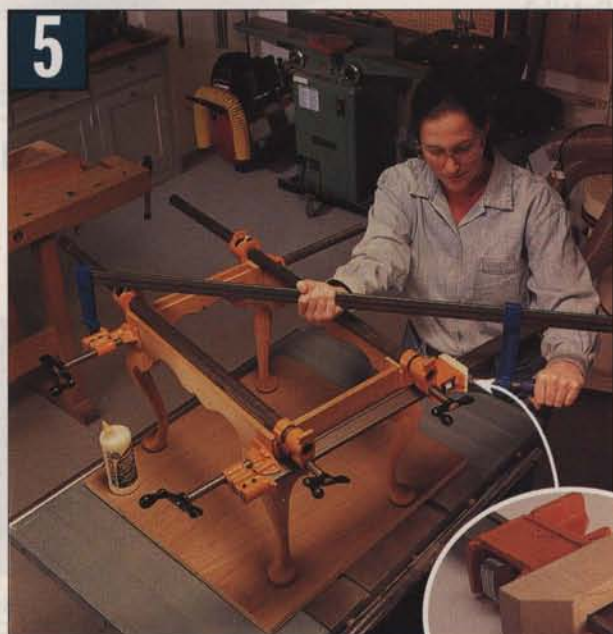
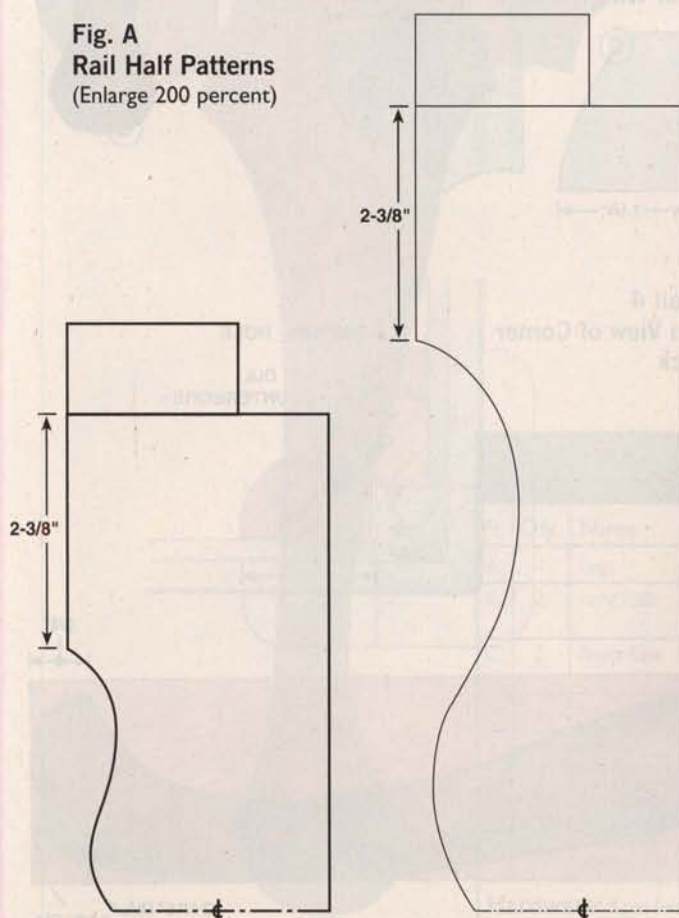
Shape the legs by hand (Photo 4). See "Cabriole Leg," page 55, for complete step-by-step photographs.

Gluing Up

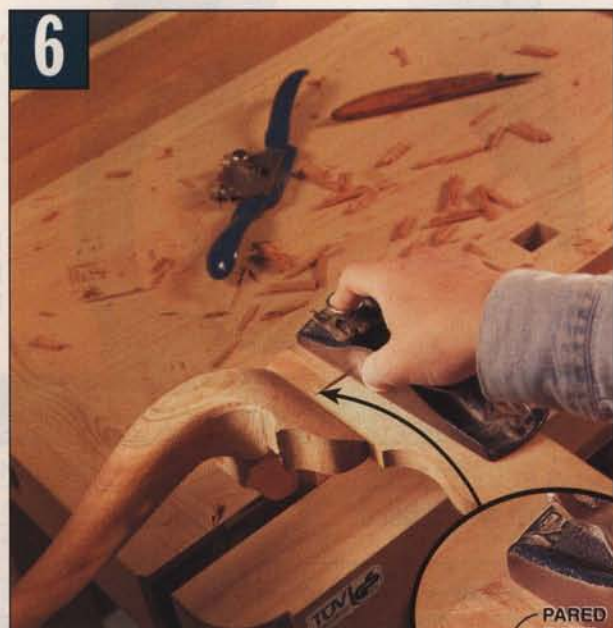
I've found it best to glue up the entire stool at one time, rather than in sections (Photo 5). Practice your setup without glue first, so you can figure out where all the clamps should go. The hardest problem to solve concerns the placement of the diagonal clamp you may have to use to pull

(text continued on page 54)

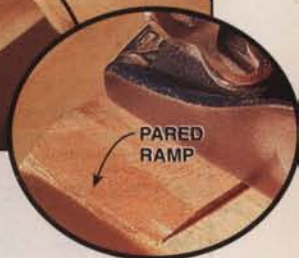
Fig. A
Rail Half Patterns
(Enlarge 200 percent)



Glue up the whole stool in one shot. Measure from corner to corner to make sure the diagonals are equal. If they're not, pull the stool square with a clamp across the long diagonal. A beveled block slid over the clamp makes it easier.

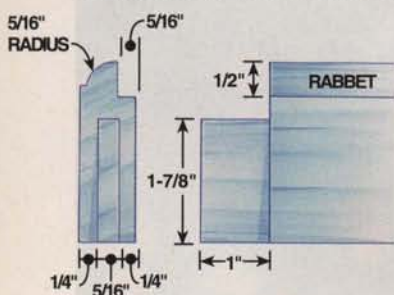


Plane the leg flush with the rail. First use a chisel to pare a small ramp down into the intersection of the knee and post, a place that the plane can't get into. Finish with a card scraper or sandpaper and round the outside corner of the leg with a rasp.



Queen Anne FOOTSTOOL

Detail 1
Elevations of Tenon and Rabbet



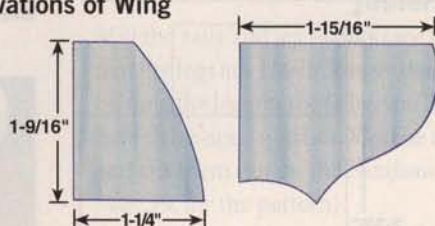
Detail 2
Tenon Shoulders



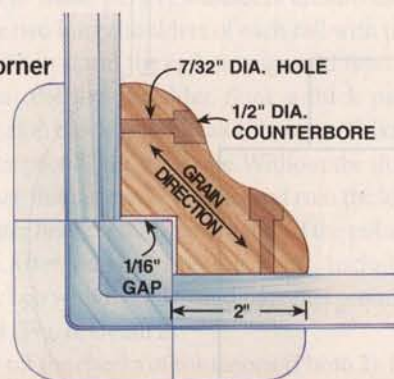
**Fig. B Exploded View
of Stool and Slip Seat**



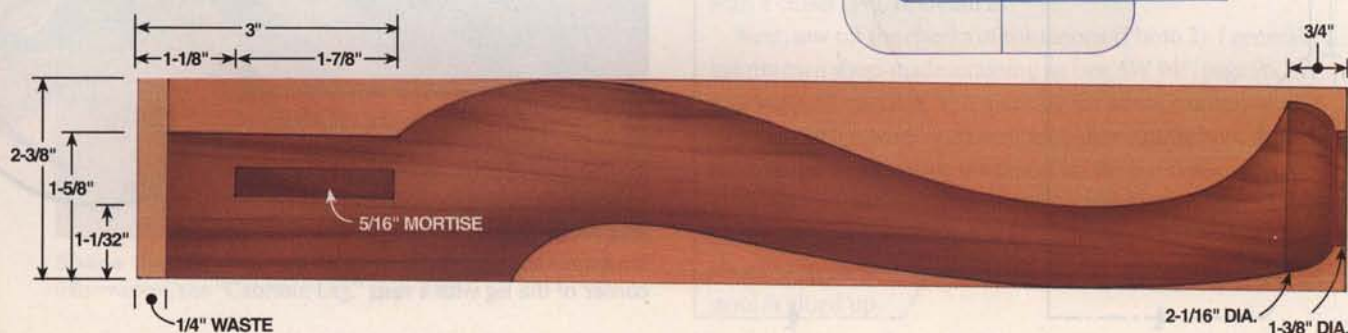
Detail 3
Elevations of Wing



Detail 4
Plan View of Corner
Block



Detail 5
Elevation of Leg Blank





F



G



E



D



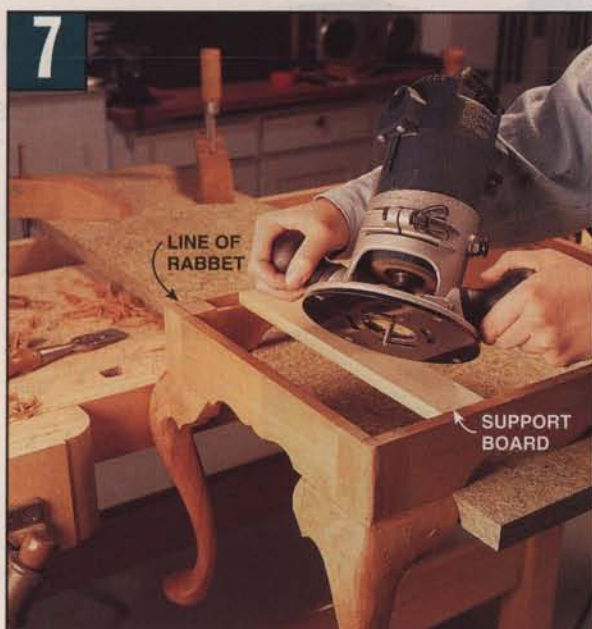
A

Detail 6
Cross Section of Slip Seat

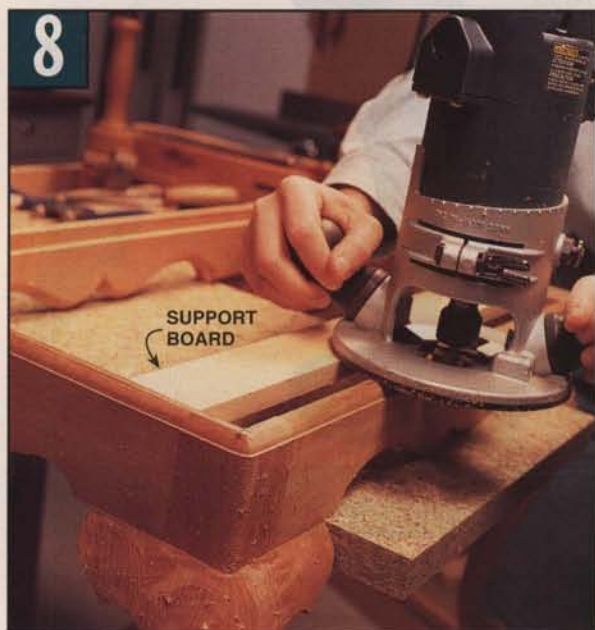


CUTTING LIST					
DIMENSIONS: 14-1/2"H x 21-1/2"W x 15"D					
Pt.	Qty.	Name	Material	Dimensions	Comments
A	4	Legs	10/4 Mahogany	2-3/8" x 2-3/8" x 14-1/4"	Finished length is 14"
B	2	Long Rails	4/4 Mahogany	13/16" x 2-3/4" x 18-3/4"	Tenon length 1" Between shoulders 16-3/4"
C	2	Short Rails	10/4 Mahogany	13/16" x 2-3/4" x 12-1/4"	Tenon length 1" Between shoulders 10-1/4"
D	8	Wings	10/4 Mahogany	1-1/4" x 2" x 1-3/4"	
E	4	Corner Blocks	5/4 Yellow Poplar	1-1/8" x 1-3/4" x 4-1/2"	
F	2	Long Rails for Slip Seat	4/4 Yellow Poplar	13/16" x 2-1/4" x 18-3/4"	1/8" gap between seat and rail
G	2	Short Rails for Slip Seat	4/4 Yellow Poplar	13/16" x 2-1/4" x 12-1/4"	

Hardware: 8 pan head sheet metal screws, 1-1/2" #10 **Materials:** Mahogany and Yellow Poplar



Rout a rabbet into the corner of the legs using a straight bit. This will finish off the rabbet for the slip seat. Support the router with a board that fits into the rabbets. This is a freehand cut so take small bites. Stop shy of the pencil line, then finish the rabbet by hand, with a chisel.



Rout a bead and fillet profile all around the top of the stool. Use a support board to balance the router.

Sources

Lumber
Constantine's, (800) 223-8087
2-1/2" x 2-1/2" mahogany turning square, 18" long, \$10.50 each.
3" x 3" mahogany turning square, 24" long, \$21 each.

Woodworker's Supply
(800) 645-9292
Behlen's Nutmeg Brown NGR stain, 1 Pt., 847-361, \$9.
Freud 5/16-in. R, 1/4-in. shank beading bit, 947-072, \$25.

(continued from page 51)

the stool square. How do you balance it on the corners of the other clamps? You may need some sort of wooden block during the actual glue-up, as in the photo, so make it now just in case.

Plane the top post of the legs flush with the rails (Photo 6). Authentic Queen Anne furniture has flush joints rather than set-back joints so the transitions from legs to rails appear seamless. This helps the whole piece look fluid.

Routing and Finishing

Complete the rabbets by routing the top inside corner of the leg (Photo 7). Lay out the lines with a pencil and use a 1/4-in. straight bit to rout as close as you dare to them by eye. You don't need a fence if you cut with care and use two boards to support the router. One board fits the short way between the rails and the other fits the long way. Use the same boards to help you cut the bead and fillet that go around the top of the rails (Photo 8 and Fig. B, Detail 1). One beading bit (see Sources, below left) does it all.

Add corner blocks to strengthen the stool (Photo 9 and Fig. B, Detail 4). Now give the whole stool a final sanding and apply a stain, if you want a richer color. I like the old-fashioned reddish look that Behlen's Nutmeg Brown Solar-Lux Stain gives to new mahogany. It's a non-grain raising (NGR) transparent stain (see Sources, below left). Any varnish will work on top of it, but I prefer the look of shellac applied as a French polish. **AW**

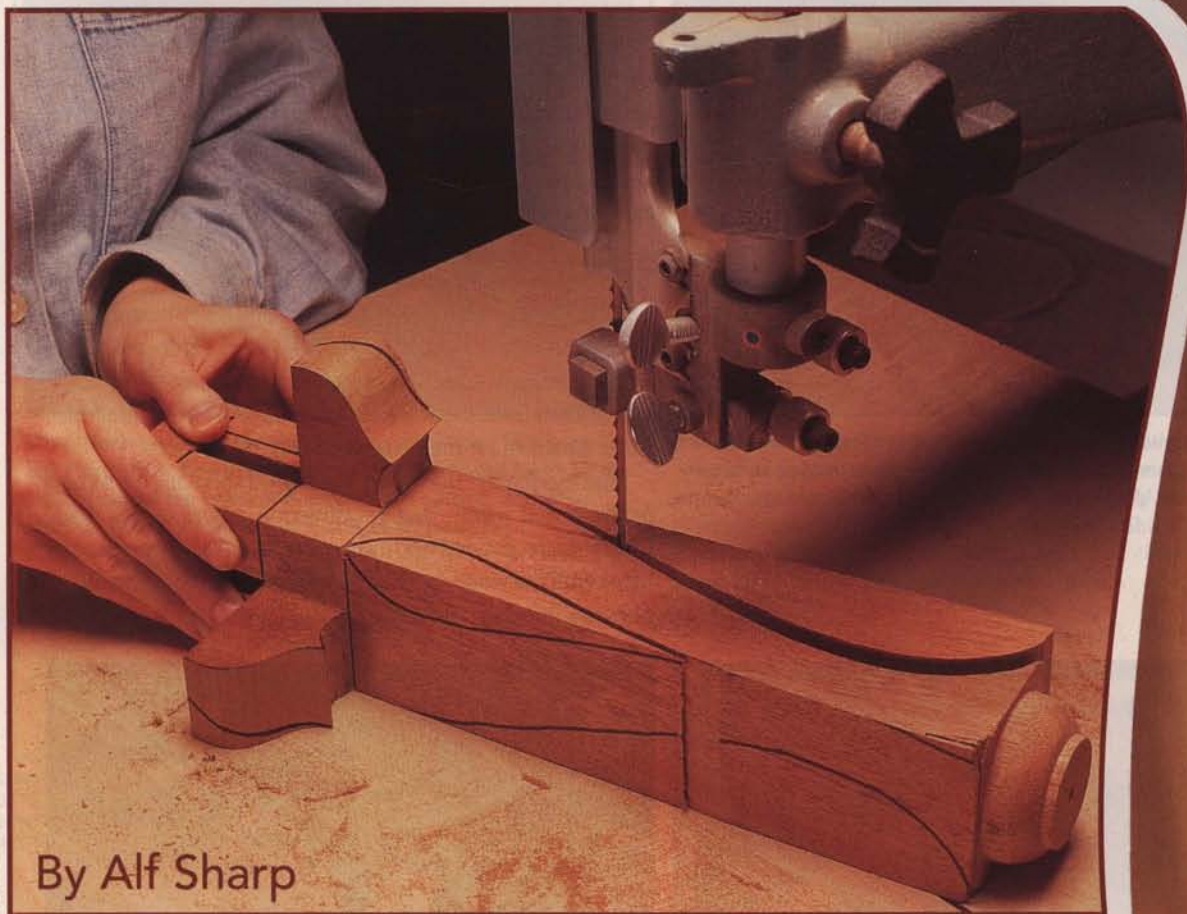


Fit a corner block around each leg. Plane or sand the block so it fits tightly against both rails. Drill screw holes in the block before you glue it in place.

Cabriole

LEG

Step-by-step instructions
for making an elegant leg.



By Alf Sharp

Cabriole legs revolutionized furniture in the early 18th-century and are still vital today. They look as if they could come to life at any time and walk away with an impossibly heavy load. Part of their vitality is an air of mystery. They puzzle every woodworker who first sees them and asks, “How *do* you make curves like that?”

The secret to making cabriole legs is actually quite simple: One pattern is used twice on adjacent sides of a square leg blank. I’ve got a great technique for sawing that avoids all the hassle of re-attaching the waste pieces in order to cut the second side. The hard part of making a truly graceful leg is finding a good pattern. I’ve made

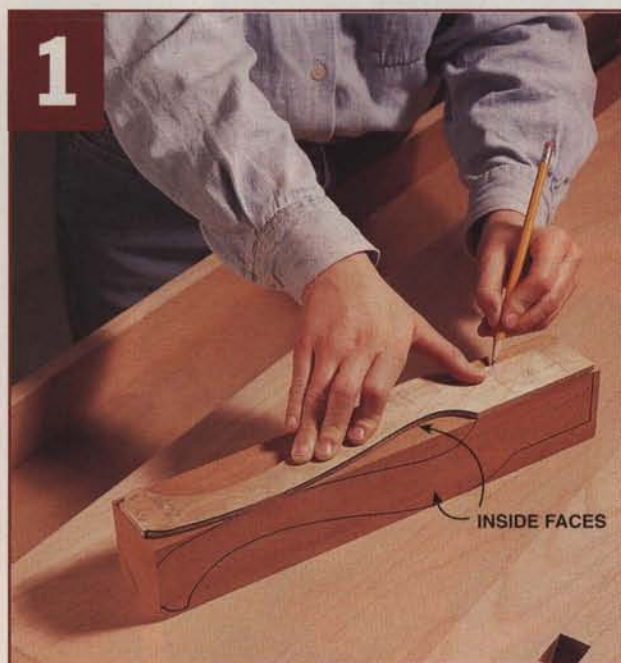
one for a footstool (page 48) that’s the result of looking at many good, bad and indifferent legs. The curves of this leg have just the right amount of spring.

