

VOL. 5 NO. 2 • ISSUE 26

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FROM THE EDITORS OF WOOD[®] MAGAZINE

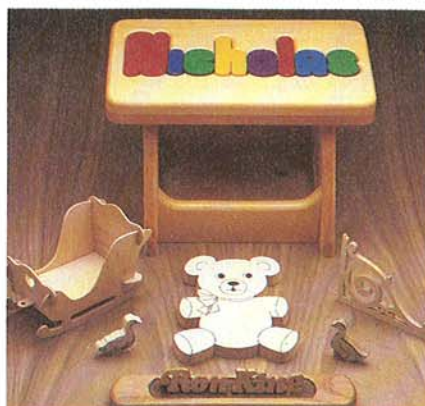


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FROM OUR SHOP

DEAR READER,

If you've walked around any crafts shows recently, you probably noticed that birdhouses aren't what they used to be. Today, you can find decorative homes for our feathered friends in all sizes, shapes, and colors. Some are so wild that you'd swear the design would scare away even the boldest bird.

For this issue, our staff decided to present a practical design, and then jazz up the same house with a decorative painting scheme. Besides being especially easy to construct, this house has special meaning to me because my grandfather, George C. Voss, designed it more than 60 years ago. If he could read this now....

Over the years, cabinetmakers at my grandfather's millwork shop built hundreds of wren houses much like the project on pages 10-13. (We altered the dimensions slightly to follow guidelines published by the United States Department of Interior.) My dad, who worked at the shop until World War II, recalls that the wren houses were a great project to fill time between big jobs and to shrink the scrap pile. Because the removable bottom made it easy to clean, Grampa's design was a popular one. "Your grandfather always had a few birdhouses around for walk-in customers," Dad remembers.



George Voss at his home lathe (1972)

I'm lucky to have grown up in the same small town where my grandparents lived. Grampa founded Voss Manufacturing Company in 1919, and his motto, printed on letterheads and painted proudly above the entrance, said it all: "If it's made of wood, we can make it." Was I proud? You bet!

Grampa was a self-made man who paid special attention to grandsons with an interest in woodworking. It always was a treat to spend a few hours at the millwork shop, where Grampa let me butcher some project of questionable value. He had plenty of opportunities (and reasons) to criticize my wood-

working, but he offered encouragement instead. Generally, he served up some valuable advice, such as, "That's lookin' better—now just sand 'till the sweat runs up your arm."

Too naive to question Grampa's wisdom, I kept checking my arms as I sanded—much to the delight of Grampa's employees. Despite the ribbing I endured (the fellows retold that story for years), I wouldn't trade away any of my days at Grampa's shop.

Carl Voss

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WOODWORKING PROJECTS STEP-BY-STEP
IN OUR SHOP. THEN, A SEASONED TEAM
OF EDITORS REVIEWS THE HOW-TO DIREC-
TIONS, TECHNICAL DRAWINGS, ILLUSTRAT-
IONS, AND BILL OF MATERIALS OF EACH
PROJECT TO MAKE SURE THE INSTRUCC-
TIONS WE PROVIDE TO YOU ARE CLEAR,
CONCISE, AND COMPLETE.

THE WEEKEND WOODWORKING PROJECTS STAFF

MPA

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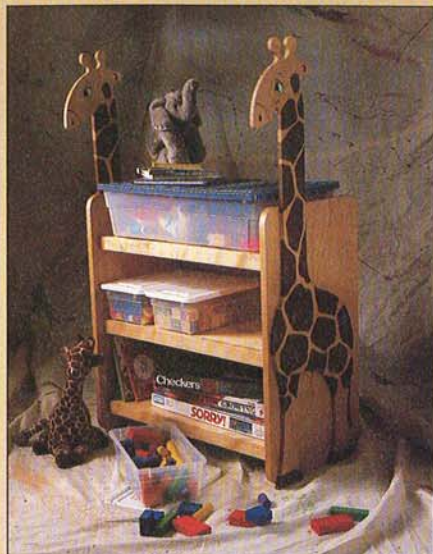
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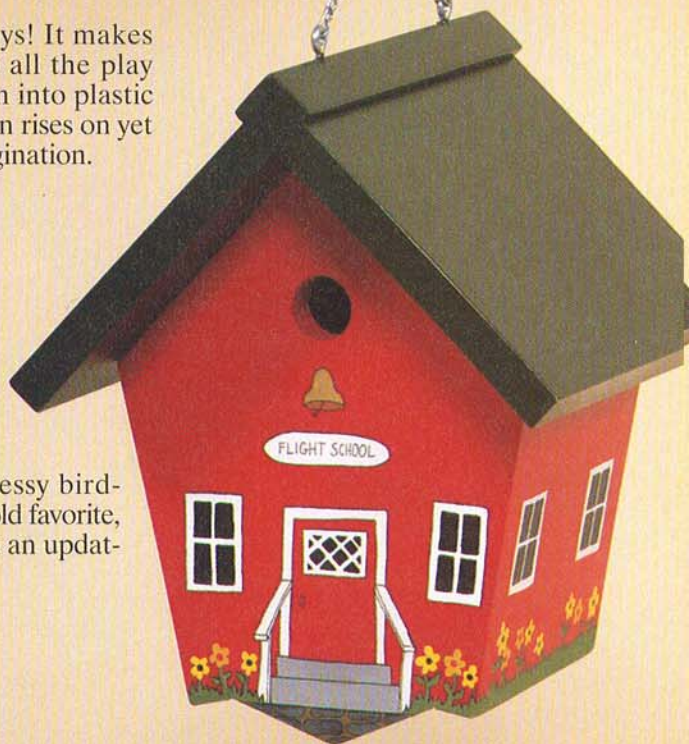


6 Safari shelves

Stop the hunting...for toys! It makes more sense to round up all the play pieces and then toss them into plastic lidded boxes—until the sun rises on yet another adventure in imagination.

10 Flight school

Tired of cleaning out messy bird-houses? We've revived an old favorite, and then presented it with an updated paint scheme, too.



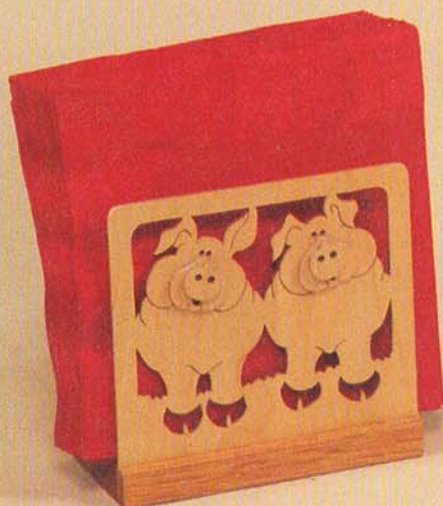
CHECK OUT THESE TIPS AND JIGS

- Positioning shelves with scrap spacers—page 7
- Hints for scrollsawing thin stock—page 14
- Using brass tubing for shaft bushings—page 26
- Epoxying bolts in perpendicular position—page 27

Note: To find these tips, turn to the indicated pages and look for the tinted step number or note.

14 Piggy napkin holder

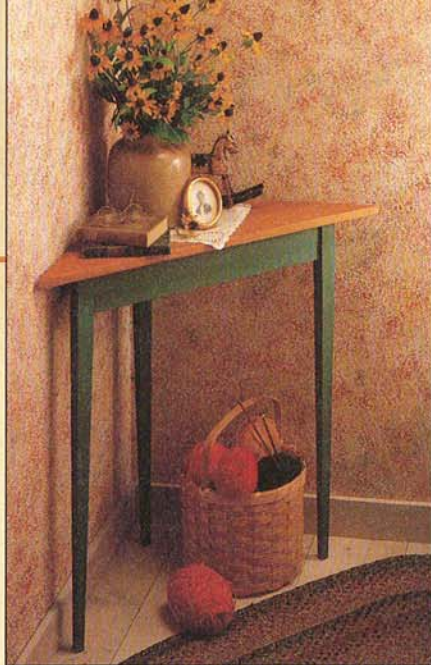
Have great fun at your next family gathering with a scrollsawed napkin holder featuring two adorable pigs.



16 Sign of hospitality

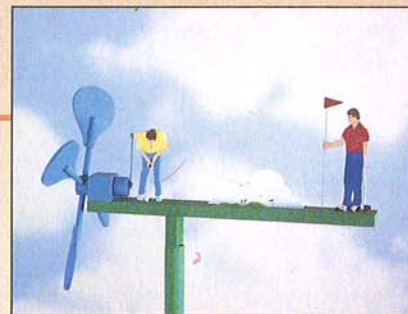
Welcome friends and relatives to your home with a warm and cheery greeting cut from 3/4"-thick native hardwood.





18 Corner classic

The simplicity of tapered legs, plus an eye-appealing paint-and-stain scheme, equals a table with loads of practicality and charm.

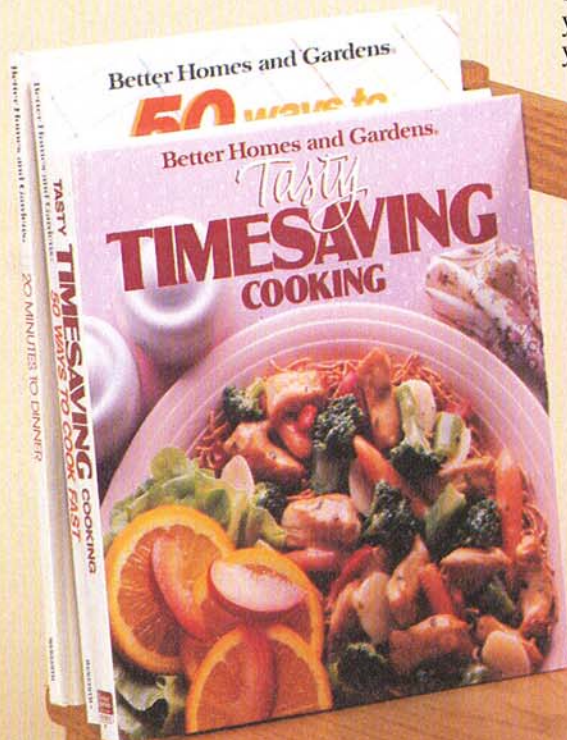


26 Putting for par

As long as there's a breeze, our whirligig golfer has lots of chances to sink his putt. Our how-to instructions have all the details you'll need to engineer this backyard project.

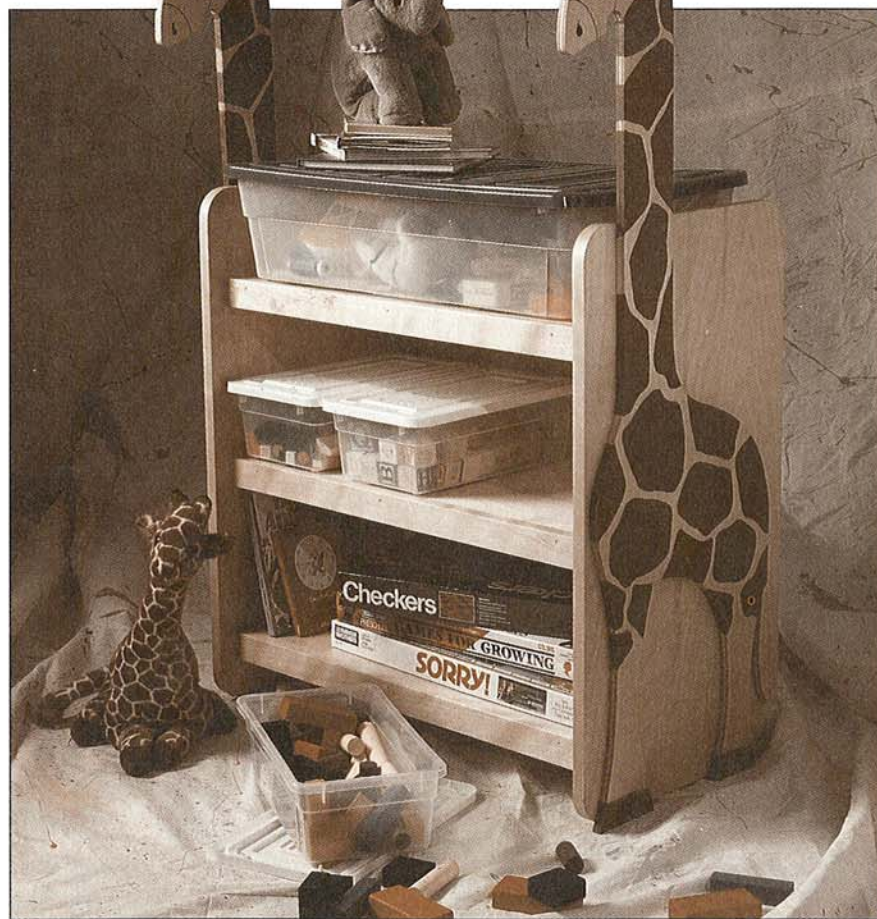
22 Organized-cook's companion

If your favorite kitchen wizard needs a better way to arrange recipe cards and books, here's the perfect solution. Whether you hang this shelf on the wall or keep it handy on the counter, favorite recipes will always be right by your side.



Toy organization from a higher point of view

SAFARI SHELVES



Stop the hunting...for toys! It makes more sense to round up all the pieces and put them in plastic storage boxes—until the sun rises on yet another adventure in imagination.

Cut the cabinet parts first

1 Using the dimensions listed on the Bill of Materials, rip and crosscut two ends (A), one back (B), and three shelves (C) from $\frac{3}{4}$ "-thick plywood. (We used birch.) See the Cutting diagram *opposite* for how we laid out the parts on our stock.

