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January 1997

#94

Popular

Woodworking

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19

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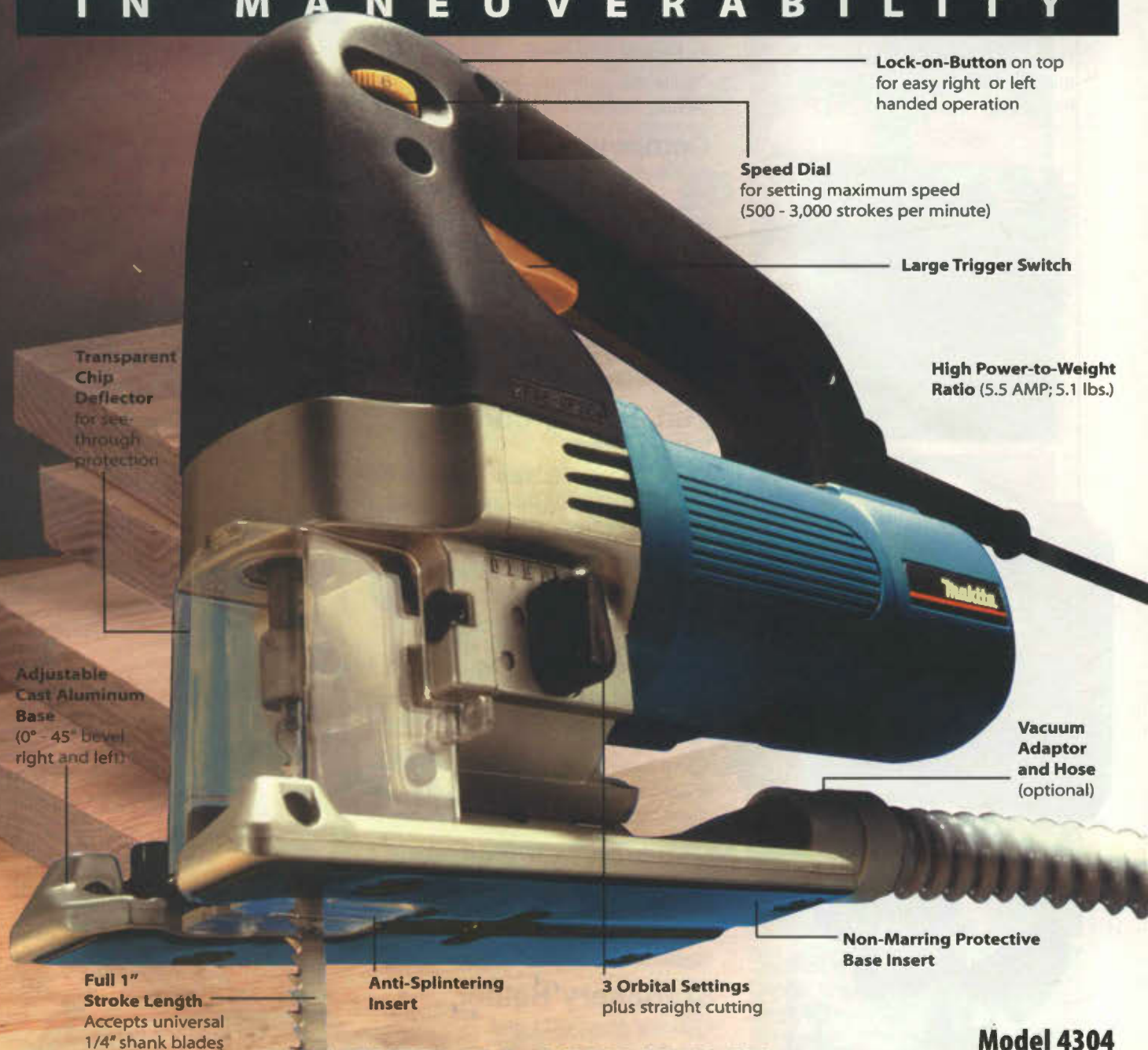
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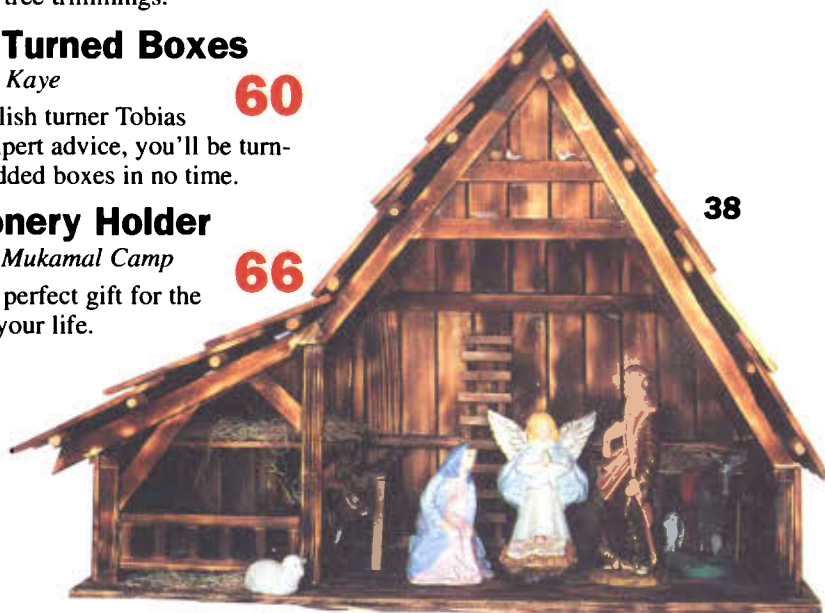
Make the perfect gift for the writer in your life.



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Safety Note

Safety is your responsibility. Manufacturers place safety devices on their equipment for a reason. In many photos you see in *Popular Woodworking*, these have been removed to provide clarity. In some cases we'll use an awkward body position so you can better see what's being demonstrated. Don't copy us. Think about each procedure you're going to perform beforehand. Think ahead. **Safety First!**



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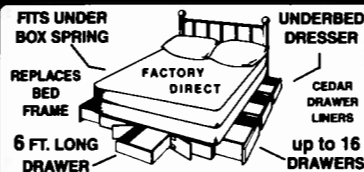
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TURNINGS

Don't Skip This Page!



I recently discussed with a group of readers how to calculate board feet and estimate lumber needs for projects. This is important because it can affect both your pocketbook and your time. For those who don't fully understand the subject, here's a close look.

Other than pure guesswork, I know of four ways to calculate board foot measure. One method is definitely more accurate, although you might not need such accuracy. You can decide which one works best for you.

First, let's make sure everyone's clear about board feet measure and lumber thickness. Rough lumber is sold in 1/4" thicknesses (quarters). Common thicknesses are 3/4" (at least 1" thick), 5/8" (at least 1 1/2" thick), 3/4" (2" thick), 1 1/4" (2 1/2"), and if you're running with the big dogs, 1 3/4" (3") and 1 3/4" (4"). In its simplest form, a board foot is 1/4" rough, or 3/4" after planing — that's 12" square. But one board foot of the same thickness might also be 6" wide and 2' long, or 4" wide and 3' long, etc. An 8/4 (2" thick) board, 6" wide and one foot long, is still one board foot. A 6/4 board of equal size would be .75 board feet.

To calculate the amount of board feet required for a project, refer to the cutting list and determine the board footage for each piece in the specified quantity. For most estimating purposes,

one of the following formulas will work fine:

For shorter boards, multiply in inches: Thickness x Width x Length, then divide by 144:

$$\frac{\text{Th}'' \times \text{W}'' \times \text{L}''}{144} = \text{BFM}$$

$$\text{Ex.: } \frac{1'' \times 6'' \times 48''}{144} = 2 \text{ BF}$$

If the piece is long, do as above, only write the length measurement in feet and divide by 12 instead of 144:

$$\frac{\text{Th}'' \times \text{W}'' \times \text{L}'(\text{ft.})}{12} = \text{BFM}$$

$$\text{Ex.: } \frac{1'' \times 6'' \times 4'}{12} = 2 \text{ BF}$$

A third way, which seems a bit more cumbersome and no more accurate, works like this:

$$\text{Th}'' \times \text{W}'(\text{ft.}) \times \text{L}'(\text{ft.}) = \text{BFM}$$

$$\text{Ex.: } 1'' \times 1/2' \times 4' = 2 \text{ BF}$$

The fourth calculation is the English Yard System. It's precisely accurate because it accounts for fractions of an inch in each piece rather than rounding up to the nearest inch. For most of us, such accuracy isn't necessary. If you'd like the details, just drop me a note and I'll fill you in.

Stephen Shaug

Senco Visits Popular Woodworking

Nearly 75 readers got in the act when Senco Products, manufacturers of pneumatic fasteners, staplers and nailers, visited our shop. It really got exciting when a pallet full of bird-feeder parts was unveiled. The Senco folks brought in pre-cut cedar parts so every guest could assemble a feeder using their latest equipment. Some of the more daring guests wandered over to the testing station where the big kahuna framing coil nailer just begged to be fired. While it's not exactly a finesse tool for fine joinery, it was fun to shoot a few framing nails into a big chunk of fir. **PW**



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Oscillating Spindle Sanders

New units oscillate vertically as they spin, revolutionizing home shop spindle sanding.

EVERY SO OFTEN a new tool comes along that supplants what had become the traditional way of accomplishing a woodworking chore. The independent hollow chisel mortiser that we discussed in the March '96 issue of *Popular Woodworking* affected the drill press' role as a mortising machine. Now oscillating spindle sanders are beating out the drill press for drum sanding by being ready instantly for use. In fact, industrial shops have been using "big brother" versions of the sanders for decades.

It still would be unworthy to disregard drill press drum sanding. I've used the system too long to be so disloyal. Yet it's nice to eliminate their negative factors, such as possible wood burn, short sleeve life and rapid heat build-up, without relying on finesse and the need for a special table to allow the drum to move vertically.

Oscillating spindle sanders cut more aggressively than single action drums. This is because the dual action constantly changes the abrasive area that contacts the work's edge, thus reducing the need for feed pressure. This leads to better control over stock removal, increasing the guarantee that the sanded edge will be square to adjacent surfaces.

The additional drum action truly minimizes the tendency of abrasive grits to become clogged with dust. A single action drum "scores" horizontal lines in the wood, whereas the abrasive grains of a drum that oscillates cut in a random pattern to produce smoother results. The motion resembles the action of portable, random orbit pad sanders.



1 Ryobi deserves the credit for being the first to take the features of industrial machines and scaling them to suit the needs of a home shop. The drum storage is built-in.



2 Clayton brings its machine close to the industrial category, structurally and price-wise. The table is made of smoothly finished steel. A separate drum storage unit can sit by the machine or can be hung on a wall.



3 The Sears Craftsman model has a 3/2 hp induction motor that yields quiet operation and long life. The drum storage unit can be attached to the machine or hung on a wall.



4 Delta's BOSS is the only model which includes a built-in fan to pull dust away from the work surface.

What's Out There?

Many units are available, with a lot of them falling in the industrial range. We settled on four models that pretty much run the gamut of machines that, functionally and price-wise, fill the needs of home and small commercial woodshops. The machines efficiently produce the multiple action that



5 Clamp the pivot sanding jig in place so it and the drum have a common centerline.



6 By adjusting the center point pin, the jig can form many circle sizes.



7 Again, the pivot jig proves useful for rounding the corners of the ends of boards.

makes them unique, but differences exist in the mechanism. The Ryobi and the Clayton (photos 1 & 2) employ a similar system. Both have belt-driven double pulleys at the base of the spindle shaft. The one that turns the spindle develops fewer revolutions per minute (rpm) than its companion. The difference, which varies depending on the design, moves the spindle up and down a certain number of times per minute because of an integral circular ramp. The Clayton's ramp mechanism is encased in an oil-filled housing, which suggests "heavy duty."

The Sears Craftsman unit and the Delta B.O.S.S. (Bench Oscillating Spindle Sander) (photos 3 & 4) don't use drive belts. The Craftsman unit functions with an eccentric that, while secured to the motor shaft, drives a gear that's inside a grease-filled housing. A cam follower, actually a disc with upward extending pins on its perimeter,

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turns inside a ramp. In effect, the pins move up and down to transfer the action to the spindle.

The B.O.S.S. has a simple oscillating system, whereby the lower end of the motor shaft drives a worm gear that rotates a cross shaft. It uses two eccentric cams to pull the entire motor/spindle assembly up and down.

Both the Delta and Craftsman units oscillate 60 times a minute at 1,725 rpm drum rotation.

All units have dust collection ports which connect nicely to a standard shop vacuum hose. The Delta model has a built-in suction fan to pull the dust into a collection bag, which offers a nice alternative to hooking up the shop vac.

I found that dust collection averaged better than 90 percent, which is pretty good but not perfect. Therefore, good maintenance involves occasionally using a small brush to dislodge stubborn debris that collect in the duct area under the spindle.

For specifications of the models discussed, refer to the chart at right.

Getting the Most From Abrasive Sleeves

Despite the oscillating action, normal sanding still uses only part of the abrasive surface. To maximize usage, change the work to contact area as frequently as needed. Do this by elevating the work on a piece of wood or plywood so a fresh area of abrasive becomes available. By duplicating the procedure after inverting the sleeve on

Specifications				
Company	Ryobi	Clayton	Sears	Delta
Model	OSS540	140	22590	B.O.S.S.
Motor	Universal (3.5 amps)	Induction 1/2 hp	Induction 1/2 hp	Induction 1/4 hp
Spindle rpm	2000	1750	1725	1725
Strokes	58	58	60	60
Spindle diameter	1/2"	1/2"	1/2"	1/2"
Spindle stroke	5/8"	13/16"	3/4"	7/8"
Spindle length	4 1/2"	4 1/2"	4 1/2"	4 1/2"
Abrasive sleeves	1/2", 1"	1/2", 3/4", 2", 3"	1/2", 2"	1/2", 3/4"
Optional sleeves	3/4", 1 1/2", 2", 3"	1", 1 1/4", 1 1/2", 2 1/4", 2 1/2"	3/4", 1", 1 1/2", 3"	1", 1 1/2", 2", 3"
Table size	14" x 20"	13 3/4" x 21"	20" x 20"	18" dia.
Table material	Laminated MDF	Ground steel	Melamine	Cast iron
Dust Collection	Yes	Yes	Yes	Yes
Storage rack	Yes	Yes	Yes	Yes
Weight	28 lbs.	80 lbs.	34 lbs.	41 lbs.
Retail price	\$160	\$540	\$145	\$195

the drum, you'll get as much usage as possible from an abrasive sleeve.

While using any handy piece of wood as an "elevator" is an option, it's better to make your own auxiliary table that's just right for your machine (**diagram 1**). It has the advantage that the accessory won't move and spoil your accuracy while you work.

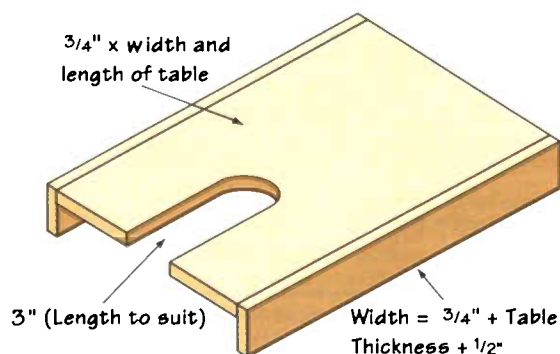
Making a Pivot Jig

Pivot jigs make it easy to produce perfect discs. I've made them for disc and

belt sanders, but they're even more efficient for an oscillating drum sander (**diagram 2**). The jig is simple — it's made from a piece of plywood or particleboard, sized to suit the machine, and threaded inserts hold pivots made from 3/16" screws (**photo 5 & 6**). Use the short, pointed pivot when the work doesn't have a center hole — the work is just impaled on the point. The longer one is suitable when a center hole is okay — say, for a wheel axle.

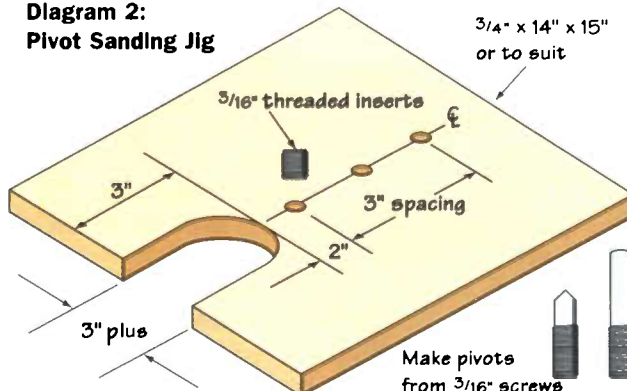
The same jig can be used to round

Diagram 1: Auxiliary Table



An auxiliary table is a wise addition for any machine. It slips easily on or off and can be clamped in place when necessary.

Diagram 2: Pivot Sanding Jig



Making this pivot sanding jig will help to produce discs with perfect edges and precise diameters.

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8 Producing a cove on the end of a piece works well, with a little patience.

off the ends of narrow, or even wide, stock (photo 7). If you'd like to experiment with the results, use the same setup but mount the work off-center.

Other Ideas

How do you produce the concave shape on, for example, the end of a rail that must fit a round leg? I've rejected my as-of-now methods for the dual-action drum sander method (photo 8). The bulk of the waste can be removed on a

scroll saw or band saw, but if I don't get impatient, I can accomplish the whole job by sanding. If one of the drums that you have isn't suitable for the cove-size needed, you can still use the idea by first rough-sawing, then finishing, with a drum that's smaller than the needed radius.

You also can reduce the width on the end of a component by using the setup shown in photo 9. Quite a bit of material can be removed in a single



9 You can be quite generous with depth of cut to reduce width if you feed the work at a reasonable pace.

pass if you use a coarse abrasive. I can "cut" as deep as $\frac{3}{16}$ ", even with a relatively fine grit sleeve, as long as I don't use force. In all situations, not using force has as much to do with preventing drum distortion and harm to the spindle as it does with getting quality results. **PW**

R.J. DeCristoforo is a member of the editorial advisory board for Popular Woodworking.

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From the Popular Woodworking mailbag...



Door Marks Woodworker's Castle

I decided to share with you this door that I built to inspire anyone who doesn't have a lot of time, room or state-of-the-art machines that it is possible to make a dream come true with a little patience and effort.

I primarily used bubinga, a very hard, tight grained wood. For accents, I used Gaboon ebony and purpleheart. The finished door is 36" wide, 79" high and weighs about 130 pounds.

My shop is a converted one-car garage, about 144 square feet of actual working space. As far as stationary tools, I own a 10" table saw, a 14" band saw, a 10" thickness planer, small jointer, and a very cheap drill press. My hand tools consist of a biscuit joiner, router, Skil saw, a cordless and corded drill, and the normal collection of drill bits, chisels, etc. After clearing out the garage, I set up a pair of sawhorses with an old door as my portable

worktable. Together, they produced a project I'm proud of.

Richard Fiedler
Philadelphia, PA

You should be proud! The door is well designed and produces dramatic results. Anyone passing your house will know a woodworker lives there. — Ed.

Adhesive-backed Piano Keyboards

In response to a reader's plea for a piano keyboard (#92), I recommend a 1" x 5³/₈" piano keyboard produced and sold by Whittemore-Durgin Glass Co. (P.O. Box 2065, Hanover, MA 02339, 800/262-1790).

Three heavy, glossy stock, pressure adhesive-backed keyboards come on one sheet, priced at \$1.49. I've designed many stained glass music box projects which require these keyboards.

James H. Hepburn
Hanover, MA

Great suggestion — thanks for sharing it. We'd also like to thank all of the other readers who sent in ideas for finding or creating piano keyboards. We only wish we had enough room to include all of them. We always appreciate hearing from you. — Ed.

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Sears Workbench: A Temporary Setback

Imagine my excitement when I turned to page 20 of the November 1996 issue. There in "Tool Talk" was my dream workbench. Because I have a small shop, the bench complex would give great versatility at a great price. I ran, not walked, to my Sears store. Then imagine my disappointment when I was told that the bench was a "close out" and no longer available.

What happened? Was this bench tested six to eight months ago and only now being put into print? I believe that a magazine of your quality should also research the availability of a product at the time of publication.

Neal T. Drago
Sandia Park, NM

While the November 1996 issue was at the printer, Sears Craftsman decided to pull the ShopBench from its

stores to make revisions, including making the benches more stable and versatile and easier to assemble. The drawer also is now sold as an option. Sears says these changes should improve the ShopBench's quality and lower the price. As of this issue's press time, the improved version was scheduled to be available to the public in November, 1996. — Ed.

Mini Flocker Is Alternative to Sticky Back Felt

In response to Ernest J. May's request for sticky back felt in issue #91, I've used both the stick-on flock and the Mini Flocker, and I would not go back to the stick-on.

Mini Flocker is available from Lee Valley Tool Ltd., (800) 871-8158. The manufacturer is Don Jer, Ilene Court Bldg. 8, Belle Mead, NJ 08502.

Len Wade
Hamilton, Ontario

Corrections:

- Some dimensions for the "Pine Tall Clock" (September 1996 issue) were incorrect. On the upper box, the top & bottom (part C) should've been $\frac{3}{4}$ " x $11\frac{1}{8}$ " x $12\frac{5}{8}$ ". On the bottom box, the front & back (part I) and sides (part J) should've been $\frac{3}{4}$ " x $11\frac{1}{8}$ " x 12".
- In "New Product Releases" for the November 1996 issue, the phone number for Coppus Portable Ventilation was incorrect. They can be reached at (800) 556-8057.

We welcome your comments about PW or anything related to woodworking. We'd also like to see color pictures of what you're building. Send your input to: Infeed/Outfeed, Popular Woodworking, 1507 Dana Ave., Cincinnati, OH 45207. Send e-mail to: Wudworker@aol.com. Letters may be edited for publication. PW

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TRICKS OF THE TRADE

Tricks of the Trade shares readers' ideas for making woodworking tasks easier and safer. Send your original, unpublished ideas to Tricks of the Trade, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207. If needed, please illustrate with a color photo or diagram. We'll pay \$35 for each trick we publish, and the best one will win a Black & Decker VersaPak™ system (pictured).



BEST TIP!

A Spray in Time

It just irks me when I spend five dollars for a quart of good tung oil, paint or stain, only to have to waste whatever isn't used. After resealing and storing, and the passage of time, I open the can wondering what incredible chemical reaction awaits. Typically a solid film forms on top of the liquid. If I was silly enough to shake the can before opening, the solid layer is floating around in little chunks — fun.

I've found a solution in a product

made for the wine industry, Private Preserve. Basically a can of gas, it contains nitrogen, argon and carbon dioxide. Just before I seal a can, I spray some into the container and seal. The inert gas displaces the nasty ingredients in our environment, and protects the liquid from reaction, decay or solidification until the next use. Private preserve is available by calling (800) 292-2753. A \$7 can preserves 30 to 40 quarts.

Steven Zawalick
San Luis Obispo, CA



Know When to Stop Sanding

When sanding glued-up panels with a belt sander, it can be difficult to know when the slab is leveled. I used to stop every few seconds to run my hand across the boards to see if it was flat yet. Now I draw a serpentine line down each glue line with a soft lead pencil. When the pencil line is completely gone, so are the irregularities of the glue line.

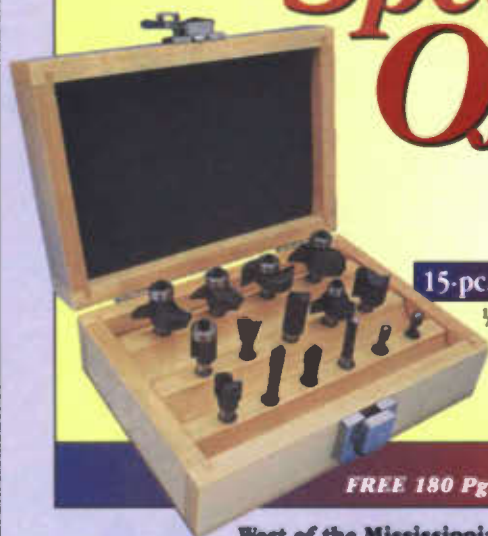
Michael Burton
Glorieta, NM



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TRICKS OF THE TRADE

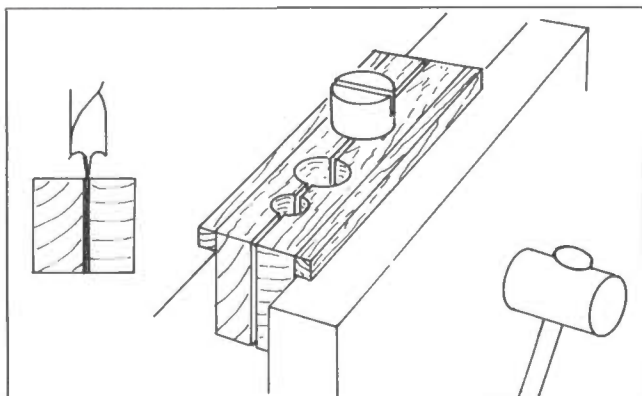
Plastics, My Boy...

