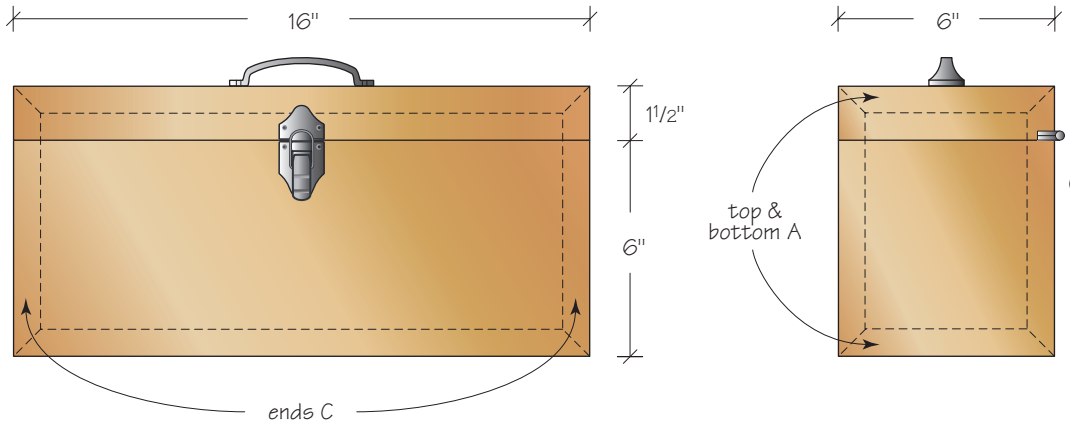
BUILDING THE PERFECT tool chest

INCLUDES 15 PROJECTS

JIM STACK

BUILDING THE PERFECT TOOL CHEST



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POPULAR WOODWORKING BOOKS
CINCINNATI, OHIO
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Metric Conversion Chart

TO CONVERT	TO	MULTIPLY BY
Inches	Centimeters	2.54
Centimeters	Inches	0.4
Feet	Centimeters	30.5
Centimeters	Feet	0.03
Yards	Meters	0.9
Meters	Yards	1.1
Sq. Inches	Sq. Centimeters	6.45
Sq. Centimeters	Sq. Inches	0.16
Sq. Feet	Sq. Meters	0.09
Sq. Meters	Sq. Feet	10.8
Sq. Yards	Sq. Meters	0.8
Sq. Meters	Sq. Yards	1.2
Pounds	Kilograms	0.45
Kilograms	Pounds	2.2
Ounces	Grams	28.3
Grams	Ounces	0.035

 Published by Popular Woodworking Books, an imprint of F&W Publications, Inc., 4700 East Galbraith Road, Cincinnati, Ohio, 45236. First edition.

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07 06 05 04 03 5 4 3 2 1

Library of Congress Cataloging-in-Publication Data

Stack, Jim, 1951-
Building the perfect tool chest / by Jim Stack.
p. cm.
Includes index.
ISBN 1-55870-650-X (pbk. : alk. paper)
ISBN-13: 978-1-55870-918-8 (EPUB)

1. Toolboxes. I. Title.
TT197.5.T65 S73 2003
684'.08--dc21

2002152507

EDITOR: Jennifer Ziegler
DESIGNER: Brian Roeth
PAGE LAYOUT ARTIST Camille Ideis
PRODUCTION COORDINATOR: Mark Griffin
STEP-BY-STEP PHOTOS AND TECHNICAL ILLUSTRATIONS: Jim Stack
CHAPTER OPENER PHOTOS: Al Parrish

SPECIAL CREDITS

I would like to thank Chris Schwarz, senior editor of *Popular Woodworking* magazine, and Glen Huey, contributing editor to *Popular Woodworking* magazine, for their contributions to this book.

Chris constructed the plane cabinet, took the step-by-step photos, wrote the captions and drew the technical illustrations.

Glen and his father, Malcolm, built the 21st-century tool cabinet, took the step-by-step photos and wrote the captions.

John Hutchinson drew the technical illustrations for Glen's project.

ABOUT THE AUTHOR

Jim is the editor of Popular Woodworking Books at F&W Publications. As such, he acquires authors to write woodworking books.

Educated at the Berklee College of Music in Boston, Massachusetts, he received a bachelor's degree in music composition. Jim feels that even though his livelihood is made through woodworking, he gained invaluable experience while studying music.

"The skills involved in any artistic endeavor transcend the particular endeavor and make it possible to cross over into other areas of artistic expression."

Jim also loves to ride on single-track mountain bike trails, which he says helps him keep his sanity. There are, however, those who question that theory.

ACKNOWLEDGEMENTS

I want to thank my friends and coworkers here at F&W Publications for supporting me in this book project and contributing all their talents in the editing, design and layout, photo taking and production.

Thanks also to all the cabinetmakers and furniture makers that I have known and worked with for the past 23 years. I stole all the ideas and techniques I could from each of you!

dedication

I dedicate this book to all the woodworkers who build works of wonder with their tools.

table of contents

PROJECTS

I would like to say at the beginning: You will see photos in this book that demonstrate techniques of woodworking with power tools. The guards on the tools, especially the table saw, have been removed to clearly show the process. I do not advocate the use of power tools without all the proper guards and other safety items in place. Using power tools can be dangerous. Don't work while you are tired or in a hurry as that is how you get hurt. If a particular setup doesn't seem quite right to you — it probably isn't. Take the time to review the setup and make adjustments if necessary. I want you to have fun and be safe while you are woodworking.

Tool chests and boxes almost invariably reflect the style, talent and personality of the builder. Those of us who work with tools like to keep them organized and in good shape.

I offer several different ideas in this book to help you decide how you would like to store your tools. I

introduction

looked at a lot of books and magazine articles about building tool chests, and came away marveling at the creative ideas out there. I couldn't include all the ideas I wanted to; I just didn't have the space.

All the projects offered here are for you to adjust, resize and reconfigure to your own personal needs and tastes. I tried to include projects for novice to advanced woodworkers, and I think I succeeded. (If you can start right out by building Glen and Malcolm Huey's 21st-century tool cabinet, I applaud you wholeheartedly!)

I'm not a fan of long introductions, so let's build some tool chests.

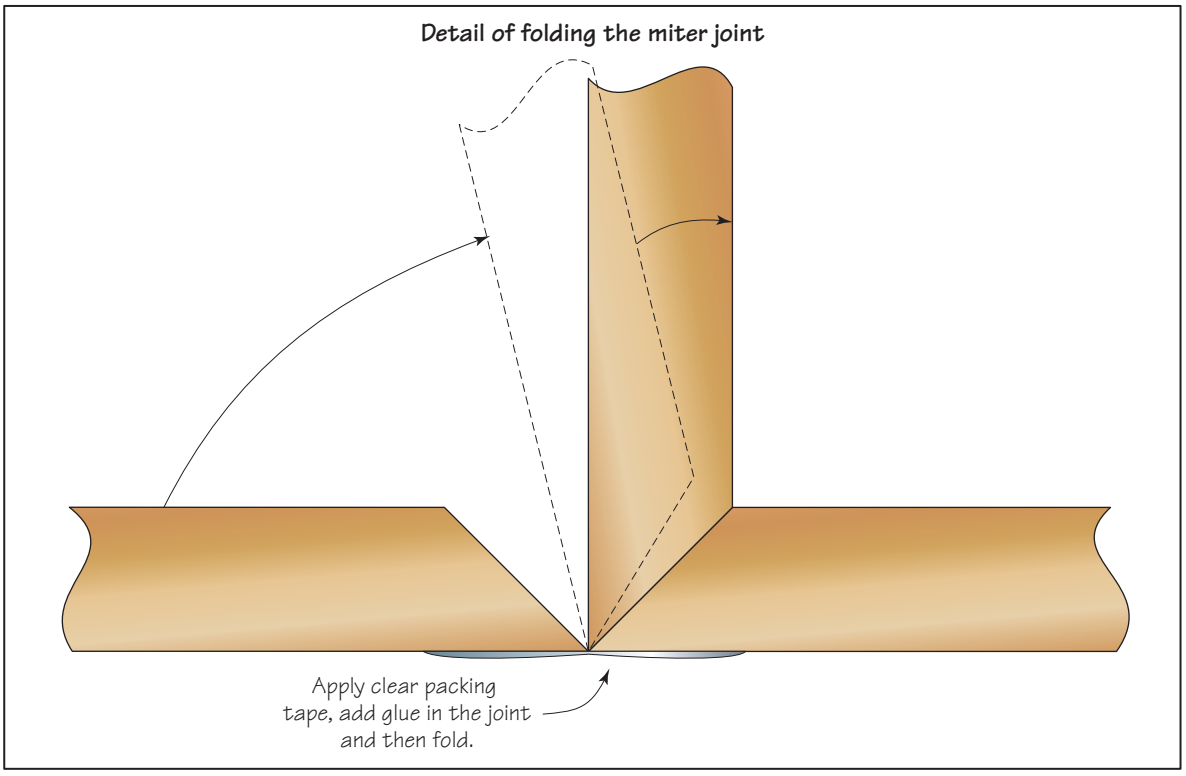
PROJECT 1

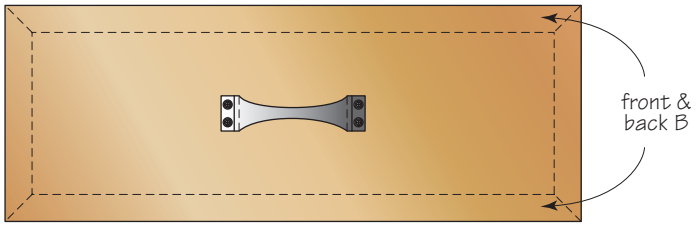
handy box

This toolbox is perfect for holding all those everyday tools that you use around the house — a tack hammer, screwdrivers, tape ruler, extra screws and nails, etc.

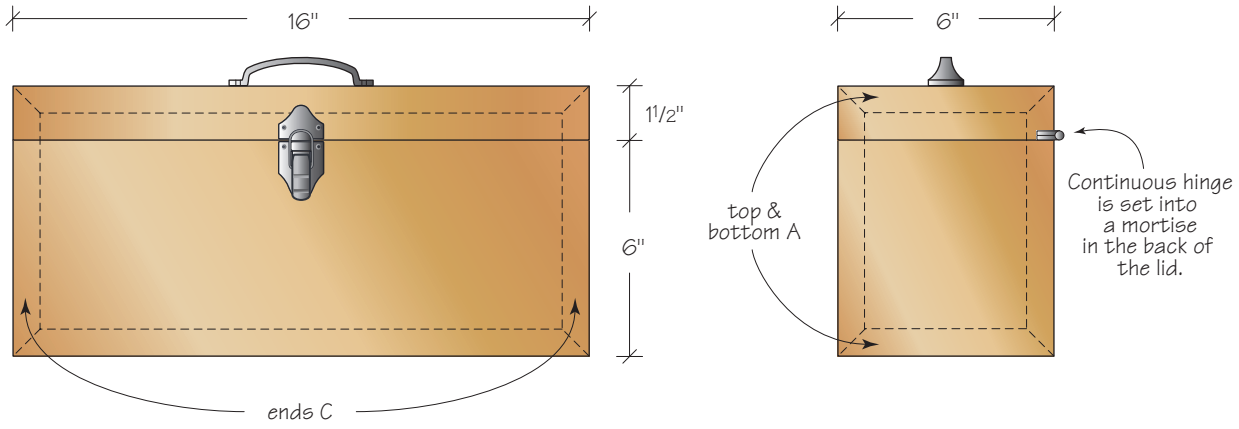
The techniques used to make this box are simple and fun. As with all the projects in this book, you can change the dimensions to suit your particular needs. For example, it would be a simple matter to make this box twice as big.

I prefer to see the wood that I use to build my projects, so I used a clear finish on all but two of the projects in this book. Feel free to finish these projects as you like — with paint, stain or whatever suits your needs.





All material is 3/4" plywood.



INCHES materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	top & bottom	plywood	3/4	6	16	all edges have a 45° bevel
B	2	front & back	plywood	3/4	7 1/2	16	all edges have a 45° bevel
C	2	ends	plywood	3/4	6	7 1/2	all edges have a 45° bevel

hardware

- 1 continuous hinge 3/16" × 1 1/2" × 16"
- 1 drawbolt
- 1 screen door handle

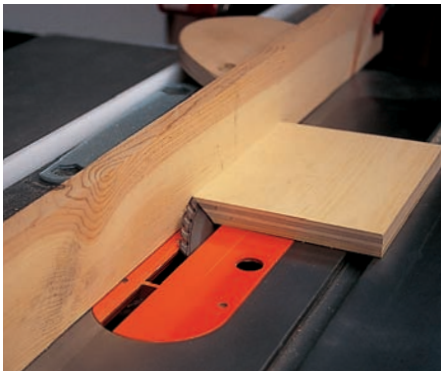
MILLIMETERS

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	top & bottom	plywood	19	152	406	all edges have a 45° bevel
B	2	front & back	plywood	19	191	406	all edges have a 45° bevel
C	2	ends	plywood	19	152	191	all edges have a 45° bevel

hardware

- 1 continuous hinge 5mm × 38mm × 406mm
- 1 drawbolt
- 1 screen door handle

STEP-BY-STEP construction



step 1 • Cut all the parts to size as shown in the materials list. Then tilt the table saw blade to 45° and attach a sacrificial fence to the saw's fence. Adjust this setup until you can cut a 45° bevel on the edge of the box parts. This setup allows you to cut bevels on parts that have already been cut to size, which is easier than trying to cut all the parts to size and bevel them at the same time.

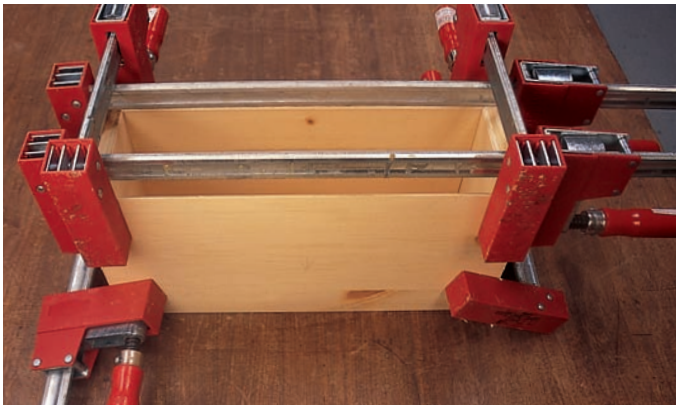
step 2 • Double-check the 45° bevel to be sure that a perfect 90° corner is formed. This is critical for all the parts to join together squarely at glue-up time.

step 3 • Lay out the bottom A, the front and back B and the two ends C faceup as shown. Use clear packing tape to tape the joints, creating a hinge. Be sure that the sharp edges of the bevels come together as cleanly as possible when you apply the tape.

tip >> BEVEL CUTS ON PLYWOOD EDGES

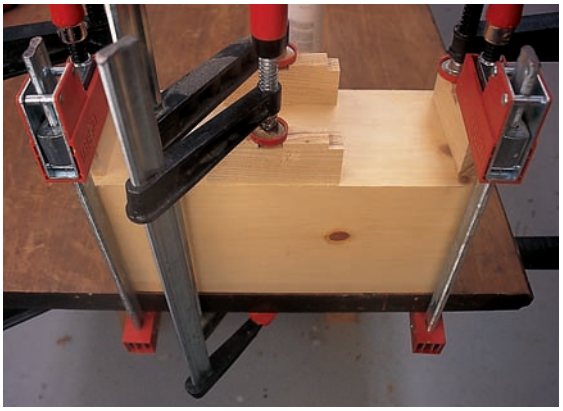
Be careful when cutting and handling plywood after you've cut bevels on the edges. Plywood edges are fragile and can be easily chipped or nicked. Also, I've received some nasty cuts from these edges as they are sharp!

step 4 • Turn the whole assembly facedown, then apply glue to all the edges that will be coming together when it's folded up.

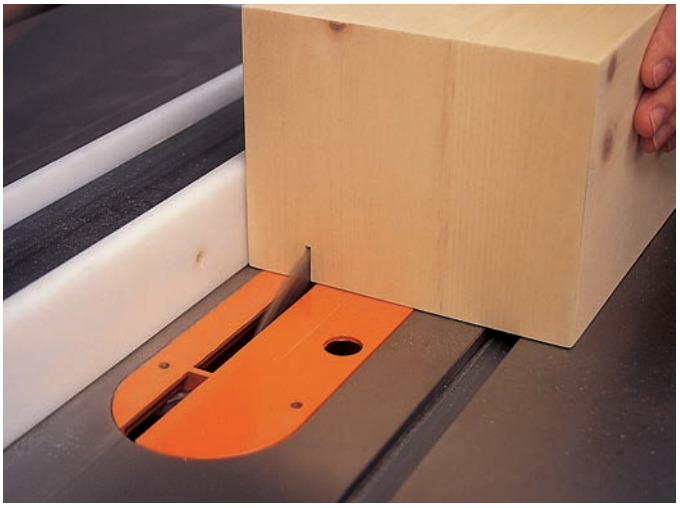


step 5 • You will need to use a few clamps to hold the side joints tightly. Don't use too much pressure, as that will distort the joint and cause it to open up at the sharp edges.

step 6 • When the glue has dried, remove the clamps, apply glue to the remaining beveled edges and attach the top.



step 7 • Use blocks under the clamps to even out the pressure. At this point you might be wondering if you could tape the top to the assembly when all the parts are lying flat in step three, and I say, "Yes, you could!" (I didn't because I simply got ahead of myself.) If I made this again, I would tape all the parts and fold up all six sides at one time.



step 8 • When the glue has dried, gently scrape or sand away any glue squeeze-out. Cut the lid off the box, using the table saw.