Note: We sized each shelf to conveniently hold one large $5\frac{7}{8} \times 14 \times 28$ " under-the-bed storage box, or three shoe-box-sized $4\frac{1}{2} \times 7\frac{1}{2} \times 13$ " plastic storage containers. Box sizes vary among manufacturers, so we suggest you buy the boxes first, and if necessary, adjust your cabinet dimensions to accommodate them.

2 With a compass, scribe a $1\frac{1}{2}$ " radius on the corners of both end panels. Cut these corners with a sabersaw, sawing just outside the line. Next, sand each corner to the line. (We used our disc sander as shown *below right*.) Sand carefully to keep the edge square for ease in installing the plywood veneer edging tape.

3 To finish the end-panel edges, measure the perimeter of one panel, and then cut two strips of $\frac{1}{2}$ "-wide plywood veneer edging to that length plus 1". (We bought birch veneer edging at a homecenter.) Brush two light coats of contact adhesive evenly on the inside face of each veneer strip and along the edges of both end panels. If you aren't familiar with contact adhesives, follow the directions on the product label, and test on scrap first. When the adhesive reaches the right tack (according to label directions), start at the bottom and apply the edging to the end panels as shown at *far right*. Trim off the excess with scissors or knife.

4 Adhere a strip of veneer plywood edging to the top edge of the back panel, using the same technique. Now, carefully sand the panel edges with 220-grit sandpaper.

5 From $\frac{3}{4}$ "-thick solid stock (we used birch), rip and crosscut three $1\frac{1}{2} \times 25\frac{1}{4}$ " shelf aprons (D). Glue and nail one apron to the front edge of each shelf, aligning the aprons along the top edge and at the ends. (For this, we used yellow woodworker's glue and 6d finish nails.) Now, finish-sand all parts.

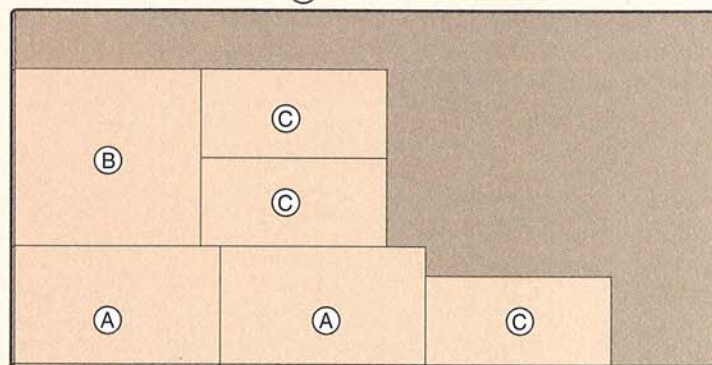
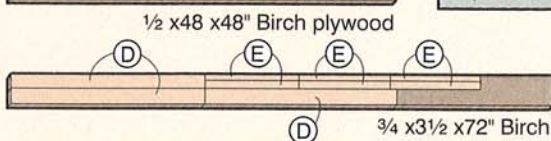
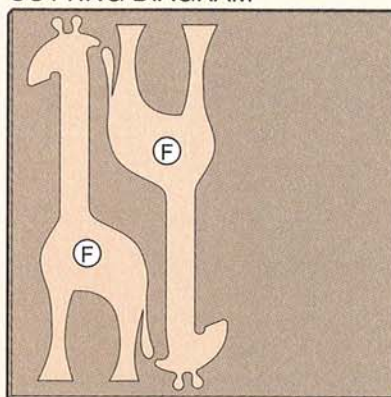
6 From the same hardwood stock, rip and crosscut six $\frac{3}{4} \times \frac{3}{4} \times 12\frac{1}{4}$ " support cleats (E). Next, drill $\frac{5}{32}$ " shank holes in each cleat so you can attach them to the side panels and to the shelves. Now, screw a pair of cleats to the underside of each shelf, aligning each with the shelf end.

7 From scrap, cut a 1"-wide 24"-long spacer, a $2\frac{1}{4}$ "-wide 15"-long spacer, and two $8\frac{1}{4}$ "-square spacers. You'll use them to space the shelves when assembling the cabinet.

Let's assemble the cabinet

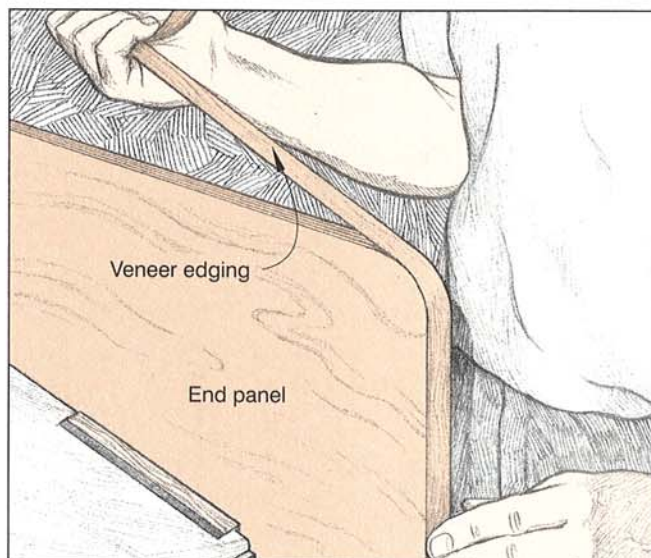
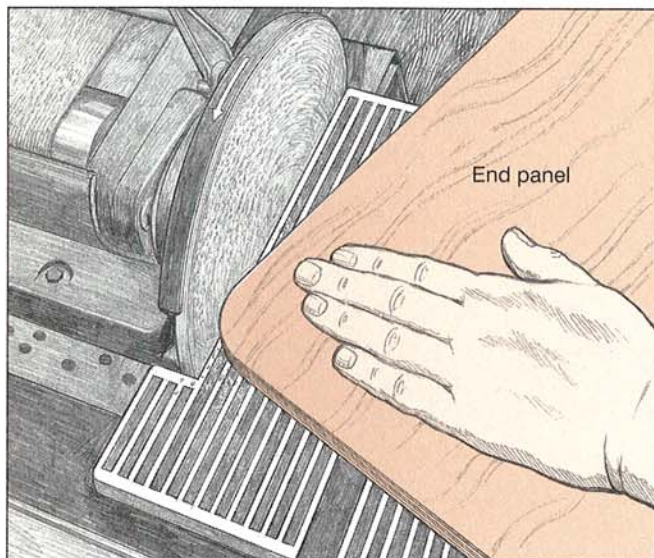
1 Lay an end panel on its side. Align the 1"-wide spacer along the back edge and clamp it in place. Clamp the $2\frac{1}{4}$ "-wide spacer along the

CUTTING DIAGRAM



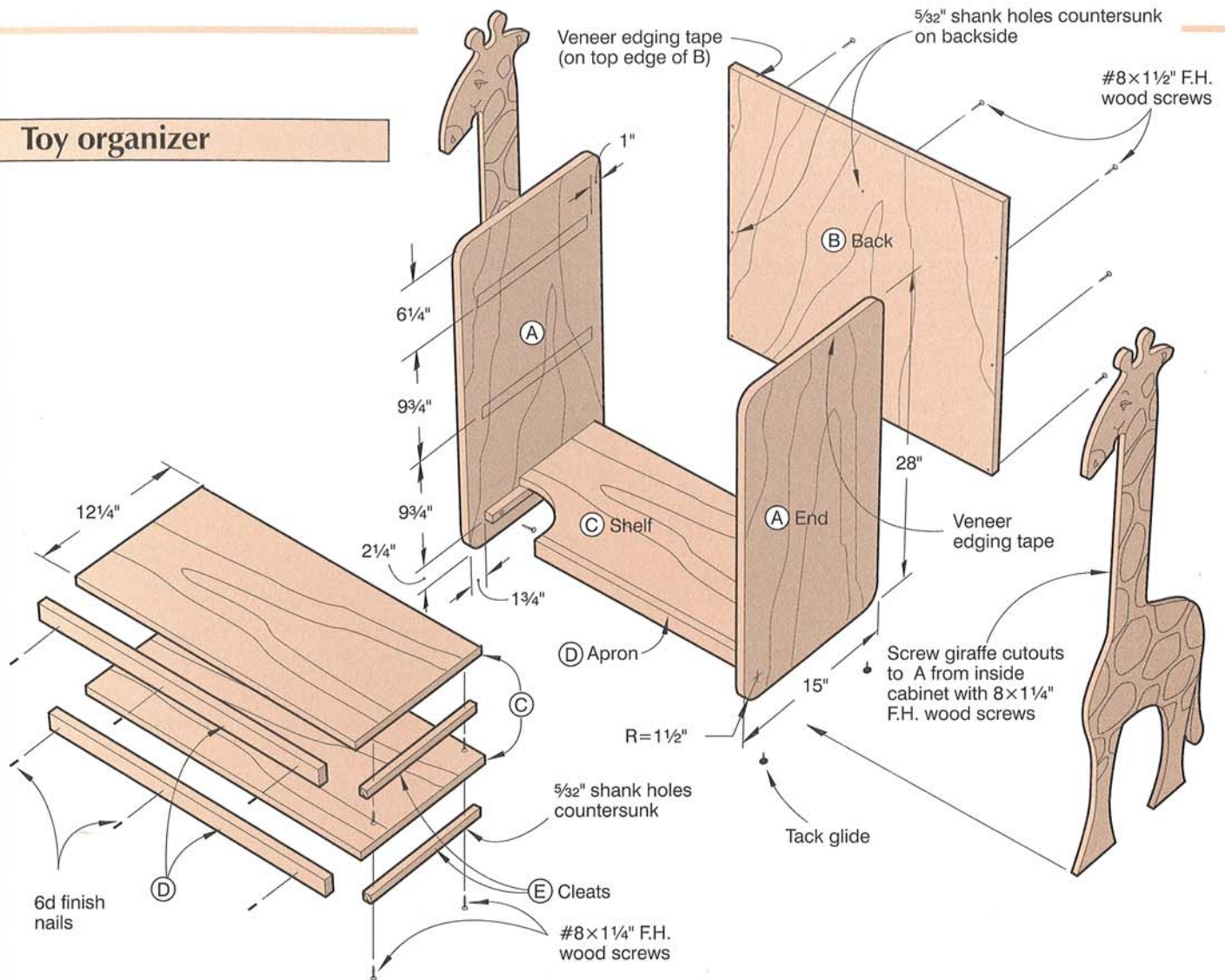
BILL OF MATERIALS					
Part	Finished Size			Matl.	Qty.
	T	W	L		
A end	$\frac{3}{4}$ "	15"	28"	P	2
B back	$\frac{3}{4}$ "	$25\frac{1}{4}$ "	$24\frac{1}{8}$ "	P	1
C shelf	$\frac{3}{4}$ "	$12\frac{1}{4}$ "	$25\frac{1}{4}$ "	P	3
D apron	$\frac{3}{4}$ "	$1\frac{1}{2}$ "	$25\frac{1}{4}$ "	B	3
E cleat	$\frac{3}{4}$ "	$\frac{3}{4}$ "	$12\frac{1}{4}$ "	B	6
F giraffe	$\frac{1}{2}$ "	$15\frac{1}{2}$ "	$44\frac{1}{2}$ "	P	2

Material key: B—birch; P—birch plywood
Supplies: #8 $\times$ 1 $\frac{1}{4}$ " and 1 $\frac{1}{2}$ " flathead wood screws, four— $\frac{7}{8}$ " tack glides, $1\frac{3}{16}$ " $\times$ 8" plywood edging, 6d finish nails, contact adhesive, paint, finish, plastic storage boxes.



Continued

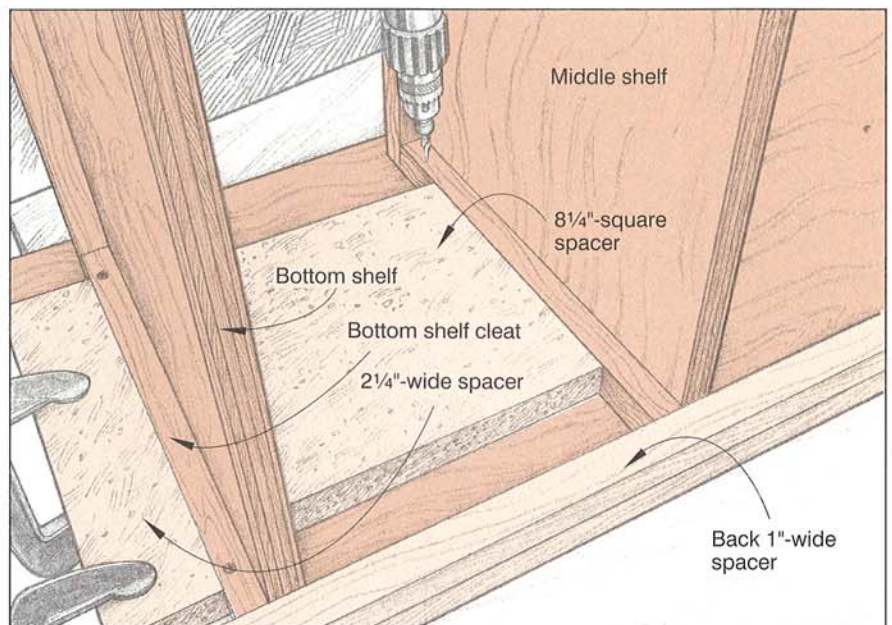
Toy organizer



bottom of the panel. Now, position the bottom shelf against the spacers and screw the bottom shelf cleat to the end as shown on the Exploded View drawing above. (We used #8x1 1/4" flathead wood screws.)

2 Stand the remaining two shelves on the end panel with the back edge against the 1"-wide spacer. Place your two 8 1/4"-square spacers between the shelves as shown at right. Screw a shelf cleat to each end. Next, turn the cabinet end for end. Attach each shelf to the second end, using the same spacers and techniques to position and attach them.

