

VOL. 6 NO. 4 • ISSUE 35

WEEKEND WOODWORKING PROJECTS

NEAT THINGS YOU CAN BUILD IN A HURRY

Please display until Nov. 6

*Colonial
Candle Stand*

*Kitchen
Message Center*

*Log Cabin
Birdfeeder*

*Dovetail
Candle Box*

*Pull Toy
Caterpillar*

*Queen-Sized
Quilt
Showcase*

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FROM THE EDITORS OF WOOD MAGAZINE

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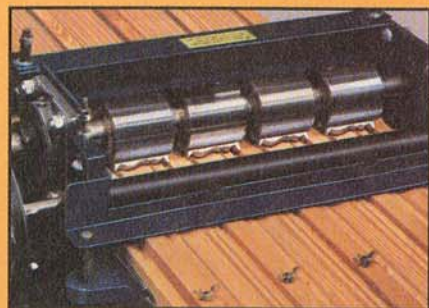
Put this versatile power-feed tool to work in your shop... see how fast it pays for itself! Quickly converts low-cost rough lumber into valuable finished stock. Turns out perfect picture frame moldings, quarter-round, casing, tongue and groove... all popular patterns... any custom design.

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Editor, Workbench Magazine

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E. D. Holtz, North Carolina

FROM OUR SHOP

A feather in the cap for our bird lovers

Have you noticed that birds seem to be "in?" Everywhere I look, people are hanging birdhouses and birdfeeders outside and inside their homes. Maybe this reflects environmental concern, or perhaps it's an outgrowth of a Nineties belief in "nesting" (turning the home into a haven from the hectic outside world). For whatever reason, people seem fascinated with taking care of our feathered friends and collecting birdhouses.

Today, some birdhouses and feeders even command top-dollar prices. In April, members of our staff donated their time to build birdhouses for a local "For the Birds" benefit auction. Over several lunch hours, staff members put together six barn birdhouses featured in Issue 9; two other staff members contributed their own original designs. This year's silent auction raised more than \$18,000 for Orchard Place/Des Moines Children's Home, a residential treatment center for children with emotional problems.



Photograph: John Hetherington

At a benefit auction, Lee Casten, center, paid \$50 for a barn birdhouse built by staff members Louise Anderson, left, and Jim Downing. Lee has more than 15 birdhouses on his acreage.

The fund-raiser, now in its third year, has proven so successful that our company recently produced a 128-page book featuring birdhouses and birdfeeders of every size and description. *For the Birds: Creating a Sanctuary* includes four practical project plans from the pages of *Weekend Woodworking Projects* and *WOOD* magazine, information about birdhouses as collectibles, detailed background on 29 popular bird species, and landscaping tips to attract birds to your backyard. All proceeds from the \$19.95 hardcover book, now available nationwide at bookstores, will benefit Orchard Place.

For a look at our newest birdfeeder design, turn to page 10. You can feed the entire feathered neighborhood with this log-cabin feeder—its walls hold more than two gallons of birdseed.

Cam Voss

Cover photograph: King Au

WEEKEND WOODWORKING PROJECTS

OUR PLEDGE TO YOU

Prior to publication, we build every project featured in *Weekend Woodworking Projects* step-by-step in our shop. Then, a seasoned team of editors reviews the how-to directions, technical drawings, illustrations, and Bill of Materials of each project to make sure the instructions we provide to you are clear, concise, and complete.

The Weekend Woodworking Projects Staff

WE CARE!

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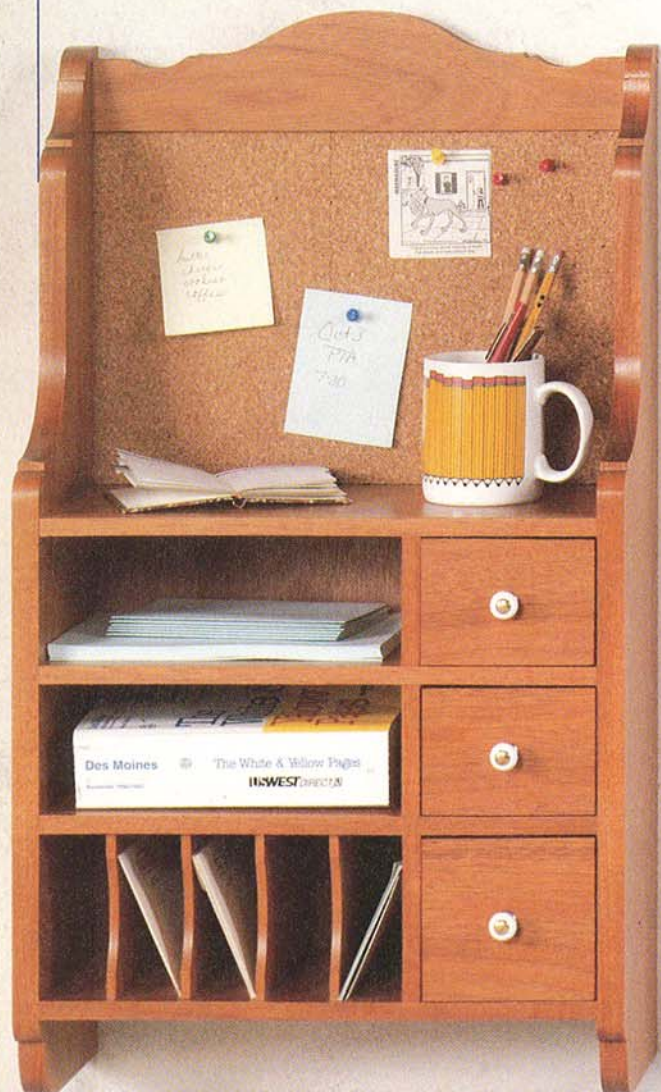
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MPA



6

ON-THE-BALL ORGANIZER

Head to your shop today and start building one of the nicest household helpers we've seen in a long time. It has plenty of pigeonholes for mail, shelves for address and phone books, a bulletin board for important messages, and three drawers for those other items you like to keep at your fingertips.

10

LOG CABIN BIRDFEEDER

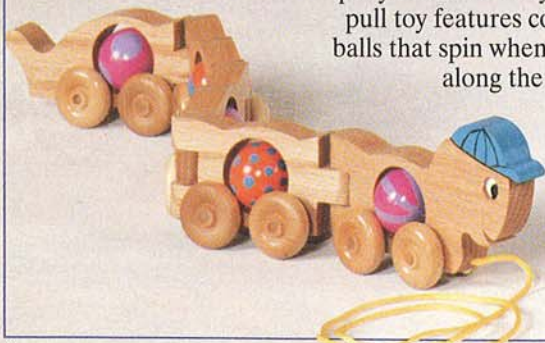
Here's a rustic restaurant that will charm your family and neighbors while it caters to ravenous winter visitors. As the builder, you'll appreciate the assembly table we developed to help you construct the redwood "logs."

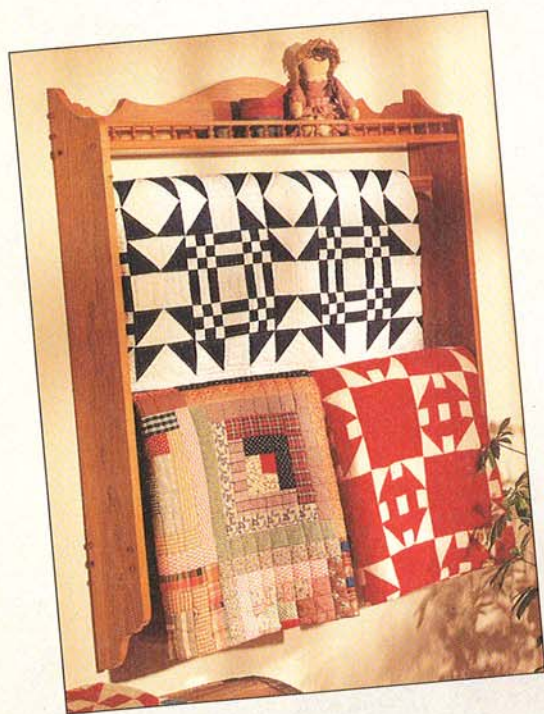


15

CRAZY CARPET CATERPILLAR

Meet Calvin the Caterpillar, an easy-to-build project from our company's Build-A-Toy® contest. This pull toy features colorful wooden balls that spin when you pull Calvin along the floor.

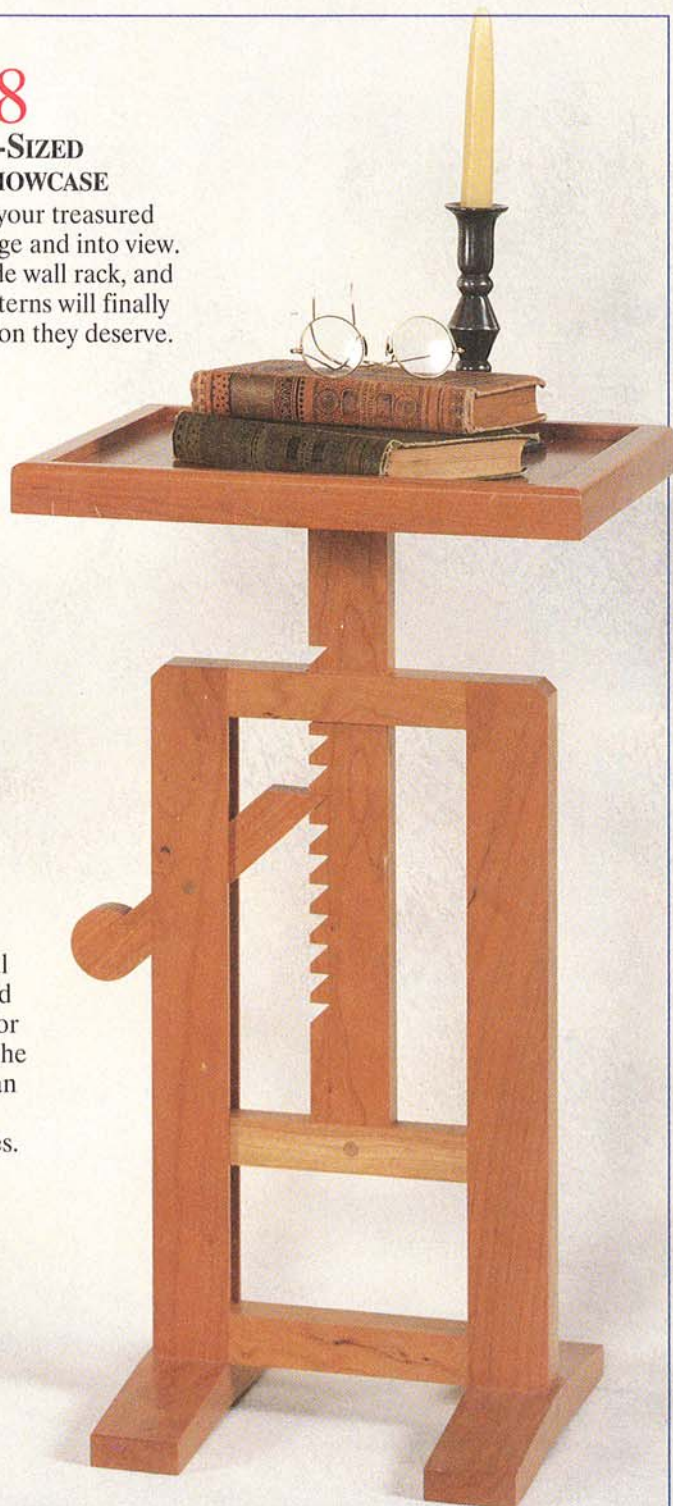




18

QUEEN-SIZED QUILT SHOWCASE

It's time to get your treasured quilts out of storage and into view. Build this 42"-wide wall rack, and your favorite patterns will finally get all the attention they deserve.



22

COLONIAL CANDLE STAND

Rediscover a colonial classic when you build this ratcheting table for your home. With just the flick of a lever, you can raise or lower the pedestal up to 8 inches.

28

CLASSIC CANDLE BOX

If you've steered clear of dovetail joints because you find chiseling to be a chancy operation, give this one-afternoon project a try. Our simple jig really streamlines the joinery process.





On-The-Ball Organizer

Instead of hiring an air-traffic controller to keep your household affairs running smoothly, spend a weekend building this practical project. It's got it all—a bulletin board for phone messages and appointment reminders, pigeonholes for sorting mail, and drawers and compartments for all those small items you'd hate to lose.

FIRST, TACKLE THE MAIN FRAME

1 To make the side panels (A), start with a $1\frac{3}{4} \times 7\frac{1}{4} \times 96$ " piece of stock. (We selected Honduras mahogany.) Rip and crosscut the side panels to $6\frac{3}{4} \times 28\frac{3}{8}$ ". From the same stock, rip and crosscut two shelf stops (B) to $\frac{3}{4} \times 15\frac{7}{16}$ " and the top rail (C) to 4×15 ".

2 Lay out the $\frac{1}{2}$ "-wide dadoes on the side panels where shown on the Exploded View Drawing *opposite*. Fit your tablesaw with a $\frac{1}{2}$ " dado set elevated to cut $\frac{3}{8}$ " deep, and cut the four dadoes on each side panel. (For all dadoing and crosscutting operations, we attached a wooden auxiliary fence to our miter gauge, clamped on a stopblock, and used a backup board to minimize tear-out.)

3 On an 8×29 " piece of paper, lay out the gridded Side Panel pattern shown on *page 8*. (If you'd prefer to work from a full-sized pattern, see our offer on *page 9*.) Make two copies of the full-sized half-pattern for the top rail, and tape them together at the centerlines. Use double-faced carpet tape to stack the two side panels. Now, adhere the two patterns to their respective pieces, and bandsaw the contoured edges, keeping your blade outside the line. Sand the bandsawed edge, then separate the side panels.

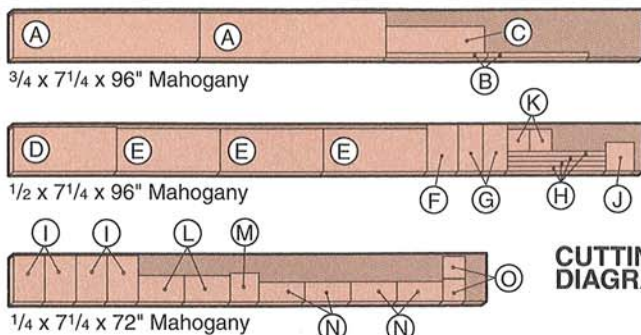
4 Draw a $\frac{3}{4}$ " radius at each end of the two shelf stops, and cut them to shape on your bandsaw. Sand these edges, then edge-glue and clamp the stops to the side panels where shown on the Exploded View drawing. After the glue has dried, sand the joints smooth.

5 Fit your table-mounted router with a rabbeting bit and fence, and rout a $\frac{1}{4}$ "-wide rabbet $\frac{3}{8}$ " deep on the back edge of each side panel where shown on the Exploded View drawing. To do this, first lay out start and stop marks where shown. After routing, square the ends of the rabbets with a sharp chisel.

NOW, BUILD SHELVES AND DIVIDERS

1 From a 96" length of $\frac{1}{2} \times 7\frac{1}{4}$ " stock, rip and crosscut the bottom shelf (D) to the dimensions listed in the Bill of Materials. Then, crosscut a 48" length of this stock, and rip it to $6\frac{1}{2}$ " wide. Crosscut three shelves (E) to $15\frac{3}{4}$ " long from this piece. From the remaining stock, crosscut the bottom shelf divider (F) and the two upper shelf dividers (G) as dimensioned on the

Continued

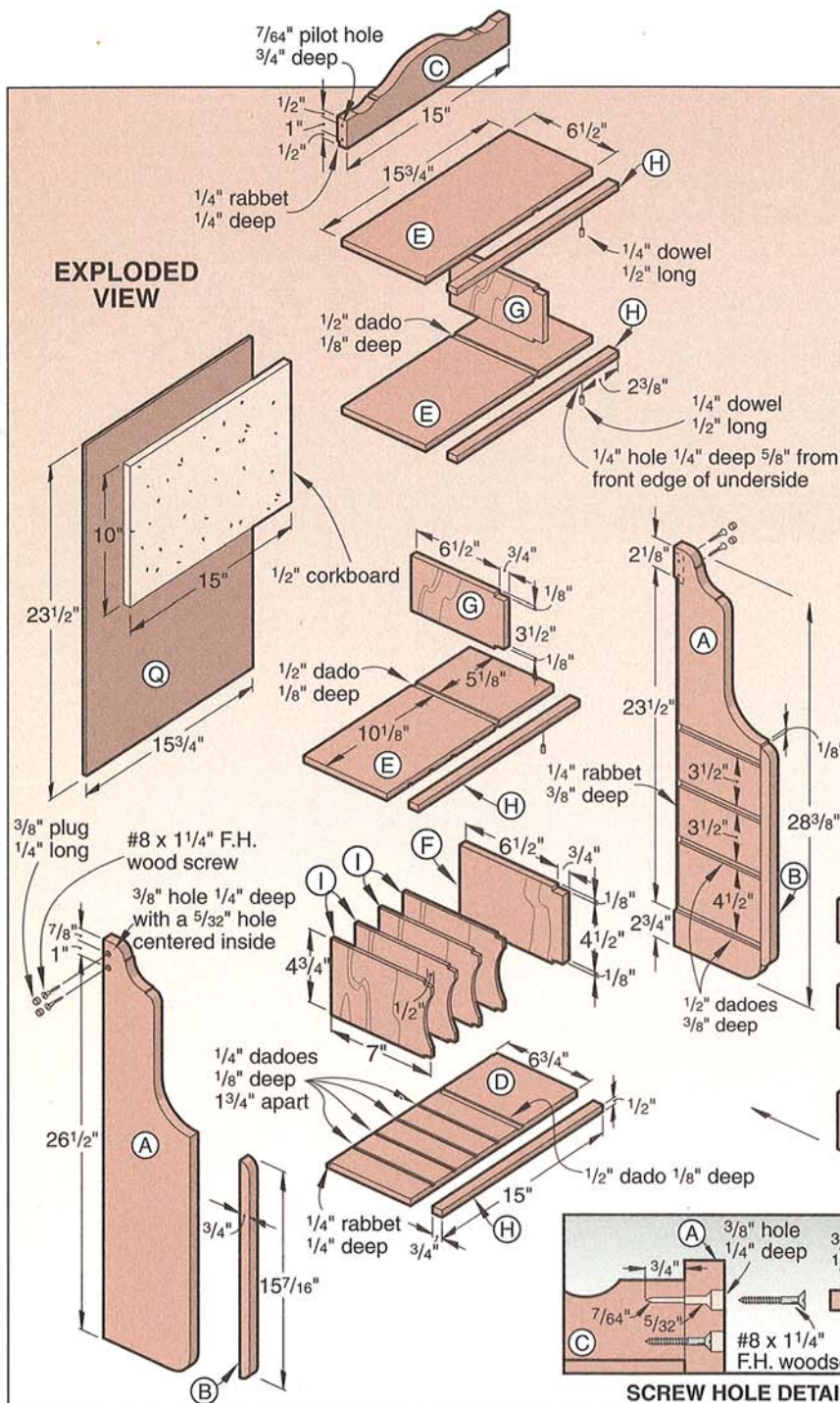


BILL OF MATERIALS

Part	Finished Size			Matl.	Qty.
	T	W	L		
A side panel	3/4"	6 3/4"	28 3/8"	M	2
B shelf stops	3/4"	3/4"	157 1/16"	M	2
C top rail	3/4"	4"	15"	M	1
D bottom shelf	1/2"	6 3/4"	15 3/4"	M	1
E shelves	1/2"	6 1/2"	15 3/4"	M	3
F bottom divider	1/2"	7 1/4"	4 3/4"	M	1
G upper dividers	1/2"	7 1/4"	3 3/4"	M	2
H divider stops	1/2"	3/4"	15"	M	4
I pigeonhole dividers	1/4"	7"	4 3/4"	M	4
J lg. drawer front	1/2"	47 1/16"	41 1/16"	M	1
K sm. drawer fronts	1/2"	37 1/16"	41 1/16"	M	2
L lg. drawer sides	1/4"	4"	7"	M	2
M lg. drawer back	1/4"	47 1/16"	47 1/16"	M	1
N sm. drawer sides	1/4"	3"	7"	M	4
O sm. drawer backs	1/4"	37 1/16"	47 1/16"	M	2
P drawer bottoms	1/4"	4 3/8"	61 1/16"	MP	3
Q back panel	1/4"	15 3/4"	23 1/2"	MP	1

Materials Key: M—mahogany; MP—mahogany plywood.