The first time I tried making a cabriole leg the results weren’t so great. You’ll probably have

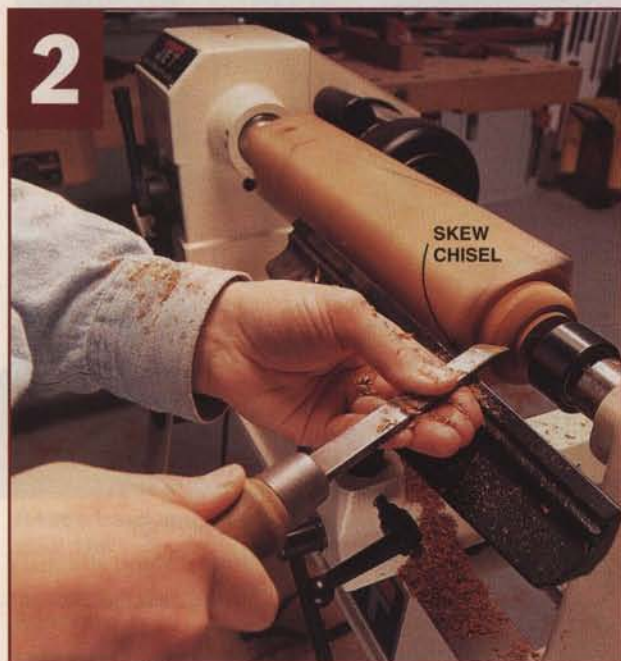
a similar experience. So glue up some thinner wood and make practice legs before you cut into the thick, expensive wood that a good cabriole leg should be made from. Use a hardwood like cherry, walnut or mahogany for a practice leg to get the feel of how your hand tools should work.

*I’ve got a great
technique for sawing the
legs that avoids all the hassle
of re-attaching the waste
pieces.*

Cabriole Leg



Trace the plywood leg pattern on both of the *inside* faces of a straight-grained square blank. Flip the pattern over to draw the second side. When you're done, you should be able to "see" the leg inside the blank.



Turn the foot. To begin, use a parting tool and calipers to cut grooves that are the diameters of the top and bottom of the foot (Fig. B). Then shape the foot with a gouge or a skew chisel turned on its side and used as a scraper.

Power Tools and Hand Tools

You'll need two power tools for making this cabriole leg: a lathe and a bandsaw. Many cabriole legs don't have turned feet, but using a lathe speeds the process. Install a 1/4-in., 4 to 6 teeth-per-inch (tpi) blade in your bandsaw. This relatively coarse blade may leave a slightly rough surface, but that's fine because you'll continue to shape the entire leg with hand tools.

You won't need many hand tools, but each one has to be very sharp. I use a 1 in. or wider butt chisel, a mallet, a flat-faced spokeshave, a medium-coarse and a fine half-round rasp, a half-round file and a cabinet scraper. Rasps and files can be expensive, but I've found that an inexpensive carpenter's 4-in-1 rasp can substitute for all of them (see Sources, page 61).

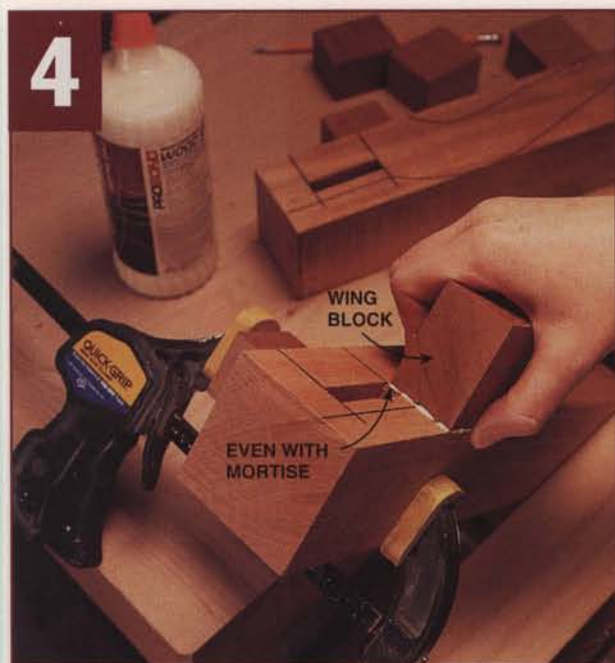
Preparing the Blank

Enlarge the leg pattern (Fig. B) on a photocopy machine and glue the full-size copy onto 1/4-in. solid wood, hardboard or plywood with a glue stick or spray adhesive. Then saw out the pattern and smooth the rough edges with a file and sandpaper. Make a pattern for the wing block (Fig. C) as well.

Fine legs require fine wood. Your wood shouldn't have knots or grain that wildly changes direction. Cabriole legs made from straight-grained wood are stronger and easier to shape by hand. Mill the wood for the legs from solid lumber and follow photos 1 through 17 to make the leg.



Cut the mortises for the rails before sawing the curves in the leg. After you're done, cut 1/4-in. off the top of the leg to eliminate the spur marks made by the lathe.



Glue both wing blocks onto the leg blank (see Tips, page 58). Match their figure as closely as possible to the figure of the leg. The top of the block is even with the bottom of the mortise. The front of the block is flush with the leg.



Saw the wing profile. It's laid out on the inside face of the wing with a plywood pattern (Fig. C). You may need a larger support surface for the leg, so add a plywood top to your bandsaw table.

Caution: You have to lift up the saw's guard to clear the leg blank, so be careful where you put your hands.

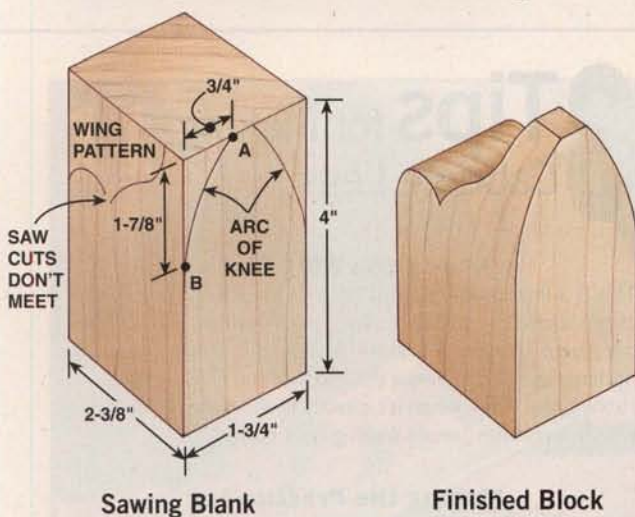
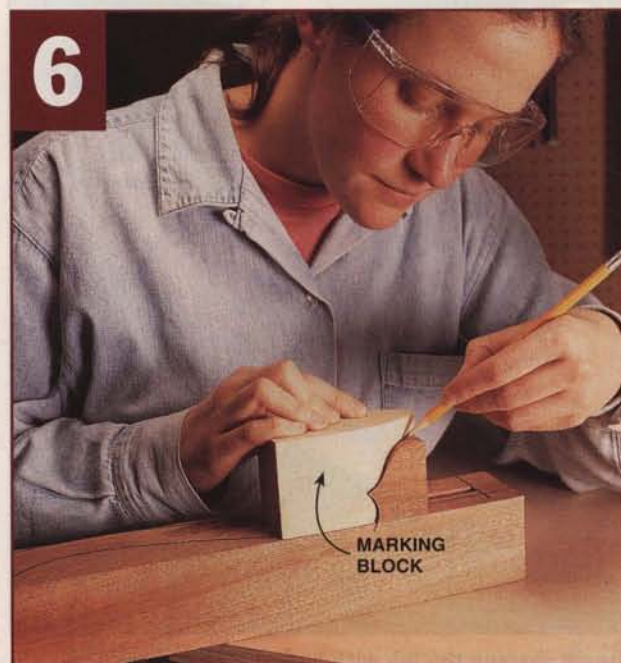


Fig. A
Marking Block for Wing Profile
of Footstool Cabriole Leg

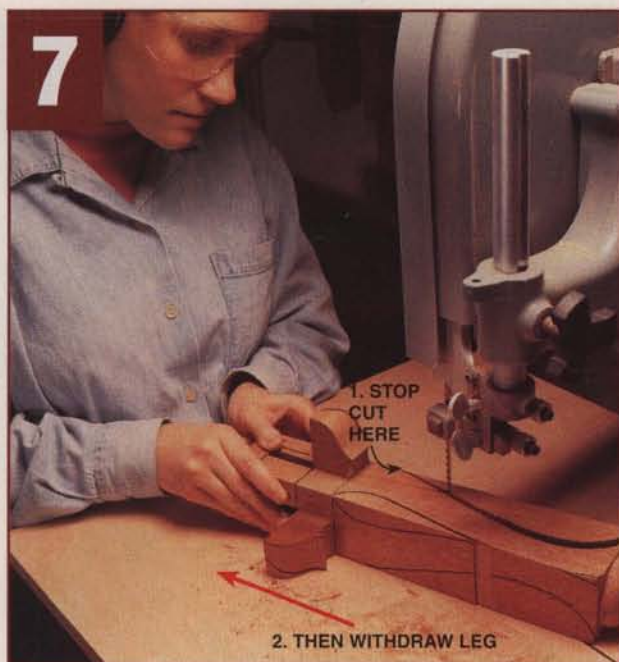
The two arcs of this block transfer the curve of the knee to both left and right wings (Photo 6). To make the block, follow these steps:

1. Trace around the full-size wing pattern.
2. Saw half the wing, but stop 1/8-in. short of meeting the other half.
3. Mark points A and B and connect them with the arc of the knee from your full-size leg pattern.
4. Saw the arcs. Break off the wing piece from the block. Sand the arcs.



Lay out the curve of the knee on the sawn edge of the wing block. Make a double-sided marking block (Fig. A) using the wing and leg patterns.

Cabriole Leg



Saw one side of the leg. Stop your cuts just short of exiting the blank and carefully back out the blade. The waste piece will bend out of the way. The beauty of this method is that the waste pieces stay attached to the leg without tape or nails.

Caution: The guard must be raised to saw through the wing blocks. Place your hands out of harm's way.



Begin shaping the leg with hand tools. Remove large chunks of waste with a chisel and a mallet. I prefer a butt chisel because its short length affords more control. Firmly support the leg in a bar clamp held in your vise or clamp the leg between bench dogs.



Flip the leg over and cut again, starting at the bottom of the leg. Begin the cut at the edge of the turned foot. This time you can saw right through to the end of the cut. Break off or saw off the waste pieces that remain hanging on the leg.

3 Tips for Making Cabriole Legs

Gluing the Wing Block

This is a finicky operation (Photo 4). I've found that if you clamp too soon the block slips out of position. To avoid this I put glue on the block and rub it around in place on the leg, pushing firmly to squeeze out most of the glue. I stop rubbing the block when it's exactly in the right place, then I wait five minutes before putting on a clamp.

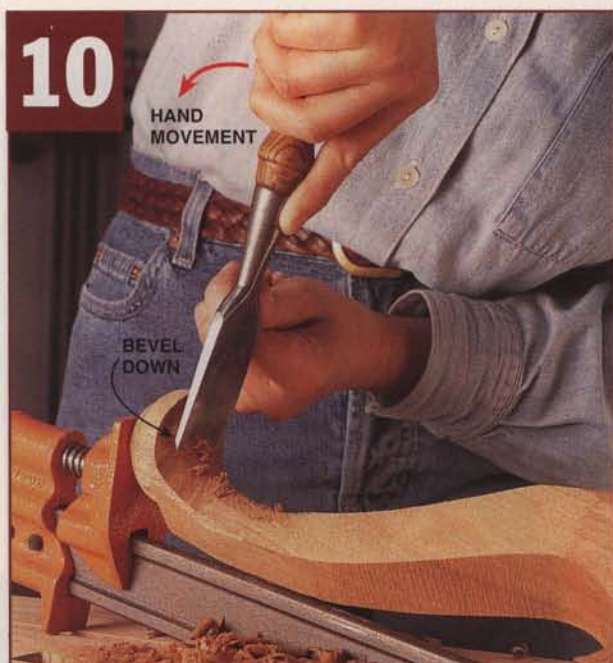
Making the Practice Leg

Each time I use a new cabriole leg pattern I make one trial leg from beginning to end so I know the basic strokes to get the shape I want. I'll also end up with a model to judge the actual legs by. I take small amounts from every surface on this trial leg as I familiarize myself with the leg's curves.

Finding the Right Shape

As I'm shaping the leg, I remove it from the clamp every so often, turn it over in my hands and take a look at it. I sight down the length of the leg to find flat spots and feel it with my hands to make sure each part of the leg flows smoothly into another. Toward the end of the process I stand the leg on the bench and continue to smooth it with the fine rasp, file and scraper (Photo 14).

10



Pare the top of the foot with a large chisel. Take light, sweeping cuts to make a curved surface. Use a freshly sharpened chisel and you'll be in control through the whole cut.

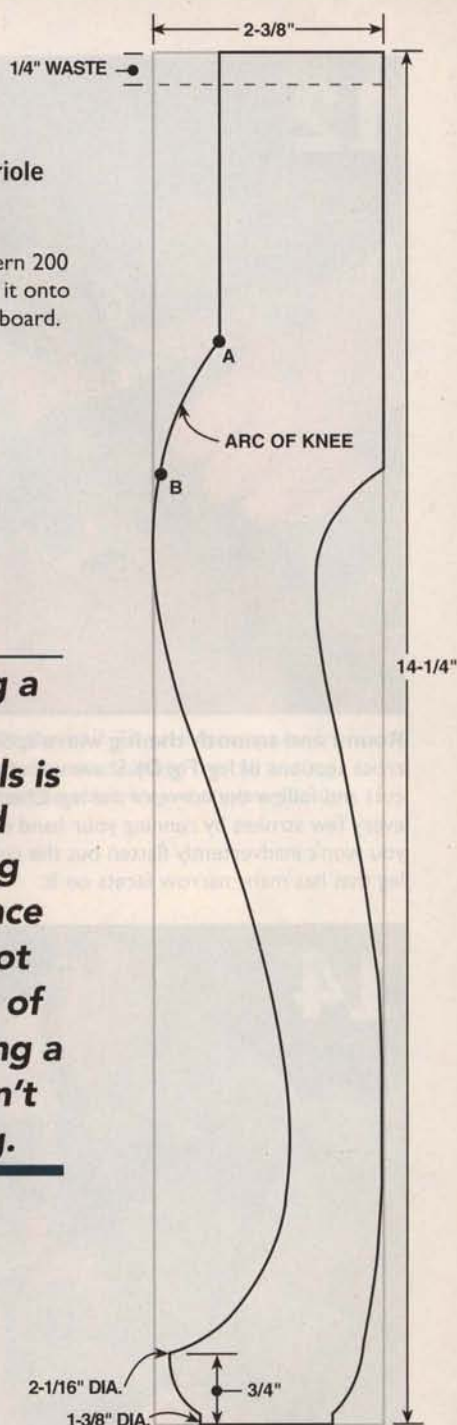
11



Use a medium rasp to slightly round the arrises at the ankle and below the wing. (An arris is an intersection of two planes). It's better to take off too little than too much at this point (see the cross section of the foot, Fig. D).

Fig. B
Footstool Cabriole
Leg Pattern

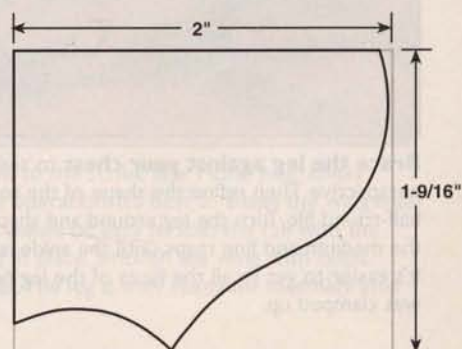
Enlarge this pattern 200 percent and glue it onto plywood or hardboard.



Rounding a leg with hand tools is quiet and rewarding work. Once you've got the hang of it, finishing a leg doesn't take long.

Fig. C
Wing Block
Pattern

This is a full-size pattern.



Cabriole Leg



12 Round and smooth the leg with a spokeshave (see the cross sections of leg, Fig. D). Shave with the grain, take light cuts and follow the curve of the leg. Check your progress every few strokes by running your hand down the leg. Then you won't inadvertently flatten out the curve. You'll now have a leg that has many narrow facets on it.



13 Round the back of the ankle with a chisel, spokeshave and medium rasp. Then pare away the arris between the wings at the upper part of the leg. Removing this corner lightens the appearance of the leg. It's okay to leave rough chisel marks here.



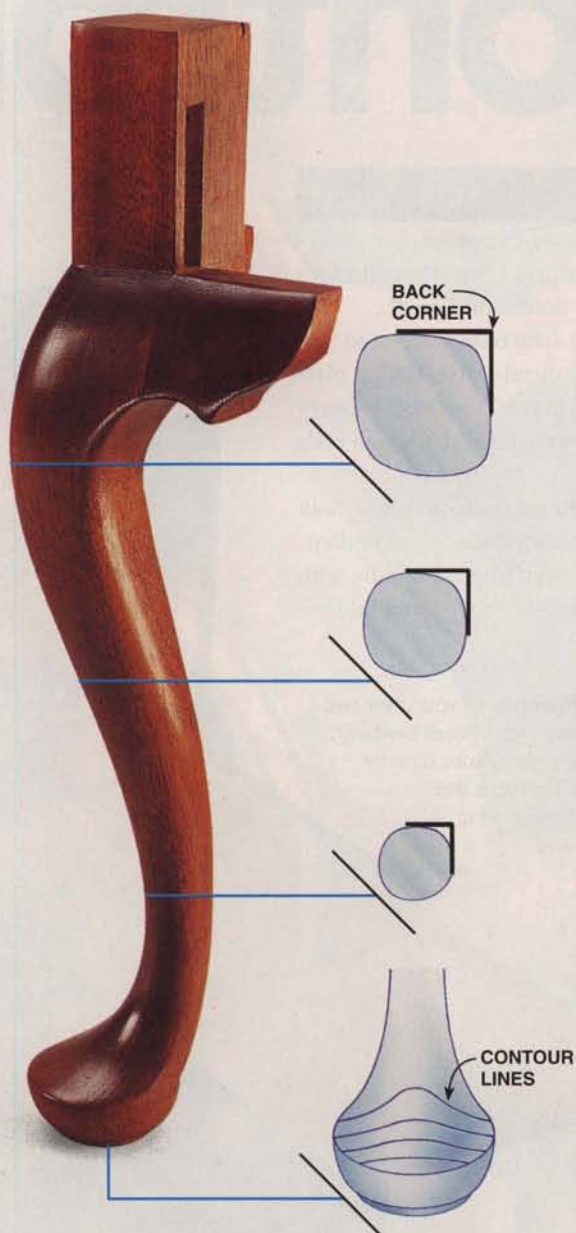
14 Brace the leg against your chest to see it in its proper perspective. Then refine the shape of the top of the foot with a half-round file. Turn the leg around and shape all its faces with the medium and fine rasps until the ankle is completely round. It's easier to get to all the faces of the leg now than when it was clamped up.



15 Remove the rasp marks with a scraper. This works extremely well on the end grain of the foot and it's faster than using coarse sandpaper! Keep the scraper moving around the leg so you don't make any flat areas. Once both your hand and eye tell you the leg is right, sand with 100-, 150- and finally 220-grit paper.

Fig. D
Cross Sections of Leg

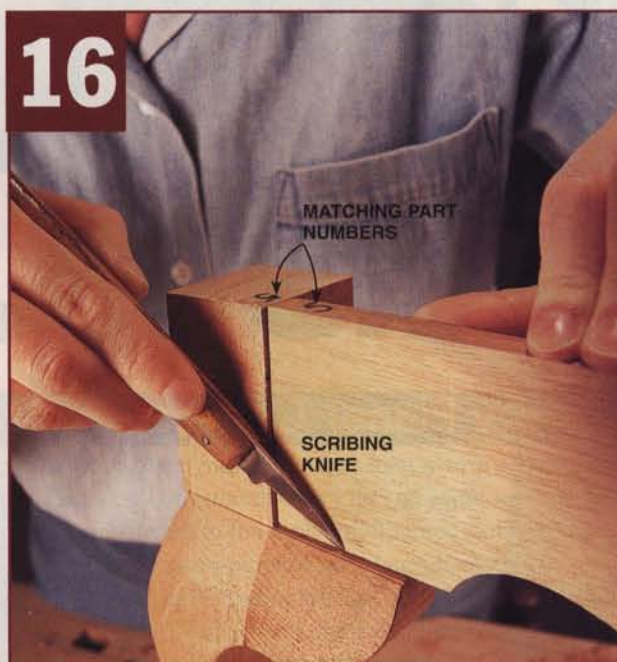
Refer to these slices as you round over the square sides of the leg left by the bandsaw.