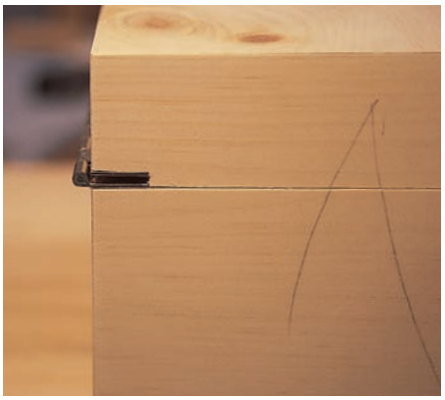
step 9 • The lid will fit perfectly on the box using this technique.

step 10 • Measure the thickness of the continuous hinge. Set the table saw fence to this measurement and make a through-cut.

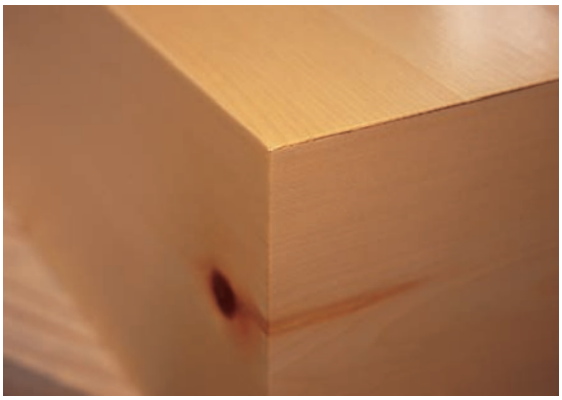
step 11 • Reset the fence to the width of the hinge leaf (this does not include the barrel of the hinge) and make the cleanup cut. This cut squares out the corner of the rabbet cut.

step 12 • This is the finished cut. If your saw blade is a little dull (as mine is), you will have some burn marks on your wood. This is OK, as the hinge will cover these marks. (I guess I should get my saw blade sharpened!)

step 13 • Install the hinge. If your cut is accurate, the hinge is lined up easily by holding the edge of the hinge leaf against the shoulder of the rabbet. By allowing the barrel of the hinge to extend beyond the edge of the box, the lid can be opened 180°.



step 14 • This is a quick but neat and tidy way to install a hinge. You can now install the drawbolt and screen door handle.



step 15 • When you've finished the box, the corners will have a nice, clean look. This is a strong joint. The gluing surface is large, and no splines or biscuits are needed.

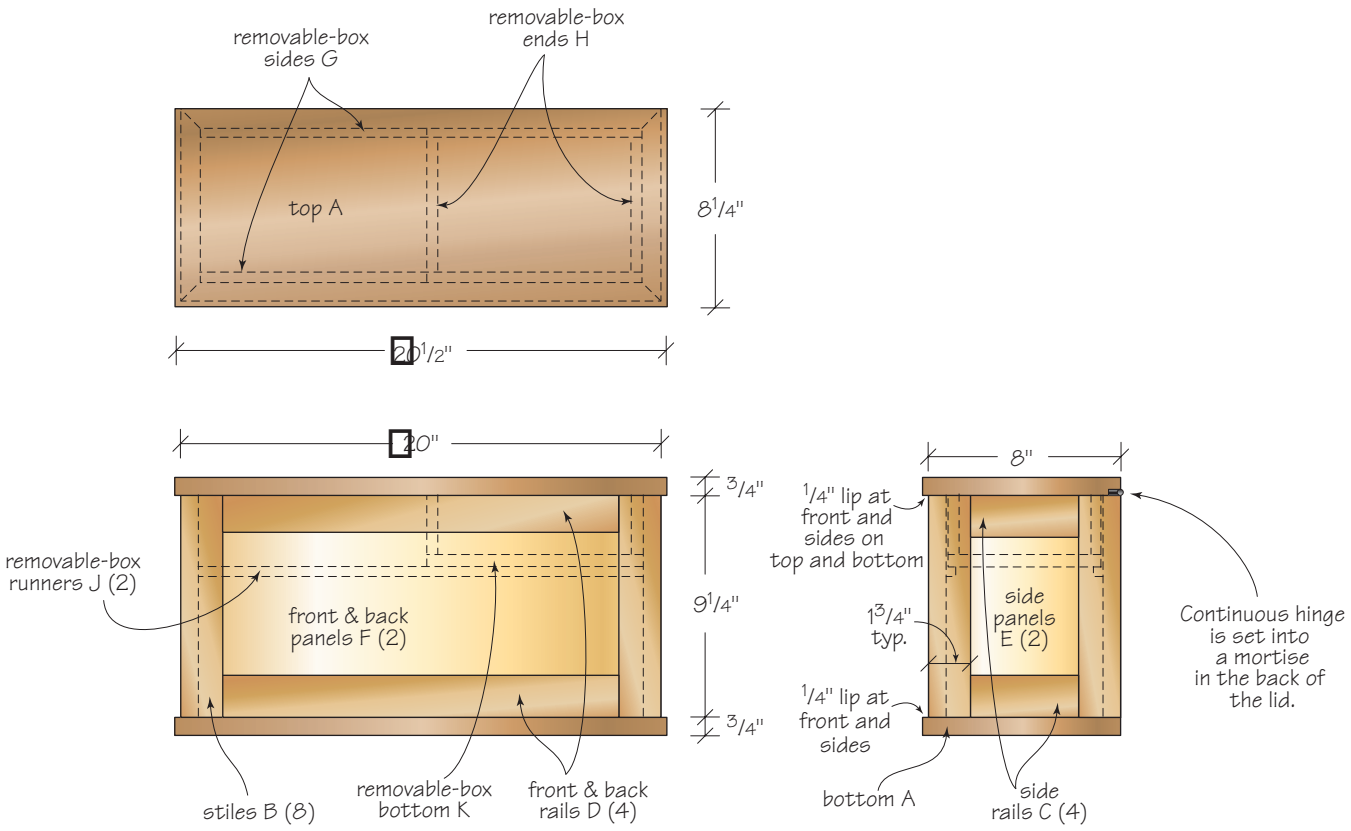
PROJECT 2

small tool chest

One of the forklift drivers in our warehouse at F&W Publications was keeping an eye out for pallet wood for me. He found a 2" × 8" × 10' board of luan mahogany. When he showed it to me I was excited because it was colorful and had some nice grain patterns in it.

I used that board to build this toolbox. I made all the framework from the solid-wood board, and I used some scrap luan ¼" plywood for the panels.

This small toolbox will sit nicely on a bench but can be easily moved if the tools in it are needed elsewhere.



materials list

INCHES

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH
A	2	top & bottom	hardwood	3/4	8 1/4	20 1/2
B	8	stiles	hardwood	3/4	1 3/4	9 1/4
C	4	side rails	hardwood	3/4	1 3/4	5 1/2
D	4	front & back rails	hardwood	3/4	1 3/4	17 1/2
E	2	side panels	plywood	1/4	6 3/4	5 1/2
F	2	front & back panels	plywood	1/4	6 3/4	17 1/2
G	2	removable-box sides	hardwood	1/2	1 1/2	8
H	2	removable-box ends	hardwood	1/2	1 1/2	5 3/8
J	2	removable-box runners	hardwood	1/2	1/2	18 1/2
K	1	removable-box bottom	plywood	1/4	6 3/8	8

hardware

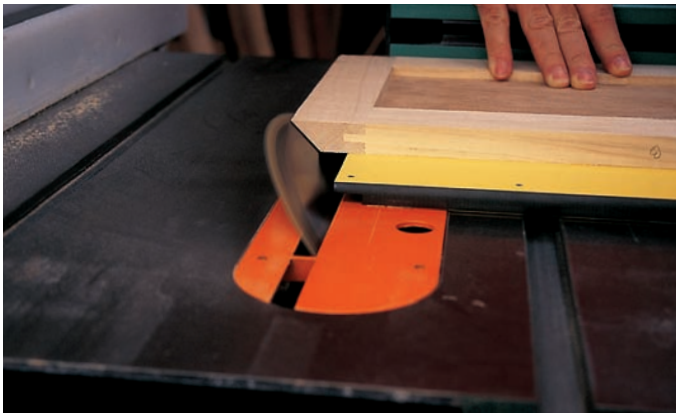
- 1 continuous hinge 3/16" × 1 1/2" × 20"

MILLIMETERS

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH
A	2	top & bottom	hardwood	19	209	521
B	8	stiles	hardwood	19	44	235
C	4	side rails	hardwood	19	44	140
D	4	front & back rails	hardwood	19	44	445
E	2	side panels	plywood	6	171	140
F	2	front & back panels	plywood	6	171	445
G	2	removable-box sides	hardwood	13	38	203
H	2	removable-box ends	hardwood	13	38	137
J	2	removable-box runners	hardwood	13	13	470
K	1	removable-box bottom	plywood	6	162	203

hardware

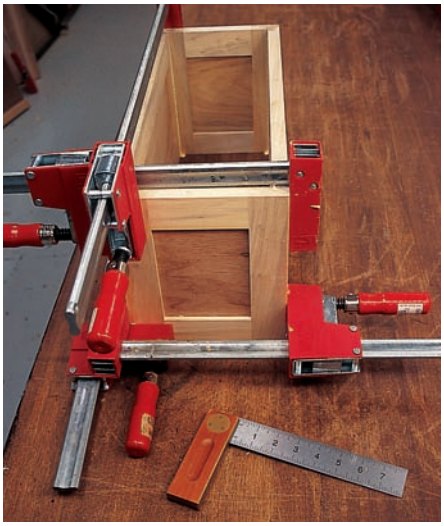
- 1 continuous hinge 5mm × 38mm × 508mm



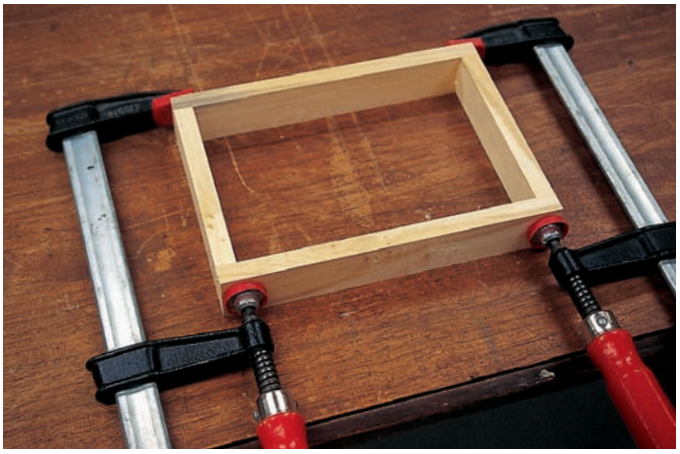
step 1 • Cut out the parts as listed in the materials list. Use parts B, C, D, E and F to build the front, back and side panels as shown in the sidebar "How to Assemble a Frame and Panel" in project seven. Then cut a 45° bevel on all the ends of the panels.

step 2 • Lay the panels faceup and end to end. Tape the joints with clear packing tape. If you like, press the tape flat with a steel or wooden roller.

step 3 • Flip the whole assembly face-down, apply glue to the bevel joints and fold it together.



step 4 • Use clamps to hold the untaped corner joint until the glue dries. Be sure the assembly is square. Cut the rabbet in the top of the back panel (see project one, steps ten and eleven), attach the continuous hinge and install the top A. Attach the bottom A with screws and install the runners J for the removable box.



step 5 • Cut out the removable-box parts G, H and K and glue the front, back and sides together using butt joints.

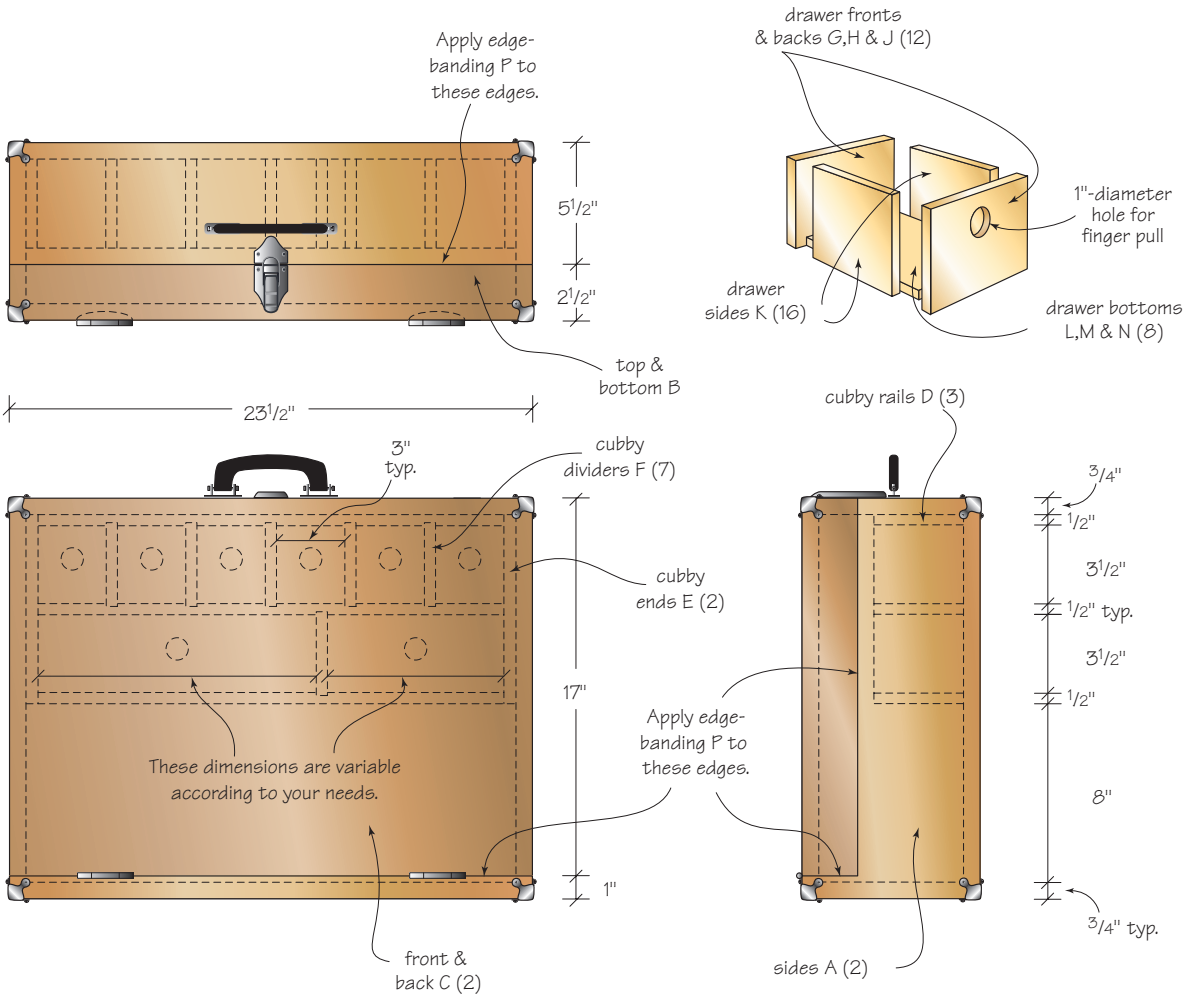
step 6 • After the glue dries, glue the bottom K to the removable box assembly. Sand the whole project and finish. Glued butt joints are strong enough for this box because the bottom helps hold the whole assembly together.

PROJECT 3

tool caddy

When I was younger, I would sometimes go with my father when he made service calls. (He was a television repairman in the late 1950s and early 1960s.) I remember a case that he called his tube caddy. It was a suitcaselike chest that held vacuum tubes, soldering guns, a volt-ohm meter and some hand tools. I was fascinated with all the compartments that held the tubes. I would sit and go through the caddy while he worked.

This tool caddy is designed with that old tube caddy as the inspiration. The cabinet is made by folding oak veneer into the shape of the box and lid. The lid is mounted with duplex hinges, so it can be removed. This might be the handiest of all the chests in this book because of how easily the caddy can be carried using the suitcase handle.