3 Remove the spacers, lay the cabinet on its front, and square the case. (We used a framing square and measured diagonally from corner to corner.) Next, lay the back panel



(with best face down) over the back edge of the shelves, aligning the bottom edge with the bottom of the shelf cleats. Now, locate the shelves, and then drill and countersink $\frac{5}{32}$ " shank holes through the back. Drill $\frac{7}{64}$ " pilot holes into the shelves. (We drilled three holes into each.) Drive a #8x1½" flathead wood screw in each hole.

Shape the giraffes next

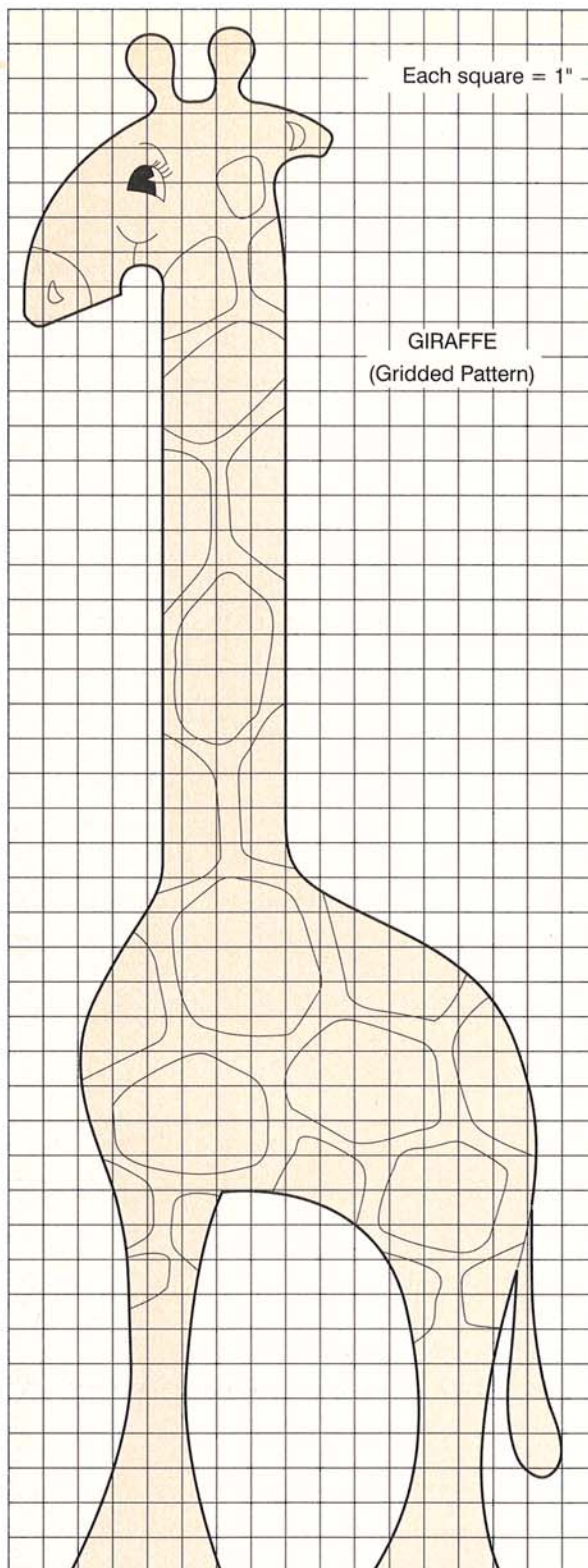
1 To make a full-sized giraffe pattern, first tape together sheets of paper to form a 17x45" rectangle. Now, start at a corner and scribe 1" squares across the entire surface of the paper.

Note: Because of the giraffe's size, we can't provide a full-sized pattern of it in the magazine. However, if you'd like to work with a full-sized pattern, see the box below right for information on how to mail-order one.

2 Using the gridded Giraffe pattern at right as your guide, draw the giraffe outline, eyes, nose, mouth, and spots onto your gridded paper. (When working with gridded patterns, we first plot the points where the pattern lines cross the grid lines. Then, we draw the lines connecting the points. We use French curves to help draw the curving pattern lines.)

3 With scissors, cut around the pattern, leaving about a 1" margin. Using transfer or carbon paper, trace one outline and all body details onto your ½"-thick birch plywood. Turn the pattern over and trace a second giraffe. Now, using a sabersaw, saw both giraffes (F) to shape. Sand the cut edges on both giraffe cutouts.

4 Position your pattern on the opposite side of each cutout.



GIRAFFE
(Gridded Pattern)

Next, transfer the body spots, the eyes, and all other facial features to the portion of each giraffe that extends above the cabinet.

Now, finish the cabinet and paint your giraffes

1 Erase unwanted marks on the giraffes. Next, seal the wood surface (we applied a light coat of sanding sealer), let it dry, and then paint the black-and-white eyes, the brown body spots, and brown facial lines. (We used acrylic paints available at crafts stores.) After the paints dry, seal the surfaces with clear polyurethane or lacquer.

2 Apply the finish of your choice to the cabinet. (We left the birch unstained. Then we applied one coat of sanding sealer and two coats of clear polyurethane, sanding after each application dried with 320-grit sandpaper.)

3 Drive tack glides into the bottom edge of each end panel, centering them 3" in from each corner. If you wish to make the cabinet more maneuverable, simply attach casters to the bottom of the panels instead. Next, attach the giraffes to the ends. (We clamped them in place, and then drilled screw holes from the inside of the cabinet. After countersinking each of these holes, we drove #8x1¼" flathead wood screws through the end panels and into the giraffes to secure them.)

4 Outfit the cabinet with the plastic storage boxes of your choice. You can buy reasonably priced clear or nearly clear plastic storage boxes similar to those we used on our shelves at stores that sell kitchen and household supplies. ■

To order a full-sized giraffe pattern:

Send \$1 for handling, and a self-addressed, business-sized envelope with 45 cents U.S. postage to:

Giraffe Pattern
Weekend Woodworking Projects
1912 Grand Ave.
Des Moines, IA 50309-3379

Birds love the accommodations; you'll treasure the convenience

FLIGHT SCHOOL

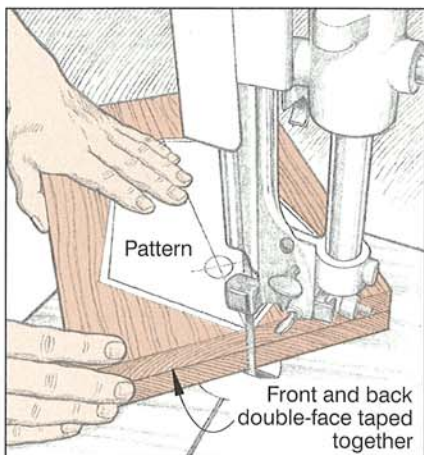
Here's a birdhouse design that always draws repeat visitors. And when it's time to clean out the house for a new family, you'll certainly enjoy the convenience of its easy-to-remove floor.



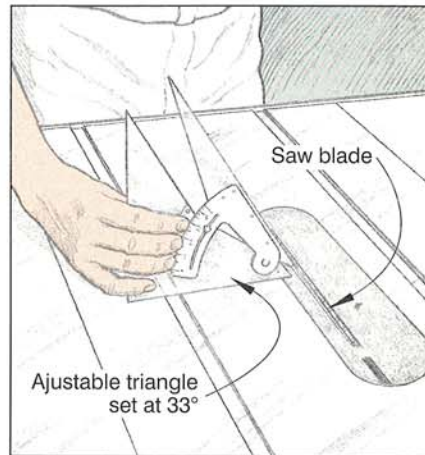
Note: The United States Department of Interior recommends specific house sizes to accommodate different bird species. We sized this birdhouse to fit chickadees and similar small nesting birds. If you desire to attract house wrens, make the entry hole 1" in diameter; for titmice, nuthatches, and downy woodpeckers, make it 1 1/4"; and for warblers, 1 1/2" in diameter. Proper sizing of the entry hole will help keep larger, unwanted birds from moving in and taking over the house.

First, let's cut out the parts

1 Rip and crosscut two pieces of 3/4"-thick stock (we used pine) to 7" wide and 10 1/2" long for the front and back (A) blanks. (Since this project only requires a small amount of wood, we raided our scrap-wood bin to find the needed material.) Stack the front and back blanks together face-to-face using double-faced tape. Now, draw diagonal lines to find and mark the centerline on the face of your front piece.



2 Make a copy of the full-sized Front pattern found on page 13. (We made a photocopy.) Cut out the pattern, leaving a 1/4-1/2" margin around all sides. Next, adhere your copy to the front piece, aligning the pattern's centerline with the centerline you just scribed on the front blank. (To adhere the pattern, we applied rubber cement sparingly on the pattern's back surface.)



3 Saw the front and back to shape. (As shown above left, we band-sawed the parts to shape, cutting just outside the pattern line. Then using our stationary belt sander, we sanded each cut edge to the line.)

4 To make the sides, (B), crosscut a 13" length from 7 1/4"-wide and 3/4"-thick stock. Next, tilt your saw blade to cut a 33° bevel. (As shown above, we used an adjustable triangle

Birdhouse

pieces, and bore the 1½"-diameter entry hole through the front. (We drilled all of the holes on our drill press.) Now, remove the pattern, and finish-sand all pieces.

2 Glue and nail the sides to the front and back. (We used Franklin's waterproof Titebond II glue and 6d finish nails.) Next, glue and nail the two roof pieces together. Center the roof on the house, and glue and nail it to the front and back. Set all nails. Glue the cap to the roof.

3 Place the floor piece inside the house, and turn it so it falls and wedges in place between the sides and front and back. Do not glue or nail the bottom. Sized correctly, it fits snugly in place, but allows you quick-and-easy access for cleaning.

4 Finish your house as you wish. If you enjoy the whimsical look, and wish to paint your birdhouse like our Flight School model pictured on page 10, transfer the painting part of the pattern onto the front, sides and back. You can use carbon or transfer paper for this. Paint the Flight School version using our color scheme listed at right, or create your own. If you prefer a simple paint job, use an exterior flat paint, and neutral colors such as gray, green, or light brown. You also may use exterior-grade wood stains and wood preservatives if you feel it needs additional protection. If you leave your house unfinished, the wood should eventually weather to a natural gray.

Note: Do not paint or finish the interior of your birdhouse. If you finish the outside, let the application weather outdoors for about a month before moving it to a permanent location.

5 To hang your birdhouse, drill ⅜" pilot holes through the cap and ½" deep into the roof where marked. Turn a ¼" screw eye into each hole, and attach chains or wires to them. If you prefer to mount it to a post or tree, screw a 4"-wide mounting board to the back, and then attach it to your mounting post. ■

Tried-and-true tips to attract birds to your yard

- Houses of this type draw birds that normally nest in cavities or holes they find in the wild. You also may attract birds that nest in trees, shrubs, and vines if you place houses near these kinds of plants. We deliberately sized this house to appeal to small nesters. To attract larger birds, you'll need to increase the floor area, deepen the cavity, and enlarge the entry hole. For more information, check reference books at your public library.

- Despite what you remember from your childhood, birdhouses shouldn't have perches. In fact, ornithologists—the people who make a career out of studying birds—say perches invite predators, allowing them to reach in and destroy eggs or kill the newly-hatched birds.

- You'll need to hang your birdhouse at specific heights in order to attract certain kinds of birds. For example, you'll discover chickadees and titmice typically nest between 6' and 15' feet above the ground; warblers, 4-7', most wrens, 6-10', and downy woodpeckers, 6-20'. Hang your birdhouse within these height ranges. Watch for activity, and change the height if you don't see desirable occupants.

- Birds apparently prefer to have their houses mounted to something solid, such as a post or tree trunk. If you mount your birdhouse, make certain predators such as rats, cats, or squirrels cannot get to it. If you hang it from a tree limb, suspend it from two lines for better stability.

- Orient your house so the entry hole faces away from prevailing winds. Also, locate the house so it will be shaded from direct sun during the hot part of the day.

- Clean the house at the end of each brooding period, or when undesirable birds move in. This prevents litter buildup, helps protect the eggs, and also keeps down parasites. When you clean, check that all vent and drainage holes are open, too.