Sources

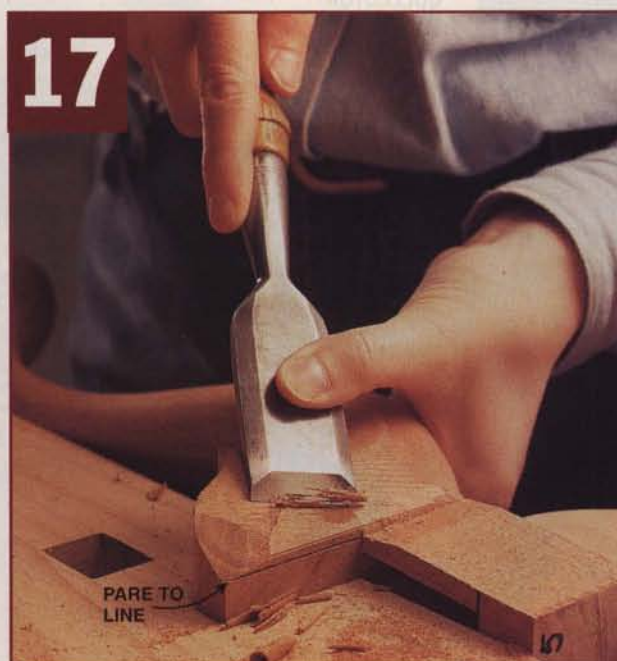
Woodcraft Supply, (800) 225-1153
 1-in. Butt Chisel, 129226, \$17
 4-in-1 Hand Rasp, 06B21, \$14
 Medium Rasp, 06B32, \$26
 Fine Nicholson #50 Rasp, 06B02, \$49
 Half-round Wood File, 06B06, \$19
 Flat Face Spokeshave, 01H10, \$25
 Sandvik Cabinet Scraper, 02Z08, \$6.50.

16



Scribe the wing to fit the rail. The rail is temporarily inserted without glue. Be sure to number the rail and leg so they go back together the same way when you glue up the footstool.

17



Pare the wing down to the scribe line. Hone your chisel again for this delicate operation. It's best to shape the wing free of the rail because it would be easy to stab the rail with the chisel if it were glued in place. Smooth the wing with rasps, scraper and sandpaper. The leg is now ready for assembly into the footstool. **AW**

Tips for Dust Control

Edited by Tom Caspar

Thrifty Planer Collector

Wanna see a grown man cry? Watch him try to collect planer shavings with a small dust collector. The hose plugs up every time the shavings get caught on the metal grid across the collector's intake. Sawdust comes flying back out of the machine and covers the floor. Good grief!

If you've been through this, you may be tempted to throw away your 1-hp collector. Not so fast. Buy a special plastic lid and a standard 30-gal. metal trash can. (Use a metal can instead of plastic so you don't build up static electricity.) The lid turns the trash can into a "separator"—heavy planer and jointer chips fall into the trash can and are separated from the fine dust, which ends up in your collector's bags. The lid accepts conventional 4-in. hoses.

As a bonus, you've increased the capacity of your collector, because a 30-gal. trash can holds about twice as many shavings as the lower bag of a small collector. Your collector's impeller won't be damaged by flying pine knots. And you won't have to fiddle with unruly bag straps to dump out the chips. The separator lid simply lifts off.



Maximize the efficiency of your new two-stage system by using short hoses bent into wide arcs. First, place the planer directly over the trash can. Then, cut the trash can's original metal lid in half with tin snips and screw the semi-circular halves together to make a perfect hose support.

Sources

Lee Valley Tools
(800) 871-8158

These lids fit 20-in. to 24-in. dia. containers;
30 to 55 gal. (pictured above)

05J30.02 Black Cyclone Lid, \$30

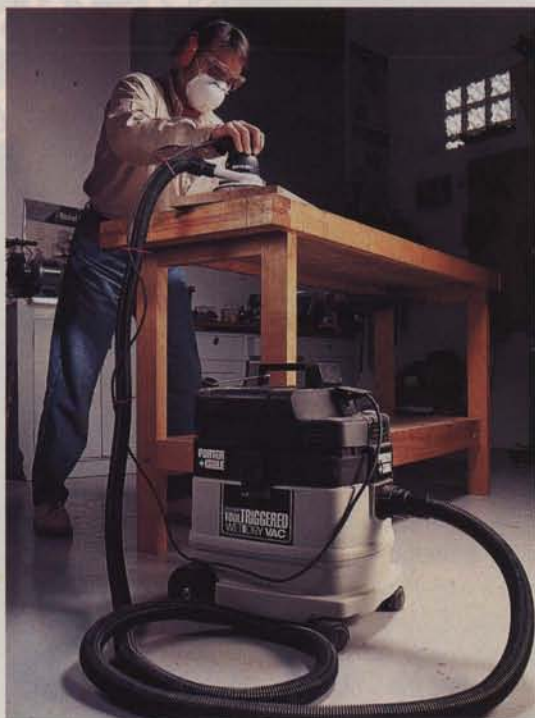
05J30.12 Clear Cyclone Lid, \$37.

Woodworker's Supply
(800) 645-9292

881-860 Two-stage collector lid for a 20-in.
dia. container (30 gal.), \$37, (pictured at right).



Tips for Dust Control



Bust Sander Dust at the Source

Sanders kick out a ton of nasty dust. They make clouds of the fine stuff that ends up coating every surface in your shop. Your misery will be history, however, when you hook up a vacuum to your random-orbit sander. That layer of dust will be *gone* and your shop will never be the same.

Here's a hot setup that's mighty convenient to use: Plug your sander into a shop vacuum that has a tool-actuated switch (see the Shop Vacuum Tool Test, page 71 for more information). The vacuum comes on when you turn the sander on, and continues about 15 seconds after you turn the sander off. It's like having a remote control right on the sander. Twist a piece of 14-gauge electrical wire around the hose and cord so they don't get tangled up.

Most of the dust that used to fill your shop now goes directly into the vacuum, but continue to wear a dust mask—nothing's perfect!

Bag That Dust

Don't you just hate it when you empty out your shop vacuum and *poof*—you're covered with dust again? I tried putting a garbage bag into my shop vacuum. Whoops! It got sucked right into the vacuum's filter with all the dust.

Here's a simple but clever reusable plastic liner to the rescue. It expands to fit any size container and keeps the bag in place. Remove the liner before you tie up and pull the bag out of the vacuum.

Sources

Penn State Industries
(800) 377-7297

Vac Sac

#VACSAC16 for 5-16 gal. shop vacuums, \$15

#VACSAC35 for 20-35 gal. containers, \$30.



Drum Sander Dust Collector

Suck up the fine dust that flies off a sanding drum with this simple setup. All you need is your shop vacuum, a 3-in. by 2-in. PVC reducing coupling (\$1.35) and a pot magnet (\$4). Bolt the magnet to the coupling and put the coupling over the end of the vacuum hose. A 2-1/4-in. dia. shop vacuum hose fits snugly inside the coupling's smaller end without clamps or glue. You can use this magnetic dust hood on any power tool with a metal table.

Lathe Dust Hood

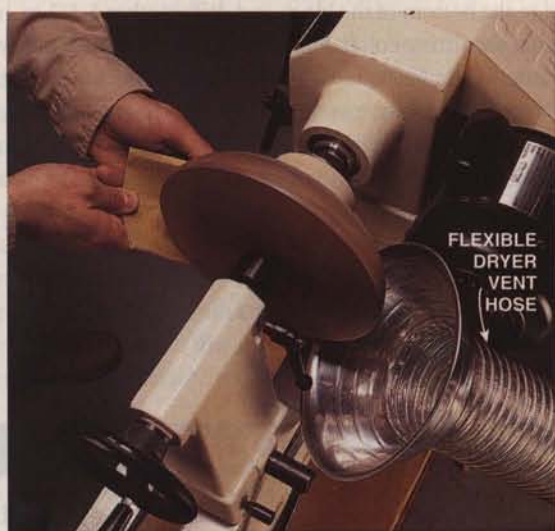


Why be a dust-bowl refugee? Sanding on a lathe makes a storm of dust that can really irritate your nose and lungs, especially if it comes from spalted or exotic wood. Funnel that obnoxious stuff into your collector with this shop-made system. It uses flexible metal hose that stays put without clamps, so you can easily aim the funnel right at the dust source.

Make the funnel from a 10-in.-dia. aluminum light shield. You can find one at any hardware store for about \$5. Remove the cord and socket and you've got a funnel with a small hole at the base.

The trick is to enlarge the hole to the size of your collector's hose. No problem. Use the same technique as you would for turning the bottom of a bowl or plate (see *Turning Plates*, #78, page 98). Hold the light shield in a rim chuck made of solid wood or plywood. Fine-tune the groove of the rim chuck with a parting tool until the shield fits snugly within it. If the groove is too large in diameter, just make it a bit deeper and smaller. Add tape for insurance.

Now cut out the hole. Set your lathe to its lowest speed and score the thin aluminum shield with the point of your skew chisel. It will cut through in no time. Wear a heavy leather glove for protection. Voila! A 4-in. hole. Now insert aluminum dryer vent hose into the shield (about \$1 for one foot).



Dress for Dust

Do the clothes really make the man? Try taking a tip from turners and dress up for dust. Wear a jumpsuit and a face shield when you can't collect sawdust at the source.

This is the outfit turners wear when they're making lots of chips. A jumpsuit is easy to brush off when you're done because it doesn't have any nooks or crannies for dust to get caught in. You can leave your dusty jumpsuit right in the shop.

The face shield is more effective than many safety glasses for keeping dust from getting in your eyes at a critical moment. It's also a first line of defense against breathing in sawdust, but remember to wear a dust mask as well.



Tips for Dust Control



Tablesaw Dust Trap

Trap dust under your tablesaw before it spreads all over your shop! This cradle directs all that dust right into your shop vacuum hose.

Make a wood frame with two curved sides and two straight sides to fit the opening at the bottom of your saw, as shown. Your saw frame may not look exactly like ours, so customize the frame to fit. With tin snips, cut a thin sheet of galvanized steel (\$3 for a 16-in. by 30-in. sheet at any home center) to fit your frame. Next, cut a 2-1/2-in. hole in the center of the trimmed sheet with your snips.

To make the small wood connector that accepts the hose, glue together two 4-in. by 4-in. pieces of 3/4-in. MDF or plywood and drill a 2-1/2-in. hole in the middle. Add a 3-in. by 3-in. square of plywood to the bottom of the block and drill another 2-1/2-in. hole to act as a tight-fitting collar. Shape the top face of the block with a belt sander or bandsaw to conform to the curve of the cradle. Connect the block to the steel by driving sheet-metal screws through the inside of the cradle and into the wood block. Glue a hose connector in the hole with epoxy. Bolt the dust trap to the saw frame and hook up your shop vacuum.



Router Dust Hood

Have you ever used a router on MDF? Man, those dust plumes can rival the explosion of Mount St. Helens!

If you own a Porter-Cable router, here's an answer. It's an integrated sub-base and hood that practically collects *all* the dust right at the source, whether you're shaping an edge or plunging into a mortise. One nozzle collects from above, another from below. Standard 1-1/2-in.-dia. hose fits both nozzles. We've used one in our shop, and though not perfect, it helps enormously in keeping down the dust.

Sources

Tools On Sale

(800) 328-0457

Porter-Cable routers only

for most 6000 series routers, #39690, \$48

for most 7000 series routers, #39700, \$55.

Central Dust Control



If you're setting up a central system, here are some basic tips. For more details, we recommend these books: "Dust Collection Basics," Woodstock International, Inc., (800) 840-8420, \$6 and "Woodshop Dust Control," Taunton Press, (800) 243-7252, \$20.

The Right Pipe

Your worst nightmare: Sparks in a dust collector send your shop sky high! Not to worry. Choose metal pipe instead of PVC and you won't have to fret about sparks from static electricity. You shouldn't be surprised to hear that the Uniform Mechanical Code (a building code followed by most jurisdictions in the U.S.) forbids using PVC pipe for dust collection.

Look for 24- or 26-gauge metal heating pipe at any home center. Twenty-four-gauge pipe is thicker and should be used on powerful central systems whose suction might cause thinner 26-gauge pipes to collapse. You can easily cut this stuff with tin snips and it's cheap. You'll pay around 75 cents per foot for 4-in. dia. straight pipe in both thicknesses.

Bigger Bends Move More Air

Join *two* standard 90-degree elbows together to make one super elbow! Why? For maximum efficiency. The turning radius of a dust collection pipe should be 1-1/2 to 2 times the diameter of the pipe itself. A standard 90-degree elbow by itself takes too sharp a turn. Elbows can be twisted to form any angle, so bend two into 45-degree turns and join them together.



Seal the Joints

Metal pipe seams leak air like crazy. After you've screwed your pipes together, seal the joints with silicone caulk. But first, clean the pipe with vinegar, or the silicone won't stick.



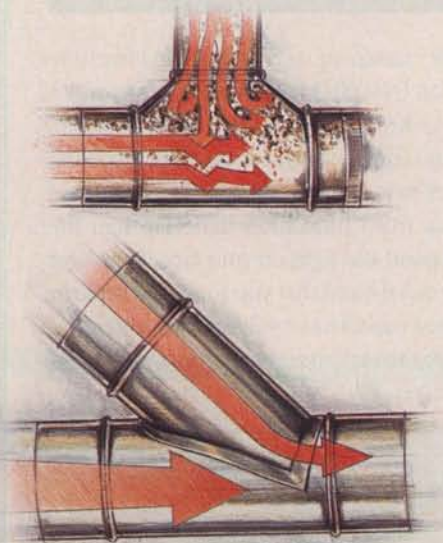
"Y" Shaped Fittings are Best

Don't you hate getting held up in your car at a crowded intersection? Dust has the same problem trying to enter the main run of a central dust collection system. Give it a freeway on-ramp by installing a Y fitting rather than a T fitting. T fittings create more turbulence in the air passing through them, so you get less suction. A 45-degree Y is more efficient, and a 30-degree Y is best.

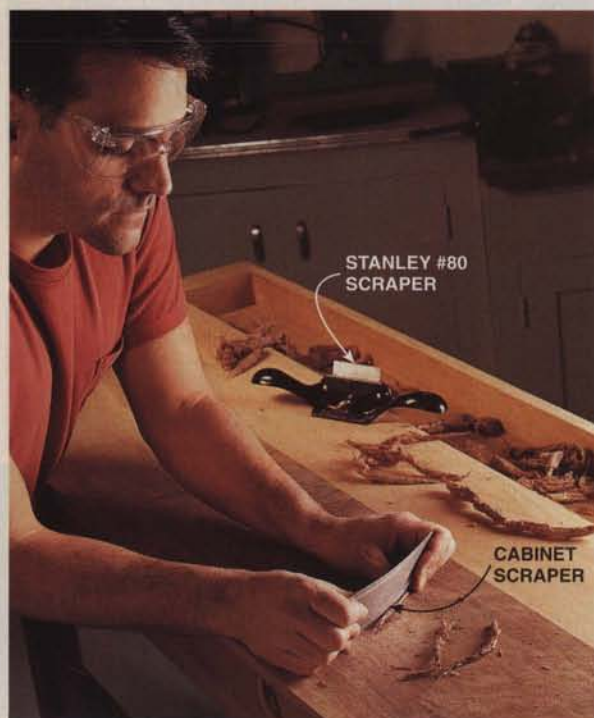
Position the Y so it comes off the side or top of the main branch. If the Y points down, material passing through the main run will fall into the branch run when the branch's blast gate is closed.

Sources

Look for Y fittings at your local home center or order from Woodworker's Supply, (800) 645-9292. They're called branch connectors and come in a variety of sizes. Typical cost: \$25.



Tips for Dust Control



Make Shavings, Not Dust

I hate sanding. Even with dust collection, machine sanding is noisy and makes my arm feel like jelly. I like to turn to the scraper, a quiet hand tool that doesn't make any dust at all.

Think of a scraper as a substitute for sandpaper. In fact, scraping is *faster* than sanding. It's easy to remove mill marks with a Stanley #80 and get a perfectly flat surface to boot. Then turn to a plain cabinet scraper for the final licks. Your arms will get a healthy workout, but you won't have to worry about spewing dust into the air.

The harder the wood, the better the scraper will work. Lightweight woods, like pine and basswood, can't stand up to scraping, but with the majority of hardwoods you'll get a surface that requires only a very light sanding with fine paper.

See Q&A, page 107 in this issue for tips on how to sharpen a #80.

Sources

Highland Hardware
(404) 872-4466

03.12.05 Stanley #80 Scraper, \$33

03.15.09 Sandvik Cabinet Scraper, \$6

Ask for the free brochure "Life After Sandpaper" for sharpening instructions.

Thin Kerf Rip Blade

It's hard to collect dust from a tablesaw, but choosing the right blade can help minimize the amount of dust you create. A thin-kerf blade makes about 25-percent less dust than a standard blade. That's far less dust in your face!

Here's more: Use a dedicated rip blade when cutting the length of a board. A rip blade makes relatively large shavings that are less harmful to your lungs than some of the

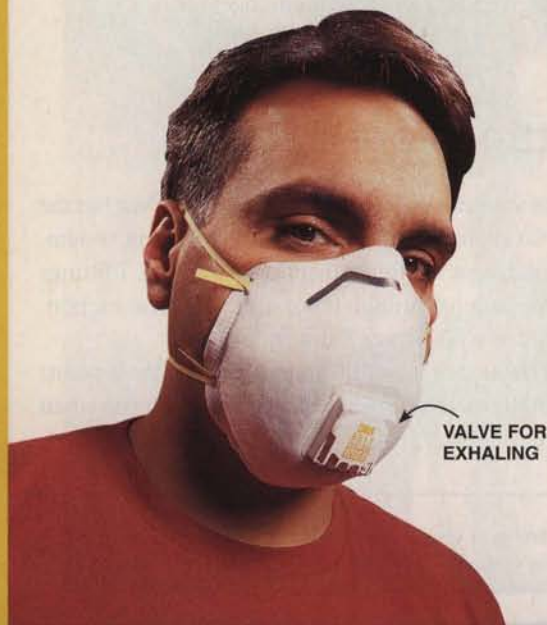
small shavings and dust made by combination or crosscut blades. Combine rip teeth and a thin kerf into a single package and you've got a great dust-busting tablesaw blade.

Sources

Tools On Sale

(800) 328-0457

Freud 10 in. Thin-Kerf Rip Blade
LU87R010, 24 TPI, \$50.



A Better Dust Mask

All disposable dust masks are *not* created equal. The National Institute of Occupational Safety and Health (NIOSH) is looking out for you, so they rate masks for effectiveness. To keep your lungs healthy, look for the NIOSH-approved label on the box. These masks cost a bit more than the inferior "comfort" masks, but they're well worth it.

The healthier masks are made from finer filter material than the cheaper masks and are built to fit good and tight on your face. They have two straps rather than one and a metal band that you pinch to conform to the bridge of your nose. The best model has a valve in the center that opens when you exhale. This keeps the seal intact between your face and the mask. No more fogged up glasses. **AW**

Sources

Look at your local home center or call

Tools On Sale

(800) 328-0457

3M #8210B (mask without valve), \$18 for 20.

Conney Safety Products

(800) 356-9100

3M #8511 N95 (mask with valve),

\$18 for 10.

Shop Vacuums

for Portable
Power Tools

**Look ma,
no dust
clouds!**



By George Vondriska

The biggest frustration I've encountered in trying to control the dust in my shop is this: You spend hundreds of dollars on a dust collector, hoses, blast gates and whatnot, you hook it all up to your big machines and you're still only halfway there. You still need to deal with some of the worst dust spewers: routers, plate jointers, belt sanders and finish sanders.

In the past few years manufacturers have introduced specialized shop vacuums that allow you to collect dust right off these tools very effectively. If you hate dust, these vacuums will make you think you've died and gone to heaven (where I'm told there isn't a speck of dust!). With one of these vacuums you can use a random-orbit sander for hours at 220 grit with no hint of a dust cloud.

The drawback is cost. These machines are twice as expensive as regular shop vacuums. So for this test, rather than just examine the three popular power-tool vacuums, we also looked at two general-purpose shop vacuums (one small, one large) outfitted with aftermarket accessories that allow them to collect from power tools.