Inexpensive plastic shoeboxes (about one dollar each) have become the answer to many storage problems in my shop. I started using them as simple storage boxes, but they've become drawer organizers, storage bins on doors, and drawers in custom storage modules. They have also been pressed into service as drawers for my shop cabinets.

The tops also make good disposable containers for tung oil or other small messes I'm working with. They've become so handy I keep a dozen or so empty ones around the shop — they stack inside each other and take up very little space.

*Ron Tye
Yorba Linda, CA*

Dowel Trimming Jig



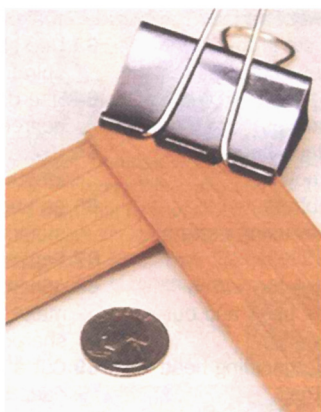
It is difficult to hold a short length of dowel rod upright in a vise if you want to level its end or cut a slot in it, but this jig will secure it. There can be as many holes to match dowels as you need in a pair of strips, which have guide pieces to rest on top of the vise jaws. So that the jig will grip, drill the pieces while pushed together with a card between them. When this has been removed, the jig will have ample clamping pressure.

*Percy Blandford
Stratford, England*

Mini-clamps

Binder clips, sold at office supply stores, are excellent substitutes for spring clamps. The clips are available in small, medium and large sizes and are wider in clamping width than the average spring clamp. They also have good clamp tension for small projects.

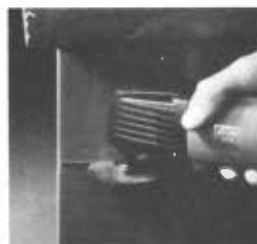
*Carl Julien
Bullhead City, AZ*



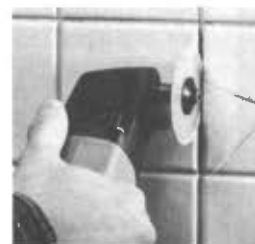
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101 Table Saw Techniques

Believe it or not, you can get more than a hundred uses out of your table saw.

By Don Kinnaman

MANY OF MY FRIENDS have asked me which machine I liked best. Without hesitation, I always choose the table saw. Virtually every machine in the shop can be duplicated in some way on this powerful tool.

Several operations listed produce the same results, but since there are several ways to do them, they have been listed separately. Should you object, remember that not all shops are equipped equally. The point in compiling the list isn't to say these are the best ways. Clearly, many opera-

tions can be performed more easily on other equipment. Rather, its purpose is to open up other possibilities and to encourage resourcefulness.

On the important issue of safety, some of the following operations can be dangerous if the operator doesn't know how to make safe setups. For many operations, a variety of fixtures, jigs, holddowns, pushblocks, pushsticks and featherboards must be used for safety.

This list is by no means complete in what the table saw can do, but I hope you find that you've vastly

expanded your use for the table saw.

I collected many of these techniques during my 40 years of teaching woodworking. My greatest resource always has been books and articles by R.J. DeCristoforo. For more information, I recommend his book, *The Complete Book of Stationary Power Tool Techniques*, Popular Science Books, which is available from Sterling Publishing.

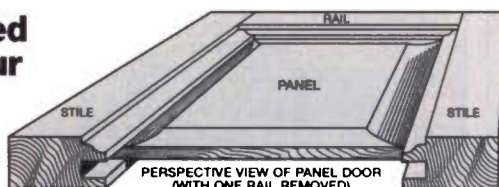
Don Kinnaman is a retired shop teacher. He lives in Phoenix.

- | | | |
|---|--|---|
| 1 Rip using fence. | 24 Reverse saw-kerfs to make a dentil mould pattern. | 47 Make bevels using single flat blade and moulding head (with grain). |
| 2 Cross cut using miter gauge. | 25 Make octagonal blanks for lathe work (cutoff pieces are glue blocks). | 48 Repeat process to make chamfers. |
| 3 Cut miter with a miter gauge. | 26 Make dados with one blade, miter gauge and fence (slide back and forth over saw blade). | 49 Make cross-grain chamfers with moulding head. |
| 4 Cut a compound miter (tilt miter gauge and saw blade). | 27 Make a wheel using a fence mounted jig. | 50 As above, make cross-grain bevels. |
| 5 Chamfer with the grain (use a fence, tilt the blade). | 28 Rotate disk against fence in vertical position for "V" belt groove. | 51 Make raised panels with one blade. |
| 6 Bevel with grain using the fence (tilt the blade). | 29 Repeat for flanged wheel. | 52 Make round cylinders using special jig and fixture. |
| 7 Bevel crosscut (tilt the blade and miter gauge). | 30 Cut square hole in a panel. | 53 Make single round taper using special jig. |
| 8 Chamfer crosscut (tilt blade and miter gauge). | 31 Cut several short blocks of equal length using fence, miter gauge and clearance block. | 54 Make double-end tapered leg using shopmade jig and fixture. |
| 9 Chamfer mitered cut. | 32 Make shelf kerfs with wobble blade (masking tape on arbor). | 55 Use dado head to make similar cuts as above on all four sides. |
| 10 Bevel miter cut. | 33 Rotate disk over lowered blade & between "V" blocks for saucer cut. | 56 Use dado head to form hand hold. |
| 11 Resaw to length using fence, workpiece on edge. | 34 Rotate disk on edge to form circular lid on workpiece. | 57 Cut perfect miters with a shopmade jig. |
| 12 Crosscut kerfs at 90 degrees to bend plywood. | 35 Tilt blade to 45 degrees to form "meat tenderizer" pattern. | 58 Cut a wide desktop using a cutoff table. |
| 13 Cut kerfs at ten degrees to make loop the loop (miter turned right). | 36 Cut rabbit with wobble washers and saw blade. | 59 Rip accurately using auxiliary fence and C-clamps. |
| 14 Cut a kerf at 10 degrees (miter turned left). | 37 Repeat process to cut dados. | 60 Cut kerfs at right angles to each other to form grid. |
| 15 Kerf 60 to 75 degrees left for spiral twist. | 38 Repeat process to cut grooves. | 61 Use a tilted blade to make pyramidal shapes. |
| 16 Kerf 60 to 75 degrees right for spiral twist in other direction. | 39 Cut rabbets with multicuts using one blade. | 62 Repeat, but turn workpiece over to make waffle cut. |
| 17 Rip bevel, workpiece on edge (used for picture frames). | 40 Repeat, but cut grooves. | 63 Use shopmade jig to cut cove in spiral cuts (like drill flutes). |
| 18 Rip bevel from both edges. | 41 Cut dados with dado head. | 64 Use dado head to make cuts at 90 degrees to form a hot tray trivet. |
| 19 Two-cut rabbit: one side cut on face, second cut on edge. | 42 Repeat, but cut grooves. | 65 Use a sander disk to bevel the length of the stock. |
| 20 Set blade low and miter at angle, dowel rod "rolls" over the blade to create a spiral. | 43 Repeat, but cut rabbets. | 66 As above, sand/joint edge on stock. |
| 21 Repeat process, miter gauge set left. Double spirals possible. | 44 Make duplicate cuts using pattern and "T" fence. | 67 Repeat, but sand ends. |
| 22 Use a single blade, auxiliary fence for a cove profile along the length of the board. | 45 Use table saw as jointer, with a flat blade, moulding head and out-feed strip. | 68 Adhere wet/dry paper to table to make a large lapping plate as a sharpening aid. |
| 23 Repeat process but crosscut to form cove. | 46 Make dowels using moulding head and round over cutters. | 69 Cut a modified dovetail groove with dado head and blade. |

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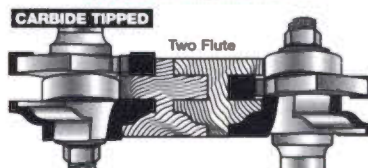


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(101 Table Saw Techniques, continued from page 18)

- 70 Cut "V" groove in two passes by tilting blade.
- 71 Tilt blade to 45 degrees to make decorative cuts.
- 72 Use fence mounted jig to joint disk with moulding head.
- 73 Use 2" stock to "turn bowls" using fence jig.
- 74 Mount wire brush on arbor to make brushed wood finish.
- 75 Repeat to clean rust from tools.
- 76 Make edge sander using 3/4" plywood fit with abrasive.
- 77 Mount work arbor to table at insert hole and use keyless pulley on the arbor shaft.
- 78 Use the same tip for horizontal drilling.
- 79 Repeat for drum sanding.
- 80 A small wood lathe can be powered from the arbor.
- 81 Use fence mounted jig to cut splines for picture frames.
- 82 Use a jig to cut a one-sided straight taper.
- 83 Use jig to cut a two-sided taper.
- 84 Use jig to cut a three- or four-sided taper.
- 85 Cut a round tenon on the dowel using miter gauge and fence.
- 86 Use a jig to make finger joints.
- 87 Use multiple blades and spacers for numerous tasks.
- 88 Produce all 26 alphabet letters.
- 89 Create 10 numbers using saw cuts.
- 90 Create an open end mortise and tenon joint.
- 91 Create a half-lap, end lap or cross lap joint.
- 92 Create a spline miter joint.
- 93 Cut through sliding dovetails with a tilted blade.
- 94 Straight line rip rough lumber by tacking straight edge to work-piece fence side.
- 95 Cut bevels on radiused stock with curved jig on saw fence.
- 96 Joint boards for edge gluing by taking 1/32" rip.
- 97 Make semi-closed end mortise and tenon joint.
- 98 Cut segments for bowl blanks.
- 99 Use as a planer with a straight moulding cutter.
- 100 Make 17 different profiles using a moulding head and standard inserts.
- 101 Produce picture frame mouldings by tilting the blade, dado head, moulding head or a combination. PW

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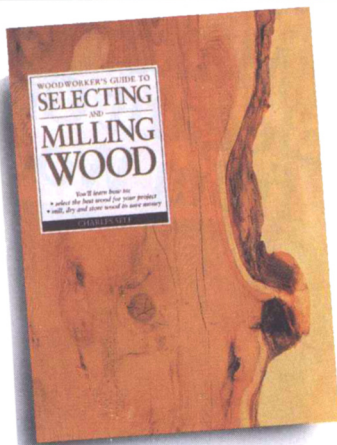
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DISCOVER

GOOD READING



The Woodworker's Guide to Selecting & Milling Wood, by Charles Self. 144 pages, hardcover, \$22.99; available from Betterway Books, 1507 Dana Avenue, Cincinnati, OH 45207.

With the cost of wood rising, this book is a welcome relief. Self provides good information on milling your wood to save you money.

The first chapter, "The Structure of Wood," is somewhat oversimplified, but I learned why quartersawn stock is preferable for many projects.

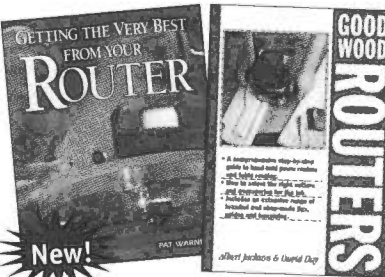
Chapter 2, "North American Softwoods," describes species by type. It also features a "Gallery of Popular Wood," which shows samples with brief descriptions. The next chapter, "North American Hardwoods," has interesting observations about uncommon woods, in addition to the more common furniture timbers. Chapter 4 deals with exotic hard and softwoods.

The fifth chapter begins with finding and felling trees. Self suggests that for about \$1,000 worth of tools, you could produce a couple hundred board feet daily. The sixth chapter explains what to do after felling the tree. Learning about defects caused and controlled by different milling methods, and grading wood should save you a lot of money.

Other chapters cover drying and machining lumber, as well as a chapter on plywoods and safety.

So much information is given in this book, it will make you a better woodworker.

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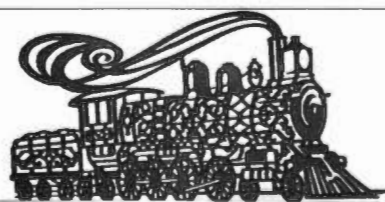
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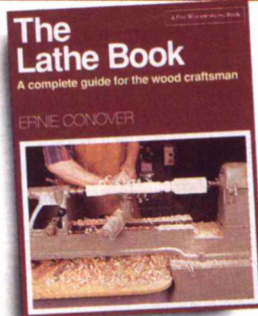
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22 Popular Woodworking

GOOD READING



The Lathe Book, by Ernie Conover.
198 pages, paperback, \$25.95; avail-
able from The Taunton Press, 63 South
Main Street, Box 5506, Newton, CT
06470-5506.

Many of us know Ernie Conover
as co-inventor of the Conover
Lathe, one of the most desirable pre-
mium turning machines available. His
book promises, "A complete guide for
the wood craftsman." I'd expand on
that — it's the best turning book by an
American that I've read. Easily the
peer of the great English and
Australian turners, Conover presents a
full course in lathes and turning, from
general to advanced techniques.

The first chapter addresses lathe con-
struction, the parts of the lathe, tool setup
and safe operation. The second chapter
deals with centers, faceplates, and com-
mercial and shopmade chucks. The next
chapter discusses turning tools, begin-
ning with cutting theory and sharpening
before advancing to selecting tools for
spindle and faceplate turning. The fourth
chapter deals with turning techniques.

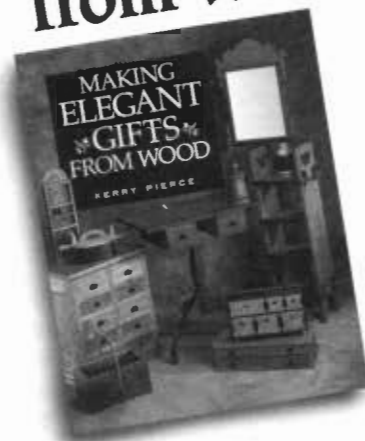
An important chapter deals with
maintenance, repair and modification.
If your neighborhood is like mine, no
one will do this work for you afford-
ably, so you have to learn yourself.
There's no one I'd rather have as a
teacher than Ernie Conover.

The final chapter offers three pro-
jects. Each applies what was taught in
the earlier chapters. Two are small and
simple, and the third is a Windsor stool.

This may not be the only book
about turning that you'll ever want,
but it's certainly a handsome addition
to any turning library. **PW**

*Hugh Foster is a woodworking author
and high school English teacher who
lives in Manitowoc, Wisconsin.*

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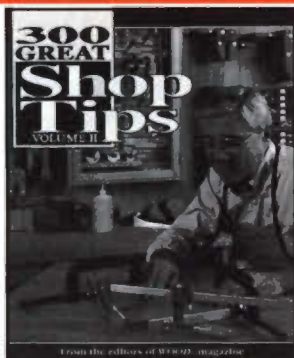
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WOOD® Magazine test, Sept. '93, pg. 45

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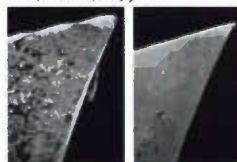
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Intricate Carving With a Router

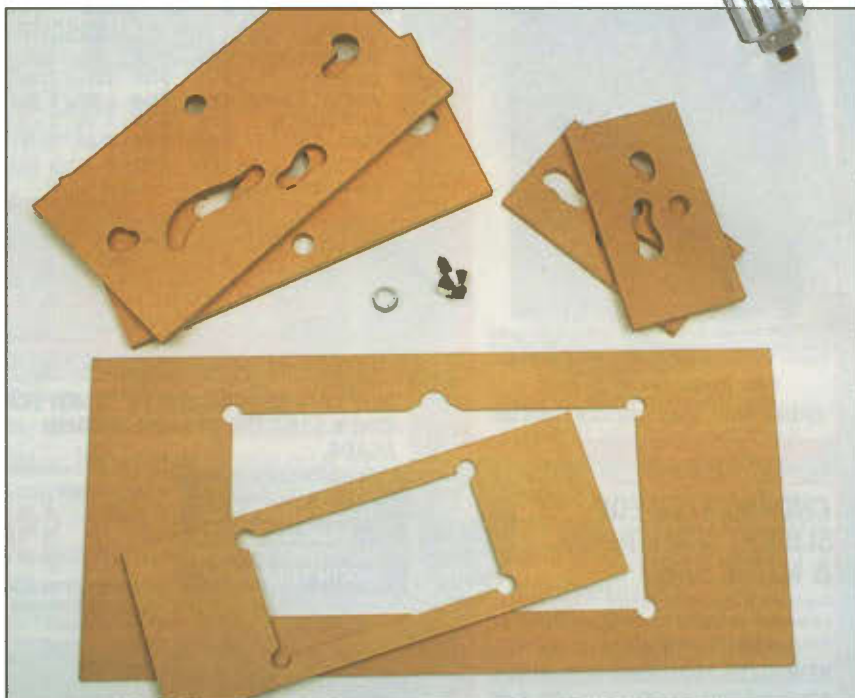
CMT's 3D Router Carver uses templates and a special bit to make carving a breeze.

CARVED DETAILS on furniture and cabinetry add the craftsman's touch we'd all like to display, but don't have the skill or time to produce. Now, thanks to an exciting new product called 3D Router Carver, anyone with a plunge router can produce handsome results in far less time than would be required using chisels to carve by hand (**photos 1 & 2**).

The innovative product includes a special, carbide-tipped router bit with a conical bearing, a template or set of templates, and a holding frame that secures the templates as you rout (**photo 3**).

The secret to 3D effects is the infinitely variable width of the slots that are formed in the templates. As the slots widen, the conical bearing allows the bit to move downward so that the V-groove is wider and deeper. As the slot narrows, the bit moves up and the groove becomes more shallow and narrow. The change is infinite along the entire length of the slots (**diagram**).

CMT's current offerings include more than 40 different template sets.



1&2
Samples of work done with the 3D Router Carver.



3 The templates and frames are made from medium density fiberboard (MDF). The shape of the slots in the templates is formed by a computer controlled machine. Diamond-tipped bits perform the cutting.

CAUTION:

Place the router carefully when starting cuts. To ensure against damaging edges that the special bit must follow, start cuts in the widest area of the template slots.

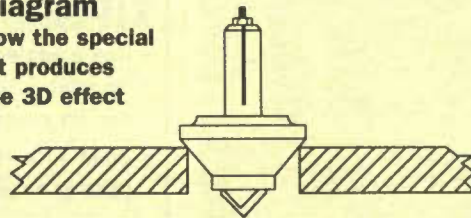
They provide classic designs for cabinet and entry doors, drawer fronts, corner details, and rosettes that are usable for individual details or that may be combined with other templates to add a central carving to the main theme.

Some patterns need only a single template that is rotated and inverted several times to produce the design. More complex patterns require a set of templates that produce phases of the carving.

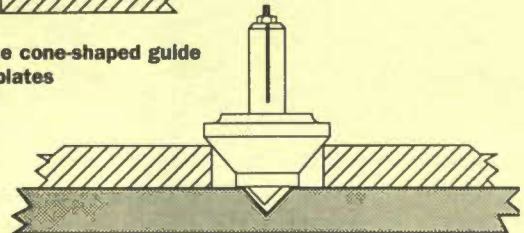
The problem of keeping the templates correctly aligned is solved by the holding frame that is clamped or tack-nailed to the project. The frame serves to secure the templates in any

Diagram

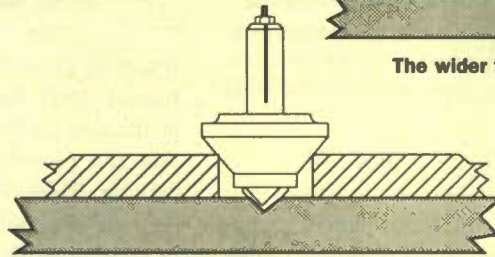
How the special bit produces the 3D effect



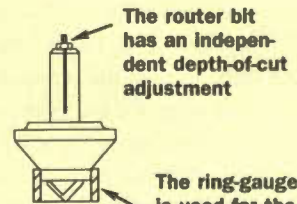
Cross section shows how the cone-shaped guide follows the slots in the templates



The wider the slot, the deeper the cut



Cut-depth decreases as the slot narrows



The router bit has an independent depth-of-cut adjustment

The ring-gauge is used for the initial setting of the bit

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4 Carving is a matter of moving the router to follow the slots in the templates. The router's plunge mechanism is unlocked so it can freely move up and down as the conical bearing on the bit follows the varying width of the slots.

of the positions that the design requires (photo 4).

In my shop tests, I found that the 3D carving system is no more difficult than the types of conventional pattern routing that's done when the router is equipped with a template guide.

Prices range from about \$27 to more than \$100, depending on the number of templates and frames that a project requires. The special router bit that's needed runs about \$99.

A recently added "accessory" to the line is a binder of full-size patterns that are printed on heavy paper stock. The

TIPS:

- Use a sealer on all edges and surfaces of frames and templates to guard against dimensional changes that can be caused by atmospheric conditions.
- Sand all surfaces very lightly with fine sandpaper (220 grt) wrapped around a block of wood.
- Don't use a power sander.
- Keep the router's plunge rods clean. Polish them with paste wax or use a dry lubricant.
- Polish the surfaces of templates and the router base with paste wax.

Source List

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reusable patterns can be removed from the binder and positioned on the workpiece so you can preview the finished carving. Thus, it's possible to do a lot of planning and designing before buying products or starting work. The set of 46 patterns sell for \$14.90. If you plan on becoming a router/carver, the book of patterns might be a wise "first buy." **PW**

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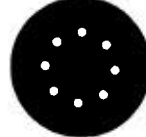
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Butternut *(Juglans cinerea)*

Common Names: White Walnut, Oilnut, Nogal, Tropical Walnut.

Growing Regions: Canada and United States.

Size Characteristics: Small to medium size tree, grows to 50 feet tall, with a trunk about 30 inches in diameter.

Characteristics of Wood: It resembles black walnut, except the heartwood is medium-brown to dark-brown. It also has a coarse but soft texture with straight grain. The wood is relatively soft, with a low bending classification.

Workability: Butternut works easily with hand and machine tools, but requires sharp cutting edges because it's rather soft and will tear out. It nails, screws and glues without problems, and is excellent for carving.

Common Uses: Suited for furniture, cabinetmaking, boat building, carv-

ing, high-class and utility joinery, and veneer. Butternut is also excellent for interior trimming.

Availability: Butternut is listed as rare, except in certain isolated areas where it can grow in relative abundance, although these areas are limited and decreasing.

Wood Movement: It is a fairly stable wood, with minimum movement and shrinkage.

Finishing Characteristics: Butternut stains well and polishes to a high sheen.

Special Features: The tree bears two edible products — nuts and a sweet, sugary syrup. The dried inner bark of the roots contains natural substances that are used in medicines.

Midwest Price: Surfaced three sides (S3S), $\frac{1}{4}$, costs about \$5.47 per board foot. **PW**



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DOVETALES

Women In Woodworking

Well, it's time to empty the mailbag. Dovetales has been getting lots of feedback, but there doesn't ever seem to be enough space to include it all. So here's a sampling, and please continue to send in your comments, questions and ideas — remember, this is your forum. Write to: Dovetales, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207. You also can send e-mail to Wudworker@aol.com. — Cristine



Deciphering a Cutting List

I'm glad to see a forum for women woodworkers. I took up woodworking as a hobby about a year ago, took a few adult education courses and read everything I could get my hands on. But I've never seen an explanation of how to develop a cutting list. You've got a plan, know where to buy your lumber, but how do you figure out how much of what size to buy and how to cut it with the least waste?

Sue Hammer
Skorff@aol.com

You're right, that's an important question that never gets answered. Perhaps because it could justify an entire book. I don't have that space here, so I'll give you an overview to get you started. For more information, also see this issue's "Turnings" on page 6.

To get an estimate of the amount of lumber or plywood your project requires, first make a complete list of the exact sizes and quantities needed to complete it. Use your project drawing to systematically make up the list. For an example, refer to any Schedule of Materials in *Popular Woodworking* project articles.

If using plywood, draw a rectangle to represent a 4' x 8' sheet. Pretend the sheet is a puzzle and the goal is fitting the most pieces from your list on it with the least waste while remembering the grain direction you want. Remember, however, that you'll always want to make straight cuts all the way through the sheet before making a second perpendicular cut.

Estimating your lumber needs is more difficult. As a general rule, buy the widest stock possible unless you'll be paying a big premium. If, for example, you're building from pine, get 1" x 12" stock. The odds are you'll get the best yield because the wider board will give you more cutting options. You can also think of this size in terms of square feet. Get an idea of the amount of square feet required from the cutting list by imagining pieces of about the same length laid side by side. From these groupings, "guesstimate" how many square feet are required. It's always a good idea to add 20 to 30 percent to your material estimate as a waste allowance.

To cut for optimum yield, the general rule is to cut the widest, longest pieces first and the smallest pieces last. Remember, though, this is a general rule, and each project will have its own peculiarities. As in most endeavors, let forethought and common sense be your ultimate guide.

A Toy From the Past

When my husband was growing up in the 1940s, he used to have a toy known as a Jacob's ladder. For some time now we've been looking for plans to build one, but have been unsuccessful. Would you possibly know where I can find these plans? My husband's birthday is coming up and I wanted to make a Jacob's ladder to surprise him. Thank you!

