

VOL. 6 NO. 1 • ISSUE 31

WEEKEND WOODWORKING PROJECTS

Page 30
5-YEAR
INDEX

NEAT THINGS YOU CAN BUILD IN A HURRY

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Tall mirror

Peacock candelabra

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notepad

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game board



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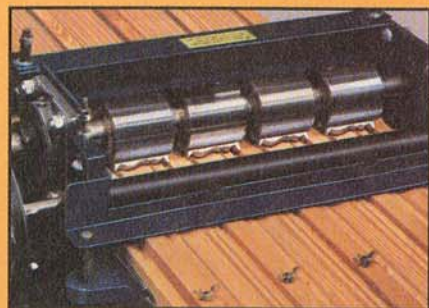
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Editor, Workbench Magazine

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E. D. Holtz, North Carolina



Celebrating our first five years

It seems like only a few months ago that I was pounding out how-to instructions for the first issue of *Weekend Woodworking Projects*®. And now...we've just put the finishing touches on a five-year index. Where did the time go?

Our research staff recently tabulated an annual reader survey that confirms our original premise: There's a devoted audience of woodworkers out there who hunger for great projects that require only a few hours' time to complete. (For you statisticians, your median project-completion time equals 8.6 hours.) We try to remain true to the mix of projects you request—a sprinkle of simple furniture items, a healthy seasoning of useful gifts and accessories, and a dash of toys for good measure. Voilà! A magazine readers await.

Thanks for your loyalty. You can count on us to continue publishing original, doable designs.

Five years after
our first issue, we've
stood the test of time.



Joanne Lockwood, who designed three of the money clips featured in Issue 28, called a few weeks ago to ask why we didn't follow her guidelines for bevel-cutting the flying eagle, trout, and dog. I explained that we had tried to simplify the scrollsaw instruction. "When you bevel-cut two stacked pieces of wood, the finished inlay looks so much better. Just tilt your scrollsaw table 6½° to the left and saw in a counterclockwise direction. It's that easy."

And you know, she's right. We should have suggested it.

Carl Voss

WEEKEND WOODWORKING PROJECTS

Cover photograph: Wm. Hopkins

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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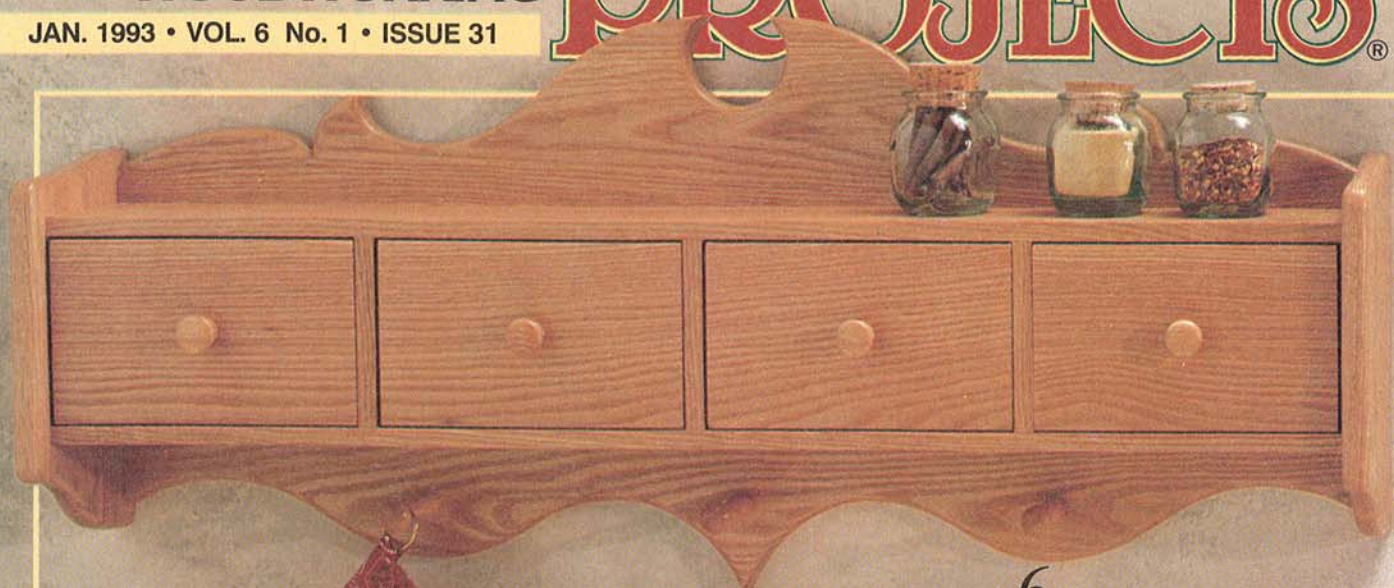
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6

DRAWER DECOR

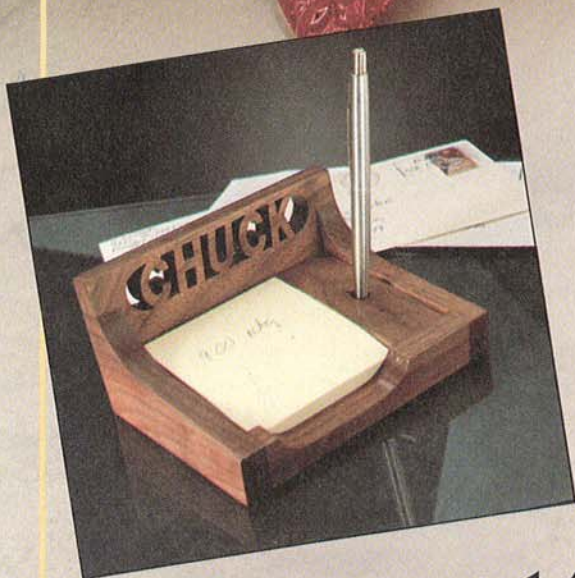
This space-saving wall unit—just 6×16×36"—features four versatile drawers, three Shaker pegs, and a great shelf for even more collectibles.



10

NOTEWORTHY NOTEPAD

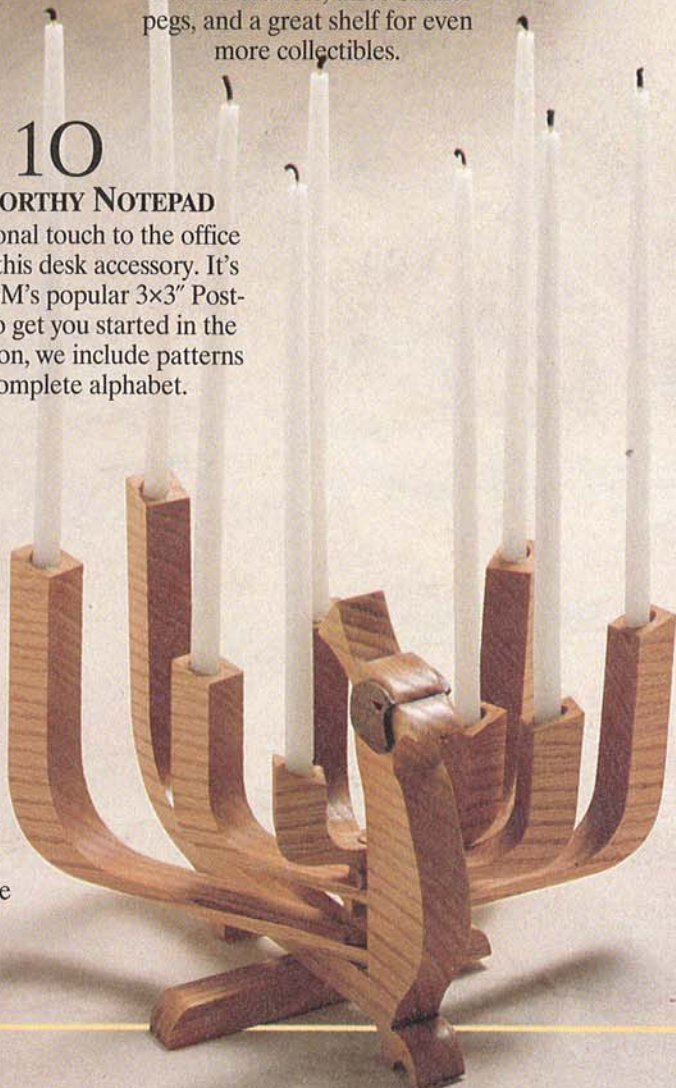
Add a personal touch to the office scene with this desk accessory. It's sized to fit 3M's popular 3×3" Post-it Notes. To get you started in the right direction, we include patterns for a complete alphabet.



14

PEACOCK ON PARADE

Brighten a festive table setting or mantel with this simple scrollsaw and drill-press project you can make from a ¾×7×11" piece of stock.



16

CLASSIC COUNTRY CABINET

Here's a three-shelf plate cabinet that will add stature to any dining room. Or, use this wall unit to showcase a favorite collection.



20

MIRROR, MIRROR ON THE WALL

Who's the skinniest of them all? When it comes to mirror frames, this slender 5 3/4"-wide project fills the bill for a narrow wall space.



22

CHINESE CHECKERS, ANYONE?

With the help of our step-and-repeat jig and a full-sized pattern, you can accurately drill this family-favorite board game. And to make sure you don't lose your marbles (so to speak), we've designed fun-to-build holders that you can display along with the board.





Space-saving
storage
brightens
a wall

LET'S START BY SHAPING THE BACK AND SIDES

1 From $\frac{3}{4}$ "-thick stock, cut three pieces to $5\frac{1}{2} \times 35$ " for the back (A). (We chose oak.) Study the Cutting diagram *opposite* to see how we laid out our materials. From the same stock, cut two 6×11 " pieces for the sides (B), and put them aside temporarily. Glue-join the three back pieces, and clamp until the glue dries. Then, remove the clamps, scrape off any glue squeeze-out, and trim the panel to $34\frac{1}{2}$ " long. Scribe horizontal and vertical centerlines on the panel's face.

2 Make a full-sized half pattern using the gridded Back pattern on *page 9*. To make full-sized working patterns from a gridded pattern, first tape together sheets of paper to make an 18" square. With a pencil and rule, start in one corner and scribe 1" squares across the paper. Next, using the gridded pattern as a guide, plot the points on the 1" grid lines where the pattern lines cross the corresponding grid lines. Then, connect those points to complete the pattern. (We used french curves to draw the curved lines.) Mark the hole centerpoints on your pattern where indicated.

*Note: If you'd prefer to work with a full-sized pattern of the back, see our pattern offer on *page 9*.*

Drawer Decor

You'll find countless uses for this country-style accessory. In the bath, load up the shelf with grooming necessities, and then tuck the overflow into one of the four drawers. Or, station this project at the back door, where it will become a natural dropping-off place for jackets and the family's gloves.

3 Place the half pattern on the left portion of the back panel, and align the centerlines. Tape the pattern to hold it in place. Next, using carbon paper or transfer paper, trace the outline onto the back. Mark the hole centerpoints with an awl. Now, flip the pattern over, placing it on the right half.

Align all of the centerlines, trace the outline, and mark the hole centerpoints.

4 Saw the back to shape. (We used a jigsaw and cut just wide of the line.) Sand the cut edges to the line. (We chucked a sanding drum into our drill press to sand the accessible areas and hand-sanded the others.)

5 Using the technique outlined in Step 2, make a full-sized pattern from the gridded Side pattern on *page 9*. Stack the two sides together using double-faced tape. Transfer the pattern outline and hole centerpoints onto the

BILL OF MATERIALS

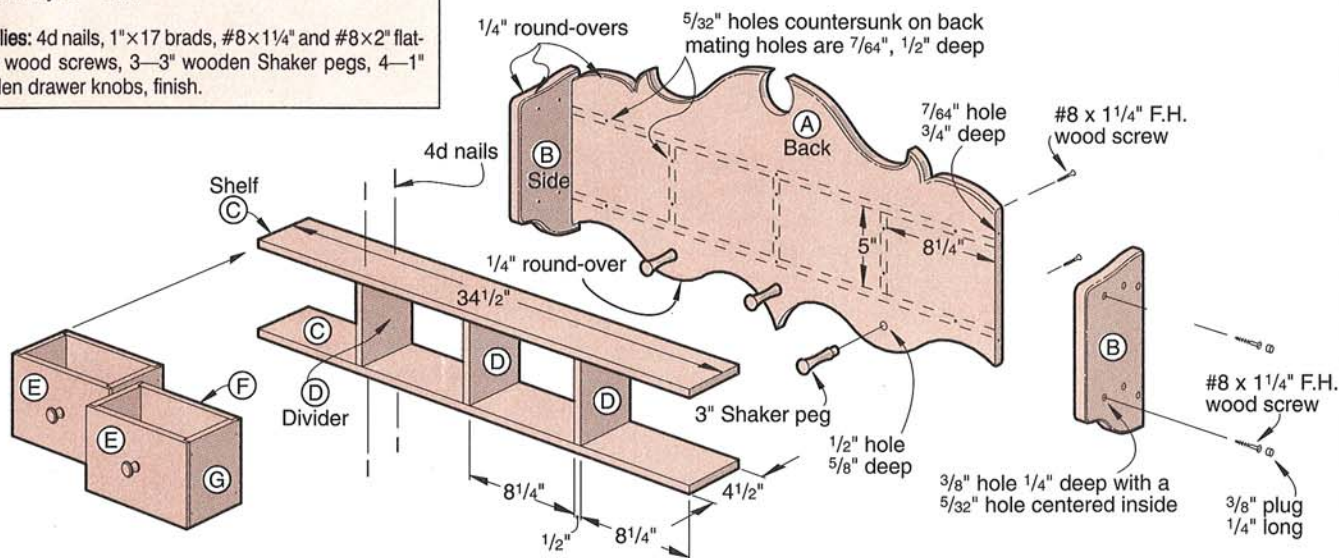
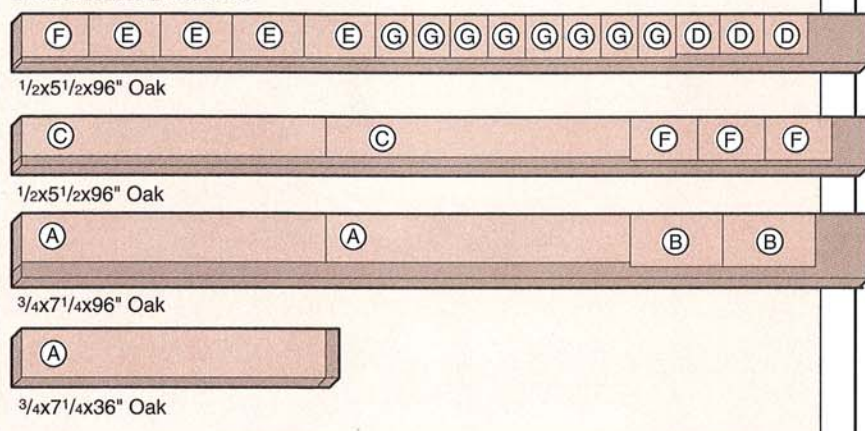
Part	Finished Size*			Mati.	Qty.
	T	W	L		
A back	3/4"	16"	34 1/2"	O	1
B side	3/4"	6"	10 1/2"	O	2
C shelf	1/2"	4 1/2"	34 1/2"	O	2
D divider	1/2"	4 1/2"	5"	O	3
E* drawer front	1/2"	4 7/8"	8 1/8"	O	4
F* drawer back	1/2"	4 7/8"	7 5/8"	O	4
G drawer side	1/2"	4 15/16"	4 1/4"	O	8
H* bottom	1/4"	3 1/16"	7 1/4"	O	4

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

Material key: O—oak.