FEATURES YOU NEED IN A PORTABLE POWER-TOOL VACUUM

The specialized features needed to collect dust from sanders, routers, plate jointers and the like are:

■ **Fine Filtration.** The tools you're hooking up to the vacuum produce very fine dust, and you don't want it just flying out the exhaust port. (I see a few bemused smiles

out there—this really does happen!) The specialized power-tool vacuums filter down to 1-micron (according to the manufacturers). For regular shop vacuums, you can purchase an aftermarket Gore-Tex filter (\$20) that also does the trick for fine particles.

■ **A Long, Flexible Hose.** You don't want the hose to make the tool awkward to handle, or tippy (bad news with a belt sander!) The smaller 1-1/4-in. or 1-1/2-in. hoses are best for maneuverability. Because you often walk around with the tool, the longer the hose the better. For regular shop vacuums, long, flexible hoses are available as an aftermarket attachment (\$30).

■ **Quiet.** It's bad enough to listen to a loud shop vacuum for a short spell of floor cleaning. Add that roar to the noise of a sander and you've got a recipe for insanity. Even the best hearing protectors aren't really enough. The specialized power-tool vacuums are fairly quiet, but for regular shop vacuums, you have to purchase an aftermarket muffler (\$35, see Sources, page 73).

■ **Tool-Actuated Switch.** With this feature, you plug your sander or other portable power tool into the vacuum, not into an outlet. When you turn on the tool, the vacuum turns on automatically. Usually the vacuum runs a bit after the dust-maker is shut off, just to clear the tool and the hose. Though certainly not essential, the tool-actuated switch is a handy feature for tools you start and stop a lot, like plate jointers and finish sanders (see photo of the Fein Turbo, page 72).

Fein Mini-Turbo

Cost:	-----\$130
Filtration:	-----1 micron
	Paper filters, \$7 each
Hose length:	-----1-1/4 in. x 10-1/2 ft.
Noise level:	-----Low
Tool Actuated Switch:	-----No
Barrel:	-----6 gal.

Pros: Hose locks into barrel. Comes with a floor wand and accessories to connect to portable tools.

Cons: Wood chunks get stuck in small hose. 6-gal. barrel fills quickly when vacuuming the floor.

Bottom line: You'll love how quietly this vacuum runs. The hose it comes with is very flexible. The motor has bypass construction, meaning plenty of air gets to the motor to keep it cool, even when the hose is restricted or blocked. This is a great tool if you aren't concerned with picking up big chunks. The price is low, for this type of tool.

Fein, (800) 441-9878.





Ridgid Tool Vacuum TV 3000

Cost:	-----\$130
Filtration:	-----1 micron, no pre-filter available
Hose length:	-----1-1/4 in. x 11 ft.
Noise level:	-----Medium
Tool-Actuated Switch:	-----Yes
Barrel:	-----3 gal.

Pros: Comes with accessories to connect to portable tools. Very flexible hose.

Cons: No accessories for floor cleaning. Small barrel fills quickly. Chunks get stuck in 1-1/4-in. hose. Tool-actuated switch only works with tools 8 amperes or less.

Bottom line: This is an inexpensive way to get a vacuum with a tool-actuated switch, but the amperage limitation leaves out many tools, such as routers and belt sanders. It's a small unit that could easily store under a bench.

Available at **Home Depot**.



What's the Deal with Tool-Actuated Switches?

Tool-actuated switches are convenient but they do have limitations. The receptacle on the Porter Cable has an amperage limitation of 6 amps; the Ridgid 8 amps; the Fein, by contrast, can take 19 amps. How does this limit what tools can plug into the vacuum? Here are some approximate tool amperages:

Finish sander	-----2 amps
Random orbit sander	-----2 amps
Belt sander	-----7 amps
Plate joiner	-----7 amps
1.5 hp router	-----11 amps
Miter saw	-----13 amps

Remember that the combined amperage of the tool and the vacuum can't exceed your circuit breakers' capacity. You may need to plug into separate outlets just to keep the amperage per circuit low.



Another option: If you choose a shop vacuum that doesn't have a tool-actuated switch, the Craftsman Automatic Power Switch lets you plug in a power tool and two accessories, like a light and vacuum. When the tool goes on, the accessories go on. The accessories continue to run three seconds after the tool is shut off. The switch can handle up to 15 amps. Get it at Sears for \$20, (800) 377-7414.



Porter Cable 7810

Cost:	-----\$285
Filtration:	-----.2 microns, disposable bags and cartridge bags, 3 for \$13.
Hose length:	-----1-1/4 in. x 13 ft.
Noise level:	-----Low
Tool-Actuated Switch:	-----Yes
Barrel:	-----5 gal.

Pros: Hose locks in barrel. Very flexible hose. Very fine filtration.

Cons: Doesn't come with floor wand (\$69). Need to buy adapter to connect to some portable tools (\$12). Wood chunks get stuck in small hose. Small barrel fills quickly when cleaning the shop. Low maximum amperage on tool switch.

Bottom line: Another excellent tool for getting dust right at the tool.

Because it was originally designed for drywall dust, filtration is exceptionally fine. A low profile makes it easy to tuck this vacuum under a bench. The maximum combined amperage for this vacuum is 15 amps, and the vacuum motor is 9 amps. You can't plug tools that exceed 6 amps into the tool-actuated switch—you have to plug them directly into the wall.

Porter Cable, (800) 487-8665.



Fein Turbo Vacuum 9-55-13

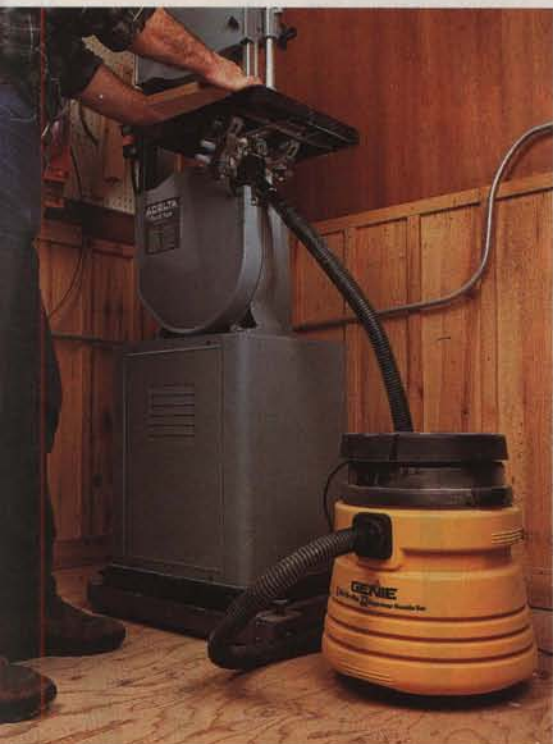
Cost:	-----\$240
Filtration:	-----5 micron standard, 1 micron available, disposable, \$8 each.
Hose length:	-----1-1/4 in. x 16 ft.
Noise level:	-----Low
Tool-Actuated Switch:	-----Yes
Barrel:	-----7.3 gal.

Pros: Very quiet. Handles tools up to 19 amps. Extra-long and flexible hose. Hose locks into barrel.

Cons: Doesn't include floor wand (\$68). Need to buy adapter to connect to some portable tools (\$4). Wood chunks get stuck in small hose.

Bottom Line: This vacuum excels at getting dust at the tool, and is OK for general shop clean up. It's very quiet, and has the highest-amp-rated tool-actuated switch. The long hose is very handy.

Fein, (800) 441-9878.



Genie SV200Q

Cost: -----\$40
Filtration: -----not available
Hose length: -----1-1/4 in. x 6 ft.
Noise level: -----High
Tool-Actuated Switch: -----No
Barrel: -----6 gal.

Pros: Inexpensive. Small and easy to move around. Comes with a floor wand.

Cons: Very noisy. You must wear hearing protection around this tool. Hose is stiff, making it cumbersome on portable tools. Needs finer filter. Doesn't include accessories to hook up to portable tools. 1-1/4-in. hose gets clogged with wood chunks. Hose doesn't lock into barrel.

Bottom Line: I wish that a \$40 vacuum like this solved the problem of dust collection on portable tools, but it doesn't quite make it. The barrel is small so it needs to be emptied often when used to clean up the shop. Even with hearing protection, I got tired of this vacuum's scream. The filter just doesn't capture fine dust. To make a vacuum like this work for tool-dust collection, plan on adding at least a \$20 filter and \$30 hose.

Available at home centers.



Shop-Vac Model QSP

Cost: -----\$130
Filtration: -----10 microns
Hose length: -----2-1/2 in. x 6 ft.
Noise level: -----Medium
Tool-Actuated Switch: -----No
Barrel: -----10 gal.

Pros: Comes with 2-1/2-in. hose which is great for cleaning the floor. Comes with a floor wand. Big barrel.

Cons: Big hose doesn't work well with portable tools. You need to buy accessories to connect to the small ports on portable tools (see Sources, below). Hose doesn't lock into barrel. Needs finer filter.

Bottom line: This is a good general-purpose vacuum, but it falls a little short for dust collection at portable tools. With the 2-1/2-in. hose you can clean the shop floor, but you'll have to add a smaller, more flexible hose (\$30), as pictured here, for use with portable tools (see Sources, below). Add a Gore-Tex filter (\$20 at home centers) to get better filtration. This machine does work well when fitted with these accessories.

Available at home centers. AW

Sources

Eagle America, (800) 872-2511

1-1/2-in. to 1-in. reducer, \$10

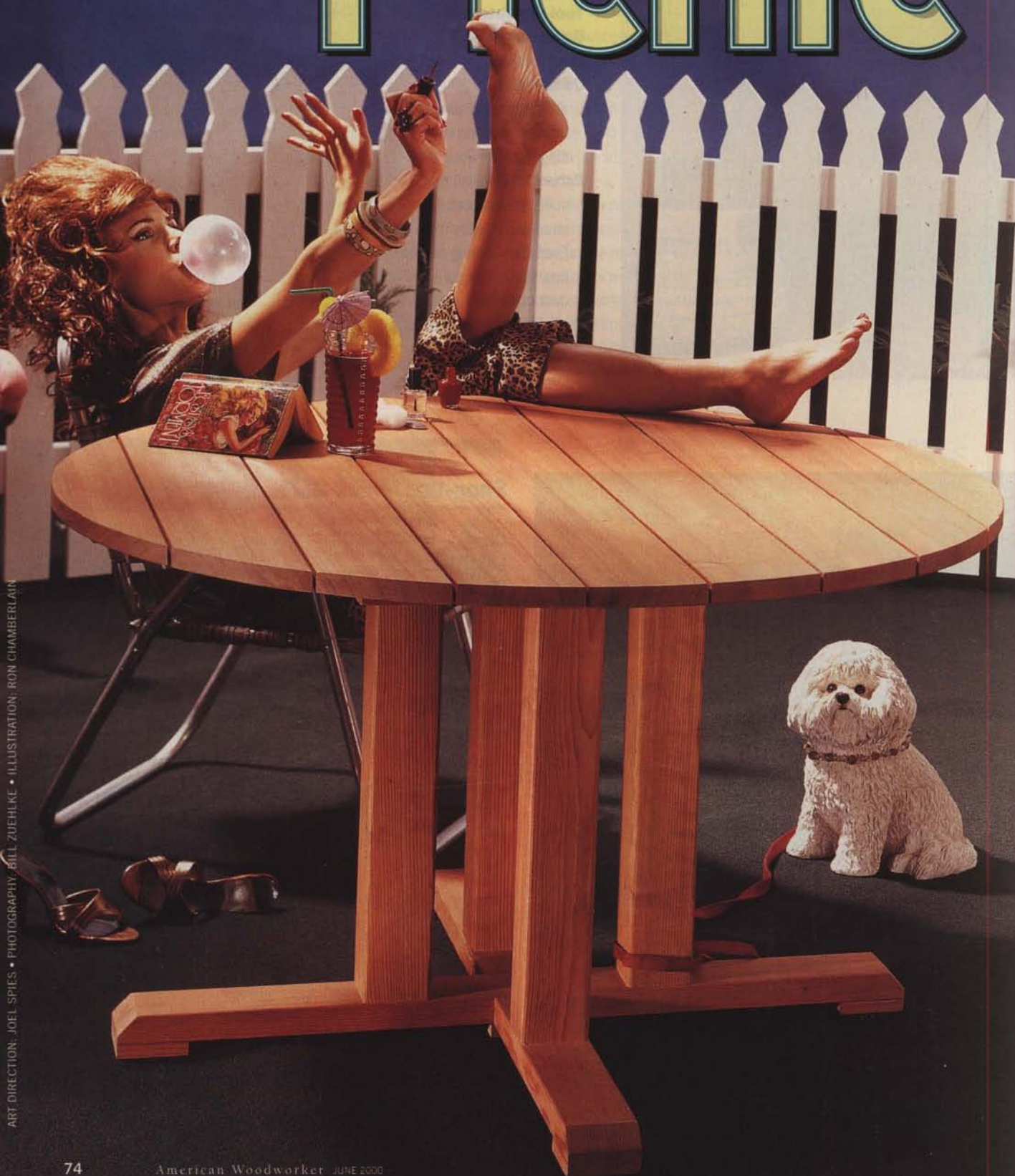
1-1/2-in. hose, very flexible, 12 ft. long, \$30.

Leichtung, (800) 321-6840

Aftermarket muffler, \$35.

Pedestal

Picnic



ART DIRECTION: JOEL SPIES • PHOTOGRAPHY: BILL ZUEHLKE • ILLUSTRATION: RON CHAMBERLAIN

Table

By Jean Bartholome

One day in the shop and you're ready to party!

If you're looking for a picnic table that's simple to build but looks great on your deck or patio, here's the design for you.

Its pedestal support ensures that no one can complain about "having the leg." The round top is fastened from below, so unlike many other tables, this one has no screws or nails visible on the top. The pedestal, joined with threaded rods, is simple to retighten if rain and sun combine to loosen it. The 48-in. dia. top easily accommodates six people.

What it takes to build

You'll need one unusual tool to build this table: a 1/2-in. dia., 12-in. or longer "ship auger" bit (see Sources, p. 76). It's used to drill the long holes through the

legs of the pedestals without wandering off course (Photo 3), and is often available at home centers for around \$15. Unfortunately, a spade bit with extension just won't do the trick.

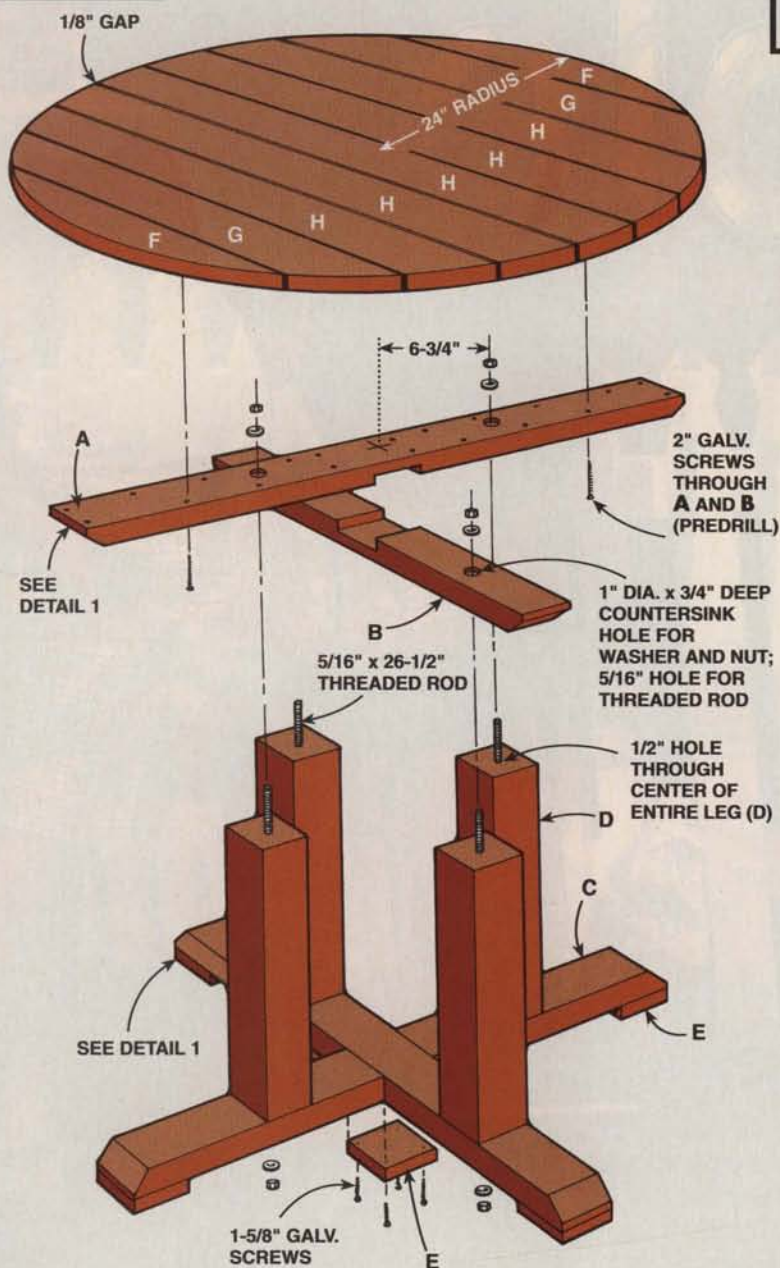
We used clear, vertical-grain redwood for our table because of its wonderful appearance, but it has gotten very expensive in recent years. You can substitute construction-grade redwood or cedar, if you pick it out carefully. If you choose pressure-treated wood for your table, be sure to use plates and cutting boards so food doesn't come into direct contact with the wood. Expect to spend \$80 for enough cedar to build the table, and more for redwood. The vertical-grain redwood we used cost \$300.

Building Tips

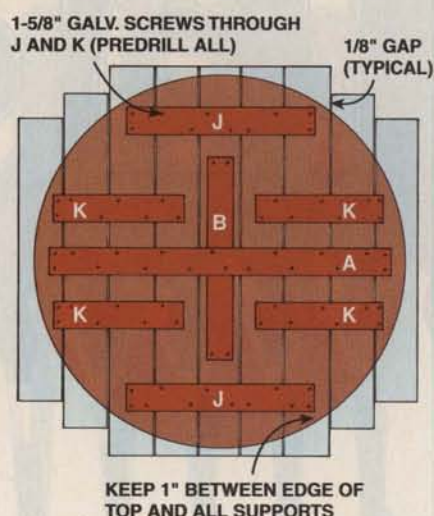
The main steps to build this table are shown in the photo sequence. After building the table, we can also offer these tips:

- When you're cutting the four pieces of 4x4 that make the pedestal legs (part D), it's more important to have the ends flat and square, and all four pieces the same length, than to make them exactly

Fig. A Exploded View



Detail 1 Underside of Tabletop



CUTTING LIST

Overall Dimensions:
48" dia. x 28-3/4" h

Part	Qty.	Dimensions
A	1	2x4 x 46"
B	1	2x4 x 26"
C	2	2x4 x 41"
D	4	4x4 x 23-7/8"
E	5	1x4 x 3-1/2"
F	2	5/4 x 6" x 30"
G	2	5/4 x 6" x 42"
H	5	5/4 x 6" x 50"
J	2	1x4 x 24"
K	4	1x4 x 18"

MATERIALS LIST

Item	Qty.
2x4 x 8'	2
4x4 x 8'	1
1x4 x 12'	1
5/4 x 6" x 12'	3
1x8 x 8' pine (for clamping jig)	1
1/2" dia. x 12" drill bit	1
2" galv. deck screws	22
1-5/8" galv. deck screws	70
5/16" x 26-1/2" threaded rod	4
5/16" nuts and washers	8
Brown caulk	1 tube
Water-repellent finish	1 qt.

Sources

Ship Auger bit, 1/2-in. dia. x 17-in. l., Irwin #47408. Available at home centers for \$12.

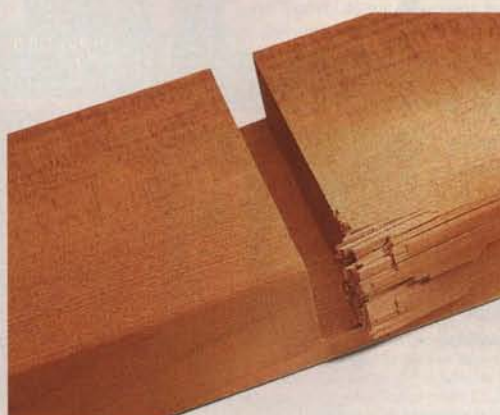
the length given in the Cutting List. So if you need to trim them a bit, go ahead.