Cecilia Ball
Warren, MI

Look no further than this issue's "Project File." I hope that your husband enjoys his surprise!

Rounding Up a Router

I am in the market for a router for rounding over the edges of small furniture projects. I've been doing a lot of reading and researching. In *Tools of the Trade's* Fall '95 issue, they say that if the only routing you plan to do is mill small profiles on the edges of boards or to cut mortises for hinges, you're better off using a laminate trimmer (4 amps) or a small router (5 to 7 amps).

I was wondering what type/brand of router you would recommend. Price for me is not a real problem. I want a router that I feel comfortable with (not real heavy) and one that will hold up and be dependable.

Any help you might be able to give me would be appreciated.

Beulah M. Skiles
Gettysburg, OH



While a laminate trimmer would work, its motor power could limit your future, unanticipated uses. I recommend a 1 hp or 1 1/2 hp plunge router. Its power allows it to cut bigger profiles. It's also relatively easy to handle if you stay with a smaller unit.

In addition to factors such as purpose, flexibility, weight, size and price, a time saving factor to consider is the wrenches that come with the router. They should allow you to change bits and tighten the collet easily. And you're correct — more money spent in quality upfront should save you time and frustration in the long run.

With all of these factors considered, I suggest that you try out the Bosch 1614 1 hp plunge router for \$175. It has a self-releasing collet system for increased bit gripping, and a shaft lock provides one wrench bit changing.

Good luck with your purchase. I hope you enjoy it!

PW

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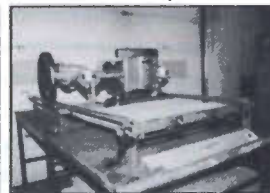
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Circle #110 on Resource Directory Coupon

Making Finger Joints

Get perfect finger joints every time with these rules of thumb.

By David Mukamal Camp

IT'S EASY TO SEE where the finger joint gets its name. It's formed by the ends of two boards that come together at a corner and intertwine like the fingers of a patiently folded hand. Though it looks like a dovetail, the finger (or box) joint doesn't require as much patience to cut and can be done entirely by machine. A simple referencing jig fits the kerf of one cut, positioning the stock for the next cut, and so on.

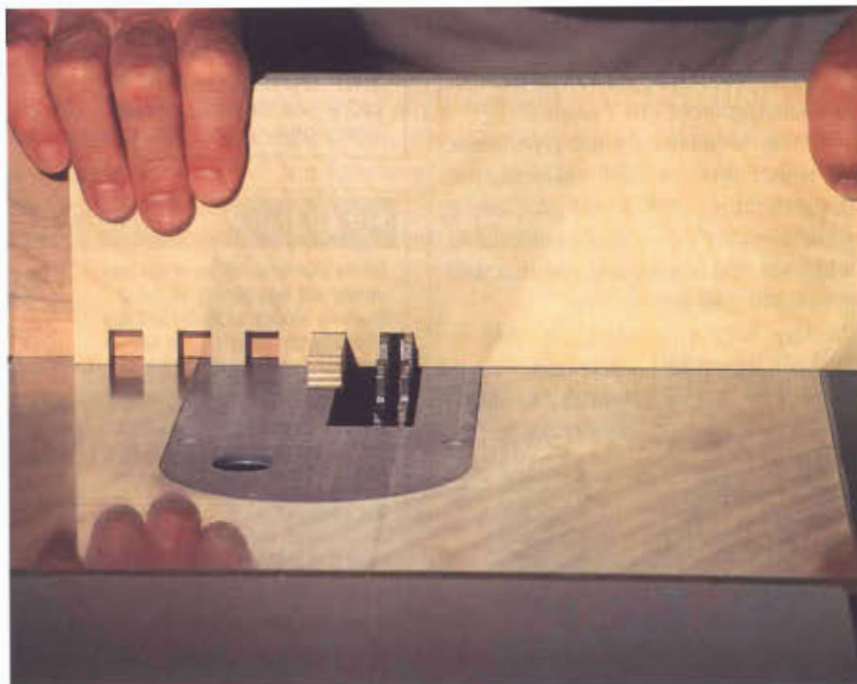
The finger joint is great for mass producing boxes of any size. It's useful for making recipe boxes, card files, trays, jewelry boxes, desktop organizers...the possibilities are endless. I recently used the finger joint technique to make a short run of magazine storage boxes. (The plans are provided on the next page.)

Stock preparation is easy. Just cut your box sides to their finished outside dimensions plus $\frac{1}{16}$ ". This extra $\frac{1}{16}$ " is so you can make the fingers $\frac{1}{32}$ " proud at each end. Then sand them flush after assembly.

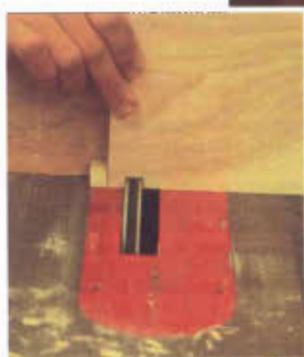
Your first step is to decide on the spacing for the fingers. You could go with the width of your saw-kerf and cut a lot of long, skinny fingers, or stack dado blades and cut them really wide. You could even cut slots and fingers of two different widths if you make a pair of referencing jigs.

I'll demonstrate the process for cutting fingers and slots sized to the thickness of your material, and leave it to you to calculate any more complicated permutations.

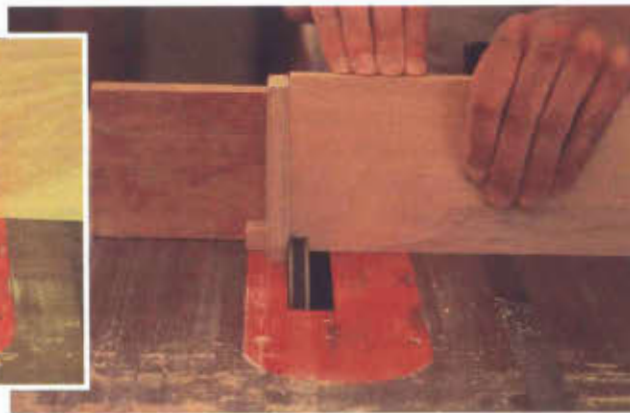
Since my box sides are made from $\frac{1}{2}$ " thick MDF core birch plywood, I cut slots $\frac{1}{2}$ " wide x $\frac{1}{2}$ " deep, spaced at $\frac{1}{2}$ " intervals. To do this, make a referencing pin of exactly the same size, in thickness and width, as the thickness of the actual stock for my box sides. (I don't know why $\frac{1}{2}$ "



1 Place the referencing pin next to the dado blade. Then align the slot in the backing board next to the pin before fastening the board to the miter gauge.



2 Butt the bottom of the side against the referencing pin to cut the first slot. Slip this first cut over the pin to position the piece for cutting the second slot.



3 Set a spacer next to the referencing pin to position the first cut in the end pieces. The spacer will offset the piece, resulting in slots that accept the fingers from the sides.

A Production Run Of Magazine Boxes

These boxes are a great way to store tool catalogs, back issues of *Popular Woodworking* and your other favorite magazines. They are also quick to produce and make great gifts.

First make a full-size pattern for the side template. Then cut the template from $\frac{1}{4}$ " MDF. Sand it to shape using disk and drum sanders. Now trace the template onto the stock. You can fit two sides onto a $9\frac{5}{8}$ " x 17" panel.

Cut the sides out on the band saw, staying about $\frac{1}{8}$ " wide of the line (**photo A**).

Then attach the template with double-sided carpet tape. Use a flush trim bit in the router table to perfect the shape of the sides (**photo B**).

Now cut the fronts, backs and bottoms to size. Join them together with finger joints, as instructed in the accompanying article.

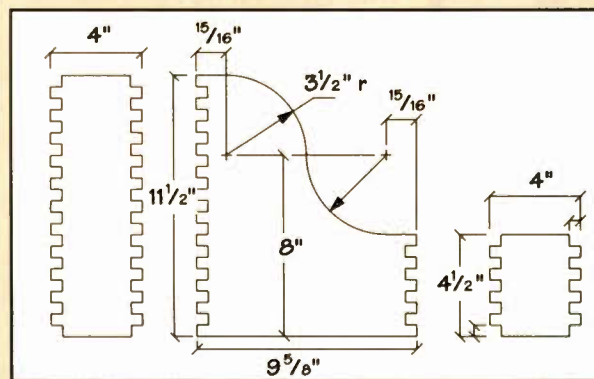
To make the bottom, cut a rabbet around the edges so they fit between the sides. Another option is to groove the sides to accept the recessed bottom. Assemble the box, gluing the bottom in place. Then sand the fingers flush.

Schedule of Materials: Magazine Boxes		
No.	Item	Dimensions T W L
2	Sides	$\frac{1}{2}$ " x $9\frac{5}{8}$ " x $11\frac{1}{2}$ "
1	Front end	$\frac{1}{2}$ " x 4" x $4\frac{1}{2}$ "
1	Back end	$\frac{1}{2}$ " x 4" x $11\frac{1}{2}$ "
1	Bottom	$\frac{1}{2}$ " x 4" x $9\frac{5}{8}$ "

A Cut out the curved sides on the band saw, staying just wide of the line.



B The template guides a flush trimming bit in the router table, shaping the sides perfectly.



plywood never measures $\frac{1}{2}$ ". . .) Make the pin $1\frac{1}{2}$ " long so it extends into the miter gauge backing board and protrudes for referencing the stock.

Next, set up the dado blades and test the cut until the width matches the thickness of the box sides and the depth is $\frac{1}{32}$ " strong. Now make the backing board. (I used some

bottom edge against the pin. Then cut all the ends, butting the bottom edge against the spacer. Now start building those boxes! **PW**

David Mukamal Camp is a custom furniture maker in Santa Fe, New Mexico.

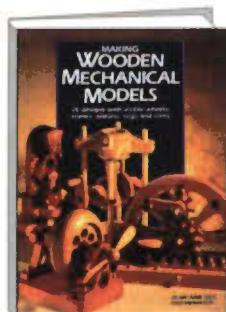


$\frac{3}{4}$ " plywood scrap.) Using the miter gauge, make a dado cut on one edge a few inches from the end to accept the referencing pin. Your next mission is to screw this board to the miter gauge so the slot and pin are offset from the blade by the width of one cut. This sometimes takes a bit of trial and error. What I do is lay my referencing pin (unattached to the backboard) next to the blade, line up the slot next to the pin (**photo 1**), and clamp the board to the miter gauge.

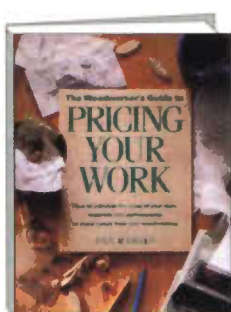
Next drive the screws, remove the clamp and test cut a row of fingers on two pieces of scrap. If the joint is too tight, shift the backing board so the first cut is closer to the blade, which will make the fingers smaller. If it's loose, shift the slot in the board away from the blade. Then plug each screw hole in the backing board with a toothpick and try again.

Cut the fingers on one side by starting with the stock butted up against the referencing pin (**photo 2**). Make one cut, then fit that slot over the pin for the next cut. Make sure you slip the wood all the way down onto the pin as you make each cut. To position the mating piece for its first cut, place a short scrap of stock that's the same thickness against the pin to act as a spacer. Butt the second side against the spacer and make the cut (**photo 3**). Now the second side will start with a slot to accept the finger from the first side.

The key to keeping this all straight is to start all your cuts from the same edge. Divide your parts into two stacks, sides and ends, and cut all the sides first with the bot-



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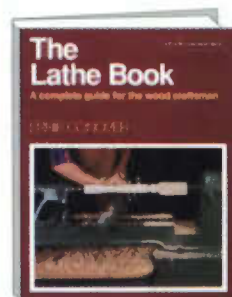
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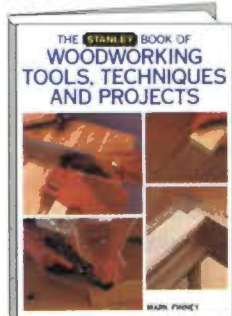
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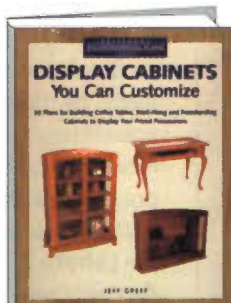
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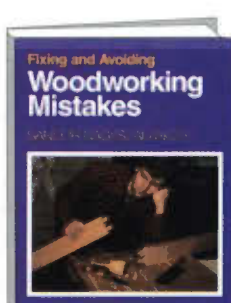
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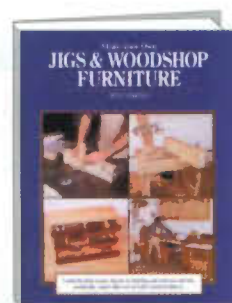
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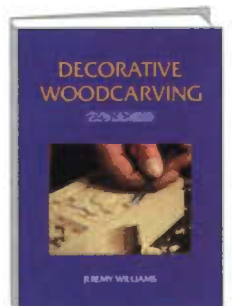
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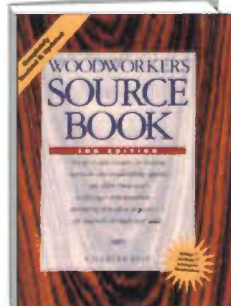
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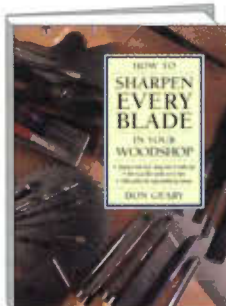
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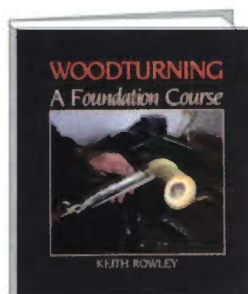
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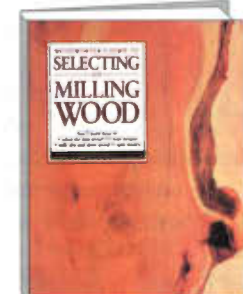
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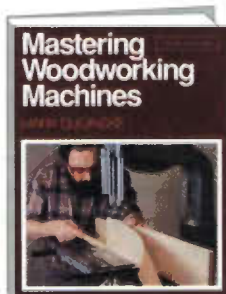
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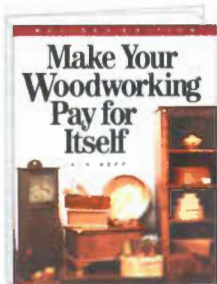
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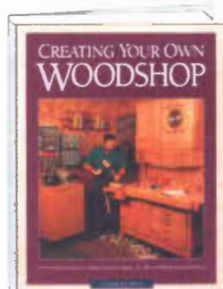
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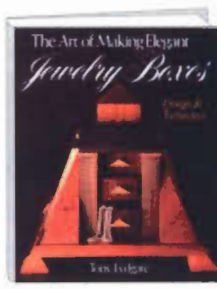
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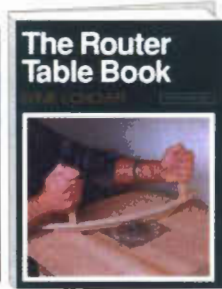
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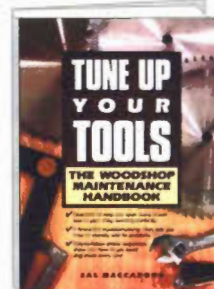
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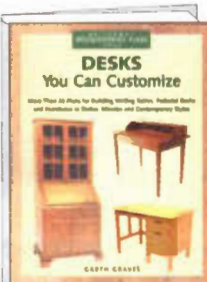
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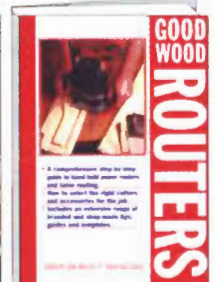
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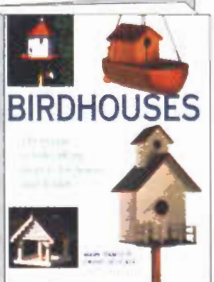
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LBT7

Punched Tin Pie Safe

Create a kitchen classic with bare bones equipment.

By Steve Shanesy



THE PIE SAFE, like the dry sink, is an enduring form of furniture whose popularity has long outlasted its purpose. While the idea of this pie safe being chock filled with fresh fruit pies is wonderful, today it's more practically suited for general storage, or even an entertainment center. If you've noted the astronomical prices for genuine antique pie safes, you'll be glad to know that this one was built for less than \$150, including the 12 pre-punched tins that are as easy to acquire as dialing an 800- phone number.

Get Started

Before heading to the shop, be sure to study the plan and cutting list. I used poplar in this project since it was available in $\frac{3}{4}$ " and $1\frac{1}{2}$ " thicknesses at the lumberyard, surfaced and ready to go. Note that the back is $\frac{1}{4}$ " and the shelves and bottom are $\frac{3}{4}$ " birch plywood.

To keep construction simple, the doors and sides are identical. The four legs are glued to the sides and, along with the bottom, top stretchers and back, make up the carcass. The top screws on through the stretchers. In other words, the whole project is simply four legs, four ladder frames (doors and sides), a top, a back and two shelves.

Most joinery uses biscuits, but not a biscuit jointer. If you have one, use it. If you don't, use your router with a $\frac{3}{32}$ " spline cutting bit. This joint is used for the ladder frame stiles and rails, and for indexing and securing the completed side ladder frames to the four legs.



Editor's Note

In the July '96 PW, I built and outfitted a portable workstation, which folds in half for easy storage, with \$498 in tools and equipment. Reckoning

many of you work under crowded circumstances, I wanted you to know that at this magazine we can work that way, too. You see, "Little Shop" projects are designed so bare bones equipment produces big results that you can duplicate in your shop.



Make the Legs

After cutting the legs to size, cut the tapers so they start 14" from the bottom of the leg where they narrow to $1\frac{1}{8}$ ". Cut the tapers on your table saw (**photo 1**). Taper only the leg on the two sides that face inward. To avoid later confusion, mark the top of each leg with regard to its orientation.

Build the Ladder Frames

Cut out the stiles and rails that make up the ladder frames. Be careful that they're cut to equal length and square to the long edges and to the face (**photo 2**).



1 Use a standard tapering jig and your table saw to taper each leg's inside edge. The taper starts 14" up and leaves a $\frac{7}{8}$ " square bottom.

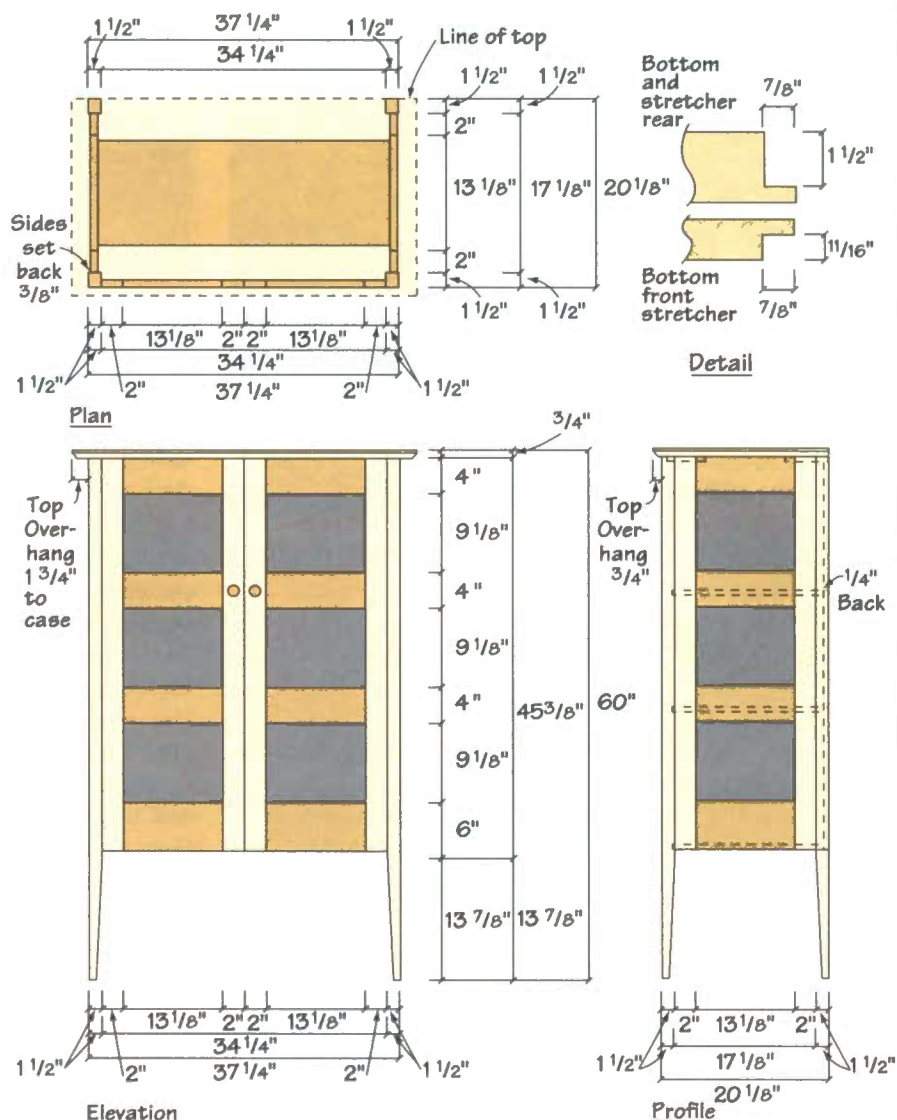
Prepare these parts for assembly by laying out the points where the rails intersect the legs (**diagram**). Mark them with a pencil, then mark the spot where your biscuit slot will be cut. Mark them all the same so you don't have to keep track of each rail/stile joint. With this done, set up the router so that the bit makes the slot cut in the center of the $\frac{3}{4}$ " thick material.

Now mill the slots on the long edges of the stiles (**photo 3**) and the ends of the rails. When this chore is complete, use glue and #20 biscuits and clamp each ladder frame together. Clean up any excess glue with a wet, then wrung dry rag, and make sure that each assembly is square.

Next, lay out the location and spacing for biscuit joining the legs to the two ladder frame sides. Mill these slots so that the biscuit is again centered in $\frac{3}{4}$ " material and the $1\frac{1}{2}$ " thick legs. When assembled, there should be a $\frac{3}{8}$ " setback from the face of the leg to the face of the frame on both sides.

Before assembling the legs to the frames, cut a rabbet on the inside top and bottom edges of the frames and on the inside of each frame opening to receive the punched tin. Cut the rabbet on the

Diagrams



Schedule of Materials: Pie Safe

No.	Item	Dimensions T W L	Material
4	Legs	1 1/2" x 1 1/2" x 59 1/4"	Poplar
8	Stiles	3/4" x 2" x 45 3/8"	Poplar
12	Rails	3/4" x 4" x 13 1/8"	Poplar
4	Rails	3/4" x 6" x 13 1/8"	Poplar

1	Bottom	3/4" x 19" x 36"	Birch ply
1	Back	1/4" x 35 3/8" x 45 1/4"	Birch ply
2	Stretchers	3/4" x 4" x 36"	Birch ply
1	Top	3/4" x 20 7/8" x 40 3/4"	Poplar
2	Shelves	3/4" x 18 15/16" x 34 3/16"	Birch ply
4	Shelf supports	3/4" x 1 1/4" x 17 1/8"	Poplar



2 To make consistent length cuts, clamp a gauge or stop block to your table saw sled. This setup cut all 16 rails to exactly the same length.



3 No biscuit joiner? No problem. Use a router set up with a $\frac{3}{32}$ " spline cutter to make biscuit slots. These slots joined stiles to rails.



4 Rabbet the inside of the frame openings, again using the spline cutting bit. Two passes at different depths make the rabbets which house the punched tins.



5 The biscuits align the legs to the side ladder frames during glue-up. Center the frames on the legs to produce a $\frac{3}{8}$ " setback front and back.

top and bottom edges using the table saw. (See "Getting a Bead on Rabbets" below.)

Use the router and slot cutting bit to make the rabbets around the inside of the frame openings (**photo 4**). Make two passes for each opening so the rabbet is $\frac{3}{16}$ " deep x $\frac{5}{8}$ " wide. Lastly, sand the frames, then glue them to the legs. Make sure the legs are turned according to plan (**photo 5**).

Prepare the Bottom, Back, Stretchers and Top

While the leg/side assemblies are drying, cut out the bottom, back, top and stretchers. After cutting the parts to size

according to the Schedule of Materials, cut notches in the corners of the bottom and stretchers so that they fit around the legs and seat properly (**photo 6 & diagram detail**). At this time, also cut a $\frac{1}{4}$ " deep x $\frac{1}{2}$ " wide rabbet in the back edge of the rear stretcher to receive the cabinet back. Use your table saw and the two-cut process that was described earlier.

If you haven't already done so, glue-up the boards that you will need to make the top. Then cut the glued-up slab to size. Next, use a router to cut an edge chamfer detail on the bottom edge of the sides and front (**photo 7**).