Supplies: 4d nails, 1"×17 brads, #8×1 1/4" and #8×2" flat-head wood screws, 3—3" wooden Shaker pegs, 4—1" wooden drawer knobs, finish.

CUTTING DIAGRAM



top piece. Drill $\frac{5}{32}$ " holes through both pieces where marked. Counterbore these holes $\frac{1}{4}$ " deep on the outer faces with a $\frac{3}{8}$ " bit. Now, saw the sides to shape, and then sand the edges. (We saved the scraps from these pieces and later cut our plugs from them.) Separate the sides. Using a $\frac{1}{4}$ " round-over bit, rout the back and both side pieces as noted on the drawing above.

6 Drill the three $\frac{1}{2}$ " holes $\frac{5}{8}$ " deep into the front face of the back for the Shaker pegs. Next, drill the $\frac{5}{32}$ " screw holes through the panel, and countersink them on the back side. Finish-sand the back and both ends.

NEXT, ASSEMBLE THE SHELVES AND DRAWERS

1 From $\frac{1}{2}$ "-thick stock, cut two shelves (C) to $4\frac{1}{2}$ × $34\frac{1}{2}$ ". If you can't buy $\frac{1}{2}$ "-thick stock locally, plane or resaw thicker stock to this size. Saw three $4\frac{1}{2}$ ×5" shelf dividers (D) from the same material. Finish-sand the five pieces.

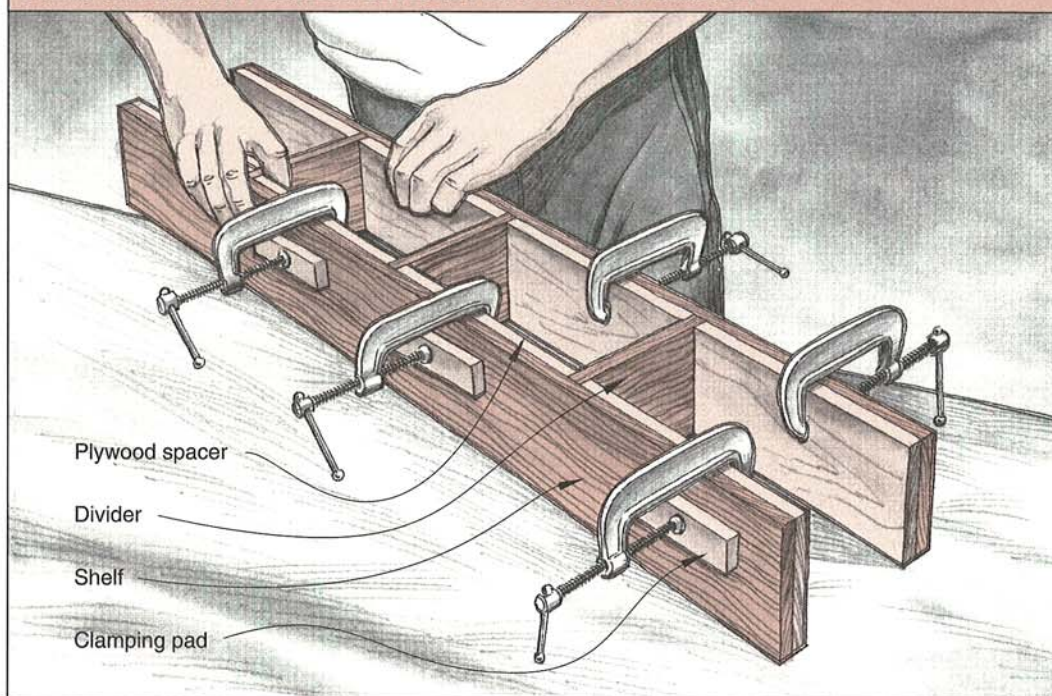
2 From scrap $\frac{1}{4}$ "-thick plywood, cut six 4 × $8\frac{1}{4}$ " spacers. Next, dry-assemble the shelves and dividers, using the plywood spacers as shown on page 8 to position the shelf dividers. Clamp the assembly to keep the parts from moving. Cut off

Continued

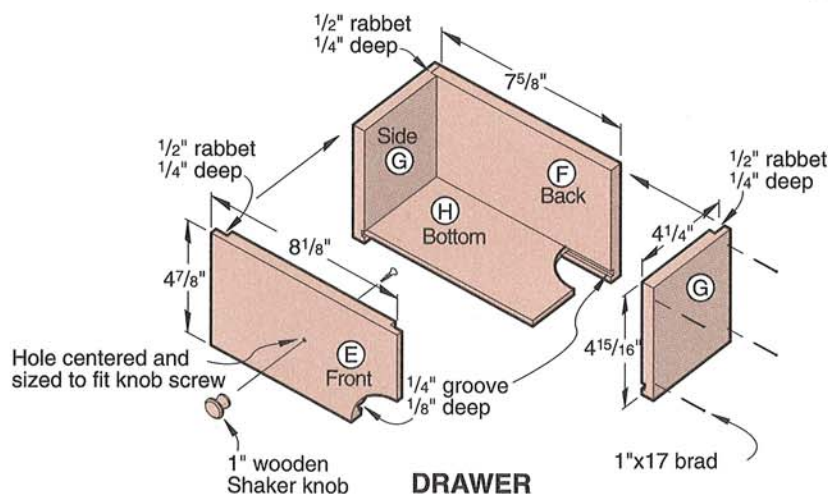
TIP We found that tapered plugs hide the counter-bored screw holes nicely and fit tightly. (Woodworker's Supply sells a $\frac{3}{8}$ " Veritas plug cutter for \$11.95. For more information, telephone 800/645-9292.) Or, if you prefer to give your project a slightly different appearance, you may want to substitute mushroom-head or oval-head screw-hole buttons.

4-DRAWER SHELF

USING SPACERS TO POSITION DIVIDERS BETWEEN THE SHELVES



TIP Want a simple but effective way to create uniform reveal around any drawer? Shorten the drawer fronts and backs, as described in Step 4, lower right.



DRAWER

the head of a 4d nail, and use it to predrill the nail holes. Now, glue, clamp, and nail the shelf unit. Set the nails, and then sand the joints flush.

3 Glue, clamp, and screw the shelf assembly to the back. (We temporarily clamped the unit in position. Next, we drilled through the existing holes in the back to form $\frac{7}{64}$ " pilot holes and then drove the #8x1 $\frac{1}{4}$ " flathead wood

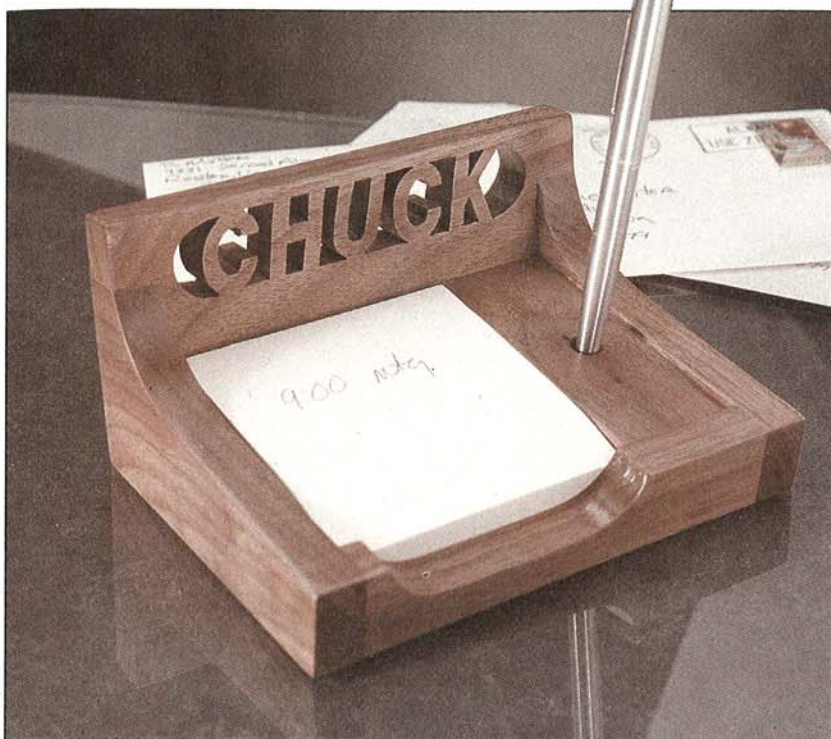
screws.) Attach the sides the same way. Now, using a $\frac{3}{8}$ " plug cutter, cut 12 plugs from the side scrap. Glue the plugs into the $\frac{3}{8}$ " counterbored holes in the side, and then sand them flush.

4 From the $\frac{1}{2}$ "-thick stock, cut four $4\frac{15}{16}$ x8 $\frac{1}{8}$ " drawer fronts (E), four $4\frac{15}{16}$ x7 $\frac{5}{8}$ " drawer backs (F), and eight $4\frac{15}{16}$ x4 $\frac{1}{4}$ " drawer sides (G) as shown on the Drawer drawing at left. Next, rip a $\frac{1}{4}$ "-wide groove $\frac{1}{8}$ " deep and $\frac{1}{4}$ " in from the bottom on all drawer pieces. Now, plane $\frac{1}{16}$ " from the bottom edges of each drawer front and back. This creates equal reveal on all drawer sides.

5 Mount a $\frac{1}{2}$ "-wide dado on your tablesaw, and elevate it to cut $\frac{1}{4}$ " deep. Then, cut the $\frac{1}{2}$ "-wide rabbets on both ends of each drawer front and along the inside back edge of each drawer side where shown on the Drawer drawing. Draw diagonal lines to find the centerpoint on each drawer front. Drill a hole for the knob's screw. (We drilled $\frac{11}{64}$ " holes for the screws on our knobs.) Finish-sand the drawer parts.

6 Dry-assemble one drawer and measure the opening for the bottom. Cut four bottoms (H) from $\frac{1}{4}$ "-thick oak plywood or hardboard, and sand. Next, glue, assemble, clamp, and nail all drawers, aligning the parts along the top edge.

Noteworthy Notepad



Photograph: Wm. Hopkins

Make a name for yourself—or a relative or friend—with a desk accessory that's certain to draw attention at the office. We'll show you how to vary the size of the project so that just about any name will fit in the scrollsawed area.

WHAT'S IN A NAME ESTABLISHES YOUR PROJECT WIDTH

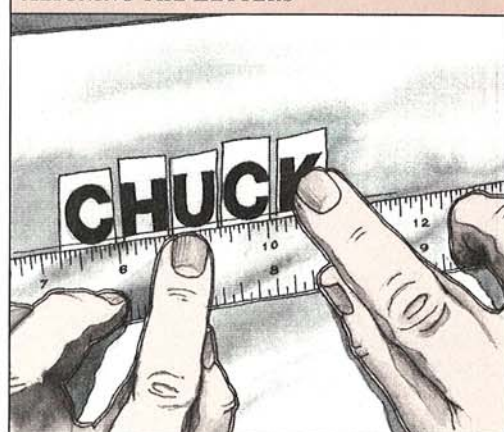
Note: The lengths of the back (A), front (C), and bottom (E) as well as the width of the pen pad (F) change, depending on the length of the name.

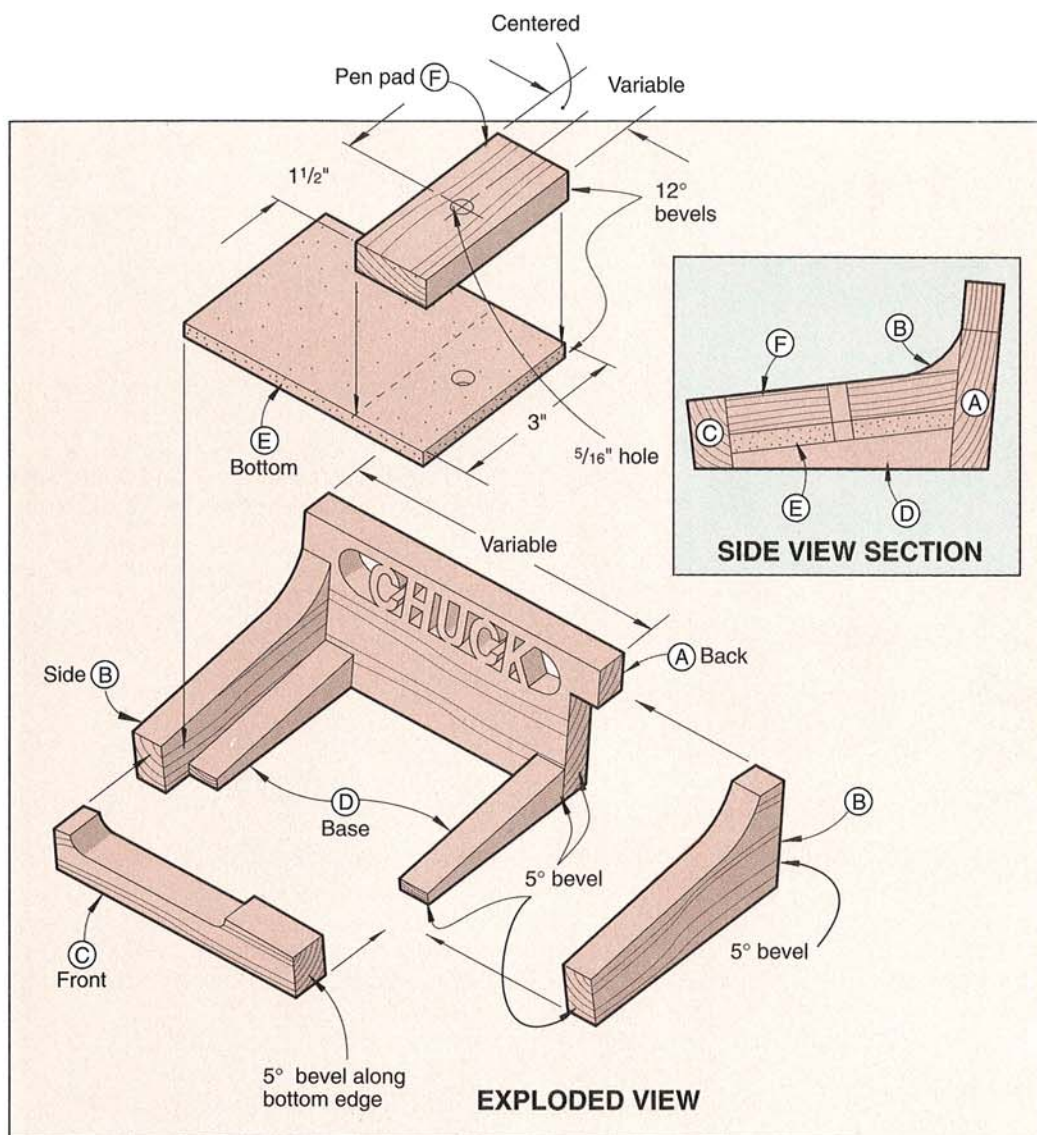
1 Trace or photocopy the letters on page 12 needed for the name. Cut out the letters and the start and stop spaces. Scribe a line on a piece of paper, space the letters on that line as shown below, and tape them in position. (We spaced our letters $\frac{1}{8}$ " apart and then shifted them slightly to improve their appearance.) Now, add a start space at the beginning of the name and a stop space at the end.