BILL OF MATERIALS

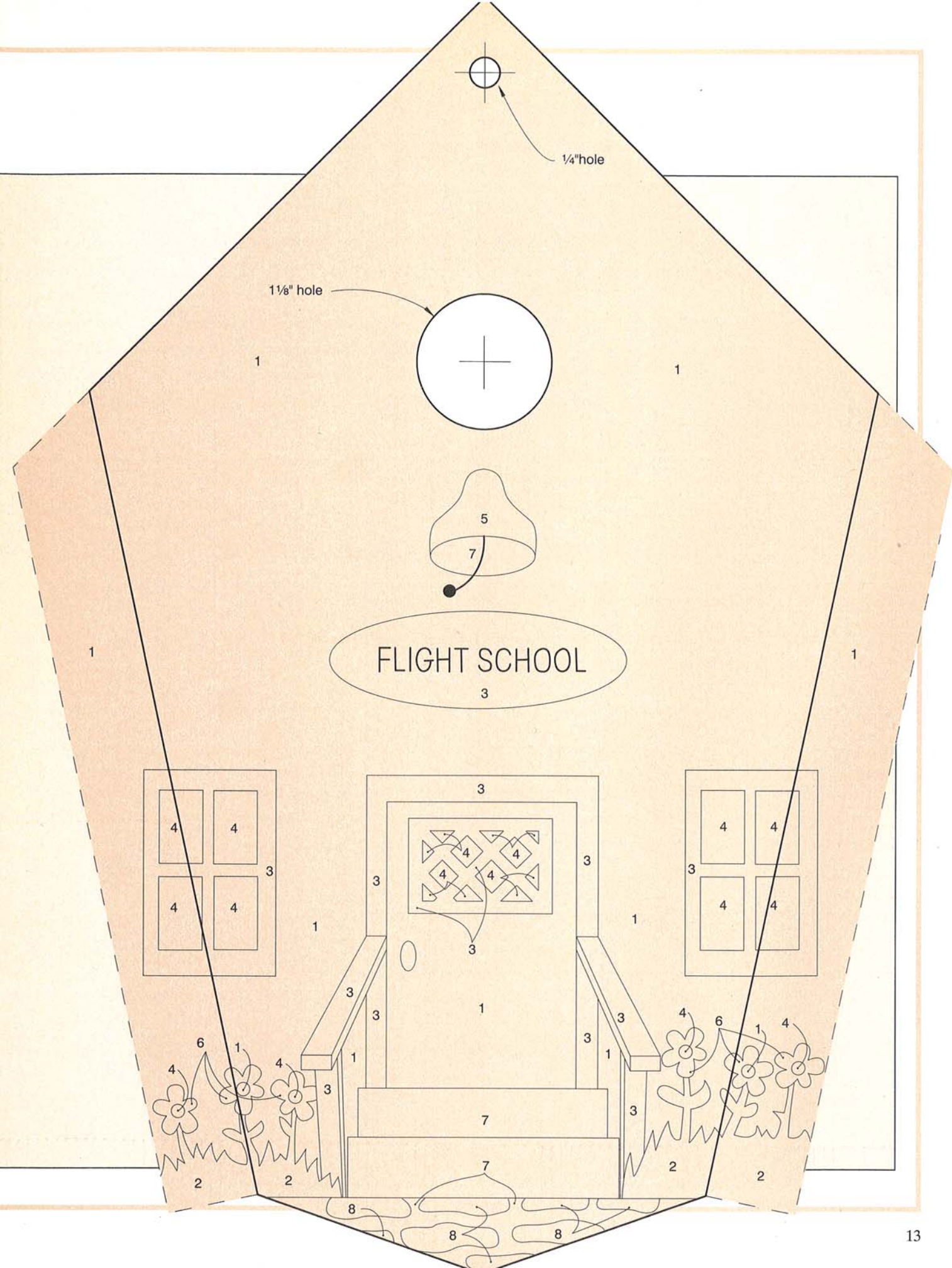
Part	Finished Size			Matl.	Qty.
	T	W	L		
A* front/back	¾"	6½"	10¾"	P	2
B side	¾"	6⅞"	6"	P	2
C floor	¾"	4⅜"	4½"	P	1
D roof	¾"	7⅞"	10"	P	2
E cap	1"	1"	10"	P	1

Cut parts marked with an to final size using a pattern.
Material key: P—pine

Supplies: 6d finish nails, ¼" screw eyes, chain, or wire for hanging.

COLOR KEY

1	Red
2	Green
3	White
4	Black
5	Gold
6	Yellow
7	Gray
8	Dark Gray





PIGGY NAPKIN HOLDER

For fun-loving table settings

1 From $\frac{1}{8}$ "-thick birch plywood, rip and crosscut two panels (A, B) to $5 \times 5\frac{3}{8}$ ". (We used plywood supplied by the mail-order source listed in the Buying Guide. You can also buy thin plywood at crafts and hobby shops.)

2 Copy the patterns on page 15. (We photocopied ours.) Cut out the Front and Back patterns and adhere them to your plywood panels, aligning the edges. (We used a thin coating of rubber cement.) Now, adhere the Nose and Tail patterns as a group to your remaining plywood.

Note: Single plywood sheets don't saw well, so if you intend to cut just one thickness, tape it to a $\frac{1}{4}$ "- or $\frac{1}{2}$ "-thick piece of scrap and saw out both together. If you plan to make two or more holders, we suggest you stack identical panels together with double-faced tape and cut them out simultaneously.

3 Drill $\frac{5}{64}$ " holes for the pigs' eyes. Next, drill the $\frac{1}{8}$ " holes through nose parts 2 and 4, and through both tail parts where marked. Now, drill $\frac{1}{16}$ "-start holes through the open pattern areas (marked with Xs,) including the mouths on parts 1 and 3.

4 Scrollsaw the open areas on both panels. (We used #5 blades and a 1750 rpm speed setting.) Make the stop cuts (heavy black lines) into the bodies before moving to a different area. To make the stop cuts, follow the black lines into the body areas,

then back out the blade from the saw kerf. Now, carefully scrollsaw the four nose and two tail parts to shape.

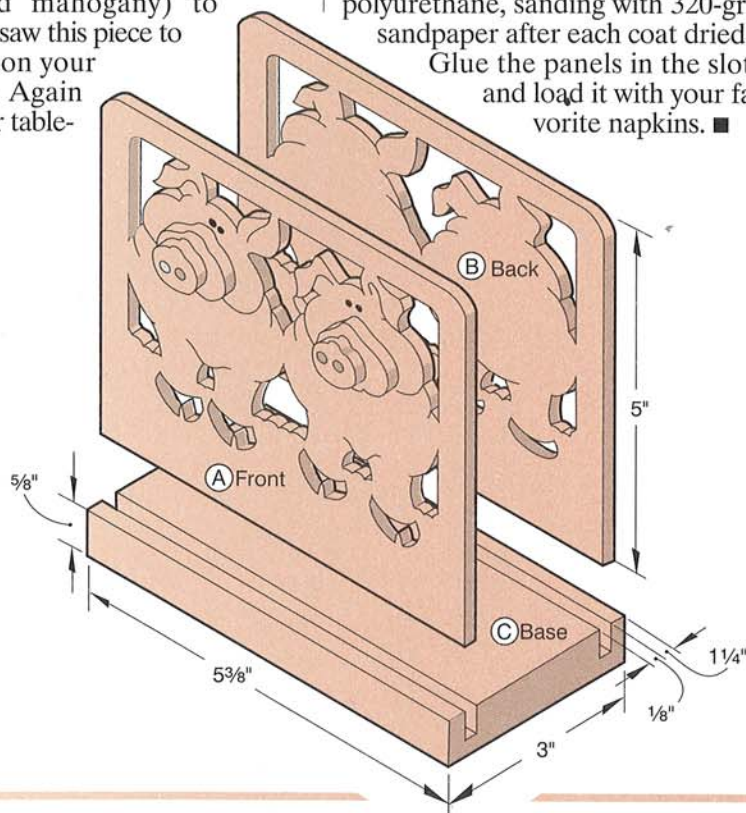
5 Remove the paper patterns and finish-sand all parts. Next, glue and clamp the nose parts to the front panel where shown on the pattern. Glue the tails onto the back panel where instructed.

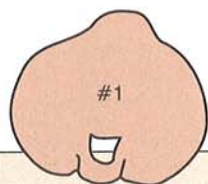
6 For the base (C), rip and crosscut a piece of $\frac{3}{4}$ "-thick stock (we used mahogany) to 3×12 ". Resaw this piece to $\frac{5}{8}$ " thick on your tablesaw. Again using your table-

saw, cut two $\frac{7}{16}$ "-deep kerfs into the top face of the base and equal to the thickness of the plywood panels. Start the grooves $\frac{1}{4}$ " from the outside edges as shown on the Exploded View drawing below. Now, crosscut a $5\frac{3}{8}$ "-long piece for the base and finish-sand.

7 Apply the finish of your choice to all parts. (We sprayed on one coat of sanding sealer and two coats of polyurethane, sanding with 320-grit sandpaper after each coat dried.)

Glue the panels in the slots and load it with your favorite napkins. ■

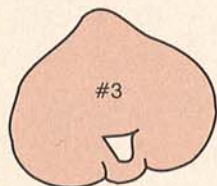




#1



#2



#3



#4

NOSE PATTERNS

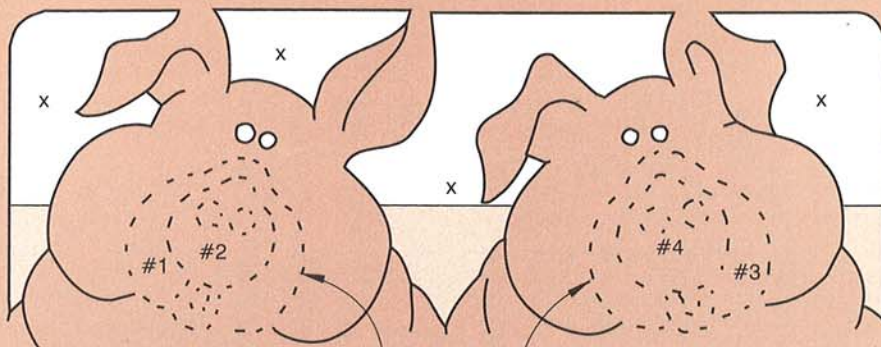
TAIL PATTERNS



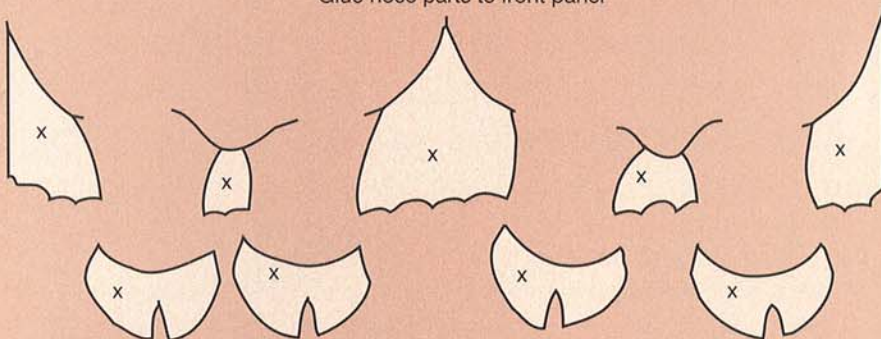
Buying Guide

• 1/8" birch plywood. One 12x12" sheet of plywood (enough for two napkin holders). Catalog no. 9981. Price: \$2.19 per sheet, plus \$2.50 shipping and handling per order. From: Meisel Hardware Specialties, P.O. Box 70, Mound, MN 55364-0070.

• For more scrollsawed patterns, contact Judy Gale Roberts, P.O. Box 1925, Lufkin, TX 75902. Send a self-addressed stamped envelope.

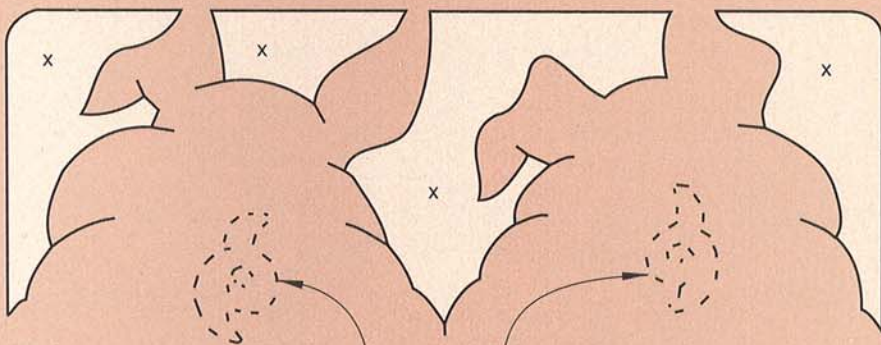


Glue nose parts to front panel

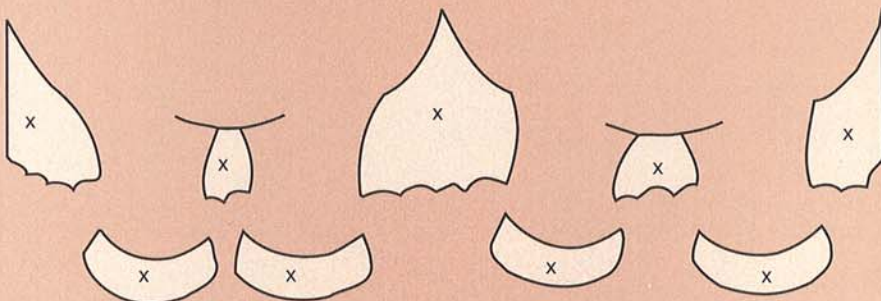


FRONT PATTERN

Drill eyes and saw out all areas marked with an X.



Glue tail parts to background



BACK PATTERN

Project design: Judy Gale Roberts, Lufkin, Texas

Illustrations: Kim Downing Photograph: Perry Struse

SIGN OF HOSPITALITY

Welcome friends and relatives with a warm, cheery greeting cut from native hardwood.

Seven quick-and-easy steps

1 Choose a piece of wood measuring at least 10×12". (We used ¾"-thick white oak, but other hardwoods with attractive grain and color work equally well.)

2 Copy the pattern (use the photograph at *right* as the pattern), and adhere it to the face of your workpiece. (We used spray adhesive.)

3 Drill ¼" start holes through each pattern area to be cut out. Make the inside cuts first, starting with the smallest areas. (We used a #5 scrollsaw blade.) Cut out the larger areas last, and then scrollsaw the sign to shape, cutting just outside the line.

4 Remove the pattern. (We used lacquer thinner to dissolve the adhesive residue.) Belt-sand both surfaces with 120-grit sandpaper. With a disc sander, sand the edge.

5 Chuck a ⅝" roman ogee router bit with a ⅝" bearing into your table-mounted router. Rout the top outside edge of the sign. If you have a keyhole bit, rout the keyhole slot into the back where shown on the pattern now. Finish-sand your sign.

6 Apply the finish. (We applied three coats of gloss lacquer to all sides, spraying from a low angle and from all directions to coat the inside edges of the cuts. Let each coat dry thoroughly before applying the next.)

7 To hang your sign, drive a round-head wood screw into the wall and place the keyhole slot over the screw head. Or, nail a sawtooth hanger to the back and hang it on the screw. ■

Builder: Rick Hutcheson

Photograph: John Hetherington

Project design: Harlequin Crafts, Grimes, Iowa





Keyhole slot

CORNER CLASSIC

Good looks in a three-legged table

The simplicity of tapered legs, plus an eye-appealing paint-and-stain scheme, equals a table with loads of practicality and charm.