Getting a Bead on Rabbets

Setting up your table saw to cut a rabbet joint using a dado set is a time consuming, tedious process. That's why I like to make rabbets using a two-cut system on the table saw with a standard blade. This method requires that the first cut is made with the work on edge. To make it safe, use a featherboard to press the work against the fence.

Set up the first cut with the space between the blade and the fence to the dimension you want the remaining leg of the rabbet to be. Raise the blade to the thickness of the material that the rabbet will house. Run the part on edge with the waste side away from the fence (**top photo**).

For the second cut, reset the fence so that the distance between the fence on the *outside of the blade* is again the thickness of the material that the rabbet will house. Set the blade as high as the rabbet's intended depth. Now make the second cut (**bottom photo**). As you complete this second pass, take care not to stand directly behind the blade. This is because the second cut separates the waste piece, leaving it between the moving saw blade and the fence, which often results in the wastepiece being sent back in the direction of the operator, sometimes at very high speeds.



Assemble the Carcase

Now all your careful preparation will begin to take shape. First, dry fit the bottom and top stretchers to make sure they fit. When satisfied, glue and nail the bottom in place. This is best done with the side/leg assembly turned upside down. Clamp across the sides to make sure the joint is tight and to help hold the pieces together as you nail. After fastening the bottom, rotate the case so it stands upright. Now glue and nail the front and rear stretchers, again using a clamp.

Before you can screw in the back, use your router and slot cutter once again to cut a rabbet in the legs to receive the back. Since you've already made the rabbet in the top stretcher, cut the rabbets in the legs to the same depth. Stop the cuts at the top and at the lower edge of the bottom. Use a chisel to square up the corners at the stopped cut. Now you can set the back in place.

Before attaching the top, drill and countersink clearance holes in the stretchers. Next, set the top in



6 The corners of the bottom and top stretchers which fit around the legs must be notched. These notches allow the back, sides and doors to mate properly.

place with the back edge flush to the back of the cabinet. Make sure there's equal overhang on both sides and in the front. Clamp the top in place so it doesn't move while you fasten it.

Hang the Doors

Begin the door hanging process by laying the case on its back. Set the doors in position to determine if any fitting is required. I needed to trim about $\frac{1}{8}$ " from my doors. Next, position the hinges and pencil mark their locations on the doors. Use a chisel and cut a mortise for each. The depth of the mortise will depend on the hinges you use. Once the mortises are cut, drill a pilot hole for the screws and screw the hinges in place.

Place the doors in position on the pie safe. Align the doors, then use a pencil to mark the hinge location on the case. Now set the doors aside. Turn the case on its side and proceed to cut mortises for the hinges on the case. When this is done, finish hanging the doors.

Cut and Set the Shelves

To avoid notching the shelves' corners to fit around the legs, cut shelf supports that include a rabbetted top edge (**photo 8**). Make the leg of the rabbet $\frac{3}{8}$ ". This leg acts as a filler, with material projecting out from the rabbet supporting the shelf. Merely screw it in place, dividing the interior into three equal spaces.

Sand and Finish

To sand and apply finish, I like to take the removable parts off for ease of handling. Give the entire project a good sanding using a random orbit sander and 120 grit, then 180 grit, sandpaper. Break or ease all the edges.

I decided to use a warm brown gel stain on the poplar since its low viscosity helps to prevent blotching, a common and frustrating staining problem with poplar. As a topcoat, you can make a "wiping varnish" by thinning regular oil-based varnish with mineral spirits in a one-to-one ratio. Apply three coats of the thinned varnish using a lint-free rag, sanding lightly between the coats with 360 grit sandpaper.



PIE SAFE

7 A chamfer bit and router cut the bevel detail on the top. If you don't have this bit, use your table saw with the blade tilted to 45 degrees.



8 Cut a rabbet detail on the shelf supports which fit between the legs. This fills the gap between the sides and the shelf ends. Otherwise the shelves would need to be notched to fit around the legs.

Since the new punched tins have a very shiny finish which I didn't like, I painted them with satin sheen latex paint. To make the paint look older, I wiped on a thinned brown glaze. Before painting, use a tin snip to cut a radius on each corner, making sure the tins fit in their openings.

When the finishing is done, reassemble the pie safe and install the tins with short pan head screws. Now you'll have to decide which way to turn the tins—sharp or smooth side out? Some antique dealers will tell you original pie safes had the sharp side out because it made it impossible for bugs to get at the fresh baked goods. Regardless, those points and the tin edges are sharp, so be careful handling them.

To complete, carefully drill a hole for the wooden door pulls and glue them in place. Use whatever style of door catch you like—magnet, roller catch or a more authentic wooden turn glued to the back of the free wheeling knob. **PW**

Steve Shanesy is editor of Popular Woodworking.

Editor's Note: For a complete hardware kit as used in this project (12 punched tins, two-pair hinges and two pulls), call The Woodworkers' Store at (800) 279-4441 and ask for kit #34108. The cost, including shipping, is \$84.95. For punched tin patterns, call Cherry Tree catalog at (800) 848-4363.

Christmas Creche

Make this heirloom a part of your family's holiday decor.

By George Antolik

NOTHING CAPTURES the essence of Christmas like a Nativity scene under the tree. This sturdy, handcrafted manger can become a part of your family's holiday tradition for generations. You can build the entire project with limited tools and materials, and with a measure of patience.

Begin by cutting your pine to the sizes provided in the Schedule of Materials. The $\frac{1}{2}$ " x $\frac{3}{4}$ " pieces are made from a simple stop moulding purchased from the local hardware store, as are the $\frac{1}{8}$ " x $1\frac{3}{8}$ " lattice pieces. In some cases, miters will be required, but these can be done after all the pieces are cut to size.

The "aging" process on the wood is achieved by carefully scorching the pieces with a propane torch. A very fine grade of steel wool will help blend the scorch marks to get the desired effect.

Building the Frame

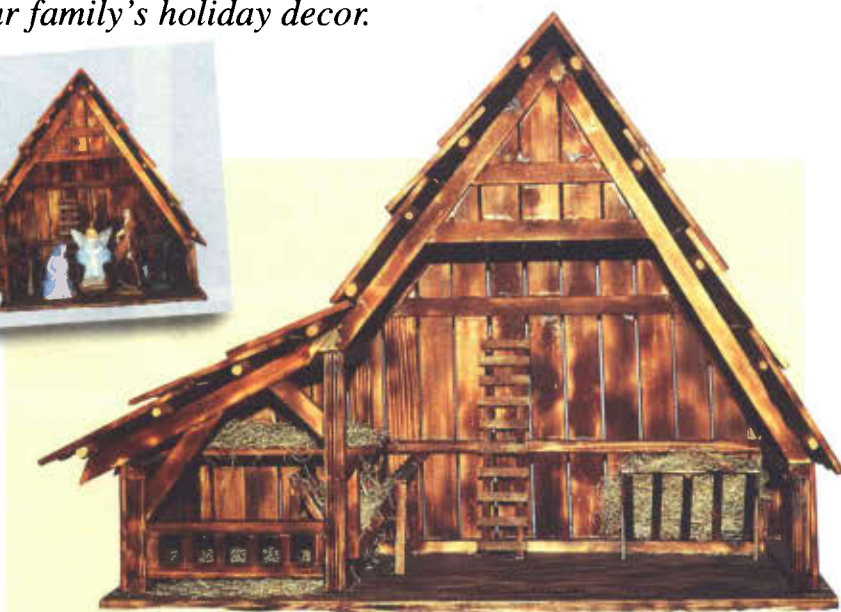
Make the two side walls using two $10\frac{3}{4}$ " (**E**) and two $4\frac{1}{2}$ " (**N**) pieces per side. Clamp and glue the **N** pieces between the **E** pieces, then cut two $2\frac{1}{2}$ " brace pieces (**P**) for each side to provide added support and a decorative effect. Glue into place across the top corners. Once the frames are dry, cut seven pieces of $5\frac{1}{2}$ " siding (**T**) and glue them to the outside of each side wall. Space the siding evenly to get a barn-like effect.

Make the back wall of the creche the same way as the sides, using two $14\frac{3}{4}$ " frame pieces (**B**) and two more **N** and **P** pieces. When the back wall is dry, glue it to the inside of the right wall. Clamp and let dry.

Now glue the hayloft frame together using two $9\frac{3}{4}$ " pieces (**H**) and three **N** pieces (**diagram 2**). Then glue the two $8\frac{1}{2}$ " pieces (**I**) to each end of the frame, and glue a third **H** piece between the two **I** pieces.

Make the front railing for the hayloft by gluing five 1" pieces (**Q**) between two $5\frac{1}{2}$ " pieces (**K**) (**diagram 1**). The back wall of the hayloft is made using two more **K** pieces and two **N** pieces. When both parts are dry, glue them between the hayloft frame and the left side wall. Finally, glue the completed hayloft section to the back wall to complete the general frame of the creche.

For the main barn, create an angled frame by gluing two $13\frac{3}{4}$ " (**C**) and two



$13\frac{1}{2}$ " (**D**) pieces together. Cut the angles for each piece as shown in **diagram 1**. Next, glue a $9\frac{3}{4}$ " cross piece (**H**) between the tops of the frame, while gluing the base of the frame to the tops of the hayloft and right side walls.

To complete the peak of the roof, cut four brace pieces (**F**, **J** & two **M**'s). Glue **F** and one **M** between the back peak frame pieces, and **J** and the other **M** between the front peak frame pieces. Then cut to fit three loft roof joists (**G**) and glue to the top of the loft and left side walls. Add the two braces (**L** & **O**) above the hayloft railing on the front facade.

Now measure and cut the five lattice pieces (**R**) to fit *inside* the top of the front frame, spaced evenly apart. Then cut the 17 **S** pieces of lattice to fit the back of the stable. Space evenly and glue to the back frame.

Adding the Shingles

Before the shingles can be placed, they need something to rest on. So use 13 **D** pieces ($13\frac{1}{2}$ " long), and whittle one



1 The hayloft includes space for Mary and Joseph's donkey, as well as another feeding trough. The ladder adds a touch of detail.



2 The feed trough in the far right corner is glued to the back frame. Then it's ready to be filled with straw.

Diagram 1: Overview

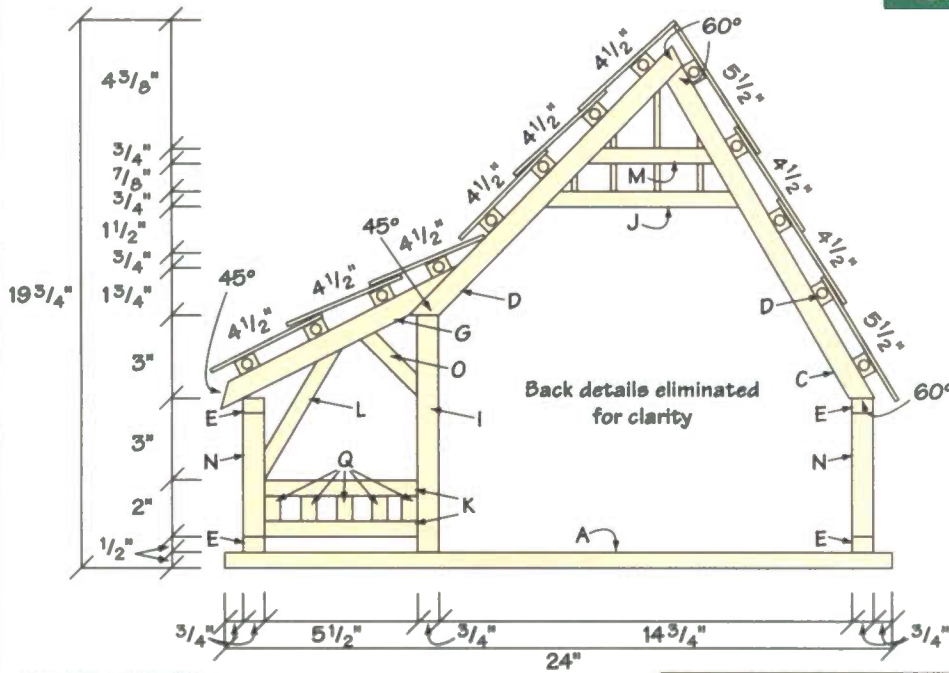
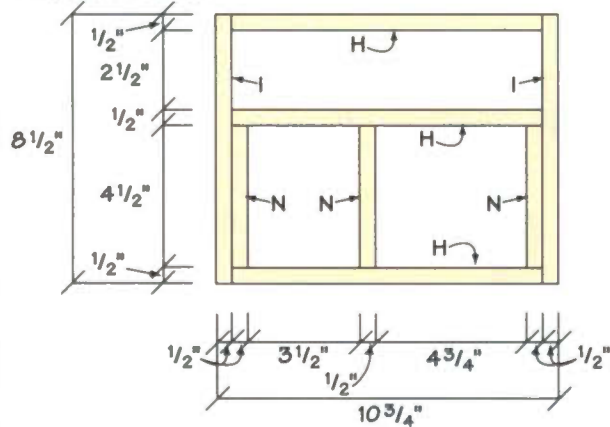


Diagram 2: Hayloft



end, about 1". Overhang the whittled end $1\frac{3}{4}$ " on the front side. Glue these pieces on top of the frame, as shown on **diagram 1**.

Next, attach the shingles as shown in **diagram 1**, alternating shingles per row ($4\frac{1}{2}$ " and 4", $5\frac{1}{2}$ " and 5", and so on). Start placing the shingles just past the whittled end. *Be sure to butt the shingles together. Don't leave a gap as on the sides.* Repeat the process on both sides, but wait to do the top rows at the same time so the ends can overlap and mate appropriately.

Creating Details

The floor of the hayloft is made of pieces of lattice ripped into seven $\frac{1}{2}$ " x $7\frac{1}{2}$ " long pieces. Start gluing the pieces to the top of the left side and loft walls, working forward from the back, stopping at the vertical brace, $3\frac{1}{2}$ " from the end (**photo 1**).

Make each of the feed troughs (**photos 1 & 2**) from five $\frac{1}{2}$ " x $\frac{3}{8}$ " x $3\frac{1}{2}$ " pieces glued to the creche frame and supported by pieces of lattice cut to $\frac{1}{2}$ " x $6\frac{1}{4}$ ", and $\frac{1}{2}$ " x 3" lengths, as shown. Miter the ends to fit against the loft frame.

Schedule of Materials: Christmas Creche

No.	Letter	Item	Dimensions T W L
1	A	Base	$\frac{1}{2}$ " x 13" x 24"
2	B	Back wall frames	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $14\frac{3}{4}$ "
2	C	Right roof peaks	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $13\frac{3}{4}$ "
15	D	Roof joists & left roof peaks	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $13\frac{1}{2}$ "
4	E	Side wall frames	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $10\frac{3}{4}$ "
1	F	Peak brace	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $10\frac{1}{2}$ "
3	G	Loft roof joists	$\frac{1}{2}$ " x $\frac{3}{4}$ " x 10"
4	H	Loft wall frames & peak brace	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $9\frac{3}{4}$ "
2	I	Loft frames	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $8\frac{1}{2}$ "
1	J	Peak brace	$\frac{1}{2}$ " x $\frac{3}{4}$ " x 7"
4	K	Loft back wall frames & railing	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $5\frac{1}{2}$ "
1	L	Loft wall brace	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $5\frac{1}{4}$ "
2	M	Roof peak braces	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $4\frac{1}{2}$ "
11	N	Side, back & loft wall frames	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $4\frac{1}{2}$ "
1	O	Loft wall brace	$\frac{1}{2}$ " x $\frac{3}{4}$ " x $2\frac{7}{8}$ "
6	P	Side & back wall braces	$\frac{1}{2}$ " x $\frac{1}{2}$ " x $2\frac{1}{2}$ "
5	Q	Loft railing spindles	$\frac{1}{2}$ " x $\frac{3}{4}$ " x 1"
5	R	Peak siding	$\frac{1}{8}$ " x $1\frac{3}{8}$ " x CTF*
17	S	Back wall siding	$\frac{1}{8}$ " x $1\frac{3}{8}$ " x CTF*
14	T	Side wall siding	$\frac{1}{8}$ " x $1\frac{3}{8}$ " x $5\frac{1}{2}$ "
10	U	Roof shingles	$\frac{1}{8}$ " x $1\frac{3}{8}$ " x $5\frac{1}{2}$ "
8	V	Roof shingles	$\frac{1}{8}$ " x $1\frac{3}{8}$ " x 5"
40	W	Roof shingles	$\frac{1}{8}$ " x $1\frac{3}{8}$ " x $4\frac{1}{2}$ "
32	X	Roof shingles	$\frac{1}{8}$ " x $1\frac{3}{8}$ " x 4"

*Cut to fit

If you've got a few pieces left, a ladder makes a nice finishing touch. Put some straw in the loft and the feeder troughs, and add your Nativity figures to make the scene complete. Merry Christmas! **PW**

George Antolik created this Christmas Creche as one of many projects for his family. He lives in Greensburg, PA.



Compound Miter Saws

Get the most for your compound miter saw buck by buying the right version for you.

By Charles Self

WITH THE INVENTION of the circular saw, the face of carpentry changed dramatically. Then the power miter saw made even more advancements. More recently, the compound miter saw once again transformed light construction. The benefits quickly carried forward into woodworking, where special mouldings, trim pieces and small box projects were more easily, neatly and accurately trimmed to size faster than ever before.

While a radial arm saw will perform the same functions as a compound miter saw (at greater depths and widths), it's harder to adjust and more apt to get out of adjustment. Today, a lot of radial arm saws end up being used as expensive crosscut machines. And whether or not you choose to own a compound miter saw, you won't find a decent radial arm saw for much less than \$650, while most compound miter saws cost half of that price.

Fixed Compound and Sliding Compound

Compound miter saws come in two basic styles — fixed compound and sliding compound — each with features that make them worth consideration. Major manufacturers offer many versions of compound miter saws to choose from. For this article, we gathered the most accessible, currently available saws.

Each style has different cutting depths at straight and angled settings that will help to determine which saw suits you best. These cut capacities are outlined in the specifications chart provided at the end of this article.

An especially nice feature in sliding compound miter saws is the lack of climb. As most of us know, pulling a radial arm saw blade through a cut means the saw has a tendency to climb into that cut and create too fast a feed. The slide compound miter saw pushes through the work. This eliminates any tendency to climb and produces a cleaner, safer cut.



Prices

You can buy a good quality fixed compound miter saw from \$250 to about \$600 and a sliding compound from \$350 to \$900, depending on the saw and place of purchase. In my opinion, when a tool's price goes beyond \$250 (and most of these saws fall well beyond the \$250 mark), consider the purchase carefully. Think about the use that the tool will get immediately and in future projects and the effect that the expenditure will have on your budget.

Power

The selections range from 9.5 amps (Hitachi's 8½" sliding compound) to 15 amps in a number of fixed compound saws and the Makita LS1211 sliding compound. The smaller amperage still manages most cuts quite comfortably, so while the extra power shouldn't change your buying plans, it's nice to have around.

The major difference between the models that we noticed was the speed at which a cut can be made.

We're not driving ambulances here, so ultimate speed is seldom needed. But if it's an important factor to you, jump on one of the 15 amp saws. The big Makita chomps wood the Ryobi TS200 more or less has to work its way through, but that performance comes at twice the price.

Ease of Use

What you need to look for in any compound miter saw is ease of use on all controls. Everything from the safety button on the power switch to the material hold-down clamp should work smoothly and easily in your hands. The tools' adjustments should be easily made, with the saw's head swinging through both its bevel and miter arcs smoothly. Preset stops should be accurate and should include 0 degrees, 22½ degrees, 30 degrees and 45 degrees. Settings for crown moulding should be clearly marked and easy to set. This is less important if you never expect to use the saw for crown moulding, but the capability is handy.

While many of these saws' features are similar, one area where differences arise is in the method for changing miter and bevel angles. Some of the saws, such as the Delta, use a squeeze grip lock release, while others have a twist handle lock and release.

The various adjustments for bevel and miter angles require nothing more than a little time to get accustomed. Some are slightly easier to operate at the outset, but all are easy enough to use and make quick, accurate changes, both in miter and bevel angles. However, no bevel adjusters operate easily from the front.

The grip handles also differ markedly, with three basic patterns — a straight handle, a vertical D-handle and a horizontal D-handle. The DeWalt and Delta's 12" offer the horizontal D-handle, while Craftsman's has a vertical D-handle. The Ryobi TS260 and the Hitachi C10FC offer a straight handle, while Milwaukee's has what might be classed as an open bottom vertical D-handle.

Every tool today includes a dual action start-up control, and it's imperative such controls work smoothly. All the ones we tested performed well, but it's probable they'll drive a left-hander straight up the wall. The buttons are usually located on the saw's left side, in a nice position for a right-handed person's thumb to rest. Makita and Hitachi provide buttons on the top front of the saw handle, making it easy access for anyone.

After weeks of handling these saws, we found their differences weren't significant. You may find yourself with a strong personal preference, but after 30 minutes of use, one handle seems as good as another, though the two types of D-handles felt more secure, especially during the sliding compound action.

Also make sure you check the blade quality. Many of the manufacturers' factory installed blades are fine for most tasks on the construction site, but they may not be the best choice for cabinet work.

Exceptions for this include the Makita LS1211, with its 96 teeth, and the Hitachi C10FS, which has fewer teeth, but also produces an incredibly smooth cut. Ryobi's TS200 blade has 40 teeth and gives a smooth cut. The Freud comes with a Freud blade, of course, and we're not going to step on our tongues doing a critique of those excellent discs. You can reasonably expect any of these tools to give you smooth-as-glass cuts if they're set up properly and a top quality blade is used.

All the saws come with spindle locks, whether fixed or slide. They do a great job of easing blade changes, though some saws make getting to the arbor nut a lot easier than others. For example, Delta's Sidekick 10" requires a couple of extra steps to allow you to draw back the cover plate over the arbor nut. The Ryobi TS200 only requires that you loosen a single screw before getting to the arbor nut, which is quickly turned with the wrench that slips under the front of the control arm.

Slide Compound Miter Saws

Slide compound miter saws provide greater capacity, but cost more. Depending on brand, size, style and power, a slide compound miter saw may range in price from about the same as the more costly fixed models (the Freud 8½", for example, is actually a few bucks cheaper than the DeWalt and Delta 12" compound miter saws) to as much as a very good table saw. (The Makita 12" dual compound miter can run as high as \$900 if you're not shopping carefully, though a few outlets may have it for as low as \$700.)

Depth of cut stops are available on many of these saws. The big Makita offers a flip-off depth control so you can go from a preset depth to a full depth cut without readjusting the saw.

Weight and Portability

Weight may or may not be a significant factor for you. If you are not transporting your compound miter saw, you should come close to permanently mounting it, if possible. Like any other saw of this type, it suffers from movement, going out of adjustment more often when it's moved frequently.

If portability is a deciding factor, pay attention to weight. For example, the 10" Ryobi TS260 is one of the clumsiest because it's almost all cast iron, pushing its weight up near 60 pounds. Weight isn't the only clumsy factor — size can be, too. The Makita LS1211's 36" length, even closed up, is a bit difficult to handle.

Locking the sliding head may not seem important, but it's an adjunct of portability. If that head is sliding all over and can't be controlled, the saw is less safe for transporting. Most saws offer lock downs that both hold the head down (closed) and keep the slide from operating, making the saw easier to handle.

The most primitive head lock is for the Makita LS1211. A stud is



COMPOUND MITER SAWS

on the head, and a chain is attached to the base. The head is set at a right 60-degree angle and a chain loop is placed over the stud. This is the most feature laden of the saws. This Stone Age hold down seems out of place, but it works, adds little weight and no complexity.

If you're looking for variety, check out the different designs of the slide action. You can find a single bottom mounted rod in Makita's LS1011 saw, while its big brother, the LS1211, uses a single top mounted rod. The Ryobi uses a triple rod top mounted slide, while Bosch mounts two rods at the top, as does Hitachi and Craftsman. The Delta Sidekick checks in with double bottom mounted rods. If that's not enough, Milwaukee's 10" slider 6497 presents a dual vertical mount. That is, the Milwaukee offers a top and bottom bar, aligned, for movement.

Something's here for everyone. All the rod setups operated well, smoothly and accurately, without excess flex, even in the case of the single rod Makitas.

Getting the Most from the Best

Getting the most from any compound miter saw starts with selecting the one that best fits your needs. As a rough guess, we'd say most woodworking shops will be well-served



Bosch Model 3915



DeWalt Model DW705

with one of the 10" or 12" fixed compound miter saws, at a considerably lower cost than the absolute top-of-the-line slide compound models. Those that aren't so served might want to consider the less expensive slide compound models.

Another important factor is checking your needs. Ask yourself when was the last time you made a compound cut in a four-by-six or four-by-eight. If the answer is never, then you don't need the big Makita.

Any of these models will give years of faithful service if you use care and keep the saw in tune. Match your needs, and you've got the miter saw of your dreams. **PW**

Charlie Self has a workshop in Bedford, Virginia.