2 Measure the name, including the start and stop spaces. Then, add some additional length for the end margins. (We added $\frac{5}{8}$ " to both ends [$1\frac{1}{4}$ " total] of our name. With longer names, you may want to add $\frac{3}{4}$ " to each end for visual balance.) This measurement establishes the length of the stock needed for the back (A). Next, find the lengthwise center of the name, and scribe a vertical centerline through it. Now, cut out the assembled name, leaving a $\frac{1}{4}$ " margin.

3 Angle your tablesaw blade 5° from vertical. From $\frac{1}{2}$ "-thick stock, bevel-rip the back piece $2\frac{3}{4}$ " wide. Crosscut this piece 1" longer than the length you determined in Step 2. Lay the back flat (see the Side View Section opposite to make sure you've oriented the piece correctly). Next, scribe a vertical centerline on the face of the piece and a horizontal line 1" down from the top. Now, adhere your letters to the back's front by aligning the vertical and horizontal lines of the letters with those on the piece.

ALIGNING THE LETTERS





4 Drill $\frac{1}{8}$ " start holes through the open letter areas, the areas separating the letters, and the start and stop spaces at the ends of the name. Scrollsaw these spaces. (We used a #5 scrollsaw blade.) After sawing out all areas, remove the pattern and lightly sand the cut edges. Now, trim the back to final width, cutting from both ends to center the name in the back piece.

5 To notch the back for the sides, first trace the L-shaped Back End pattern on page 13 onto cardboard. (We used a piece of an old file folder for ours.) Cut this pattern to shape. Next, position the pattern on one end of the back, align the edges of the pattern with the back, and then trace around the inside edge. Turn the pattern over, and trace its outline onto the opposite end of the back. Now, using the miter gauge on your bandsaw, carefully cut the notches into both ends of the back piece.

FINISH CUTTING OUT THE PARTS, AND THEN ASSEMBLE THE HOLDER

1 From $\frac{1}{2}$ "-thick stock, cut two $2 \times 4\frac{1}{4}$ " pieces for the sides (B). Copy patterns B, C, and D on page 13. Cut out the full-sized Side pattern, and adhere it to the face of one side piece. Using double-faced tape, stack this piece on top of the remaining piece. Saw the curve and the back and front bevels, cutting just wide of the lines. Then, sand to the lines. (We sanded the curves with our 2" drum sander.)

2 To make the front (C), rough-cut a $\frac{1}{2}$ "-thick piece $1\frac{1}{4}$ " wide and 12" long. Next, angle your tablesaw blade to 5° from vertical, and bevel-rip the piece to $\frac{15}{16}$ " wide. Adhere the Front pattern to the side of the front piece, aligning the left edges. Saw the notch into the front piece, and then sand. Remove the pattern.

Continued

TIP We positioned the pen to the right side of the notepad on our holder. However, if you're left-handed or simply prefer having the pen on the left side, just flip the front pattern end-for-end, and align it with the right end of the front piece. Then, cut the thumb notch into the piece at that position.

A B C D E F G H I J K
L M N O P Q R S T U
V W X Y Z

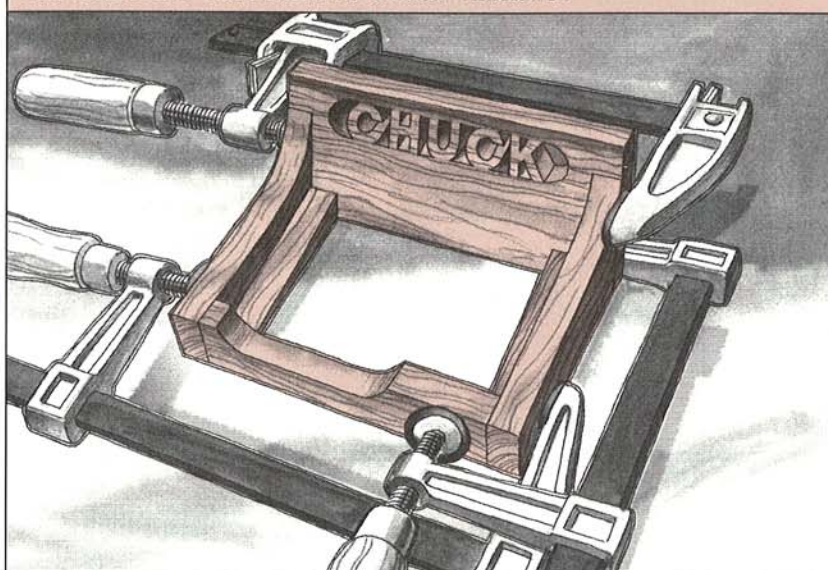


3 Using the Base pattern, cut two wedge-shaped base pieces (D). Next, dry-assemble the back and sides as shown on the Exploded View drawing. (As shown *below*, we dry-clamped the pieces temporarily.) Mark and then cross-cut the front piece to fit between the sides by trimming where shown on the pattern. Next, measure the rectangular opening, and rough-cut a piece of stock $\frac{1}{2}$ " wider and longer for the bottom. Resaw this piece to $\frac{1}{8}$ " thickness. Bevel-rip one edge of this thin piece at 12° , and then

trim it to fit the holder opening. Now, make sure all parts fit, and adjust as needed by sanding.

4 Glue, assemble, and clamp the back, side, and front pieces. Check the holder for square, and adjust if necessary. After the glue dries, remove the clamps, and finish-sand all joints. Glue and clamp the wedge-shaped base pieces and the bottom to the assembled holder. Remove the clamps after the glue has dried.

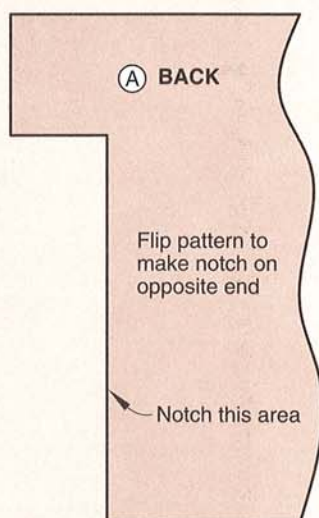
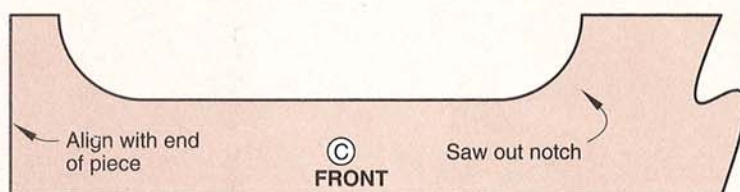
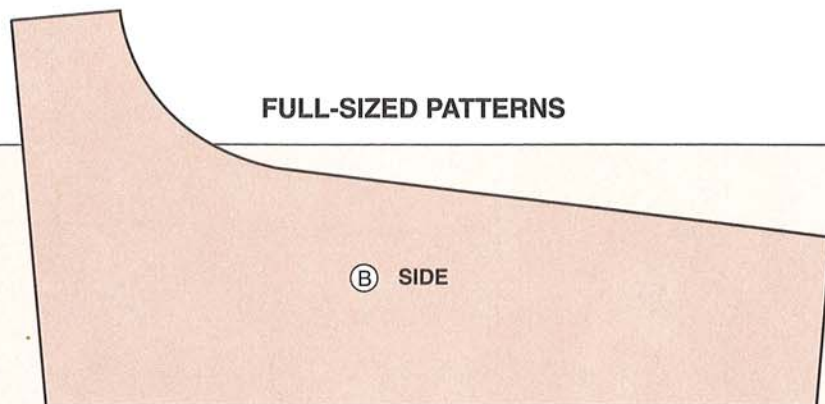
DRY-CLAMPING THE PARTS TO CHECK THEIR FIT



5 To size the pen pad (F), first place a notepad in the holder against the left edge. Measure the distance between the notepad and the opposite side of the holder. (We used a 3x3" self-sticking notepad [like a 3M Post-it] in our holder. With a longer name, you may have enough length for a 3x5" notepad.) Next, rip a $\frac{1}{2}$ "-thick piece of walnut to that dimension. Now, bevel-cut one end of that piece at 12° , return your saw blade to vertical, and crosscut the opposite end so it fits inside the holder where shown.

6 Locate the centerpoint for the pen hole in the pen pad. (We centered ours top-to-bottom and side-to-side.) Drill a $\frac{5}{16}$ " hole through the pen pad, and then finish-sand the piece. (We used a cone-shaped bit because it forms a conical-shaped hole. A tapered pencil or pen fits into this hole nicely and stands better. See the Buying Guide for a mail-order source for a tapered bit.) Glue and clamp the part in place. Now, extend the pen hole through the bottom.

FULL-SIZED PATTERNS



(We test-fitted the pen in the hole until the hole depth appeared appropriate.)

7 Finish-sand the holder. Next, apply the finish of your choice. (We applied a coat of clear sanding sealer and then two build-up coats of semigloss lacquer. We sanded between coats with 320-grit sandpaper to level the finish.)

8 Now, outfit the holder with a notepad and your favorite pen or pencil. ■

BILL OF MATERIALS

Part	Finished Size*			Matl.	Qty.
	T	W	L		
A* back	1/2"	2 5/8"	55 1/16"	W	1
B side	1/2"	2"	43 1/16"	W	2
C* front	1/2"	7/8"	43 3/8"	W	1
D base	1/2"	9 1/16"	27 7/8"	W	1
E* bottom	1/8"	3 1/8"	43 3/8"	W	1
F* pen pad	1/2"	1 1/4"	3 1/8"	W	1

*Note that the length of parts A, C, and E and the width of part F will vary depending on the length of your name. Read all instructions before cutting these parts.

Material key: W—walnut

Supplies: 3×3" (or larger) self-sticking notepad, pencil or ball-point pen.

Buying Guide: Power-drive hole restorer. (Cone-shaped hole reamer.) Catalog no. 826-105. Price: \$7.95 plus \$3.55 packing and shipping. From: Woodworker's Supply 1108 N. Glenn Rd., Casper, WY 82601-1698. Credit card orders call 800/645-9292.

TIP We made our notepad holder from 1/2"-thick walnut stock. We cut all of the parts from a scrap piece measuring 4x14", including the resawn 1/8"-thick bottom. If you don't have thin stock, you can use 1/8"-thick plywood or hardboard. Finish-sand both surfaces of your stock before cutting.

Project design: James Boelling, Des Moines
Illustrations: Kim Downing; Roxanne LeMoine; Carson Ode
Project builder: Chuck Hedlund



Photograph: Wm. Hopkins

Spread your woodworking wings Peacock on Parade

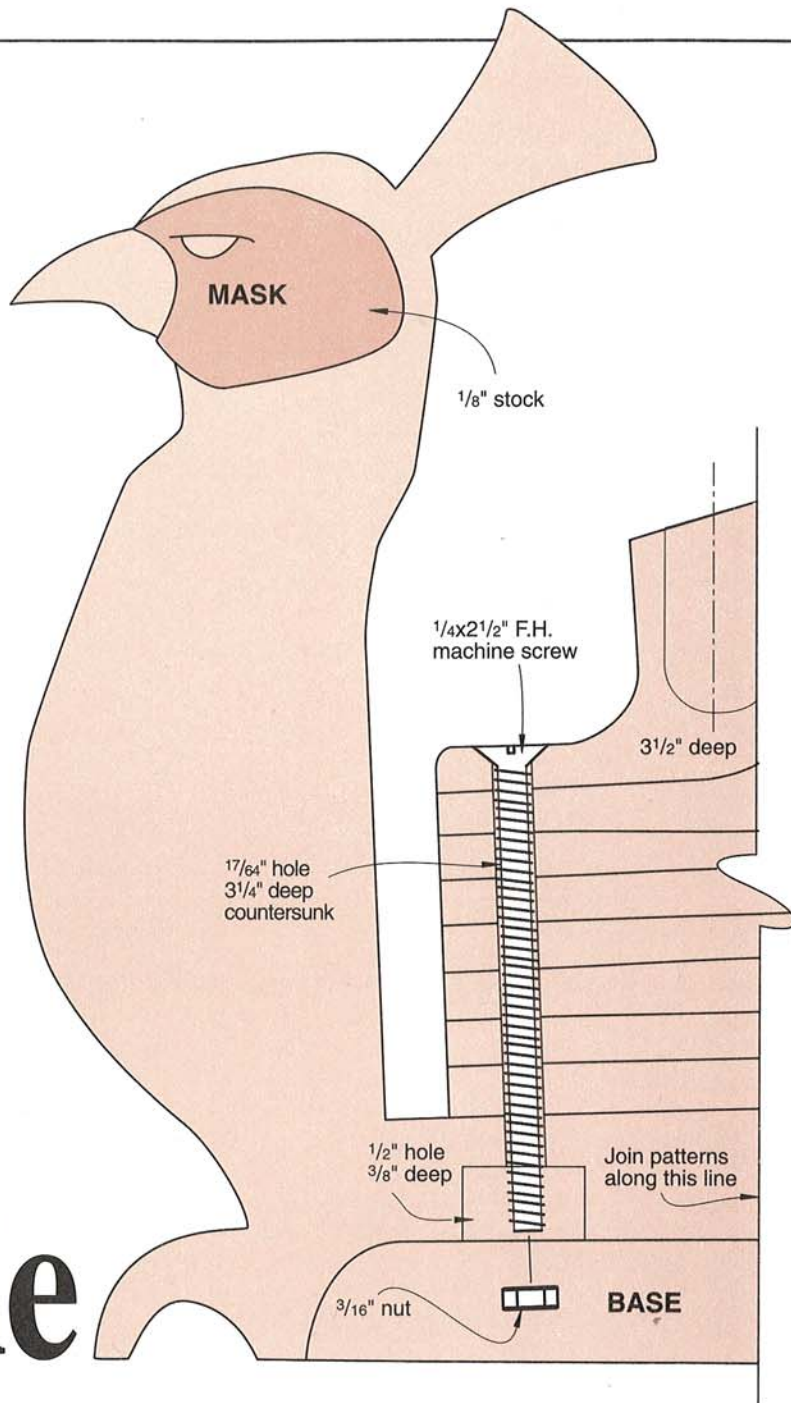
You'll be proud as a peacock after completing this regal centerpiece. Just fan the candleholders—all cut from the same stock—and then bask in the glow of compliments from your party guests.