Supplies: #8 x 1 1/4" flathead wood screws; #17 x 1" and #17 x 3/4" brads; 1/4" dowel stock; stain; finish; 1/2"-thick corkboard panel; low-odor, nonflammable contact cement; drawer knobs; triangle picture hangers; adhesive cork pads; #10 x 2" panhead wood screws.



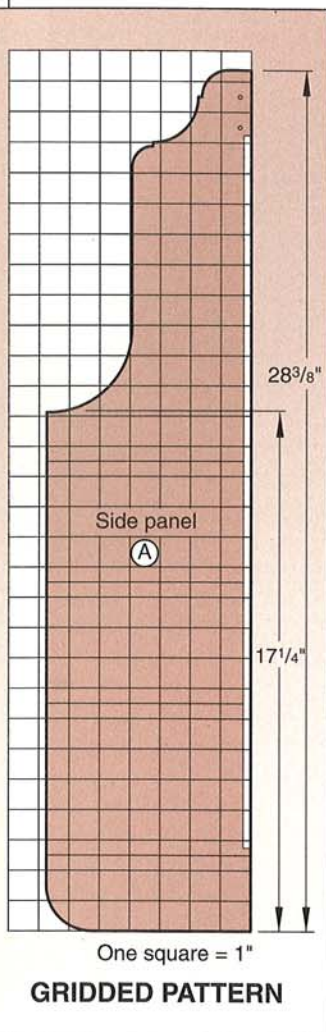
TIP To adhere the corkboard panel to your organizer, we recommend Franklin Countertop or a similar low-odor, nonflammable contact cement. You can find it at hardware stores and home centers.

1
Pigeonhole divider

FULL-SIZED PROFILE

$\frac{1}{8}$ "

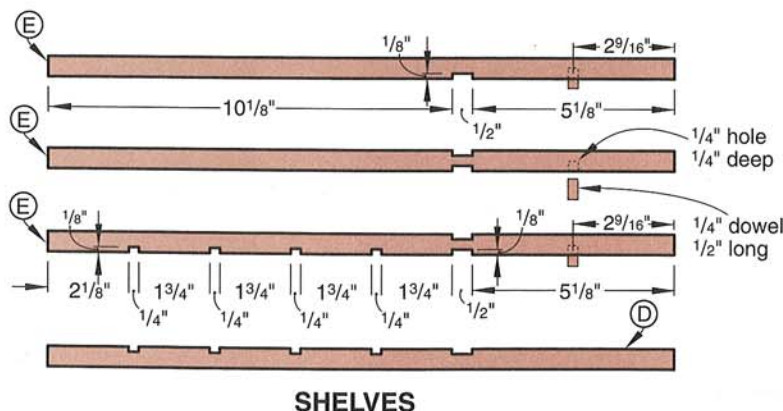
$\frac{1}{2}$ "



6 Stack the four pigeonhole dividers using double-faced carpet tape. Then, copy the full-sized Pigeonhole Divider profile, and adhere it

4 Use glue and #8x1¼" flathead wood screws to attach the top rail. Then, cut four ⅜"-diameter plugs from leftover stock, and glue them into the counterbored holes. Sand flush when the glue has dried.

2 From leftover 1/4x7 1/4" stock, rip and crosscut two sides (L) and a back (M) for the large drawer as dimensioned in the Bill of Materials. Rip and crosscut four sides (N) and two backs (O) for the two smaller drawers. Lay out the top profile on all three backs, and use your band-saw or scrollsaw to cut them to shape.



3 Fit your tablesaw with a $\frac{1}{4}$ " dado set, and elevate it to cut $\frac{1}{8}$ " deep. Use your fence to cut a groove along the inside face of all drawer fronts, sides, and backs $\frac{1}{4}$ " from the bottom edge. Then, use your miter gauge and stopblock to cut a $\frac{1}{4}$ " rabbet $\frac{1}{8}$ " deep along the inside back end of each drawer side.

4 Elevate your $\frac{1}{4}$ " dado set to $\frac{1}{4}$ ", and cut a rabbet along the top edge and both ends of the back face of each drawer front. (To avoid weakening the drawer front, we chose not to rabbet the top edge flush with the drawer sides.) Next, plane or rip $\frac{1}{16}$ " from the bottom edge of each drawer front and back. This will create a reveal at the drawer bottom equal to that at the top.

5 From a quarter-sheet (2x4') of $\frac{1}{4}$ "-thick mahogany plywood, rip and crosscut three drawer bottoms (P) to $4\frac{3}{8} \times 6\frac{11}{16}$ ". Then, finish-sand all drawer parts. Glue and clamp the drawers, but allow the bottoms to float freely in the grooves. Check for square, then nail the drawers using #17x $\frac{3}{4}$ " brads. (We drilled $\frac{1}{16}$ " pilot holes for the brads so they wouldn't split the thin stock.) Set the brads, fill the holes, and sand flush when the filler has dried.

ADD THE FINISHING TOUCHES, THEN START GETTING ORGANIZED

1 From your remaining plywood stock, rip and crosscut the back panel (Q) to fit inside the rabbets. (Ours measured $15\frac{3}{4} \times 23\frac{1}{2}$ ".) Then, finish-sand both faces.

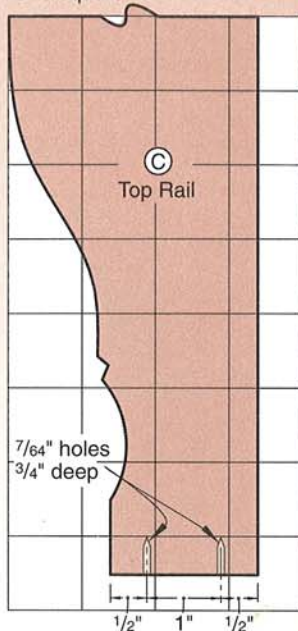
2 To make drawer stops, cut three $\frac{1}{2}$ " lengths of $\frac{1}{4}$ " dowel stock, and glue them into the holes you drilled on the bottom faces of the shelves. Finish-sand any surfaces that still need it. Now, apply the finish of your choice to the organizer, the drawers, and the back-panel front face. (We wiped on Minwax Natural Wood Finish, let it stand for 10 minutes, then wiped off the excess. After letting the finish dry overnight, we applied three coats of Deft semi-gloss aerosol lacquer, hand-sanding between coats with 320-grit sandpaper.)

3 When the finish has dried, attach the back panel using #17x1" brads. Then, adhere a 10x15" panel of $\frac{1}{2}$ "-thick corkboard to the front face. (We found a 12x24" panel at a local crafts store, cut it to size, and adhered it using contact cement. See our tip on page 7.) Now, attach the drawer knobs.

4 To wall-mount your organizer, center and attach a triangle picture hanger to the back edge of each side panel $1\frac{3}{8}$ " from the top. Adhere a cork pad to the back edge of each side panel to make the organizer hang vertically. Now, locate two adjacent studs in your chosen wall, and mount #10x2" panhead wood screws positioned to fit the two hangers. (Standard distance between stud centerlines is 16", and your hangers should measure $15\frac{3}{4}$ " apart.) ■

Project design: Bob Colpetzer, Clinton, Tenn.
Illustrations: Roxanne LeMoine
Project builder: Chuck Hedlund
Photograph: King Au

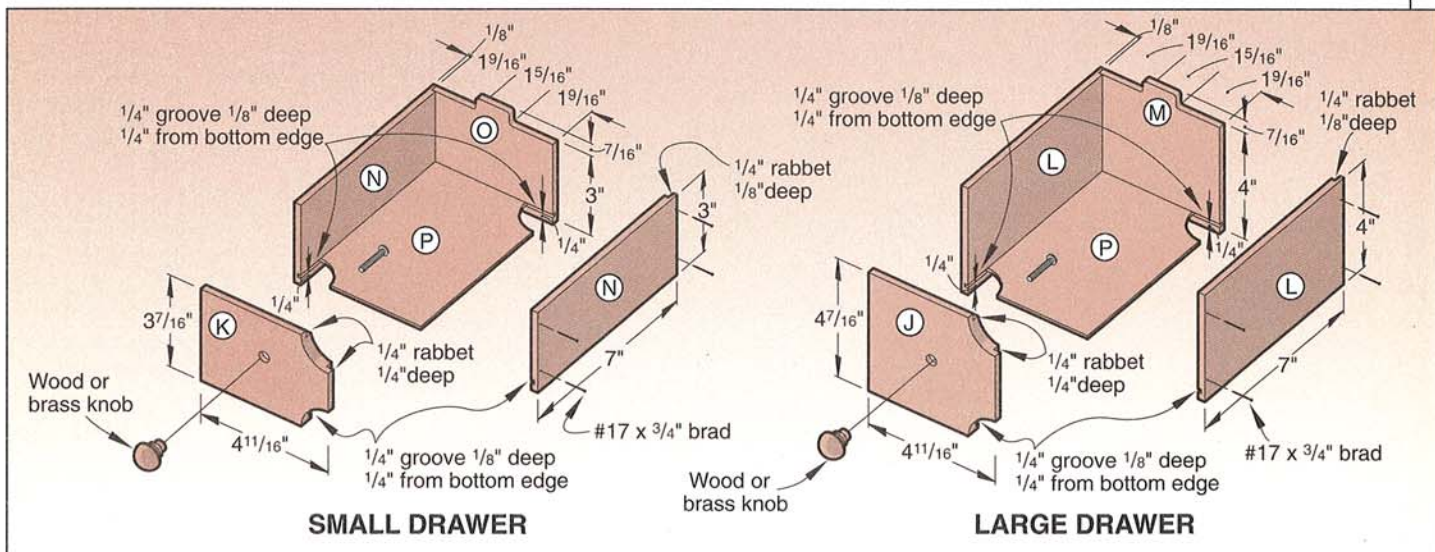
One square = 1"



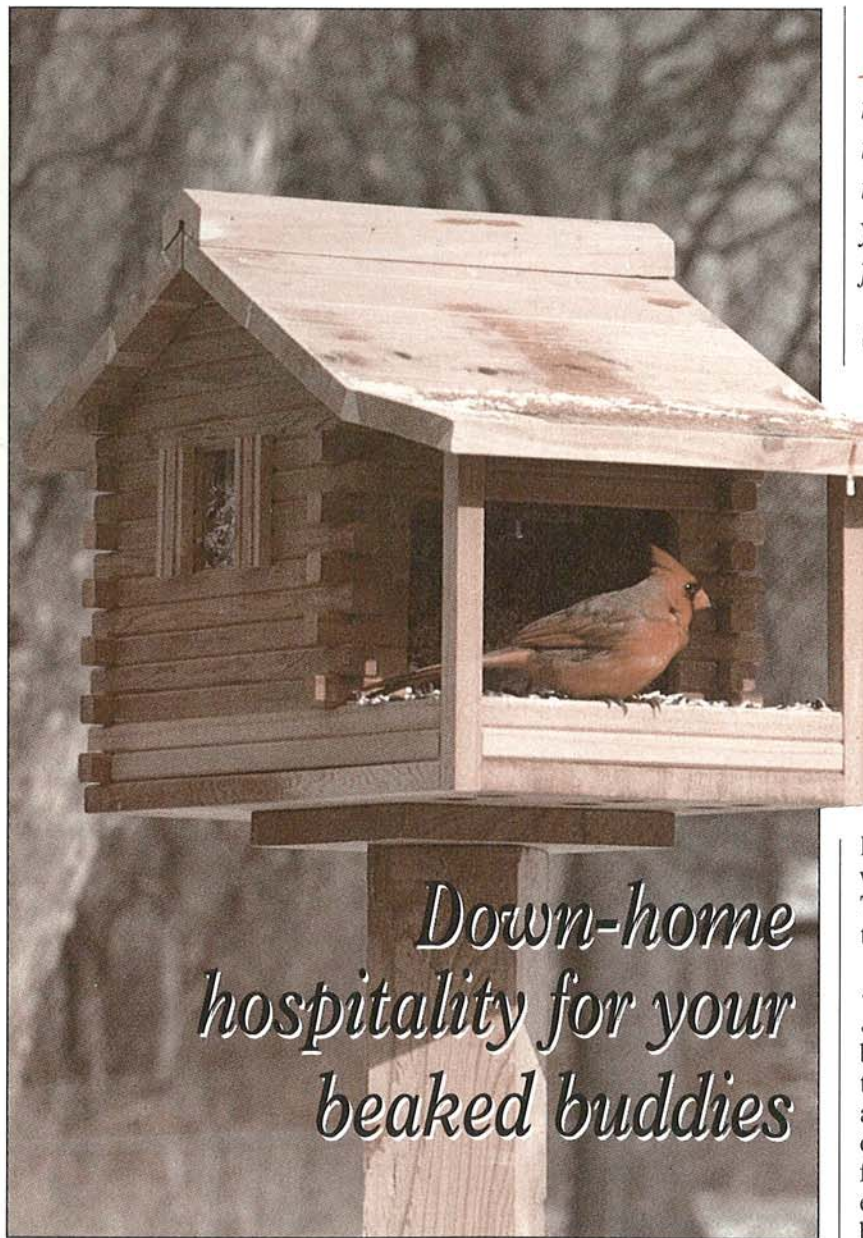
GRIDDED HALF PATTERN

If you'd like full-sized patterns for the side panels and top rail, send \$1 and a self-addressed, business-sized envelope with 52 cents postage to:

On-the-Ball Organizer
Weekend Woodworking Projects®
1912 Grand Ave.
Des Moines, IA 50309-3379



Log Cabin Birdfeeder



*Down-home
hospitality for your
beaked buddies*

Here's a rustic restaurant that will charm your family and neighbors while it caters generously to ravenous winter visitors. And with this feeder's two-gallon capacity, you'll find yourself making fewer forays out into the snow to refill it.

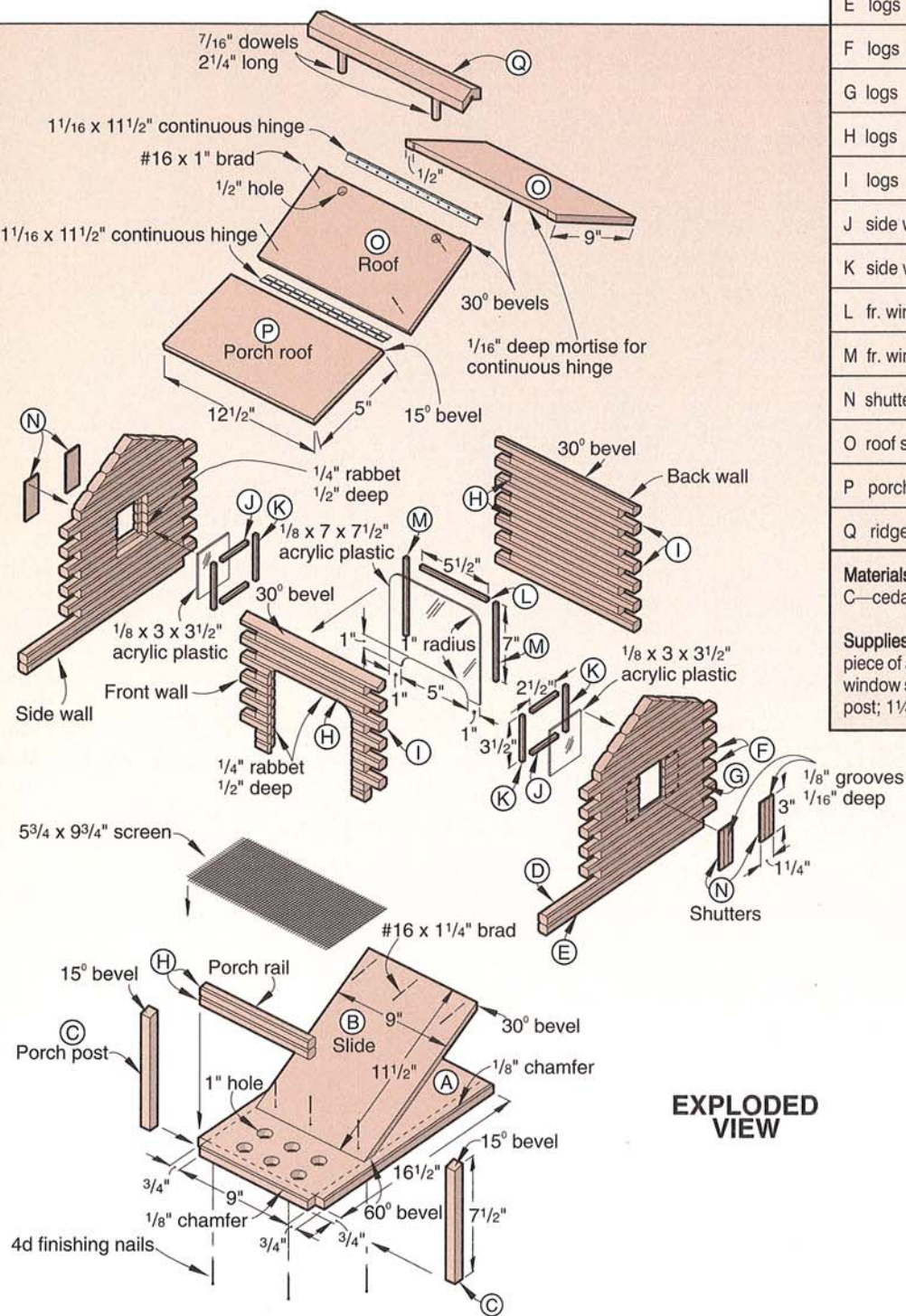
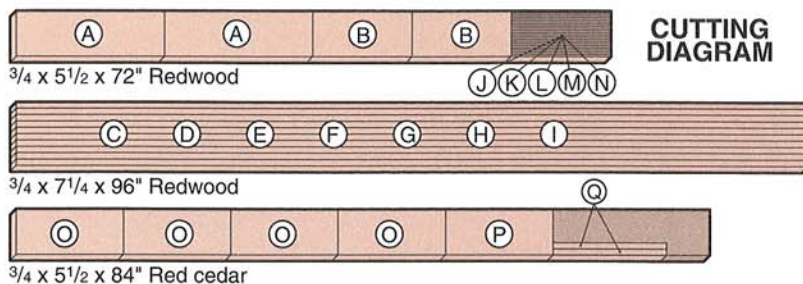
START WITH THE CABIN BASE

1 Edge-join enough $\frac{3}{4}$ " $\times$ 5 $\frac{1}{2}$ " stock to make an 11 $\times$ 18" base panel (A), and a 9 $\frac{1}{2}$ " $\times$ 12" slide panel (B). (We selected redwood and used Franklin Titebond II, a water-resistant glue, throughout.) After the glue dries, remove the clamps and trim the base panel to 10 $\frac{1}{2}$ " $\times$ 17 $\frac{1}{4}$ ".