INCHES materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	sides	oak plywood	3/4	8	18	45° bevel cut on all edges
B	2	top & bottom	oak plywood	3/4	8	23 1/2	45° bevel cut on all edges
C	2	front & back	oak plywood	3/4	18	23 1/2	45° bevel cut on all edges
D	3	cubby rails	plywood	1/2	4	21	
E	2	cubby ends	plywood	1/2	4	8 1/2	
F	6	cubby dividers	plywood	1/2	3 3/4 H	4 D	
G	12	drawer fronts & backs	poplar	3/8	3 1/2 H	3	
H	1	drawer front	poplar	3/8	3 1/2 H	12 1/2	
J	1	drawer front	poplar	3/8	3 1/2 H	8	
K	16	drawer sides	poplar	3/8	3 1/2 H	3 1/8	
L	6	drawer bottoms	poplar	3/8	3 1/8	2 1/4	
M	1	drawer bottom	poplar	3/8	3 1/8	11 3/4	
N	1	drawer bottom	poplar	3/8	3 1/8	7 1/4	
P		edge-banding	oak	1/16	3/4	16'	cut to sizes needed

hardware

- 8 corner protectors, chrome
- 2 duplex hinges 3/16" × 1 1/2" × 2 1/2"
- 1 suitcase handle, black
- 1 drawbolt, chrome

MILLIMETERS materials list

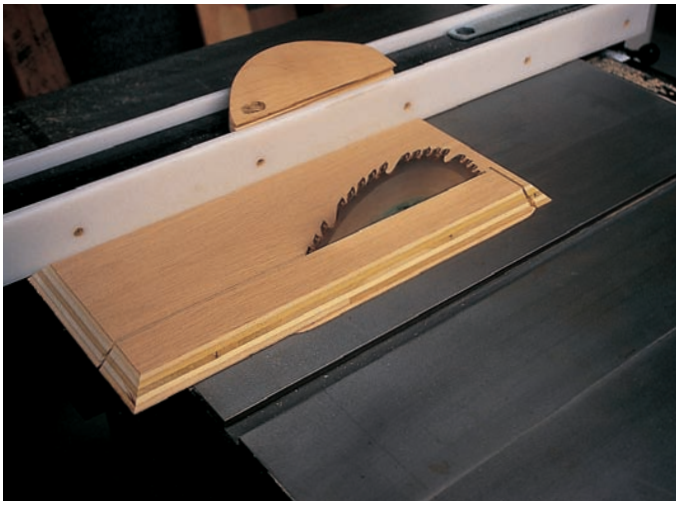
REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	sides	oak plywood	19	203	457	45° bevel cut on all edges
B	2	top & bottom	oak plywood	19	203	597	45° bevel cut on all edges
C	2	front & back	oak plywood	19	457	597	45° bevel cut on all edges
D	3	cubby rails	plywood	13	102	533	
E	2	cubby ends	plywood	13	102	216	
F	6	cubby dividers	plywood	13	95 H	102 D	
G	12	drawer fronts & backs	poplar	10	89 H	76	
H	1	drawer front	poplar	10	89 H	318	
J	1	drawer front	poplar	10	89 H	203	
K	16	drawer sides	poplar	10	89 H	79	
L	6	drawer bottoms	poplar	10	79	57	
M	1	drawer bottom	poplar	10	79	298	
N	1	drawer bottom	poplar	10	79	184	
P		edge-banding	oak	2	19	5m	cut to sizes needed

hardware

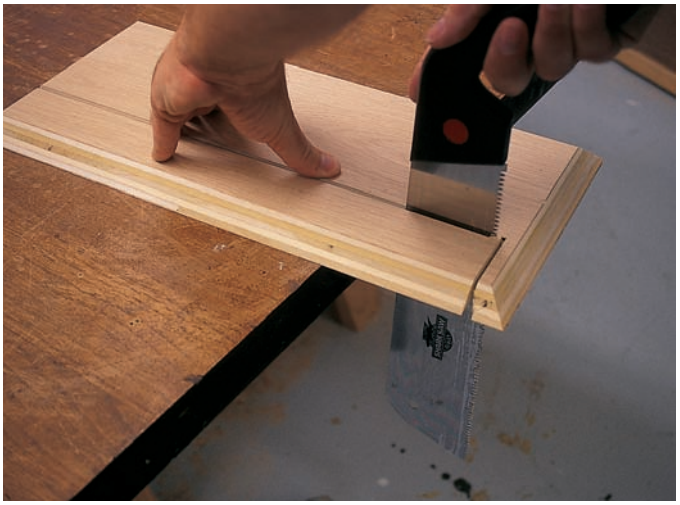
- 8 corner protectors, chrome
- 2 duplex hinges 5mm × 38mm × 64mm
- 1 suitcase handle, black
- 1 drawbolt, chrome

STEP-BY-STEP construction

step 1 • Cut out all the caddy parts A, B and C as shown in the materials list. Cut the 45° bevel on all edges (see project one, step one). Lay out the door cutouts on the sides A and make the short cut. This is safely done on the table saw when using the miter gauge with a fence attached. Remember that one part will be face out and the other will be face in. This will create left and right sides.



step 2 • Make the long cut with the sides flat on the table saw. Raise the saw blade to its full height and cut almost to the crosscut saw kerf. Be aware of the blade undercut. Turn off the saw and wait for the blade to stop turning before removing the part. Remember that one cut will be made with the side part faceup and the other will be made with the part facedown in order to create left and right parts.



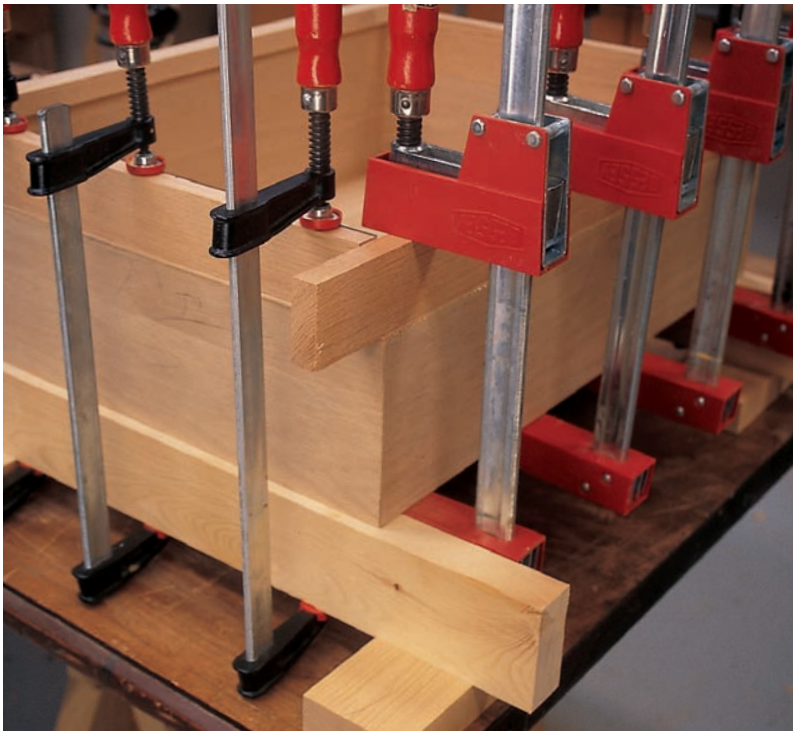
step 3 • Square the cutout with a handsaw. Clean up the little pieces of material remaining on the door part.

step 4 • Lay all the caddy parts faceup on a flat surface, align the bevels and tape the joints as shown. Turn the assembly over and fold it up dry. If all the parts have been cut squarely, the open joints should come together perfectly. Unfold, add glue to the bevel joints and fold the caddy together. Use clamps as needed to help hold the box square. These glued joints are quite strong.

step 5 • Cut the $^{1}/_{16}$" hardwood strips P, fit them at the corners using miters and tape the miters so the whole edge-banding assembly can be glued on at one time.

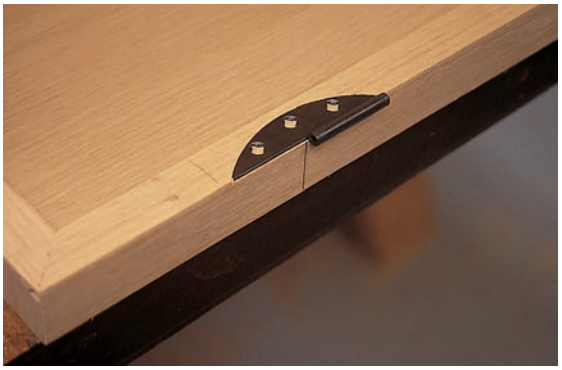
step 6 • Apply an even coat of glue to the raw edges of the plywood. Be sure the glue covers the edges completely and that it isn't too thick. The glue will begin to get tacky at this point. I've discovered that this helps the edge-banding seat better and keeps it from shifting around.

step 7 • Be sure the miter joint lines up with the miter joints on the plywood. Hold the edge-banding in place with cauls and clamps.

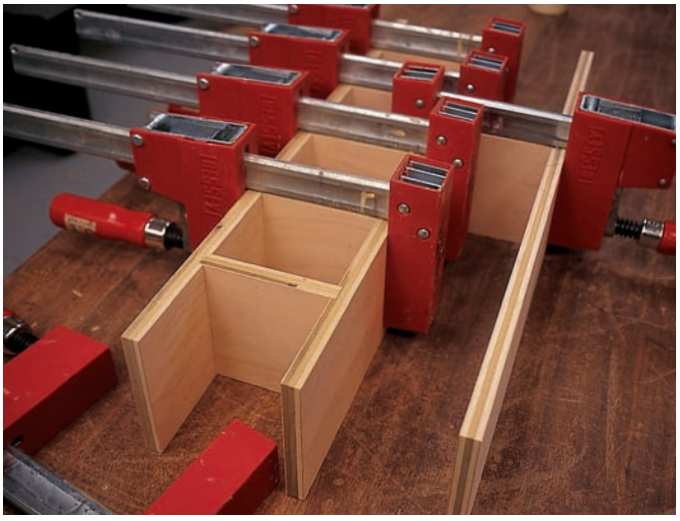


step 8 • Use gluing cauls to even out the clamping pressure and to protect the edge-banding.

step 9 • After the edge-banding has been applied and sanded flush to the surface of the veneer, cut slots for the hinges using a biscuit joiner. Center the cut on the hinged joint of the lid and the box.



step 10 • Attach the duplex hinges (the hinge will come apart, allowing the lid to be removed from the box) to the lid and box. These hinges are slick and easy to use, as you can see.



step 11 • Cut the cubby rails D, ends E and dividers F to size. Cut the dado slots in the rails and glue the assembly together. Cut the drawer parts G through N to size. Glue the drawers together using butt joints (see project two, steps five and six), then sand and fit them to the cubby assembly. Drill 1"-diameter finger holes in the fronts of the drawers. Finish the caddy, install all of the hardware, load up the caddy and you're ready to go.

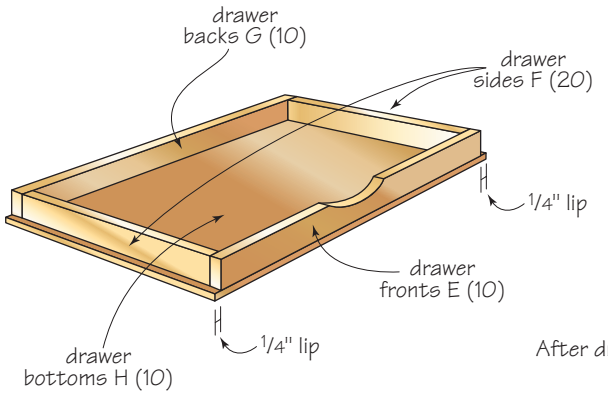
PROJECT 4

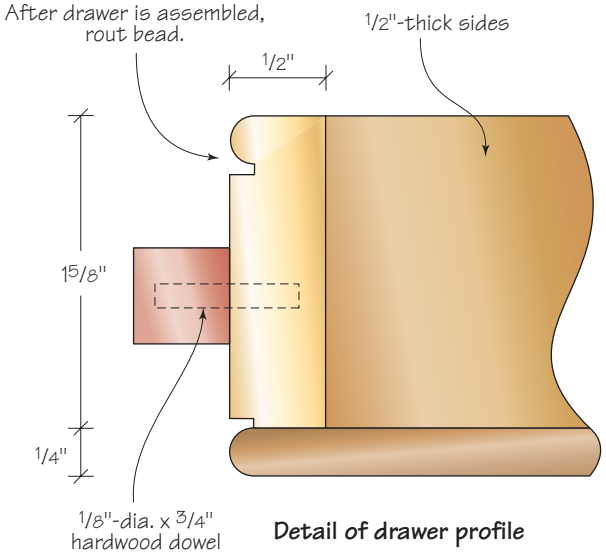
ten-drawer chest

Most woodworkers have several tools that are small, like screwdrivers, files, chisels, pliers, dividers and compasses. These can all be stored in shallow drawers, which is where this chest comes into the picture.

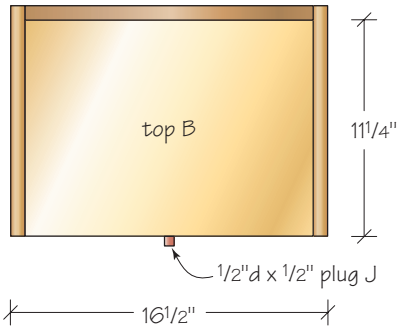
The design for the chest came from a couple of inspirations. One was a Craftsman-style bookcase plan. The chest is made of quarter-sawn white oak, and the sides and top are shaped like the bookcase. The other inspiration came from multidrawer chests that were made years ago to store sheet music.

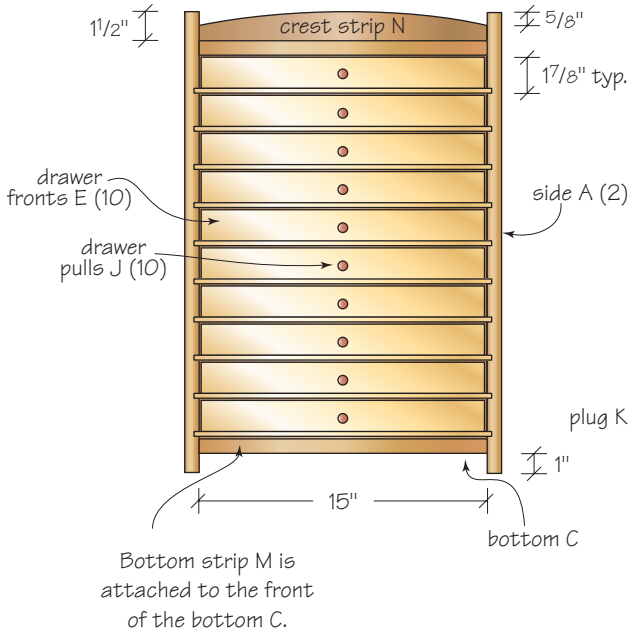
This chest was assembled with butt joints and screws. The screws were countersunk and the holes plugged with $\frac{3}{8}$" redheart plugs. The drawer pulls are also redheart, which were cut using a $\frac{1}{2}$" plug cutter.

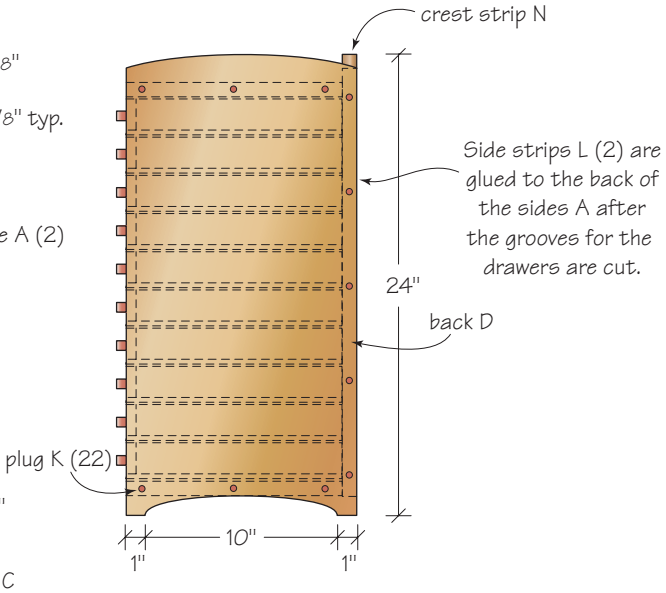




Detail of drawer profile







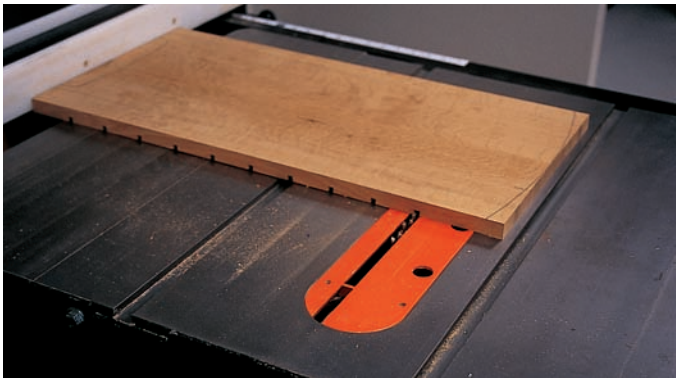
materials list

INCHES

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	sides	qs white oak	3/4	12	24	qs = quarter-sawn
B	1	top	qs white oak	3/4	11 1/4	15	
C	1	bottom	plywood	3/4	11 1/4	15	
D	1	back	plywood	3/4	15	23	top crown is 2 1/4"-wide qs white oak
E	10	drawer fronts	qs white oak	1/2	1 5/8	14 15/16	
F	20	drawer sides	poplar	1/2	1 5/8	10 1/4	
G	10	drawer backs	poplar	1/2	1 5/8	14 15/16	
H	10	drawer bottoms	plywood	1/4	11 1/4	15 1/2	trim sides to fit after drawers are assembled
J	10	drawer pulls	redheart	1/2 dia		1/2	cut with 1/2" plug cutter
K	22	plugs to cover screws	redheart	3/8 dia		1/4 +/-	cut with 3/8" plug cutter
L	2	side A strips	qs white oak	3/8	3/4	24	
M	1	bottom C strip	qs white oak	3/8	3/4	15	
N	1	crest strip	qs white oak	3/4	2 1/4	15	
P	10	dowel rods	hardwood	1/8 dia		3/4	

MILLIMETERS

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	sides	qs white oak	19	305	610	qs = quarter-sawn
B	1	top	qs white oak	19	285	381	
C	1	bottom	plywood	19	285	381	
D	1	back	plywood	19	381	584	top crown is 57mm-wide qs white oak
E	10	drawer fronts	qs white oak	13	41	379	
F	20	drawer sides	poplar	13	41	260	
G	10	drawer backs	poplar	13	41	379	
H	10	drawer bottoms	plywood	6	286	394	trim sides to fit after drawers are assembled
J	10	drawer pulls	redheart	13 dia		13	cut with 13mm plug cutter
K	22	plugs to cover screws	redheart	10 dia		6 +/-	cut with 10mm plug cutter
L	2	side A strips	qs white oak	10	19	610	
M	1	bottom C strip	qs white oak	10	10	381	
N	1	crest strip	qs white oak	19	57	381	
P	10	dowel rods	hardwood	3 dia		13	



step 1 • Cut the sides A 3/8" narrower than the finished dimension. Then cut the grooves for the drawers. Glue a 3/8" × 3/4" strip L to the back of each side. This strip will cover the ends of the grooves.

step 2 • Draw the top arc on each of the sides.

step 3 • When laying out the radii at the bottom of the sides, use a small, round object to draw the small radius that defines each foot.

step 4 • Connect these two small radii with an arc that is 1" high from the bottom of the side. Trammel points mounted on a stick are great for drawing arcs. A little trial and error is involved here unless you can figure the radius using math. I try connecting the dots, moving the pencil up or down the stick until I find the radius that works. If you don't have trammel points, drive a nail through a stick at one end. This is your fixed point. Use a small clamp or rubber band to hold a pencil anywhere you need to along the length of the stick to draw your arc.