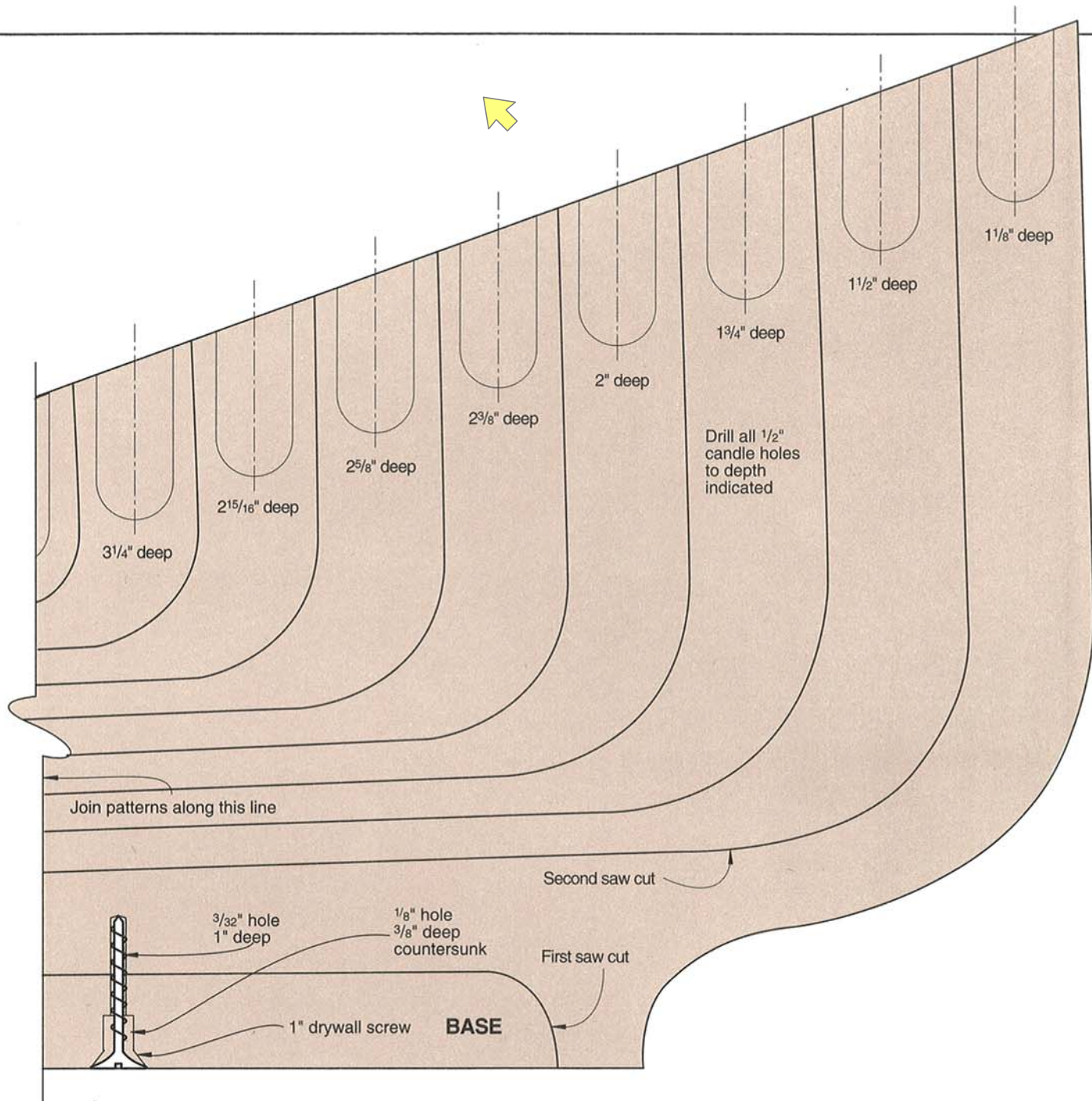
1 Copy the full-sized peacock pattern. (We photocopied ours.) Next, rough-cut a board to 7×12". (We chose oak. If you intend to paint the project, we suggest using birch or poplar.) Now, adhere the peacock pattern to the board, aligning the bottom of the pattern with the bottom edge of your board.

2 With a try-square, extend the locations of the screw-hole centerlines from the side of the pattern around to the bottom edge of your board. Now, using the same procedure, extend the 1/2" candle-hole centerlines across the top edge of the piece.

3 Drill and countersink the 1/8" shank hole 3/8" deep into the base. (While drilling, we clamped the board to the drill-press table with a wood screw clamp.) Now, center and drill a 3/32" pilot hole through the base and into the board to a depth of 1".

4 Bore the 1/2"-diameter candle holes in the center of the board's top edge where marked. Drill each hole to the depth specified on the pattern. Before drilling these holes, we suggest you check that the candles you buy will fit the holes you drill in the top edge. (We purchased 12"-long 1/2" tapers at a local Hallmark store.)





5 Using your scrollsaw and a #5 blade, cut away the base pivot. Next, drill the $\frac{17}{64}$ " hole $\frac{3}{4}$ " deep into the board. Now, counterbore a $\frac{1}{2}$ "-diameter hole $\frac{3}{8}$ " deep for the nut.

6 Scrollsaw around the outside edge of the pattern to separate the bird from the scrap. Next, saw around the eight inner tail feathers, and then cut them apart.

7 Trace the eye mask pattern onto two pieces of $\frac{1}{8}$ "-thick wood. (We chose walnut.) Saw the eye in each, and then cut both masks to shape. Glue a mask to each side of the head.

8 Countersink the bolt hole in the top feather. Sand the curving ends of the base piece so that it can pivot when screwed to the body.

9 Apply your choice of finish. (We applied one coat of sanding sealer and one coat of clear lacquer, sanding between coats with 320-grit sandpaper.) If painting, prime all pieces first.

10 Assemble the feathers. Insert a $\frac{1}{4} \times \frac{1}{2}$ " flathead brass machine screw through the holes. Place the feathers on the bird. Thread on the nut and tighten. Grind off the screw's excess. Screw the base piece in place. ■

Supplies: $\frac{3}{4}$ " stock, $\frac{1}{8}$ " stock, finish, 1—#6 $\times$ 1" drywall screw, 1— $\frac{1}{4} \times \frac{1}{2}$ " flathead brass machine screw and nut.

Project design and illustration: Bill Zaun
Project builder: Rick Hutcheson

Great for plates—and collections, too

Classic Country Cabinet



Photograph: Wm. Hopkins

Generations ago, craftsmen built shallow cabinets for families' everyday dinner service. Although originally designed for plates, this reproduction also makes an excellent display space for other collections such as dolls, tin boxes, or figurines.

THE BASIC CABINET GOES TOGETHER QUICKLY

1 From your $\frac{3}{4}$ "-thick stock, saw two sides (A), two plates (B), and two shelves (C) to the dimensions listed in the Bill of Materials on *page 18*. (We chose to make our cabinet from poplar because we intended to paint it.) Next, from $\frac{1}{2}$ "-thick stock, cut the crown piece (D). If you can't buy $\frac{1}{2}$ " lumber locally, plane or resaw thicker stock to this size. Refer to the Cutting diagram on *page 18* to see how we laid out our stock for cutting of the cabinet parts.

2 Mount a $\frac{3}{4}$ "-wide dado set on your tablesaw, and cut a $\frac{3}{4}$ "-wide rabbet $\frac{1}{4}$ " deep along each end of both side pieces where shown on the Exploded View drawing *opposite*.

3 To accommodate the back, reduce the dado and cut a $\frac{1}{4}$ "-wide rabbet $\frac{1}{4}$ " deep along the inside back edge of both side pieces and along one edge of both plates. See the Exploded View drawing for details.

4 Mark the shelf locations on the side pieces using the dimensions shown on the Exploded View drawing and the Side detail. Lay out two screw holes for each shelf, and then drill and counterbore them as detailed on the drawings.

5 Set up your table-mounted router as shown on the Shelf detail *opposite*. Rout a $\frac{1}{4}$ "-groove $\frac{3}{16}$ " deep in the top face of both shelves and the

Continued

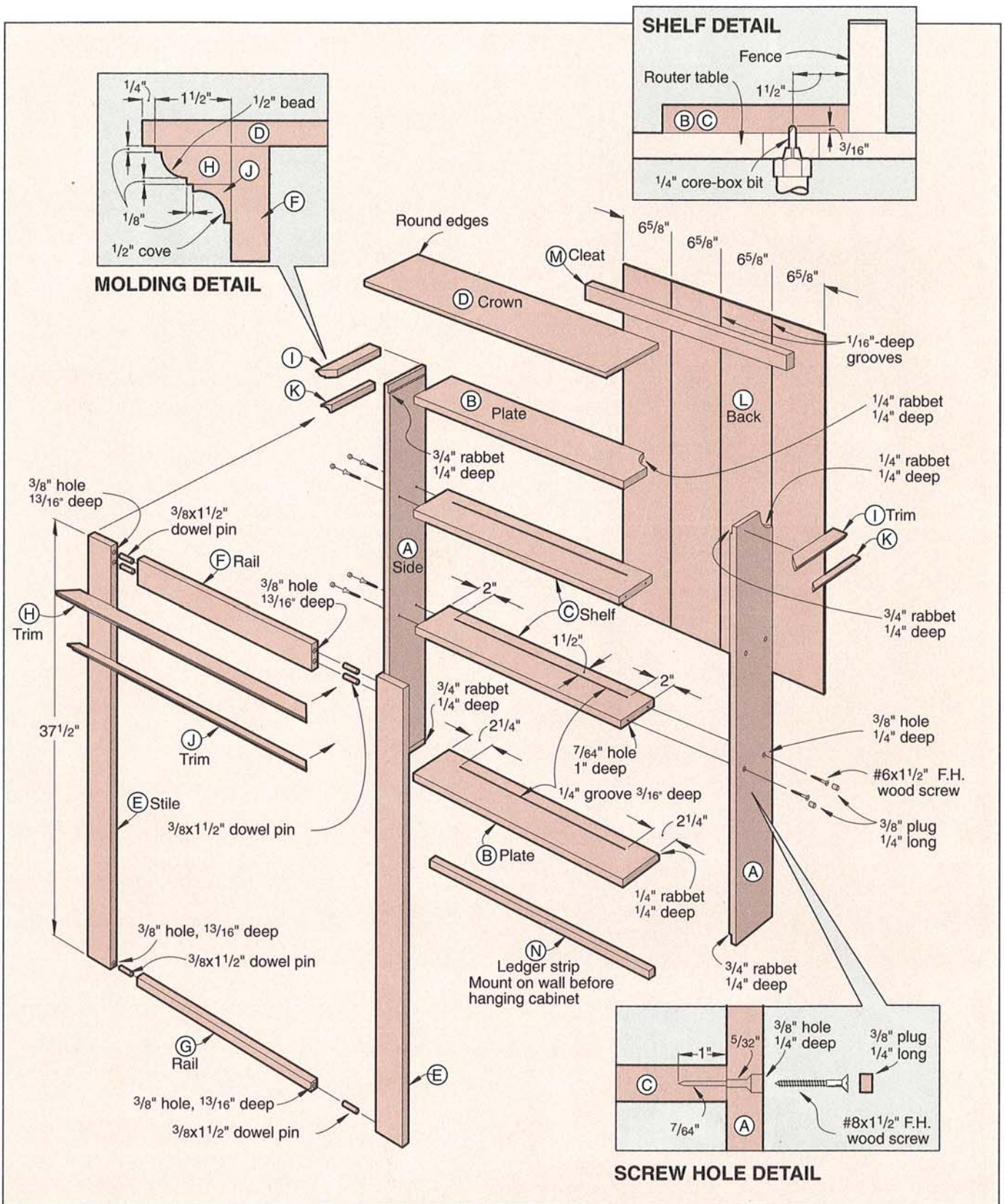
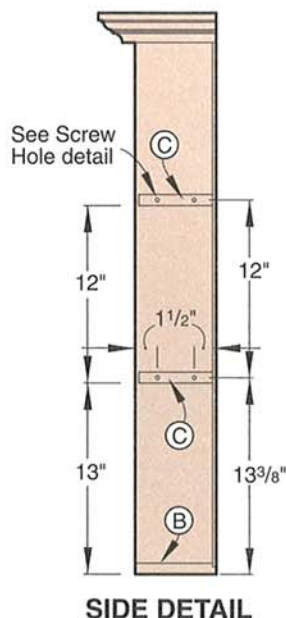


PLATE CABINET



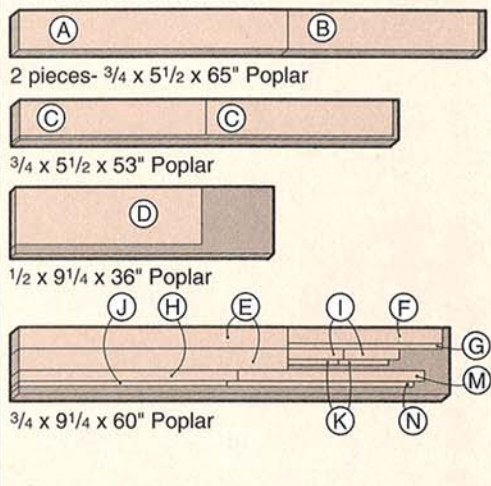
BILL OF MATERIALS						
Part		Finished Size*			Matl.	Qty.
		T	W	L		
A	side	3/4"	5 1/2"	37 1/2"	P	2
B	plate	3/4"	5 1/2"	26 1/2"	P	2
C	shelf	3/4"	5"	26"	P	2
D	crown	1/2"	8"	31"	P	1
E	stile	3/4"	3"	37 1/2"	P	2
F	rail	3/4"	2 1/4"	21 1/2"	P	1
G	rail	3/4"	3/4"	21 1/2"	P	1
H*	trim	3/4"	1 1/2"	30 1/4"	P	1
I*	trim	3/4"	1 1/2"	7 5/8"	P	2
J*	trim	3/4"	3/4"	28 13/16"	P	1
K*	trim	3/4"	3/4"	7"	P	2
L*	back	1/4"	26 3/8"	36 3/8"	PW	1
M*	cleat	3/4"	3/4"	26"	P	1
N	ledger	3/4"	1"	27 1/2"	P	1

*Parts marked with an * are cut to final size during construction. Please read all instructions before cutting.

Material key: P—poplar; PW—pine plywood

Supplies: #6 x 1 1/2" flathead wood screws, 3/8 x 1 1/2" dowel pins, paint, and finish.

CUTTING DIAGRAM



bottom plate. (To rout these blind grooves, we first scribed a mark on the router fence in line with the center of the bit. Next, we scribed lines [on the underside] 2" from the end of each shelf and 2 1/4" from the end of the bottom plate. To rout the grooves, we aligned the front line on each piece with the bit's centerline as shown *below left*, lowered the pieces over the spinning bit, and then moved them forward until the second line aligned with that mark.) Now, finish-sand all parts with 100- and 150-grit sandpaper.

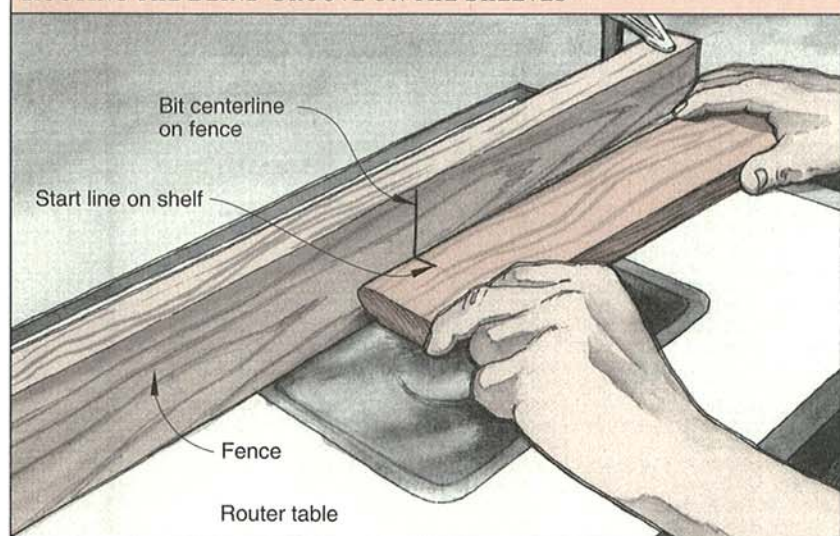
6 Dry-assemble the case on your floor or workbench. Next, glue the top and bottom plates in the side rabbets, clamp, and check the corners for square. Wipe off any glue squeeze-out with a damp cloth.