2 Lay out the $\frac{3}{4}$ "-square corner notches in the front edge and the 1" hole centerpoints in the base using the dimensions on the Base drawing *opposite*. With a chamfering bit, rout a $\frac{1}{8}$ " chamfer along the top edges of the base. Cut out the two notches, and bore the six holes. Now, cut a 5 $\frac{3}{4}$ " $\times$ 9 $\frac{3}{4}$ " piece of fine-mesh window screen, and nail or staple it over the holes in the base. (We centered the screen so it would fit under the feed slide and cabin walls. The screen and holes allow moisture to drain through the seed tray.)

3 Trim the slide (B) to the dimensions shown on the Exploded View drawing *opposite*, bevel-cutting both ends as dimensioned. To do this, position your tablesaw rip fence snug against the blade on the left side (or the side opposite the tilt direction). Tilt the blade to 30° from perpendicular, stand the slide on its front end against the fence, and bevel-cut it. For the back end, remove the rip fence, and lay the slide flat on the saw table. Without changing the blade tilt, cut the bevel using your miter gauge.

Continued

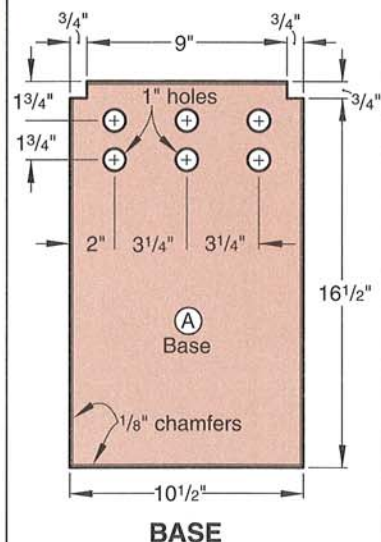


BILL OF MATERIALS

Part	Finished Size			Matl.	Qty.
	T	W	L		
A base	3/4"	10 1/2"	17 1/4"	ER	1
B slide	3/4"	9"	11 1/2"	ER	1
C posts	3/4"	3/4"	7 1/2"	R	2
D logs	3/4"	3/4"	16 1/2"	R	2
E logs	3/4"	3/4"	15 1/4"	R	2
F logs	3/4"	3/4"	12 1/2"	R	14
G logs	3/4"	3/4"	10"	R	16
H logs	3/4"	3/4"	9"	R	15
I logs	3/4"	3/4"	11 1/2"	R	13
J side window stops	1/4"	1/4"	2 1/2"	R	4
K side window stops	1/4"	1/4"	3 1/2"	R	4
L fr. window stops	1/4"	1/4"	7 1/4"	R	1
M fr. window stops	1/4"	1/4"	6"	R	2
N shutters	1/4"	1 1/4"	3"	R	4
O roof sections	3/4"	9"	12 1/2"	EC	2
P porch roof	3/4"	5"	12 1/2"	C	1
Q ridge cap	3/4"	11 3/16"	12 1/2"	EC	1

Materials Key: R—redwood; ER—edge-joined redwood; C—cedar; EC—edge-joined cedar.

Supplies: #16 x 1 1/4" brads; 4d finishing nails; 1/8 x 8 x 12" piece of acrylic plastic; 1 1/16 x 24" continuous hinge; nylon window screen; caulk or silicone sealant; 4 x 4 x 96" cedar post; 1 1/4" galvanized deck screws; 7/16" dowel stock.



LOG CABIN BIRDFEEDER

PREPARE THE CABIN LOGS NEXT

1 From your $\frac{3}{4}$ "-thick stock, rip enough $\frac{3}{4} \times \frac{3}{4}$ " strips to make approximately 700 linear inches of log stock. (We ripped eight strips from a $7\frac{1}{4} \times 96$ " board.)

2 Using a chamfering bit in your table-mounted router, rout a $\frac{1}{8}$ " chamfer on all four edges of your log stock. (**Note:** Make sure you leave a 16" length of log stock unchamfered for the porch posts.)

3 Crosscut the porch posts (C) and logs (D, E, F, G, H, and I) to the lengths specified in the Bill of Materials. (We used a stopblock on our tablesaw miter gauge to ensure uniform lengths.) Separate the logs by length as you cut them.

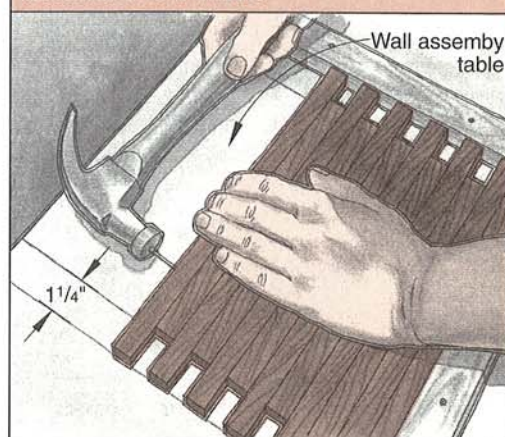
NOW, CONSTRUCT THE CABIN WALLS

1 Make a wall-assembly table as shown *above right* by first cutting a piece of scrap plywood or particle-board to 20×20 ". Cut two $\frac{3}{4} \times 1 \times 20$ " straightedges (we made ours from scrap pine), and nail them to two adjacent edges, squaring the corner you've created. Now, use your framing square to draw vertical lines on the assembly table to help align the logs (at a $\frac{1}{4}$ " offset) as you assemble the walls.

2 Build the back wall on the assembly table, alternating logs (H and I) as shown on the Back Wall drawing *at left*. (To assemble the walls, we applied a bead of glue along the mating surface of the bottom log, then placed the next log against it, and drove two $\#16 \times 1\frac{1}{4}$ " brads through them as shown *above right*. We repeated these steps for all 13 logs.) Wipe off any glue squeeze-out with a damp cloth. Now, lay the assembled wall on a flat surface, and weight it to keep it flat while the glue dries. (See our tip *opposite*.)

3 Using the procedure described in the previous step, build one front and two side walls with the logs identified on the Front and Side Wall

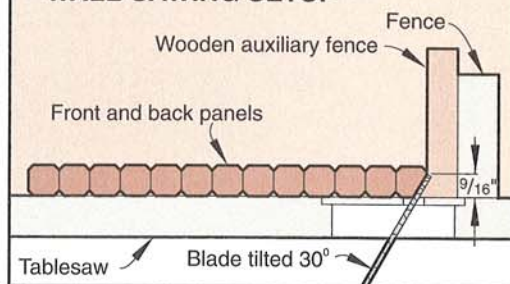
ASSEMBLING A WALL



drawings. After the glue in the back and front walls has dried, rip a 30° bevel along the top edge of both using the saw setup shown on the Wall-Sawing Setup drawing *below*.

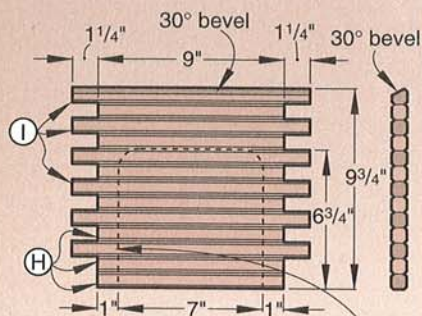
4 Using the dimensions shown on the Side and Front Wall drawings, lay out and cut the side and front window openings and roof gables in the appropriate walls. (We drilled entry holes

WALL-SAWING SETUP

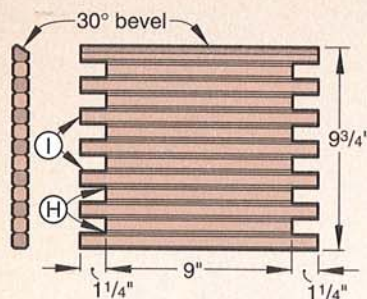


for the side windows and then cut them out with our portable jigsaw. We used our bandsaw for the other cuts.) Next, fit your table-mounted router with a $\frac{1}{4}$ " rabbeting bit elevated to cut $\frac{1}{2}$ " deep. Rout around the front and side windows on the inside face.

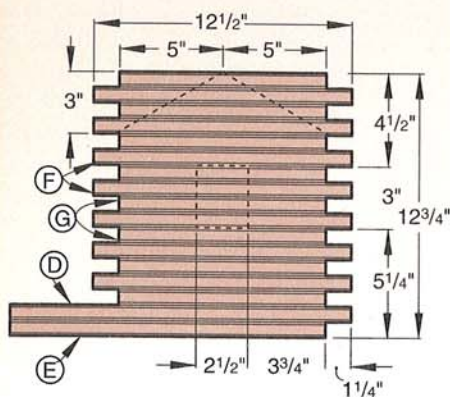
5 Measure the rabbeted window openings, then cut $\frac{1}{8}$ "-thick acrylic plastic windows to fit. (We sawed the plastic on our scrollsaw using a $\#3$ blade.) Insert the plastic windows into the window rabbets. From redwood scrap, rip $\frac{1}{4} \times \frac{1}{4}$ " stock for the window stops. Crosscut the side window stops (J and K) as dimensioned on the Exploded View drawing. Sand the ends if necessary, and glue them in place.



FRONT WALL



BACK WALL



SIDE WALL

6 Cut the 1×5" seed opening in the bottom edge of the front window where shown on the Exploded View drawing. Then, mount the window in the front wall, and glue in the front window stops (L and M).

7 To make shutters (N), cut a piece of redwood stock to ¼×1¼×14". Elevate your tablesaw blade to cut ¼" deep, and use your rip fence and a push stick to cut a groove ¼" in from each edge on one face. Using an extension on your miter gauge, crosscut four 3" lengths, then glue and nail them to the side walls where shown.

YOU'RE READY TO START ASSEMBLING THE CABIN

1 Dry-assemble the four cabin walls. If any logs don't interlock, use a fine-toothed file to trim them. Next, position the assembled cabin on the base, aligning the front ends of the bottom logs with the notches on the base front end. When you're satisfied with the fit, apply beads of glue to the mating surfaces on the logs, then reassemble and clamp. (We attached 12" bar clamps to the ends of the logs.) Check for square, and allow the glue to dry.

2 Glue and clamp the assembled cabin to the base. Then, nail through the base and into the walls using 4d finishing nails.

3 Position the slide inside the cabin where shown on the Exploded View drawing, placing its front edge over the screen and against the back of the front wall. Now, nail it to the back wall. (We drove #16×1¼" brads through the slide and into the back wall and base.) Apply a bead of caulk or silicone sealant along both edges of the slide to prevent birdfeed from slipping through the cracks.

4 Tilt your tablesaw blade to 15° from perpendicular, and bevel-cut the top ends of the two porch posts (C) to 7½" long. Glue and nail the posts in the base notches. Then, glue and nail together two porch-rail logs (H), and glue and nail them between the porch posts.

IT'S TIME TO MAKE THE ROOF AND RIDGE CAP

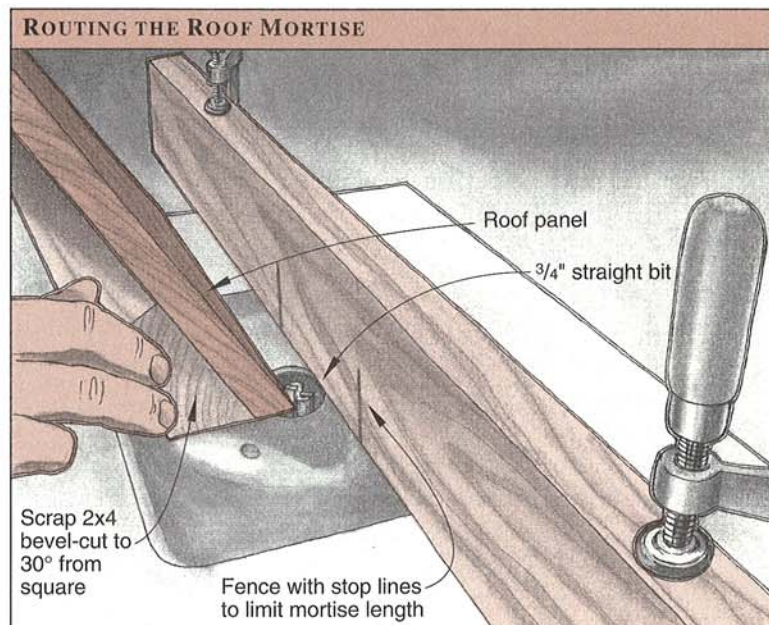
1 To build the roof, edge-join enough ¾×5½" stock to make two 10×13" panels. (We used red cedar.) After the glue has dried, remove the

clamps, and trim both roof panels (O) to final size, bevel-ripping one edge of each at 30° where shown on the Exploded View drawing.

2 To accommodate the continuous hinge, mortise the beveled edges of the roof panels where shown on the Mortise detail on the Exploded View drawing. To do this, bevel-rip the edge of a 12½" length of scrap 2×4 to 30° from square, and adhere each roof panel to it as shown *below* so that both beveled edges are flush. Fit your table-mounted router with a ¾" straight bit elevated to cut ¼" deep, and set the fence 1" back from the bit. Draw stop lines on the roof panel and fence to stop the mortise ½" from each end. Now, hold the assembly with the beveled edges flat on the table, and make several passes to rout the mortise.

3 Use your hacksaw to cut a 1½×24" continuous hinge into two 11½" lengths. (We found ours at a local hardware store.) Attach one of these to the mortised edges of both roof

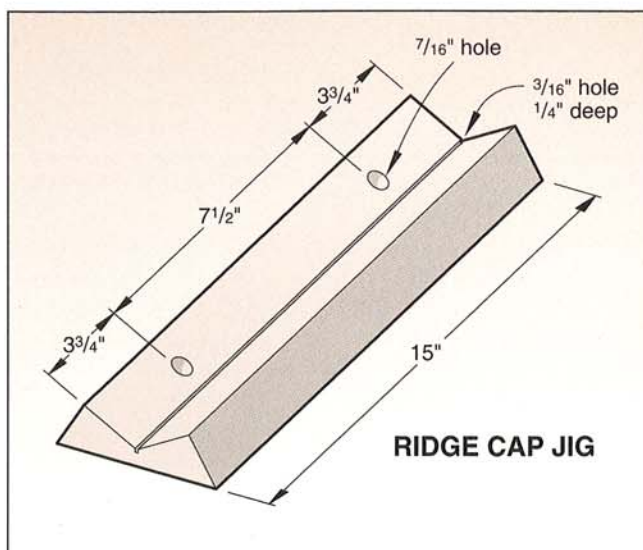
TIP To keep our walls flat during glue-up, we laid newspaper on a concrete floor with waxed paper over it. Then, we laid the walls on top, followed by another sheet of waxed paper and more newspaper for padding. We then set an 8×8×16" cinder block facedown on each wall.



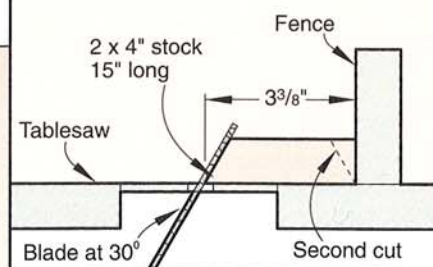
pieces. Cut the porch roof (P) to size, bevel-cutting one edge at 15°. Next, attach it to the front roof panel using your second length of continuous hinge on the bottom faces. Center this assembly over the cabin, then glue and nail the front roof to the cabin walls and the porch roof to the porch posts. Now, set all nails. (**Note:** If you're concerned about rust from the nails staining your feeder, fill the holes as well.)

Continued

LOG CABIN BIRDFEEDER

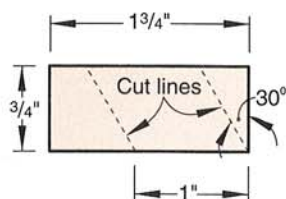
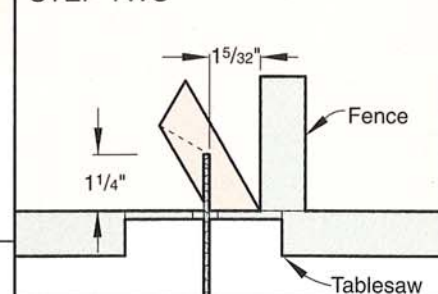


STEP ONE

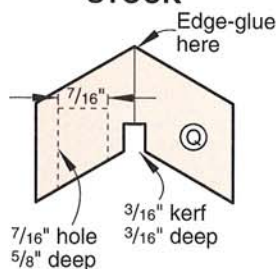


JIG-CUTTING SETUP

STEP TWO



RIDGE CAP STOCK



RIDGE CAP (SECTION VIEW)

4 To make the ridge cap (Q), rough-cut a $\frac{3}{4}$ "-thick piece of redwood stock to $1\frac{3}{4}$ " wide and 26" long. Tilt your tablesaw blade to 30° from perpendicular and rip both edges, cutting the piece to the dimensions shown on the Ridge Cap Stock drawing at left. Crosscut this piece in half, then edge-glue and clamp the two pieces where shown on the Ridge Cap drawing at left to form the cap. After the glue has dried, elevate your tablesaw blade to $\frac{5}{8}$ ", and cut a $\frac{3}{16}$ "-wide groove $\frac{3}{16}$ " deep along the center of the ridge cap where shown. (This groove will require two passes.) Now, crosscut the cap to $12\frac{1}{2}$ " long. (**Note:** This ridge cap will help protect both the birdseed and hinge from moisture. As a simpler but less visually appealing alternative, you could attach a $2 \times 12\frac{1}{2}$ " strip of vinyl or inner-tube rubber over the hinge using #18 $\times \frac{5}{8}$ " wire nails.)