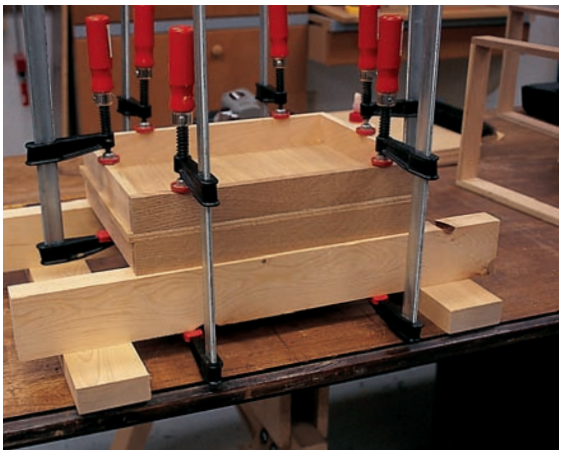
step 5 • Drill holes with the same radius as the small arcs and connect them by cutting the larger arc with a jigsaw or band saw.

step 6 • Smoothing and shaping is easily done with a rat-tail file or curved rasp.

step 7 • Glue the crest strip N on the top of the back panel D. Make the arc on the crest as you've done for the sides. Cut the top B and bottom panels C to size, then glue a $\frac{3}{8}$" × $\frac{3}{4}$" strip M on the front of the bottom panel. Assemble the chest using 2" screws. Cut the plugs K and glue them in place to cover the screw heads.

step 8 • If you like, you can cut the crest arc with a bevel to match the arc of the sides. You could go one step further and put a bevel on the side arcs to match the arc of the crest. These little details will make the sides and back flow together nicely.

step 9 • Cut all the drawer parts E, F, G and H to size. The sides F are captured between the front E and back G parts, so glue-up can be done with two clamps. I just used glue on these butt joints. I know what you're thinking: Why would he use just glue and no fasteners or other joinery to strengthen this joint? Well, after the bottoms are glued in place, the drawers are quite strong. (If you would like to use fasteners, please do so. Screws or tenons would work well.)



step 10 • I use bench horses all the time to hold parts for gluing. Several drawers can be glued at one time. After applying glue to the bottoms H, hold them in place with a few small brads or nails. Then stack up a few drawers and clamp them while the glue dries. This also helps keep the drawers flat.

step 11 • When the glue has dried on the drawers, rout the beading on the top and bottom of the drawer fronts. The drawer bottoms are the perfect thickness to accept the radius of the bead. (See the technical illustration drawer detail.)

step 12 • If necessary, fit the drawers by planing or sanding the sides of the bottoms that fit into the grooves to ensure the drawers slide smoothly. Then cut the plugs for the drawer pulls J. I attached the pulls with a $\frac{1}{8}$" dowel rod P. Drill a hole in the center of the plug, and a matching hole in the drawer front. Glue the pulls in place, then sand and finish the chest and drawers.

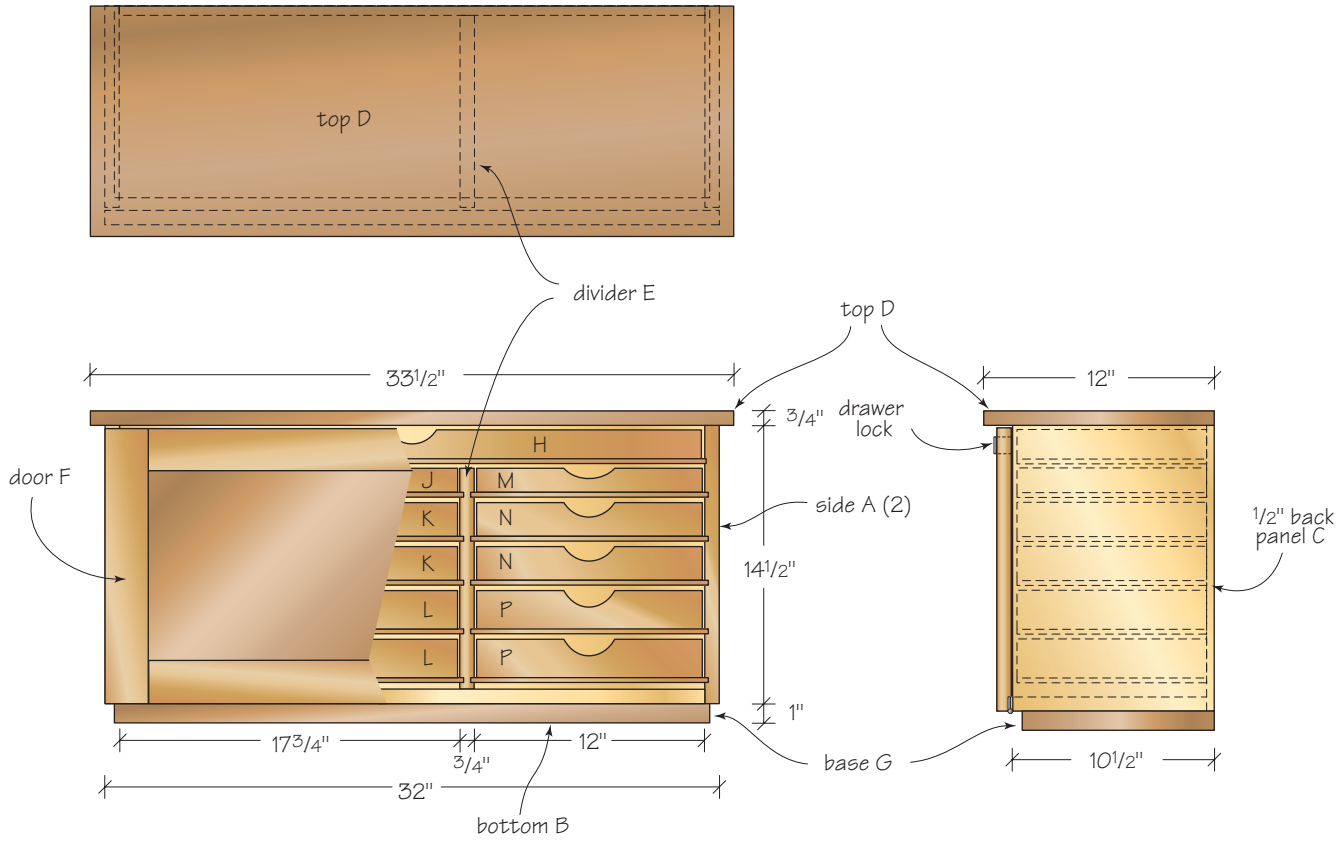
PROJECT 5

Jim's toolbox

This box is patterned after a box I made several years ago while working in a large production shop. It holds a surprising amount of tools. (At the time I made the original, I didn't have enough tools to fill half of the drawers!)

One feature deviates a little from traditional cabinetry: The divider is attached to the chest only at the bottom and the back. This makes it possible to put a wide drawer (a standard crosscut handsaw fits in it perfectly) at the top of the chest and still have smaller drawers below it. The drawers are made using the same techniques as the drawers for the ten-drawer chest.

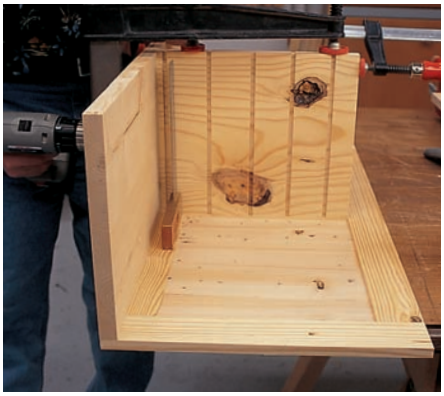
I made this chest out of a pallet I found in a warehouse. The wood has nail and screw holes in it, but it still looks neat.



STEP-BY-STEP construction

step 1 • After cutting out the parts and assembling the back panel C (see the sidebar "How to Assemble a Frame and Panel" in project seven), glue the bottom B to the back panel. Double-check for squareness.

step 2 • Cut the drawer grooves in the ends A and the divider E. Use a table saw or a router mounted in a router table. Be sure to reference the grooves from the bottoms of the parts. Hold the bottoms against the fence. This will ensure that all the grooves will line up with each other.



step 3 • Glue and screw the vertical divider E to the bottom B, and glue it to the center stile in the back panel C (no screws). Double-check that the divider is square to the bottom panel. This panel will stay in position with very little movement at the front, and the drawers will work just fine.

materials list

INCHES

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH
A	2	ends	pine	3/4	10 1/2	14 1/2
B	1	bottom	pine	3/4	10	30 1/2
C	1	back panel	pine	1/2	30 1/2	14 1/2
	2	back C stiles	pine	1/2	2 1/4	14 1/2
	1	back C center stile	pine	1/2	2 1/4	11
	2	back C rails	pine	1/2	2 1/4	27
	2	back C panels	pine	3/16	12 5/8	11
D	1	top	pine	3/4	12	33 1/2
E	1	divider	pine	3/4	10	11 1/2
F	1	door	pine	3/4	32	14 3/8
	2	door F stiles	pine	3/4	2 1/4	14 3/8
	2	door F rails	pine	3/4	2 1/4	28 1/2
	1	door F panel	pine	1/4	10 5/8	28 1/2
G	1	base	pine	1	10	31
	2	base G side rails	pine	1	2	10
	1	base G front rail	pine	1	2	31
	1	base G back rail	pine	1	2	27
H	1	top drawer	pine/ply	1 3/4	10	31
	2	drawer H sides	pine	1/2	1 1/2	9
	2	drawer H frnts & bcks	pine	1/2	1 1/2	30 7/16
	1	drawer H bott	plywood	1/4	10	31
J	1	drawer	pine/ply	1 1/2	10	18 1/4
	2	drawer J sides	pine	1/2	1 1/4	9
	2	drawer J frnts & bcks	pine	1/2	1 1/4	17 11/16
	1	drawer J bott	plywood	1/4	10	18 1/4
K	2	drawers	pine/ply	2	10	18 1/4
	4	drawer K sides	pine	1/2	1 3/4	9
	4	drawer K frnts & bcks	pine	1/2	1 3/4	17 11/16
	4	drawer K botts	plywood	1/4	10	18 1/4
L	2	drawers	pine/ply	2 1/4	10	18 1/4
	4	drawer L sides	pine	1/2	2	9
	4	drawer L frnts & bcks	pine	1/2	2	17 11/16
	2	drawer L botts	plywood	1/4	10	18 1/4
M	1	drawer	pine/ply	1 1/2	10	12 1/2
	2	drawer M sides	pine	1/2	1 1/4	9
	2	drawer M frnts & bcks	pine	1/2	1 1/4	11 15/16
	1	drawer M bott	plywood	1/4	10	12 1/2
N	2	drawers	pine/ply	2	10	12 1/2
	4	drawer N sides	pine	1/2	1 3/4	9
	4	drawer N frnts & bcks	pine	1/2	1 3/4	11 15/16
	2	drawer N botts	plywood	1/4	10	12 1/2
P	2	drawers	pine/ply	2 1/4	10	12 1/2
	4	drawer P sides	pine	1/2	2	9
	4	drawer P frnts & bcks	pine	1/2	2	11 15/16
	2	drawer P botts	plywood	1/4	10	12 1/2

hardware

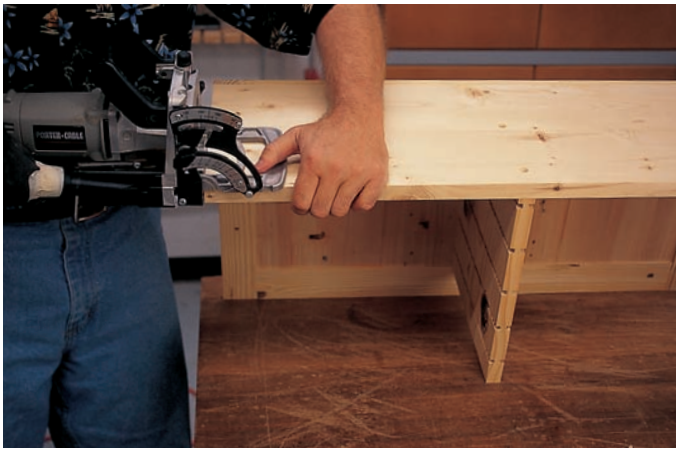
- 1 continuous hinge 3/16" × 1 1/2" × 32"
- 1 drawer lock

MILLIMETERS

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH
A	2	ends	pine	19	267	368
B	1	bottom	pine	19	254	775
C	1	back panel	pine	13	775	368
	2	back C stiles	pine	13	57	368
	1	back C center stile	pine	13	57	279
	2	back C rails	pine	13	57	686
	2	back C panels	pine	5	321	279
D	1	top	pine	19	305	851
E	1	divider	pine	19	254	292
F	1	door	pine	19	813	365
	2	door F stiles	pine	19	57	365
	2	door F rails	pine	19	57	724
	1	door F panel	pine	6	270	724
G	1	base	pine	25	254	787
	2	base G side rails	pine	25	51	254
	1	base G front rail	pine	25	51	787
	1	base G back rail	pine	25	51	686
H	1	top drawer	pine/ply	45	254	787
	2	drawer H sides	pine	13	38	229
	2	drawer H frnts & bcks	pine	13	38	773
	1	drawer H bott	plywood	6	254	787
J	1	drawer	pine/ply	38	254	464
	2	drawer J sides	pine	13	32	229
	2	drawer J frnts & bcks	pine	13	32	456
	1	drawer J bott	plywood	6	254	464
K	2	drawers	pine/ply	51	254	464
	4	drawer K sides	pine	13	45	229
	4	drawer K frnts & bcks	pine	13	45	456
	2	drawer K botts	plywood	6	254	464
L	2	drawers	pine/ply	57	254	464
	4	drawer L sides	pine	13	51	229
	4	drawer L frnts & bcks	pine	13	51	456
	2	drawer L botts	plywood	6	254	464
M	1	drawer	pine/ply	38	254	318
	2	drawer M sides	pine	13	32	229
	2	drawer M frnts & bcks	pine	13	32	303
	1	drawer M bott	plywood	6	254	311
N	2	drawers	pine/ply	51	254	298
	4	drawer N sides	pine	13	45	229
	4	drawer N frnts & bcks	pine	13	45	303
	2	drawer N botts	plywood	6	254	311
P	2	drawers	pine/ply	57	254	298
	4	drawer P sides	pine	13	51	229
	4	drawer P frnts & bcks	pine	13	51	303
	2	drawer P botts	plywood	6	254	311

hardware

- 1 continuous hinge 5mm × 38mm × 813mm
- 1 drawer lock

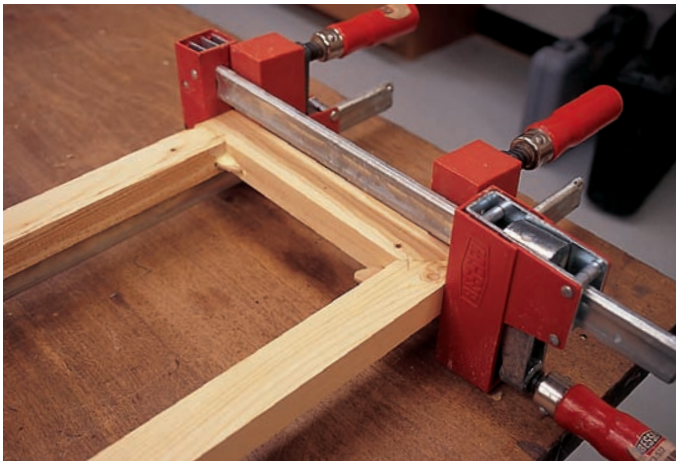


step 4 • Cut biscuit slots in the ends of the back panel C and matching slots in the end panels A.

step 5 • Using biscuits, attach the ends A to the back/bottom assembly.

step 6 • Cut the necessary biscuit slots in the top edges of the ends and back. Cut matching slots in the top D. (Remember, when cutting the slots in the underside of the top, allow for the top overhang at the sides.)

step 7 • This is another view of the top glue-up. Using wooden battens helps distribute the clamping pressure evenly and protects the project from being dented by the clamps.



step 8 • Assemble the tool chest base G using biscuits. The two front joints are mitered, and the back joints are butted.

step 9 • Attach the base G to the bottom of the cabinet with screws. Use no glue.

step 10 • Cut out all the drawer parts. Then cut or sand a circular finger pull in the drawer fronts.

step 11 • Assemble the drawers as shown in project four, steps nine and ten. Remember to cut the drawer fronts and backs $\frac{1}{16}$" less than the opening that the drawer will fit into. This will allow plenty of clearance for the drawers to slide freely. This is not a finely tuned set of drawers. They are made to work smoothly and still fit nicely in their respective openings.

step 12 • The drawer bottoms have a $\frac{1}{4}$" lip on each side. Measure the drawer boxes and add $\frac{1}{2}$". Cut the drawer bottoms to this dimension and center the bottoms on the drawer box. The drawers should fit just right. If the drawers do need fitting, shave a little material off the ends of the drawer bottoms. It won't take much, so go easy. If you want to fit the drawers just right, measure the drawer opening from the bottom of each groove, then cut the drawer bottom to this dimension. Assemble the drawer and try the fit. If the drawer bottom fits into the grooves (right to the bottom of the groove), you will have a nicely fitting drawer that will have minimal side-to-side movement.

step 13 • Assemble the frame and panel door. Then, set the continuous hinge into a mortise in the door. This mortise depth should be the same dimension as the thickness of the hinge so the door will close tightly against the front of the chest.

step 14 • This is a view of the closed door. (It looks cleaner if the door seats tightly to the chest.) You could also set the hinge in a stopped mortise if you don't want to see the end of the mortise and the hinge. Finally, install the door lock.