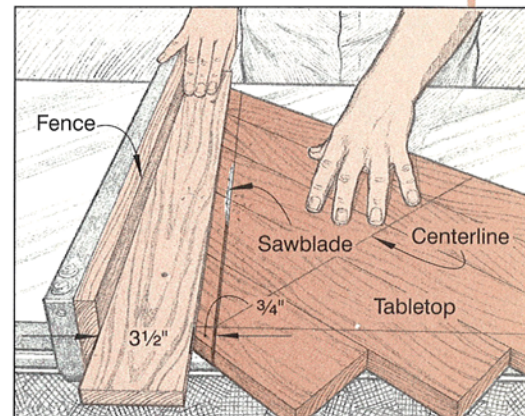
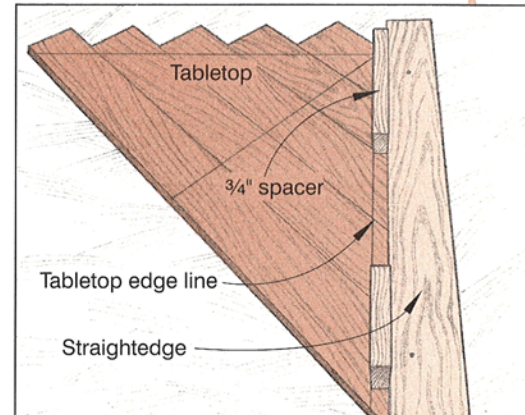
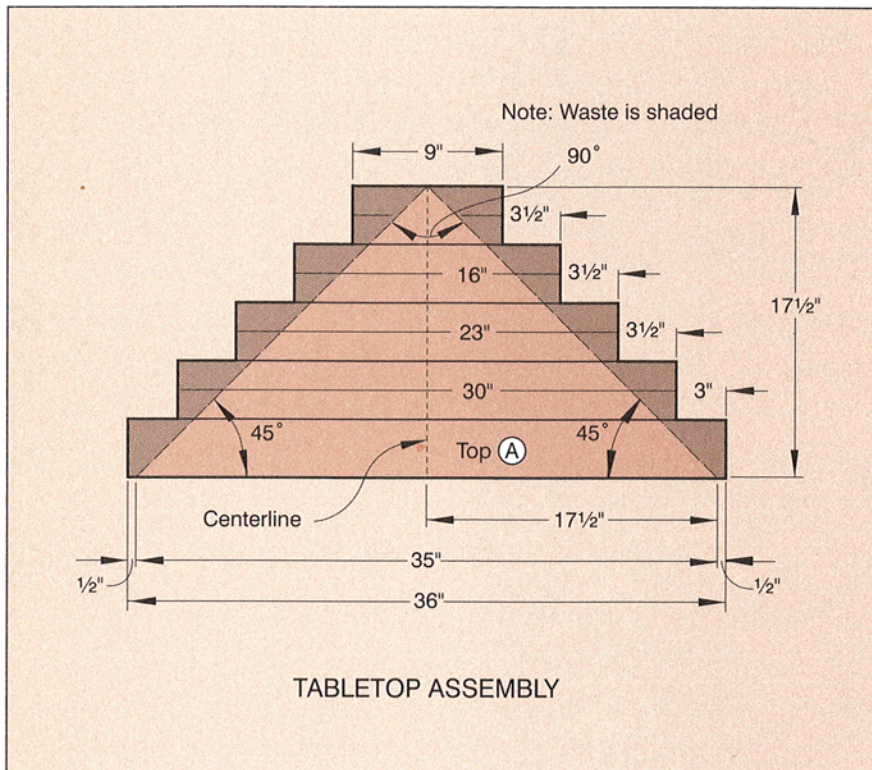
Assemble the tabletop first

1 Joint one edge of 10 linear feet of $\frac{3}{4}$ "-thick stock. (We used poplar, but other softwoods or hardwoods will work, too.) Next, using your tablesaw, rip the stock $3\frac{1}{2}$ " wide. Now, crosscut lengths of 36", 30", 23", 16", and 9" from this stock for the top (A). See the Cutting diagram on page 21 for a way to lay out the parts on your stock. Mark the center of each piece.

2 Dry-assemble the tabletop as shown on the Tabletop Assembly drawing *opposite*. Next, apply glue to the mating edges and clamp both panels together as shown at *right*, aligning them with the centermarks you made on each board. (We used scrap as pads between the clamps and panel to prevent denting. We also positioned our clamps over and under the panel to equalize the pressure and to prevent warping of the panel.)

3 Remove the clamps and scrape off the glue squeeze-out. Now, belt-sand both surfaces with 100-, 120-, and 180-grit sandpaper.



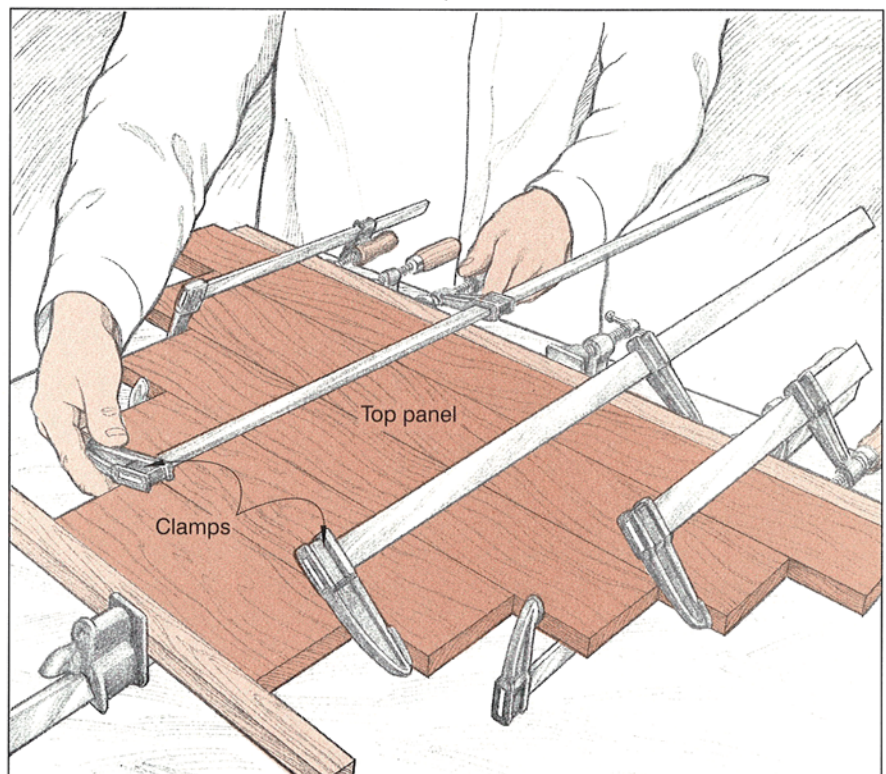


4 Mark the center of the panel along the longest or front edge. From this point, scribe a pencil mark 17 1/2" to the back, and the same distance out to both sides. Draw lines connecting these points to form the triangular-shaped top.

5 Make a straightedge by jointing one edge of a piece of 3/4 x 3 1/2 x 30" stock, and then ripping the second edge. Now, tack this straightedge to the tabletop (place nails in the waste side), spacing it 3/4" from one edge line as shown *top, right*. (We used pieces of 3/4"-thick scrap to gauge the straightedge's offset.)

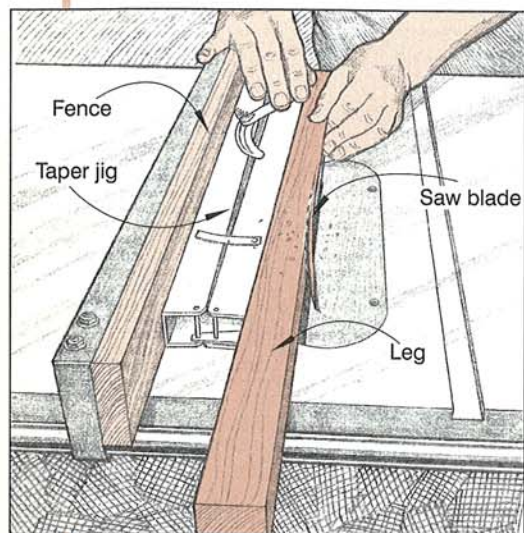
6 Set the fence on your tablesaw so the blade cuts just outside your pencil line. (We positioned our saw's fence 4 1/4" from the inside of the blade.) Place the straightedge against the saw fence, and crosscut the edge of the top as shown *right, center*.

7 Move the straightedge to the other tabletop edge, and then follow steps 5 and 6 to saw that edge.



Continued

Corner table



Let's make the legs and frame parts next

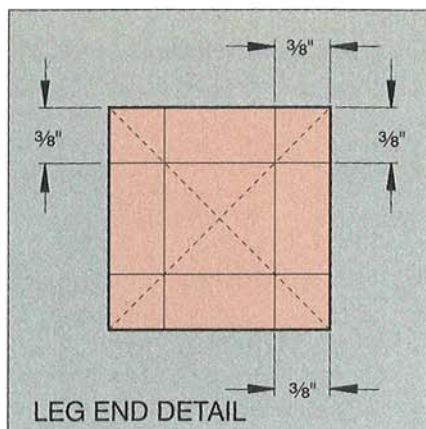
1 From 1½"-thick stock, rip and crosscut three leg blanks (B) to the dimensions listed *opposite* on the Bill of Materials. Scribe a line 4" down from the top on all sides of each leg. See the Leg Side View drawing at *right* for additional details.

2 To taper the legs, draw diagonal lines on the bottom of one leg blank. Scribe a line ⅜" in from each edge on the bottom as shown on the Leg End detail *above right*. Scribe lines on two adjacent sides, starting at the lines 4" from the top and down to the ⅜" lines on the bottom.

3 Set your taper jig and tablesaw fence, and then cut the four tapers on each leg as shown *above*.

4 Rip and crosscut the front apron (C) to the size listed on the Bill of Materials. Rip and crosscut the two side aprons (D), bevel-cutting both ends at 45° as shown on the Exploded View drawing *opposite*. Now, finish-sand the legs and apron parts. (We used 120- and 180-grit sandpaper.)

5 Rip and crosscut two side cleats (E) and one front cleat (F) to the sizes listed on the Bill of Materials. For clearance, bevel-cut the ends of the front cleat at 45°. Drill and countersink ⅝" shank holes in two adja-

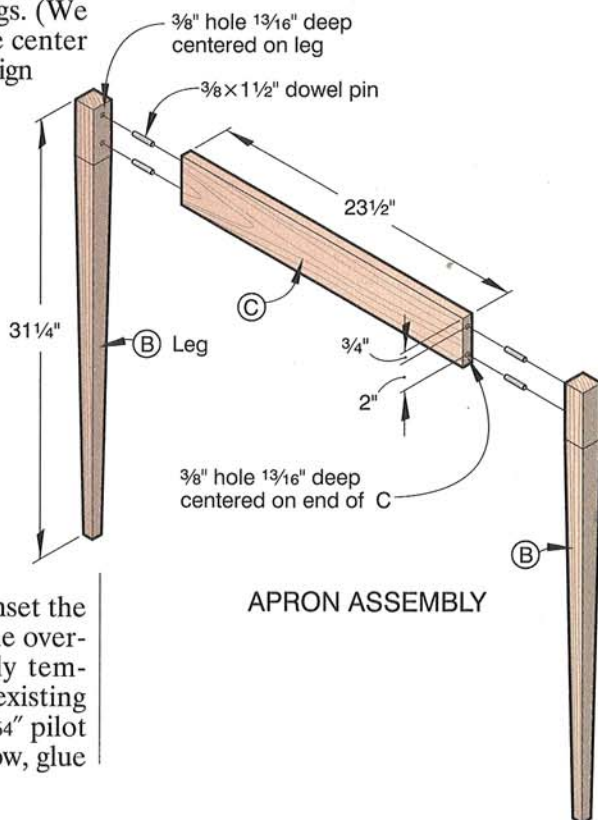
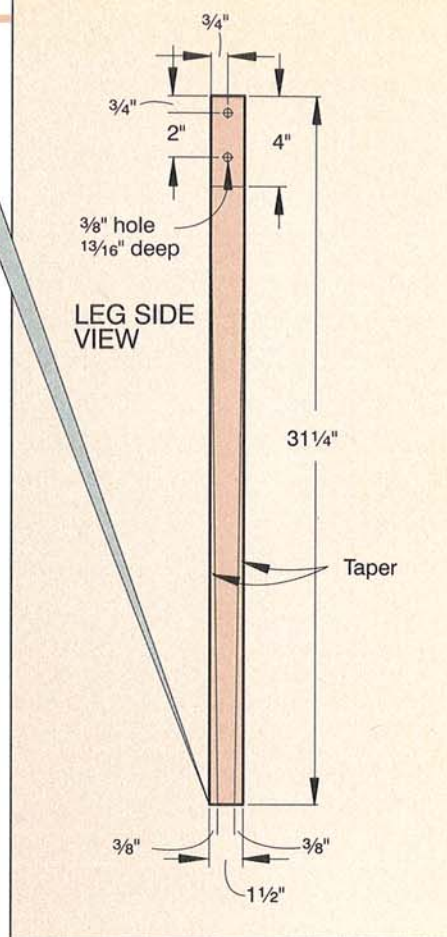


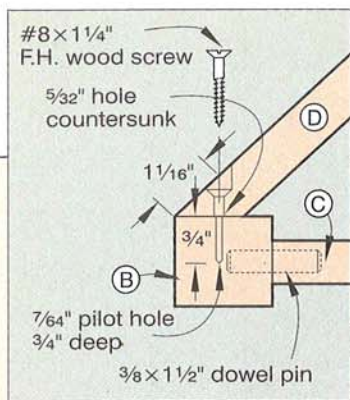
cent edges of the cleats where shown on the Exploded View drawing. Now, glue and screw the cleats to the inside face of the aprons, aligning them along the top edges of the aprons. (We used yellow woodworker's glue and #8×1¼" flathead wood screws for this step.)