Specifications (Fixed Compound Miter)

Brand	Blade Size/ # of teeth	Amps	Weight	Max. Cut @ 90°	Max. Cut @ 45°	Miter Stops @	Retail price
Craftsman 23512	12"/32	15	39 lbs.	5 ⁷ / ₈ " x 3 ⁷ / ₈ "	3 ⁷ / ₈ " x 4 ¹ / ₈ "	0°, 15°, 22.5°, 30° and 45°	\$ 320
Delta 36-230	12"/40	13	47 lbs.	7" x 3 ¹ / ₂ "	5 ³ / ₄ " x 2 ¹ / ₂ "	0°, 15°, 22.5°, 30° and 45°	\$ 360
DeWalt DW705	12"/n/a	13	38 lbs.	5 ⁷ / ₈ " x 3 ⁷ / ₈ "	3 ⁷ / ₈ " x 4 ¹ / ₈ "	0°, 15°, 22.5°, 30° and 45°	\$ 380
Hitachi C10FC	10"/80	15	32 lbs.	2 ⁵ / ₈ " x 5 ³ / ₄ "	2 ³ / ₄ " x 3 ¹ / ₂ "	0°, 15°, 22.5°, 30° and 45°*	\$ 265
Milwaukee 6494	10"/80	15	37 ¹ / ₂ lbs.	3 ¹ / ₂ " x 3 ⁷ / ₈ "	2 ³ / ₄ " x 2 ³ / ₄ "	0°, 15°, 22.5°, 30° and 45°*	\$ 350
Ryobi TS260	10"/28	15	59 lbs.	3 ¹ / ₂ " x 3 ⁷ / ₈ "	2" x 5 ¹ / ₂ "	0°, 15°, 22.5°, 30° and 45°*	\$ 250
Skil HD3812	12"/40	15	43 lbs.	3 ⁷ / ₈ " x 5 ⁷ / ₈ "	2 ¹ / ₂ " x 5 ¹ / ₂ "	0°, 15°, 22.5°, 31.6° and 45°*	\$ 380

*Left & right

Specifications (Sliding Compound Miter)

Brand	Blade Size	Amps	Weight	# Slide Supports	Max. Cut @ 90°	Max. Cut @ 45°	Retail price
Bosch 3915	10"	13	47 lbs.	2	3 ¹ / ₂ "	2 ¹ / ₄ "	\$ 590
Craftsman 23492	8 ¹ / ₄ "	n/a	42 lbs.	2	2 ¹ / ₂ "	2 ¹ / ₂ "	\$ 430
Delta 36-250	10"	13	55 lbs.	2	3 ⁵ / ₈ "	2"	\$ 509
Freud TR215	8 ¹ / ₂ "	9.7	37 lbs.	2	2 ³ / ₄ "	2"	\$ 349
Hitachi C8FB2	8 ¹ / ₂ "	9.5	39 lbs.	2	2 ⁹ / ₁₆ "	1 ⁹ / ₁₆ "	\$ 499
Hitachi C10FS	10"	10	44 lbs.	2	3 ⁹ / ₁₆ "	2 ³ / ₈ " (Dual compound)	\$ 899
Makita LS1011	10"	12	35 lbs.	1	3 ⁹ / ₁₆ "	1 ⁹ / ₁₆ "	\$ 559
Makita LS1211	12"	15	51 lbs.	1	4 ³ / ₄ "	2 ⁹ / ₁₆ " (Dual compound)	\$ 899
Milwaukee 6497-8	10"	n/a	55 lbs.	2	3 ²⁹ / ₃₂ "	2 ³ / ₈ "	\$ 679
Ryobi TS200	8 ¹ / ₂ "	10"	44 lbs.	3	2 ⁵ / ₈ "	1 ³ / ₄ "	\$ 469

The Burr Puzzle

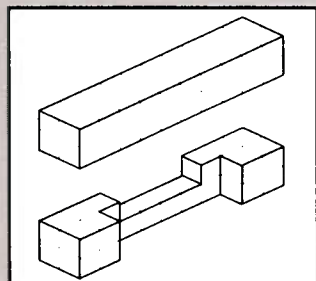
A “burr” is an interlocking puzzle made from square, sectioned wood. Most varieties have six pieces, but this one has 18 pieces. All burrs have the same assembled appearance, but the shape of the individual pieces (and the solution’s complexity) can differ considerably. All require accuracy to achieve satisfying results.

I recommend straight-grained hardwood for this puzzle because of the wear caused by people trying to solve it, and occasionally bouncing it off the wall in frustration.

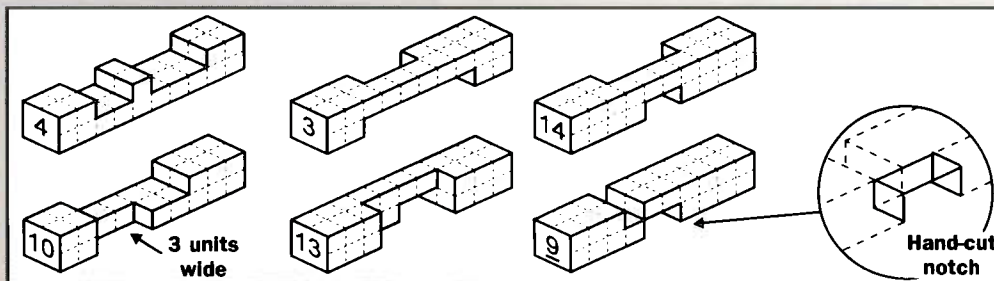
The method of marking, and subsequently cutting, each piece is based on the idea that each piece’s size is a multiple of one unit. The units can be of any dimension, so the size chosen for the unit determines the puzzle’s final size. My puzzle is based on a unit size of $\frac{1}{2}$ ", making all 18 pieces 1" x 1" x 5". Some minor sanding may be necessary for the best fit.

The puzzle is challenging to solve, and I wouldn’t like to make strong woodworkers cry, so the solution is provided — but don’t give it to your friends.

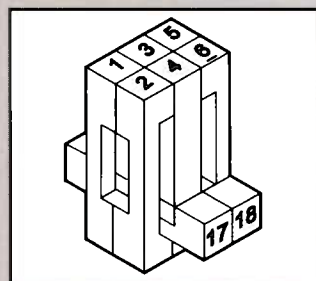
— By Dave Mackenzie



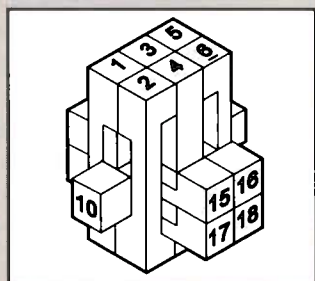
1 Twelve pieces are cut alike as shown, and numbered 1, 2, 5, 6, 7, 8, 11, 12, 15, 16, 17 and 18.



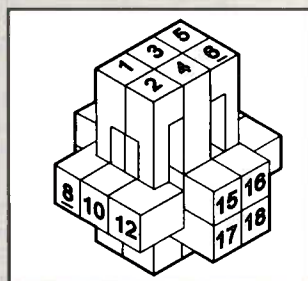
2 These six pieces are each cut differently. Their orientations as shown are important for assembly. Use a $\frac{3}{4}$ " dado and a miter gauge to create notches. By using a stop clamped to the miter gauge and $\frac{1}{2}$ " x $\frac{1}{2}$ " spacers against the stop, all cuts can be made with one saw setup. Then chamfer the pieces’ ends to ease assembly.



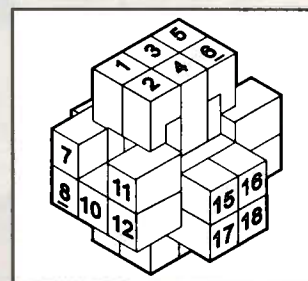
3 Place these eight pieces into place (rubber bands will help).



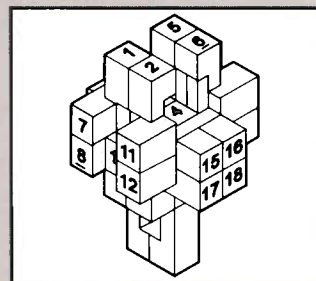
4 Put 10 into place, then 15 and 16.



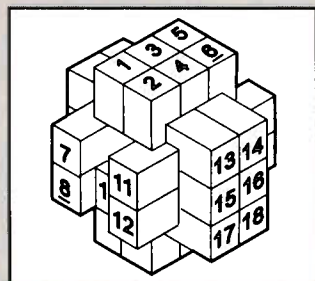
5 Pieces 15 and 16 are slid upward; 8 and 12 are put in from the sides.



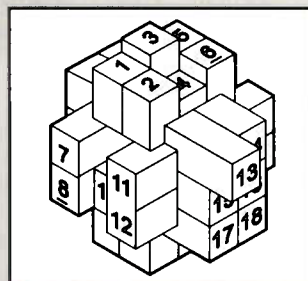
6 Pieces 7 and 11 are laid into position.



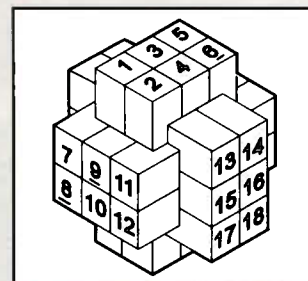
7 Let 3 drop down, then push 10 in as far as possible. This allows 4 to be pushed down with 3.



8 The last step will allow 13 and 14 to be put in. Then 3 and 4 can be pushed back into place.



9 With 10 pushed in, 4 pushed down, 3 pulled up, and 13 pulled forward in the positions shown...



10 ...piece 9 can be put in and 10, 4, 3, and 13 can be pushed into their final places.

Wooden Earrings

This gift idea is not only easy to make but also displays the beauty of wood. All you need are earring accessories (available from most craft stores) and a few scraps of your best wood.

First cut $\frac{1}{8}$ "-thick slices off the face or edges of your wood. Never slice your earrings from the ends, as the short end grain is too fragile. With small scraps, use a jig or clamp to hold the piece while cutting to keep your fingers away from the blade. Next, sand the slices smooth. To hold them, apply a piece

of double-sided tape to the slice and stick it on a scrap block. With a piece of 150 grit sandpaper face-up on your workbench, hold or clamp one edge of the sandpaper.

Now draw your patterns on the slice either by freehand, with a template or by affixing a paper pattern that's been sprayed lightly with an adhesive. If you're making a few earrings with the same pattern, you

can stack the slices. Hold them together with some small brads, double-sided tape or masking tape wrapped around the ends.

Next, mount a fine blade in your scroll saw and cut the pattern out, taking care to get smooth, even curves. Then use a small piece of folded sandpaper to smooth and slightly round the earring blanks' edges. For studded earrings, sand the edges to a larger radius on the face side. It's best to glue the studs on before finishing. Roughen up the stud's face with fine sandpaper, then glue it to the earring blank with a drop of five-minute epoxy. For loop earrings, drill a $\frac{1}{16}$ " hole for the connecting ring and loop, which is added after finishing.

Apply at least one thin coat of polyurethane, depending on your desired look. A polymerized Tung or Danish oil can also be used; however, oil will have to be applied periodically to maintain appearance.

Patterns and Templates

Templates are available at art supply stores. You can buy the professional versions with accurate ovals, ellipses, flow-chart symbols and other shapes. You also can purchase children's templates at stationary stores. They have less of a range of shapes, but they also cost less.

Patterns can be found just about anywhere. Trace silhouettes from books, calendars, magazines, or even your own photos. After tracing the silhouettes, use a photocopier to reduce them to the right size.

— By Michel Theriault

Design Options

These design ideas are only some of the interesting and unique possibilities:

1. Use solid pieces of wood or laminate, including veneers, with different thicknesses and colors to create an interesting design. For strength, make sure the grain runs in the same direction so you don't end up with end grain.
2. Use a plain, light-colored wood such as maple, then stain or dye the earrings once they're cut out and sanded. If you or someone you know can paint, the slices make a great background for delicate painted scenes or accents.
3. Drill holes in the blank and fill with a different colored wood or even colored epoxy before slicing the earring blanks from it.
4. With a scroll saw, cut out complementary pieces of different color woods from the $\frac{1}{8}$ "-thick slices. Inset them inside each other to create the look of marquetry or intarsia.
5. You can buy thin wood from some wood sources and mail order stores. Constantine, (800/223-8087) carries it, and Lee Valley (800/871-8158) offers thin exotic wood.



Design Option 2, at left: Glue-up thin pieces of contrasting stock. Then slice off the edges and scroll saw a pattern. **Design Option 3, at right:** Create this design using dowel stock glued in a pattern, then sliced off.



Rooftop Santa Puzzle

Start with a scrap piece of $\frac{1}{4}$ " Baltic birch plywood, and cut it slightly over the size given on the cutting list. While you're at it, cut a piece of $\frac{1}{4}$ " hardboard the same size. Next enlarge the pattern and affix it to the plywood to scroll saw the puzzle parts.

Proceed with cutting the general outline, then saw the various parts.

Now glue and clamp the puzzle exterior to the hardboard and clean any glue squeeze-out that would prevent the puzzle pieces from seating properly inside the frame. While the glue dries, sand the puzzle pieces, especially easing the edges. After the glue has dried, trim the four outside edges that give the puzzle its final dimensions.

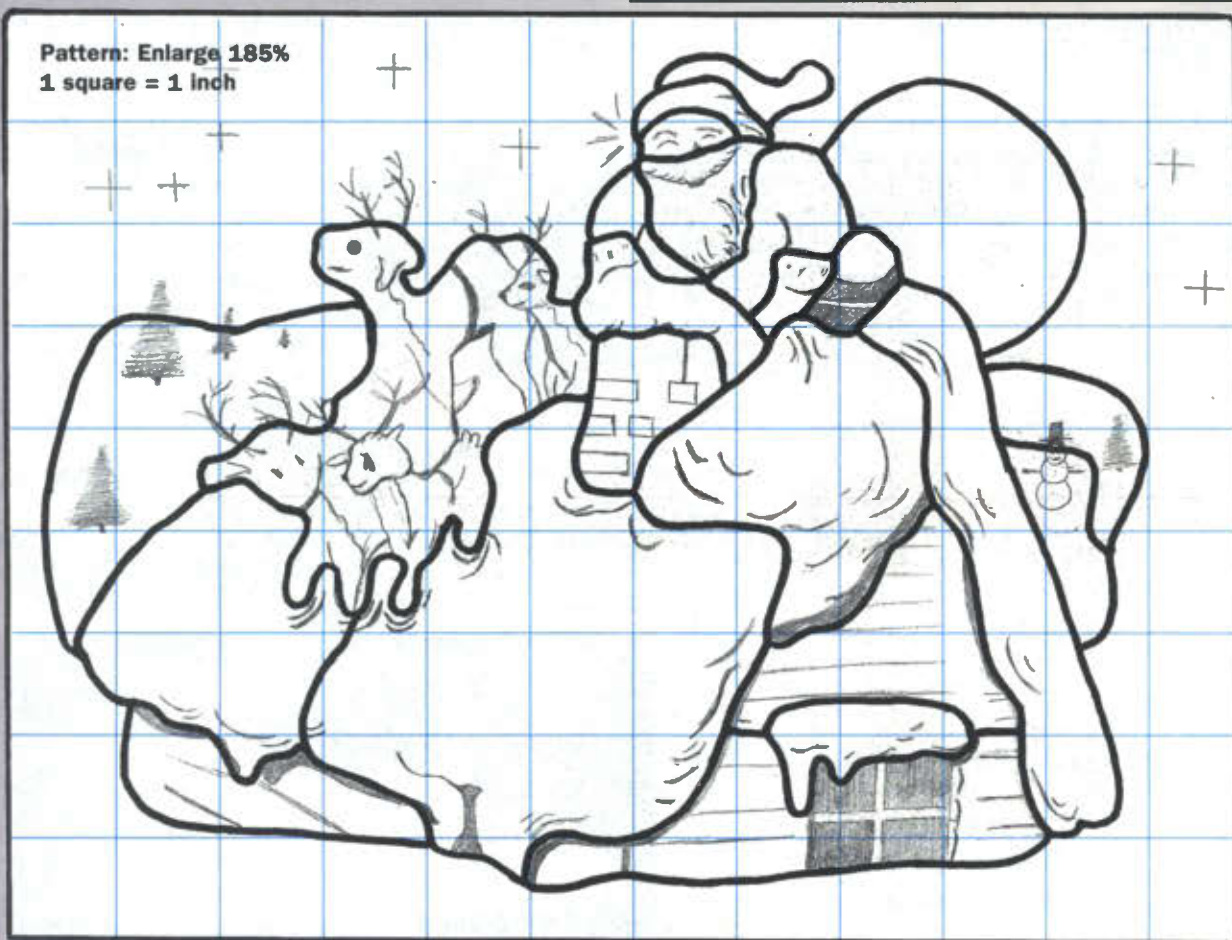
To paint, remove the pieces and decorate each one separately following the details on the pattern.



Schedule of Materials: Santa Puzzle

No.	Item	Dimensions T W L	Material
1	Face	$\frac{1}{4}$ " x 9" x 12"	Baltic birch plywood
1	Backing	$\frac{1}{4}$ " x 9" x 12"	Hardboard

Pattern: Enlarge 185%
1 square = 1 inch



Fireplace Matchbox

This project will keep your fireplace matches handy all winter long — all you need is some scrap wood long enough to run through the planer, jointer and saw.

Start by planing all the material to $\frac{1}{2}$ " thick. Then cut the back, front, top, bottom and two sides according to the Schedule of Materials.

Now set up a $\frac{1}{2}$ " dado on your table saw or use a router table with a straight, short bit to cut a $\frac{1}{2}$ " wide x $\frac{1}{4}$ " deep dado on the front, back and two edges, $\frac{1}{2}$ " up from the bottom edge of each. This will hold the box's bottom. Then reset the saw or router to cut a $\frac{1}{4}$ " x $\frac{1}{4}$ " rabbet on the long edges and top edge of the sides, front and back, and all four edges of the top.

Next cut $2\frac{1}{2}$ " off the top of each side, the front and the back to form the top piece. Mark the sides so they can be matched once the box is assembled. This is a reasonably simple process, but requires a few clamps to ensure even pressure along the sides. Do a test assembly to make sure all the parts fit exactly before putting glue to wood.

When the glue has dried, use 100 grit, then 150 grit, sandpaper to clean up the box. Remove any glue and generally make the surfaces neat.

Jewelry box hinges will work well for the lid. You



may want to add a catch to the front to make it even more classy. One caution from experience — you must drill pilot holes for the brass screws provided with this type of hardware. Otherwise the heads will easily twist off the screws.

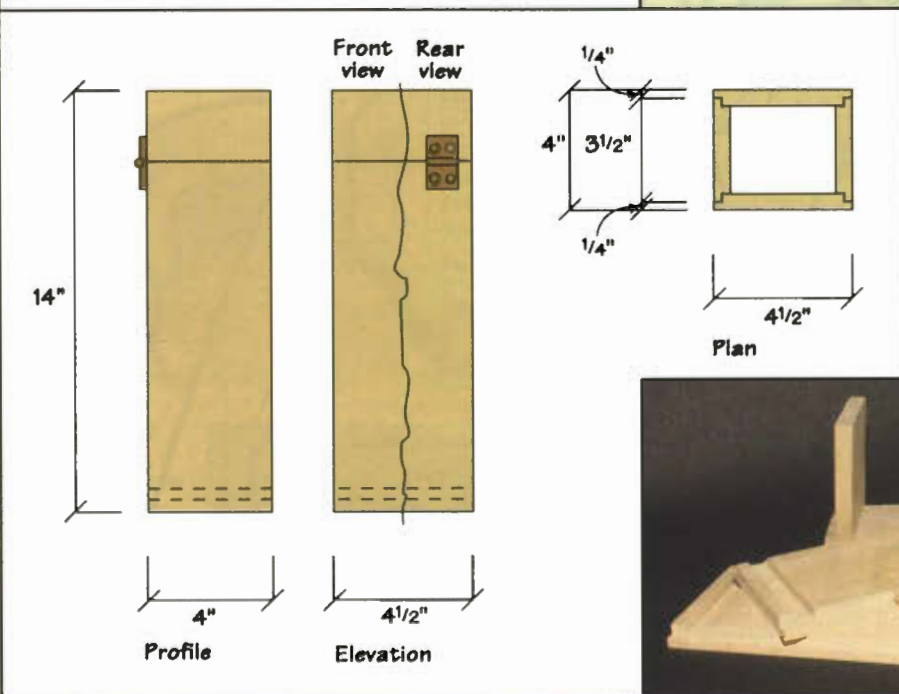
Use your favorite stain and finish to give the matchbox its final appearance. I used four coats of an oil finish on my cherry box.

For a nice touch, glue a piece of 200 to 400 grit wet/dry sandpaper into the recessed bottom of the box as a match scratcher. You now have a fireplace matchbox of your own. The simple construction may even lead you to build many more as gifts.

— By Charles Self

Schedule of Materials: Matchbox

No.	Item	Dimensions T W L	Material
2	Front & back	$\frac{1}{2}$ " x $4\frac{1}{2}$ " x 14"	Cherry
2	Sides	$\frac{1}{2}$ " x $3\frac{1}{2}$ " x 14"	Cherry
2	Top & bottom	$\frac{1}{2}$ " x 4" x $3\frac{1}{2}$ "	Cherry



The completed parts ready for assembly. Note the dado for the bottom and rabbet joints for the sides.



A Cute Little Shelf

Since I was mass producing this project and cost was definitely a factor, 1" pine was my material of choice. By measuring and cutting carefully, you can cut all parts except the towel bar from one 3' long piece of 1" x 12". Assembly couldn't be easier — glued and screwed butt joints hold the shelf together. Countersink the screws and cap, or use putty. If you'd rather not use a towel bar, a couple of evenly spaced Shaker pegs also work nicely. Good luck!

— By Dick Hanratty

Schedule of Materials: Cute Little Shelf

No.	Item	Dimensions T W L
1	Top	3/4" x 5 1/2" x 22"
1	Back	3/4" x 4" x 16"
2	Sides	3/4" x 3 1/2" x 6"
1	Towel bar	5/8" dia. x 16 1/2"

*Editor's Note:
Read the story
behind this "Cute
Little Shelf" in this
issue's Out of the
Woodwork.*

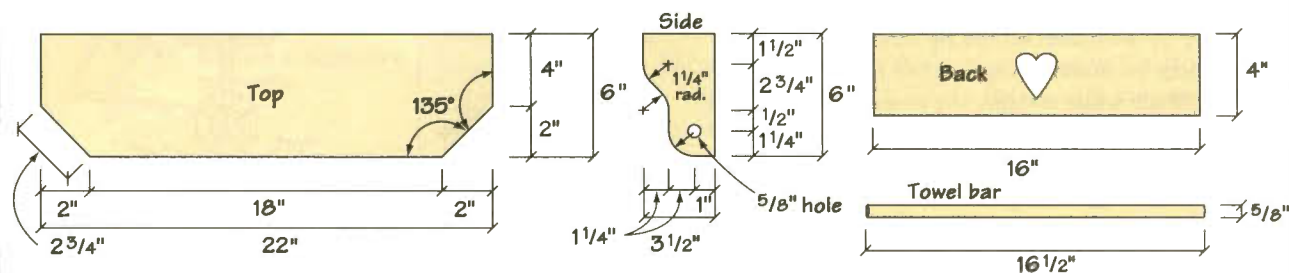


THE PROJECT FILE

A CUTE LITTLE SHELF

THE PROJECT FILE

TRAIN WHISTLE



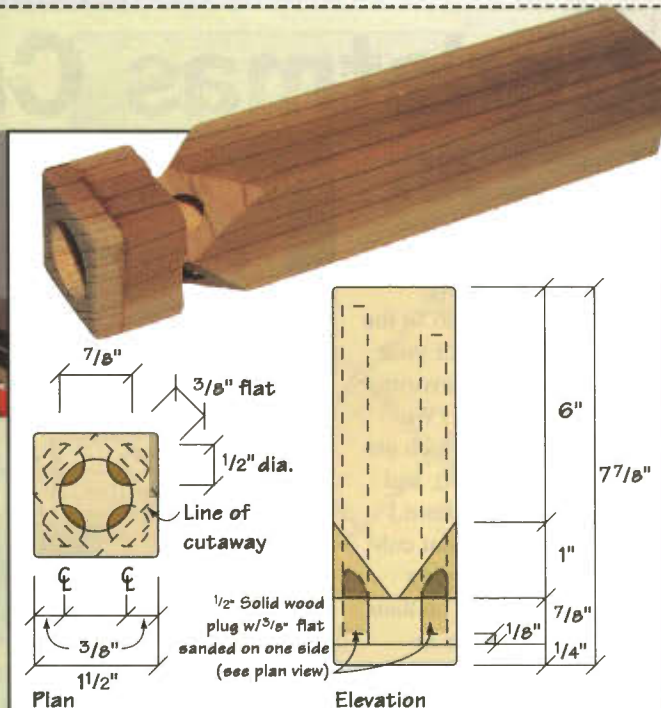
Train Whistle

In the days of steam driven trains, engineers made some sweet sounds with the whistle atop the "iron horse." Now you can recreate those wonderful sounds with just an hour or two in your shop.

Select a piece of scrap to make a 1 1/2" x 1 1/2" x 7 7/8" block. Since you will be drilling deep, 1/2" diameter holes, use a softer wood. On the end of the block, lay out the four, 1/2" hole drilling centers. Use a drill press with a simple jig for accurate boring, as shown in the inset photo above. Set it up so all you need to do when switching from one hole to another is to rotate the block a quarter turn.