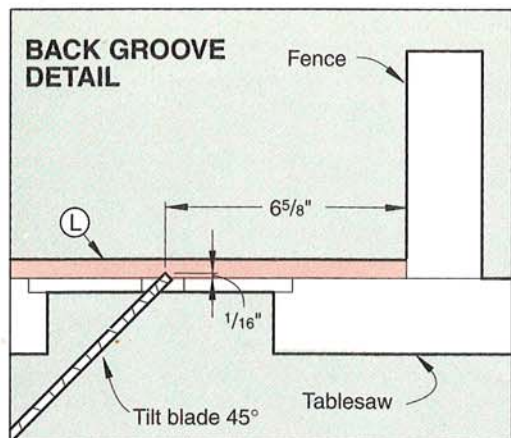
7 Position the shelves inside the cabinet, and place a 1/4"-thick spacer underneath them to provide an offset for the back. Next, center the shelves on the side holes, and square them with the sides. Drive the screws through the predrilled holes in the sides. (After squaring the shelves to the sides, we held them in place with clamps and then drilled the 3/32" pilot holes 1" deep in the shelf ends before driving the #6 x 1 1/2" flat-head wood screws.)

8 Using a 3/8" plug cutter, cut eight 1/4"-long plugs from your scrap. Next, glue one in each of the counterbored screw holes. After the glue dries, sand the plugs so they will be flush with the sides.

9 Apply glue to the top surface of the top plate. Place the crown (D) on it, align the back edges, and center the crown from side to side. Now, clamp this assembly until the glue dries.

ROUTING THE BLIND GROOVE ON THE SHELVES





NEXT, PREPARE THE FACE FRAME AND TRIM

1 From $\frac{3}{4}$ "-thick stock, cut two stiles (E), one top rail (F), and one bottom rail (G).

2 Plot centerpoints for the $\frac{3}{8}$ "-diameter dowel holes on the inside edges of both stiles as dimensioned on the Face Frame detail at right. Drill these holes $\frac{13}{16}$ " deep. Next, place $\frac{3}{8}$ " dowel centers in these holes, and as shown above right, mark the centerpoints for mating holes in the top and bottom rails. Drill these holes $\frac{13}{16}$ " deep. Finish-sand the parts.

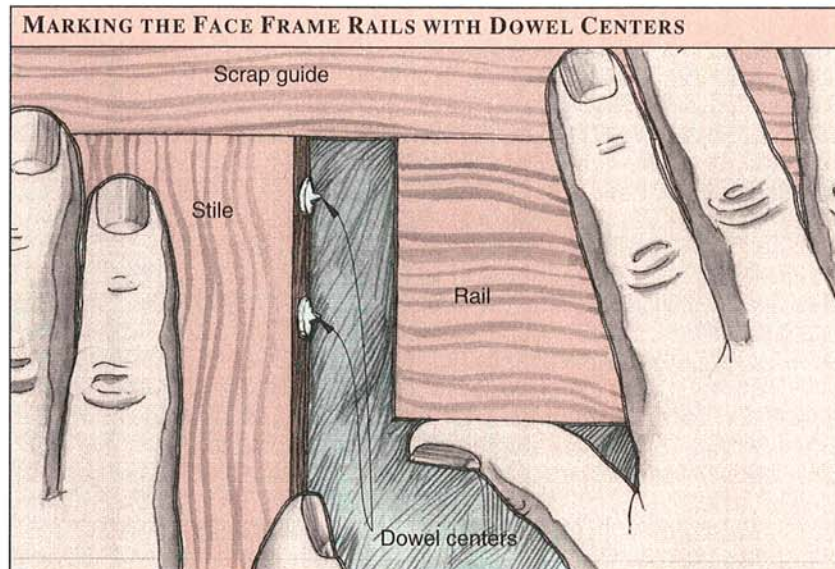
3 To assemble the face frame, first glue $\frac{3}{8} \times 1\frac{1}{2}$ " dowel pins in the ends of the rails. Next, glue the ends of the dowel pins into the stiles. Square and clamp the frame.

4 Glue and clamp the face frame onto the assembled cabinet. Sand the edges of the face frame flush with the cabinet sides and bottom.

5 To make the top trim, rip and crosscut one $\frac{3}{4} \times 1\frac{1}{2} \times 56$ " strip and one $\frac{3}{4} \times \frac{3}{4} \times 56$ " strip. Next, rout a $\frac{1}{2}$ " bead along one edge of the $1\frac{1}{2}$ "-wide strip (for H, I), as shown on the Molding detail on page 17, and a $\frac{1}{2}$ " cove along one edge of the $\frac{3}{4}$ "-square strip (for J, K).

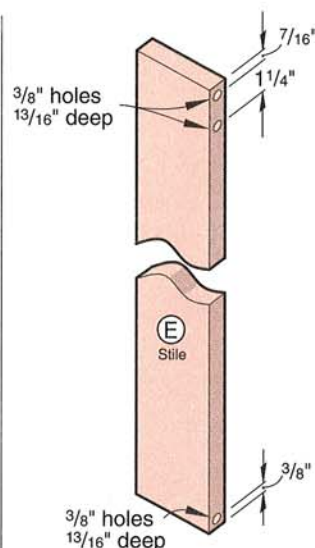
6 Measure the width of the cabinet, and miter-cut the trim pieces (H, J) from those strips to fit the front. Glue and clamp them in place. Measure and cut the side trim pieces (I, K), and glue them in place.

7 Measure the back opening between the rabbets, and cut a $\frac{1}{4}$ "-thick plywood panel to that size for the back (L). (We used pine plywood.) To groove the back, set up your table-saw as shown in the Back Groove detail above. Turn the plywood so the good side faces down, and cut the first groove. Turn the piece end-for-



end, and cut the groove in the opposite side. Now, move the fence and cut a third groove that will be centered between the two outer grooves.

8 If you plan to mount the plate cabinet on a wall, you'll need to cut a $\frac{3}{4} \times 1\frac{1}{2}$ " mounting cleat (M) to fit inside the cabinet under the top plate. If you know where the cabinet will hang, hold the mounting cleat in position on that wall, and mark the stud locations on the strip. Drill and countersink screw holes on these marks. Now, finish-sand the piece, and glue it in place inside the cabinet where shown on the Exploded View drawing. From the same stock, cut a $1 \times 2\frac{7}{8}$ " piece for a ledger strip (N). Mount it on the wall before hanging the cabinet.



THE FINAL STEPS: FINISHING AND MOUNTING THE CABINET

1 Apply the finish of your choice. (We applied two coats of Sherwin-Williams Oxford Blue interior flat enamel to our cabinet and ledger strip and a medium-oak colored stain to the back panel. After the stain dried, we brushed on two coats of semigloss lacquer, sanding each coat after it dried with 320-grit sandpaper.)

2 Attach the back panel to the cabinet opening with 1×16 nails.

3 To wall-mount your cabinet, attach the ledger strip to the wall at the height you want the bottom of the cabinet. (We countersunk the holes in the strip and then drove drywall screws into the wall studs.) Next, place the cabinet on top of the ledger strip, align the edges, and then drive $2\frac{1}{2}$ "-long drywall screws through the mounting cleat and into the wall studs. ■

Project design: Roxanne LeMoine, Des Moines
Illustrations: Roxanne LeMoine; Carson Ode
Project builder: Chuck Hedlund



Mirror, Mirror on the Wall

Don't let this skinny frame fool you. Despite being only 5¾" wide, it works just as well as a standard full-length mirror when you check out your head-to-toe attire.

HERE'S AN EASY WAY TO CUT THE FRAME OPENING

1 Cut a piece of ¾"-thick stock to 5¾×60". (We chose oak for our mirror frame.) Scribe lines ¼" in from both ends of the piece.

2 Make two copies of the full-sized End pattern *opposite*. (We traced ours using carbon paper.) Cut out the patterns, and apply adhesive to the backs. Adhere them to the board, aligning the pattern ends with these lines.

3 Elevate the saw blade, placing the gullets ⅛" above the board's top. Next, make an auxiliary fence at least 130" long, center it over the blade arbor, and attach it to your saw's rip fence. Now, set the auxiliary fence ⅓⅛" from the inside of the saw blade.

4 Place the board against the exiting edge of the saw blade. Using a square, transfer this point into a vertical line on the side of the fence as shown in *illustration A*. This will be your *stop* reference line. Next, place the board against the entry edge of the blade, and transfer this point to a line on the side of the auxiliary fence as shown in *illustration B*. This will be your *start* line.

5 Hold the board against the fence as shown in *illustration C*, aligning the forward pattern's rip start/stop line with the start line on the fence. Clamp a stopblock to the fence at the end of the board. (We used a short workpiece to demon-

ILLUSTRATION A

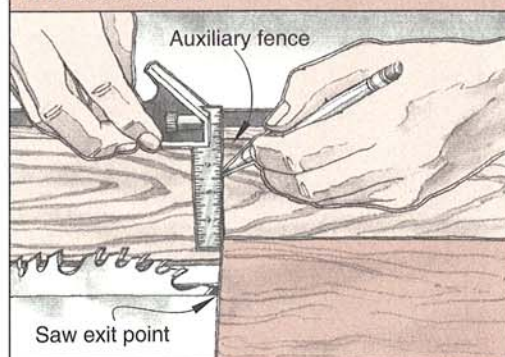
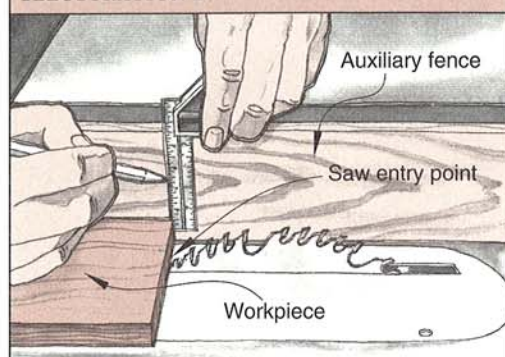


ILLUSTRATION B



strate this. To rip your frame, you'll need to position the stopblock much farther back from the saw blade than we show here.)

6 Position the board against the stopblock and fence, holding it above the saw blade. Turn on the saw, and slowly lower the piece onto the saw blade. Then, move the board forward until the pattern's rip start/stop line aligns with the stop line on the fence as shown in *illustration D*. Turn the piece end-for-end and rip the opposite side the same way.

7 With a hand jigsaw, finish sawing the frame's inside opening at both ends. Drill ¼" start holes through the cone-shaped pattern areas, and saw them to shape. Now, saw around the outside pattern edge.

NOW, JUST ROUT THE EDGES AND APPLY THE FINISH

1 Sand the cut edges. With a ⅜" piloted round-over bit, rout the front edges of the frame. (We did not rout the small, cone-shaped areas.)

2 Apply the finish of your choice. (We brushed on a light-oak oil stain, let it set for about 10 minutes, and then wiped off the excess with a dry cloth. After the stain dried, we brushed on one coat of sanding sealer and then two coats of clear, semigloss lacquer.) ■

ILLUSTRATION C

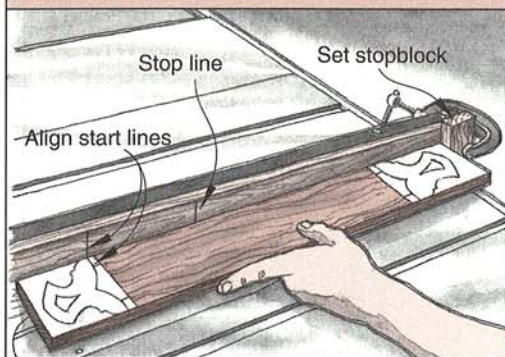
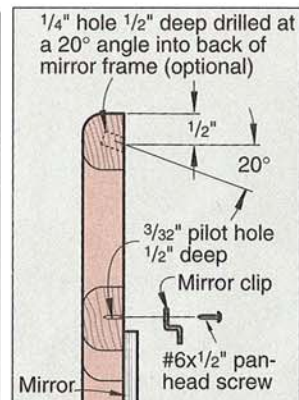
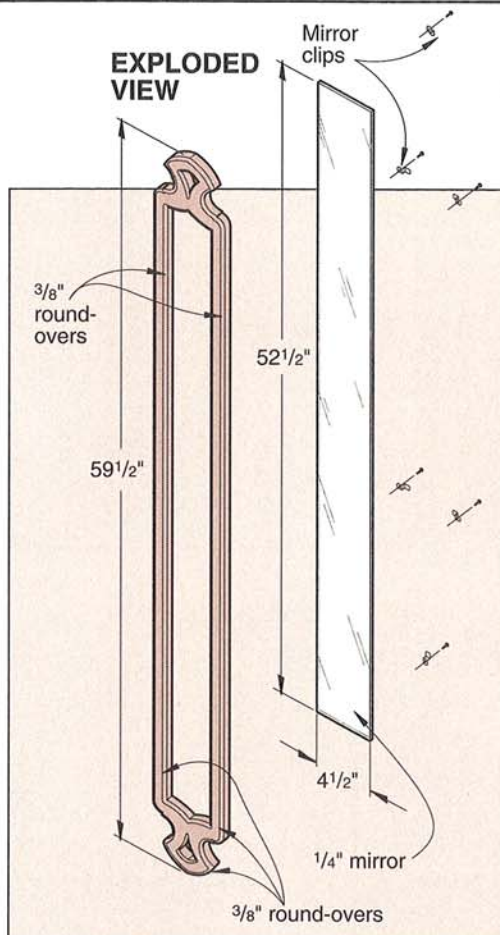
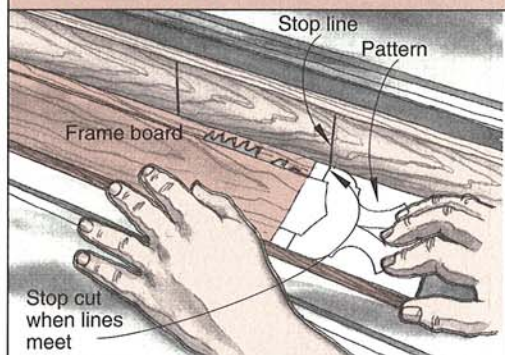