5 To drill the mating dowel holes in the cap and roof, make a V-shaped jig by following the steps shown on the Ridge Cap Jig drawing above. Place the piece flat-side-up on your tablesaw, and cut a full-length $\frac{3}{16}$ " groove $\frac{1}{4}$ " deep in the center of the "V". Next, mark a line across the "V" $1\frac{1}{4}$ " from each end. Now, drill the $\frac{7}{16}$ " holes through the jig where marked.

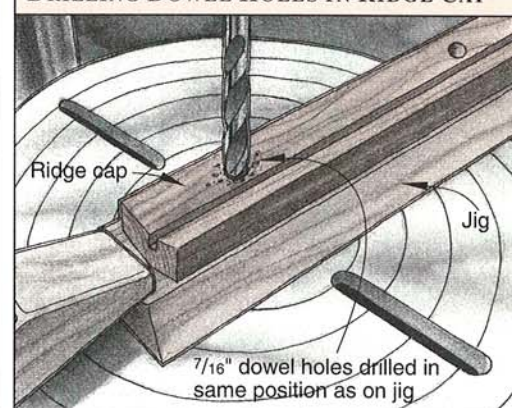
6 To drill the $\frac{7}{16}$ " dowel holes in the ridge cap, turn the jig flat-side-down on your drill-press table, and center the bit in one of the two existing holes. While holding the bit in the hole, clamp the jig to the table. Next, place the ridge cap in the "V" of the jig, align the ends with the marks, and drill a $\frac{7}{16}$ " hole $\frac{1}{2}$ " deep into the cap as shown at right. Use the same procedure to center the bit in the other jig hole, and then drill a second hole in the cap.

7 Crosscut two $2\frac{1}{4}$ " lengths of $\frac{7}{16}$ " dowel stock. Sand a chamfer on the ends, and then glue them into the ridge-cap holes.

8 To drill the holes in the roof, first mark a line $1\frac{1}{4}$ " in from each end of the flat side of your jig. Place the jig over the roof ridge (holes to the front), and align the marks with the roof edges. Drill through the existing holes in the jig and through the roof using a $\frac{7}{16}$ " twist bit. Then, remove the jig. Switch to a $\frac{1}{2}$ " twist bit, and enlarge the holes in the roof. Place the cap over the roof, inserting its dowels into the holes.

9 Find a suitable location, then mount your feeder on an 8'-long 4×4 cedar post set 2' into the ground. (We cut a 7" square of $\frac{3}{4}$ "-thick cedar stock and attached it to the post using four $1\frac{1}{4}$ " deck screws. We then mounted the feeder on this pedestal using four more deck screws.) ■

DRILLING DOWEL HOLES IN RIDGE CAP



Project design: David Ashe
Illustrations: Roxanne LeMoine,
 Carson Ode
Project builder: Francis Carr
Photograph: Doug Cantwell

Crazy Carpet Caterpillar

A toddler-tempting pull toy with plenty of personality

Met Calvin the Caterpillar, another eye-catching design from our company's Build-A-Toy® contest. In this easy-to-build project from Robert Phillips of Odessa, Missouri, each brightly painted ball spins backward as the wheels roll forward. The kids will love Calvin—you can bank on it!

USE OUR FULL-SIZED PATTERNS FOR ALL DRILLING OPERATIONS

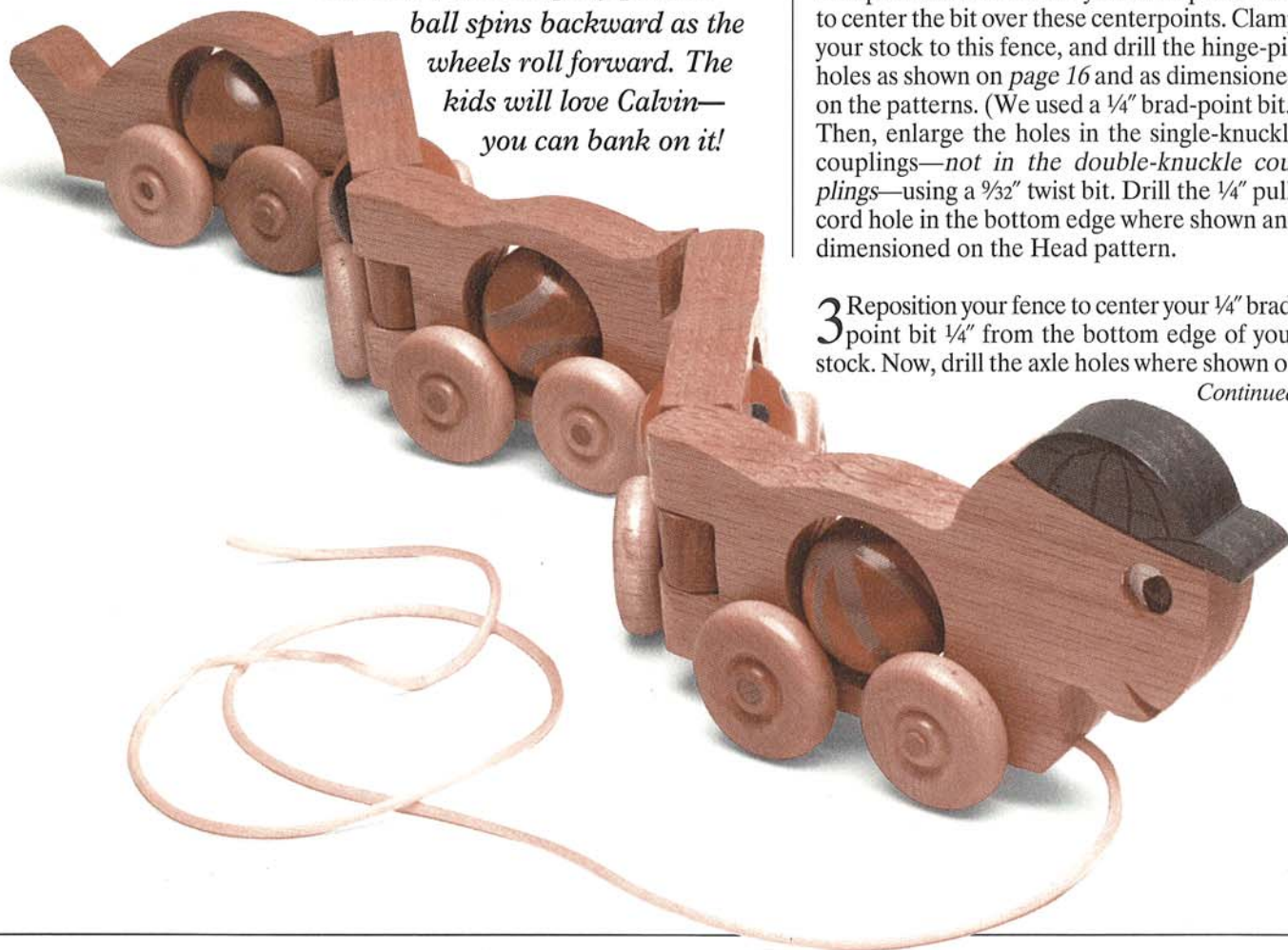
1 Start with a $\frac{3}{4} \times 3\frac{1}{2} \times 30$ " piece of stock. (We selected red oak.) Make copies of the full-sized Head (A), Middle Segment (B), and Tail (C) patterns shown on page 17. (Make as many middle segments as you wish, but be sure to calculate how much additional stock you'll need. Our 30" length of stock allows for three middle segments.) Cut out the patterns (including the borders surrounding them), align the bottom border of each with one edge of your stock, and adhere them using a spray adhesive.

Note: Since actual dowel diameters vary these days, we recommend measuring your dowels before you proceed to the following steps. Adjust the specified hole diameters as necessary. Our dowels measured exactly $\frac{1}{4}$ " in diameter.

2 Use your combination square to transfer the hinge-pin and pull-cord hole centerpoints to the bottom edge of the stock. Now, position and clamp a wooden fence to your drill-press table to center the bit over these centerpoints. Clamp your stock to this fence, and drill the hinge-pin holes as shown on page 16 and as dimensioned on the patterns. (We used a $\frac{1}{4}$ " brad-point bit.) Then, enlarge the holes in the single-knuckle couplings—not in the double-knuckle couplings—using a $\frac{5}{32}$ " twist bit. Drill the $\frac{1}{4}$ " pull-cord hole in the bottom edge where shown and dimensioned on the Head pattern.

3 Reposition your fence to center your $\frac{1}{4}$ " brad-point bit $\frac{1}{4}$ " from the bottom edge of your stock. Now, drill the axle holes where shown on

Continued



CARPET CATERPILLAR

TIP To separate stock pieces adhered with double-faced carpet tape, splash a bit of acetone or lacquer thinner on the edges, and allow it to penetrate the adhesive.

Illustrations: Roxanne LeMoine,
Carson Ode
Project builder: Don Wiperman
Photograph: King Au

BILL OF MATERIALS

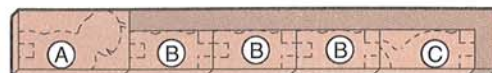
Part	Finished Size			Mati.	Qty.
	T	W	L		
A head	3/4"	3 1/2"	6 3/8"	O	1
B middle segments	3/4"	2 1/4"	5"	O	3
C tail	3/4"	2 1/4"	5 5/8"	O	1

Materials Key: O—oak.

Supplies: 1/4" dowel stock, acrylic enamels, finish, 1/8" braided nylon.

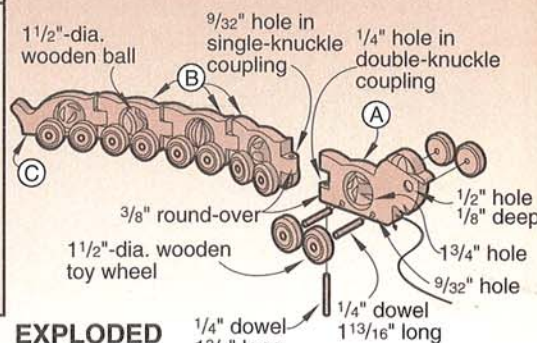
Buying Guide

Wheel and Ball Kit. Includes 20—1 1/2"-diameter hardwood wheels; 5—1 1/2"-diameter hardwood balls. Kit no. 2347. \$5.79 plus \$3.50 shipping and handling. (Minn. residents add 6.5% sales tax.) Meisel Hardware Specialties, P.O. Box 70-WEW, Mound, MN 55364-0070. Phone 800/441-9870.



3/4" x 3 1/2" x 30" Oak

CUTTING DIAGRAM



EXPLODED VIEW

the patterns. (We used a backup board to minimize tear-out.) Again, change to a 9/32" twist bit to enlarge each axle hole. Next, use a 1/2" brad-point bit to bore the eye recess 1/8" deep on both sides of the head.

4 Reset your fence to center the bit 1 1/8" from the bottom edge of the stock. Bore the 1 3/4" ball hole in each part where shown on the patterns. (We used a Forstner bit.)

YOUR CATERPILLAR'S NEARLY READY TO ROLL

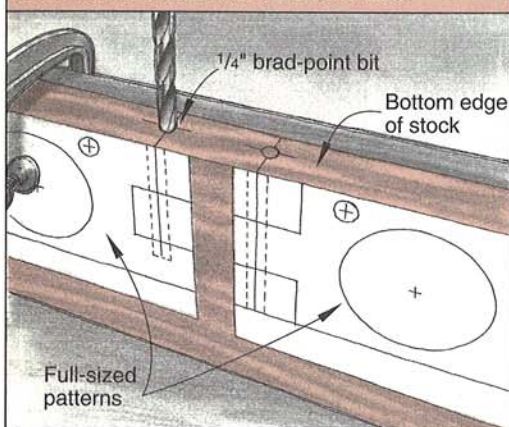
1 Crosscut the head, middle segments, and tail to length, keeping your tablesaw blade on the waste side of the border surrounding each pattern. Fit your table-mounted router with a 3/8" round-over bit, and rout the back end of the head, both ends of the middle segments, and the front end of the tail. (We used double-faced carpet tape to adhere a backup board to both edges of each part to minimize tear-out.)

4 Paint the head and five 1 1/2"-diameter hardwood balls. (We painted each ball differently, using a purple/pink scheme on the first, third, and fifth balls and a teal/orange scheme on the second and fourth.) When the paint has dried, apply finish to the caterpillar parts, the balls, and to twenty 1 1/2"-diameter hardwood wheels. (See our Buying Guide to order the balls and wheels. We used Liquitex Acrylic paints, then sprayed all parts with two coats of Deft semigloss aerosol lacquer. To spray the wheels, we spaced them loosely on a 36" length of 3/16" dowel, which we then suspended using two lengths of wire.)

5 From 1/4" dowel stock, cut 10 axles to 1 13/16" and four hinge pins to 1 3/4". Apply glue sparingly around one end of each axle, and insert this end into a wheel until flush with the outside wheel face. Now, insert each axle in turn into an axle hole, place a ball in each 1 3/4" hole, and dry-assemble the remaining 10 wheels with the other ends of the axles. Roll each part around on your bench to check the wheel/ball action. (The rims of the wheels should spin the balls.) Adjust axle lengths as necessary, then glue the second 10 wheels onto the axles, applying the glue sparingly as before.

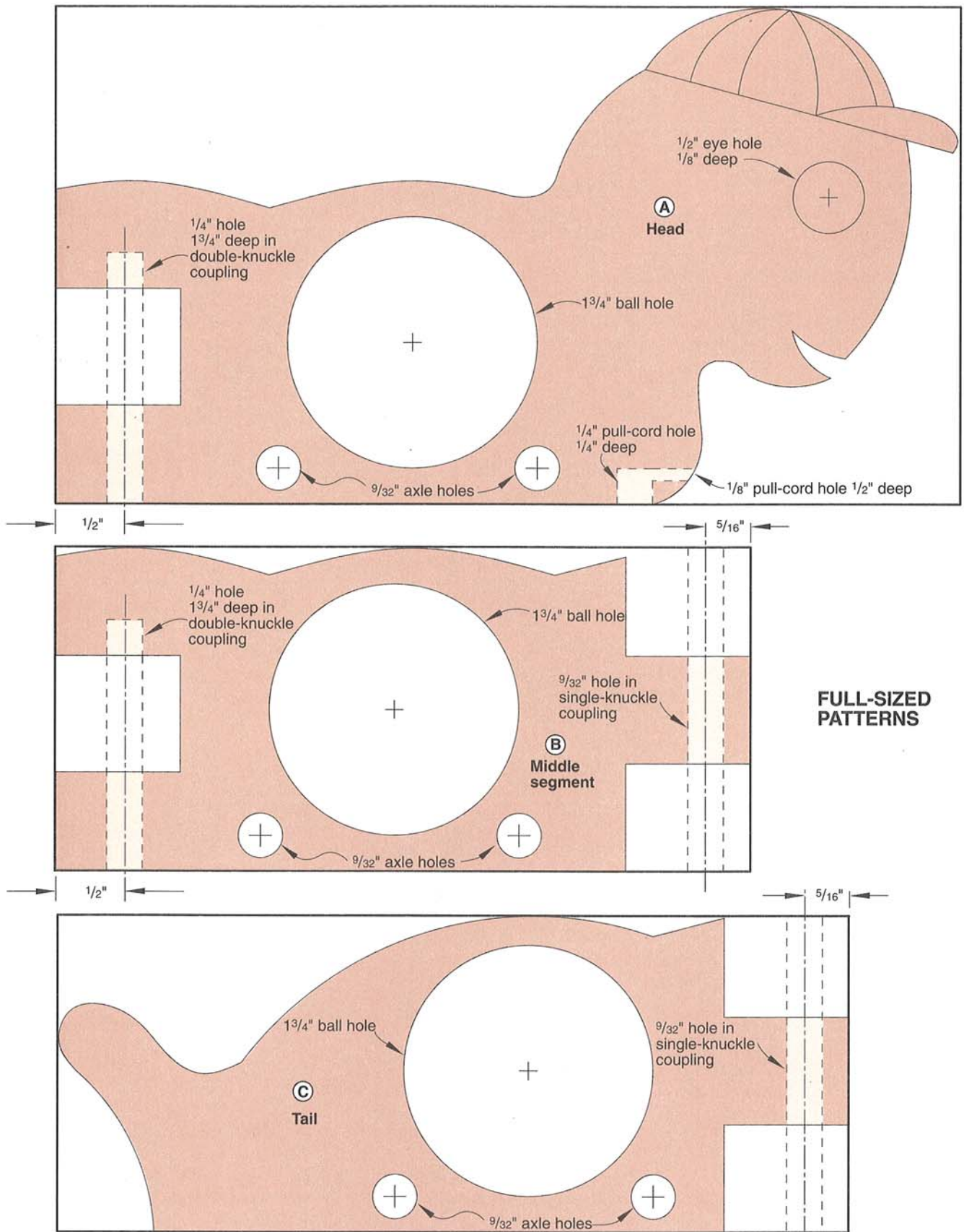
6 Couple the parts together where shown on the Exploded View drawing by inserting a hinge pin into each coupling. (We drove each pin three-fourths of the way into the coupling using a wooden mallet and a 4" length of scrap dowel. Then, we applied glue sparingly around the bottom 1/4" before driving in the pin the rest of the way.) Thread a 36" length of 1/8" braided nylon through the 1/8" pull-cord hole, and knot it at both ends. ■

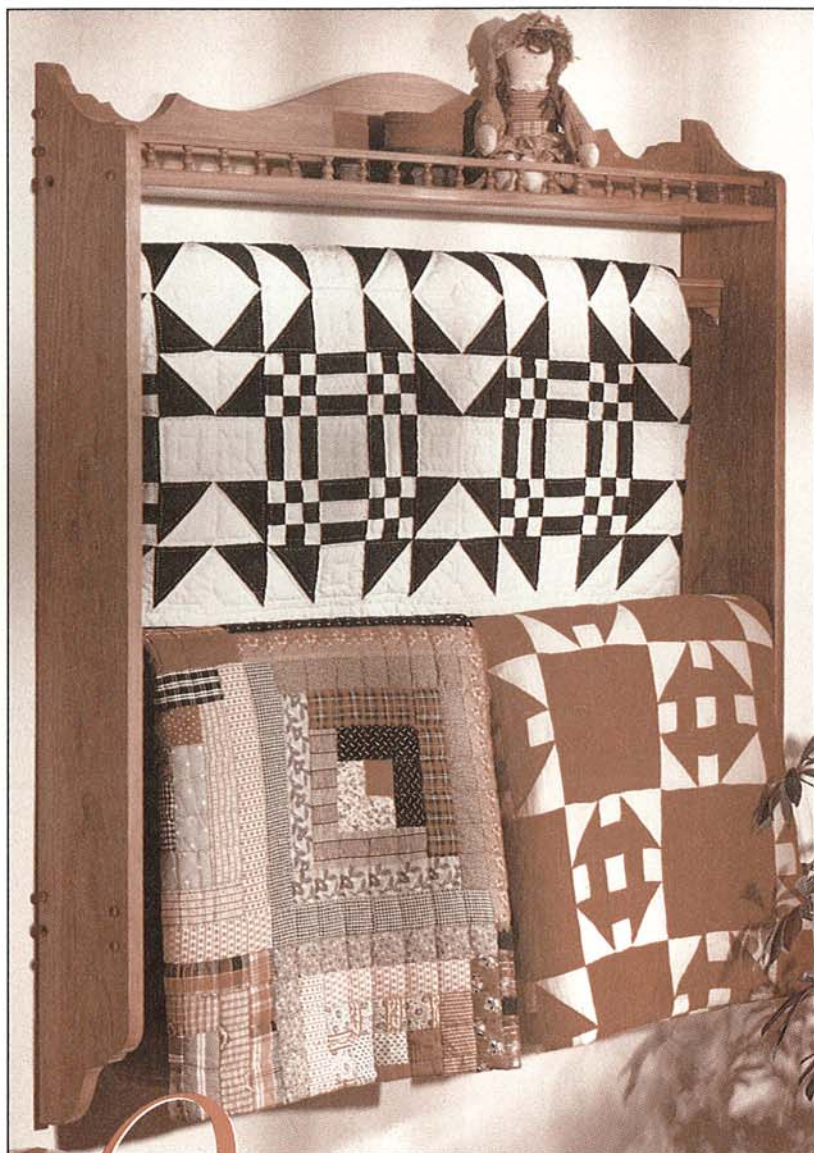
DRILLING THE HINGE-PIN HOLES



2 Use your combination square to continue the coupling cutout lines on the patterns (now partially torn away by the routing) around the ends of the parts. Cut each part to shape on your scroll-saw, keeping your blade outside the line. (We used a #9 blade.) Now, sand to the line.