Using a spade bit, drill the four holes as deep as you can, about 3 1/2". Now clamp the block in a vise and use an extension shaft with the spade bit. Leave one hole at 3 1/2" and make the others 4 1/2", 5 1/2" and 6 1/2" deep. Each will produce a different musical note.

Next lay out the "V" shaped cuts on the whistle block's edges, then cut them using a band saw, dovetail saw or table saw. Slice off 1/4" from the end of the block opposite the holes, and drill a 7/8" hole. Next cut a 1/2" length of dowel rod and sand a flat edge as shown in the diagram, then cut to length. Glue these four pieces in the holes as shown.



Lastly, glue the 1/4" piece with the 7/8" hole on the end and complete with sanding as required. You'll find that you'll get real train whistle sounds by varying the air pressure that you blow into the end.

Schedule of Materials: Train Whistle

No.	Item	Dimensions T W L
1	Block	1 1/2" x 1 1/2" x 7 7/8"
4	Dowels	1/2" x 3/4"

Cobbler's Candlestand

Adjustable lighting has come a long way, but today's options don't have the same character as a Cobbler's Candlestand.

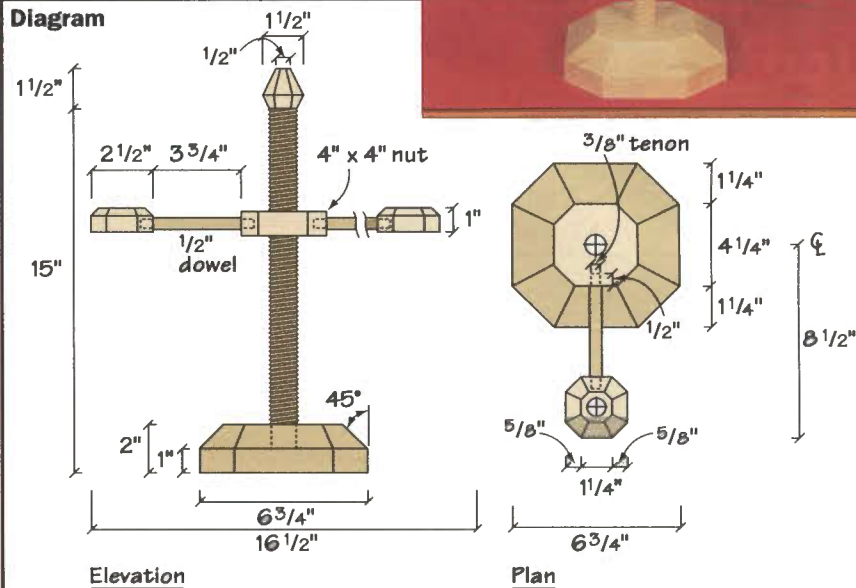
Fabrication requires a wood threading tool and a combination disc/belt sander. After roughing out the pieces, mark the corners according to the **diagram**, then cut them off on the band saw. Mark the location where the bevel facets stop on the base, cups and finial, then set the table on the belt sander for 45 degrees. Carefully sand the bevels to your marks on the base and cups. Repeat the process on the finial using a 22 degree bevel.

Next, cut a $\frac{1}{2}$ " long round tenon at both ends of the arm pieces using the table saw. With the miter gauge clamped in place at the center of the blade, set the rip fence at $\frac{3}{8}$ " to form the tenon's length. Then slowly raise the blade while rotating the dowel until the tenon is the right diameter.

After sanding, assemble the stand by running a screw up through the base into the threaded rod, then glue the other pieces in place. A dowel secures the finial, and you can drill the cup holes to fit your candles.

Schedule of Materials: Candlestand			
No.	Item	Dimensions T W L	
1	Base	2" x 6 $\frac{3}{4}$ " x 6 $\frac{3}{4}$ "	
1	Center nut	1" x 4" x 4"	
2	Candle cups	1" x 2 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ "	
1	Finial	1 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ "	
1	Threaded rod	1" diameter x 14"	
2	Arms	$\frac{1}{2}$ " diameter x 4 $\frac{3}{4}$ "	

Diagram



Christmas Card Holder

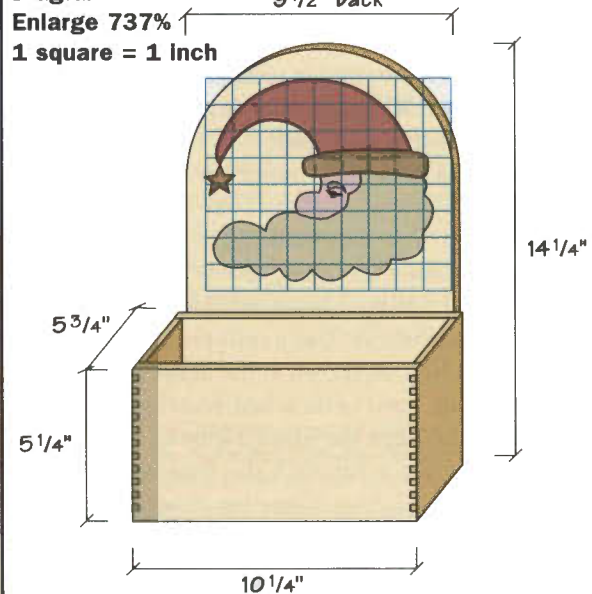
Finally, all of those Christmas cards that keep piling up will have a home that doubles as a charming decoration.

Make the box to fit the approximate size of your cards using your favorite joinery technique. (We used box joints, which are detailed on page 30, and biscuits for the bottom.) Mill out the different colored woods to varying thicknesses, based on their intended use. Make as many copies of the pattern as you have species of wood and cut out their respective parts.

Using a temporary adhesive, attach the assorted pattern parts to the different woods, being careful of the grain direction noted in the **photo**. Scroll saw the parts, then rout a $\frac{1}{4}$ " radius on the hat section and a $\frac{1}{8}$ " radius on the brim. Sand, finish, then apply with Super Glue from behind to a pre-finished piece of $\frac{1}{4}$ " cherry veneer plywood. Lastly, screw this assembly to the back of the box.

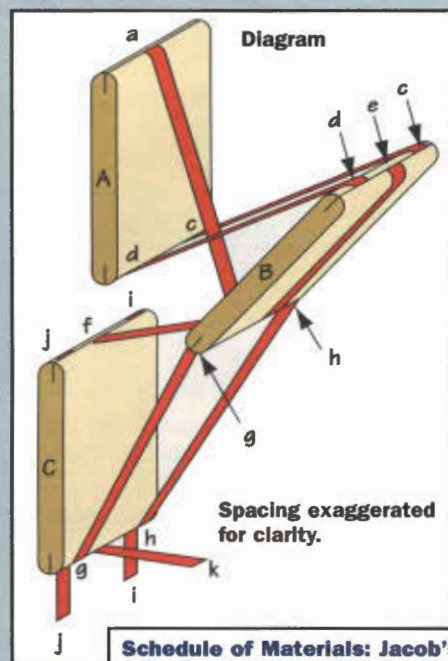


Diagram



Schedule of Materials: Christmas Card Holder			
No.	Item	Dimensions T W L	Material
2	Ends	$\frac{3}{8}$ " x 5 $\frac{1}{4}$ " x 5 $\frac{3}{4}$ "	Maple
2	Front/back	$\frac{3}{8}$ " x 5 $\frac{1}{4}$ " x 10 $\frac{1}{4}$ "	Maple
1	Bottom	$\frac{1}{2}$ " x 5" x 9 $\frac{1}{2}$ "	Maple
1	Back	$\frac{1}{4}$ " x 9 $\frac{1}{2}$ " x 14 $\frac{1}{4}$ "	Cherry ply

Jacob's Ladder



Schedule of Materials: Jacob's Ladder

No.	Item	Dimensions T W L
5	Blocks	$\frac{1}{4}$ " x 2" x 3"
12	Ribbon	$\frac{3}{8}$ " x $2\frac{3}{4}$ "



The Jacob's ladder has been a favorite childhood toy for ages. When the first block of wood hits the one below, the attached pieces fall down one by one, creating a vertical domino effect. And not only is the Jacob's Ladder easy to use, but it's also quick and easy to make. Any number of pieces can be used, as long as they're exactly the same size.

We made ours using five thin pieces of wood measuring $\frac{1}{4}$ " x 2" x 3". They're attached with $\frac{3}{8}$ " wide ribbon. After cutting your wood, round and smooth the ends to a $\frac{1}{8}$ " radius. Cut a handsawn kerf in both ends of each piece approximately $\frac{1}{4}$ " deep. (We used a thin kerf Japanese style saw.)

Finish the blocks as you wish prior to gluing the ribbon, or leave natural, but don't use oil, it will stain the ribbons.

Next, divide the ribbon into 12 strips, measuring about $\frac{3}{4}$ " longer than the block. Put a drop of glue on the ribbon's end, then use the blunt edge of the saw blade's front or top to push the ribbon into the kerf. Use the **diagram** for locating the ribbons and assembling the blocks.

Cris-Cross CD Rack

CD racks cost a pretty penny these days, although they're often made from inexpensive materials. You can finish this one in about three hours using about \$5 worth of hardwood.

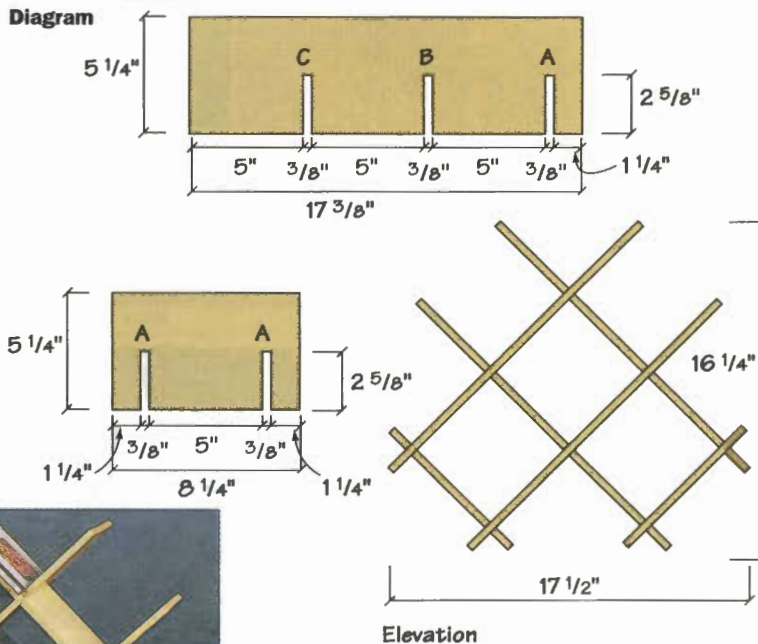
First dimension your lumber to $\frac{3}{8}$ " x $5\frac{1}{4}$ " x $17\frac{3}{8}$ ". Then cut to length the two different sizes and finish sand. Now set your table saw blade height for $2\frac{5}{8}$ " and cut slot A on all six pieces (**diagram**).

Two separate passes on the saw will define the sides of the slot, then the remaining material can be snapped out by hand. Repeat the cutting steps for slots B and C on the long supports.

Using the edge of a file, fit the individual parts' joints and touch-up with sanding. Number the joints on the back of the unit so they can be properly re-assembled.

Finally, apply two coats of your favorite finish. You can place the CD rack on a flat surface or attach hooks to

Diagram



Elevation

Schedule of Materials: Cris-Cross CD Rack

No.	Item	Dimensions T W L	Material
4	Long supports	$\frac{3}{8}$ " x $5\frac{1}{4}$ " x $17\frac{3}{8}$ "	Red oak
2	Short supports	$\frac{3}{8}$ " x $5\frac{1}{4}$ " x $8\frac{1}{4}$ "	Red oak



the back to hang it on the wall. Since the rack holds as many as a hundred CD's, make sure your wall attachment is secure enough to hold the weight.

Jewelry Armoire

Classic styling masks the functionality of this tabletop keepsake.

By David Thiel

THOUGH I'm very much aware I will never be able to make a jewelry box large enough to satisfy my wife's ambitions, I think I've finally made one attractive enough to keep her content.

This jewelry armoire uses clean, art deco styling and highly figured curly maple, accented with black lacquer. The most important aspect of this project is selecting a finely figured wood to serve as the focal point.

To achieve the most dramatic effect from the wood, I chose a single piece of curly maple that measured $8\frac{1}{2}$ " across. This allowed me not only to cut all the drawer fronts from one piece, but I also was able to match the grain so it carried around the side of the door to the front.

Construction is actually very simple. First cut all the parts as shown in the Schedule of Materials, marking the door and drawer parts to retain grain orientation. Then make the side dado cuts as shown in **photo 1**.

The door backs require a clearance cut to receive the mortise hinges, as detailed in **photo 2**. The drawer fronts receive similar cuts for the drawer pulls to fit flush with the top edge. Center these cuts, and make them $\frac{1}{8}$ " deep. Then cut the drawer pulls from a strip of poplar on the table saw, making a lip at the front of the pulls (**diagram detail**).

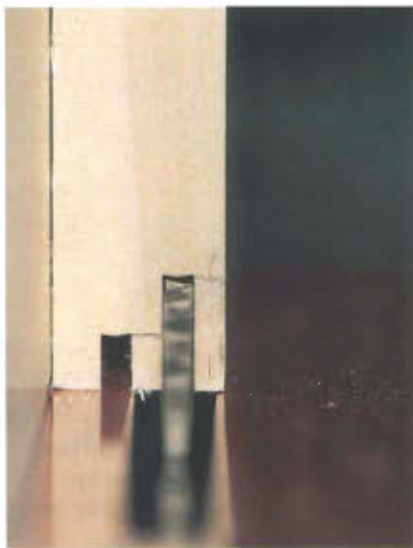
The detail on the top and bottom of the armoire comes next (**photos 3 & 4**). First sand all the interior surfaces of the door pieces, then glue the pieces of the doors together. Start with the door fronts and sides. Do each of



1 The case sides have $\frac{1}{4}$ " dados cut on the insides to accept the drawer bottoms, which do double duty as drawer slides. Starting from the bottom edge of the sides, make the dados at $2\frac{7}{8}$ ", $5\frac{3}{8}$ ", $7\frac{5}{8}$ ", $9\frac{5}{8}$ " and $11\frac{5}{8}$ ". Also cut a $\frac{1}{4}$ " x $\frac{1}{4}$ " rabbet on the inside rear edges to receive the back.



2 I mortised the door back pieces for the three $\frac{1}{8}$ " thick hinges used on each door. The hinges you use may be different, so I won't bother giving you their cutting locations. To mill the relief cuts, I made repeat passes over the saw blade using my slot miter gauge to guide the work.



3 Create the step detail on the top and bottom pieces using four saw setups. The first two cuts (on edge) define the horizontal face of the steps.

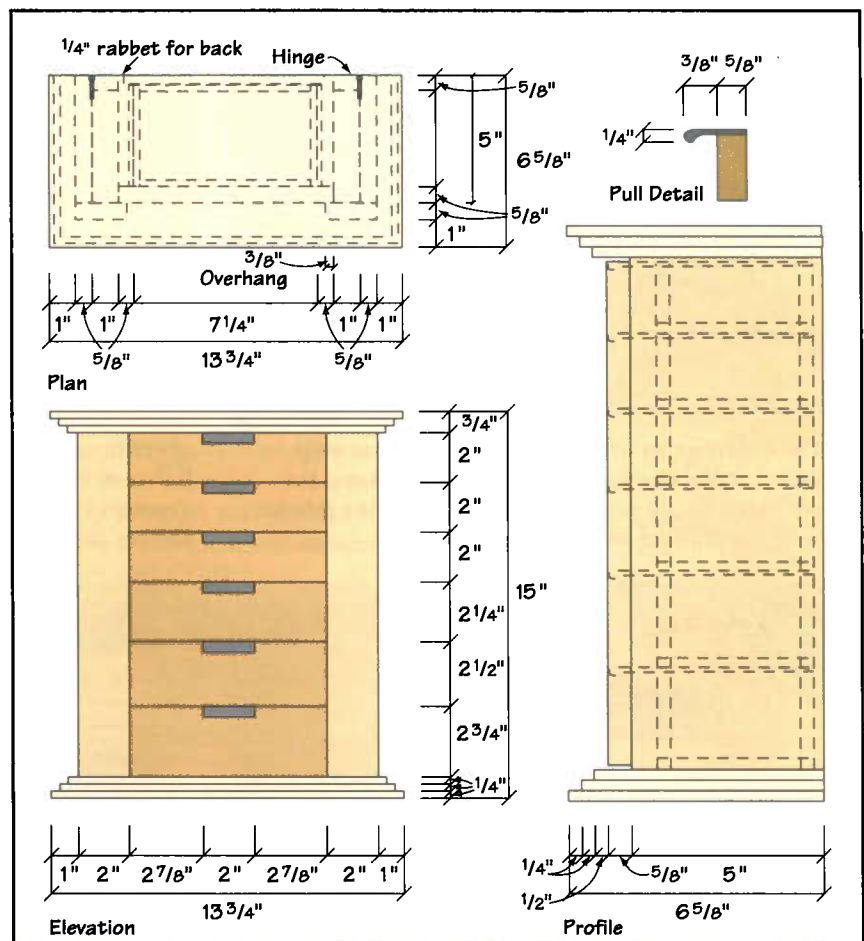


4 The last two cuts define the depth of the steps. The cleaner these cuts are, the better. Otherwise some serious sanding will be necessary to make them look good under the black finish.

these steps individually, because if you try to glue all the pieces in place at one time, you may end up with a horrible, sticky mess.

Once the door fronts are in place and the glue dry, glue the top and bottom pieces in place using the back pieces to gauge the spacing at the rear of the door. The final step is to glue the back pieces in place.

Next, assemble the drawer boxes using finger, or box,



Schedule of Materials: Jewelry Armoire

No.	Item	Dimensions T W L	Material
2	Top & bottom	3/4" x 6 5/8" x 13 3/4"	Poplar
2	Interior sides	5/8" x 4 3/8" x 13 1/2"	Maple
2	Door sides	5/8" x 5" x 13 3/8"	Maple
2	Door fronts	5/8" x 2" x 13 3/8"	Maple
2	Door backs (hinged)	5/8" x 1" x 12 1/8"	Maple
4	Door tops & bottoms	5/8" x 1" x 5"	Maple
3	Drawer fronts	5/8" x 2" x 8 1/2"	Maple
1	Drawer front	5/8" x 2 1/4" x 8 1/2"	Maple
1	Drawer front	5/8" x 2 1/2" x 8 1/2"	Maple
1	Drawer front	5/8" x 2 5/8" x 8 1/2"	Maple
6	Drawer box sides	1/4" x 1 5/8" x 4"	Plywood
6	Drawer box front/back	1/4" x 1 5/8" x 7 3/16"	Plywood
2	Drawer box sides	1/4" x 1 7/8" x 4"	Plywood
2	Drawer box front/back	1/4" x 1 7/8" x 7 3/16"	Plywood
2	Drawer box sides	1/4" x 2 1/8" x 4"	Plywood
2	Drawer box front/back	1/4" x 2 1/8" x 7 3/16"	Plywood
2	Drawer box sides	1/4" x 2 3/8" x 4"	Plywood
2	Drawer box front/back	1/4" x 2 3/8" x 7 3/16"	Plywood
5	Drawer bottoms	1/4" x 4" x 7 5/8"	Plywood
1	Drawer bottom	1/4" x 4" x 7 1/4"	Plywood
1	Armoire back	1/4" x 7 7/8" x 13 1/2"	Plywood
6	Handles	1/4" x 1" x 2"	Poplar

joints. Instructions on making this type of joint appear elsewhere in this issue, so I won't repeat them here. I used a Baltic 5-ply plywood for the drawer sides. This material works well for strength, and it adds an attractive detail to

JEWELRY ARMOIRE



5 The construction of the drawers is the next step. After cutting the finger joints, glue and clamp the drawer sides, fronts and backs. Again, sand the interior faces of the drawers before you start gluing.



6 With all the drawer boxes assembled, tack the bottoms in place. Make sure the boxes are equally spaced to square and define the tongues of the drawer bottom guides.



7 Once assembled, the drawers determine proper spacing of the interior sides in relation to the top and bottom. After determining the drawer spacing, drill clearance holes in the bottom and screw it to the sides (pilot drill into the sides). Use dowels and glue to attach the top from its underside only to hide the joinery, leaving a flawless top.



8 Before attaching the drawer fronts, use shims to equally space them. Work down from the top drawer. Drill clearance holes in the drawer box fronts, and use double-sided tape to temporarily secure the front while screwing the fronts to the drawer boxes. Remove the cabinet back to make it easier to push the drawers out without changing the front's spacing before finally securing it.



9 Finishing touches include lining the bottoms of the drawers with felt to protect the jewelry. Use small hooks attached to the inside of the doors to hang necklaces and bracelets. Felt pads attached to the underside of the bottom protect the surface of the dresser.

the finger joints. After cutting the pieces, assemble as shown in **photos 5 & 6**.

Since the top, bottom and drawer pulls are painted black and the curly maple finished clear, finish all parts prior to assembly. Put masking tape on the drawer pull bottoms to leave bare wood for a better glue bond to the drawer front.

Begin assembling the armoire by locating the sides on the top and bottom (**photo 7**). Use the back to square up the case, but don't nail the back in yet. Attach the top with dowels and glue.

You'll find a tight fit when screwing on the fronts. To solve this, mark a pilot hole while the front is "stuck" to the drawer box, then remove and pilot drill the fronts. An L-

shaped screwdriver, ratchet screwdriver or long shanked screwdriver held at an angle will ease this step. Next, drill and insert a small magnetic catch at the top of each door prior to hanging. Remember to pilot drill for all the brass screws, or you'll end up with a bunch of twisted off screw heads. Once the doors are hung, locate the proper spot for the catch plate on the cabinet side.

To make the armoire jewelry-friendly, add felt as shown in **photo 9**. After that, it's up to the box's new owner to arrange all her jewelry — just watch that you aren't talked into buying more. **PW**

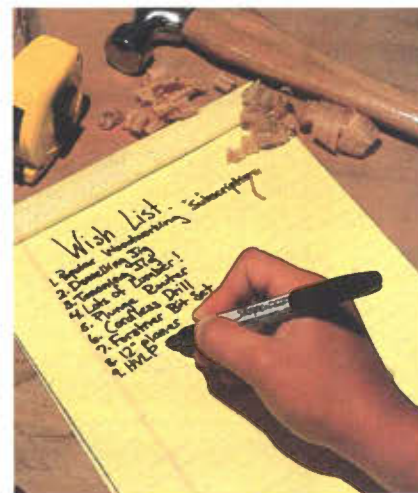
David Thiel is associate editor of Popular Woodworking and is now much more happily married.

Our Readers' 2nd Annual Christmas Wish List

It's that time of year again, when a sampling of woodworkers tell us what they want for the holidays.

Once again we asked 500 *Popular Woodworking* readers what was on their woodworking Christmas list. We received lots of interesting write-in responses, including a van, a drum sander, a portable sawmill, and the ever-popular answer — more shop space. Most readers selected items from a shopping list we provided that was divided into eight retail price categories. We've listed the top three requested items in each category (or more if there were ties). We hope this will help you plan your holiday shopping list.

For a detailed copy of the survey results, send a self-addressed stamped envelope to *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207.



And the winners are...

Our respondents received a chance to win prizes for their participation. The winners are:

- Steven Pesko, of Warren, Ohio, received a shop-tested compound miter saw.
- Joseph Gusek, of Palm Bay, Florida, won \$250 worth of woodworking books.

Congratulations, and Happy Holidays!

Gifts for \$20 and less



Jorgensen's E-Z Hold II line solves many fast adjusting clamp needs.

MOST REQUESTED GIFT: FAST ADJUST BAR CLAMP

Everybody needs more clamps. For less than \$20 you can get your choice of sizes from 10" to 28". Prices range between \$12 and \$15.

1st RUNNER-UP: POPULAR WOODWORKING MAGAZINE

Last year's most requested gift came in as first runner-up this year, but we feel certain we can regain the top position next year... (Available for \$19.97.)

2nd RUNNER-UP: WATERSTONE SHARPENING SET

If you're sharpening tools, the easier the process, the better. Waterstones have gained popularity throughout the country, and will make a fine addition to your shop. They sell at \$20 for a 250/1000 grit stone.

Gifts for \$21 to \$50



Sears' drill press mortising kit gets you boring for \$25.

MOST REQUESTED GIFT: MORTISING ATTACHMENT

Our readers' first choice in this category is a mortising attachment for their drill press. Offering the same functions as a dedicated tool, many manufacturers offer the drill press mortising attachment for less than \$50.

1st RUNNER-UP: ROUTER TEMPLATE GUIDE SET

Dropping a notch from last year's position, the router template guide is still a strong favorite. If you own a router, this \$40 accessory increases its many uses.

2nd RUNNER-UP: ROLLER STAND

New to this category, a \$40 roller stand is a great addition to any one-operator shop. If you sometimes need an extra hand, you can rely on this terrific gift.