- When you're cutting the boards for the top, be sure to cut the longest pieces (H) first, then use the remaining pieces to cut parts F and G. There are few things more frustrating than chopping up a long board, only to find you still need to get a long piece out of it.
- This tip is a chestnut, but it's useful on this project: Before you cut the threaded rod for the base, screw a nut onto it.

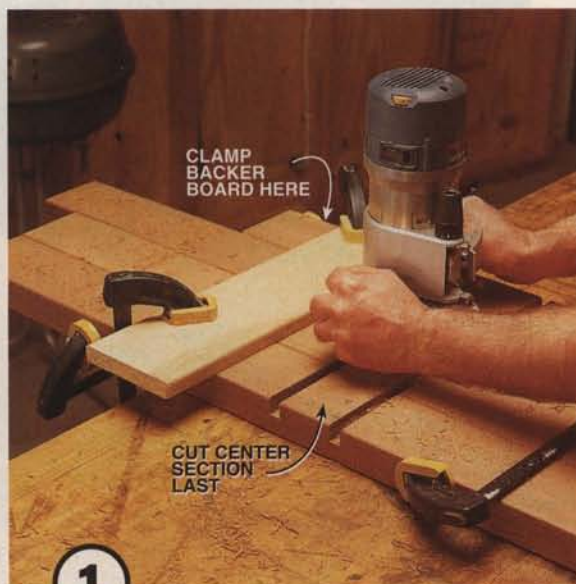
Cut the rod, file the cut end smooth and then back the screw off. It will clean up the threads nicely.

- It's a lot easier to sand the pieces of the base *before* you assemble them.
- It's fine to finish the whole table after it's assembled, but for maximum longevity, put a weather-repellent finish on all the parts before assembly, making sure the finish soaks well into the end grain. Or you can skip a finish entirely and let the table age to a natural gray color.

Oops!

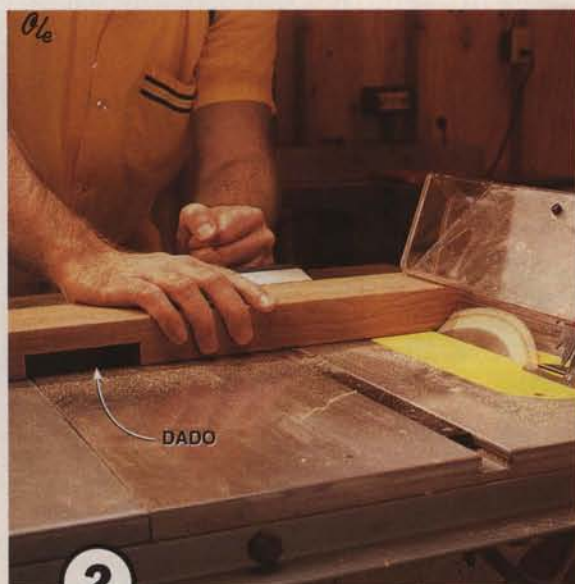


WE FORGOT to clamp a piece of scrap at the end of the boards we cut, and this is what happened—"blow out." Luckily, we were able to hide the damage. The moral: clamp a piece of scrap wood at the end of the cut as a backer board.



1

CUT DADOES in the four boards that will form the top and bottom "x" on the pedestal. Cut the dados all at once, making them half the thickness of your boards so a lap joint is formed. Cut the dado a little undersized in width, then sneak up on the final width, using a scrap of the lumber to test the fit. It should be a snug, sliding fit.



2

CUT BEVELS ON THE ENDS of the four boards. Be sure the bevels are on the same side as the dado on two of the boards, and on the opposite side from the dado on the other two. When the two "x"s are assembled, all the bevels should face up. Drill the 1-in. counterbore holes in these parts on the non-beveled sides. Then drill the 5/16-in. holes.



3

DRILL A HOLE through the center of each pedestal leg, using a 12-in. "ship auger" bit. Drill in halfway from each end, using a guide block to help the bit go in straight. I know it seems impossible that these two holes will meet, but the special design of the drill bit prevents it from wandering. It does work, even when you're drilling by eye.

Picnic Table

Tip

FOR OUTDOOR FURNITURE

it's important to finish the pieces *before* assembly. That way the finish penetrates all surfaces, especially the end grain. The only exception is areas that will be glued.



4

ASSEMBLE THE BASE

on blocks so you can hold the nuts on the bottom. Tighten the nuts from both ends. Fill the 1-in. holes on the top with brown caulk so water can't collect in the hole. Glue and screw the small feet on the ends of the base.



5

CLAMP THE TOP BOARDS

in a simple jig, bottom side up, with 1/8-in. spacers between the boards. A line drawn on the middle of each board beforehand makes them easier to align.



6

DRAW A CIRCLE

using thin wire or chain and a nail in the middle of the center board. Take the boards out of the jig, cut out the arcs with a bandsaw or jigsaw and sand the ends. Put finish on the top boards and reassemble the top, including the spacers, on the clamping jig. You'll need to reattach the end block of the jig, because the top is now smaller.



7

ATTACH THE BASE TO THE TOP.

Set the upside-down pedestal assembly onto the top boards and screw it down. Cut the cleat boards (J and K) and screw them down as well. Flip the table over, remove the spacers and you're done. **AW**

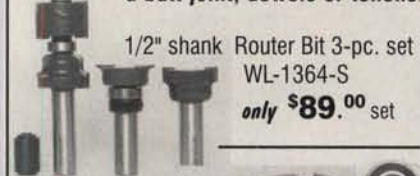
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DUST COLLECTORS

for the Small Shop

Wood dust is a health hazard, and the worst dust is the stuff you can't see. Dust collectors seem like an easy answer to the problem. But do they do the job? Most of the collectors we tested collected chips just fine, but instead of collecting the fine dust, most of them actually emitted it! We'll tell you which collectors made the grade at collecting dust, and why. We'll also show what can be done to transform a dust spewer into an effective dust collector.

There are a lot of dust collectors out there. We limited this test to machines most likely to be used in a small shop—1- to 2-hp models costing less than \$1,000.

We examined two crucial aspects of dust collection: 1. How well the machines pull in dust and chips at the source (air volume as measured in cubic feet per minute or cfm) and 2. How well the collectors contain the dust they collect.

A PRESSURE GAUGE was used to determine the air flow performance of each machine in cubic feet per minute (cfm).

CFM

Our chart includes two cfm readings; "Max" cfm and "Under Load" cfm.

To determine Max cfm we hooked up a 10-ft. section of maximum-diameter, smooth-walled duct to each machine and used clean bags.

Under Load cfm represents

the real-world performance you can expect when the collector is hooked up to a small central system with bags that have developed a dust cake. Some collectors performed much better than others under these conditions.

The central system we set up for testing consisted of 20 ft. of maximum-diameter straight pipe, a 90-degree bend, all the appropriate step-downs and 6 ft. of 4-in. flex hose with a 90-degree bend. (We assumed the system would collect from one machine at a time.) A dust cake develops on all filters and bags as soon as they begin to collect dust. The dust cake actually improves filtering performance but it also cuts down on the airflow and thus the cfm of your machine. In addition to the effects of dust cake, the cfm performance of single-stage collectors drops another 20 percent as the lower bag gets full. (This is not true of cyclones.)

Only a few
collect the most
hazardous dust.

Dust Collectors

THE FILTER IS THE MAIN THING

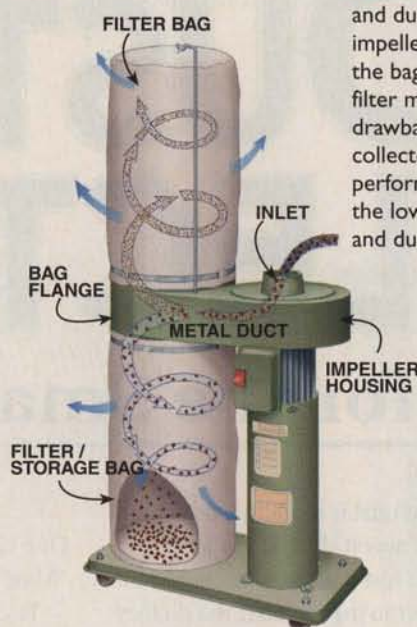
The collection bags of single-stage collectors are expected to do double duty as filters. Unfortunately, most collector bags are made from woven fabric which is not particularly good at capturing fine particles (Photo 1). The best bags are made from 16-ounce polyester felt which is a "rated" filter material designed to remove 99 percent of particles 1 micron or larger (Photo 2). But, this rating only holds true if one square foot of felt is used for every 10 cfm of airflow. In other words; if your collector is pulling 500 cfm, you need 50 sq. ft. of 16-ounce polyester felt. The Penn State machines come closest to this ideal by using felt for both the top and bottom bags (32 sq. ft. for the DC2-5 and 22 sq. ft. for the DC1B-XL). (Aftermarket bags designed to handle 500 cfm are available from Oneida Air Systems; see Sources, page 85 and Product Review page 88.)

A few collectors get it half right with a felt top bag. But these collectors have a plastic bottom bag, which filters no air, leaks at the bag flange (see Photo 4) and is a nightmare to attach.

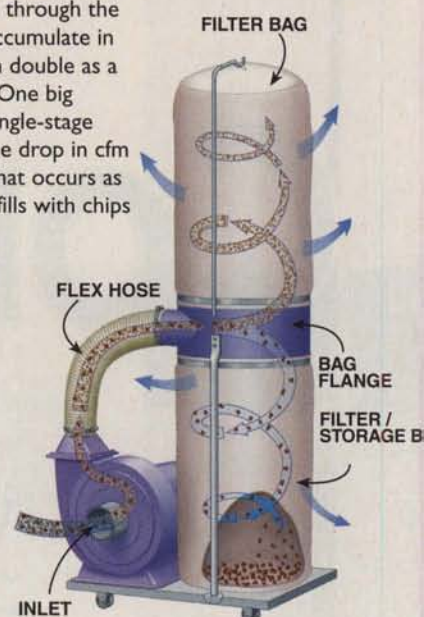
Of all the collectors that come with a felt bag(s), only Felder and Penn State use double or triple stitching on all seams. The others used single stitching to attach the round piece at the top of the bag. Single stitching can be stressed by the air pressure in the bag and open up escape routes for the dust-laden air. (See Sources, page 85, for suppliers of aftermarket bag upgrades with double stitching.)

Oneida Air Systems cyclone collector is unique in that it uses a pleated filter cartridge instead of a bag. The cartridge is made of non-woven, spun-bonded polyester that outperforms even 16-ounce polyester felt.

IN A SINGLE-STAGE COLLECTOR the chips and dust travel through the impeller and accumulate in the bags, which double as a filter medium. One big drawback to single-stage collectors is the drop in cfm performance that occurs as the lower bag fills with chips and dust.



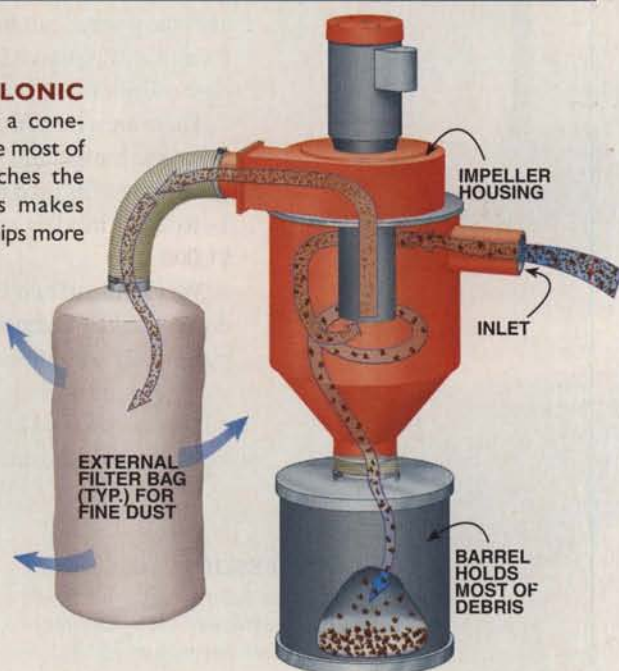
1-HP, SINGLE-STAGE COLLECTORS have smaller bags that require more frequent emptying. But their small size is an asset in a shop where floor space is at a premium. The impeller housing is connected directly to the bag flange via a short metal duct. We found this design to be far less prone to dust leaks than the larger 1-1/2-hp and 2-hp models with a flex-hose attachment. The 1-hp collectors perform best when connected directly to a machine.



1-1/2 AND 2-HP SINGLE-STAGE COLLECTORS are better able to handle the cfm demands of a small central system. The Delta, Jet and Penn State 1-1/2-hp collectors provide the most cfm for the buck when compared to the 2-hp models. Having a large, 6-in. inlet dia. appears to be more important than horsepower when it comes to cfm performance. The 1-1/2 hp can also run on any standard 20-amp household circuit while the 2-hp models need special wiring.

A TWO-STAGE CYCLONIC COLLECTOR

employs a cone-shaped canister to separate most of the debris before it reaches the impeller and filter. This makes removal of the dust and chips more efficient and convenient. Also, because the filter on a two-stage cyclone does not act as a container for chips, there is no subsequent drop in the cfm performance as the barrel fills with debris.





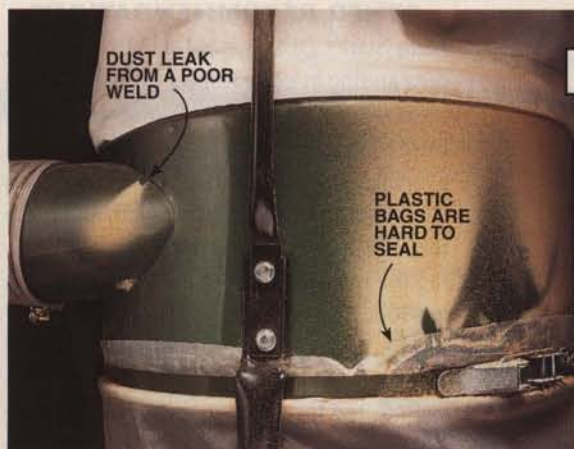
1 WOVEN BAGS are poor filters. The pinholes you see here allow the most hazardous fine dust to blow right back into your shop.



2 FELT FILTERS are comprised of dense layers of polyester fibers, which trap most of the finest dust, while letting air pass back into the room.



3 ATTACHING A BAG after it has been removed for emptying is a fact of life with single-stage collectors. Getting the bag off isn't so tough, but putting it back on can be a real challenge. We found adjustable spring clamps provide the best combination of seal and ease of use for single-stage collectors.



4 DUST LEAKS were common around bag flanges and duct welds. Plastic bags are a pain in the sitter to seal even when using spring clamps. Tip: A couple of 20-in. bicycle inner tubes can be stretched around the bag flange to help form a good seal for the bags. Silicone caulk can be used to seal any duct leaks.

IMPELLERS

The collectors we tested had impellers made of steel, cast aluminum and plastic. Aluminum and plastic impellers are safest because they won't produce sparks when struck by metal accidentally vacuumed into the collector. Fires started this way are rare but be mindful that there is a risk.

RECOMMENDATIONS

EDITORS' CHOICE

The Oneida 1.5 hp Cyclonic Collector is our Editors' Choice. Its unique design replaces the external bag with a high-quality, internal pleated filter. This not only saves floor space, but unlike single-stage collectors, the Oneida can use the most efficient fan design possible because it's required to handle only filtered air. The Oneida is the only machine that seems to do everything right. It performs well Under Load (see chart), its high-efficiency filter captures the fine dust and is easy to clean, rubber gaskets insure against leaks, the barrel is far easier to empty than any bag system and it uses a high-quality, American-made motor. It's expensive (\$695), but once you figure in the bag upgrades and reduced efficiencies of single-stage collectors, the Oneida makes sense for woodworkers who spend a lot of time in the shop.

BEST BUY

Our Best Buy award goes to the Penn State DC1B-XL. A real stand-out among the single-stage collectors, the DC1B-XL is an excellent value for \$210. If you're on a budget and want a collector to use on one machine at a time or in a small, carefully designed central system, the Penn State is a great choice.

Dust Collectors



ONEIDA AIR SYSTEMS 1.5 HP CYCLONIC COLLECTOR (\$695) is clearly the best collector for a central dust collection system. It brings the superior engineering of industrial collectors to the small shop.



PENN STATE INDUSTRIES 1-HP, SINGLE-STAGE COLLECTOR comes with 16-oz. felt bags, a 5-in. inlet, is powerful for its size and had no visible leaks. It's our Best Buy at \$210.

SINGLE-STAGE	1 HP	Brand / Model	Price	Inlet Dia.	CFM		BAGS and FILTERS	
					Max.*	Under Load†	Material	Spring Clamps
		Bridgewood BWO15A	\$159+	4"	455	350	F/P	Y
		Delta 50-840	\$229	4"	440	365	W	Y
		General 10-010	\$275	4"	410	350	F/W	Y
		Grizzly G1028	\$282+	4"	515	410	W	N
		Jet 650	\$229	4"	455	365	W	Y
		Penn State DC1B-XL	\$210+	5"	665	420	F	Y
		Reliant NN720	\$179+	4"	480	350	W	N
		Ridgid DC2000	\$249	4"	380	290	W	Y
SINGLE-STAGE <th rowspan="5">1-1/2 HP</th> <td>Sears 29978</td> <td>\$300</td> <td>4"</td> <td>410</td> <td>350</td> <td>W</td> <td>Y</td>	1-1/2 HP	Sears 29978	\$300	4"	410	350	W	Y
		Sunhill UFO-90	\$159+	4"	490	380	W	N
		Woodcraft	\$215+	5"	665	345	W	Y
		Woodtek 802-124	\$229+	4"	455	330	W	Y
		Delta 50-850	\$299	6"	895	495	W	Y
	2 HP <td>Felder AF-10</td> <td>\$559+</td> <td>4.5"</td> <td>420</td> <td>345</td> <td>F/P</td> <td>N</td>	Felder AF-10	\$559+	4.5"	420	345	F/P	N
		Jet DC-1100	\$300	6"	860	495	W	Y
		Penn State DC2-5	\$300+	6"	860	610	F	Y
		PowerMatic 073	\$350+	2-4"	560	290	W/P	Y
		Bridgewood 002A	\$259	5"	770	515	F/P	Y
ONE	1-1/2 HP	General 10-110	\$435	5"	825	515	F/P	Y
		Grizzly G1029	\$292+	5"	825	485	W	N
		Jet DC-1200	\$400	6"	1025	555	W	Y
		Reliant NN-820	\$299+	5"	790	420	W	N
		Seco UFO-101	\$288	5"	790	485	W	N
	2 HP <td>Sunhill UFO 101</td> <td>\$275+</td> <td>5"</td> <td>790</td> <td>515</td> <td>W</td> <td>N</td>	Sunhill UFO 101	\$275+	5"	790	515	W	N
		Woodcraft	\$350+	5"	825	485	W	Y
		Woodtek 805930	\$399+	5"	770	455	W	Y
		Oneida Cyclone	\$695+	6"	745	702	SB	NA
		Penn State Tempest	\$500+	5"	420	381	F	NA

Cfm Requirements

TOOL	cfm
15-in. Planer	500
Radial-Arm Saw	450
Drum Sander	450
6-in. Jointer	400
12-in. Planer	350
Tablesaw	350
Bandsaw	350
Drill Press	350
Floor Sweep	350
Disc sander	350

OTHER RECOMMENDATIONS

Penn State's DC2-5 is a 1-1/2 hp collector, outstanding in every respect from felt bags to cfm Under Load. Its only failing was a leaky fitting where the exhaust port changes from a square to a round duct. A little judicious caulking would solve the problem and make the DC2-5 an excellent choice for those seeking the most cfm for the buck. It's a bargain at \$300.