3 Clamp the head into your vise, and drill the horizontal pull-cord hole where shown and dimensioned on the pattern. Now, break the edges on all parts, and then finish-sand.





Queen-Sized Quilt Showcase

Here's an easy approach to Early American elegance. Our wall-mounted design lets you display your favorite quilts proudly—instead of just hanging them on the usual free-standing model. We proportioned this rack generously because we've never met a quilt lover yet who had just one favorite.

START WITH THE MAIN FRAME PARTS

1 To make the side panels (A), start with a 96" length of $\frac{3}{4} \times 7\frac{1}{4}$ " stock. (We selected cherry.) Rip the stock to 7" wide, then crosscut two lengths to 47 $\frac{7}{8}$ ". From a second piece of $\frac{3}{4} \times 7\frac{1}{4} \times 96$ " stock, crosscut the top rail (B) to 40 $\frac{1}{2}$ " long.

2 Lay out the gridded Side Panel patterns shown on page 21 and Top Rail half-pattern shown on page 20 in full size on large sheets of paper. (We keep a roll of butcher paper in our shop for this purpose. If you'd prefer to work from full-sized patterns, see our offer *opposite*.) Make a copy of each Side pattern and two copies of the Top Rail half-pattern. Stack the two side panels using double-faced carpet tape, and adhere the top and bottom patterns to one face. Tape the two copies of the half-pattern together at the centerline. Then, find the center of the top rail, align the pattern centerline with it, and adhere the pattern to the stock.

3 Fit your portable jigsaw with a fine-tooth blade, and saw the side panels and top rail to shape, keeping your blade outside the line. Sand to the line using a 1 $\frac{1}{2}$ "-diameter fine-grit drum sander in your drill press. Smooth the angular details with a small triangular file.

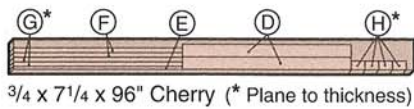
4 To make the shelf (C), rip and crosscut your leftover stock to 6 $\frac{3}{4} \times 40\frac{1}{2}$ ". From a third $\frac{3}{4} \times 7\frac{1}{4} \times 96$ " piece of stock, rip and crosscut two stretchers (D) to 3 $\times 40\frac{1}{2}$ ".

5 Fit your table-mounted router with a piloted $\frac{1}{4}$ " round-over bit, and rout the top and bottom front edges—not the ends—of the shelf. Then, rout all four edges of the front stretcher and just the front edges of the back stretcher where shown on the Exploded View drawing. Finish-sand the side panels, top rail, shelf, and stretchers using 150- and 220-grit sandpaper.

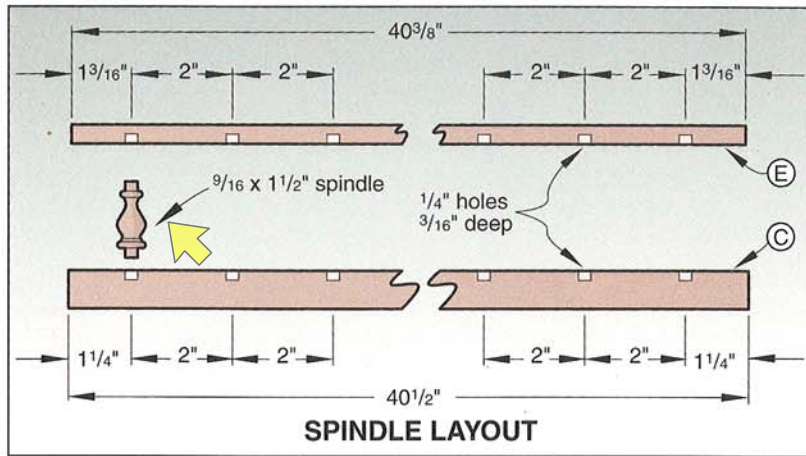
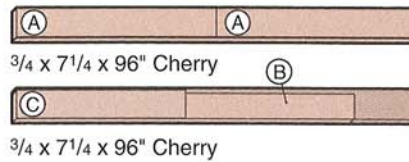
NOW, ADD A RAIL AND SPINDLES TO ACCENT THE SHELF

1 From your third piece of stock, rip and crosscut a shelf rail (E) to $\frac{3}{8} \times 40\frac{1}{2}$ ". (Cut the rail to finished length after drilling the spindle holes.) Mark the center of one edge, and lay out 20 spindle holes from this centerline where shown on the Spindle Layout drawing *opposite*. Now, dry-clamp the shelf rail to the shelf 1 $\frac{1}{2}$ "

Continued



CUTTING DIAGRAM



BILL OF MATERIALS

Part		Finished Size*			Matl.	Qty.
		T	W	L		
A	side panels	3/4"	7"	47 7/8"	C	2
B	top rail	3/4"	6"	40 1/2"	C	1
C	shelf	3/4"	6 3/4"	40 1/2"	C	1
D	stretchers	3/4"	3"	40 1/2"	C	2
E*	shelf rail	1/2"	3/4"	40 9/8"	C	1
F	hangers	3/4"	1 1/8"	40 7/16"	C	2
G	hanger caps	1/2"	1 1/8"	40 7/16"	C	2
H	brackets	1/2"	1 1/8"	2 1/8"	C	4

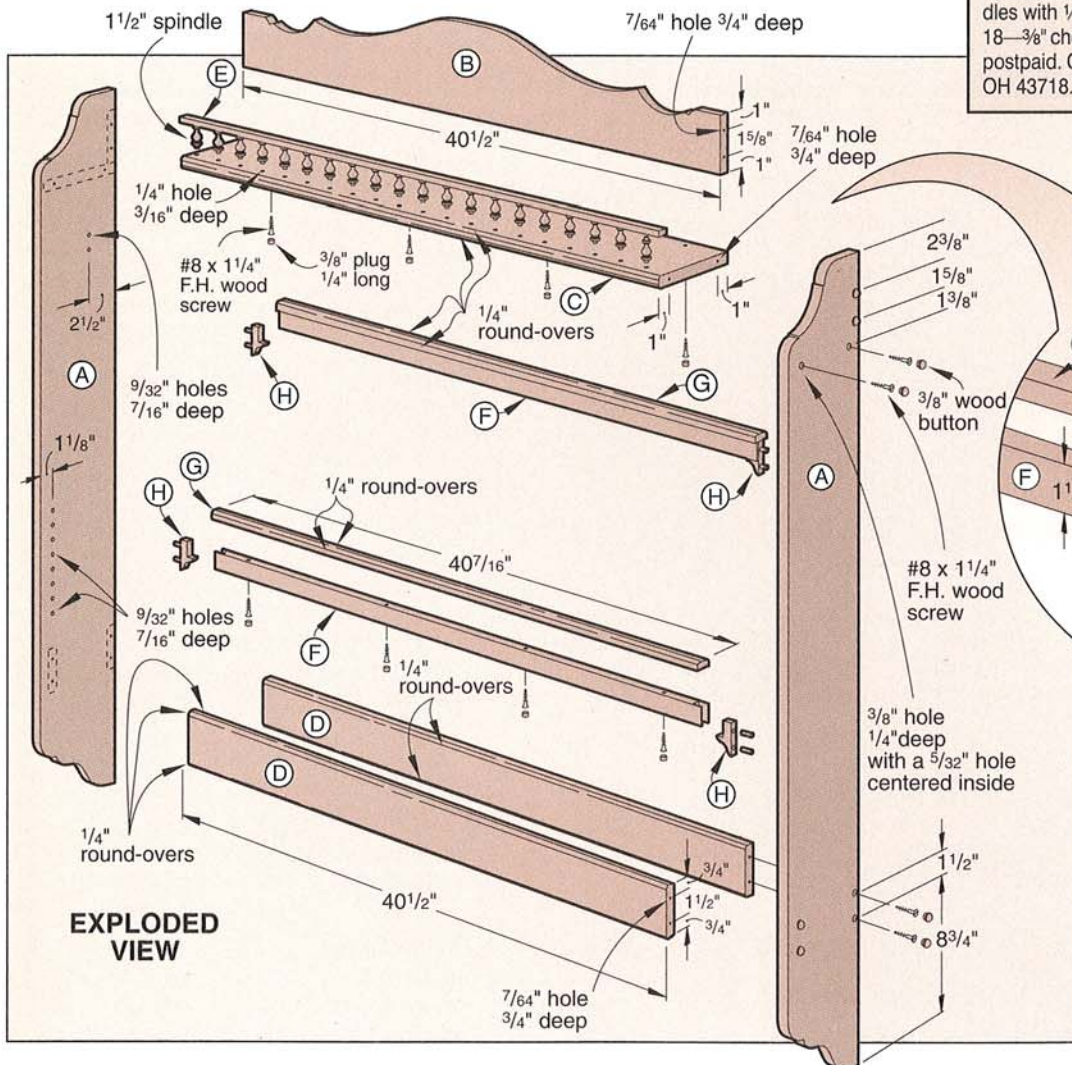
*Cut parts marked with an * to final size during construction. Please read all instructions before cutting.

Materials Key: C—cherry.

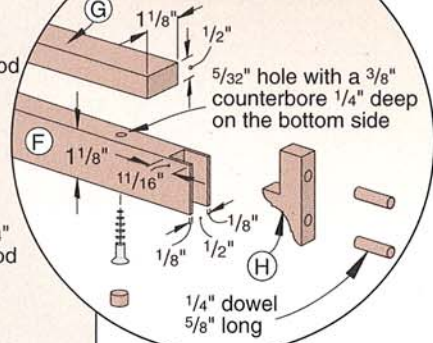
Supplies: #8 x 1 1/4" flathead wood screws, 1/4" dowel stock, #10 x 2" panhead wood screws, triangle picture hangers, adhesive cork pads, finish.

Buying Guide

Spindle and Plug Kit. Includes 20—1 1/2 x 9/16" gallery spindles with 1/4 x 3/16" tenons; 14—3/8" flathead cherry plugs; 18—3/8" cherry mushroom plugs. Kit no. WWP-10. \$16.25 postpaid. Cherry Tree Toys, Inc. P. O. Box 369, Belmont, OH 43718. Phone 800/848-4363.



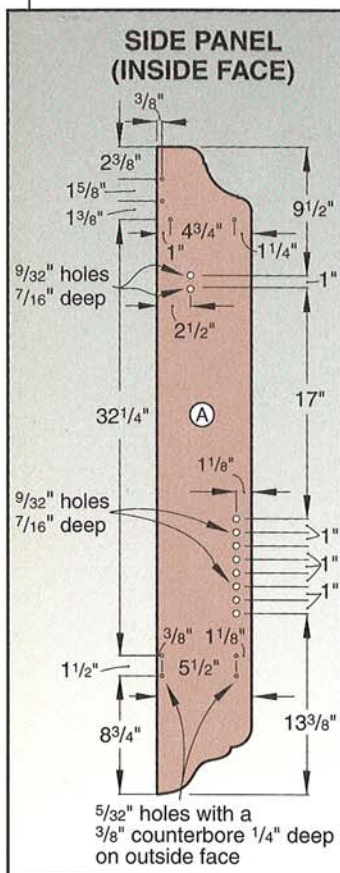
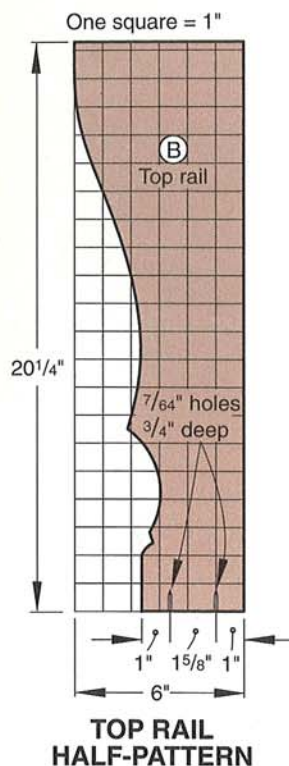
HANGER AND BRACKET DETAIL



If you'd like full-sized patterns for the side panel and top rail, send \$1 and a self-addressed, business-sized envelope with 52 cents postage to:

Quilt Showcase Pattern
Weekend Woodworking Projects®
1912 Grand Avenue
Des Moines, IA 50309-3379

QUILT SHOWCASE



from the front edge as shown *at right*. Use your combination square to transfer the hole centers to the shelf 1" from the front edge.

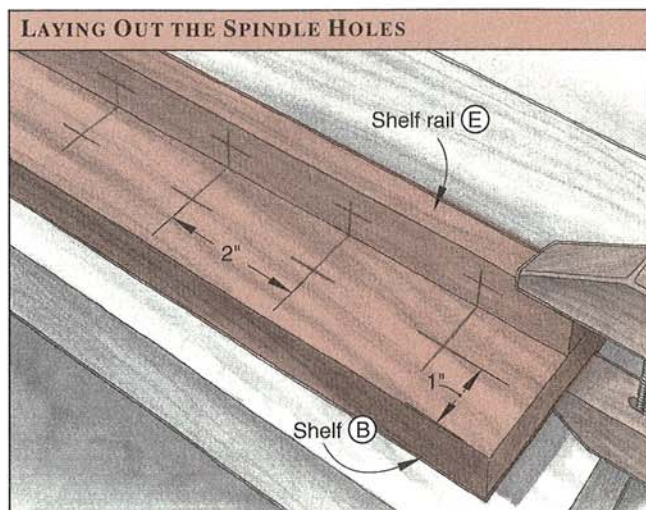
2 Set up your drill-press table with a fence and $\frac{1}{4}$ " brad-point bit. Set the quill to a $\frac{3}{16}$ " depth, and drill the 20 spindle holes on the shelf rail. Adjust the fence, then drill the shelf holes. Now, trim $\frac{1}{16}$ " from each end of the shelf rail for a finished length of $40\frac{3}{8}$ ". Finish-sand the rail using 150-grit sandpaper.

3 Glue a 1½" cherry spindle with ¼×¾" tenons into each hole on the shelf rail. (See our Buying Guide for a mail-order source.) Glue the spindles into their respective holes on the shelf, then clamp. (We applied glue only to the tip of each spindle tenon and clamped straight-edges to the rail top and shelf bottom.) Allow the glue to dry, then unclamp.

YOUR QUILT RACK BEGINS TO TAKE SHAPE

1 Next, drill adjustment holes for the lower hanger brackets where shown on the Side Panel drawing *at left*. To ensure the accuracy of the hole positions, make a template as shown *opposite* from a 7×12" piece of 1/8"-thick perforated hardboard. (Peg-Board is a familiar brand name.) Cut one edge of the hardboard 1/8" from the center of a row of holes as shown. Align this edge with the front of one side panel, and position the template so the center of the bottom hole measures 13 3/8" from the bottom of the side panel. Clamp the template, then drill through the second row of eight holes where shown. To do this, use a portable drill with a depth stop set to 9/16" to allow for the 1/8"-thick hardboard. Drill a first set of holes with an 1 1/64" twist bit to prevent the bit from wandering. Then, enlarge these holes with a 9/32" twist bit.

2Lay out two bracket holes for the upper hanger on each side panel where shown on the Side Panel drawing. Again, use a piece of perforated hardboard as a template. (We cut a 3"-wide piece with one edge $\frac{1}{2}$ " from the center of a row of holes. We aligned this edge with the side-panel back edge to position a row of holes $2\frac{1}{2}$ " from the back edge.)



3 Lay out and drill four evenly spaced counterbores and shank holes $\frac{3}{8}$ " from the back edge of the shelf bottom as dimensioned on the Exploded View drawing. Next, lay out and bandsaw four right-angled, L-shaped corner jigs from $\frac{3}{4}$ "-thick plywood. Use two of these to clamp the top rail to the top face of the shelf, then drill a pilot hole in each shank hole. Unclamp, then glue and screw the top rail to the shelf using #8x1 $\frac{1}{4}$ " flathead wood screws. Glue a $\frac{3}{8}$ " flathead cherry plug into each counterbore, and sand flush when the glue has dried. (See the Buying Guide for a mail-order source.)

4 Lay out and drill eight counterbores and shank holes on the outside face of each side panel where shown and dimensioned on the Exploded View and Side View drawings. Next, lay out the positions of the shelf assembly and stretchers on the side panels. Use your four corner jigs to clamp the shelf assembly to the side panels, then drill $\frac{7}{64}$ " pilot holes through each shank hole to a total depth of $1\frac{1}{4}$ ". Repeat this step for the two stretchers.

5 Unclamp all parts, then glue and screw the shelf/top rail assembly and stretchers to the side panels. Check for square, then wipe off any glue squeeze-out with a damp cloth. Allow the glue to dry.