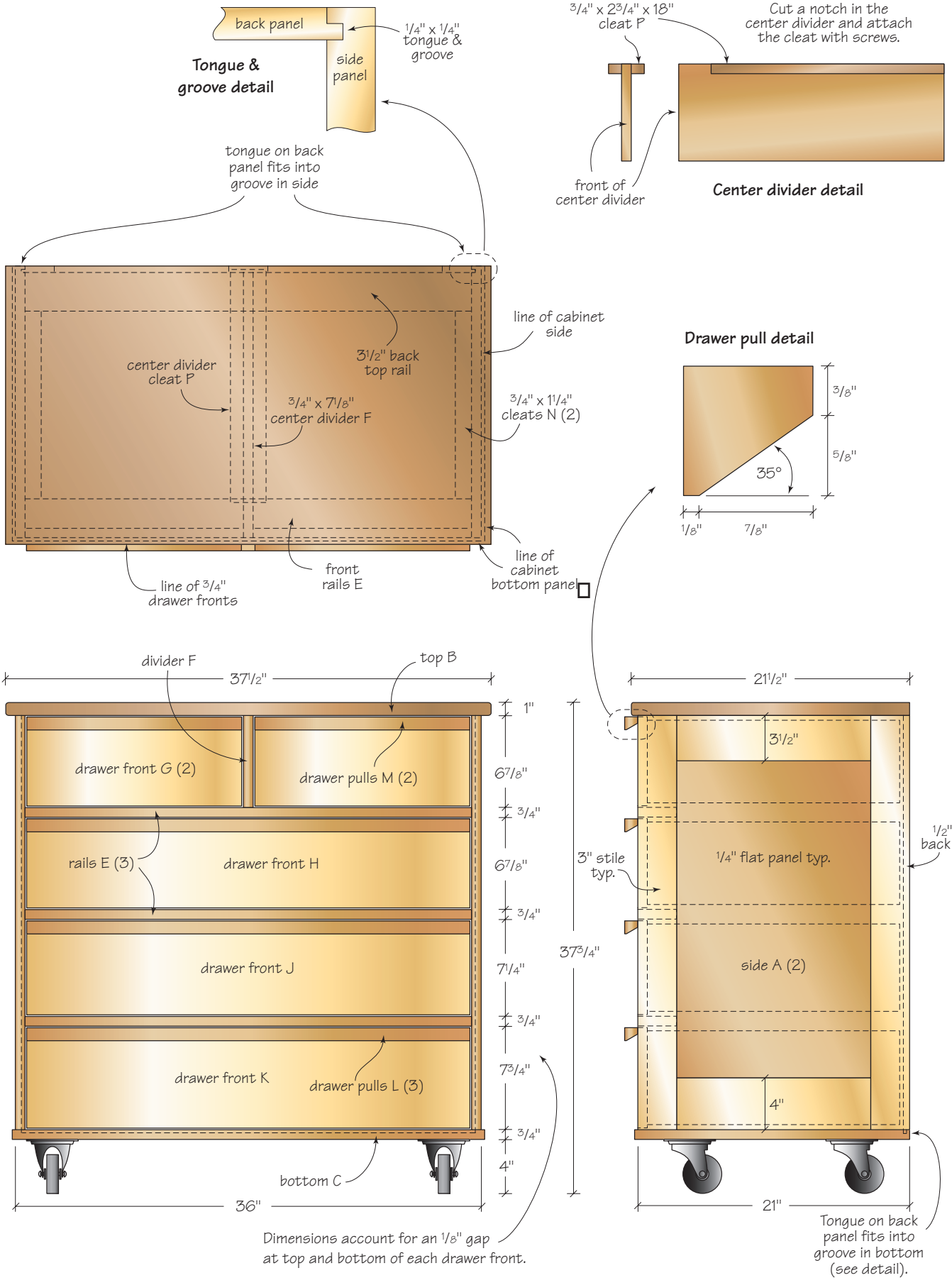

PORTER-CABLE
PORTER-CABLE

PROJECT 6

rolling tool cabinet

If you need a place to store hand power tools, this rolling cabinet is a great choice. If you need to move the tools where the work is, no problem. The top of the cabinet also makes a great work surface. The drawers are deep enough for most hand power tools. If you need more room, it's easy to make the drawers larger. I built this cabinet from two pallets. Pallet lumber is good to use because it won't change dimensions much. It has been exposed to the elements for a fair amount of time, so its moisture content is stable.

You can use the tool-box in project five with this cabinet to make a roomy tool storage unit.


back panel
1/4" x 1/4" tongue & groove
side panel
Tongue & groove detail
tongue on back panel fits into groove in side
3/4" x 2 3/4" x 18" cleat P
Cut a notch in the center divider and attach the cleat with screws.
front of center divider
Center divider detail
line of cabinet side
3 1/2" back top rail
center divider cleat P
3/4" x 7 1/8" center divider F
3/4" x 11/4" cleats N (2)
Drawer pull detail
3/8"
5/8"
35°
1/8"
7/8"
line of 3/4" drawer fronts
front rails E
line of cabinet bottom panel
divider F
37 1/2"
top B
1"
drawer front G (2)
drawer pulls M (2)
6 7/8"
3/4"
rails E (3)
drawer front H
drawer front J
7 1/4"
drawer front K
drawer pulls L (3)
7 3/4"
4"
bottom C
36"
Dimensions account for an 1/8" gap at top and bottom of each drawer front.
21 1/2"
3 1/2"
1/2" back D
1/4" flat panel typ.
3" stile typ.
37 3/4"
side A (2)
4"
21"
Tongue on back panel fits into groove in bottom (see detail).

materials list

INCHES

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH
A	2	sides	pine	3/4	21	32
	4	side A stiles	pine	3/4	3	32
	2	side A top rails	pine	3/4	3 1/2	16
	2	side A bottom rails	pine	3/4	4	16
	2	side A panels	pine	1/4	15 3/4	25 1/4
B	1	top	pine	1	21 1/2	37 1/2
C	1	bottom	pine	3/4	21 1/4	36 1/2
D	1	back	pine	1/2	32 1/4	35
	2	back D stiles	pine	1/2	3 1/4	32 1/4
	1	back D center stile	pine	1/2	3	25 1/2
	1	back D top rail	pine	1/2	3 1/2	29 1/2
	1	back D bottom rail	pine	1/2	4 1/4	29 1/2
	2	back D panels	pine	3/16	13 5/8	25 1/2
E	3	front rails	pine	3/4	3	35
F	1	divider	pine	3/4	7 1/8	19 1/2
G	2	drawer fronts	pine	3/4	6 7/8	16 5/8
H	1	drawer front	pine	3/4	6 7/8	34 1/4
J	1	drawer front	pine	3/4	7 1/4	34 1/4
K	1	drawer front	pine	3/4	7 3/4	34 1/4
	4	drawer G box frnts & bcks	Baltic birch ply	1/2	6 3/8	14 7/8
	2	drawer H box frnts & bcks	Baltic birch ply	1/2	6 3/8	32 1/2
	2	drawer J box frnts & bcks	Baltic birch ply	1/2	6 3/4	32 1/2
	2	drawer K box frnts & bcks	Baltic birch ply	1/2	7 1/4	32 1/2
	6	drawer G & H box sides	Baltic birch ply	1/2	6 3/8	19 1/2
	2	drawer J box frnts & bcks	Baltic birch ply	1/2	6 3/4	19 1/2
	2	drawer K box frnts & bcks	Baltic birch ply	1/2	7 1/4	19 1/2
	2	drawer G bottoms	Baltic birch ply	1/2	15 7/8	19 1/2
	3	drawer H,J &K bottoms	Baltic birch ply	1/2	33 1/2	19 1/2
L	3	drawer H, J & K pulls	pine	1	1	34 1/4
M	2	drawer G pulls	pine	1	1	16 5/8
N	2	top cleats	pine	3/4	1 1/4	14 1/4

hardware

- 4 4" swivel casters
- 5 sets 20" full-extension, heavy-duty drawer slides

MILLIMETERS

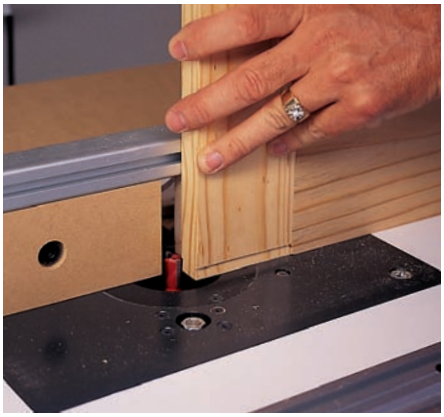
REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH
A	2	sides	pine	19	533	813
	4	side A stiles	pine	19	76	813
	2	side A top rails	pine	19	89	406
	2	side A bottom rails	pine	19	102	406
	2	side A panels	pine	6	400	641
B	1	top	pine	25	546	953
C	1	bottom	pine	19	540	927
D	1	back	pine	13	819	889
	2	back D stiles	pine	13	82	819
	1	back D center stile	pine	13	76	648
	1	back D top rail	pine	13	89	749
	1	back D bottom rail	pine	13	108	749
	2	back D panels	pine	5	346	648
E	3	front rails	pine	19	76	889
F	1	divider	pine	19	181	495
G	2	drawer fronts	pine	19	175	422
H	1	drawer front	pine	19	175	870
J	1	drawer front	pine	19	184	870
K	1	drawer front	pine	19	197	870
	4	drawer G box frnts & bcks	Baltic birch ply	13	162	378
	2	drawer H box frnts & bcks	Baltic birch ply	13	162	826
	2	drawer J box frnts & bcks	Baltic birch ply	13	171	826
	2	drawer K box frnts & bcks	Baltic birch ply	13	184	826
	6	drawer G & H box sides	Baltic birch ply	13	162	495
	2	drawer J box frnts & bcks	Baltic birch ply	13	171	495
	2	drawer K box frnts & bcks	Baltic birch ply	13	184	495
	2	drawer G bottoms	Baltic birch ply	13	403	495
	3	drawer H,J & K bottoms	Baltic birch ply	13	851	495
L	3	drawer H, J & K pulls	pine	25	25	870
M	2	drawer G pulls	pine	25	25	422
N	2	top cleats	pine	25	32	362

hardware

- 4 100mm swivel casters
- 5 sets 500mm full-extension, heavy-duty drawer slides

step 1 • Carefully inspect all the wood for nails, screws, staples and any other pieces of metal. Use a small metal detector to find the hidden nails, etc. Once the wood is cleaned up, it's on to building the project!

step 2 • Construct the frame and panel sides A and back D as shown in the sidebar "How to Assemble a Frame and Panel" in project seven. Cut a tongue on the sides and bottom of the back panel. Then cut matching grooves in the sides and bottom C. (See the technical illustration for details.) Lay out the dovetail slots for the front rails E on the insides of the side panels, then make a simple jig as shown to guide the router when cutting the stopped slots.



step 3 • Using the same dovetail router bit, cut the tails on the ends of the front rails E. (Use some scrap wood the same thickness as the rails to make test-cuts when fitting the tails to the stopped slots.) Note the use of a scrap piece of wood to stabilize the rail.

step 4 • When all the parts are fitted properly, add some glue to the slots and tails. Tap the rails E into place.

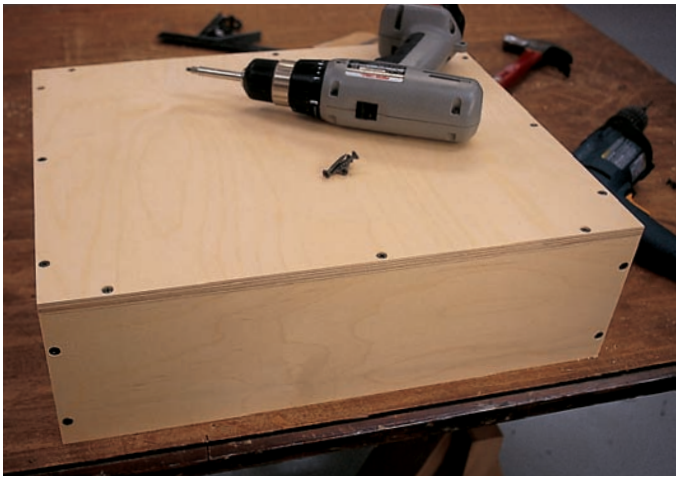
step 5 • Glue the back panel D into the grooves in the sides A. I let the cabinet hang over the bench so the tongue on the bottom of the back panel could stand proud of the sides.

step 6 • Cut biscuit slots in the bottom panel C as shown.

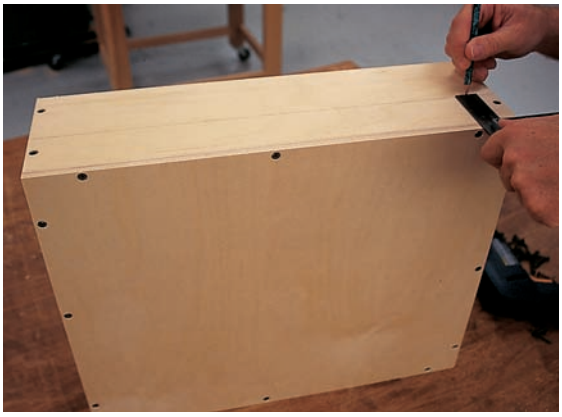
step 7 • Cut matching biscuit slots in the bottom edges of the cabinet sides A. Put glue on the center biscuit only, set the panel in place and use screws in oversize clearance holes to hold the panel in place. (The extra biscuits are to help align the parts.)

step 8 • Lay the cabinet on its sides to install the drawer slides. Draw a center line square to the front of the cabinet, line up the screw holes in the slide on this line and insert the screws. I prefer to mount side-mount drawer slides toward the top of the drawer box. Use full-extension, heavy-duty slides. You'll be putting heavy tools into these drawers, and you'll want full access to them. Then, install the top cleats N on the inside top of each side panel. Put glue only in the back groove in the top. Use screws installed in oversized holes drilled in the cleats N to attach the top. This allows for seasonal movement of the top.

step 9 • Cut the drawer parts to size and screw the drawer boxes together. I've found that drawers that are screwed together are very strong and are much quicker to make than drawers that involve more complex joinery. Of course, you can make them to your own personal preferences. If you do, remember to make the proper adjustments in the drawer parts' dimensions.

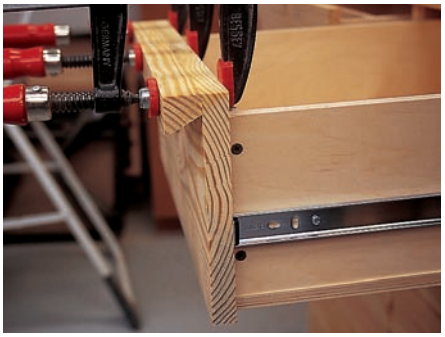


step 10 • Attach the bottoms. The ½"-thick bottoms will support large amounts of weight.



step 11 • Draw a center line on the sides of each drawer box and install the hardware runners. Then put the drawer boxes into the cabinet so you can align and attach the drawer fronts.

step 12 • When mounting the drawer fronts onto the drawer boxes, I've found it's easiest to install two screws toward the top and at each side of the box front. Drive the screws slightly through the drawer box front, align the drawer front on the cabinet and tap it slightly. This will make two dimples on the inside of the drawer front that you can use as guides to drill pilot holes for the screws. Then simply realign the drawer front and screw it into place on the drawer box.



step 13 • These down-and-dirty drawer pulls will stand up to whatever you dish out. Cut each pull's profile on the table saw, sand the pulls smooth and glue them onto the drawer fronts. They'll never bend or come loose!


WAYNE

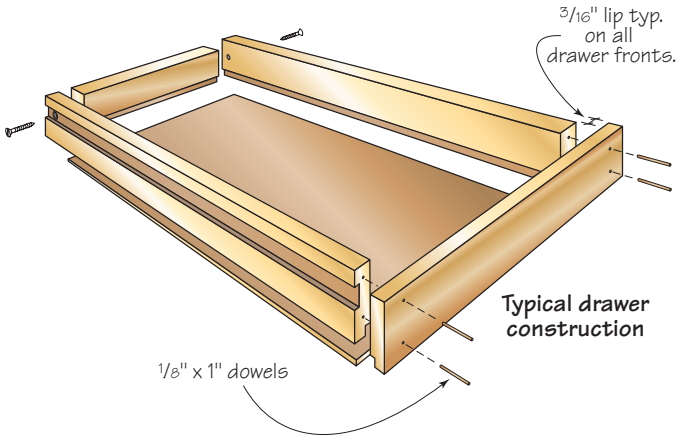
PROJECT

7

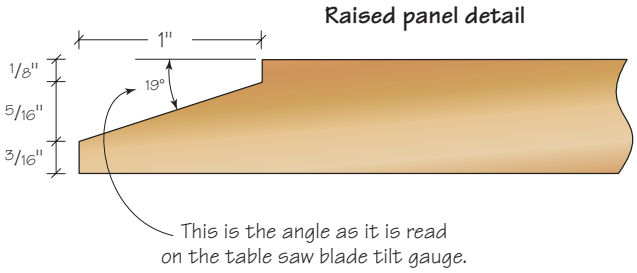
cabinetmaker's chest

This tool chest is a classic design. I made it out of red oak and stained it a medium-dark color. When closed, the lid pushes a rod into a hole in the top of the drop-front door, holding it closed. If the top is locked, the whole chest is locked. It is easily moved using the handles on the sides.