The Delta 50-850, the Jet DC-1100 and 1200 were also excellent performers with well-sealed housings and ductwork. Their only failing was the woven bag material that came with the collectors. You'll need to spend an extra \$60 to \$100 to upgrade the bags to felt (see Sources, at right). **AW**

Brand	MOTORS		Size WxLxH	Impeller	Dust Leak	Comments
	AMPS	Volts**				
Bridgewood	16/8	115/230	16x29x56	Steel	Y	Plastic bag is difficult to attach.
Delta	9/4.5	115/230	16x29x60	Steel	N	Minimal setup.
General	7	115	16x29x60	Alum.	Y	Includes handle for mobility; bag clamp sewn into bottom for easy attachment.
Grizzly	14/7	115/230	22x38x76	Steel	Y	Steel-strap bag clamps make for a tight seal but require a screwdriver to adjust.
Jet	11/5.5	115/230	14x27x57	Steel	Y	Bag clamps sewn into each bag for easy attachment; no inlet grate prevents clogging but exposes impeller to damage from large debris.
Penn State	16/8	115/230	17x29x59	Steel	N	Large-size bags; convenient handle; window on bottom bag.
Reliant	11.5/5.5	115/230	14x28x53	Steel	Y	Minimal setup; cinch-strap bag clamps don't seal well; no inlet grate prevents clogging but exposes impeller to damage from large debris.
Ridgid	7	115	16x28x60	Steel	Y	Shop vacuum hose adapter; small top bag; quick-change bottom bag; handle for mobility.
Sears	7	115	16x28x60	Steel	Y	Quick-change bottom bag; small top bag; handle for mobility.
Sunhill	12/6	115/230	14x27x55	Steel	Y	Cinch strap bag clamps don't seal well; no inlet grate prevents clogging but exposes impeller to damage from large debris.
Woodcraft	16	115	16x29x57	Steel	Y	Easy setup.
Woodtek	16/8	115/230	15x29x60	Alum.	N	Easy setup; well-sealed housing was leak-free.
Delta	12/6	115/230	21x37x83	Steel	N	Easy setup; well-sealed housing was leak-free.
Felder	7.2	230	16x31x78	Steel	Y	In-line casters don't swivel; designed for 5-in. flex hose attachment; loud; plastic bags are extremely difficult to attach.
Jet	11/5.5	115/230	22x36x79	Steel	N	Easy setup; quick-change bottom bag.
Penn State	18/9	115/230	20x37x73	Steel	Y	Quiet, incomplete manual led to difficult setup; window on bottom bag.
PowerMatic	15/7.5	115/230	18x33x73	Steel	Y	Gaskets on bag housing create a good seal; incomplete manual led to difficult setup; handle for mobility; plastic bag is difficult to attach.
Bridgewood	24/12	115/230	22x37x76	Steel	Y	No instructions for converting to 115V; power cord is undersized for 115V application; plastic bag is difficult to attach.
General	9	230	23x37x76	Alum.	Y	Well-sealed, square metal duct between bag housing and impeller housing was leak-free; plastic bag is difficult to attach and leaked at attachment flange.
Grizzly	24/12	115/230	23x38x76	Steel	Y	Steel strap bag clamps make for a tight seal but require a screwdriver to adjust; power cord is undersized for 115V application.
Jet	15	230	21x38x79	Steel	N	Well-sealed housing was leak-free; manual not up to Jet's normal standards.
Reliant	24/12	115/230	23x38x76	Steel	Y	Easy setup; power cord is undersized for 115V application.
Seco	12	230	23x38x76	Plastic	Y	Easy setup.
Sunhill	24/12	115/230	23x38x77	Steel	Y	Easy setup; power cord is undersized for 115V application.
Woodcraft	24/12	115/230	23x38x77	Steel	Y	Easy setup; comes without a plug; power cord is undersized for 115V application.
Woodtek	24/12	115/2330	22x37x77	Alum.	N	Easy setup; well-sealed housing was leak-free; power cord is undersized for 115V application.
Oneida	17.2/8.6	115/230	24x24x84	Plastic	N	Quiet; includes barrel and fittings; mobile stand available; manual difficult to follow; comes without a power cord. Free central system design service.
Penn State	18/9	115/230	20x20x90 +bag	Steel	Y	Quiet; good manual; does not include barrel; mounting bracket needs to be constructed by owner (requires one sheet of plywood).

+ Shipping and handling not included.

* With clean bags and 10 ft. of straight pipe.

** Motor voltages vary from 110/220 to 220/240.

W=Woven fabric

F=Felt

F/P=Felt top/plastic bottom

SB=Spun-bonded filter media cartridge

† With dust-caked bags and a small central system.

SOURCES

Wilke Machines of
Bridgewood, (800) 235-2100

Craftsman (Sears), (800) 377-7414

Delta, (800) 438-2486,
www.deltawoodworking.com

Felder, (800) 572-0061
www.felderusa.com

General, (514) 326-1161,
www.general.CA.com

Grizzly, (800) 523-4777,
www.grizzlyindustrial.com

Jet, (800) 274-6848

Oneida Air Systems, (800) 732-4065,
www.oneida-air.com

Penn State Industries, (800) 377-7297,
www.pennstateind.com

Powermatic, (800) 248-0144

Ridgid, Home Depot stores
(888)-743-4333
www.ridgid.com

Seco, (888) 558-4628

Sunhill, (800) 929-4321

TrendLines (Reliant), (800) 877-7899,
www.trend-lines.com

Woodtek (Woodworker's Supply), (800) 645-9292

FILTER (BAG) UPGRADES

American Fabric Filter Co. (custom felt bags),
(800) 367-3591, sift@aol.com

Oneida Air Systems, Inc., (800) 732-4065,
www.oneida-air.com

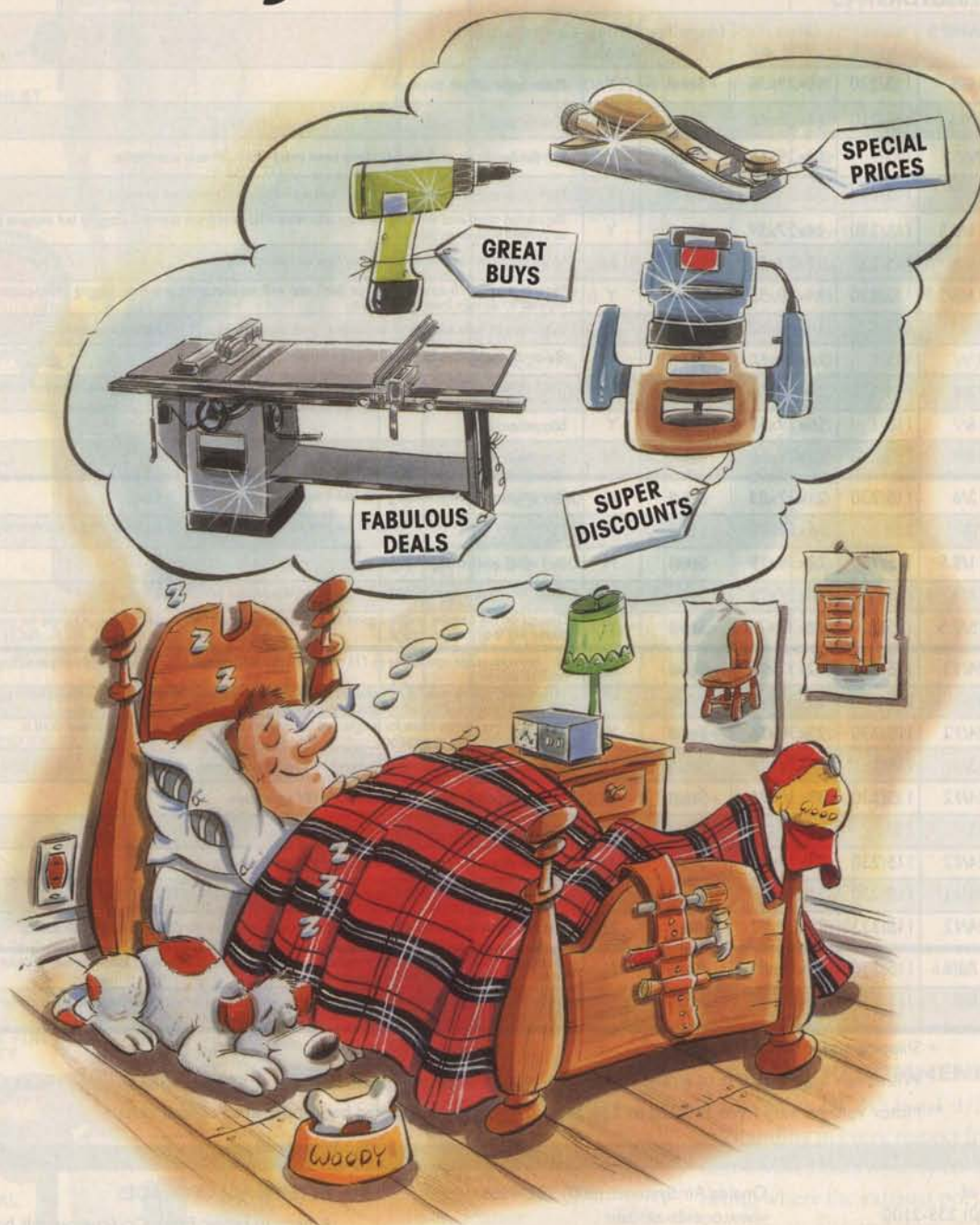
Penn State Industries, (800) 377-7297,
www.pennstateind.com

FOR MORE INFORMATION

Woodshop Dust Control, by Sandor Nagyszalanczy, Taunton Press, 1996, (800) 243-7252, \$20.

Dust Collection Basics: Recommendations for Home Shop Systems, Woodstock International, Inc., 1995, (800) 840-8420, P.O. Box 2309, Bellingham, WA 98277, #W1050, \$6.

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Fri., 9:00-11:00am; Sat., 9:00-11:00 am

Sun., 11:30-1:30pm

This butternut wall-hung coat rack appeared in AW issue, #73. Make one at the show and use it to hang your favorite fedora. Capacity: 12. Cost including all materials: \$75.

Make a Hinge Mortising Jig

Carol Reed

Fri., 9:00-11:00 am; Sun., 11:30-1:30

Make and keep a great jig for routing hinge mortises in your boxes and cabinets. You will also get a set of hinges and learn to install them using the jig. Capacity: 20. Cost including all materials: \$60.

Make Your Own Clamps

Fred Matlack

Fri., 2:00-4:00 pm; Sat., 9:00-11:00 am

Sun., 2:00-4:00 pm

Handmade from wood and aluminum. It will last forever. Take the pair home to use on your next project. Capacity: 20. Cost including all materials: \$60.

Make a Mahogany Jewelry Box

Frank Klausz

Fri. & Sun., 2:00-4:00 pm

Learn to layout and cut dovetails by hand. Use tools sharpened by Frank, and then complete the jewelry box at home. Capacity: 12. Cost including all materials: \$75.

Make the Jig that Makes Jigs

Carol Reed

Sat., 2:00-4:00 pm

Customize a plastic marking gauge to suit your router. Then, take the gauge home and use it in your shop to make other new, very accurate woodworking jigs. Capacity: 20. Cost including all materials: \$65.

Sharpen and Use a Cabinet Scraper

George Vondriska

Sat., 2:00-4:00 pm

Learn how to properly sharpen and burnish a cabinet scraper, and how to use it for smoothing woods. Take home the scraper and burnisher. Capacity: 15. Cost including all materials: \$60.

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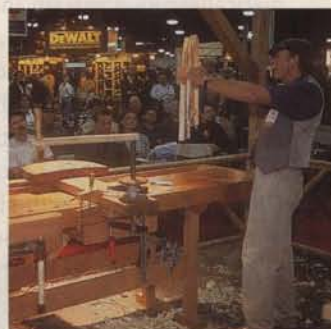
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to *Fine Tool Journal* and "the antique tool authority". Bring your old tools to the show.



Sharpening
Paul Anthony
Sun., 11:30-1:30 pm
Learn how to put a truly keen edge on your
chisels and plane irons. Bring a couple tools for
a serious tune-up. Take home a sharpening aid.
Capacity: 12. **Cost including all materials: \$60.**

SEMINARS

\$5 Each! Tickets available only at box office.

Stain Without Pain
Michael Dresdner
Fri. and Sat., 9:00 am-10:30 am
You'll learn how to mix colors, make dyes,
choose and apply the correct stains even-
ly—without blotching—on any wood in any
situation.

Woodworking Fundamentals
Frank Klausz
Fri., 11:30 am-1:00 pm; Sat., 1:30-3:00 pm
Learn how to select and understand tools, mat-
erials and machines. Choose projects and join-
ery you can handle. Allow for wood movement.

Tablesaw Basics, Fred Matlack
Fri., 11:30-1:00 pm; Sat. 3:30-5:00 pm
Learn how to use it safely and efficiently
for ripping, crosscutting, dadoing, and
other essential woodworking operations.

Making and Fitting Cabinet Doors
Paul Anthony
Fri. & Sat., 1:30-3:00 pm
This design tour of cabinet door styles will
include a demonstration of construction and
installation techniques.

Getting Started with your Router
Carol Reed
Fri., 1:30-3 pm; Sat. 11:30-1:00 pm
For anyone new to routing. Learn how to rout
safely and successfully. Discover which
routers, bits, and aftermarket jigs and fixtures
will work best for you.

Finishing Secrets
Michael Dresdner
Fri., 3:30-5:00 pm; Sat., 3:30-5:00 pm
Learn how to select the best finish for the job.
Understand wood stains and use them cor-
rectly. From surface preparation to final pol-
ish, you'll know what it takes to get a profes-
sional finish.

Tablesaw Tips and Tricks
Andy Rae
Fri., 3:30-5:00 pm; Sat., 11:30am-1:00 pm
Tired of wobbly cuts and wasted wood?
Want to know the safe way to saw?
Learn 4 savvy steps, from simple tune-up
procedures and safe sawing methods,
to jigs that improve your skills and
accessories the pros use.

The Perfect Finish
Michael Dresdner
Sun., 2:00-3:30 pm
Learn how to choose the perfect finish for
each of your projects, and the best ways
to apply it too. Learn the basics and the
tricks that pros use to get flawless finishes.

Product Reviews

Better Bags for Dust Collectors

Is your dust collector sluggish, with barely enough power to do the job? When you turn on your dust collector, do you see a cloud of dust blowing through the filter bags? If so, consider an upgrade to extra-large polyester felt bags. This material gives you the best combination of filtration and air flow. Some seams on these better bags are double and triple stitched which dramatically cuts down on the dust that escapes through the seams.

The bag's extra surface area also improves how well your collector pulls air. Think of it like this; if the air can't flow out of your collector, it can't flow in. Upgrading to bags with significantly more surface area allows your collector to pull in more air (and dust) from your tools. The bags from Penn State have another cool feature; a window in the lower bag so you can see when it's full.

Depending on the collector you're buying bags for, expect to pay \$50 to \$100.

American Fabric Filter, (800) 367-3591.
Oneida Air Systems, (800) 732-4065.
Penn State Industries, (800) 377-7297.



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Get more air flow and better filtration with upgraded bags. Triple stitching (left) keeps seams tight.

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Product Reviews

Better Collector Fans

In addition to upgraded dust bags, you can dramatically improve the performance of your dust collector with a new impeller.

The impeller is the fan wheel in your collector that spins and creates the air flow needed to pick up dust. Oneida Air Systems' Aluminum Fan Wheel (\$107) retrofits to 2-hp dust collectors, and improves your collector in several ways.

- Oneida's impellers are statically and dynamically balanced. They run truer than your original impeller and should extend the life of your motor.
- The fins have greater surface area than most original impellers, so they help your collector move more air.
- Oneida's impellers are aluminum, so, unlike steel impellers, they won't spark if a chunk of metal gets pulled into your collector. Sparks and dust are never a good combination.

All of these features combine to increase air flow and static pressure by 30 to 80 percent. In testing we found that



the more you load your dust collection system, the more you benefit from Oneida's impeller. So, if your collector is connected to one machine

with one 10-ft. hose, you won't see much difference. But if you've piped your collector to lots of machines, you can see a dramatic difference in its efficiency.

The impeller is 12-in. in diameter and 4-in. deep. Be sure it'll fit the housing on your collector. The 12-in. dia. doesn't seem to be a problem, but some machines may not be able to accept the 4-in. depth.

Oneida Air Systems, (800) 732-4065.
www.oneida-air.com

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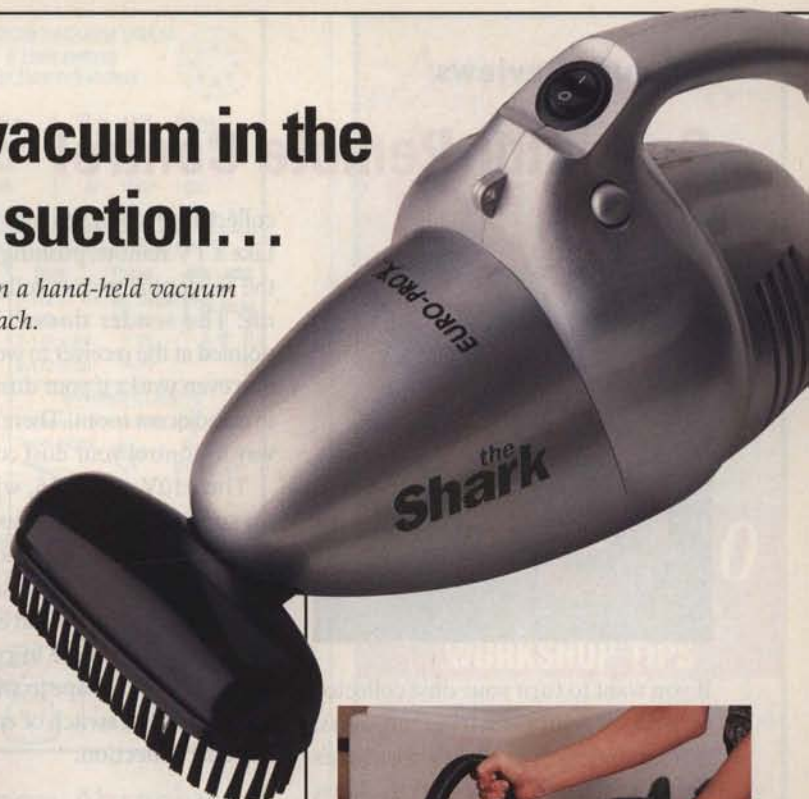
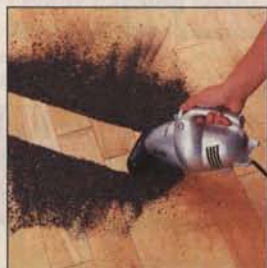
The Euro-Pro Shark provides the power of an upright in a hand-held vacuum and sucks dirt from places ordinary hand vacs can't reach.

by Sandra Brosberg

I'm a neat freak. I admit it. But with a cat, two dogs and two children, it's tough to keep everything clean. Everytime I turn around, there's a new mess on the kitchen floor, the living room carpet or the bathroom tile. Whenever I spotted a mess, I had to go to the closet and drag out the upright vacuum cleaner. Thank goodness I discovered the Shark Turbo hand vacuum! With seven times the suction of ordinary hand-held vacuums, it gives me the cleaning power of a top-of-the-line upright.

Unlike any other. The Shark Turbo hand vac easily outperforms all others. With its unique 600-watt motor, it offers the most powerful suction available in a hand-held vacuum. It sucks dirt from corners, crevices and other difficult areas that ordinary hand vacs miss. It is powerful enough to pull dirt from a computer keyboard yet portable enough to use on stairs. It's perfect for cleaning cars, boats and RVs. Why drive to the gas station and pump quarters into an industrial vacuum when the Shark Vac can give you similar results in your own driveway?

No bag, no mess. Its convenient dustcup design is another great feature—no more hassling with messy replacement bags! When the dustcup is full, simply pull out the container and empty the filter. Then, you simply rinse the filter in cold water



Lightweight and versatile, the Shark is the perfect tool for cleaning your entire house—from automobile interiors to wooden floors!

and let it dry. Just snap it back in and you're ready to clean again. You'll never have to buy bags again.

Ergonomic design ensures ease of use. The Shark comes complete with two accessory brushes and a flexible hose to provide the ultimate in cleaning versatility. Its lightweight design is easy to hold and maneuver around even the tightest of corners. Plus, a convenient shoulder-strap makes cleaning a breeze! Once you've seen the powerful results you get from this amazing cleaner, you can leave that upright in the closet. It gives you the portability and practicality of a hand-held vacuum with the powerful suction of vacuum cleaners many times as large.

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Unique 600-watt motor makes it seven times more powerful than other hand vacs

the Shark Turbo hand vac leaves your home. The Shark comes with a one-year manufacturer's limited warranty and Comrad's exclusive risk-free home trial. If you're not fully satisfied, return it within 90 days for a complete "No Questions Asked" refund.