ILLUSTRATION D

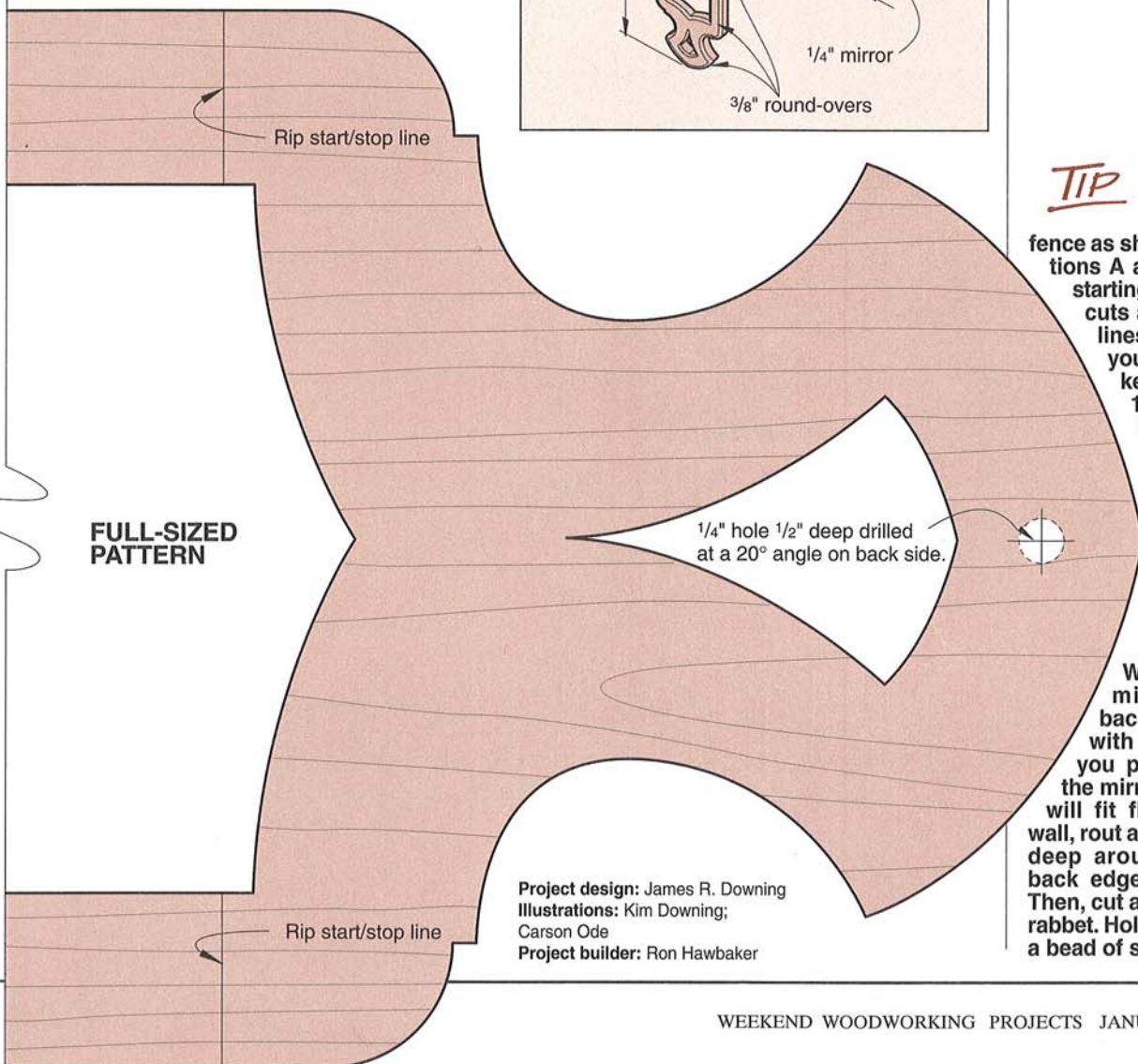


SIDE VIEW

Supplies: 1/4" plate mirror, mirror clips, #4 x 1/2" panhead screws, small screw eyes, picture wire, finish.

TIP By setting the stop/start lines on the auxiliary fence as shown in illustrations A and B, and then starting and ending the cuts at the start/stop lines on the pattern, you'll automatically keep the saw cut 1/8" back from the corner on the underside.

FULL-SIZED PATTERN



Project design: James R. Downing
Illustrations: Kim Downing;
 Carson Ode
Project builder: Ron Hawbaker

TIP We mounted our mirror onto the back of the frame with metal clips. If you prefer to recess the mirror so the frame will fit flat against the wall, rout a 1/4" rabbet 1/4" deep around the inside back edge of the frame. Then, cut a mirror to fit the rabbet. Hold it in place with a bead of silicone sealant.

A BOARD-GAME CLASSIC

Chinese Checkers



Photograph: Wm. Hopkins

Remember those lightweight, painted metal Chinese checker boards you used to play with as a child? If so, you'll really appreciate this project for its style and good looks. And if you give this game as a gift, you'll be known for your generosity and your woodworking skills. Come on, why not give it a go!

THE GAME BOARD—IT'S EASIER TO MAKE THAN YOU MIGHT THINK

1 From $\frac{3}{4}$ "-thick stock (we chose maple), cut three pieces $4\frac{3}{4}$ " wide and $14\frac{1}{2}$ " long. Glue-join them to make up a $14\frac{1}{4} \times 14\frac{1}{2}$ " panel. After the glue dries, remove the clamps, scrape off any glue squeeze-out, and sand both surfaces with 100- and 150-grit sandpaper.

2 Trim the game board to 14" square. Select the top face, and draw diagonal lines to find the centerpoint. Mark it with an awl. Next, using a framing square and pencil, scribe centerlines to divide the board into four equal parts as shown on the Game Board Front View drawing *opposite*. Drill a $\frac{1}{16}$ " hole through the center.

3 Make two copies of the Star half pattern provided on page 28. (We photocopied ours.) With scissors, cut out the patterns, leaving a $\frac{1}{4}$ " margin around the edges. Tape the two half pattern copies together to complete the six-pointed star. Next, apply a light coat of adhesive to the pattern back. (We used rubber cement.)

4 Center and align the pattern on the game board as shown *top right*. (We used a small brad to align the centerpoints of the pattern and board. We also made certain that the star centerlines aligned with the board's centerlines.) Using a light coat of rubber cement, adhere the pattern to the board.

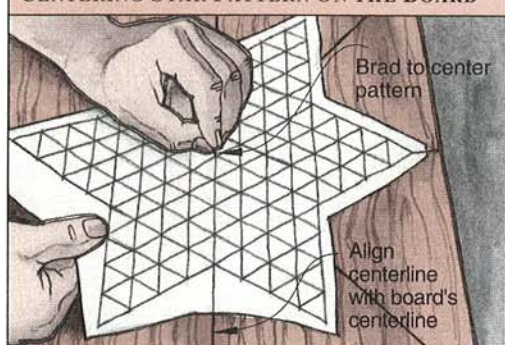
5 Make the step-and-repeat jig shown on page 29. Place it on your drill-press table, and set it up to use as described. Now, with a $\frac{1}{2}$ " core-box router bit, bore the $\frac{1}{2}$ "-diameter marble holes $\frac{1}{4}$ " deep.

GET READY TO SHAPE THE GAME BOARD

1 Using a compass and the center hole on the board's back, scribe a $5\frac{1}{4}$ "-radius ($10\frac{1}{2}$ "-diameter) circle. Next, with the same compass setting, mark off six equidistant points along that circle where shown on the Game Board Back View drawing *opposite*. Drill $\frac{3}{8}$ " holes $\frac{5}{16}$ " deep at these points for screwhead buttons.

2 Scribe a centerline on the board's back, and then mark a centerpoint $3\frac{1}{2}$ " from the top. Rout a keyhole slot at that point as dimensioned on the Keyhole Slot detail associated with the Back View *opposite*.

CENTERING STAR PATTERN ON THE BOARD



SANDING THE BOARD'S EDGE



3 Scribe a $6\frac{3}{4}$ "-radius ($13\frac{1}{2}$ "-diameter) circle on the board's back. Bandsaw the board round, sawing just outside this line.

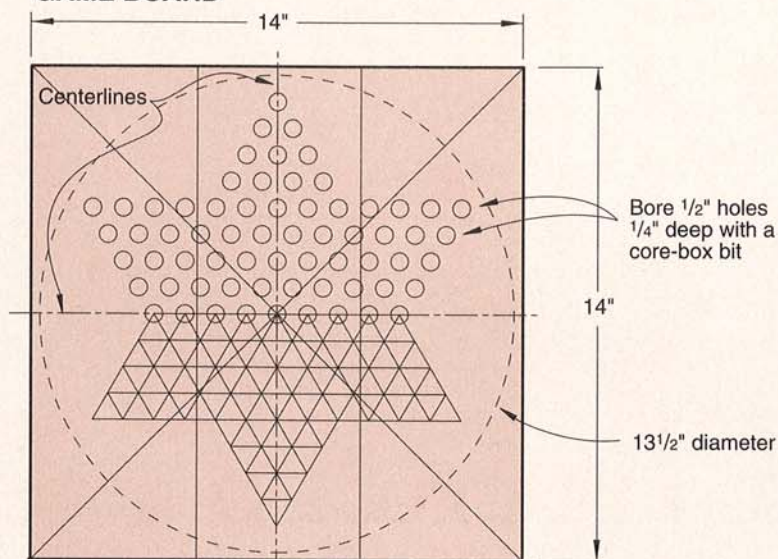
4 Sand the sawed edge of the game board as shown above. (We clamped a piece of scrap plywood to our sander's table to serve as a pivot board and then drove a 4d nail into it 6" from the edge and in line with the center of the sanding disc. We clipped off the nailhead [leaving $\frac{3}{8}$ " of the nail exposed] and then placed the board's centerhole over this pivot. We then rotated the board slowly against the spinning sander. Applying light pressure against the plywood pivot board increases sanding depth on the game board's edge.)

5 Using a $\frac{5}{16}$ " round-over bit, rout along both edges of the board. Finish-sand the board.

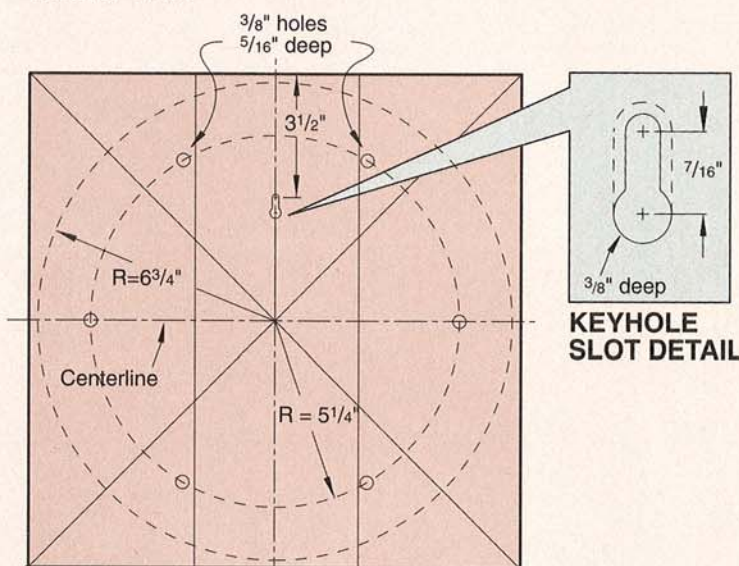
BUILD THIS ATTRACTIVE WALL MOUNT FOR YOUR GAME BOARD

1 From $\frac{3}{4}$ "-thick stock (we chose walnut), cut a $4\frac{1}{2}\times 27$ " piece. Sand both faces of this board with 150-grit sandpaper. Next, lay out the six grooves on the board, using the dimensions on the Wall Mount drawing on page 24. (To do this,

GAME BOARD



FRONT VIEW



BACK VIEW

we scribed one line to mark the location of the top edge of each groove.)

2 Set your keyhole slot-cutting bit to cut as dimensioned on the Router Setup drawing on page 25. Measure from the edge of the bit to the edge of your router's base to determine the fence position. From $\frac{1}{2}$ "-thick scrap, cut a $\frac{9}{16}$ "-wide and 6"-long spacer.

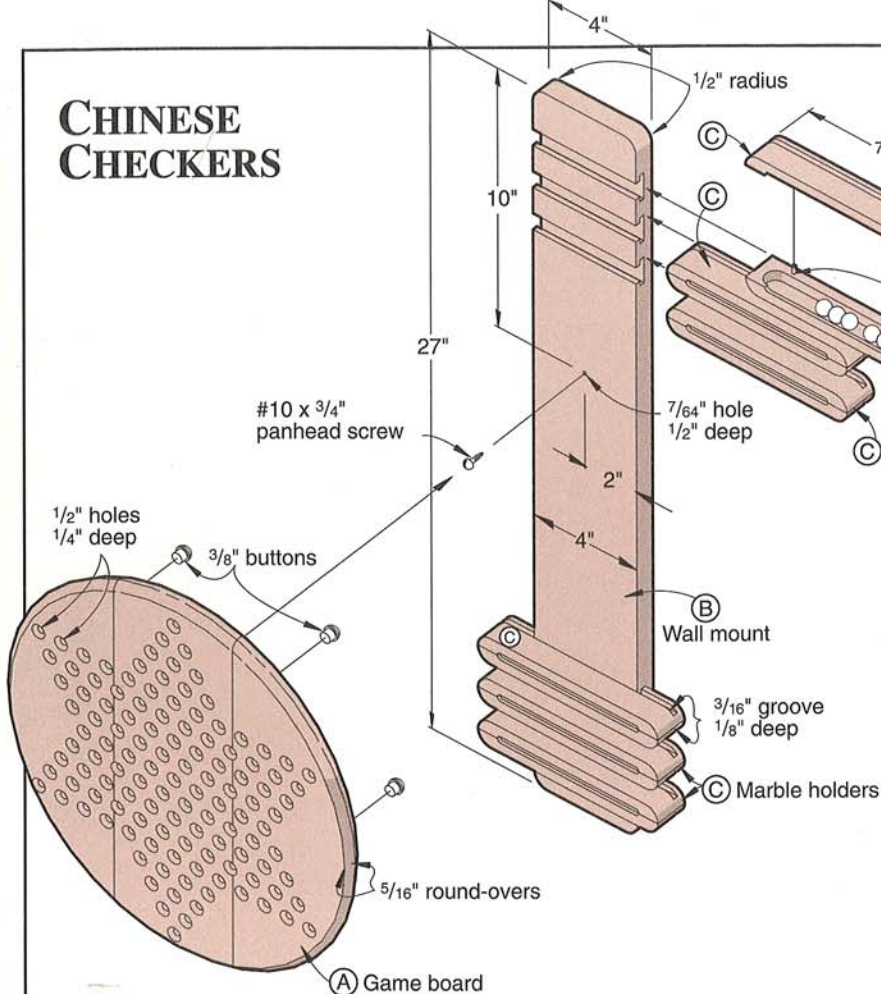
3 To rout the first slot, place the workpiece on your bench. Clamp the fence at the necessary distance from the slot edge (determined in the previous step) as shown bottom right, page 24. Place the spacer you made in the previous step between the fence and the router's base.

Continued

TIP We suggest you saw the game board on your bandsaw. However, if you prefer, you may shape the board using a hand-held router, straight bit, and trammel base.

TIP When cutting keyhole slots, always let your router bit come to a full stop before removing it from the slot.

CHINESE CHECKERS



Make the first pass with your router. Next, remove the spacer, and make a second router pass. Now, carefully rout away any wood remaining between the two grooves by making additional router passes.

4 Move the fence to the second slot line and repeat the procedures. Rout the four remaining slots the same way.

BILL OF MATERIALS

Part	Finished Size*			Matl.	Qty.
	T	W	L		
A board	3/4"	13 1/2" dia.		M	1
B wall mount	3/4"	4"	27"	W	1
C holder	1/2"	1 1/4"	7"	C	12

*Cut parts to final dimensions during construction. Please read all instructions before cutting.