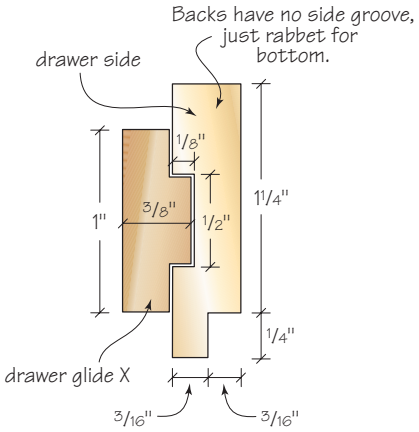
If you want to make a larger version of this chest, add more drawers or make the top deeper, feel free to do so. This is a basic starter unit for someone with a few screwdrivers, wrenches, pliers and socket sets.



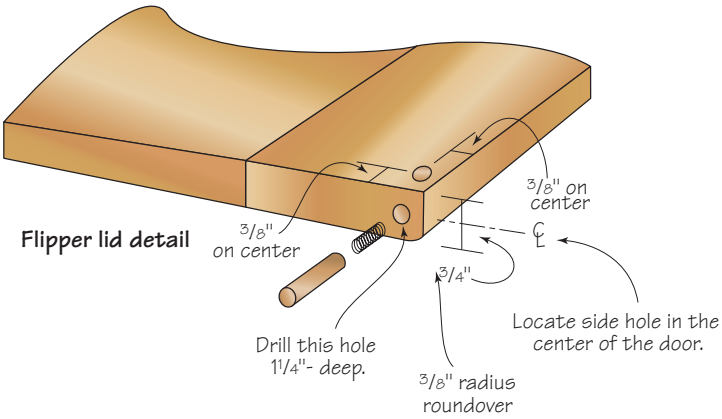
Typical drawer construction



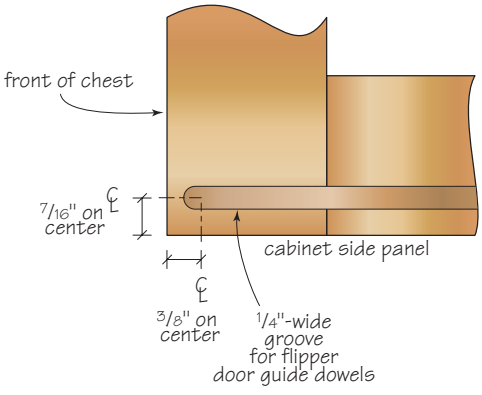
Raised panel detail



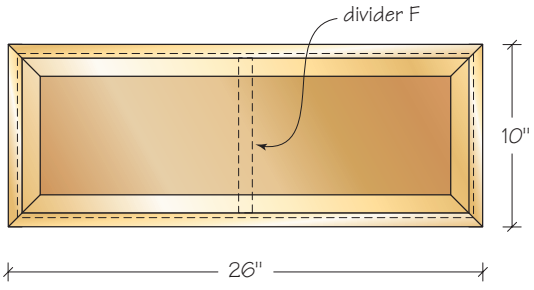
Full-scale drawer glide/side detail



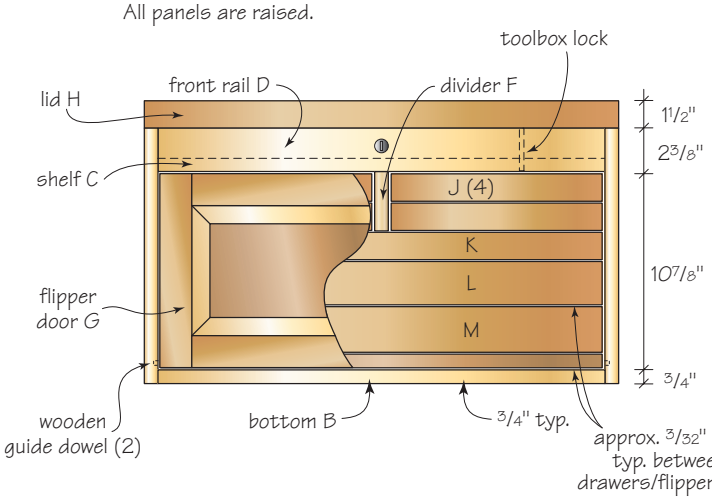
Flipper lid detail

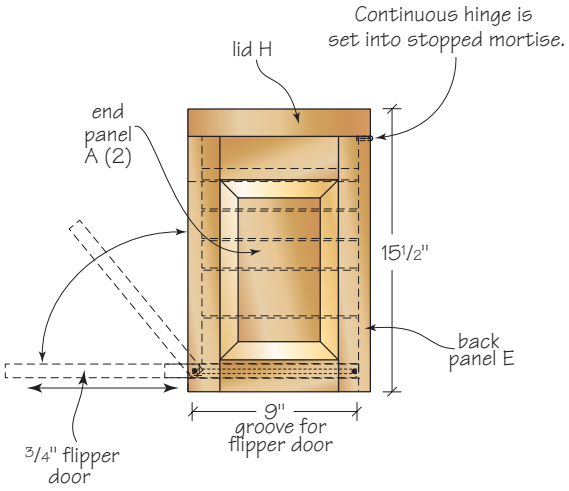


Half-scale detail of groove for flipper door



All panels are raised.





INCHES materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	end panels	red oak	3/4	10	14	
	4	end A stiles	red oak	3/4	1 3/4	14	
	2	end A top rails	red oak	3/4	2 3/8	7 1/2	
	2	end A bottom rails	red oak	3/4	1 3/4	7 1/2	
	2	end A panels	red oak	1/2	7 1/4	10 7/8	
B	1	bottom	plywood	3/4	9 1/4	24 1/2	with 1/4" × 3/4" × 24 1/2" red oak strip to front edge of bottom
C	1	shelf	plywood	3/4	8 1/2	24 1/2	
D	1	front rail	red oak	3/4	2 3/8	24 1/2	
E	1	back panel	red oak	3/4	14	24 1/2	
	2	back E stiles	red oak	3/4	1 3/4	14	
	1	back E top rail	red oak	3/4	2 3/8	22	
	1	back E bottom rail	red oak	3/4	1 3/4	22	
	1	back E panel	red oak	1/2	10 7/8	22	
F	1	divider	plywood	3/4	3 1/4	8 1/2	with 1/4" × 3/4" × 3 1/4" red oak strip to front edge of divider
G	1	flipper door	red oak	3/4	10 5/8	24 3/8	
	2	flipper door G stiles	red oak	3/4	1 3/4	10 5/8	
	2	flipper door G rails	red oak	3/4	1 3/4	21 7/8	
	1	flipper door G panel	red oak	1/2	7 7/8	21 7/8	
H	1	lid	red oak	1 1/2	10	26	
	2	lid H side rails	red oak	3/4	1 1/2	26	
	2	lid H end rails	red oak	3/4	1 1/2	10	
	1	lid H panel	red oak	1/2	9	25	
J	4	drawer fronts	red oak	3/8	1 1/2	11 11/16	
K	1	drawer front	red oak	3/8	1 1/2	24 5/16	
L	1	drawer front	red oak	3/8	2 3/8	24 5/16	
M	1	drawer front	red oak	3/8	2 1/2	24 5/16	
N	10	drawer J & K sides	red oak	3/8	1 1/2	7 7/8	see illustration for drawer glide/side details
P	2	drawer L sides	red oak	3/8	2 3/8	7 7/8	see illustration for drawer glide/side details
Q	2	drawer M sides	red oak	3/8	2 1/2	7 7/8	see illustration for drawer glide/side details
R	4	drawer J backs	red oak	3/8	1 1/2	10 9/16	
S	1	drawer K back	red oak	3/8	1 1/2	23 3/16	
T	1	drawer L back	red oak	3/8	2 3/8	23 3/16	
U	1	drawer M back	red oak	3/8	2 1/2	23 3/16	
V	4	drawer J bottoms	plywood	1/4	8 1/4	10 15/16	
W	3	drawer K, L & M bottoms	plywood	1/4	8 1/4	23 9/16	
X	14	drawer glides	red oak	3/8	1	7 7/8	see illustration for drawer glide/side details

hardware

■ 1	continuous hinge	3/16" × 1 1/2" × 24"
■ 1	bullet catch	Rockler #28464
■ 1	5/8" sash knob	Rockler #68627
■ 1	toolbox lock	Rockler #79236
■ 2	brass chest handles	Rockler #25841
■ 1	full-mortise lock	Rockler #28241
■ 1	small expansion spring	from a ballpoint pen, cut in half to make 2 springs
■ 2	wooden guide dowels	1/4" dia. × 3/4"
■ 28	wooden drawer dowels	1/8" × 1"

MILLIMETERS materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	end panels	red oak	19	254	356	
	4	end A stiles	red oak	19	45	356	
	2	end A top rails	red oak	19	60	191	
	2	end A bottom rails	red oak	19	45	191	
	2	end A panels	red oak	13	184	276	
B	1	bottom	plywood	19	235	622	with 6mm × 19mm × 622mm red oak strip to front edge of bottom
C	1	shelf	plywood	19	216	622	
D	1	front rail	red oak	19	60	622	
E	1	back panel	red oak	19	254	622	
	2	back E stiles	red oak	19	45	356	
	1	back E top rail	red oak	19	60	559	
	1	back E bottom rail	red oak	19	45	559	
	1	back E panel	red oak	13	276	559	
F	1	divider	plywood	19	83	216	with 6mm × 19mm × 83mm red oak strip to front edge of divider
G	1	flipper door	red oak	19	270	619	
	2	flipper door G stiles	red oak	19	45	270	
	2	flipper door G rails	red oak	19	45	556	
	1	flipper door G panel	red oak	13	200	556	
H	1	lid	red oak	38	254	660	
	2	lid H side rails	red oak	19	38	660	
	2	lid H end rails	red oak	19	38	254	
	1	lid H panel	red oak	13	229	635	
J	4	drawer fronts	red oak	10	38	297	
K	1	drawer front	red oak	10	38	618	
L	1	drawer front	red oak	10	60	618	
M	1	drawer front	red oak	10	64	618	
N	10	drawer J & K sides	red oak	10	38	200	see illustration for drawer glide/side details
P	2	drawer L sides	red oak	10	38	200	see illustration for drawer glide/side details
Q	2	drawer M sides	red oak	10	64	200	see illustration for drawer glide/side details
R	4	drawer J backs	red oak	10	38	268	
S	1	drawer K back	red oak	10	38	589	
T	1	drawer L back	red oak	10	60	589	
U	1	drawer M back	red oak	10	64	589	
V	4	drawer J bottoms	plywood	6	210	278	
W	3	drawer K, L & M bottoms	plywood	6	210	599	
X	14	drawer glides	red oak	10	25	200	see illustration for drawer glide/side details

hardware

■ 1	continuous hinge	5mm × 38mm × 610mm
■ 1	bullet catch	Rockler #28464
■ 1	16mm sash knob	Rockler #68627
■ 1	toolbox lock	Rockler #79236
■ 2	brass chest handles	Rockler #25841
■ 1	full-mortise lock	Rockler #28241
■ 1	small expansion spring	from a ballpoint pen, cut in half to make 2 springs
■ 2	wooden guide dowels	6mm dia. × 19mm
■ 28	wooden drawer dowels	3mm × 25mm

How to Assemble a Frame and Panel

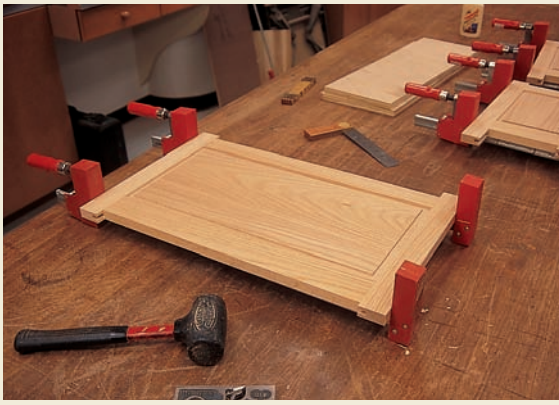
step 1 • Assembly of a frame and panel can be simplified if you proceed as shown in these photos. First, lay out all of the parts, including glue, hammer and clamps. Orient all the parts as you want them put together in the final assembly. It may seem silly to do this for each assembly, but it is easy to make mistakes — for example, turning a panel upside down.

step 2 • Add glue to the end of the first rail and set it in place on the stile. (Note that I cut my stiles a little longer than indicated in the cutting list. I then trim them to length after the frame is assembled. If you cut your stiles to the dimensions as shown in the cutting list, your rail's edges will be flush with the ends of the stiles.)

step 3 • Put the panel in place.

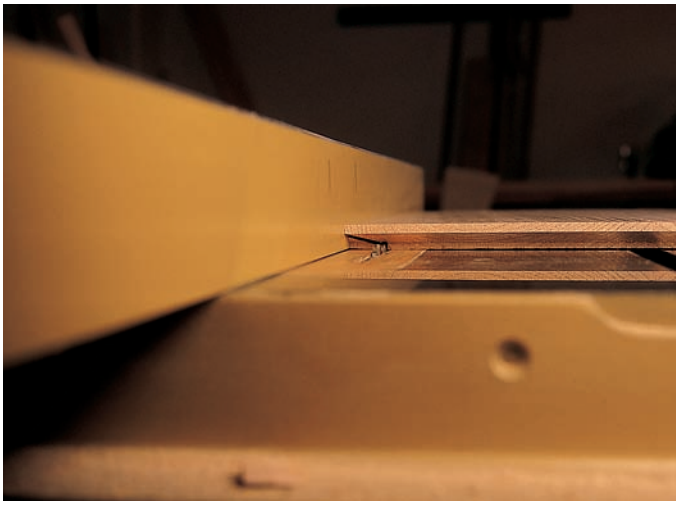
step 4 • Add glue to the end of the other rail and put it in place.

step 5 • Put glue on the ends of both rails and put the other stile in place.



step 6 • Lay the clamps and panel assembly flat; apply light pressure with the clamps. Check the assembly for squareness, adjust if necessary and add a little more pressure with the clamps until the joints are tight. Do not apply any more clamping pressure than is needed because you could distort the joint and it won't stay seated properly.

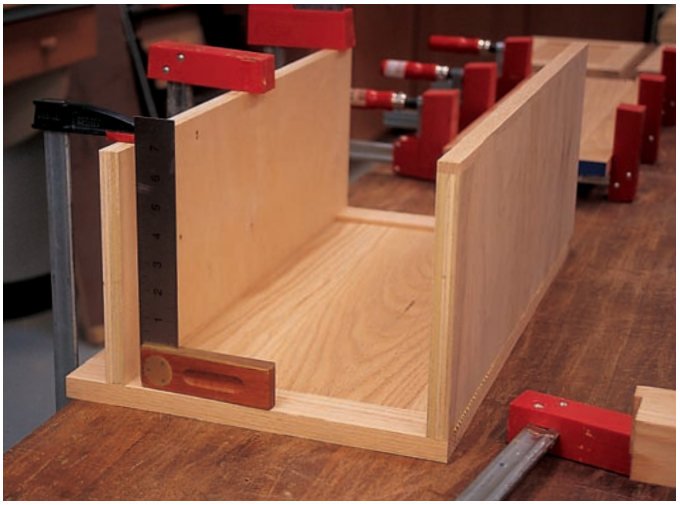
step 1 • Use a ripping blade to cut the bevels on the panels for ends A, back E, flipper door G and lid H. These are cut at 19°. Standard bevels are usually 5° to 9°. I wanted a narrower setoff on the raised part of the panel, so I increased the angle. (This allows the end of the bevel to still fit into the $^{1}/_{4}$" groove in the frame parts.)



step 2 • After cutting the bevels, set the saw blade square to the table. Lay the panel facedown and cut the cheek on the bevel to set the raised section of the panel. Cut and machine all the frame parts, then glue the panels together. See the sidebar "How to Assemble a Frame and Panel."

step 3 • Glue the hardwood edging on the front edge of the bottom B. Level the excess edging to the surface of the plywood using a block plane or sand it flush.

step 4 • Glue the bottom B to the back panel E. As always, check for squareness of the parts to each other.



step 5 • Next, glue the shelf C to the back E. Align the bottom of the shelf with the bottom edge of the back's top rail.

step 6 • Cut the stopped grooves (which are the tracks for the guide dowels in the flipper door G) in the end panels A, using a ¼" straight router bit. (See the technical drawing for details.) You can do this as shown on a router table or you can set up a router with a guide fence. Use the bottom of the panel as a reference for the guide fence.