6 Using the dimensions on the Apron Assembly drawing *below*, mark the centerpoints for the two ⅜" dowel holes in the ends of the front apron. With a doweling jig, drill these holes 1⅜" deep. Next, place dowel centers in these holes, position the apron against the legs, and squeeze them together to mark mating holes in the center of the front legs. (We scribed short lines down the center of the two front legs to help align the holes.) Now, drill these ⅜" dowel holes 1⅜" deep into the legs.

7 Glue a ⅜×1½" dowel pin in each hole in the ends of the front apron. Glue the front legs to the front apron, and clamp with bar clamps until the glue dries. Wipe off any glue squeeze-out with a damp cloth.

8 Place the tabletop face down on a flat work surface. Position the front leg assembly 1⅝" in from the front edge and centered between the ends. (We used 1⅝"-wide scrap spacers to inset the legs to uniform depth for the overhang.) Clamp the assembly temporarily. Drill through the existing holes in the cleat to form ⅞" pilot holes ¾" deep in the top. Now, glue





SCREW HOLE DETAIL

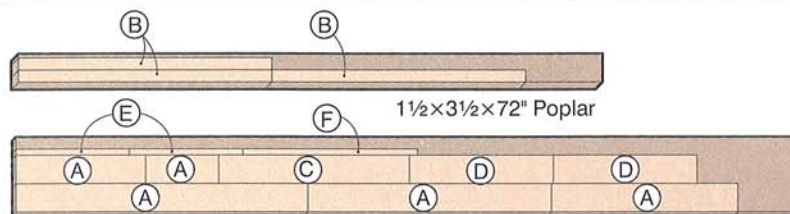
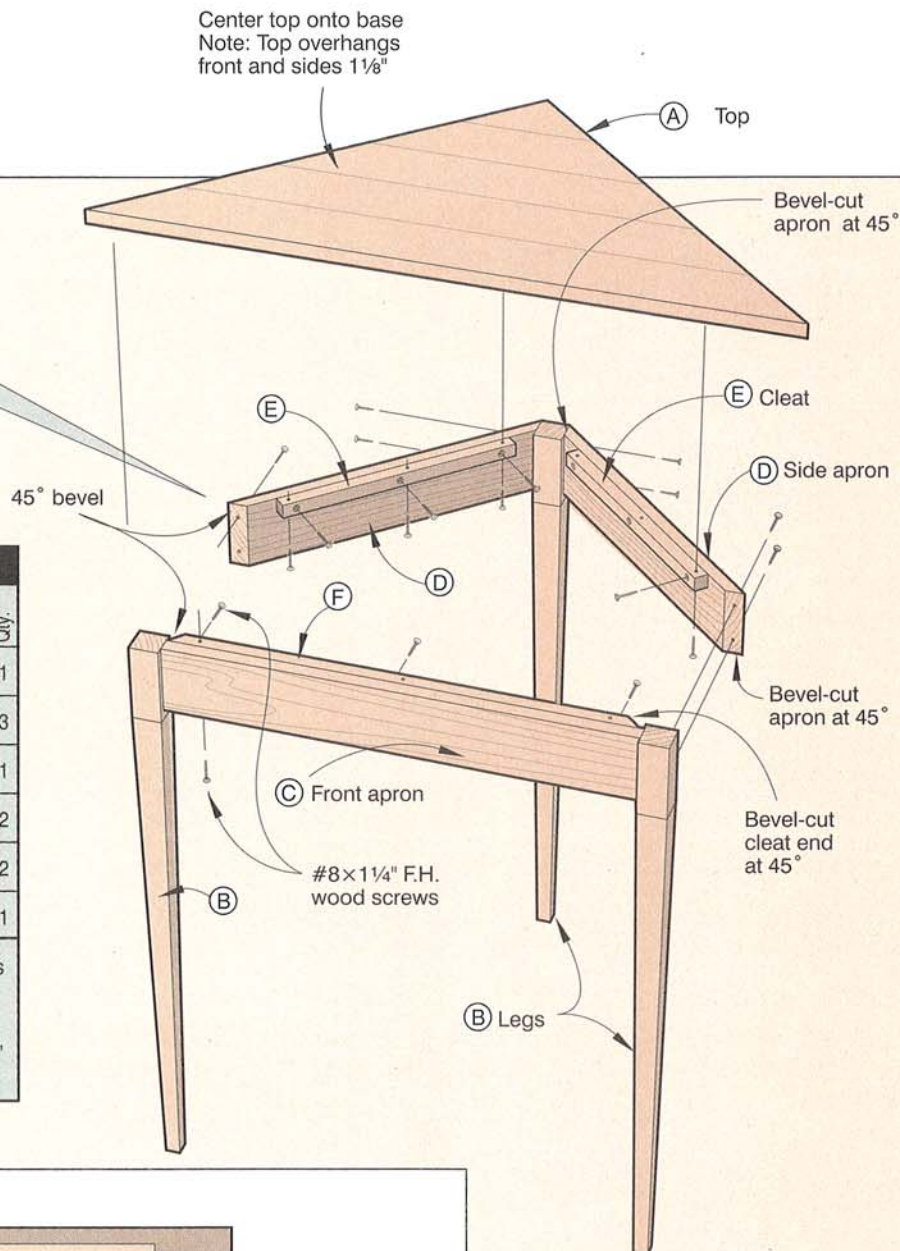
BILL OF MATERIALS

Part	Finished Size			Matl.	Qty.
	T	W	L		
A* top	3/4"	17 1/2"	35"	P	1
B leg	1 1/2"	1 1/2"	31 1/4"	P	3
C front apron	3/4"	3 1/2"	23 1/2"	P	1
D side apron	3/4"	3 1/2"	17 3/4"	P	2
E side cleat	3/4"	3/4"	14"	P	2
F front cleat	3/4"	3/4"	21 1/2"	P	1

*Part edge-joined during construction. Read instructions before cutting materials.

Material key: P—poplar

Supplies: 3/8" dowel pins, #8 x 1 1/4" flathead wood screws, finish.



CUTTING DIAGRAM

and screw the front cleat (and apron) to the tabletop.

9 Dry-fit both side aprons against the front legs, and set the rear leg in place. Screw the side aprons to the tabletop the same way you attached the front apron. Drill holes and screw the side aprons to the legs as shown on the Screw Hole detail above.

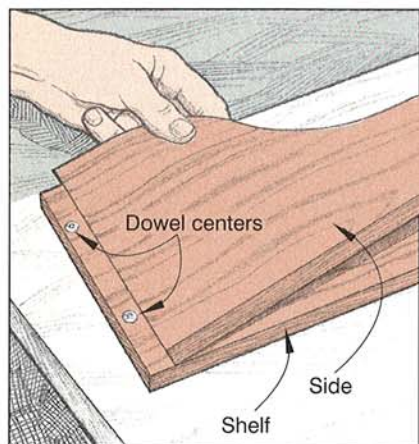
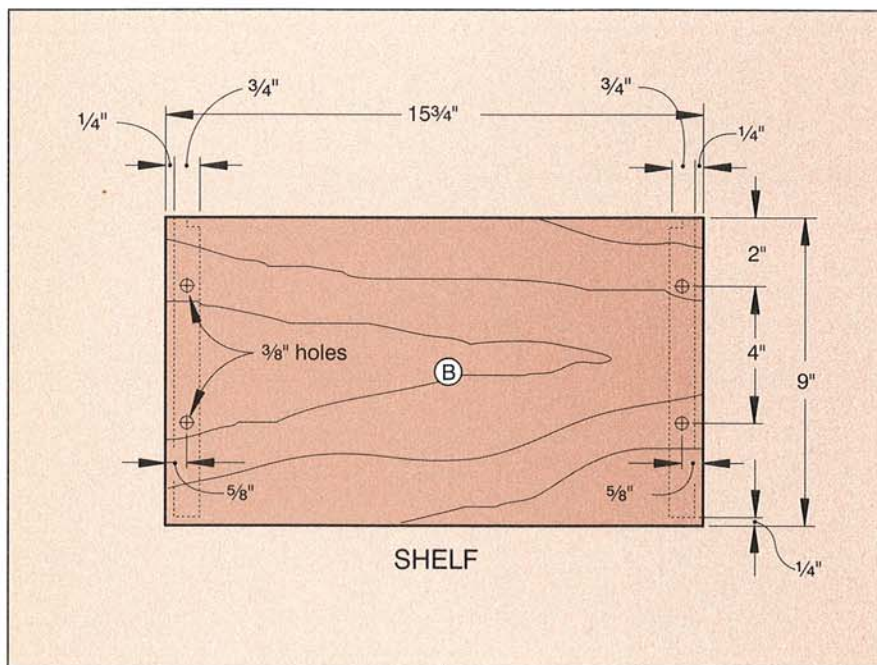
Finish the table your way

1 Test the stability of your table. If it wobbles, identify the long leg and carefully sand or trim the bottom of it to eliminate the movement.

2 Apply the finish of your choice. (We stained the tabletop with Raw Sienna oil, but any oil or water-based wood stain will work. We

Painted the aprons and legs with Sherwin-Williams Teal Stencil, an interior semi-gloss latex enamel paint. After the paint dried, we brushed a coat of the Raw Sienna oil over the painted surface and let it dry to produce an antique look. Finally, we applied two coats of clear satin lacquer to seal all surfaces.) ■

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



down on the sides to mark the centers of the mating holes in the sides. (We also drew guidelines on the parts to help align the holes.) Using a doweling jig, drill the $\frac{3}{8}$ " holes you just marked 1" deep into the bottom edge of both of the sides (A).

assembly.) Now, finish-sand all cabinet pieces. (We used 120-, 180-, and 220-grit sandpapers.)

6 Stack and tape the two shelves face-to-face, aligning the edges. For orientation, make a faint pencil line across the back edges of both. Locate the centerpoints for the four $\frac{3}{8}$ " holes on the face of the top. Drill through the top shelf and $\frac{1}{2}$ " into the bottom one. Separate the shelves.

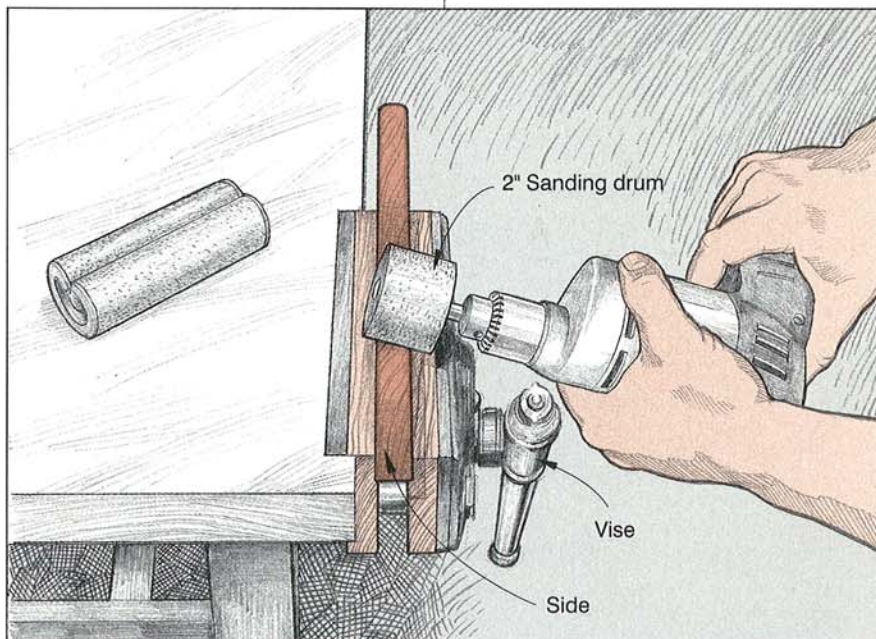
7 Place $\frac{3}{8}$ " dowel centers in the top holes of the top shelf. One by one, position the sides (A) on the shelf, align as shown *above*, and then press

8 Place the dowel-hole centers in the holes in the underside of the top shelf and mark the hole centerpoints in the top edge of both spacers (C). Using the same technique, mark the centerpoints for the mating holes in the bottom edge of the spacers and bottom shelf. Drill the $\frac{3}{8}$ " holes $\frac{1}{2}$ " deep into the edges of both spacers where you've marked them.

9 Set up your table-mounted router as shown on the Edge Round detail on page 24. Next, round over the front edge and ends on both shelves (B). *Do not* rout the back edges on either piece. Now, sand a matching round-over along the curved front edge of both sides (A) using the technique shown *below*.

Assemble the cabinet now

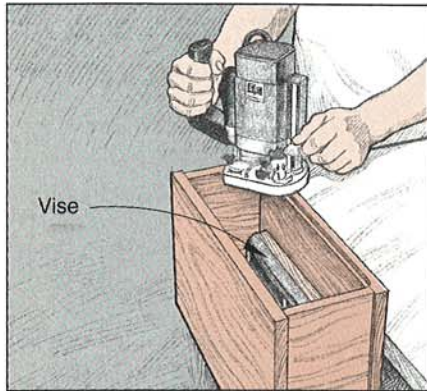
1 Crosscut four $\frac{3}{8}$ " dowels $\frac{7}{8}$ " long, and glue them in the holes in the bottom shelf. Cut four $\frac{3}{8}$ " dowels $1\frac{3}{4}$ " long, and glue them in the holes in the top edge of the spacers. Next, glue the top and bottom shelves to the spacers. Note: The dowels extend through the top shelf. Clamp the assembly and square. (We cut a scrap piece to fit tightly in the opening and



Recipe box

to hold the box square.) Wipe off the glue squeeze-out. Remove the clamps after the glue cures.