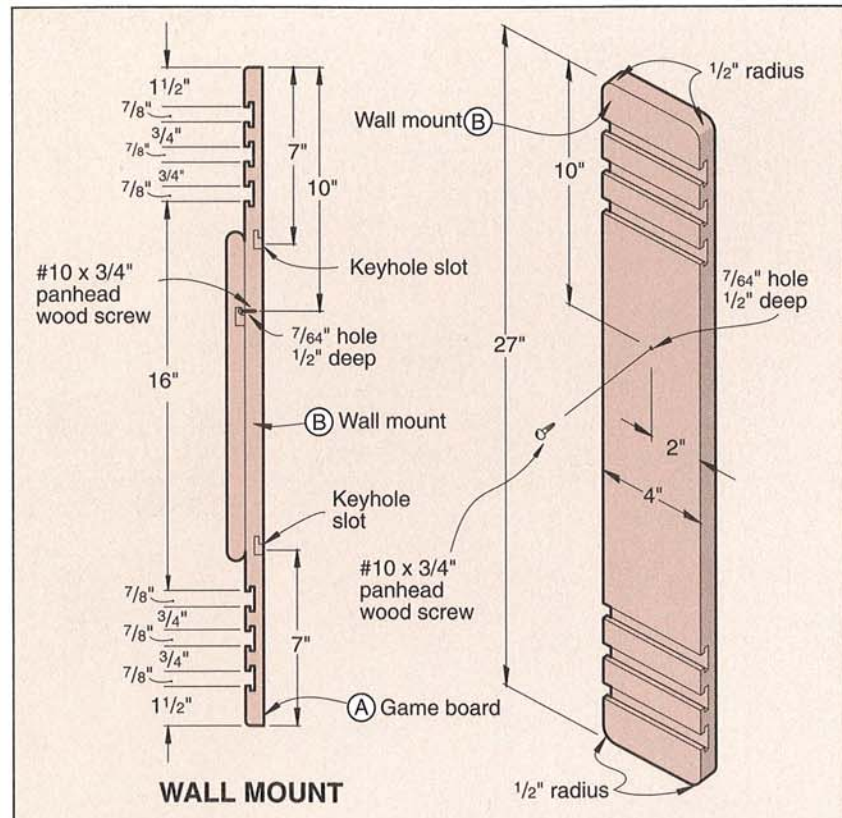
Material key: M—maple; W—walnut; C—cherry

Supplies: #10x3/4" and #10x2" panhead screws, six 3/8" mushroom-type screw-hole buttons, six sets of 10 marbles, finish.

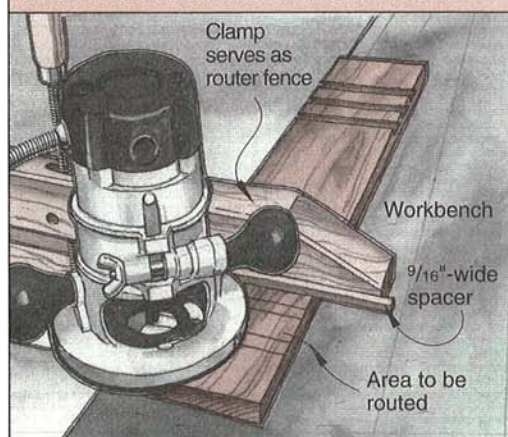
Buying Guide

•Keyhole router bit. Carbide-tipped, 1/2" diameter, 1/4" shank. Price: \$10.99 plus \$4.95 shipping. From: Eagle America, P.O. Box 1099, Chardon, OH 44024. Telephone: 800/872-2511.

•Marble assortment for Chinese checkers. Six sets of 10 marbles. Catalog no. 8018. Price: \$4.39 plus \$3.95 shipping. From: Meisel Hardware Specialties, P.O. Box 70-WEW, Mound, MN 55364-0070.



ROUTING SLOTS IN THE WALL MOUNT



5 Rip or plane the wall mount to final width. (We trimmed both edges.) Next, lay out the $\frac{1}{2}$ "-radius corners, and then saw and sand them to shape. Rout the two keyhole slots into the mount's back 7" from each end. Now, drill the screw hole in the front face.

WITH THESE HOLDERS, YOU WON'T HAVE TO HUNT FOR THE MARBLES

1 Rip and crosscut two $\frac{3}{4}$ "-thick boards to $1\frac{1}{4}\times 96$ ". (We chose cherry.) Now, scribe lines across both, the first starting at 4" from the end and the others at 8" intervals.

2 To form the marble grooves, first make the router template shown on page 26. Place it over one of the $1\frac{1}{4}$ "-wide boards as shown at right, align the centermark of the template with the first line on the board, and clamp the template in place. Next, using a $\frac{3}{4}$ " core-box bit, rout the $\frac{3}{8}$ "-deep groove. See the Marble Holder drawing on page 26 for details. Using a sharp carbide bit will help minimize wood burning.

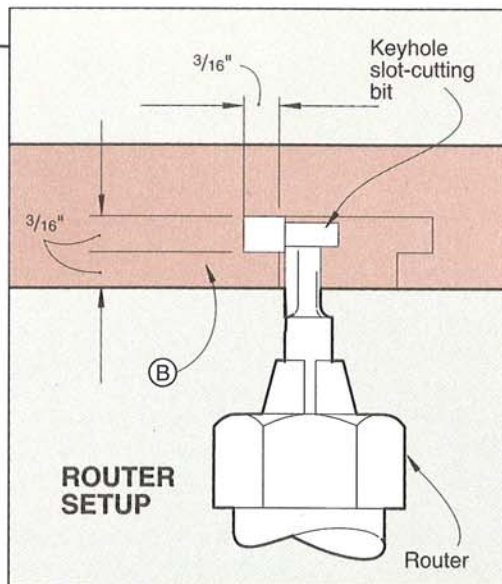
3 Move the template to align with the next line, and rout the second groove the same way. Rout the remaining grooves on both boards following these procedures. Crosscut the holders to rough length for easier handling.

4 To cut the holder halves to uniform length, first set a stopblock on your saw's miter gauge $3\frac{1}{2}$ " from the blade as shown below right. Next, align the centerline of each holder with the stopblock, and crosscut one end on each holder. Mark the untrimmed ends. Now, set the stopblock at 7", and saw off the marked ends.

5 Using your tablesaw and a $\frac{1}{8}$ "-thick blade, cut the $\frac{3}{16}$ "-wide and $\frac{3}{32}$ "-deep groove on the outside of two holder halves where shown on the Marble Holder drawing. Note that this requires two passes with a $\frac{1}{8}$ "-thick blade. Put the two halves together face-to-face, and insert them in the wall mount slots to test-fit. Make saw adjustments if necessary for a good fit. Then, cut the grooves in your remaining holders.

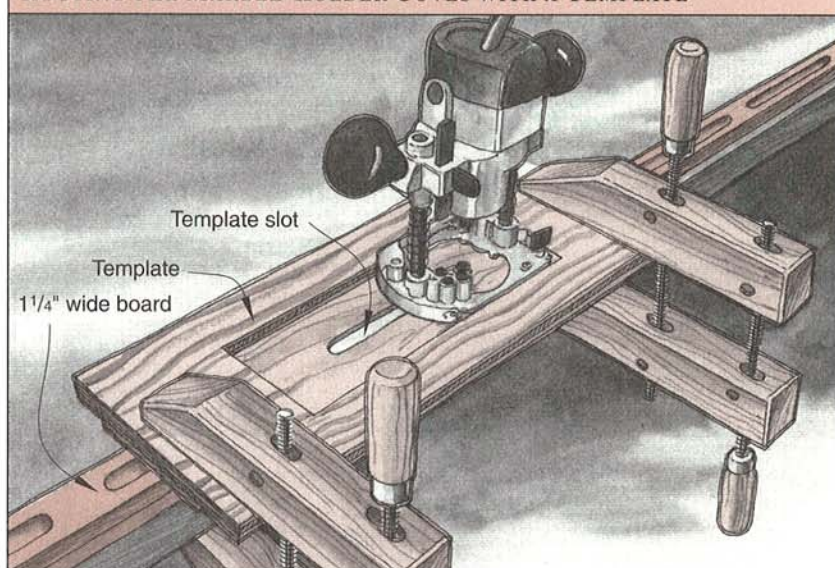
6 Cut a piece of $\frac{3}{4}$ "-thick plywood to 12×14 ". Make certain that the plywood has a solid edge free of voids, and then glue sandpaper to the top face. Nail a fence across the plywood parallel to the front edge and exactly 7" back from

Continued

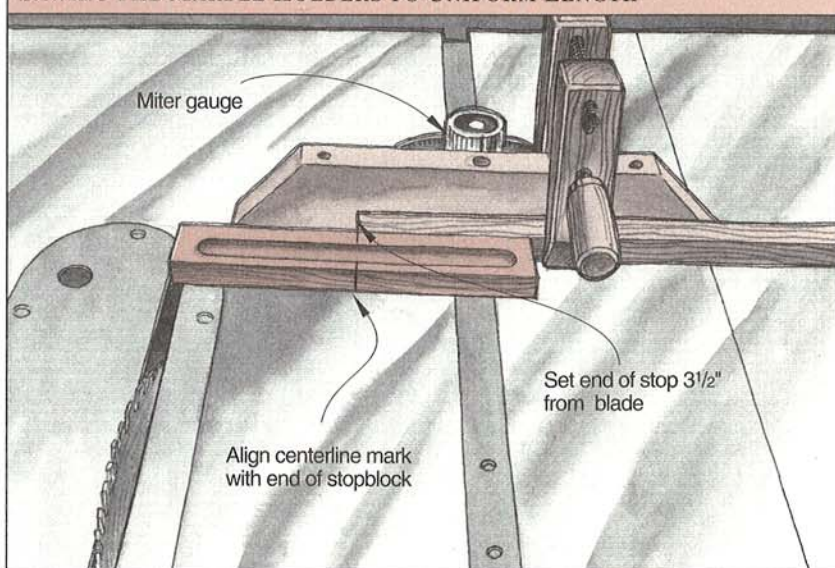


TIP The slots in the wall mount and the grooves in the marble holders were sized to match the cuts made by the keyhole slot-cutting router bit listed in the Buying Guide. If you use a different bit, you may have to change the dimensions on these parts.

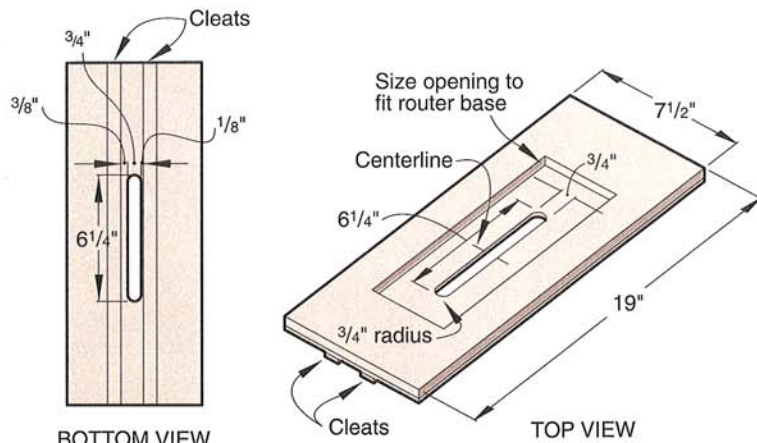
ROUTING THE MARBLE-HOLDER COVES WITH A TEMPLATE



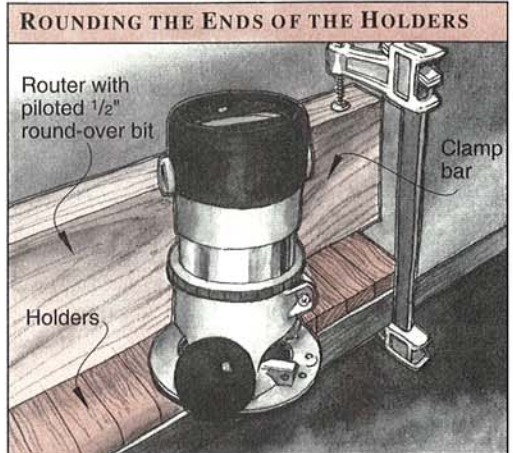
SAWING THE MARBLE HOLDERS TO UNIFORM LENGTH



CHINESE CHECKERS



ROUTER TEMPLATE



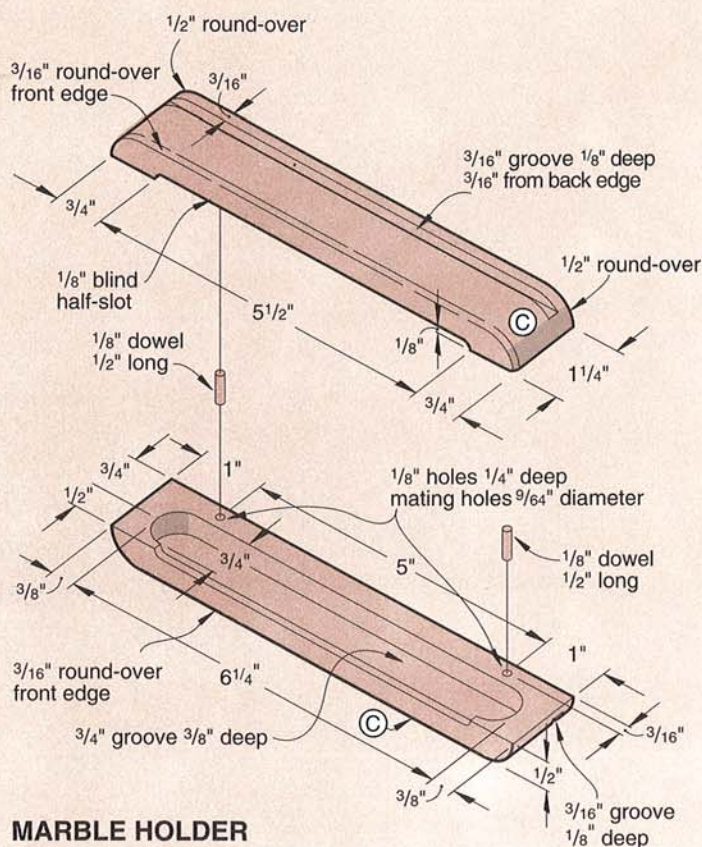
it. Next, place half of the holders side-by-side with the 3/4" groove face down on the sandpaper. Then, press them tightly together, and tack scrap strips along both edges. (The strips also keep the bit from tearing the edges of the outside holders.) Now, clamp a plywood bar across the holders to secure them firmly.

7 Using a piloted 1/2" round-over bit, rout the exposed edges of the holder halves as shown above. Sand the rounded ends. (We used our pad sander.) Next, turn the holder halves end-for-end, reverse the side cleats, and round over and sand the exposed holder ends. Finally, shape the remaining holder halves the same way.

8 Table-mount your router, and set a 1/4" straight bit to cut 3/16" deep. Place the fence on the right side so it touches the bit, and as shown at right, set stopblocks 3 1/2" in front and in back of the bit. Start the router, place a holder (coved face) against the fence (groove at top), and lower it down onto the bit. Rout the blind half-slot along the edge where shown on the Marble Holder drawing. Test-rout two holder halves, and join their mating faces to determine if the stopblocks need to be reset. Adjust if needed. Now, rout the half-slot in each holder half. (We made two passes—the first to cut the slot, the second to clean up the edge.)

Note: To drill the mating dowel holes accurately into the holders, you need to set all stopblocks from the same edge. The next two steps and the 2-step drawings opposite explain how to do this.