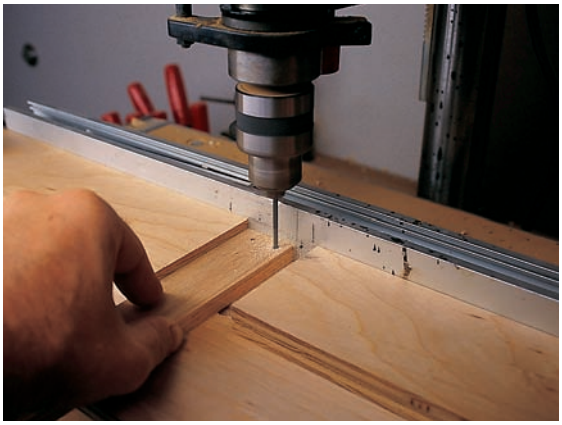
step 7 • Glue the end panels A and front rail D in place.

step 8 • Set up a dado cutter on the table saw and attach a sacrificial fence to your standard fence. Machine the drawer glides X and the drawer sides N, P and Q. Then machine the drawer backs R, S, T and U with just the rabbet for the drawer bottoms.

step 9 • Attach the divider F to the underside of the shelf C with screws, centering it carefully in the chest. Cut the drawer glides X to length and attach them to the inside of the cabinet. Use a spot of glue and staple or screw them into place.

step 10 • Carefully lay out the holes for the guide dowels in the flipper door G. (See the technical drawings.) I used a self-centering doweling jig to drill the holes. I needed to set the holes a little off-center, so I used a shim of cardboard. The grooves in the end panels A should allow the guide dowels to help the front of the flipper door align with the front of the tool chest face.

step 11 • Drill an access hole on the inside of the flipper door G. This will allow you to use a sharp point to pull the guide dowel out of the groove and back it into the hole far enough so the door can be removed from the tool chest. I cut a spring (from a ballpoint pen) in half. I inserted one of these halves in each of the holes for the dowels, then inserted the dowel. The spring pushes the guide dowel into the groove in the tool chest sides.



step 12 • Drill the holes for the drawer dowels in the drawer fronts J, K, L and M using the drill press. I used two stops on the drill press table. That way I could drill one hole holding the drawer front against one stop, then move it against the other stop and drill the other hole. Be sure the holes line up where there is solid wood on the ends of the sides. (Avoid the grooves in the drawer sides.)

step 13 • Attach the drawer sides N, P, and Q to the backs R, S, T, and U with screws. Then put the drawer front in place and drill the holes into the fronts of the drawer sides, using the drawer front as a guide. Add glue and insert the drawer dowels. Use clamps to hold the drawer front tight to the sides while the glue dries. Glue the drawer bottoms V and W in place. If the drawers need fitting, pare a little material off the glides in the chest. After the chest is finished (inside and out), the drawers should work perfectly. Apply some paste wax to the glides and the drawer sides if you want.

step 14 • Cut 45° miters on the ends of the top's rails and assemble the lid H. Cut a stopped rabbet 3/32" deep by 3/4" wide by 24" long in the top edge of the tool chest's back E. Cut a matching rabbet in the lid H's bottom back rail.

step 15 • Square the inside corners of the rabbet and attach the continuous hinge with two or three screws.

step 16 • Set up a router with the proper size bit (measure the lock you have) and cut a shallow mortise for the full-mortise lock's shoulder plate.

step 17 • Rough out the deep part of the mortise with a drill. Use a chisel to fit the mortise to the lock.

step 18 • When the lock fits, measure and lay out the hole for the key. Drill the hole and size it with a round file if necessary. Finish the chest. Next, install the flipper door G, mark for the toolbox lock and install the lock according to the manufacturer's instructions. Then, install a small bullet catch to hold the flipper door closed. Finally, attach the sash knob on the flipper door, the chest handles on the end panel's top rails and the escutcheon plate on the front rail over the mortise lock's keyhole.

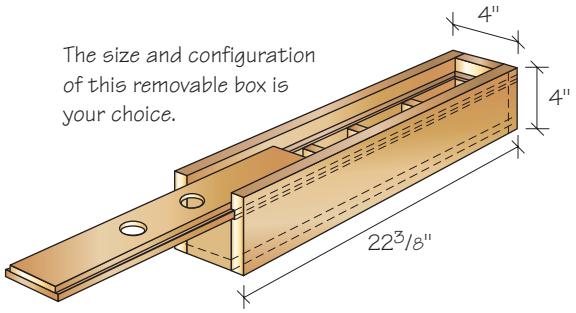

STANLEY 5002
STANLEY 5002
STANLEY 5002

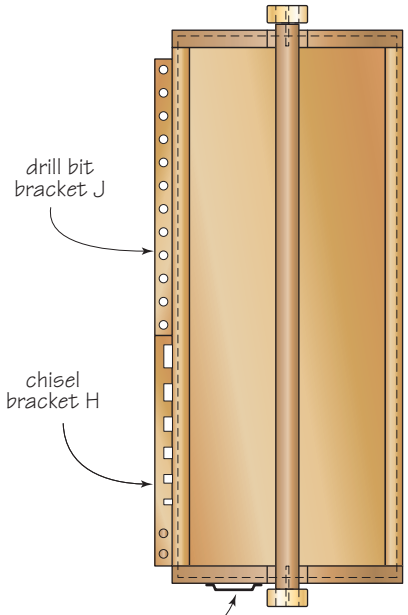
PROJECT 8

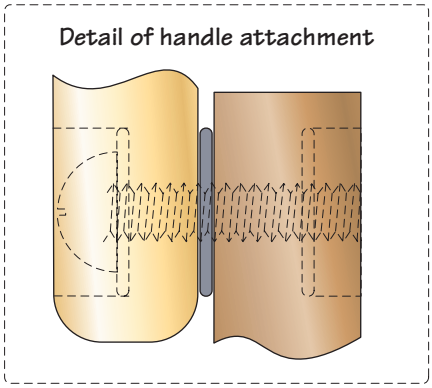
journeyman's tote box

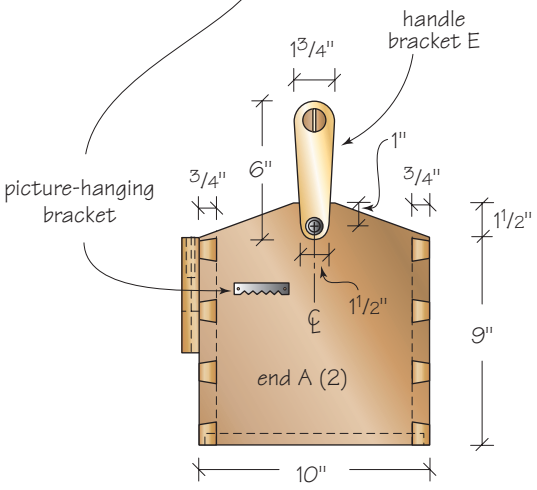
This basic tool tote box has a couple of extras. I've used the basic box before, and I always found myself wishing the handle would swing out of the way so I could easily get to the tools. I put this handle on a couple of swivel bolts, and it works great. Not only does the handle move out of the way, but the box levels itself when you carry it. Because I can never find my tape rule (it always settles to the bottom of the toolbox), I attached a picture-hanging clip on the end of the box to keep it within reach.

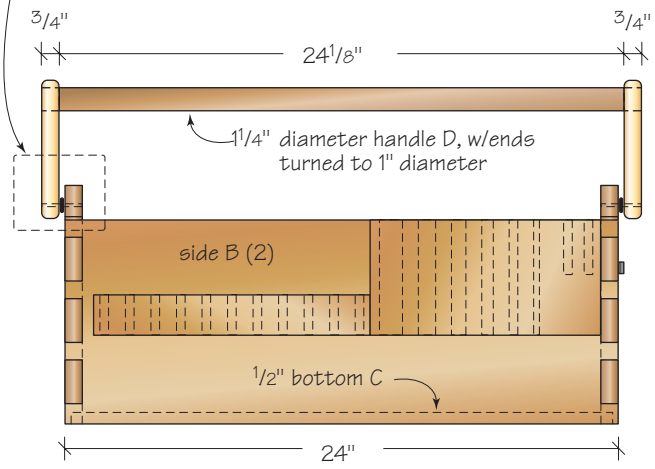
Small tools, screws, nails and anything else you might need can be stored in two removable boxes with sliding lids. These boxes fit neatly into the tote.


The size and configuration of this removable box is your choice.
4"
4"
22 3/8"


drill bit bracket J
chisel bracket H


Detail of handle attachment


handle bracket E
1 3/4"
1"
3/4"
6"
3/4"
picture-hanging bracket
1 1/2"
1 1/2"
9"
end A (2)
10"


3/4"
3/4"
24 1/8"
1 1/4" diameter handle D, w/ends turned to 1" diameter
side B (2)
1/2" bottom C
24"

materials list

INCHES

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	ends	poplar	3/4	10	10 1/2	
B	2	sides	poplar	3/4	9	24	
C	1	bottom	plywood	1/2	9 1/2	23 1/2	
D	1	handle	poplar	1 1/4 dia.		25 5/8	
E	2	handle brackets	plywood	3/4	1 3/4	6	cut taper as shown in illustration if desired
F	2	removable boxes	plywood	4	4	22 3/8	
	4	box F sides	plywood	1/2	4	22 3/8	
	4	box F ends	plywood	1/2	3	4	
	7	box F dividers	plywood	1/2	3	3 3/16	number of dividers is your choice
	2	box F sliding lids	plywood	1/2	3 1/2	22 1/8	
	2	box F bottoms	plywood	1/2	3	21 3/8	
G	2	keeper strips	poplar	1/2	1/2	8	
H	1	chisel bracket	poplar	3/4	5	10	
J	1	drill bit bracket	poplar	3/4	1 3/4	12	

hardware

- 2 1/4 – 20 × 1 1/4" roundhead bolts
- 2 1/4 – 20 nuts
- 4 1/4" flat washers
- 1 picture-hanging bracket

MILLIMETERS

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	ends	poplar	19	254	267	
B	2	sides	poplar	19	229	610	
C	1	bottom	plywood	13	242	597	
D	1	handle	poplar	32 dia.		651	
E	2	handle brackets	plywood	19	45	152	cut taper as shown in illustration if desired
F	2	removable boxes	plywood	102	102	569	
	4	box F sides	plywood	13	102	569	
	4	box F ends	plywood	13	76	102	
	7	box F dividers	plywood	13	76	81	number of dividers is your choice
	2	box F sliding lids	plywood	13	89	562	
	2	box F bottoms	plywood	13	76	543	
G	2	keeper strips	poplar	13	13	203	
H	1	chisel bracket	poplar	19	127	254	
J	1	drill bit bracket	poplar	19	45	305	

hardware

- 2 M6 – 30mm roundhead bolts
- 2 M6 – nuts
- 4 M6 flat washers
- 1 picture-hanging bracket

step 1 • Lay out the pins for the dovetails on the sides B and mark the waste sections. Whether you cut the pins or tails first is your choice. (I think it's easier to fit the tails to the pins, so I cut the pins first.)

step 2 • Cut out the waste on the table saw using the fixture shown in the sidebar, "Table Saw Dovetail Fixture." To cut both sides of the pins, you will need to move the fixture and use the left-hand fence. If you want to speed up the waste removal process, use a dado cutter.

Table Saw Dovetail Fixture

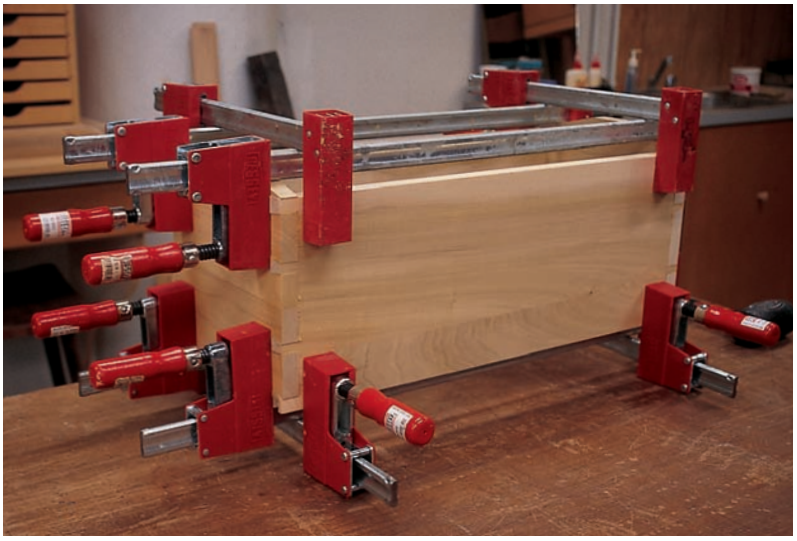
I made this fixture to cut dovetails. One side has fences set at 10° on the left and right ends for cutting the dovetail pins. To use the different fences, the fixture is moved to the left and right on the table saw. (One runner on the bottom fits in the slots on the table.)

To cut the tails, reverse the fixture and set the saw blade to 10°. You need to turn the part to cut each side of the tails. (The blocks on the backs of the fences are for protection from the saw blade.)

step 3 • After you cut the pins, use them to mark the tails on the ends A. Reverse the fixture, set the saw blade to 10° and remove the waste, leaving the tails. You will need to clean up the corner of the pins with a chisel.

step 4 • Cut the bevels on the top of the ends A. Note that the tails need to be cleaned up in the corners. You can do this easily with a chisel.

Drill the ¾" seating holes for the flat washers on the insides of the ends A to a depth of ⅜", then drill the ¼" through-holes for the bolts in the tops of the ends. See the technical drawing for hole location.



step 5 • When the dovetails have been cut and fit, dry fit the box to be sure all is in order. Then assemble using glue. The sides B and ends A of this box are thick enough that no clamping blocks were needed directly over the joint. Use no more clamping pressure than is needed so the parts don't distort.

Using a rabbet-cutting router bit, cut the ½" × ½" rabbet on the inside bottom of the box. Square out the corners of the rabbet and cut the bottom panel C to fit. Then, glue and screw it into place.

step 6 • Cut, shape and drill the holes in the handle brackets E. Then, turn the handle D so that it is comfortable for your hand and turn the ends of the handle to fit the predrilled holes in the brackets. Drill a 1" hole in a scrap piece of plywood, insert the end of the handle, center the setup over the table saw blade and cut a slot in the ends of the handle.

step 7 • This is a close-up of the slotted handle D and a bracket E. Next, cut a wedge of wood the same width as the diameter of the hole and a little thicker than the width of the slot in the handle. Taper the wedge so it can be inserted into the slot about three-fourths of the way.

Drill the ¾"-diameter seating hole for the flat washers in the brackets to a depth of ⅜". Then, drill the ¼" through-holes for the machine bolts.

tip >> FREQUENT CUTTING OF DOVETAILS ON THE TABLE SAW

If you find you are cutting a lot of dovetails, you might want to have a saw blade sharpened with a 10° bevel on all the teeth. This will eliminate having to clean up the corners of the tails. Be sure to check the blade tilt on your table saw so the bevel will be slanted the correct way.

step 8 • Add glue to the slots and around the ends of the handle. Put the handle assembly together and insert the wedges. Clamp the assembly to a flat surface so that the handle will be properly aligned at both ends. Drive the wedges into place using a clamp as shown. Pulling the wedges into the slots is much easier than trying to drive them in with a hammer.

step 9 • After the handle assembly glue has dried, cut and sand the ends of the handle flush with the brackets. Then attach the handle assembly to the box. See the technical drawing detail for the location of the bolt, washers and nut.

step 10 • This is the inside view of the handle bolts and nut. Recess the nut and be sure the bolt doesn't protrude past the inside surface.

step 11 • Attach the keeper strips G (for the removable boxes) on the inside of the ends, 4" from one side of the box. To keep the box balanced, install the drill bit and chisel brackets on the opposite side of the tote from the removable boxes.

step 12 • I made brackets for a set of chisels H and drill bits J that can be mounted on the outside of the box. Lay out your tools and mark the spacing of the slots for the chisels and the holes for the drill bits. I made a couple of extra holes for a four-way screwdriver and a pencil in the chisel bracket.

step 13 • Cut the slots for the chisels on the table saw. Then attach the bracket H to the side of the box. Drill the holes for the drill bits and mount that bracket J to the side of the box.

step 14 • The removable boxes F are handy for storing screws, nails, pliers, screwdrivers, wrenches and the like. How many dividers you use is your choice. After cutting the grooves for the sliding lid, I used screws to assemble the boxes. Two 1"-diameter finger holes in the lid will make lifting the boxes easy.

step 15 • This view of the box shows the lid inserted in the grooves.