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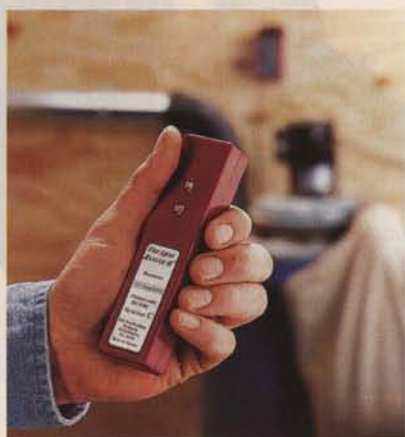
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Product Reviews

Collector Remote Control



If you want to turn your dust collector on and off with no wiring, no muss, no fuss, and most of all little cost, here's the answer. Hi-Yo, Silver—It's the Long Ranger! (Sorry, we couldn't resist.)

This device consists of two parts; a sender and a receiver. The receiver gets plugged into an outlet and your dust

collector gets plugged into the receiver. Like a TV remote, pushing a button on the sender turns your collector on and off. The sender doesn't have to be pointed at the receiver to work. The system even works if your dust collector is in an adjacent room! There's no simpler way to control your dust collector.

The 110V unit, \$65, will handle a maximum load of 1.5 hp. The 220V unit, \$75, will handle a load up to 2 hp.

You know how easy it is to lose a remote control, so buy an extra one for \$29. For the ultimate in convenience, use double-faced tape to stick a remote near the on/off switch of each tool that has dust collection.

Woodcraft Supply, (800) 225-1153;
Tool Crib of the North, (800) 635-5140.



Super Scoop

My final battleground for dust is the floor. My weapons? A push broom and dust pan. But the dainty dust pans I steal from the kitchen don't cut it. If, like me, you need the mother of all dust pans, here it is—the new Shop-Scoop from Scoop Works.

The back is enclosed, so when you overfill it, stuff won't fall out. The handle makes it easy to hold onto, even when it's full of heavy stuff. Shop Scoop works great on sawdust piles and liquids.

\$15 from Scoop Works, (800) 526-0906.

www.scoopworks.com

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Note: * = thru 320 grit * Now in 5 hole pattern *

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Jet's New Air Scrubber

No matter how good your dust collection may be, there are always "the ones that got away." Those stray dust particles determined to float around the air and end up in your lungs (or in a can of varnish!). That's where an air scrubber comes in. Like the name says, it scrubs dust particles from the air in your shop.

Jet's AFS-1000 scrubber offers a lot of features:

- A 5-micron outer filter and 1-micron inner filter.
- A 3-speed motor that provides 450, 550 or 650 cubic feet per minute (cfm).
- A timer that can shut the scrubber off after two, four or eight hours.
- A remote to control the whole deal. Turn it on and off, set the speed and set the timer. Because most scrubbers are hung from the ceiling, making them hard to get to, the remote makes sense.

If all this sounds good but you need a bigger unit, look for Jet's new AFS-2000. It should be available in July 2000. It'll have all the features of the AFS-1000, but moves air at 800, 1000 or 1300 cfm. In addition, the AFS-2000 will take charcoal or electrostatic filters, providing even better air cleaning. At the time of this writing, the design is being finalized, so features and pricing may change.

How do you know what size scrubber you need? Buy one that recirculates the air in your shop six to 12 times per hour. Here's how to run the numbers: First calculate the volume of your shop in cubic feet. Divide this number by

the cfm of the scrubber you're considering. The answer is how many minutes it'll take for one air exchange. Five minutes means 12 exchanges per hour.

Buy the AFS-1000 for \$235; the AFS-2000 for around \$450.

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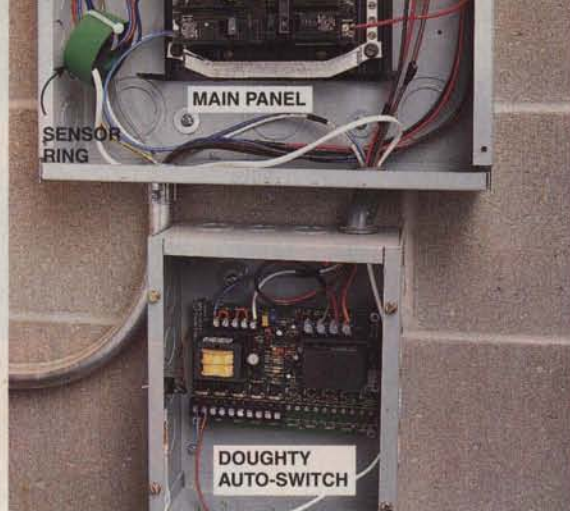
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Product Reviews

Doughty Auto-Switch

For the ultimate in dust-collection convenience, try this. It's a switch that turns your dust collector on and off as you switch on and off your tools. Doughty Electronic Systems' auto-switch (\$225) gets wired into your circuit breaker panel. Little doughnut-shaped sensors surround wires that go to tools that need dust control. When you turn on the tool, the sensor detects the flow of electricity and sends power to your dust collector.

Doughty's sensors can detect a power draw as low as 1/4 hp and as high as 300 hp. Your collector comes on three to five seconds after the tool so you don't overload your panel. The collector continues to run one minute after the tool is shut off so the pipes are cleared of



dust. This also lets you get to another tool and turn it on without making the collector cycle on and off. You can increase or decrease the delay on start up and shut down. The only disadvantage is if you plug an electric drill into the same circuit as your jointer, using the drill will make the collector run.

To connect the Doughty switch you'll have to open up your circuit breaker box and thread the appropriate wires through the sensors. You'll also need to run leads to your dust collector. You'll

need electrical expertise or the services of a licensed electrician. If you have trouble, call Doughty and they'll walk you through the installation. The switch works with 120V or 240V collectors, single or three phase. It comes with one sensor, which can handle three to four machines, depending on their amperage draw. Extra sensors

are \$37.50 each. Get a manual-over-ride switch for \$20 if you want to run the collector for something not wired into the auto-switch.

Doughty Electronic Systems,
(870) 772-5849,
www.cable1.net/samdoughty

A very similar switch, not tested by us, is available from Dan Trimble and Co. It sells for \$250, including a manual-over-ride switch. Call (724) 357-8555. **AW**

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Finishing Tips

Instant Dewaxed Shellac

Take the wax out of shellac and you've got a great sealer that's compatible with most other finishes. It's best to get this "dewaxed" shellac as dry flakes that you mix with denatured alcohol. Usually you have to order the flakes through the mail. But in a pinch, you can decant (draw off one layer of liquid from another) dewaxed shellac from the canned shellac you'll find at the hardware store.

Bring a clean can or lidded jar with you to the store. With the okay of a salesperson, carefully carry a can of shellac to the counter and open it. If the liquid looks creamy, like cappuccino, put the can back and try another one. A good candidate for decanting will contain a clear, deep amber-colored liquid with a creamy-colored layer



THINNED WITH
DENATURED ALCOHOL

of residue at the bottom. This indicates that the wax has settled out. You can decant between two and three cups of dewaxed shellac from a quart of liquid shellac. After decanting, pay for the shellac and ask the clerk to dispose of the can with the waxy residue.

Paul Kantor



1 DECANT DEWAXED SHELLAC

from a can at the hardware store. Find a can in which the wax has settled to the bottom and pour off the pure shellac from the top.

2 THIN THE DECANTED SHELLAC

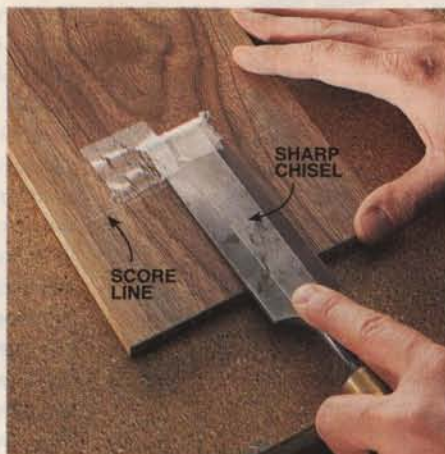
with an equal amount of denatured alcohol for use as a sealer.

Here's good news! Starting this August, Wm. Zinsser & Co., Inc. will market a premixed, liquid dewaxed shellac. Watch for it under the name "Bullseye Seal Coat" wherever Zinsser products are sold.

Test for Adhesion

How do you make sure that old can of finish will work with the new stuff you want to use as a top-coat? Lay one coat of finish over the other, in the order you plan to use them. Allow each coat to dry before proceeding. Then score the surface across the grain and see if you can lift one layer off the other with a sharp chisel. If you can, don't use them together.

James Dahlgren



Got A Tip?

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

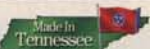


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Finishing Tips

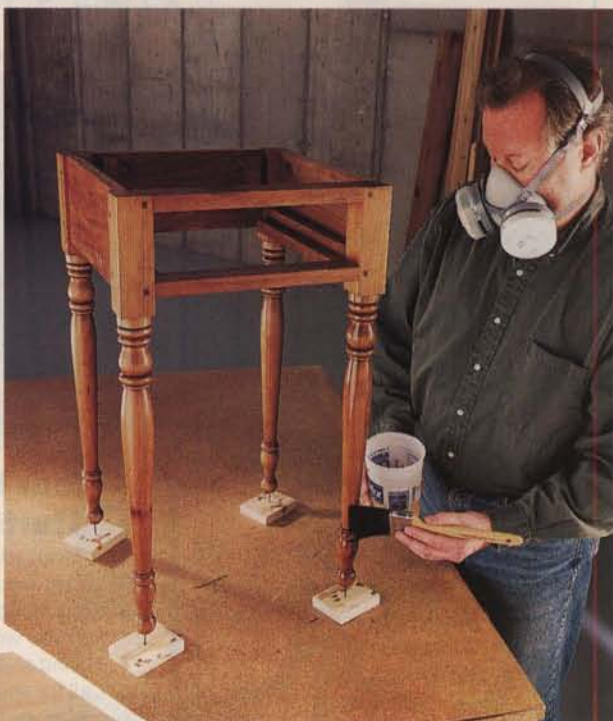
Levitators

Brushing around the bottom of furniture legs is awkward. It's hard to see what you're doing, so it's easy to miss spots or lay on a coat that's too heavy. It's also hard to keep your brush from touching the workbench. If your brush gets contaminated, your finish can be ruined.

Simple-to-make "levitators" make this job much easier. By raising your workpiece off the workbench, they give more room to maneuver the brush. A slight tap on the top of each leg sets the screw points—pick up the workpiece and the levitators remain attached. This makes it easy to reposition the piece while you're working on it or move it out of the way when you're done.

Drywall screws work best because they have very sharp points. (Standard wood screws don't work.) Levitators are handy to have around, so make a bunch. Just stick them in a piece of rigid foam insulation board for storage so you won't get jabbed by the points!

Kevin O'Donnell



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Perfect form—every time! Torso Track 2 is so simple to use, it's almost foolproof. Just glide slowly back and forth across the track and you're attacking all of the abdominal muscles. Better yet, you are also strengthening and toning your chest, shoulders and back. With Torso Track 2 you are constantly using your abdominals throughout the entire range of motion. No wasted effort or time—just results.

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Built to last. Torso Track 2 is quality made with features you'd expect on machines costing hundreds more. The solid steel frame guarantees years of use while the padded handles and knee pad offer exercise comfort. The Torso Track 2 is lightweight, portable and about half the size of an ironing board. It fits perfectly under the bed, behind the sofa or in the closet.

Best of all, Torso Track 2 is endorsed by Suzanne Sommers. Known throughout the world for her dedication to fitness, Suzanne Sommers knows a fitness breakthrough when she sees one. "I've never experienced such an easy workout and still gotten such fabulous results," says Suzanne. With Torso

Track 2, Suzanne found the ultimate way to tighten and tone her abdominals in just minutes a day. Isn't it time you discovered the potential Torso Track 2 has for you?

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Finishing Tips

Warm the Look of Waterborne Polyurethane

Waterborne polyurethane finishes often make wood look parched (at right, top). Because they don't change the wood's color the way oil-based finishes do, the wood still looks raw. Tinting waterborne poly with amber-colored dye adds the warm color that's missing (at right, bottom).

It's easy. You can use either water- or alcohol-based dye. The dye is available as a dry powder or pre-mixed. If you choose the powder, mix it with water or alcohol following the instructions on the package. Add a teaspoon of the mixture to a quart of finish. Never add dry powder directly to the polyurethane. If you use a premixed liquid concentrate, add about five drops to a quart of poly. Experiment on scrap to get the right color intensity. Just

remember—you'll want to apply three or four coats of waterborne poly for adequate protection, and each tinted coat will add a little color, so use the dye sparingly.

Adding color this way has another big advantage—it's blotch-free. Unlike stains, which can cause blotches when they soak in, waterborne poly forms a film on top of the surface. No soak, no blotch. **AW**

Kelly Schrenk

Sources

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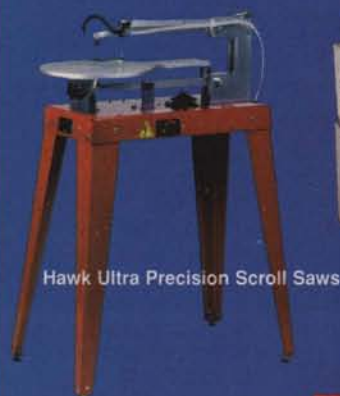
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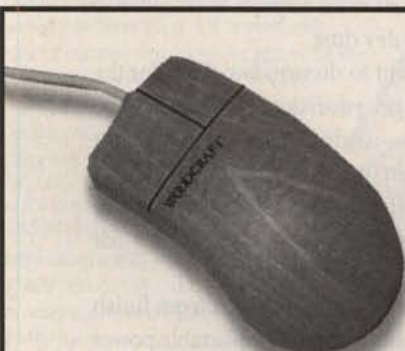
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Question & Answer

Health Hazards of Wood Dust

Q. I've read that OSHA is tightening up restrictions on wood dust in commercial shops because of possible links with cancer. Is wood dust a potential health problem for a weekend woodworker?

Fred Russo

A. There is some research to suggest that decades of exposure to fine wood dust can contribute to nasal and lung cancer. These cases are among factory workers who breathed dust day in and day out for many years. For the weekend woodworker, however, allergies are a much more likely problem. Allergies can develop quickly, even among occasional wood-

workers, and the symptoms worsen with increased exposure.

Besides the common sneezing attacks, allergic reactions can take the form of skin rashes, bronchitis and even asthma. The woods most likely to lead to reactions are red cedar, oak, redwood, mahogany, walnut and many tropical species. However, all wood dusts are potential allergens, and the fine dust—10 micron and smaller—is the worst offender. If you've ever talked to a hard-core woodworker who's been forced to abandon his shop forever because of allergies, it will make you a true believer in dust control.

Besides the health issues, we encourage dust control because dust is a fire hazard. Sparks can occur from faulty wiring or a grinder, dust can settle on hot light fixtures, plus there's always danger from oily rags. All of these have caused numerous shop fires. If your shop is in your home,

you should be doubly careful. One frequently neglected fire-safety practice is to empty your dust collector after each day's use. You don't want a spark to smolder in that pile of dry dust.

If you want to do woodworking for the long haul, get your dust—especially the fine dust—under control. The best approach (in order of priority):

- Wear an effective mask (see page 68).
- Use a dust collector with generous felt bags on stationary machines.
- Use a vacuum to collect dust from finish sanders, routers, and other portable power tools (see page 69).
- Invest in an air scrubber (see page 42).

Dust Sets Off Smoke Alarm

Q. The smoke alarm in my basement shop keeps going off, apparently from dust. Can I get one that is set off by heat, or can tell smoke from wood dust so this doesn't happen? It's driving me nuts.

Eric Miles

A. In a word, no. You shouldn't use a heat-activated alarm as a substitute for a smoke alarm. These alarms don't give you the necessary warning. As you've discovered, smoke alarms are triggered by the particles in smoke and are set off just as easily by fine wood dust. The only solution is to control your airborne dust.

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.



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Value	★★★★★

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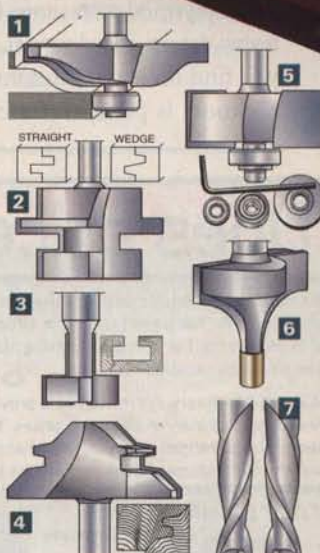
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Plain-Sliced Plywood

Q. I'm building a project out of red oak plywood and I'd like to use the best plywood I can find. Is plain-sliced the best grade? It certainly costs more!

Ben Reffleck

A. Plain-sliced plywood isn't "better" in any objective sense, but the face veneer (the oak, in your case) is more expensive and requires more work in the manufacturing process, so the plywood costs more. In simple terms, rotary-sliced veneer, the kind you find on standard home-center plywood, is peeled off the log like

paper towels off a roll. Plain-sliced veneer is sliced off the log like miniature boards. The difference is in appearance: Rotary-sliced veneer has a grain pattern that is often very open, with the porous growth lines very far apart. Plain-sliced veneer duplicates the appearance of solid-wood boards, with arches. The multiple arches on a piece of plain-sliced plywood result from individual pieces of edge-glued veneer.

Most people find the look of plain-sliced

to be more natural and appealing, though as you've noticed, you pay about 50 percent more for it in oak. However, sometimes rotary-cut plywood can look very much like plain-sliced, so it's worth looking at it first to see how wild and open the grain really is. And for some projects, like the Hoosier Cabinet we featured in AW #77 (December 1999), rotary-cut plywood is a more authentic choice. It looks great because we chose the sheets carefully.

1 Plain-sliced veneer plywood

2 Rotary-sliced veneer plywood

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Sharpening a No. 80 Scraper Blade

Q. I bought a No. 80 scraper to help me smooth big flat surfaces, but I can't get the hang of sharpening it and raising the burr. What should I be doing?

Roy Plotnick

A. One of our editors, Tom Caspar, is a long-time user of this scraper, and recommends the simple jig shown here for both sharpening the blade and raising the burr. Make the jig from a thick piece of hardwood, with a wide bevel cut at 45 degrees on one side. Cut a wide bandsaw or handsaw

kerf to hold the blade right where the bevel meets the flat surface. Then draw a guide line on the block at a 20-degree angle.

To sharpen the blade, place it in the jig, and clamp the jig in a vise, which secures the blade tightly. Use a mill bastard file to sharpen the blade, holding it against the



1 **GUIDE THE FILE** with this simple jig. The scraper's edge must be dead straight and form a wire edge along its entire length.



2 **TURN OVER A HOOK** on the blade with the corner of a triangular burnisher. Hold the burnisher at the angle scribed on the jig.

beveled surface and moving it sideways across the block. When the blade is smooth and straight, remove the wire edge with a slipstone. Then burnish the edge, keeping the burnisher parallel to the guideline. **AW**

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~~\$399~~ **\$199**

ITEM 42204-1SFA

4-1/2" x 1/4" GRINDING WHEELS

- 24 grit, 7/8" arbor

FOR	ITEM	10 PACK
Metal	06674-0SFA	\$899
Masonry	07422-2SFA	\$899

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VARIABLE SPEED RECIPROCATING SAW

- Gear driven, variable speed
- Max. wood cutting depth: 4-1/2"
- Max. metal cutting depth: 10mm
- 300 SPM to 2000 SPM • 1-1/8" stroke
- All ball bearing • 600 watts
- 8 HP, 110V, 6 amps, 60 Hz, single phase
- Overall length: 17"

~~\$599~~ **\$399**

RECIPROCATING SAW BLADES (PACK OF 10)

- 5 metal cutting 18 TPI
- 5 wood cutting 8 TPI
- Universal 1/2" shank

ITEM 06467-2SFA

~~\$299~~

DEWALT

LIMITED QUANTITIES

12" DeWalt DW705R

HEAVY DUTY COMPOUND MITER SAW

- Spindle lock • Electric brake
- Stainless steel miter scale with 9 positive stops • 0-48" bevel capacity
- 0-48" miter left and right
- Factory reconditioned, factory perfect
- Capacities 5-1/4" crown moulding; 2 x 8 at 45° bevel; 4 x 4 & 2 x 6 at 45° miter
- Head lock down with handle for easy transport • 1" round arbor
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- 100% ball bearing construction
- Includes 32 tooth blade
- 40 lbs. shipping weight

ITEM 51594-3SFA

~~\$299~~ **\$299**

CENTRAL MACHINERY

6" INDUSTRIAL RABBETING JOINTER

- Cast iron infeed/outfeed tables; Rack & pinion hand controls; Cast iron fence tilts 45° left/right with 45° and 90° positive stops. Includes stand.
- Motor: 1 HP, 110V, 4 amp
- Cutter head speed: 4600 RPM
- Infeed table size: 22-1/2"
- Rabbet cut: 3/8" • Weight: 160 lbs.
- Outfeed table size: 19-1/2"
- Cutter head size: 3"
- Rabbeting ledge: 2-7/8"
- Dimensions: 37-1/2" x 16" x 26-3/4"

~~\$279~~ **\$199**

ITEM 30289-4SFA

REPLACEMENT BLADE SET

ITEM 38268-0SFA **\$999**

LIMITED QUANTITIES

10" DIRECT DRIVE TABLE SAW

- Convenient rail mounted safety switch
- Precision T-style, cam lock, quick release fence
- Precision T-style miter gauge with positive stops at 45° right and left
- Full 22.25" x 38.5" table surface with extensions
- Removable stand for bench top use
- Includes 10" x 28T carbide blade, wrench and manual

Motor: 2 HP, 115V, 15 amp 4200 RPM; Maximum rip capacity: 27" right, 15" left; Maximum cut depth @ 45°: 2.25"; Table height: 34.25"; Overall dimensions: 38.75" x 51" x 36"; Tool weight: 154 lbs.