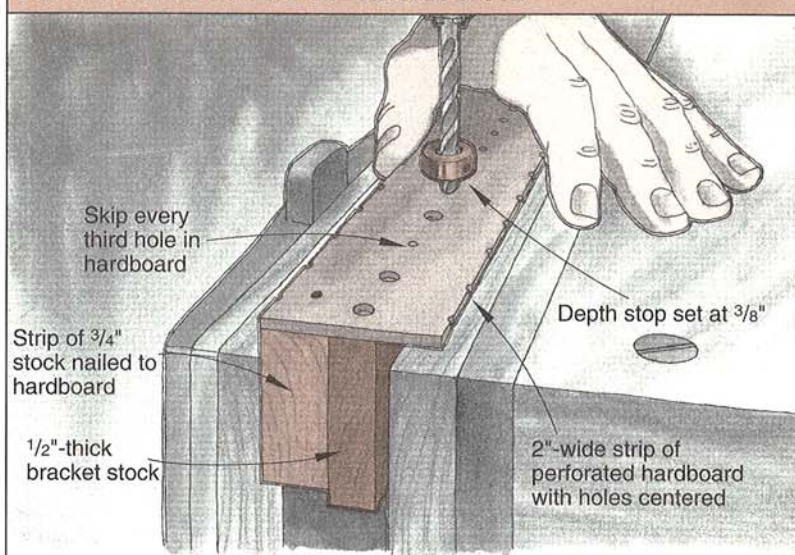
MACHINE THE HANGERS AND BRACKETS, THEN APPLY YOUR FINISH

1 Rip and crosscut two hangers (F) to 1½×407/16" from ¾"-thick stock. Set up your tablesaw and rip fence to cut a centered slot in both ends of each hanger where shown and dimensioned on the Hanger and Bracket detail on the Exploded View drawing. (We stood the

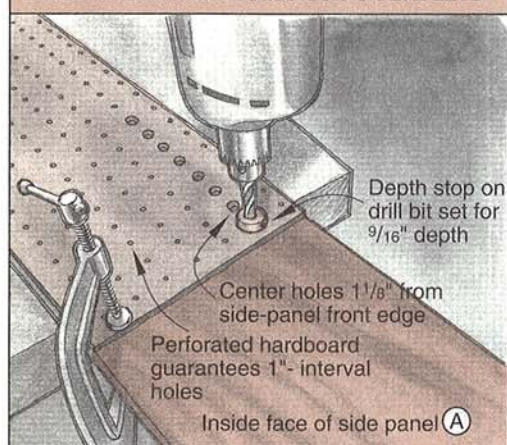
hangers on end and clamped them to a 10×15" sliding wooden auxiliary fence.) Use a rasp to taper the inside tongue faces and smooth the slot surfaces. Then, finish-sand the hangers.

2Plane the remainder of your third piece of stock to 1/2" thick. Rip and crosscut two hanger caps (G) to 1 1/8×40 7/16". Fit your table-mounted router with a 1/4" round-over bit, and rout the top edges of each. Finish-sand each cap, then center and clamp a cap to the top edge of each hanger. Drill counterbore, shank, and

DRILLING DOWEL HOLES IN THE BRACKET STOCK



DRILLING BRACKET HOLES USING TEMPLATE



pilot holes where shown and dimensioned on the Exploded View drawing and the Hanger and Bracket detail. Unclamp the parts, then glue and screw the hangers to the caps using #8 × 1 1/4" flat-head wood screws. Glue 3/8" flathead cherry plugs into the counterbores, and sand flush after the glue has dried.

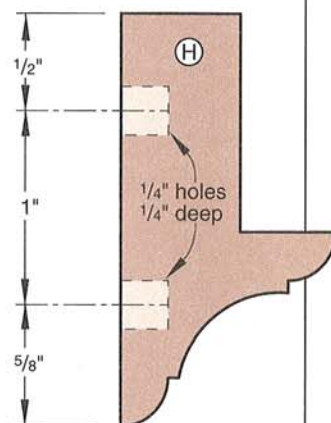
3To make the brackets (H), rip and crosscut a 2×14" piece of 1/2"-thick stock. Make a simple jig as shown above right by cutting a 2×14" piece of perforated hardboard with a centered row of holes. (In other words, rip each edge down the centerline of a row of holes.) Nail this piece to the edge of a 3/4×1 1/2×14" straightedge so that the row of holes is centered 1/4" from the straightedge. Place the jig over the top edge of your bracket stock, and clamp this assembly into your vise as shown. Drill two 1/4" holes 3/8" deep (1/4" deep plus 1/8" for the hardboard thickness) starting approximately 1" from the end. (Again, we started with an 1 1/64" twist bit, then finished with a 1/4" twist bit.) Skip a hole, and then drill two more holes. Repeat this procedure until you've drilled four pairs of holes.

4Unclamp your stock, and make four copies of the full-sized Bracket pattern shown below. Align the holes shown on the patterns with the holes you drilled in the previous step, and adhere your patterns to one face of the stock. Bandsaw the four brackets to shape, keeping your blade outside the line. Then, sand to the line. Sand the flat surfaces smooth. Cut four 5/8" lengths of 1/4" dowel stock, and chamfer one end of each. Glue the other dowel ends into the bracket holes. Now, trial-fit the brackets in the adjustment holes on the side panels.

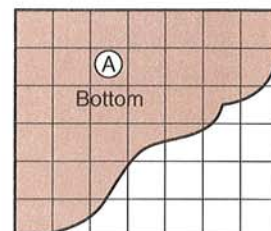
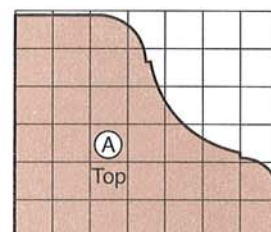
5Finish-sand the side panels, then glue a cherry mushroom plug into each counterbore. (See our Buying Guide for a mail-order source.) Now, apply the finish of your choice. (We brushed on Watco Natural Danish Oil Finish, let it stand for 15 minutes, then wiped off the excess. After an hour, we repeated this procedure. We allowed the finish to dry for 24 hours, then rubbed it out with a cotton cloth. Next, we sprayed all surfaces with three coats of Deft satin aerosol lacquer, sanding between coats with 0000 synthetic steel wool.)

6To wall-mount your rack, locate two studs 32" apart in your chosen wall, and mount #10×2" panhead wood screws. (**Note:** If you can't manage to situate the rack over two studs, mount toggle bolts and picture hanging hooks in the wallboard.) Attach two triangle picture hangers to the back face of the top rail, positioning them to fit the screws. Adhere an adhesive cork pad to the bottom back edge of each side panel to make the rack hang vertically. ■

Project design: Bob Colpetzer, Clinton, Tenn.
Illustrations: Roxanne LeMoine, Carson Ode
Project builder: Don Wipperman
Photograph: King Au



FULL-SIZED BRACKET PATTERN

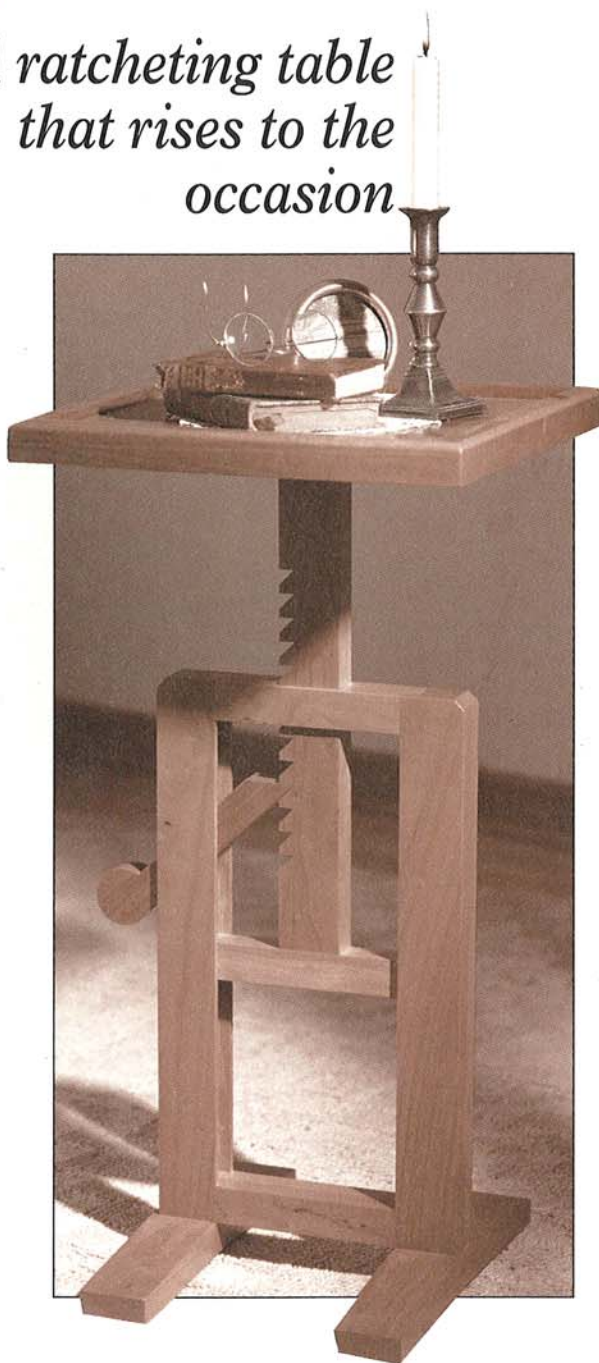


One square = 1"

SIDE PANEL PATTERNS

Colonial Candle Stand

*A ratcheting table
that rises to the
occasion*



If you appreciate functional beauty like the practical-minded American colonists did, then check out the appealing mechanics of this project. Try it as a snack tray, a plant stand, a lamp table—or build a pair for your bookshelf-sized speakers.

FIRST, DADO AND LAMINATE THE FRAME PARTS

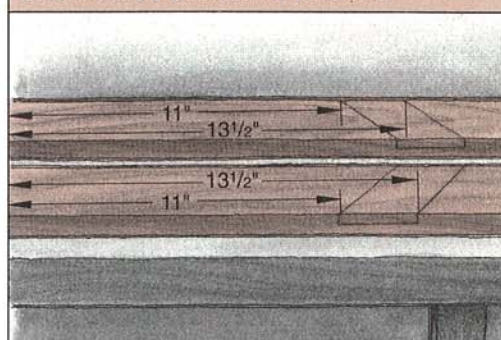
1 To make the two uprights (A) and two rails (B), start with a $\frac{3}{4} \times 5\frac{1}{2} \times 60$ " piece of stock. (We selected cherry.) Plane one edge on your jointer, then rip two pieces to $2\frac{1}{4}$ " wide, and crosscut four 20" lengths and two 16" lengths.

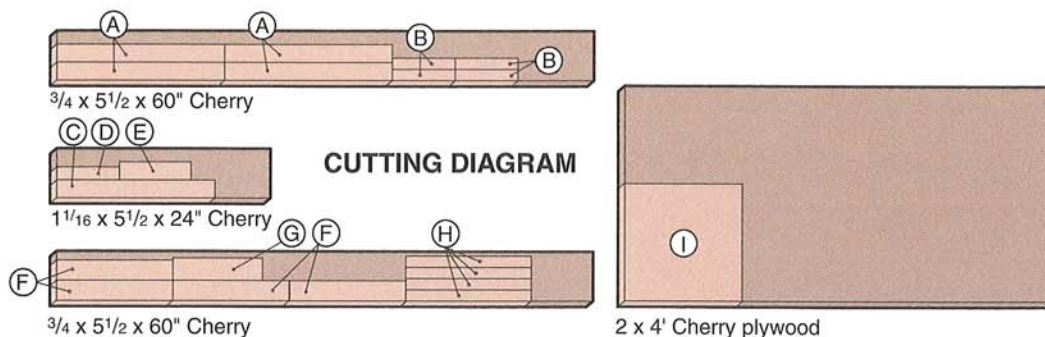
2 Cut a dado in each 16" piece to make the two halves of the ratchet-post opening in the top rail. (These two pieces will be laminated and then crosscut to make the top and bottom rails.) To do this, lay out a $2\frac{1}{16}$ "-wide dado $\frac{1}{16}$ " deep on each piece starting 3" from one end. Make several passes using a $\frac{3}{4}$ " dado set on your table-saw. (We attached a wooden auxiliary fence to our miter gauge and used a stopblock.)

3 To cut the diagonal dados that will form the ratchet-stop opening in the left upright, keep your dado elevation at $\frac{1}{16}$ ". Select two of your 20" pieces for best grain match, and mark one edge of each piece 11" and $13\frac{1}{2}$ " from one end. (**Note:** Lay out these marks on opposite edges as shown below so that the dados will match when you laminate the pieces.) Set your miter gauge and auxiliary wooden fence to 45°, and use these marks to cut a $2\frac{1}{2}$ "-wide diagonal dado in each piece as shown on page 24.

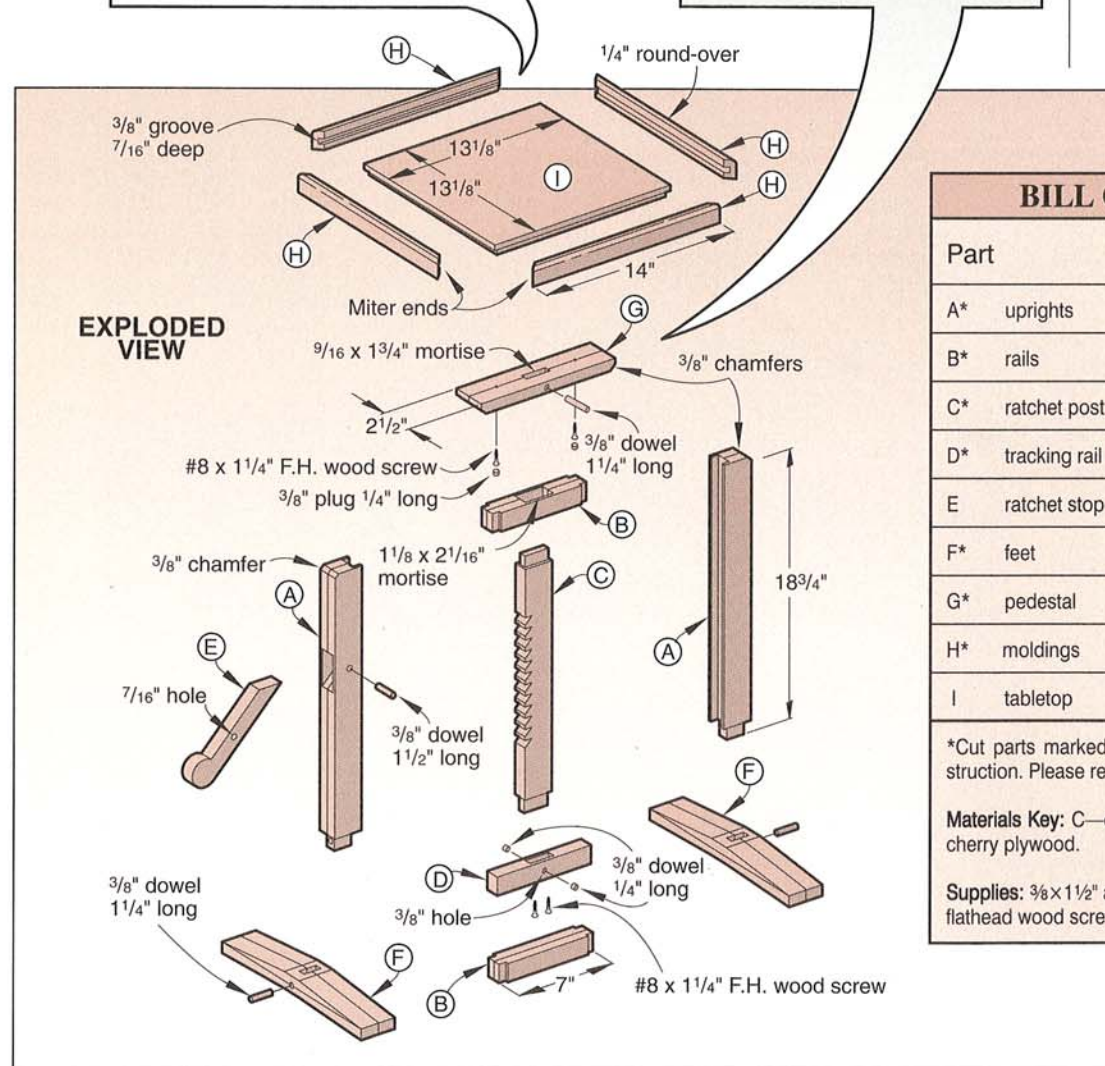
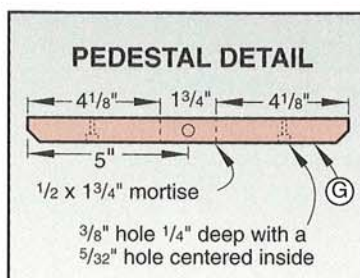
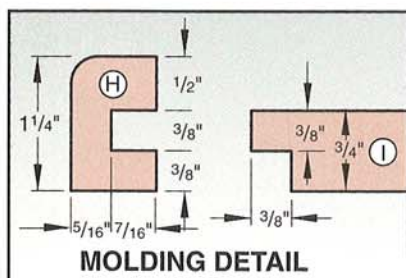
Continued

LAYING OUT DIAGONAL DADOES





TIP Before laminating our uprights and rails and edge-joining the feet and pedestal, we cut spacers from 3/4"-thick scrap to hold the dados square during gluing. We taped waxed paper around the spacers to prevent glue from adhering to them.



BILL OF MATERIALS

Part	Finished Size*			Mater.	Qty.
	T	W	L		
A* uprights	1 1/2"	2"	18 3/4"	CL	2
B* rails	1 1/2"	1 1/4"	7"	CL	2
C* ratchet post	1 1/16"	2"	16 3/4"	C	1
D* tracking rail	1 1/16"	1 1/4"	6 15/16"	C	1
E ratchet stop	1 1/16"	1 7/8"	8"	C	1
F* feet	1 1/8"	2 1/4"	13"	CL	2
G* pedestal	3/4"	2 1/2"	10"	C	2
H* moldings	3/4"	1 1/4"	14"	C	4
I tabletop	3/4"	13 1/8"	13 1/8"	CP	1

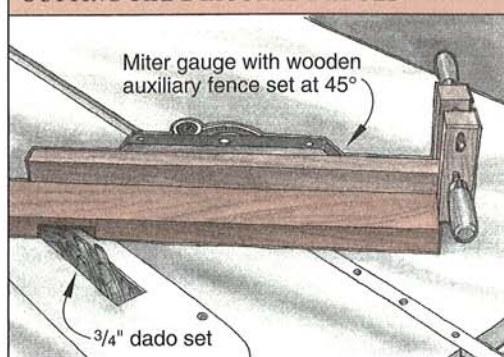
*Cut parts marked with an * to final size during construction. Please read all instructions before cutting.