2 Chuck a $\frac{3}{8}$ "-piloted rabbeting bit into your handheld router and set it to cut $\frac{1}{4}$ " deep. Clamp the box in a vise back-side up, and as shown *below*, rout a rabbet around the *inside* edge of the box. See the Back Rabbet detail *lower right* for information. Chisel the round rabbet corners square. Now, rip and crosscut the back (F) to fit the rabbeted opening. (We used $\frac{1}{4}$ " oak plywood, but hardboard would work.) Finally, glue and nail the back in place.



3 Glue and clamp the sides (A) to the box assembled in Step 1. Fit the back spanner between the sides and crosscut it to final length. Place it in position, and then drill through the existing holes in each side and $\frac{3}{4}$ " into the ends of the spanner. Glue a $\frac{3}{8} \times 1\frac{1}{2}$ " dowel in each hole. Sand the dowel ends flush with each side.

4 Crosscut the front spanner (D) to fit between the spacers. Glue it in place where shown on the Exploded View drawing *opposite*.

Complete the drawers and then finish the recipe box

Note: We designed the drawers so you can't accidentally pull them all the way out of the shelf—and spill the cards.

1 From $\frac{3}{4}$ " stock, rip and crosscut two drawer fronts (G) to dimension. Next, rip and crosscut four drawer sides (H) and two drawer backs (I) to dimension. See the Drawer Assembly drawing *below* for additional details.

2 To cut the rabbets on the drawer fronts, study the Drawer Assembly drawing carefully. Set the rip fence $\frac{3}{4}$ " to the left of the saw blade.

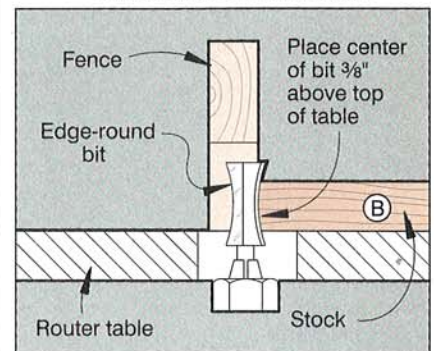
Elevate the blade to $\frac{3}{8}$ " above the saw table. Now, saw a $\frac{1}{8}$ "-wide kerf on both ends of both fronts and on one end of each side piece (H).

3 Set the fence $\frac{1}{4}$ " to the right of the blade and make $\frac{1}{8}$ " kerfs for your drawer bottoms in both fronts and the four drawer sides. Next, set the fence $\frac{5}{8}$ " to the left of the saw blade. Now, saw a kerf along the top inside edge of the two fronts.

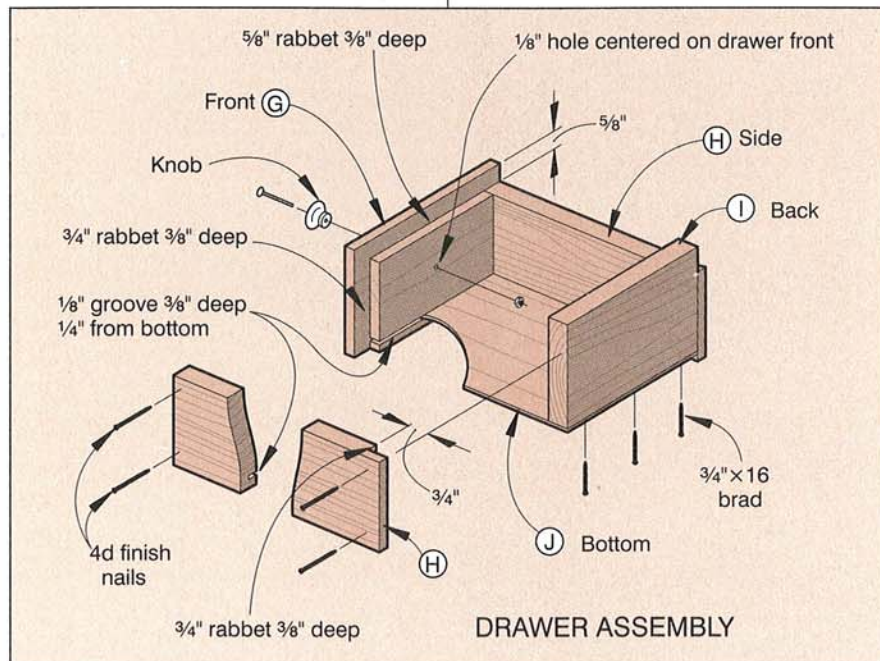
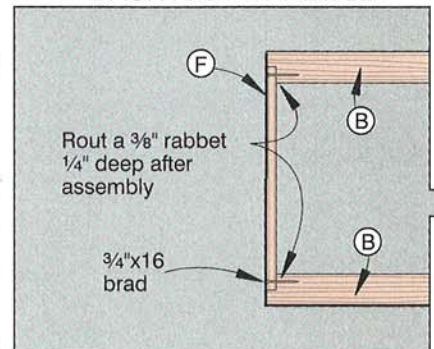
4 Set the fence $\frac{3}{8}$ " to the right of the blade and then elevate the blade to $\frac{5}{8}$ " above the saw table. Turn the fronts on edge and saw along the top edge to complete the top rabbet. Now, elevate the blade to $\frac{3}{4}$ " above the saw table. Cut along the ends of both fronts to finish forming the rabbets on the ends of the two fronts. Finally, do the same operation to one end on each of the sides.

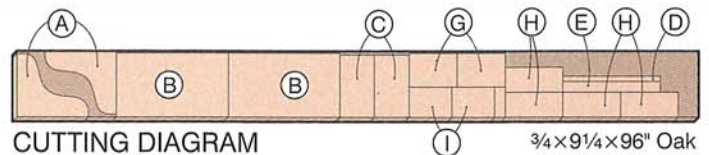
5 Draw diagonal lines on the drawer fronts to locate the centerpoint. Drill a $\frac{1}{8}$ " hole through both fronts for the knob screws.

EDGE ROUND DETAIL



BACK RABBET DETAIL





CUTTING DIAGRAM

BILL OF MATERIALS

Part	Finished Size*			Matl.	Qty.
	T	W	L		
Cabinet					
A side	¾"	8¾"	10"	O	2
B shelf	¾"	9"	15¾"	O	2
C spacer	¾"	8¾"	47⅝"	O	2
D* front spanner	¾"	¾"	13¾"	O	1
E* back spanner	¾"	1½"	13¾"	O	1
F* back	¼"	5⅝"	14½"	OP	1

*Parts marked with an * will be cut to fit during construction. Please read instructions before cutting.

Material key: O—oak; OP—oak plywood; H—hardboard

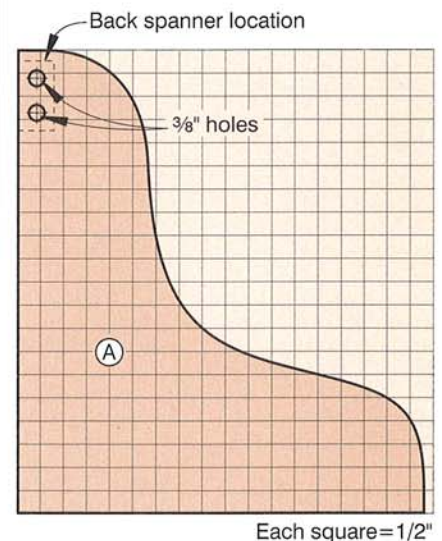
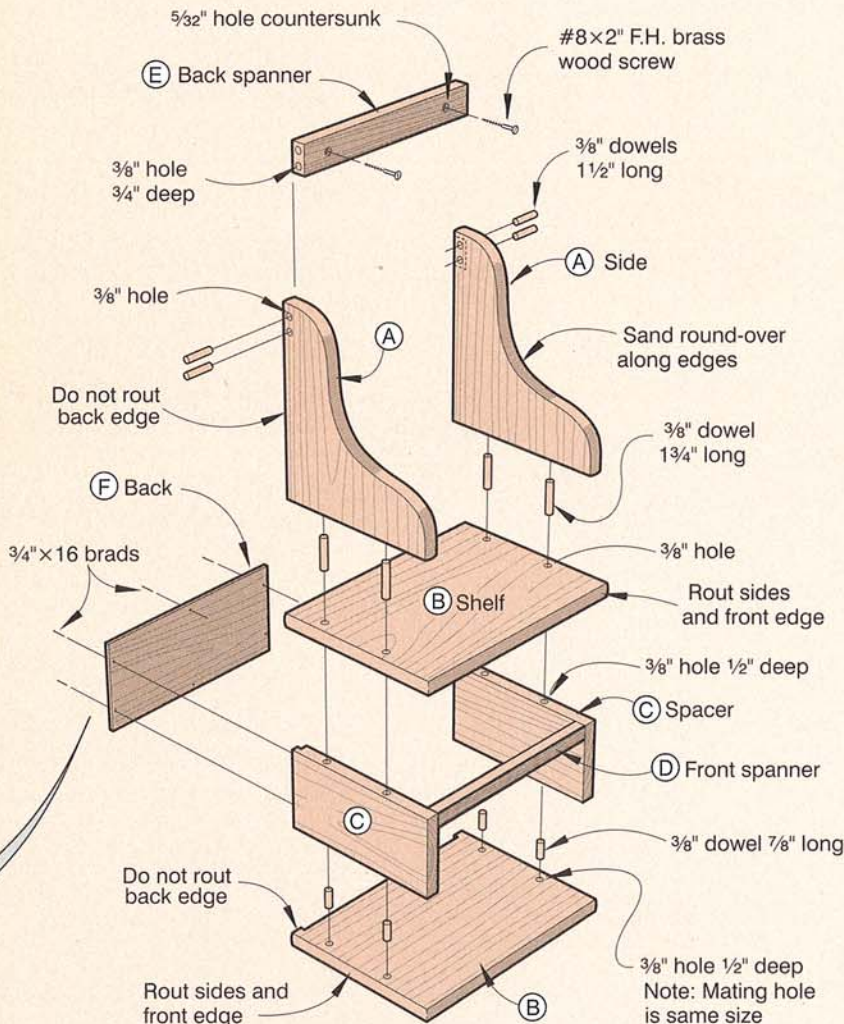
Supplies: 3/8" dowel, 4d nails, 3/4" x 16 brads, #8 x 2" round-head brass wood screws, two drawer pulls.

6 Glue and nail the drawers together. (We used 4d finish nails.) Square the drawers and clamp while the glue dries. Measure and then cut the bottom (J) for each drawer from 1/8" hardboard. Slide the bottom panels into the grooves in the sides. Next, apply a light film of glue along the bottom edge of the back and nail the bottom to it with 3/4" x 16 brads.

7 Apply the finish of your choice. (We wiped on a medium-oak oil stain. After it dried, we applied one

coat of lacquer sanding sealer and two coats of clear semigloss lacquer, sanding between coats with 320-grit sandpaper to level the surfaces.) Attach drawer pulls of your choice.

8 If you wish to wall-mount the recipe box, drill two 5/32" holes through the back spanner where shown. Attach the rack to the wall with #8 x 2" roundhead or ovalhead brass wood screws. Use other wall fasteners in areas where screws do not penetrate wall studs. ■



SIDE (Gridded Pattern)

PUTTING FOR PAR



As long as there's a breeze, our whirligig golfer will keep trying to sink his putt.

This golf outing begins by making the base

1 Rip and crosscut a $\frac{3}{4}$ "-thick piece of pine to $2 \times 20\frac{5}{8}$ ". From it, cut a 2" length for the stand block (A). Use the remaining piece for the base (B).

2 For the shaft block (C), rip and crosscut a $1\frac{1}{2} \times 1\frac{1}{2} \times 2$ " block from a piece of scrap 2×4 . Or, you can glue together two pieces of $\frac{3}{4}$ "-thick stock and then trim it to make a same-sized shaft block.

3 Drill and countersink the four $\frac{5}{16}$ " shank holes into the base where shown on the Exploded View drawing *opposite*, and the Section View on page 29. Drill six $\frac{1}{4}$ " holes $\frac{7}{16}$ " deep into the top face of the base for the tabs on the golfers and scenery where shown. Next, draw diagonal lines on the front face of the shaft block to locate the centerpoint. Using your drill press, bore a $\frac{5}{16}$ " hole through the block center. Now, bore a $\frac{5}{16}$ " hole $1\frac{1}{2}$ " deep into the bottom edge of the stand block.

4 Cut two $1\frac{1}{2}$ " lengths of $\frac{3}{32}$ "-outside-diameter brass tubing. (We purchased our tubing at a hobby store, selecting a size that fit over a $\frac{1}{4} \times 2\frac{1}{4}$ "-20 hexhead bolt.)

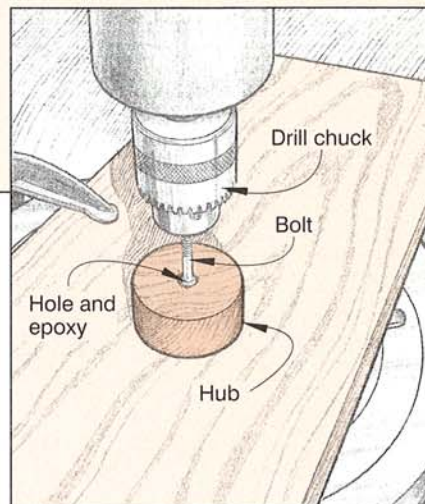
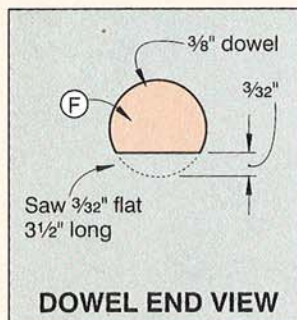
Insert one of the tubes into the $\frac{5}{16}$ " hole in the stand. Insert the second into the hole you drilled through the shaft block.