~~\$359~~ **\$329**

ITEM 53648-2SFA

CHICAGO
 Electric Power Tools

A. 18 VOLT CORDLESS, VSR DRILL/DRIVER KIT WITH 3/8" KEYLESS CHUCK

VSR; Speed range: 0-900 RPM; 3/8" Jacobs® keyless chuck; 6 pc. screwdriver & 6 pc. drill bit sets; Includes charger, battery and carrying case

~~\$72~~ **\$59**

ITEM 37144-4SFA

B. 18 VOLT CORDLESS, 5-3/8" CIRCULAR SAW KIT

Kit includes: 1 hour quick charger, 18V battery, saw & hex key. 2400 RPM, 1.3 amps, 10mm arbor, & 50° bevel capacity.

~~\$109~~ **\$69**

ITEM 37412-7SFA

INCLUDES CHARGER & BATTERY



18 VOLT REPLACEMENT BATTERY

ITEM 37145-1SFA **\$299**

5-3/8" TUNGSTEN CARBIDE TIP BLADE

Teeth: 24, C2 carbide steel, 10mm arbor, maximum RPM: 7000

ITEM 41290-0SFA **\$799**

RIP FENCE **\$399**

ITEM 37449-1SFA

Pittsburgh

2 PC. 3/4" HEAVY DUTY PIPE CLAMP

Constructed from heat-treated cast iron, these durable clamps keep your work rock steady. Just screw the handle side onto a 3/4" threaded pipe and slide the spring loaded end on. You're ready to go! Pipe not included.

- Handle screw operating range: 2-1/8"
- 1-1/2" throat depth
- Weight: 2-7/16 lbs.

~~\$69~~ **\$349**

ITEM 31255-8SFA

1/2" PIPE CLAMP

- 1-1/2" throat depth
- Weight: 1-4/5 lbs.

~~\$59~~ **\$299**

ITEM 37056-2SFA

DRILL MASTER

115 PC. TITANIUM NITRIDE COATED DRILL BIT SET

These titanium nitride coated high speed steel bits last up to six times longer than standard bits. Cool turning titanium bits are a must for metal workers. All bits can be sharpened. Includes: 29 fractional sizes 1/16" through 1/2"; 26 letter sizes A through Z; 60 numbered sizes 1 through 60; Heavy duty metal drill index.

~~\$59~~ **\$399**

ITEM 01611-2SFA

115 PC. M2 HIGH SPEED STEEL DRILL BIT SET W/INDEX

Same sizes as above; M2 high speed steel

~~\$349~~ **\$299**

ITEM 00528-1SFA

CENTRAL MACHINERY

12" DIRECT DRIVE BENCH TOP DISC SANDER

Gel sharp, accurate finishes without burning or marring. Direct drive disc won't slip. Table tilts to 45°; 2" dust collection outlet; fan-cooled brushless motor; miter gauge, base pads prevent creeping; safety switch. Includes 60 grit, 12" sanding pad.

- 1 HP, 120V, 10.0 amps
- Wheel diameter: 12"
- No load speed: 1793 RPM
- Base: 13" x 10"
- Shipping wt.: 92 lbs.

~~\$119~~ **\$899**

ITEM 37297-3SFA

CENTRAL MACHINERY

5 SPEED BENCH DRILL PRESS WITH 1/2" KEYLESS CHUCK

Five speeds: 620, 1100, 1720, 2340 and 3100 RPM; 2" spindle stroke, 8-1/4" swing. Column diameter: 1-13/16"; Table dimensions: 6-1/2" x 6-5/8"; Tilts 45° left and right; Base dimensions: 11-1/2" L x 7-1/2" W x 5-5/8" H; Height: 22-1/2"

~~\$699~~ **\$499**

ITEM 34231-6SFA

5 SPEED BENCH DRILL PRESS WITH KEYED CHUCK

- 620 to 3100 RPM • 1/2" chuck
- 1/3 HP, 2" spindle stroke, 8-1/4" swing
- 6-1/4" square table • 22-1/2" height
- 8-1/4" max. distance spindle to table

~~\$599~~ **\$399**

ITEM 01844-6SFA

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4" PLATE JOINER

- Fence adjusts to a maximum depth of up to 1-1/8"
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- Preset depth stops: 0, 10, and 20
- Includes 4" carbide tipped blade, dust bag, high impact base and fence, carbon brush set, 4mm hex wrench, arbor wrench, glue bottle, assorted biscuits (10 each of 0, 10, and 20 gauge)
- 4" blade diameter
- 115V, 6.4 amps, 10,000 RPM, 60 Hz, single phase
- Tool wt.: 6-1/2 lbs.

ITEM ~~\$59.99~~ **\$45.99**
38437-5SFA

CARBIDE TIP PLATE JOINER REPLACEMENT BLADE

- Blade teeth: 6 carbide tip teeth
- Blade diameter: 4"
- Maximum RPM: 12,000

ITEM ~~\$7.99~~ **\$7.99**
38840-0SFA

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18 GAUGE AIR BRAD NAILER

Includes 3 and 4mm wrenches and tool oil.

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A smooth-cutting saw that's perfect for production work. Make precise miter and compound cuts. Retractable blade guard. Includes arbor wrench, two side extension arms, electric brake, two U-brackets and an adjustable stop block.

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ITEM ~~\$179.99~~ **\$179.99**
39214-2SFA

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Die cast aluminum table 26" x 16", has adjustable 17-7/8" x 2" rip fence and inch/metric scale for precise cutting. Blade adjustments control angle and depth of cut. Anti-kickback fingers and see-through blade guard for safety.

- Maximum depth of cut at 90°: 3-1/8"; at 45°: 2-1/2"
- Motor: 2 HP, 115V, 60 Hz, 10 amp, 4500 RPM
- Shipping wt.: 36 lbs.
- Miter gauge adjusts 0° - 60° left and right
- Blade capacity: 10" with 5/8" arbor
- Blade and stand sold separately

ITEM ~~\$119.99~~ **\$79.99**
38533-1SFA

10" SAW BLADE 40T

Precision ground M2 molybdenum tips.

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6" OPEN STAND JOINTER

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- Spring loaded joint blade guard and rear blade guard provides maximum protection
- Large cast iron table with precision machined finish for accuracy
- Fully adjustable infeed and outfeed height
- Includes knife guards, 3 knives, 4" dust chute, and stand

Motor: 3/4 HP, 115/230V; Cutter head speed: 4850 Cutting capacity: 6" x 1/2"; Rabbeting capacity: 1/2"; Rabbeting ledge: 3-1/8" x 8-3/4"; Table size: 7-3/4" x 46" x 31-3/4"; Fence: 4" x 27-1/4"; Blade size: 6-1/16"

ITEM ~~\$359.99~~ **\$329.99**
53652-3SFA

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3 HP PLUNGE ROUTER

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37793-4SFA

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150 PSI working pressure, 200 PSI burst. Resistant to oil, abrasion and weather.

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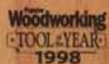
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Shop Solutions

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screws into studs or insert plastic anchors into cinder blocks and fasten with the recommended screws.

Cut a piece of the conduit (A) that reaches from the top box up into your rafters. Fasten the conduit to the top box with a connector (T), and to the wall with a conduit strap. Then fasten another connector on top of the conduit. Make all wiring connections.

Next, mount the utility boxes (U) near your blast gates. Run the thermostat cable (G) from the control panel through a knockout in your first switch. Now, using the other thermostat cable (H), run a path from the first switch to the second, the second to the third and so on until you've connected the last switch. Neatly stuff all the wires into the boxes and then push the switches and outlets into the boxes. Secure the switches and outlets to their boxes and place the matching switch covers over them. Place some electrician's putty (AA) in the knockouts where the wires enter the box to act as a dust barrier.

Turn off the master switch (C) and plug your dust collector into the receptacle (P). Switch on the master switch and try the control switches. Your dust collector should turn on and off using any control switch. If not, switch the power off at the main electrical panel and check your wiring. **AW**

Submitted by
Willis Bowman,
Minneapolis, MN.

If you have a great shop solution, send it to us with a sketch or photo and a brief explanation. 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.

SUPPLY LIST

REF.	QTY.	GRAINGER PART NO.	DESCRIPTION
A	1	6XC30	10' piece of 1/2" metal conduit
B	1	5A052	4" sq. box, 2-1/8" dp, 1/2" knockouts.
C	1	6A704	20A 120V toggle switch
D	1	6XC67	4" sq. 1/2" raised single switch cover
E	2	*	ground screw, #10-32
F	1	4X744	20VA transformer, 120VAC / 24VAC
G	1	3ZK70	18/2 thermostat cable
H	1	3ZK71	18/3 thermostat cable
J	1 bag	6X687	Yellow wire nut
K	1	4A079	Metal relay enclosure
L	1	3X744	SPDT 30A 1-1/2 hp relay, 24 VAC coil
M	2	*	3/4" offset nipple
N	1	4A239	2-1/8"-deep utility box
P	1	5C363	20A 125V single outlet
Q	1	*	Metal utility cover for single receptacle
R	A/R	5A060	Residential 3-way switch
S	A/R	*	Residential 4-way switch
T	2	5XC12	1/2" EMT conduit connector
U	A/R	3KG83	Weatherproof box
V	A/R	*	Weatherproof switch cover
W	1	*	Rubber grommet
X	A/R	4W192 and 4W193	12 ga. THHN solid or stranded 4W187 wire, white and black
Y	A/R	1W674	12/2 with ground NM-B nonmetallic sheathed cable (Romex)
Z	1 bag	3KF16	1/2" cable staples
AA	*	*	Electrician's putty
BB	1	6XC41	1/2" EMT strap

* Find at your local home center.

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Shop Solutions

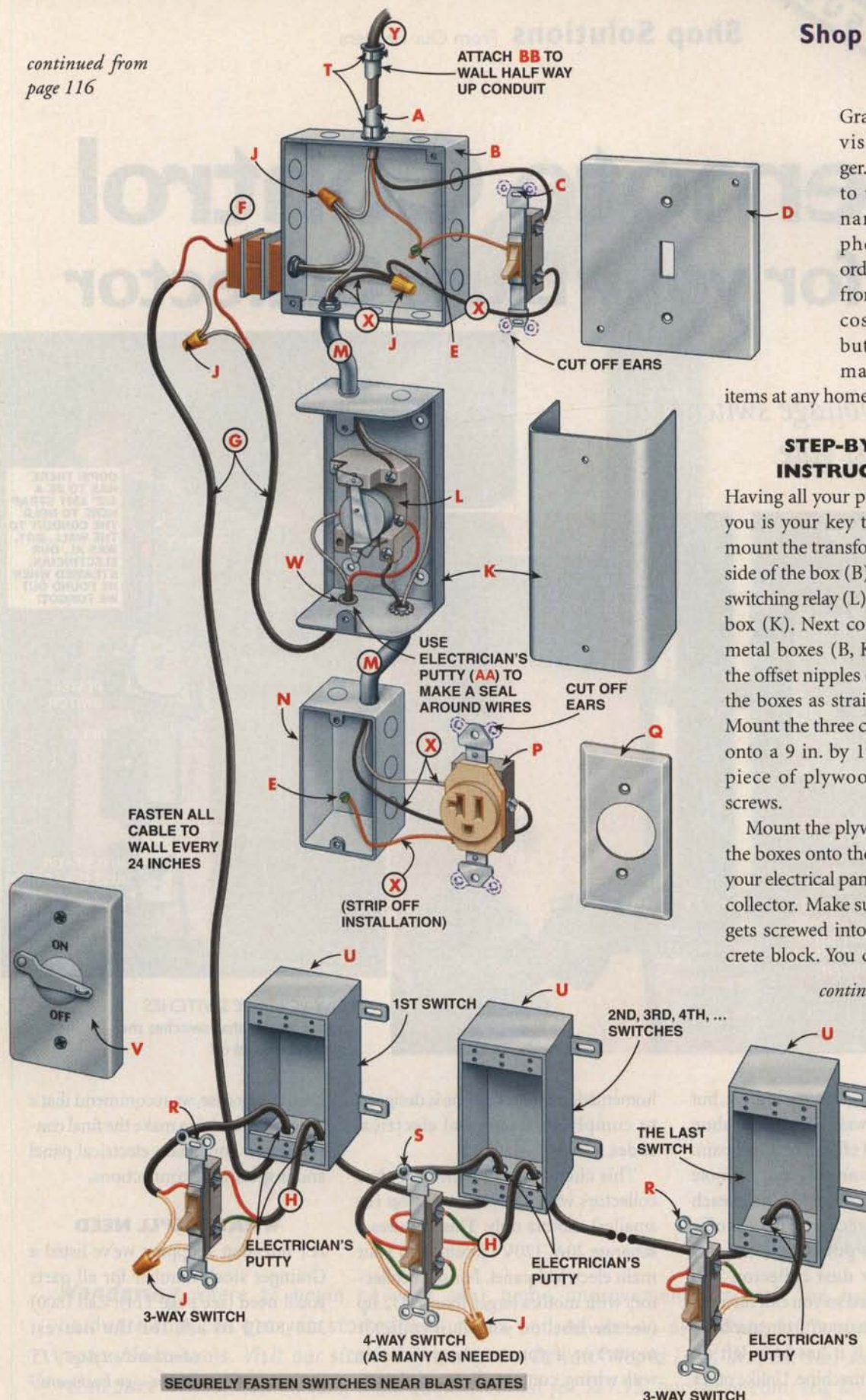
Grainger outlet or visit www.grainger.com. You'll have to use a business name to place a phone or online order. Parts ordered from Grainger will cost about \$150, but you can find many of these items at any home center for less.

STEP-BY-STEP INSTRUCTIONS

Having all your pieces in front of you is your key to success. First mount the transformer (F) on the side of the box (B) and mount the switching relay (L) inside the metal box (K). Next connect the three metal boxes (B, K and N) using the offset nipples (M) and line up the boxes as straight as you can. Mount the three connected boxes onto a 9 in. by 19 in. by 1/2-in. piece of plywood using wood screws.

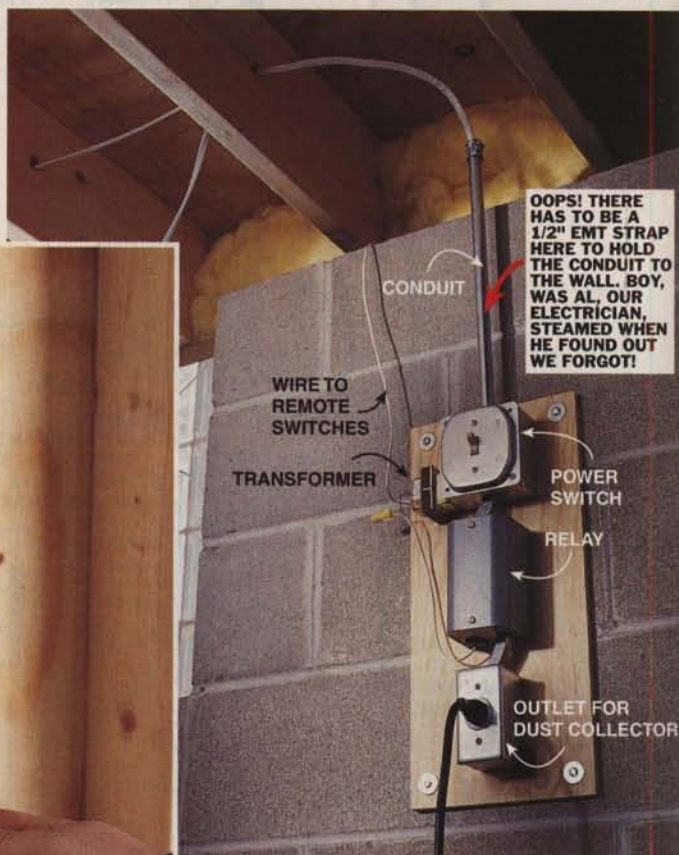
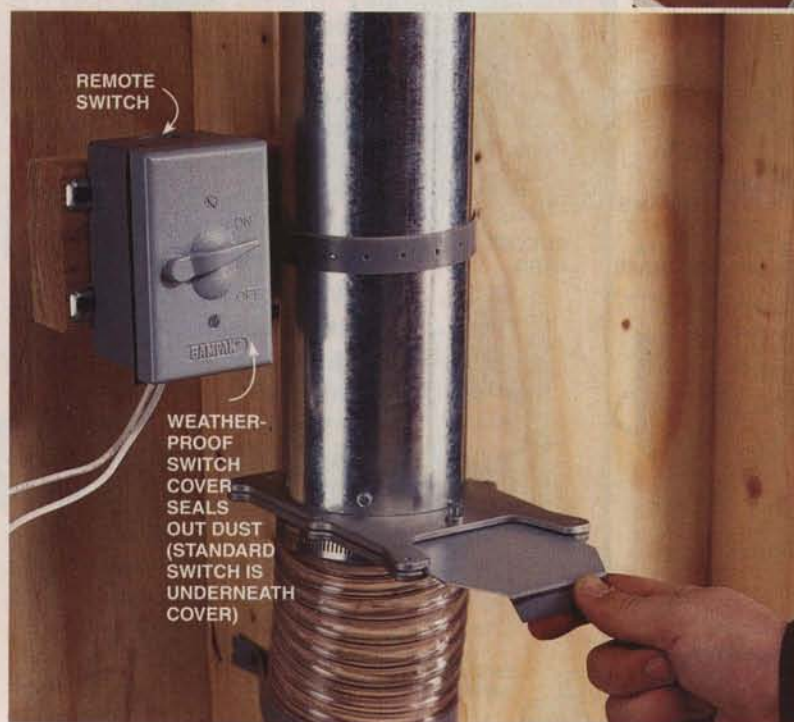
Mount the plywood piece with the boxes onto the wall near both your electrical panel and your dust collector. Make sure the plywood gets screwed into a stud or concrete block. You can use drywall

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Remote Control for your Dust Collector

Put low-voltage switches at every blast gate.



LOW-VOLTAGE SWITCHES control a relay, that switches the collector on and off.

A central dust collector is great, but having to walk across your shop to turn it on and off can be a real pain. Here's my ingenious solution: a remote low-voltage on-off switch near each blast gate. The switches turn on or off a relay, which lets power flow (or cuts power) to your dust collector. The switches are wired so you can turn the dust collector on or off from any blast gate no matter if it has been left on from a previous machine. Unlike other

homemade circuits, this one is designed to comply with national electrical codes.

This circuit was designed for dust collectors with 115VAC, 1-1/2 hp (or smaller) motors only. This requires a separate 20A, 120V circuit from your main electrical panel. For dust collectors with motors larger than 1-1/2 hp (see the label on your dust collector motor) or if you are uncomfortable with wiring, contact a licensed electrician. In any case, we recommend that a

licensed electrician make the final connection to your main electrical panel and inspect your connections.

WHAT YOU'LL NEED

For one-stop shopping we've listed a Grainger stock number for all parts you'll need (see page 114). Call (800) 328-8010 to ask for the nearest

*continued on page 115
(That's right—go backward!)*



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