Materials Key: C—cherry; CL—cherry lamination; CP—cherry plywood.

Supplies: 3/8 x 1 1/2" and 3/8 x 2" cherry dowel pins; #8 x 1" flathead wood screws; finish.

CANDLE STAND

CUTTING THE DIAGONAL DADOES



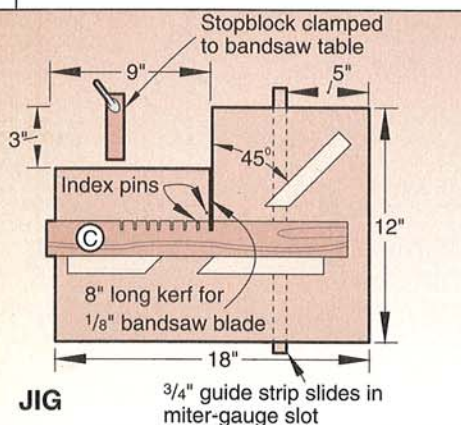
4 Glue and clamp the two diagonally dadoed pieces, the two remaining 20" pieces, and the two 16" dadoed pieces face-to-face. (See our tip about spacers on page 23.)

2 Lay out and bandsaw the 12 notches (11 teeth) in one edge of the post where shown on the Ratchet Post drawing and Tooth detail below right. (We built a sliding table jig out of a 12x18" piece of 1/4"-thick plywood as described below and as shown on the Jig drawing below left.) Nail a guide strip to the bottom face that will slide back and forth in the miter-gauge slot on your bandsaw table. Next, lay the jig on your bandsaw table with the guide strip inserted in the slot. Saw an 8"-long kerf where shown using a 1/8" blade. Starting from this kerf, lay out bisecting perpendicular and diagonal (45°) lines across the plywood. Now, align an 8"-long fence with the diagonal line, and nail it to the plywood. Miter-cut a 12"-long piece into two roughly equal pieces. Nail them 3" apart along the perpendicular line where shown on the Jig drawing.

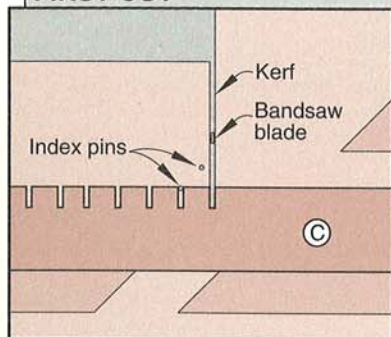
3 Cut out the left front corner of the jig where shown on the Jig drawing, and clamp a stopblock to your bandsaw table to limit the depth of cut. Then, cut a scrap piece to the same dimen-

NOW, CUT AND MACHINE THE RATCHET PARTS

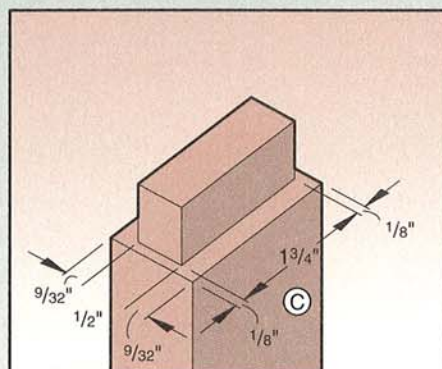
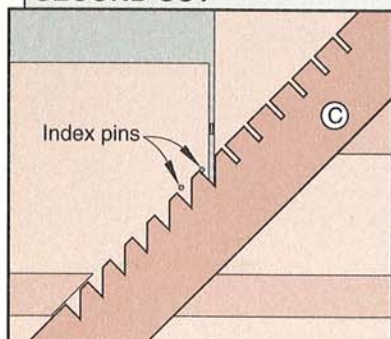
1 To make the ratchet post (C), start with a 24" length of 1 1/2 x 5 1/2" stock. Rip a piece to 2 1/8" wide, then plane 1/16" from each edge on your jointer to leave a finished width of 2". Next, crosscut the piece to a 16 3/4" finished length.



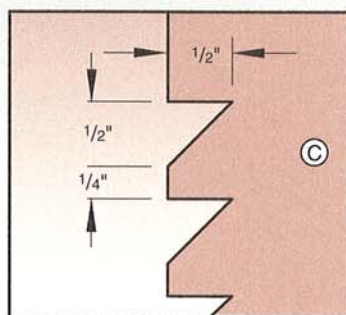
FIRST CUT



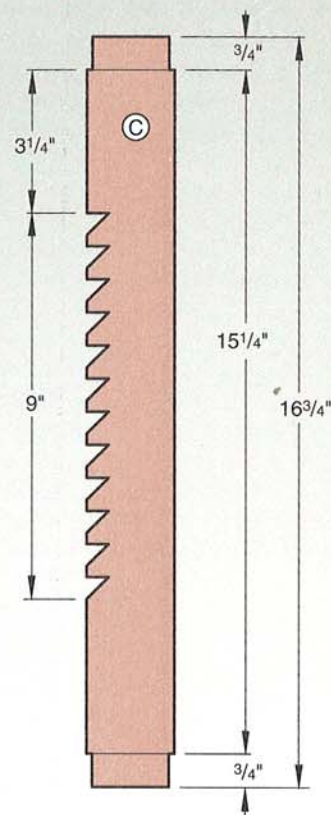
SECOND CUT



TENON DETAIL



TOOTH DETAIL



RATCHET POST

sions as the ratchet post. Lay out two or three teeth on this piece, and use the jig to carefully bandsaw them. Using the perpendicular fence, align the 90° cut of one tooth with the kerf, and nail an index pin against the adjacent tooth where shown on the Jig drawing. (We used #17×1" brads.) Repeat this procedure for the 45° cut using the diagonal fence. (Once you cut the top tooth, these index pins will serve as stops to keep the distance between cuts identical.) Now, position your scrap piece where shown on the First Cut and Second Cut details (below the Jig drawing), and cut a couple of teeth using the index pins. Adjust the pins if necessary, then bandsaw the 12 notches on your ratchet post.

3 Lay out identical tenons on both ends of the ratchet post as dimensioned on the Tenon detail on the Ratchet Post drawing. Fit your tablesaw with a 3/4" dado set elevated to 1/8", and cut the tenon edges. Raise the blade to 9/32" to cut the tenon faces.

4 For the tracking rail (D), rip a piece of 1 1/16"-thick stock to 1 3/8"×8". Plane both edges to a 1 1/4" finished width. (**Note:** Don't trim the piece to finished length until you've assembled the frame and measured the exact width of the track.) Lay out a centered mortise on one edge to the dimensions shown on the Tracking Rail drawing above right. Bore a 1/2" hole 3/4" deep at each end of the mortise on your drill press. Bore overlapping 7/16" holes between the end holes to rough it out. (We used a 1/2" Forstner bit and a 7/16" brad-point bit.) Then, clean out the mortise with a sharp chisel.

5 Make a copy of the full-sized Ratchet Stop pattern (E) shown on page 27, and adhere it to a 2×9" piece of 1 1/16"-thick stock. (We used a spray adhesive.) Bandsaw the stop to shape, keeping your blade outside the line. With the pattern still attached, mark the hole centerpoint with an awl, then drill the hole on your drill press. (We used a brad-point bit and a backup board.) Sand to the line, then remove the pattern. Finish-sand all surfaces of the ratchet post, tracking rail, and ratchet stop.

FASHION THE FRAME PARTS AND THEN ASSEMBLE THEM

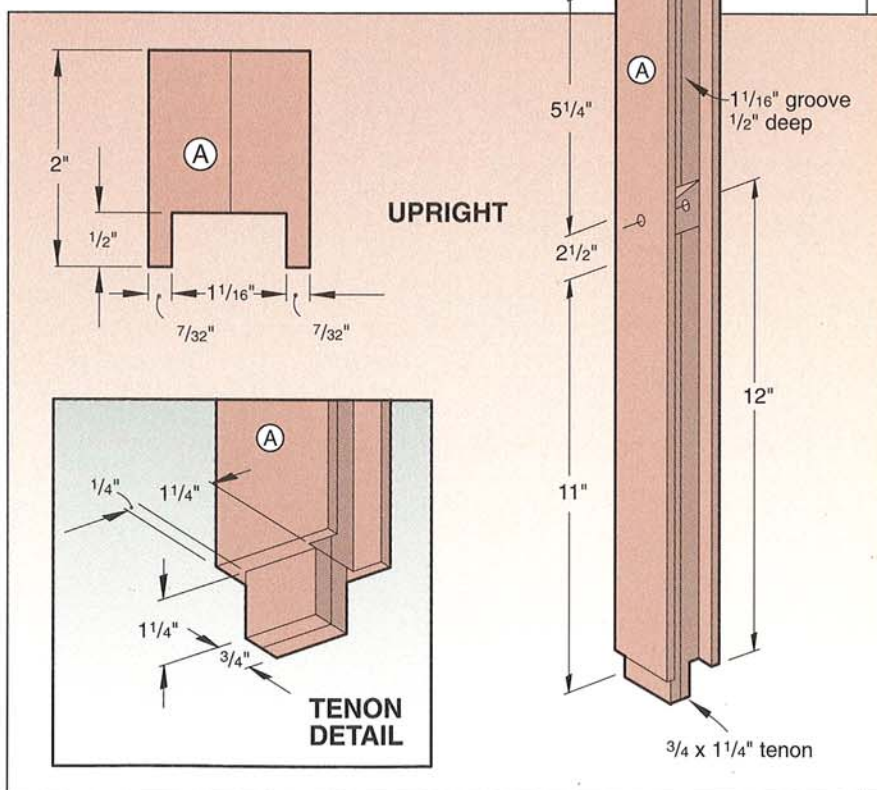
1 When the glue has dried, unclamp the laminated uprights and rails. Scrape off any glue squeeze-out, and plane one edge of each piece.

Rip the two uprights to 2 1/16", then plane the ripped edges to 2" wide. Repeat this procedure for the 16"-long laminated piece (the rails), ripping it to 1 5/16" and then planing it to 1 1/4" wide. Now, crosscut the top and bottom rails to a finished length of 7".

2 Crosscut the uprights to 18 3/4" long. Fit your tablesaw with a 3/4" dado set elevated to 1/2". Now, measure the thickness of your sanded tracking rail. Using your rip fence, cut a centered, full-length groove on the inside edge of each upright just wide enough to allow the tracking rail to slide freely. (See the Upright drawing below. Our tracking rail measured 1 1/32" thick, so we cut our grooves 1 1/16" wide.)

3 Next, cut a tenon on the bottom end of each upright where shown and dimensioned on the Upright drawing. To do this, mark all four sides 1 1/4" from the end. Elevate your tablesaw blade as necessary to cut each shoulder where shown. To avoid tear-out, use your bandsaw and fence to saw the tenon cheeks to shape.

Continued



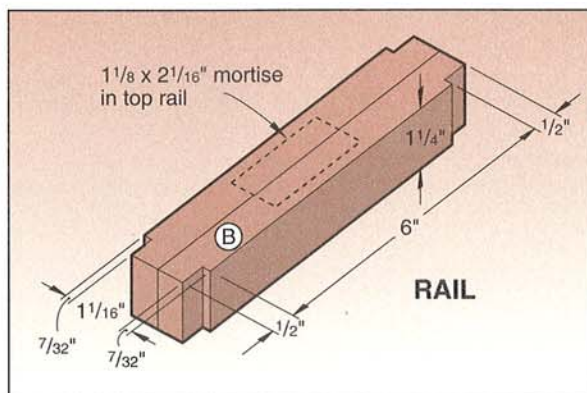
TIP We recommend finishing the subassemblies as you go rather than waiting until the entire candle stand is assembled. We applied finish to the frame/feet assembly after gluing it up. We finished the ratchet post/pedestal assembly, tracking rail, and ratchet post before assembling them, taking care not to apply finish to any mating surfaces.

CANDLE STAND

TIP For all crosscutting, dadoing, and chamfering operations, we used a wooden auxiliary fence on our tablesaw miter gauge. For precise cuts, we clamped a stop-block to this fence.

4 Cut a $\frac{3}{8}$ "-deep chamfer on the top outside corner of each upright. To do this, first tilt your tablesaw blade to 45° , and clamp a stop-block to your miter-gauge auxiliary fence to limit the depth. (We used a backup board to minimize tear-out.)

5 Lay out tenons on both ends of the top and bottom rails where shown and dimensioned on the Rail drawing below. Make them wide enough to fit snugly in the grooves you dadoed in the uprights. To cut the tenon shoulders, figure out half the difference between your groove width and your rail thickness. (Our grooves measured $1\frac{1}{16}$ " wide and our rails measured $1\frac{1}{2}$ " thick, so half the $\frac{7}{16}$ " difference was $\frac{7}{32}$ ".) Elevate your dado set to cut this depth, and cut tenons on the rail faces where shown. (Again, we used an auxiliary fence on our miter gauge and attached a stopblock.)



6 Dry-assemble the two uprights and rails to check for fit, and adjust as necessary. Now, glue and clamp the four pieces.

FOR A FIRM FOUNDATION, BUILD AND ATTACH THE FEET

1 To make the feet (F), start with a $\frac{3}{4} \times 5\frac{1}{2} \times 60$ " piece of stock. Rip and crosscut four pieces to $2\frac{5}{8} \times 14\frac{7}{8}$ ", then glue and clamp two pairs face-to-face. When the glue has dried, unclamp the laminated pieces, and plane one edge of each on your jointer to a width of $2\frac{5}{16}$ ". Then, set your rip fence $1\frac{1}{4}$ " from the tablesaw blade, and rip both feet into two pieces where shown on the Foot drawing opposite. Plane the ripped edge of all four pieces to $\frac{3}{16}$ " wide. (We made reference marks on the mating surfaces to remind us how the pieces fit together.)

2 Dado each half of both feet to make a mortise. To do this, fit your tablesaw with a $\frac{3}{4}$ " dado set elevated to cut $\frac{5}{8}$ " deep, and lay out a centered dado on the two edges you ripped and planed. After you cut the dados, glue and clamp the two halves of each foot. (See our tip about spacers on page 23.)

3 When the glue has dried, unclamp the feet, and scrape off any glue squeeze-out. Then, plane $\frac{1}{16}$ " from both edges to a finished width of $2\frac{1}{4}$ ", making sure to keep the mortise centered between the two edges. Now, select a top face of each foot, and plane this surface to $1\frac{3}{8}$ " thick. (**Note:** Avoid planing the bottom face of the feet. Otherwise, the lamination line will show up in an unattractive position when you bandsaw the profile.)

4 Lay out the top and bottom profiles on the edge of both feet where shown on the Foot drawing, keeping the mortise centered lengthwise. Crosscut the feet to 13" finished length, then bandsaw the profiles on each foot, keeping your blade outside the line. Sand to the line, then finish-sand both feet.

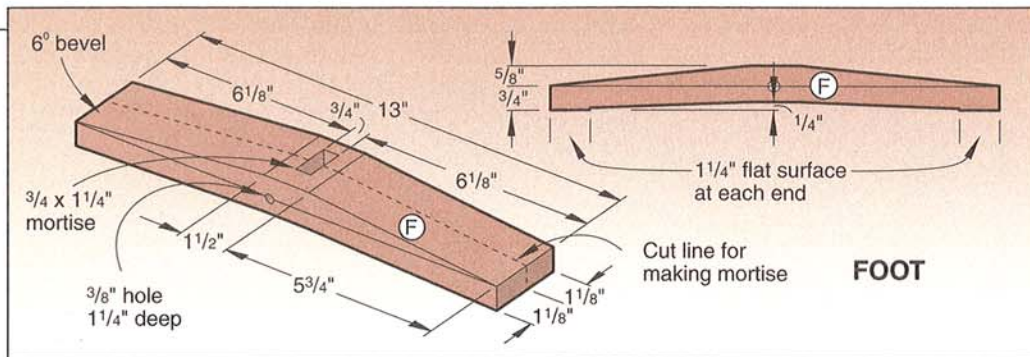
5 Dry-assemble the frame and feet to check the mortise-and-tenon fit. Adjust as necessary, then glue and clamp. (We attached bar clamps to the tops of the uprights and to 2×13 " scrap boards laid across the bottoms of the feet.) When the glue has dried, unclamp, and lay out a centered $\frac{3}{8}$ " dowel hole on the outside edge of each foot. Drill the dowel holes $1\frac{1}{4}$ " deep, and glue a $1\frac{1}{2}$ "-long cherry dowel pin into each. When the glue has dried, sand flush.

IT'S TIME TO EDGE-JOIN AND FRAME THE TABLETOP

1 To make the tabletop pedestal (G), rip a 22" length of $\frac{3}{4}$ "-thick stock to $1\frac{5}{16}$ " wide. Plane one edge on your jointer to a width of $1\frac{1}{4}$ ", then crosscut two $10\frac{1}{2}$ " lengths. Fit your tablesaw with a dado set elevated to $\frac{9}{32}$ ", and cut a $1\frac{3}{4}$ "-long dado centered in the planed edge of each. (See our tip about spacers on page 23.)

2 When the glue has dried, sand the glued joint, and crosscut the pedestal to 10" long, making sure you keep the mortise centered lengthwise. Fit your tablesaw with a crosscut blade, tilt it to 45° , and cut $\frac{3}{8}$ " chamfers on the pedestal bottom face at both ends. Next, lay out and drill

Project design: James R. Downing
Illustrations: Roxanne LeMoine,
Carson Ode
Project builder: Chuck Hedlund
Photograph: King Au



two counterbores where shown and dimensioned on the Pedestal detail on the Exploded View drawing. Now, sand the pedestal smooth.

3 To make the four tabletop moldings (H), rip and crosscut four pieces of $\frac{3}{4}$ "-thick stock to $1\frac{1}{4} \times 15$ ". Install a $\frac{3}{8}$ " dado set elevated to cut $\frac{7}{16}$ " deep, and cut a full-length groove in one face of each piece where shown on the Molding detail on the Exploded View drawing. Then, miter the ends at 45° to a finished length of 14".

4 Make the tabletop (I) by ripping and crosscutting a $13\frac{1}{8}$ " square of $\frac{3}{4}$ "-thick plywood. (We selected plain-sliced cherry plywood.) Fit your table-mounted router with a rabbeting bit and fence, and rout a $\frac{3}{8}$ "-wide rabbet $\frac{3}{8}$ " deep on all sides of the tabletop bottom edge. Now, finish-sand both tabletop faces.

5 Dry-assemble the four moldings and tabletop to check for fit, and adjust as necessary. (*Note: These dimensions leave $\frac{1}{16}$ " clearance on all sides between the tabletop and frame to allow for seasonal expansion and contraction.*) When everything fits, apply glue to the molding ends and tabletop edges, and assemble and clamp the molding pieces around the tabletop. Wipe away any glue squeeze-out with a damp cloth, then allow the glue to dry.