5 Glue and screw the stand block to the bottom side of the base. (We used Franklin's Titebond II waterproof glue and #6 $\times 1\frac{1}{2}$ " flathead wood screws to assemble our whirligig.) Attach the shaft block to the top of the base the same way.

Let's make the rotor and propeller

1 Cut a $\frac{3}{4}$ " length of $1\frac{1}{4}$ " dowel for the rotor (D). Or, make a $1\frac{1}{4}$ "-diameter disc from a $\frac{3}{4}$ "-thick piece of scrap maple.

2 Using the dimensions on the Rotor detail on page 28, locate

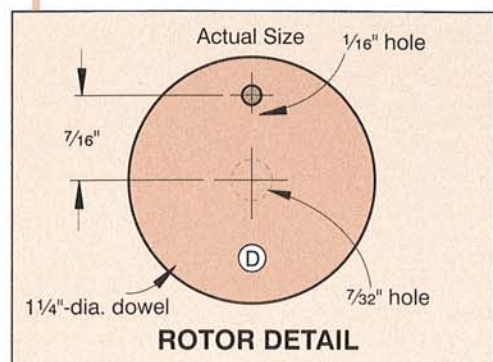
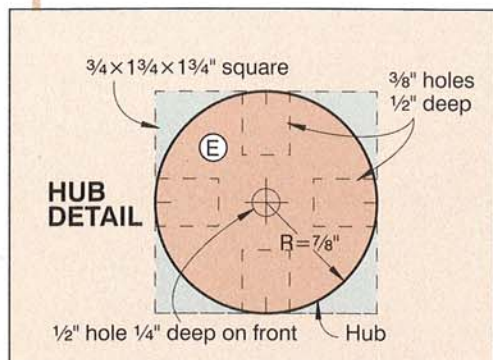


3 For the propeller hub (E), rip and crosscut a $\frac{3}{4}$ "-thick piece of scrap maple to $1\frac{3}{4}$ " square. To find the center, draw diagonal lines on one face. See the Hub drawing on page 28.

4 Clamp the maple square on edge in a handscrew clamp as shown at *right*, and drill a $\frac{3}{8}$ " hole $\frac{1}{2}$ " deep into the edge's centerpoint. Next drill

27

Whirligig

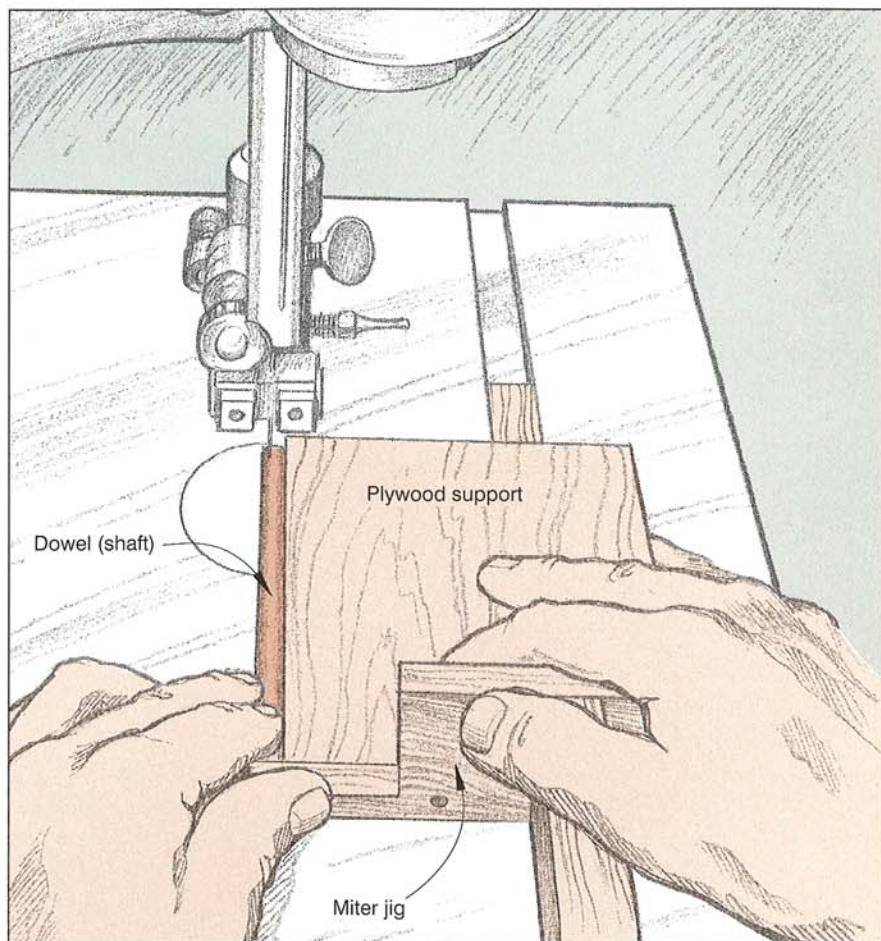


identical holes in the other three edges. Bore the $\frac{1}{2}$ " center hole $\frac{1}{4}$ " deep. Now, bandsaw or scrollsaw the hub to shape. (We sawed just outside the line, and then sanded to the line.) Epoxy the head of a $\frac{1}{4} \times 2\frac{1}{4}$ " hexhead bolt in the center hole. (As shown on page 27, we chucked the end of the bolt in our drill press to hold it square in the hub while the epoxy set up.)

5 For the propeller shafts (F), cross-cut four $4\frac{1}{2}$ " lengths of $\frac{3}{8}$ " dowel. Scribe a mark 2" from one end on each. Now, using a miter jig and a piece of plywood as shown *above right*, bandsaw the $\frac{3}{32}$ " flat surface on one side of each dowel, cutting to the 2" mark. See the Dowel End View drawing on page 27 for more details.

6 For the propeller blades (G), cut four $4 \times 4\frac{1}{2}$ " blanks from $\frac{1}{4}$ "-thick hobby or exterior plywood. (We purchased the plywood at a hobby store.) Stack the blanks face-to-face, using double-faced tape.

7 Using a photocopier or carbon paper, make copies of the patterns



(G, H, I, J, K, L, M) on page 30. Include the figure details and painting outlines. Next, trace the blade pattern onto the top blank of the stack, and then bandsaw the blades to shape. Sand the edges, separate the parts, and remove the tape.

8 Center, glue, and clamp a blade to the flat area on each shaft. After the glue cures, drill and countersink two $\frac{3}{32}$ " holes through each blade where shown. Drive a $\#2 \times \frac{1}{2}$ " flathead brass wood screw into each.

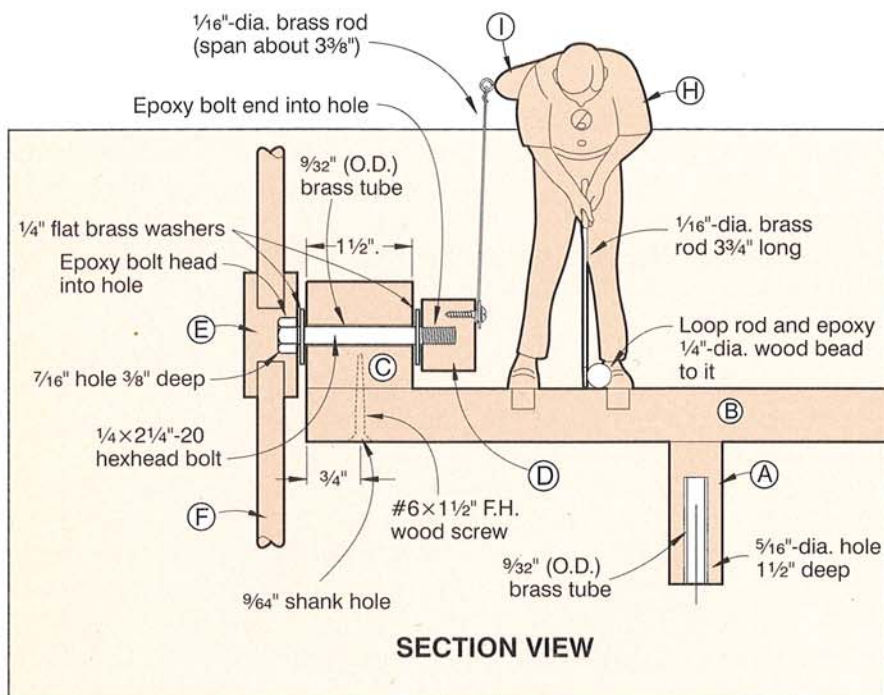
9 Secure the whirligig base in a vise or clamp. Insert a prop shaft into each hub hole, and set the blades at a 45° angle as shown on the Hub Side View on page 27. Insert the hub bolt through the shaft block, and spin the propeller to test its balance. To adjust its balance, move the shafts in

or out of the hub. When it spins smoothly, scribe depth and alignment marks around the base of each shaft, and then number each shaft and mating hole. Now, glue and reassemble the propeller, aligning the parts where previously marked.

Cut out your twosome and the sunny-day scene

1 Transfer the remaining pattern outlines and figure details (we used carbon paper) onto $\frac{1}{4}$ "-thick hobby or exterior plywood. Scrollsaw the figures and scenery to shape.

Note: The upper body pattern (H) of the putting golfer serves as both the front and back upper body part. If you want the golfer putting on both sides, cut duplicate fronts. If you want him putting on one side only, cut the back (H) piece



along the dashed line. Also, you need to sand the lower body (J) to reduce thickness and friction.

2 Drill and countersink the 5/32" holes through the body parts where indicated on the patterns. Drill a 1/16" hole 1/2" deep into the hands for the club shaft. Drill the 1/16" hole in the end of the swing arm and then turn a screw eye into the hole. Now, glue and assemble the putting golfer as shown on the Exploded View drawing. Drill a 1/16" hole vertically through the center of the flag-tender's hand for the flag pole.

3 Round the tabs on the base of the golfers and the scenery to fit into the 1/4" base holes. Next, place the flag-tending golfer (K) on the base, insert a 1/16" brass rod through the hole in his hand, and mark the spot where it touches the base. Drill a 1/16" hole 1/2" deep where marked.

4 To shape the putter, temporarily place the tabs of the putting golfer in the base holes. Cut a 3 1/2" length of 1/16" brass rod, and with a needle-nosed pliers, bend a loop at one end. Now, trim the rod to 3 3/4" long, and then epoxy the end in the putting golfer's hands. Epoxy a 1/4"-diameter wood bead onto the front of the rod loop to serve as a golf ball.

5 Cut a 3/4 x 1" rectangle from 1/4" plywood. Trace the flag pattern onto the face of the piece, and drill a 1/16" hole vertically through it where shown for the pole (brass rod). Now, cut the flag (M) to shape, and then epoxy it onto the tip of the brass rod. Paint your flag red.

It's nearly tee time—just paint and assemble

1 Paint the parts with exterior enamel paints. Apply your choice of colors or follow our paint scheme. (We painted the base green, and the propeller, shaft block, and rotor blue. See the colors printed on the patterns for how we painted those parts.)

2 Assemble the propeller, hub, and putter as shown on the Section View drawing. (We applied a coating of white grease to the bolt before inserting it through the brass tube in the shaft block. Note placement of the brass washers. Then, we applied epoxy to the bolt threads and threaded the rotor onto the bolt until there was no shaft end play.)

3 Glue the golfers and scenery to the base. Cut a 7" length of 1/16" brass rod, insert it through the hand of the flag-tending golfer, and epoxy the end of it in the base hole.

BILL OF MATERIALS

Part	Finished Size			Mati.	Qty.
	T	W	L		
A stand	3/4"	2"	2"	P	1
B base	3/4"	2"	18 1/2"	P	1
C shaft block	1 1/2"	1 1/2"	2"	P	1
D rotor	1 1/4" dia.		3/4"	D	1
E hub	3/4"	1 3/4" dia.		M	1
F shaft	3/8" dia.		4 1/2"	D	4
G* blade	1/4"	4"	4 1/2"	PW	4
H* upper body	1/4"	2 1/2"	3"	PW	2
I* swing arm	1/4"	1 1/4"	2 1/2"	PW	1
J* lower body	1/4"	2"	5"	PW	1
K* golfer	1/4"	4"	7 1/2"	PW	1
L* flag	1/4"	1"	1 1/2"	PW	1
M* scenery	1/4"	3 1/2"	7"	PW	1

* Cut parts marked with * from 1/4" hobby plywood using patterns during construction. Read the instructions before cutting.

Material key: P—pine; M—maple; PW—1/4" hobby or exterior plywood; D—dowel stock

Supplies: 2—1/16" brass rods, 1—9/32" O.D. brass tube, 1/4 x 2 1/4"-20 hexhead bolt, 1/4 x 3"-20 hexhead bolt, 1 1/4"-dia. dowel, #6 x 1 1/4" flathead wood screws, #4 x 1/2" flathead brass screws, #4 brass flat washer, 2—1/4" flat brass washers, 1/4" screw eye, 3/8" dowel, 1/4" wood bead, #6-32 x 1" flathead machine screw and #6 nut, waterproof glue, epoxy, paints.

4 From a length of 1/16" brass rod, make the drive rod connecting the rotor and putting golfer. To determine the rod length, center the putter straight up and down. Center the small screw of the rotor at either the 3 or 9 o'clock position. (Our rod measures 3 3/8" from loop center to loop center.) Test the whirligig action. Adjust the rod length if necessary for smooth operation.

5 Prepare your whirligig for mounting as shown on the Exploded View drawing. Grease the exposed bolt in the post, and then place the whirligig stand block over it.

Continued

Whirligig