Gifts for \$51 to \$100

MOST REQUESTED GIFT: DOVETAIL JIG

The dovetail joint typifies craftsmanship in most woodworking, but it doesn't have to take years of practice to perfect. A router dovetail jig gives quality appearance and excellent joint strength to any project. Maybe that's why it's the most requested gift two years in a row.

1st RUNNER-UP: TABLE SAW TENONING JIG

Time saving tools are always popular, as this runner-up helps prove. A tenoning jig on your table saw will go a long way. Options range from \$75 to \$100.



Porter-Cable's dovetail jig with bit comes in at just under \$100.

2nd RUNNER-UP (tie):

RANDOM ORBIT SANDER & MOISTURE METER

Random orbit sanders belong in every workshop, providing nearly scratch-free surfaces. But you can't sand the wood if it's too wet, so the moisture meter lets you know when your wood is ready to work. Either can be bought for about \$80.

Gifts for \$101 to \$150



Freud's carbide-tipped Forstner bits range from 1/4" to 1 3/8" to make a seven-piece set, retailing at \$120.

MOST REQUESTED GIFT: 7-PIECE FORSTNER BIT SET

Guided by the rim instead of the center, Forstner bits can move through material without deflection from grain or knots. They also can produce flat-bottomed holes.

1st RUNNER-UP: 16" SCROLL SAW

Scroll saws provide lots of options for woodworkers, but not everyone wants to spend a lot of money on one. A 16" for less than \$150 is a little hard to find, but Ryobi offers a single speed 16" for \$149.

2nd RUNNER-UP: 3-D ROUTER CARVER SYSTEM

The 3-D router carver system from CMT offers lots of options for the surfaces of your projects. The carver bit sells for about \$99, and the varied templates range from \$10 to \$35.

Gifts for \$151 to \$200



CMT's anti-kickback dado set with four-wing chippers sells for \$179.



MOST REQUESTED GIFT: ANTI-KICKBACK DADO SET

If you love making dados and grooves on your table saw, your best friend should be a reliable, safe dado set. Numerous models are available, so do a little shopping to make sure you get what you need. Besides, shopping is half the fun.

1ST RUNNER-UP: 15-PIECE ROUTER BIT SET

If table saws aren't your first choice for making dados, a router with the proper bit may be the answer. A 15-piece set will more than likely cut your dados and much, much more for about \$170.

2ND RUNNER-UP: PNEUMATIC FINISH NAILER KIT

Despite dropping from first to third in this category, pneumatic nailers are still a favorite. Priced between \$150 and \$200, nailers are for much more than production work these days. They offer a wide range of applications. Once you start using one size, you'll need more.

Gifts for \$201 to \$250



Tying for the top honor, Jet's Model 650 for \$240 will keep your shop practically dust-free. Makita's 1hp Hot Dog compressor's 2½ gallon tank will run any naller for \$210.

MOST REQUESTED GIFT (tie): DUST COLLECTOR & AIR COMPRESSOR

For home shop users, one of the worst problems is dust. A dust collector does not eliminate the problem, but it does keep it in a manageable location and out of the air. No wonder it's the most requested gift for two years running.

Air compressors move up two notches to tie with the dust collector. As pneumatic tools become more affordable, and woodworkers start working more with spray finishes, compressors have increasingly more importance in the shop.

1st RUNNER-UP: POWERED SHARPENING SYSTEM

Just as the waterstone proved in an earlier category, sharpening means a lot to your shop efficiency. Having an electronically powered sharpener makes it even easier to keep up with your sharpening chores. A variety of systems are available to meet your individual needs for about \$225.

2nd RUNNER-UP: HEAVY-DUTY DRILL PRESS

While most woodworkers own a drill press, it may not always live up to your expectations, especially if you're taking advantage of the most-requested mortising attachment. A good, heavy-duty drill press will perform your mortising needs, as well as a wide variety of other projects, for about \$225.

Gifts for \$251 to \$300

MOST REQUESTED GIFT: LUMBER OF YOUR CHOICE

On a whim we included lumber as a gift idea, and were intrigued to see that it came in as the most requested gift in this category. It's a good reminder that even though tools are fun, the basis of our woodworking is the wood itself.

1st RUNNER-UP: SET OF EIGHT BAR CLAMPS

As in the "\$20 and less" category, clamps prove their popularity. But at about \$35 each, this category provides eight clamps instead of one.

2nd RUNNER-UP: HVLP SPRAY FINISH UNIT

Woodworkers are discovering the ease, safety and environmental friendliness of high-volume, low pressure finishing units. If brushed-on finishes aren't living up to your expectations these days, take a look at an HVLP for about \$280.



PW editor Steve Shaneshy shows what smart shopping can do with \$300 worth of lumber...well maybe not, but it's nice to dream.

Gifts for \$301 to \$500

MOST REQUESTED GIFT (tie): 12" PLANER & COMPOUND MITER SAW

These two winners provide a woodworker with ultimate control over wood preparation. Many of our readers wanted a 12" planer. For those who aren't ready to prep their own lumber (or already have those tools), a compound miter saw is a top request. Since both are useful, one is certain to fit your shop needs.

1st RUNNER-UP: 6" JOINTER

This runner-up further proves that this category is for wood preparation. Closely behind the planer and miter saw, woodworkers wanted a 6" jointer, retailing at \$500. While a jointer works well without a planer, they work best together...hint, hint.

2nd RUNNER-UP: PRECISION TABLE SAW FENCE

Your table saw's performance can get even better by adding a precision fence for \$400. Many aftermarket brands are available, and a few manufacturers are so proud of their fences, they now sell them as add-ons for other saws. **PW**



Grizzly's 12" planer offers 2 hp and a 5" cutting height for \$399. Delta's 10" Sidekick gives you lots of tool for \$500.

Advent Calendar

Help the little ones count down the days 'til Santa's arrival.

By Nancy & Mark Vincent

This Christmas calendar can be passed down to children for generations since it's strong, durable and practical. We recommend using Baltic birch plywood.

Begin making the shadow box and calendar frame by ripping $\frac{1}{4}$ " and $\frac{1}{8}$ " thick plywood strips to the widths and lengths given in the Schedule of Materials. After cutting the 1" strips to length, use a simple jig on your table saw or router table to form a finger or box joint for the corners of the frame. (See "Making Finger Joints" on page 30.) Add an extra $\frac{1}{16}$ " of length to allow a $\frac{1}{32}$ " overhang, which will be sanded flush after gluing.

Create the shadow box's border from the frame bottom and sides, and another $18\frac{1}{8}$ " strip for the top. Set this strip into $\frac{1}{4}$ " wide x $\frac{1}{8}$ " deep dadoes in the sides, starting $6\frac{1}{4}$ " up from the bottom inside corner. Cut other $\frac{1}{8}$ " x $\frac{1}{8}$ " dadoes in the top, sides and bottom to position $\frac{1}{8}$ " thick strips that make up the shadow box's interior. The eight spaces are divided evenly across the width, so mark and make your dadoes accordingly. Join the center strips with edge-lap, or egg crate, joints. Cut them on the table saw using the miter fence with a backing board to minimize tear-out.

Now enlarge and transfer the tree and ornament patterns from the pattern provided to $\frac{1}{4}$ " plywood. Use a scroll saw to cut the tree and ornaments. A #2 reverse tooth blade works very well. Sand all pieces smooth, then prime all pieces with a primer/sealer, except for the back of the tree.

Now it's time to start painting the tree. Small quantities of these paints are available at arts & crafts stores. Apply green first, then splatter on a darker green. Use the same dark green to shade the underside of the tree's branches and sides. Highlight the top of the branches with pearl white. Finish with a coat of satin polyurethane.

Use thumbtacks to hold the ornaments on the tree. Each ornament will have a small magnet set in its back. Determine where to position the thumbtacks, then drill small pilot holes at these points. Use a wire cutter to trim the tips of the thumbtacks to less than $\frac{1}{4}$ " long so they won't protrude through the back of the tree. Place a small amount of epoxy cement to help secure the thumbtacks, and tap them into place with a hammer.

Using a $\frac{1}{2}$ " Forstner bit, drill a hole in the back of each ornament to recess a round magnet. Then glue the magnets in the holes with epoxy cement. Now prime the ornaments, then paint them with basic colors, adding as much detail as possible. A fine marker or technical pen works well for fine lines and outlines. Finish with satin polyurethane.



For the shadow box, prime the back and front with a white primer/sealer. Leave an area under the tree unprimed so the glue will hold better. Paint the area around the tree with white, then paint the ornament compartments red.

Now draw the window onto the background behind the tree, and apply navy blue paint to the windows and brown to the casing and sill. Paint gold hardware on the window, then outline with an ultra fine marker. Paint the white stars, and finish the entire box with a satin polyurethane, again leaving an area under the tree unfinished.

Now drill two holes on the window for the tacks and drill one hole in the center of each shadow box compartment. Attach the tacks as before.

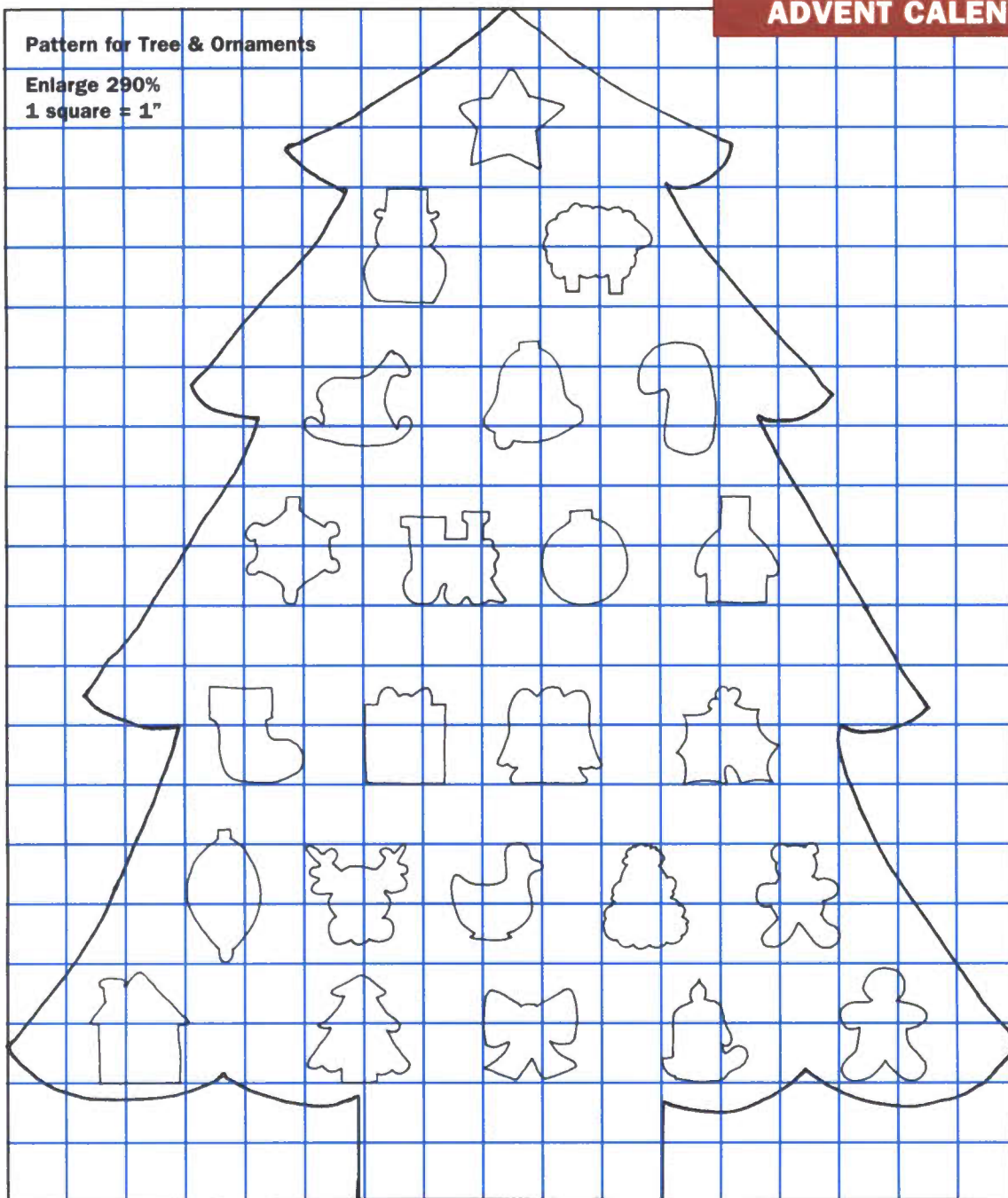
Spread wood glue on the back of the tree and on the unfinished area of the shadow box. Position the tree on the background and glue in place, using weights to hold the tree down until the glue dries. Using #2 x $\frac{1}{4}$ " wood screws, attach a sawtooth picture hanger to the center back of the calendar, near the top. After drilling the holes, use epoxy cement under the hanger for extra strength.

Now all that's left is to determine where each ornament goes as the countdown to Christmas begins. **PW**

Nancy & Mark Vincent built this as a team. Nancy paints miniature wooden items, and Mark enjoys general woodworking.

Pattern for Tree & Ornaments

Enlarge 290%
1 square = 1"



Ornaments Made Easy

If you aren't confident of your artistic abilities, don't turn the page just yet. Here's a quick, simple way to create colorful ornaments without picking up a paint brush.

Look through Christmas cards, photos and stickers, and cut out your favorite images. (Make sure they fit in the shadow box compartments.) Now spray adhesive onto the back side of your cutouts and your wood. Let the adhesive dry until it's tacky, then mount the images onto the wood. Let dry about ten minutes. Using the pictures as patterns, cut out your ornaments with a scroll saw, then sand the back and sides of the ornaments. Now just put the magnets on the ornaments. — *by Joni Marshall*

Schedule of Materials: Advent Calendar

No.	Item	Dimensions T W L	Material
1	Frame back	1/4" x 17 7/8" x 30"	Birch plywood
2	Frame sides	1/4" x 1" x 30 9/16"	Birch plywood
2	Frame T & B	1/4" x 1" x 18 1/2"	Birch plywood
1	Frame center	1/4" x 3/4" x 18 1/8"	Birch plywood
2	Box centers	1/8" x 3/4" x 18 1/8"	Birch plywood
7	Box centers	1/8" x 3/4" x 6 1/2"	Birch plywood
24	Ornaments	1/4" x 2" x 2"	Birch plywood
1	Tree	1/4" x 17" x 20"	Birch plywood



Holiday Ornaments

Deck the halls with handmade wooden decorations.

By The Popular Woodworking staff



THE BEST TREASURES of Christmas are homemade with loving care. These scroll sawn and turned ornaments will create lasting holiday decorations. All you need are some scraps of attractive wood of varying colors. Pick your most dramatic pieces to make these small objects more interesting.

Scroll Saw Ornaments

First, mount a pattern to your wood using a temporary adhesive spray. (Artist's spray mount works well.) Cut around the pattern's exterior, being careful at delicate corners, as some woods are more brittle than others and can break off.

Next, use your smallest bit to drill holes at the starting point of the ornament's detail lines. This hole allows the blade to cut the inside lines without having to saw through the ornament's outside edge. I recommend a spiral scroll saw blade since the shapes you'll be cutting are short but look best with a wider kerf.

After completing your cuts, remove the mounted pattern from the wood and sand. Start with the fronts and backs of the ornaments. Sand the sides next, being careful not to round the edges.

For the star and tree, cut out two

patterns for each. The two pieces will fit into mating slots to create a three-dimensional ornament.

For the swan and bear, you have the option of simply painting the objects on the ornament or applying a thinner contrasting color of wood. If you choose the latter, watch your fingers — the pieces you'll be cutting are quite small. Repeat the cutting steps, then glue the piece onto your ornament with Super Glue.

Once the glue is dry, sand smooth, then use an X-acto knife, followed by a black fine-tip felt pen, to define the lines on the bear's wrapped package.

To complete, apply a coat of clear finish, then attach bright colored ribbon or hooks for hanging the ornaments.

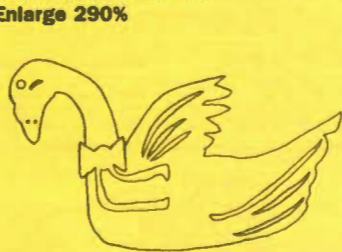


TIP On interior detail scroll saw cuts, our standard $\frac{1}{16}$ " drill bits made holes too large. We later learned Woodcraft offers extra small drill bits. A 20-piece wire gauge-sized drill set (#04X73) costs \$16.99. Contact Woodcraft at (800) 225-1153.

Turned Ornaments

Start with a block of rough turning stock, then find the center point of each end by drawing lines from corner to corner. Drill $\frac{1}{8}$ " deep holes with a drill

Scroll Saw Patterns
Enlarge 290%



Laminated Turning Blanks

One method of stack laminating is gluing varying thicknesses of wood together. For the "bulb" ornament, glue a simple stack of $\frac{1}{4}$ " and $\frac{3}{8}$ " thick wood strips. For the "plum bob" ornament, it gets a bit tricky. Laminated a piece of $\frac{1}{4}$ " x $\frac{3}{4}$ " cherry between two strips of $\frac{13}{16}$ " x $\frac{13}{16}$ " maple. Once dry, make a jointer cut on the wide side of the lamination and cut in half. Glue the pieces to a $\frac{1}{4}$ " thick piece of cherry that's a little wider than the width of the lamination. Take special care to line up the cherry strip in the two laminated pieces, forming an "x" shape.

bit to start drive centers, then trim the corners of the block on a table saw or a band saw to form an octagonal length.

Mount your stock on the lathe, and move the tailstock up to center and lock it down. Make sure everything fits tight and the tool rest is as close as possible to your work.

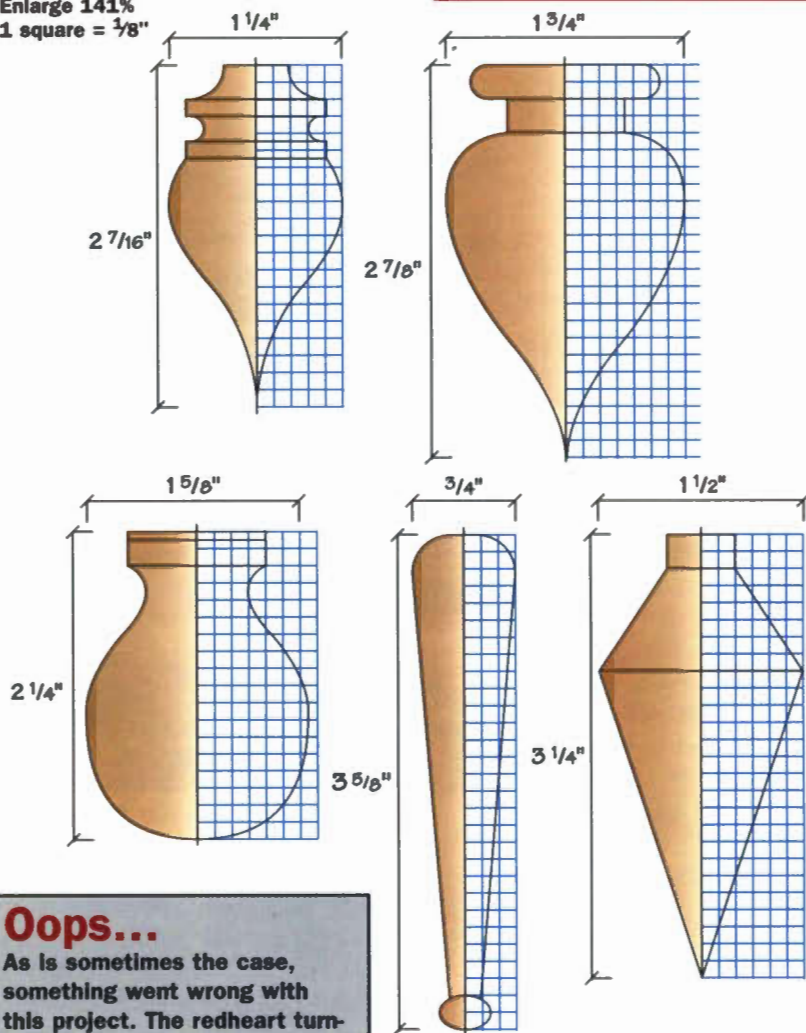
Put on your face shield, then begin the turnings by using a slow speed (about 500 rpm) to rough out the stock to a cylindrical shape. The roughing gouge should rest just about at the center of the cylinder.

When you are done roughing, increase the speed to about 1,000 rpm. Prior to marking your parting lines, use a skew to clean up the cylinder. Start your pass by holding the skew pinched firmly between the fingers and thumb of your forward hand, with the cutting edge parallel to the blank. Slide the tool slowly across the tool rest, taking small shavings as you go. Then reverse your direction, and carefully repeat the cut until the stock is round. Make sure that you use caution with these cuts, as a skew can catch more easily in the blank than a gouge.

Once smooth, stop the lathe and put one of the patterns

Turning Patterns

Enlarge 141%
1 square = $\frac{1}{8}$ "



Oops...

As is sometimes the case, something went wrong with this project. The redheart turning was supposed to have a small ball at the bottom, but the turning broke and spun itself off the lathe. (Note: Always wear a face shield.) I made do with what I had by using my trusty whittling knife to carve a tapered tip.

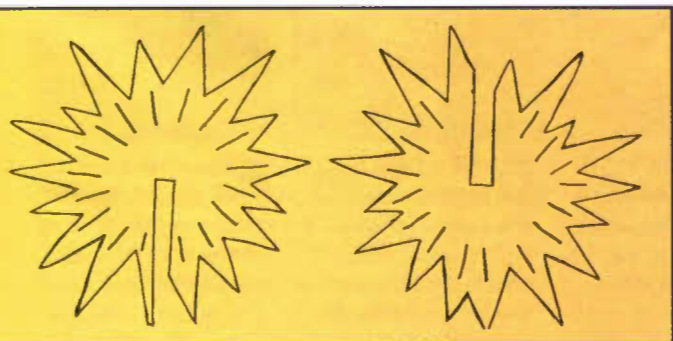
TIP When gluing-up stack laminate blanks, prevent sliding by drilling a hole through all the parts, inserting a nail through it, and nailing it onto a mounting board with wax paper to prevent sticking. When dry, simply pry the mounting board from the lamination by pulling the nails. Trim off the nail holes when squaring the blank.

provided against the wood. Pencil in marks where each cut will be made, then turn on your lathe and finish marking the parting lines around the diameter of the blank.

Now use a faster speed (between 1,000 to 1,500 rpm) to shape the wood as required. For beads or coves, turn from the outside into the center. When you're finished, sand the wood while it's still mounted on the lathe with progressively finer grits of sandpaper. Start with 180 grit and finish with 220.

Once the ornament is smooth, remove it from the lathe and cut the ends off the end stock with a band saw, then smooth the cuts with sandpaper. Apply a coat of clear finish and attach a brass cup hook to hang the ornament.

Now keep on turning, and you will soon have a whole collection for your tree. **PW**



HOLIDAY ORNAMENTS

Small Turned Boxes

Create a variety of small lidded boxes on a lathe.

By Tobias Kaye

LITTLE turned wooden boxes are delightful projects. They make excellent presents, such as a decorative protective container for jewelry or a loose change receptacle.

Starting Out

Box designs vary greatly and can have several types of lid fittings, but most designs benefit from delicacy in execution. This is why a close-grained wood works best. Fruitwoods are highly suitable (plum is the prettiest).

How you hold the wood on the lathe depends mainly on what lid design you want. Fittings one, two and three (**diagrams 1 & 2**) can be made with the wood chucked at one end only. Fittings four, five and six require both ends of the wood to be chucked separately so the lid may be hollowed out.

Three types of fit are possible for each design. One type is tapered so the lid slips on and off easily and doesn't rattle, as seen in designs 3 and 4. Another type is parallel so the smoothness of the craftsmanship is evident, as seen in design 5. All six designs can be adapted to each style of fit.

Chucking

Designs 4 and 5 (**diagrams 1 & 2**) will help you decide whether to chuck at one end or both. A contracting grip



1 Boring a center hole prior to hollowing with a scraper or gouge.



chuck is the best device for holding boxes. The modern scroll chuck is also quite good. Mount the blank, roughed to normal size on the chuck. If it's to be chucked at both ends, part the lid from the base now. Whether you make the lid or the base first depends on which is to be outside on the fit.

Those delicate cuts which will determine how well your

Turning an Acorn Box



A Having mounted in the chuck, part off the body, leaving about 2½" in the chuck for turning the lid.



B Working from the center, up and out, use a spindle gouge to hollow the lid, with the shank against the rim.



C If you use a scraper for the final hollowing cuts, try a shearing action with the tool tilted over a little.

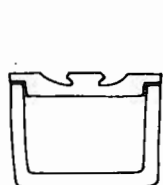


D The lid will be a pop fit, so use the parallel jaws of a Vernier gauge to check that the undercut has been made.

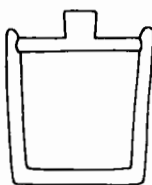


E Shape the outside of the lid. Try to keep the tool cutting all the way from the top to the knob.