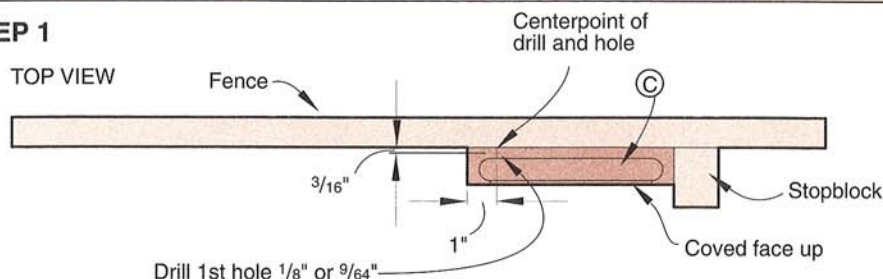
9 Clamp a fence to your drill-press table 3/16" from the hole centerpoint. Set a stopblock to locate the first hole 1" from the end as shown on the Step 1 Drilling Holders drawing opposite. Next, using this setup, drill a 1/8" hole 1/4" deep into half of your holders. Switch to a 9/64" bit, and without moving the fence or stopblock, drill a



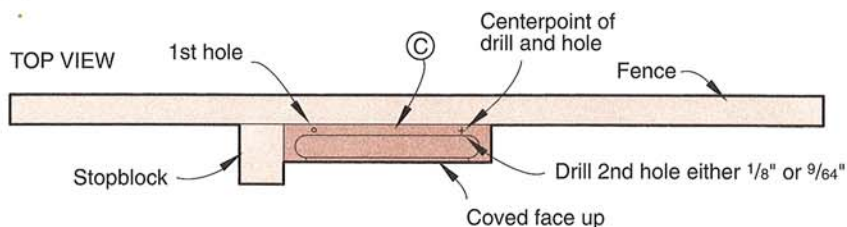
MARBLE HOLDER

DRILLING HOLDERS

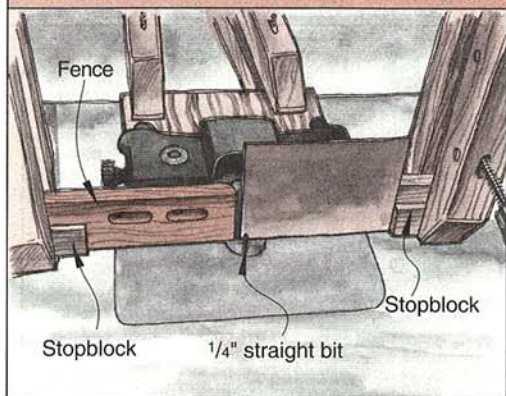
STEP 1



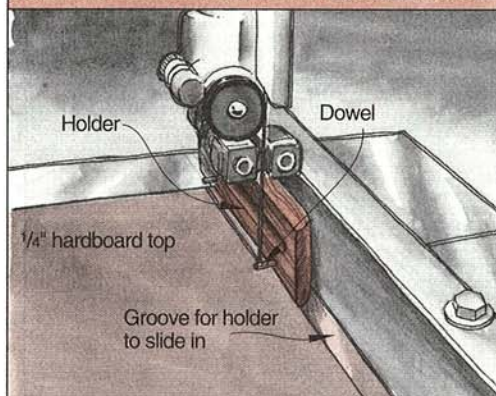
STEP 2



SETTING ROUTER TO CUT BLIND SLOTS



SAWING DOWELS TO THE FINAL LENGTH



$\frac{9}{64}$ " hole in the remaining half of the holders. To avoid confusion later, separate the holders with differently sized holes as you drill.

10 Take the last holder you drilled, and continue the $\frac{9}{64}$ " hole all the way through it. Next, flip this holder end-for-end and turn it upside down. Center the bit in that hole. Move the stopblock and clamp it to the opposite end of the holder as shown on the Step 2 drawing. Using that setup, drill the second $\frac{9}{64}$ " hole in the holders with that size of hole. Then, switch back to a $\frac{1}{8}$ " bit, and drill the second hole in the holders with the $\frac{1}{8}$ " holes.

11 From a $\frac{1}{8}$ " dowel, cut twelve $\frac{3}{4}$ " lengths and glue them in the $\frac{1}{8}$ " holes. Next, saw the dowels to a final length of $\frac{3}{16}$ ". (As shown above right, we placed an auxiliary hardboard top on our bandsaw and set the fence to cut the dowels uniformly to the desired length.) Sand the tips of each dowel to chamfer them slightly.

NOW'S THE TIME TO ADD YOUR OWN FINISHING TOUCHES

1 Finish-sand all parts with 150- and 180-grit sandpaper. Plug the small hole in the center of the game board. (We glued in a round toothpick and sanded it flush.) Next, apply the finish of your choice. (We applied one coat of sanding sealer, let it dry, and then sanded with 320-grit sandpaper. Later, we applied two coats of clear polyurethane, sanding between coats.)

2 Glue $\frac{3}{8}$ " mushroom-type screw-hole buttons into the holes in the underside of your game board. Drive a #10 $\times\frac{3}{4}$ " panhead screw into the wall mount where shown, allowing the head to protrude about $\frac{1}{4}$ " above the surface. Hang the game board on this screw and adjust the screw depth. To prepare the wall mount, drive #10 $\times 2$ " panhead screws into the wall to match the position of the keyhole slots in the mount board. Now, hang the wall-mount board over these two screws. Adjust if necessary. ■

TIP The marble holders require accurate machining to make the pieces identical and interchangeable. You'll need 12 holder halves or six pairs, but we suggest you make extras so you have some for testing the setups or in case you damage one or two while making them.

Project design: Bob Colpetzer, Clinton, Tenn.
Illustrations: Roxanne LeMoine; Carson Ode
Project builder: Chuck Hedlund

CHINESE CHECKERS

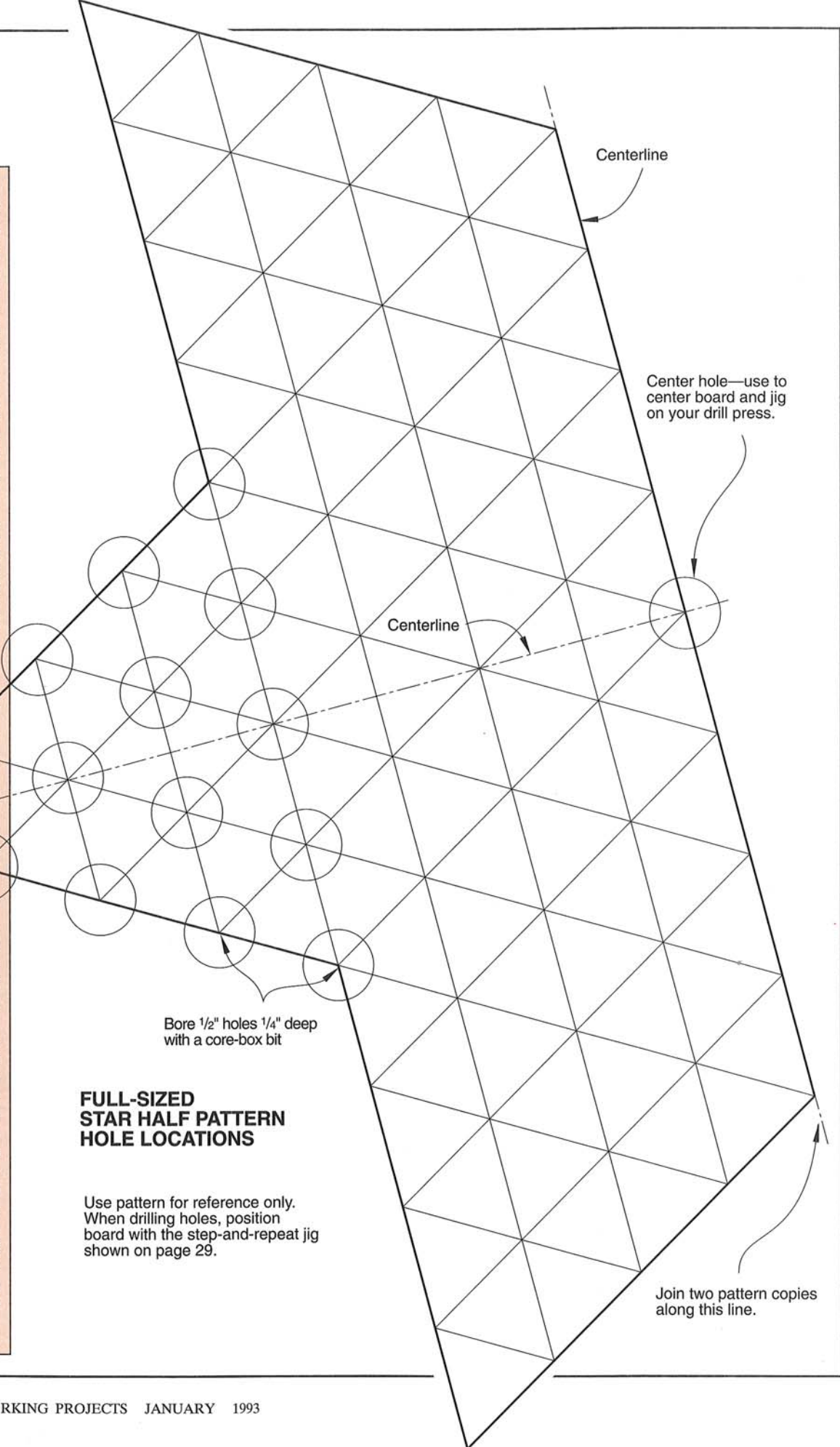
A Winning Strategy

If it has been a few years since you last played this game, take time out for a rules and strategy refresher. First, remember that two to six people may play. To start, each player selects a home triangle and fills its holes with 10 identically colored marbles. Then, taking turns, each player moves the marbles, one at a time, from his or her home triangle to the one across the playing field. The first player completing the transfer wins.

A turn consists of moving one marble. You may move it one hole or jump over one marble or series of marbles during a turn. You may jump over your own marbles or those of opponents. You may move any marble in any direction as long as you have

at least one open hole for it and you move in a straight line. You cannot jump over two or more adjacent marbles or over two or more adjacent empty holes.

A winning approach: Build a continuous line of marbles as you advance across the playing field using your own marbles and those of other players. Move a marble across this "bridge" as far as possible at each turn. Concentrate on moving your marbles rather than on slowing the advance of opponents' marbles. You cannot hold marbles in your triangle indefinitely to prevent an opponent from moving in his or her marbles.



FULL-SIZED STAR HALF PATTERN HOLE LOCATIONS

Use pattern for reference only. When drilling holes, position board with the step-and-repeat jig shown on page 29.

Make drilling repetitive holes fast and accurate

Step & Repeat Jig

1 Construct the jig shown *below* from $\frac{1}{2}$ "- or $\frac{3}{4}$ "-thick plywood. Saw the $\frac{1}{8}$ " kerfs.

2 From $\frac{1}{8}$ "-thick hardboard, cut two $\frac{3}{4} \times 17$ " strips. Insert these strips into the plywood grooves. From the same hardboard, cut eight $\frac{3}{4} \times 12$ " strips, six $\frac{7}{8} \times 12$ " strips, one $\frac{7}{16} \times 12$ " strip, and one $5\frac{1}{4} \times 12$ " strip.

3 Place the jig on your drill-press table with the hardboard fences at your right and against the drill-press post. Insert a $\frac{1}{16}$ " bit in the chuck. Put the game board on the jig, and place the $\frac{7}{16}$ "- and $5\frac{3}{16}$ "-wide hardboard spacers between the right fence and the game board's right edge. Push the game board firmly against the fence and spacers, and then clamp it to the jig.

4 Move the jig to center the drill bit over the star pattern centerpoint as shown at *right*. Then, clamp the jig to the drill-press table.

5 Drill a $\frac{1}{16}$ " hole through the pattern center and the board. (We locked down the drill's quill to hold the board in place.) To bolt the jig to the drill-press table, mark centerpoints for two bolt holes from underneath the table. Drill and counterbore $\frac{5}{16}$ " holes through the jig where marked. Insert 2"-long $\frac{1}{4}$ " machine bolts through the holes and table, and loosely tighten the nuts.

6 Place the game board on the jig again. Position the $\frac{7}{16}$ "-wide and the $5\frac{3}{16}$ "-wide hardboard spacers at the board's right edge. Now, lower the drill bit and move the jig (move the drill-press table, too, if needed) until the bit centers in the center-locating hole drilled in Step 5. After centering, tighten the machine-bolt nuts.

7 Without moving the jig or board, chuck a sharp (preferably carbide) $\frac{1}{2}$ " core-box router bit into your drill. Change your drill's speed setting to operate at the fastest RPM possible. (We ran our drill press at 2,470 RPM.)

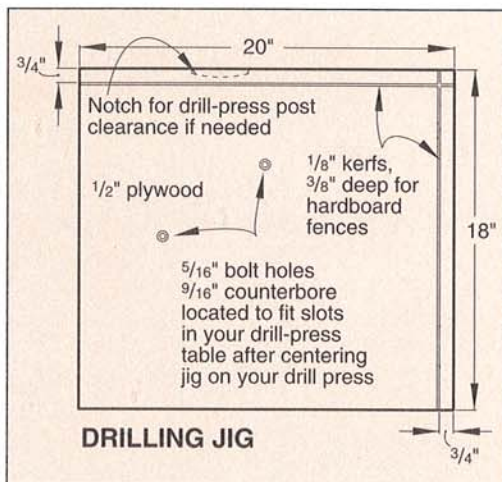
8 With the core-box bit centered over the pattern's center hole, bore a round-bottom hole $\frac{1}{4}$ " deep. Set the quill lock at this depth. (We substituted a scrap while determining and setting boring depth.)

9 To bore the second hole along the centerline, add a $\frac{7}{8}$ "-wide spacer at the right. Always push the board hard against the fence and spacers before boring the hole. To bore the next hole, add another $\frac{7}{8}$ "-wide spacer on the right side. Drill the remaining holes along the centerline by adding another $\frac{7}{8}$ "-wide spacer for each hole.

10 To bore holes left of the board's center, remove the $5\frac{3}{16}$ "-wide spacer, and use combinations of narrower spacers to step the board from row to row.

11 To bore holes in the second row, place a $\frac{3}{4}$ "-wide hardboard strip between the board and the back fence. Again, use a combination of spacers to step the board to the left in order to drill the holes where indicated on the pattern. Add another $\frac{3}{4}$ "-wide spacer to step the board away from the fence so the drill bit aligns over the third row as shown *below right*. Now, bore all of the remaining holes in this section of the board.

12 Turn the board 180° to place the undrilled pattern area against the jig's back fence. Place the $\frac{7}{16}$ "- and the $5\frac{3}{16}$ "-wide spacers between the right fence and the right edge of the board. Loosen the bolts holding the jig, and center the core-box bit in the center hole. Center and tighten the nuts. Bore the marble holes in that section following the same procedures used to form the holes in the first half. ■



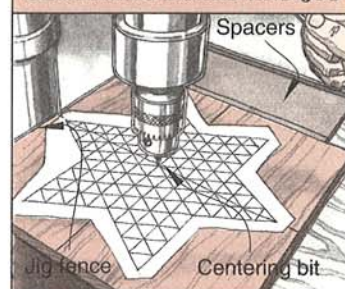
Build this simple, inexpensive jig to bore the marble holes in the Chinese checkers game board featured on pages 22-23. By changing the widths of the spacers, you can adapt it to drill repetitive, equally spaced holes in other game boards.

TIP After centering the game board and jig, we used the pattern as a guide only to indicate where the holes should be bored along the rows. Let the spacers position the board precisely for drilling each hole.

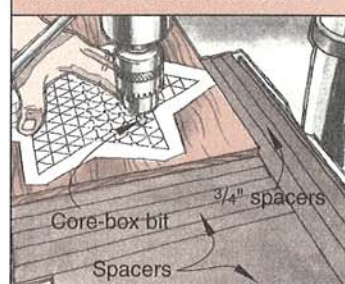
Supplies: $\frac{1}{8}$ "-thick hardboard, $\frac{1}{2}$ "- or $\frac{3}{4}$ "-thick plywood, $\frac{1}{4} \times 2$ " machine bolts with nuts and washers, $\frac{1}{2}$ " core-box router bit.

Jig designer: Chuck Hedlund, Des Moines
Illustrations: Roxanne LeMoine; Carson Ode

CENTERING BOARD AND JIG



BORING A MARBLE HOLE



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