6 Fit your table-mounted router with a $\frac{1}{4}$ " piloted round-over bit, and rout the top outside edges of each molding. Then, finish-sand the four moldings.

NOW, FOR THE FINAL ASSEMBLY

1 Dry-assemble the pedestal and the top of the ratchet post to check for fit. Adjust as necessary, then glue and clamp. When the glue has dried, unclamp the assembly, and drill a centered $\frac{3}{8} \times 1\frac{1}{4}$ "-deep dowel hole on one edge of the pedestal. (We cut a support block to hold the ratchet post level in a horizontal position, then drilled the hole using our drill press and a brad-point bit.) Glue in a $1\frac{1}{2}$ "-long cherry dowel pin, and sand flush when the glue has dried.

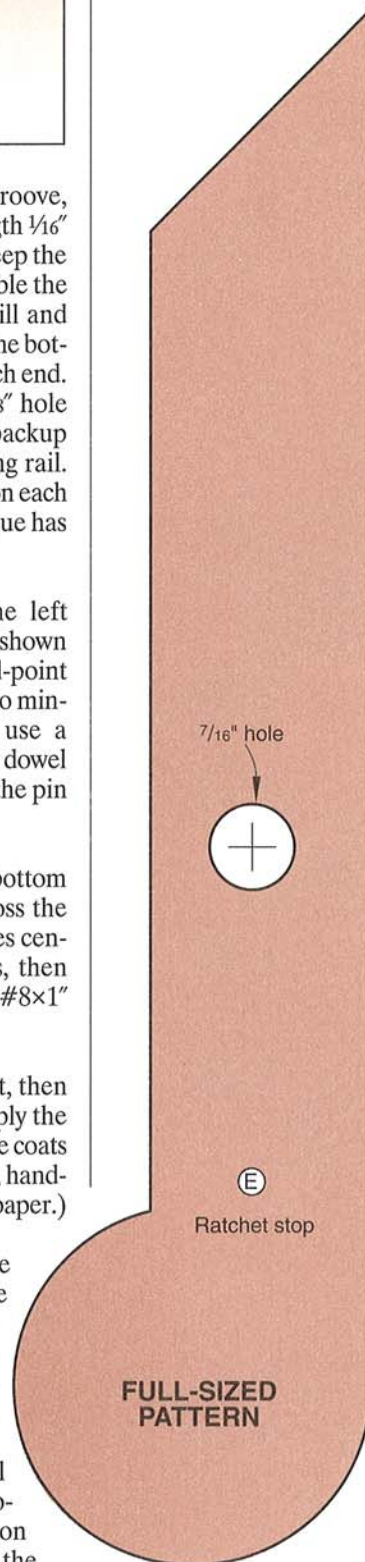
2 Measure the width of the tracking groove, then crosscut the tracking rail to a length $\frac{1}{16}$ " shorter than this width, making sure to keep the mortise centered lengthwise. Dry-assemble the ratchet post and tracking rail. Then, drill and countersink two shank and pilot holes in the bottom face of the tracking rail 3" in from each end. Disassemble, then lay out a centered $\frac{3}{8}$ " hole on one face of the tracking rail. Using a backup board, drill the hole through the tracking rail. Glue a $\frac{1}{4}$ " length of $\frac{3}{8}$ " dowel in the hole on each face to simulate a dowel pin. When the glue has dried, finish-sand the tracking rail.

3 Drill a $\frac{3}{8}$ " dowel hole through the left upright for the ratchet-stop pin where shown on the Upright drawing. (We used a brad-point bit in our drill press and a backup board to minimize tear-out.) Insert the stop, and use a wooden mallet to drive in a 2"-long cherry dowel pin. Sand both ends flush, then remove the pin and ratchet stop.

4 Center and clamp the pedestal to the bottom face of the tabletop, orienting it across the grain. Drill $\frac{5}{32}$ " shank and $\frac{7}{64}$ " pilot holes centered in the two pedestal counterbores, then attach the tabletop to the pedestal using #8 $\times$ 1" flathead wood screws.

5 Finish-sand any parts that still need it, then re-insert the ratchet-stop pin, and apply the finish of your choice. (We sprayed on three coats of Minwax fast-drying satin polyurethane, hand-sanding between coats with 320-grit sandpaper.)

6 After the finish has dried, insert the tracking rail into its groove through the ratchet-stop opening in the left upright. Insert the ratchet post through the top-rail opening, and attach it to the tracking rail using #8 $\times$ 1" flathead wood screws. Now, position the ratchet stop, and re-insert the pin until only $\frac{1}{8}$ " of it still protrudes. Apply a bit of glue to this protruding end and to the inside of the hole on the other face. Insert the pin the rest of the way, and wipe clean. ■



Classic Candle Box

Finally—dovetailing demystified



If you've steered clear of dovetail joints because you find chiseling to be a chancy operation, give this one-afternoon project a try. We've come up with a simple jig that lets you achieve the look of old-world craftsmanship using just your dovetail and fret saws.

USE OUR SIMPLE JIG TO SAW PRECISION PINS AND TAILS

1 From a 60" length of $\frac{1}{2} \times 5\frac{1}{2}$ " stock, rip and crosscut a piece to $3\frac{1}{2} \times 36$ ". (We selected cherry.) Lay out and crosscut two side panels (A) and two end panels (B) in A-B-A-B order, so that the grain will run continuously around the box. Then, make reference marks on the mating surfaces. (**Note:** These dimensions accommodate 10"-long candles. If you intend to use a different length of candle, simply add $1\frac{1}{4}$ " to the candle length to determine your side-panel, lid, and bottom-panel lengths.)

2 Next, make our simple clamping jig as shown *opposite* to cut the pins. To do this, rip and crosscut two $1\frac{1}{16} \times 8$ " pieces of $\frac{1}{16}$ "-thick hardwood stock. Next, cut two 8" lengths of $\frac{1}{8} \times 1$ " aluminum angle. (We bought ours at a home center.) Adhere one of these to each hardwood piece, then adhere both assemblies together with the aluminum angles face-to-face. (We used double-faced carpet tape in both places.) Next, lay out centered $\frac{3}{32}$ " holes 1" from each end on the back face of one hardwood piece. Drill through both aluminum angles and hardwood pieces. (We used a twist bit in our drill press.) Then, attach the jig sides using a $\frac{1}{4} \times 4$ " carriage bolt, split washer, and wing nut in each hole.

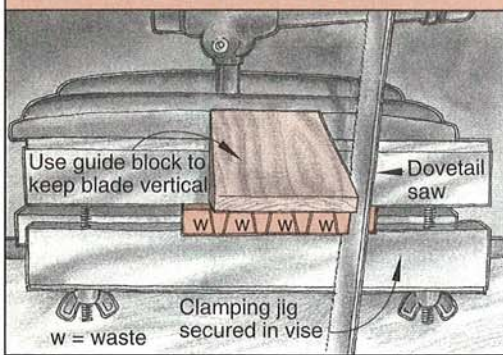
3 Make four copies of the full-sized Pin pattern shown *opposite*, and adhere a copy to each end of both end panels. Then, mark a stop line across each end panel $\frac{1}{2}$ " in from each end, and clamp one of them into your jig so the stop line is flush with the aluminum angle faces. Clamp the other end of the stock into your vise. Now, use a dovetail saw to make the vertical cuts as shown *opposite*, keeping your blade on the waste side of each line. (We used a guide block as shown to keep the blade vertical. Also, see our tip *opposite*.)

4 Next, use a fret saw to saw out the waste as shown *opposite*, making progressively more horizontal angle cuts until your blade is flush with the jig surface. Repeat this procedure for each end of both end panels. (We used a #5 scroll-saw blade in our fret saw.)

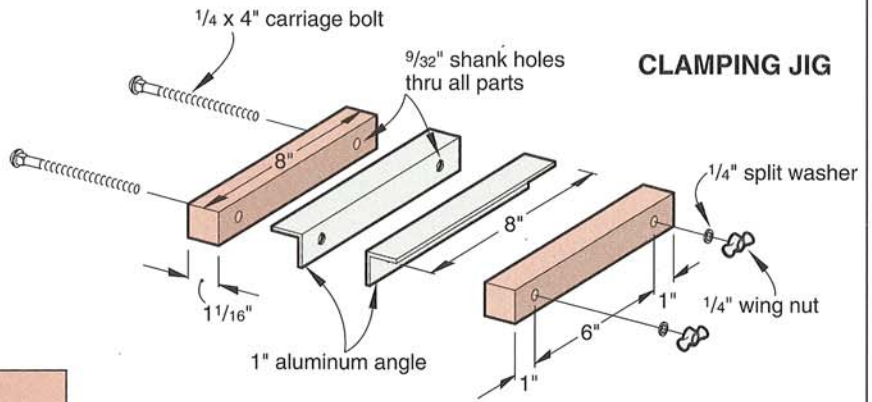
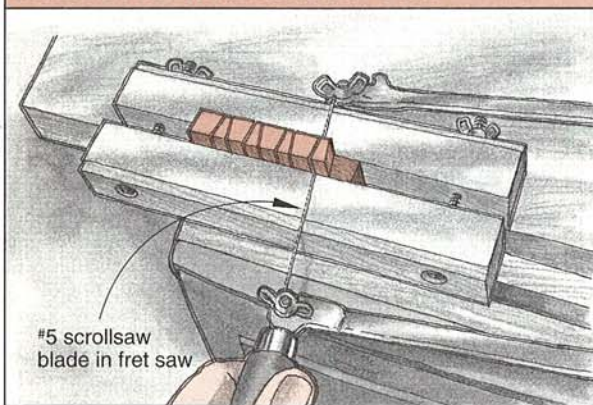
5 To saw the tails in the side panels, first match each side-panel end with its mating end-panel end. Then, use a sharp pencil to trace each set of pins onto the inside face of the side panel. To do this, lay the side panel flat on your

Continued

MAKING THE VERTICAL PIN CUTS

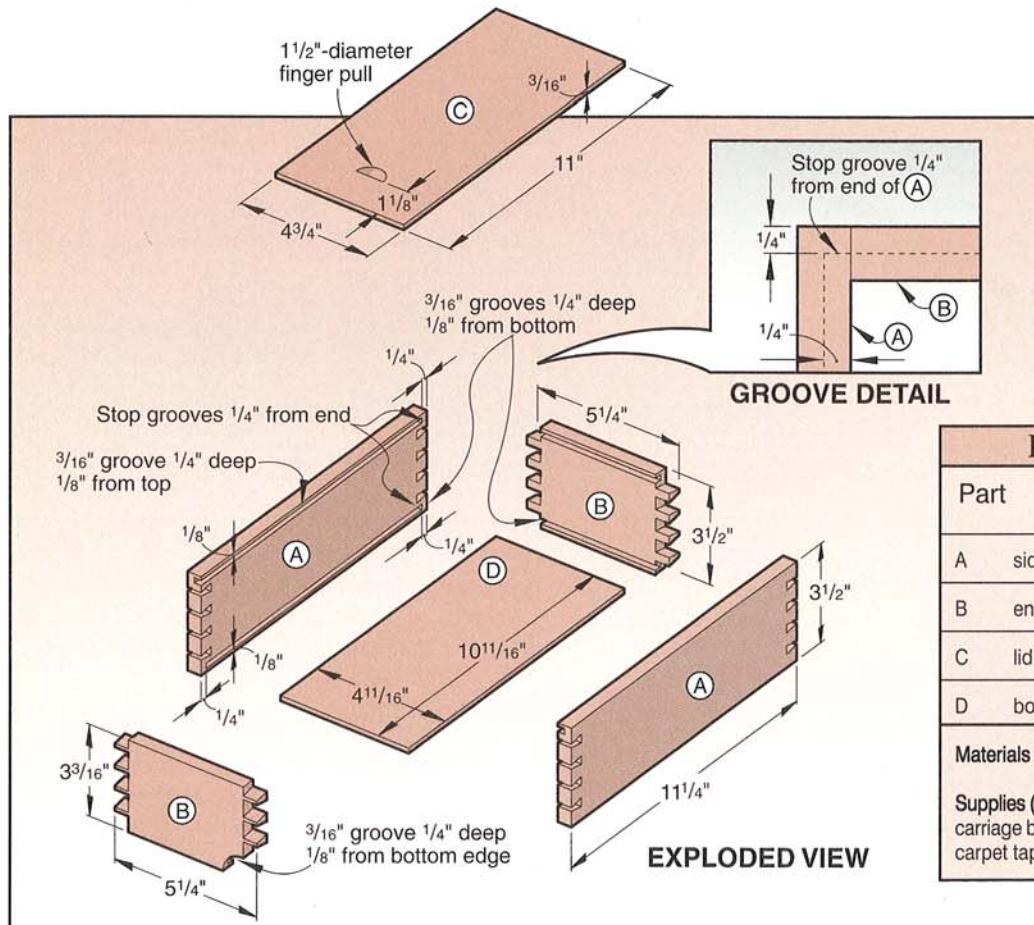


MAKING THE HORIZONTAL PIN CUTS



FULL-SIZED PIN PATTERN

TIP Be careful to stop cutting when you make contact with the aluminum jig surface. This will ensure uniformity in your cuts as well as prolong the useful life of your jig.



BILL OF MATERIALS

Part		Initial Size			Matl.	Qty.
		T	W	L		
A	side panels	1/2"	3 1/2"	11 1/4"	C	2
B	end panels	1/2"	3 1/2"	5 1/4"	C	2
C	lid	3/16"	4 3/4"	11"	C	1
D	bottom	3/16"	4 11/16"	10 11/16"	C	1

Materials Key: C—cherry.

Supplies (for jig): 2—1/8 x 1 x 8" aluminum angles; 2—1/4 x 4" carriage bolts, split washers, and wing nuts; double-faced carpet tape.

CANDLE BOX

TIP As an alternative to making a finger pull, lay out and bore a 1"-diameter finger hole 1½" from the opposite end of the lid. Use a Forstner or multi-spur bit and a backup board on your drill press to prevent tear-out.

Project design: James R. Downing
Illustrations: Roxanne LeMoine, Carson Ode
Project builder: James E. Boelling
Photograph: John Hetherington

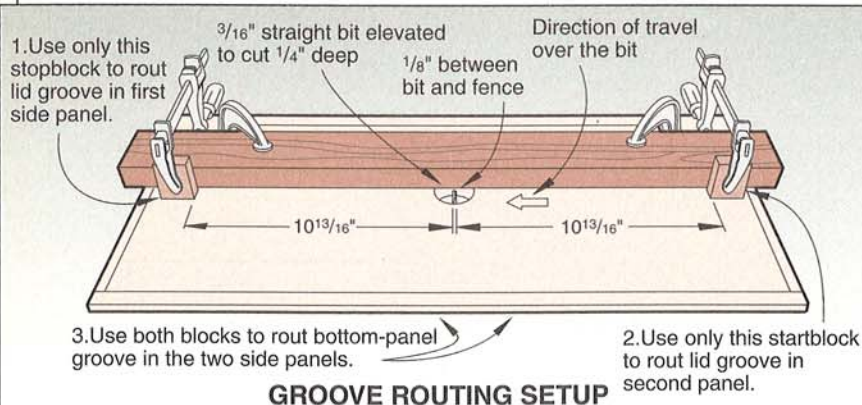
bench, and stand the end panel on it. Square and align the two pieces before you trace. After tracing, use a combination square to transfer the ends of the traced pins onto the side-panel ends.

6 Clamp the side panel into your jig so that the bottoms of the traced pins are flush with the angle faces. This time, mark the pin sections as waste, and repeat the sawing procedures used in the previous step. When you've sawed tails in both ends of each side panel, dry-assemble the four panels, tapping the parts lightly until they slide together. Watch for tight spots in the joints, and don't force the pieces together. Adjust the fit as necessary using a triangular file.

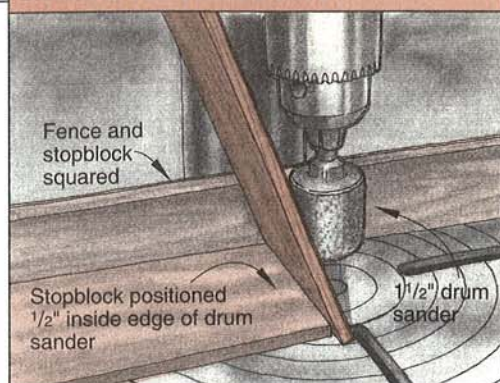
ROUT THE GROOVES, THEN YOU'RE READY TO ASSEMBLE

1 First, rip ⅝" off the top edge of one end panel to allow the lid to slide. Then, fit your table-mounted router with a ⅜" straight bit and fence. Rout grooves along the end panels where shown and dimensioned on the Exploded View drawing. (**Note:** Check the pins to make sure you're routing the inside faces. Rout only a bottom-panel groove in the end panel you just ripped.)

2 Rout the lid groove in one side panel using the groove-routing setup shown in the drawing below. To do this, clamp a stopblock to your router-table fence to the left of the bit where shown. (**Note:** Make sure you position the lid grooves so that their open ends will mate with the open-topped end panel you ripped in the previous step.) Feed one of the side panels from right to left over the bit, using the block to stop the cut ¼" from the right end. Next, remove the stopblock, and position a startblock to the right of the bit where shown. Butt the right end of your



SANDING THE FINGER PULL



other side panel up against the startblock, lower the left end down onto the spinning bit, and rout the groove clear through the right end.

3 To rout the bottom-panel groove in the two side panels, reclamp the left-hand stopblock, keeping your right-hand startblock in position. As in the previous step, butt the right end of each panel up against the startblock and lower the left end down onto the bit, but this time use the stopblock to stop the cut ¼" from the right end of both side panels.

4 Plane or resaw a 24" length of stock to ⅜" thick. Then, rip and crosscut the lid (C) and bottom (D) to the dimensions listed on the Bill of Materials.

5 Sand the bottom-panel ends so they'll fit in the stopped grooves. Then, finish-sand the inside faces of the side, end, and bottom panels. Glue and clamp these parts, allowing the bottom panel to float in the grooves without glue.

PUT A LID ON THIS PROJECT, THEN APPLY THE FINISH

1 To make the finger pull on the lid, first chuck a 1½"-diameter drum sander into your drill press, and elevate the table to 1" below the bottom of the drum. Clamp on a fence and stopblock as shown above. Then, brace the lid against your fence and stopblock, and ease the lid into the drum sander until the bottom of the pull is ⅛" deep. (We used calipers to check the depth during this operation so as not to sand all the way through the lid. See our tip at left.)

2 Sand the lid top face until the lid slides smoothly in its groove. Then, finish-sand all surfaces that still need it, and apply the finish of your choice. (We applied Watco Natural Danish Oil Finish, let it stand for 15 minutes, then wiped off the excess. We repeated this procedure an hour later. After 24 hours, we rubbed out the finish with a cotton cloth.) ■