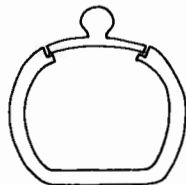
Diagram 1: Six Ways to Lid a Box



1 Traditional food container



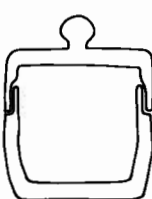
2 Tobacco or cigar box



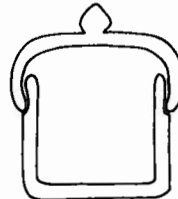
3 Chinese turned box



4 Glass jar and lid



5 Jewelry box



6 Jewelry box variation

lid fits are best made on an out-facing surface; or that part of the joint that fits inside the other. This means that for design 4, make the base first. For designs five and six, make the lid first.

Hollowing the wood out means working into the end grain. This is the toughest form of cutting and requires special techniques.

Scraping

A round nosed scraper that can cut sideways through the fibers is easier for scraping, though you'll need a square nosed scraper if you want corners in the bottom of your box. If you can bore a wide hole to depth with a tailstock mounted bit (**photo 1**), so much the better. This will leave the side grain open for the scraper to cut into, with the tool starting in the hole then drawing it sideways and out. I prefer a 1/2" wide round nose scraper with additional grinding to make it cut sideways (**photo 2**).

A useful tip when using scrapers is to roll the tool onto its edge so the angle of the part cutting the wood is across the fibers at an oblique or shearing angle, not at 90 degrees as is common with scrapers. To do this, round the tool's bottom edge to a pencil lead size of roundness. Then sim-

TURNED BOXES



2 If you grind a long bevel for side cutting, the other bevel must be obtuse for the end-grain box bottom.



3 With a long bevel ground on the edge of a deep fluted gouge, you can start at the edge and work inward.

ply lift the tool's far side to bring the tip to the wood at a shear scraping angle.

Special Deep Gouge

One other method used by some people doing a lot of hollowing into deep form is with a deep fluted gouge ground back on one side only (**photo 3**). The end of the gouge is



F Sand and polish the outside and inside of the lid before you take the knob too far down and lose stability.



G Keep shaping the knob until the lid drops into your hand. Oak isn't ideal for boxes because it can split at this point.



H If you want to finish off the lid perfectly, turn a jam chuck from the waste and remount the lid, then finish the knob.



I Mark out the hole in the body by subtracting 3/16" from the inside lid diameter, with the caliper points down.



J Hollow out the body with the method you prefer. I used a bedan in this particular case.

ground at a steep angle so the bevel may be kept in contact, even where access is severely limited. Between these two extremes, the bevel's angle changes quite rapidly for negotiating the tight curves at a box hollow's base.

This tool cuts from the outside inward, both centerward and depthwise. Start the hole either by using the tool's steep bevelled end rolled over to face center or by drilling to depth (a better choice). For the latter case, begin the cutting inside the top of the drill hole, using the side of the gouge. The amount of cut that is taken with each pass depends on how much the tool is rolled into the wood and by the handle's angle. To limit the cut, swing the handle across the center. To get a heavy cut, have it almost in line with the bed of the lathe. This gouge will take heavier cuts sideways, but a lot of control over the cuts across the bottom is possible.

To grind such a gouge, hold the tool against the stone, pointing just ten degrees above the stone's axis. Roll without swinging to one side to produce the steep bevel for bottoming. Then roll back and swing without rolling out the other side until the tool is almost straight across the stone's face. The long acute edge up the side needs a small, "safe" flat on it at the handle end to stop the tool from catching on side cuts. On forged gouges, this is naturally present. On round bar gouges, you'll have to create it.

A Comparison

Comparing the two methods of hollowing, using a scraper or the specially ground hollowing gouge, I'd say the scraper is the easiest to control. The hollowing gouge is considerably quicker and leaves a slightly better finish.

Creating Close Fits

Having hollowed the various parts of your box, making the lid fit nicely is the next task. As mentioned above, this is most easily done on an exterior surface so that the tool's handle may be held at right angles to the surface.

The easiest fit to create is the tapered fit. This is also the most practical, as the lid may easily be removed and replaced with one hand. Let us presume for this description that design 3 is being made. Using vernier calipers, mea-

sure the diameter at the top of the box fitting and cut a taper on the wood for the lid until the calipers fit over the very beginning of it. This first cut should be quite a steep taper, 1:3 or 1:4. Now reduce the taper to the same or very slightly steeper than inside the box. Hold the box up to this to check the fit and adjust bit by bit until the lid slides in just to the shoulder in the box. (If you wish to make such a taper fit on design 5, simply measure the box where the lid joins it and proceed as above.)

Tapers can be accurately measured by drawing them out on paper and using this as a sight guide. For instance, for a tapered lid-fit at 1:15, proceed as follows. Draw a line $7\frac{1}{2}$ " long and mark a point $\frac{1}{2}$ " away at right angles from one end. Then connect this point with another line to the other end of the first line. Place this on the bench or wall near your lathe so the one line looks parallel with the bed. The other line then can be sighted in on the taper. For internal tapers, hold a small, straight stick against the surface and sight across this.

Creating the parallel slide fit is a more delicate task. Presuming that we're making design 5, start out by cutting a slight taper on the box until the calipers, then the lid itself, just fit over the start of the taper. The mark left on by the calipers or the lid against the spinning wood will give you your mark to cut to. Make the taper down to parallel level with this point. The lid should now push snugly over the box.

Failing this, take the parallel section down about $\frac{1}{32}$ ", either with the tool or the sandpaper glued to or wrapped tightly around a flat stick. The fit should be very snug when first created, and the lid will burnish it down to create a smoother sliding action. Just how smooth or tight is a matter of preference. This type of fit is particularly sensitive to moisture changes.

One problem that you may discover with any close fitting lid is that a few days after completion, it ceases to fit so nicely, becoming either tighter or looser than intended, and never goes back. The fit may also change from day to day. This problem is due to one part being much thicker than the other. The thin part swells or shrinks sooner than the other as the weather changes.



K Leave a $1\frac{3}{8}$ " diameter waste to support the cuts, and make a taper cut around the rim.



L Continue to taper until the calipers (set $\frac{1}{64}$ " wider than the lid hole) slide on at the narrowest place.



M Use the lid to make a glossy mark. Cut halfway through the mark and make a reverse taper behind the high point.



N Pop the lid on the box, over the high point, and burnish. Shape the outside of the body.



O Take the body of the box down to a $\frac{1}{8}$ " diameter neck, and finish shaping the outside.

The problem experienced in the former case usually arises as follows: During sanding, the wood warms from the friction and loses much of its previously stable moisture. One part may have to be sanded more than another, or being further from the end grain, react more or less than the other, thereby giving an untrue impression of its normal size during the time you're perfecting the fit. The larger the diameter of the box, the more that this effect shows. During the next few days, both pieces will adjust to balance with the ambient moisture level. Then your hard work is wasted.

The answer lies in leaving the lid joint too tight to fit for a few days after completing all other stages. With very large diameter boxes, 4" over, this is important. Boxes less than 2" won't really need it. Those less than 1" will only benefit marginally.

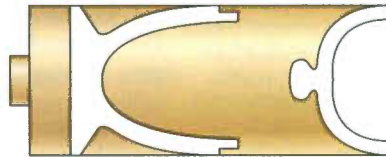
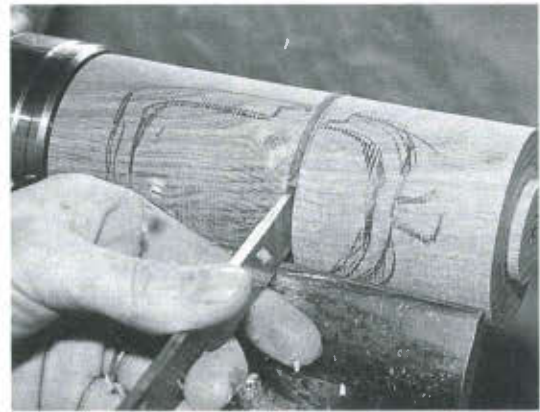
Reversing

Having made your box, you may wonder how to finish the base. Again, three popular methods spring to mind.

The first for jobs where speed is important is to simply part off and sand on a belt or disc sander.

The perfectionist's method is the same, parting as above, but also creating a ridge and a shoulder on the waste to fit snugly inside the box. This will enable a fine gouge to cut across the bottom for a finish that requires very little sanding. If you have a chuck that takes wood jaws, this will also do the task of holding while you refinish the base.

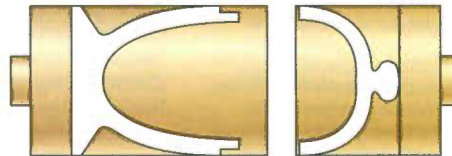
Diagram 2: Four Ways to Organize A Blank for a Box And a Lid



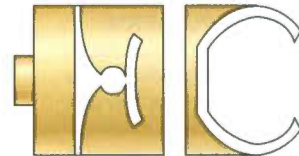
The easy way is to hollow the lid, then the box. You only mount it once in a chuck at the blank's box end.



This way produces the best grain match, but you must use a chuck for both the lid and box. Hollow and shape the lid first.



For simple sit-in lids, this method produces the best grain match. Shape and polish the lid, then part off and turn the box.



For the best fit on sit-in lids, turn the box, then part off. Turn the lid upside down so you can test the tapered fit.

The intermediate method is to pare the waste back to finish across the bottom with a skew, steadily thinning the waste until reaching the center and the box drops into your hand. Sanding and waxing may be done during this process.

Whichever way you do it, the satisfaction of little boxes with neatly tilting lids is immense. **PW**

Tobias Kaye, an expert tuner, writes, teaches and practices his craft from his home in Devon, England.

Editor's Note: This is an edited version of an article that appeared in the July 1993 issue of Good Woodworking, a British woodworking publication edited by Nick Gibbs.



P Remove the lid, then sand and polish the box body. It is best to finish the inside after hollowing.



Q Cut away the waste until the box drops into your hand. Some turners leave a tiny knob to prevent tearing.



R Rather than clean up in the palm of your hand, you could remount the body on a jam chuck again.

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D/J 97

Victorian Stationery Holder

This classic carry-all makes a great gift for the writer in your life!

By David Mukamal Camp

I made this project as a gift for my bride-to-be, who loves to write letters and maintains an active correspondence with a number of people across the country. Based on one I saw at a Victorian bed and breakfast inn, this little rack has spaces for cards, paper, envelopes, a notepad, a sketchpad, pens and pencils. It also has a handle so it can be carried out in the garden, and it looks charming when sitting on a desk or hanging on a wall.

Making the Sides and Bottom

I used $\frac{1}{2}$ " alder for the sides and bottom, and $\frac{3}{16}$ " thick agathis plywood for the back and the dividers. Choose any thin plywood you like that matches the wood. You may find some plywood that is closer to $\frac{1}{8}$ " thick or some that is nearly $\frac{1}{4}$ ". Size your grooves accordingly, and if the wood is more than $\frac{3}{16}$ " thick, you might want to make the sides a bit wider and add more space between the grooves.

Make a template for the sides with the help of the diagrams. Use heavy cardboard or some scrap plywood. By flipping the template as you lay out the sides, you can get both pieces out of a 17" long board.

Cut out the sides on a scroll saw, working just a bit wide of the line. Use a drum sander to smooth the curves, then cut a $\frac{1}{2}$ " x $\frac{1}{4}$ " deep rabbet across the square end of each for the bottom. Cut the bottom to size.

Cutting the Grooves

Set up the table saw to cut the grooves for the dividers. Depending on the

thickness of your plywood, this might involve using a dado set. My thin plywood allowed me to use a regular blade. For each groove I made one pass, then moved the fence over a bit to widen the kerf to fit the thin plywood. I kept several scraps on hand, using them to check my fit before cutting the real pieces.

Set the depth of the blade at $\frac{1}{4}$ " and position the fence $1\frac{3}{4}$ " from the blade to make the first cut. Run the front edge of each side along the fence — feed one through bottom first and the other through top first to create a right and a left. Make this same cut on the bottom, referencing the front edge against the fence as well. Shift the fence away from the blade as needed to widen the groove, and make another pass with all three pieces.

Position the fence $3\frac{3}{8}$ " from the

blade, and cut the second divider groove in the three pieces. Then position the fence to cut a rabbet along the back edges of the sides to the same thickness as the dividers. When you make this cut in the bottom piece, raise the blade and cut all the way through since the back overlaps the bottom.

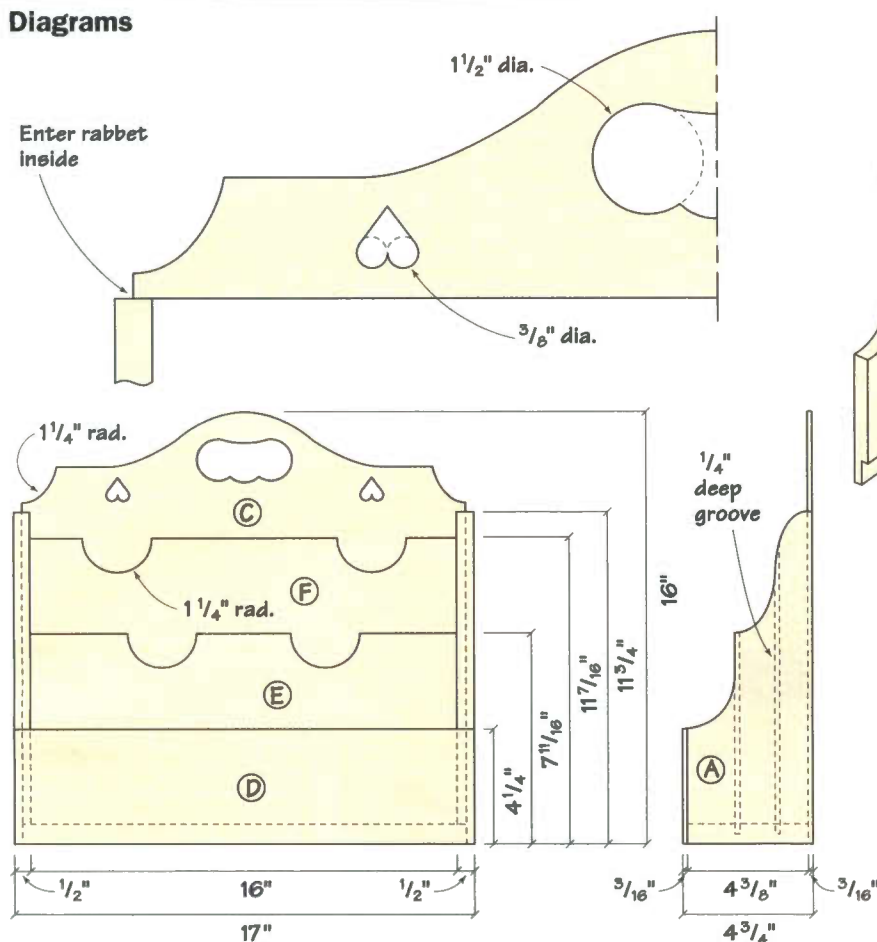
Making the Dividers

Cut the back, front, first divider and second divider from your hardwood plywood. Using the diagrams, cut out the shape for the back on the scroll saw. For best results, use Forstner bits in the drill press to cut the two lobes of each heart and the circular sections of the handle. Then complete with the scroll saw.

Now dry assemble the stationery holder. You'll notice that the second



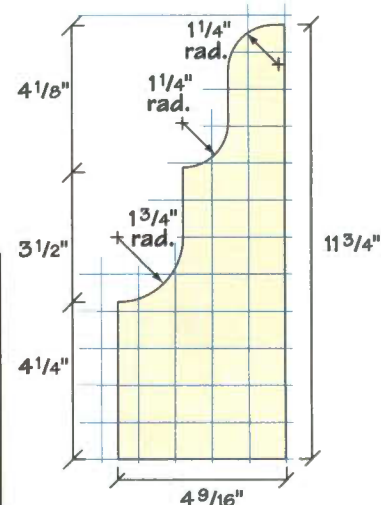
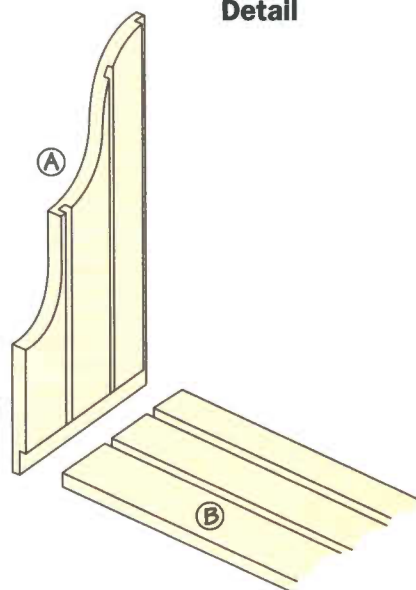
Diagrams



Elevation

Profile

Detail



Enlarge 525%

1 square = 1"

Schedule of Materials: Victorian Stationery Holder

No.	Letter	Item	Dimensions T W L
2	A	Sides	1/2" x 4 9/16" x 11 3/4"
1	B	Bottom	1/2" x 4 3/8" x 16 1/2"
1	C	Back	3/16" x 16" x 16 1/2"
1	D	Front	3/16" x 4 1/4" x 17"
1	E	First divider	3/16" x 7 7/16" x 16 1/2"
1	F	Second divider	3/16" x 11 3/8" x 16 1/2"

divider is a little long, so bevel the top edge until it blends into the curve of the sides smoothly.

Use a compass to draw the semicircles on the dividers as indicated in the drawing at the top left. Cut these out on the scroll saw. Now sand all the pieces, especially the sawn edges. It's a good idea to finish the pieces before final assembly because there's no room to do so afterwards. Avoid getting finish in the grooves and rabbets or the glue won't stick. Make sure you leave the front edges of the sides unfinished, as well as the edges of the dividers that fit into them.

Assembling the Holder

Put glue in the grooves and in the rabbet on the bottom of each side. Then

put the dividers in place and fit the side grooves over them. Use two bar clamps to hold the sides in place and lay the unit down on its face. Next put some glue in the rabbets that accept the back and along the bottom edge. Put the back in place and nail it to the bottom. Now turn the unit over onto its back and glue the front in place. I didn't want any nail heads to show in the front, so I just clamped it.

You can make a couple of inner dividers if you'd like to create compartments. I used some scrap alder to partition a section to one side for pencils and pens. I glued and nailed a little stop to the bottom edge, then glued

both pieces in place between the first and second divider.

That's all there is to it. Now you can hang the holder in your room or carry it out into the garden to write a letter. There's probably someone who'd like to hear from you! **PW**

David Mukamal Camp is a former editor of Popular Woodworking. He's now a custom furniture maker and freelance writer in Santa Fe, New Mexico.

NEW PRODUCT RELEASES



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For more information, circle #190 on the Resource Directory Coupon.

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Features:

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- Six-piece set consists of two .010", two .012" and two .015" shims

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For more information, circle #195 on the Resource Directory Coupon.



PW Tool Update...

In the September 1996 issue, we told you about the JTAS-10 table saw from Jet Equipment and Tools. This right tilting arbor saw has been redesignated as the Xacta Saw Right™, and Jet has added a left tilting arbor saw designated as the Xacta Saw Left™. Both saws feature a 3 or 5 hp motor option, a 27" x 40" cast iron table and the 50" Xacta Fence™. The left model offers a heavier gauge steel cabinet, offering almost 50 more pounds than the right version, a 50 tooth Teflon coated Systimatic saw blade and chrome handwheels. The Xacta Saw Left will retail for about \$1,699. PW

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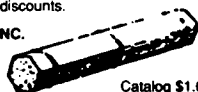
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**Popular
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CAPTION the CARTOON



#22

PORTER-CABLE

illustrated by Bob Rech

Submit your caption(s) for this
issue's cartoon on a postcard to
**Popular Woodworking, Cartoon
Caption #22, 1507 Dana Ave.,
Cincinnati, OH 45207** by December
17, 1996. Winning entries will be
chosen by the editorial staff.

The winner receives a Porter-Cable Limited Edition,
90th Anniversary router. The
model 90690 is a 1½ hp,
23,000 rpm router featuring 100
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struction. The fixed base router
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finish and logo, and includes an all-metal carrying case.

The two runners-up will each win a one-year subscription to
Popular Woodworking.



WIN
ME!

The winner of our "Caption the Cartoon Contest #20" from the
September issue and recipient of the Porter-Cable Profile
Sander kit is:

P. Ream, from Eugene, Oregon.

The runners-up receive a one-year subscription to *Popular
Woodworking*:

B.T. Pitt-Hart, from, Sioux Falls, South Dakota, for:
"Here try my little ole Texas brad naller!"

Jim Bobara, from Avon, Connecticut, for:
"Next time you want to drive those nails home, use a designated
driver!"



#20

"Okay Dad, I think you've worn 'em
down, I'll take over from here."

Shelf Indulgence

One "cute little shelf" becomes too much of a good thing.

"COULD YOU BUILD this cute little shelf?"

I put down the newspaper and looked at the catalog my wife was showing me. It was a simple little shelf, about 18" wide and 5" or 6" deep. Side pieces supported a towel bar and a heart was cut into the back.

"Sure," I said, knowing that if I couldn't put this together, I'd never be able to acquire another power tool.

"Wouldn't it be nice in the bathroom, above the toilet, for brushes and hairspray?"

I had no idea what I was getting myself into. "I'll get some pine and build it this weekend."

And I did. I made a pattern, cut the pieces, routed, sanded, glued, nailed, stained and varnished that cute little shelf. Then I mounted it right over the toilet. We hung a towel on the bar and put combs and brushes on the shelf. We even put a little brass cup hook on the underside of the shelf to hold a hand mirror.

With just that one cute little shelf, I soon managed to justify owning a radial arm saw, a band saw, a router, an orbital sander, a drill press and numerous hand tools. Yes indeed, that cute little shelf truly improved the quality of my woodworking life.

Then my mother-in-law came over and saw it. "What an adorable little shelf," she said. She knew her loving daughter would volunteer her woodworker husband to build one for her bathroom. No, make that one for *each* of her *three* bathrooms. I had now made four cute little shelves.

Then my mom came for a visit. It goes without saying that if you do something for your mother-in-law, you'd better do it for your own mother. Her master bath, main bath and laundry room bath meant three more. That totaled seven cute little shelves.

Now the word was out in the fam-



ILLUSTRATION BY JIM BENTON

ily. Between my brothers and my wife's siblings, I had to build six more. That made 13 cute little shelves.

Then the neighbor ladies came over for coffee and lamented that their husbands were "woodworking challenged." So my wife committed me to three more. Now I was up to 16 cute little shelves.

By now I was sure I'd made that shelf for everyone I knew. I was ready to retire as a shelf maker, but my wife had other ideas...

"Honey, my friends and I are going to put on a Christmas crafts bazaar. We were wondering if you might make a few of your shelves for us to sell?" she asked. I was getting ready to say no when she added, "Everyone just loves them." That was a real low blow.

I should've said, "Are you nuts? Now I'm wearing my tools out! And they've had to clear 10 acres of pine in Georgia since I started building these shelves." But I swallowed hard and answered, "I guess so. How many do you want?"

"How about a dozen?"

So I did a dozen. By now I'd started producing them in mass quantities. An evening of cutting was followed by an evening of routing, then an evening of assembly and an evening of finishing. I finished the dozen just in time for the bazaar. That made the total 28 cute little shelves.

On the first morning of the bazaar, two of the shelves sold to individuals who wanted them for their bathrooms.

Then a guy who'd just bought an antiques and collectibles shop bought the other ten. In the writing of one check, our inventory was gone. Not only that, but he left his card and asked my wife to have me call him. I did — he wanted another dozen. That made 40 cute little shelves. I'd now made 39 more shelves than my father before me. I started to get compliments at work on my pine scented cologne.

In the next year, I made another dozen "cute little shelves" for an assortment of friends and relatives, relatives of friends, and friends of relatives. That was 52 rotten little shelves. When the second Christmas craft bazaar came along, I was pretty close to shelf burnout and only managed to crank out nine. They all sold on the first day. That made 61!

Then we moved across the country. I did make three of those shelves for our new home because they really *are* cute and they're handy to have in the bathroom. That made 64 (if you're still counting). But whenever anyone asks where we got those cute little shelves, I tell them my wife found them in a catalog years ago. **PW**

Editor's Note: Plans for the "cute little shelf" appear in this issue's Project File.

Dick Hanratty is still getting requests to build that cute little shelf in Grand Island, New York.



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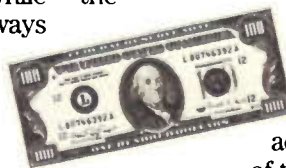
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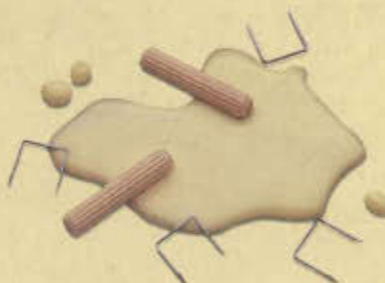
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