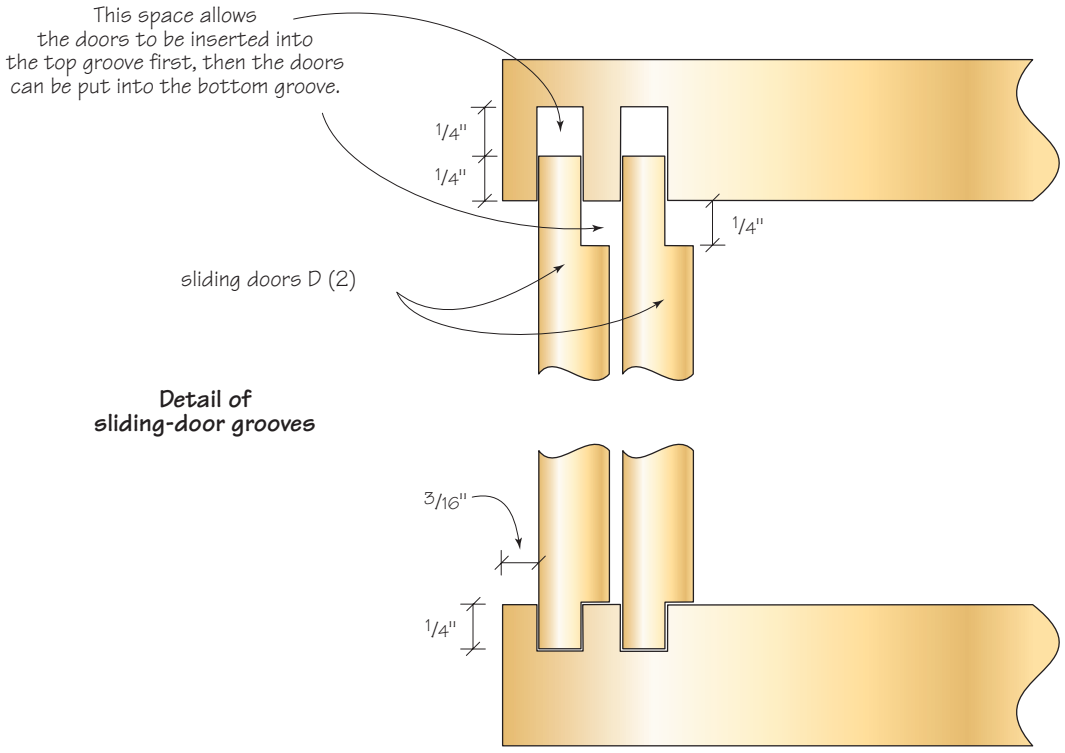
PROJECT 9

sliding-door cabinet

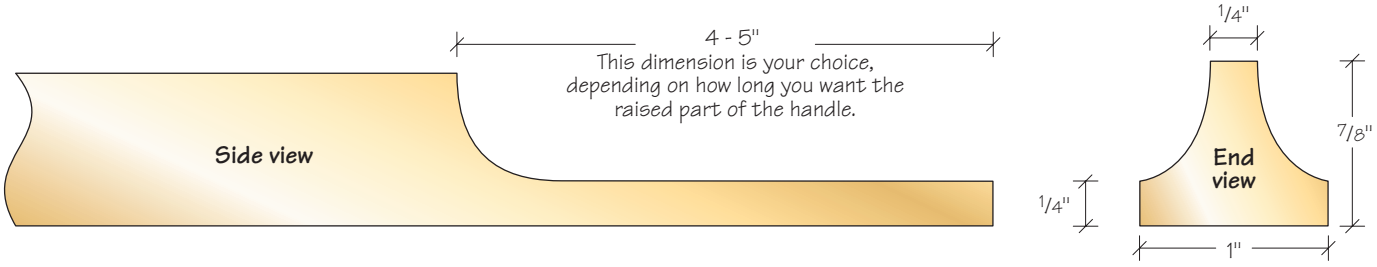
I've found that I can keep my router bits organized easily in a cabinet like this. This cabinet can be hung on the wall next to your router table at eye level. Wrenches, extra collets and bearings can also be at your fingertips.

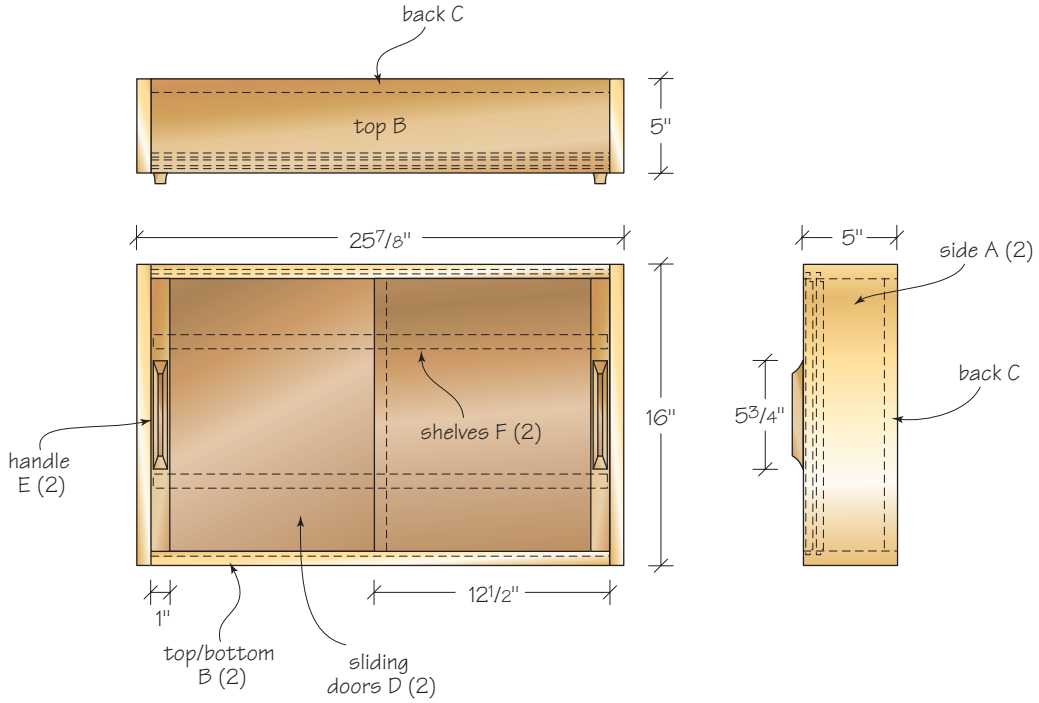
This cabinet is not very large, so you probably have enough scraps of wood in your shop already to build it. I got lucky and found a pallet with bright red luan mahogany slats on it. I grabbed them immediately and made the doors for this cabinet. The ash handles were a result of the mahogany of the doors being too narrow. I needed extra width on the doors, so I added the ash strips and shaped the pulls right into them. The body is made from scraps of ash.

The construction of this cabinet is simple. I completed the whole project in about four hours.



Detail of sliding-door grooves





INCHES materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH
A	2	sides	ash	3/4	5	16
B	2	top & bottom	ash	3/4	5	24 3/8
C	1	back	plywood	3/4	14 1/2	24 3/8
D	2	sliding doors	hardwood	3/8	11 1/2	15
E	2	handles	ash	7/8	1	15
F	2	shelves	poplar	1/2	3 3/8	24 5/16

MILLIMETERS

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH
A	2	sides	ash	19	127	406
B	2	top & bottom	ash	19	127	619
C	1	back	plywood	19	368	619
D	2	sliding doors	hardwood	10	292	381
E	2	handles	ash	22	25	381
F	2	shelves	poplar	13	86	618

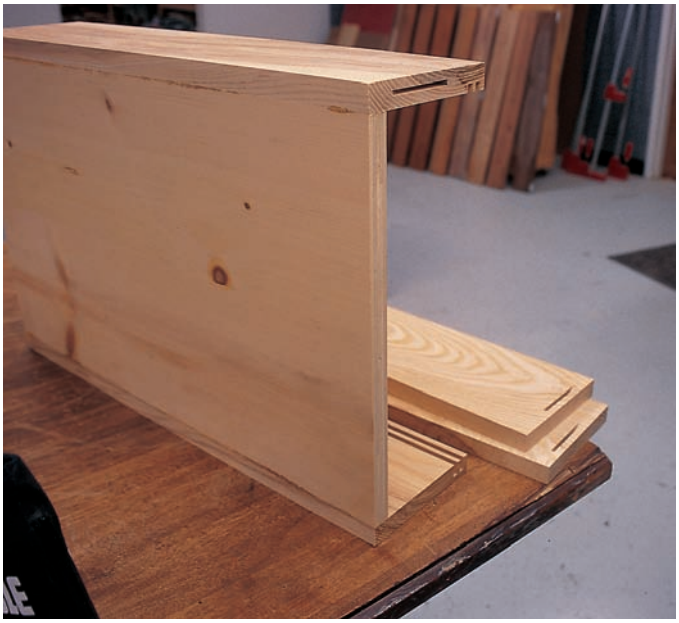
STEP-BY-STEP construction

step 1 • Cut the parts to size. Then cut the grooves for the sliding doors in the top and bottom B. The grooves in the bottom are 1/4" deep.

step 2 • The grooves in the top are 1/2" deep. After the cabinet is assembled, the doors can be lifted up into these grooves and then lowered into the grooves in the bottom panel.

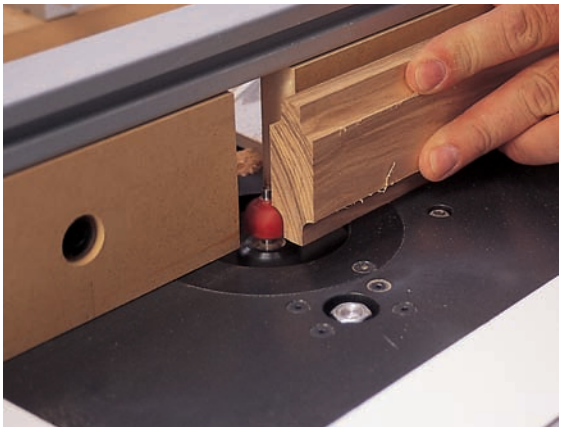
step 3 • Glue the top and bottom panels B to the back panel C. Note the spacers to help hold the assembly square.

step 4 • Cut biscuit slots in the sides A.



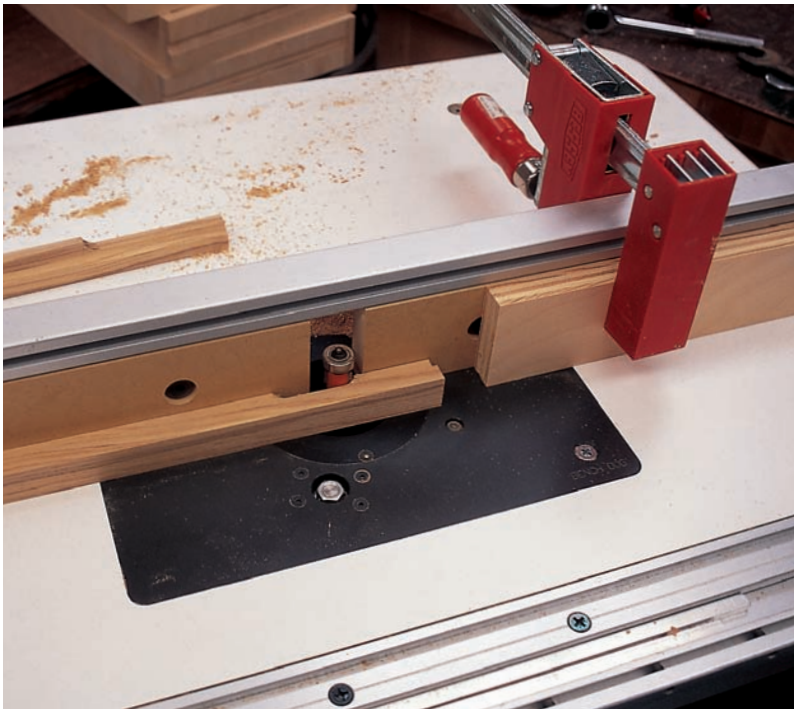
step 5 • Cut matching biscuit slots in the ends of the top and bottom panels B.

step 6 • Glue the sides A to the cabinet.



step 7 • The handles E for the doors are made using a ½" cove cutter on the router table. Make the cove cuts on a larger piece of stock.

step 8 • Cut the handles apart on the table saw.



step 9 • Set up a straight-cutting bit on the router table. Mount a stop block to the fence and use it to start the offset cut on the handle. Flip the handle end for end to make the other cut.

step 10 • Glue the handles E to the door panels D. Then cut the tenons on the doors D to fit into the grooves in the top and bottom of the cabinet. Be sure the door slides freely. Cut the shelves F to size. Lay out all of your router bits (if that's what you're going to store in this cabinet) and drill holes in the shelves to hold the bits in place.

PROJECT 10

chris's plane cabinet & case

BY CHRIS SCHWARZ

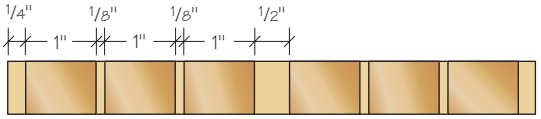
On certain holidays, such as New Year's Day, craftsmen in Japan clean their tools, put them on a shrine and offer them gifts such as sake and rice cakes. It is their way of thanking the tools for the service they have provided and will provide in future days.

As my collection of hand planes grew from a few rusty specimens handed down from my great-grandfather to a small arsenal of high-quality instruments, this Japanese tradition began to weigh heavily on my mind. My planes generally squatted on my workbench when not in use, and I had to constantly move them around to avoid knocking them to the floor as I worked.

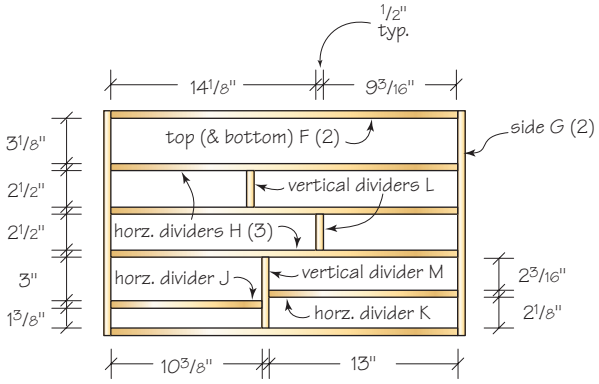
After some thought, I decided that a cabinet dedicated to my planes was the best way to protect them from dings and to honor them for the service they provide almost every day of the year.

This cabinet is designed so it can be used either as a traditional tool chest that sits on a bench or a cabinet that hangs on the wall, thanks to a tough French cleat. Because planes are heavy tools, the case is joined using through-dovetails. The lid is a flat panel door assembled using mortise-and-tenon construction. And the dividers inside the cabinet are screwed together so the configuration can be rearranged easily as my collection or needs change.

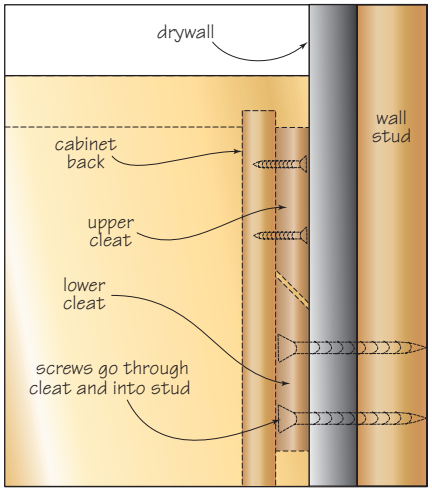
As you design your own chest, you should measure your planes to ensure there's enough space for everything you own, and plan to own. This cabinet should provide plenty of room for all but the biggest collections.



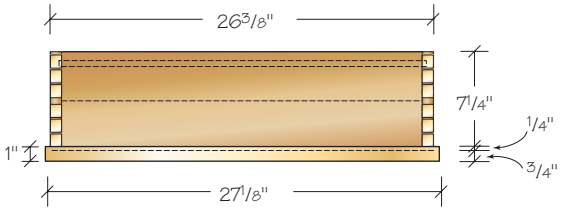
Layout of dovetails



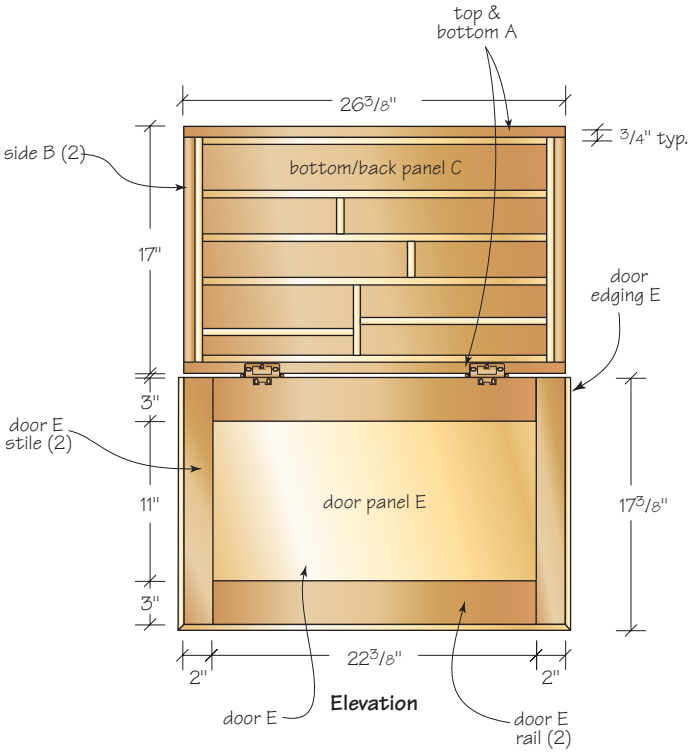
Elevation internal dividers



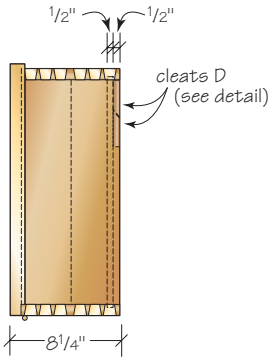
French cleat detail



Plan



Elevation



Profile

materials list

INCHES

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	top & bottom	cherry	3/4	7 1/2	26 3/8	cut 1/16" long
B	2	sides	cherry	3/4	7 1/2	17	cut 1/16" long
C	1	bottom/back	plywood	1/2	16	25 3/8	
D	2	cleats	maple	1/2	2 1/2	24 7/8	cut 45° bevel on one long edge
E	1	door	cherry/poplar	3/4	17 3/8	27 1/8	
	2	door E rails	cherry	3/4	3	24 3/8	
	2	door E stiles	cherry	3/4	2	17	
	1	door E panel	poplar	3/8	12	23 3/8	
		door E edging	cherry	3/8	1	65	1/4" roundover one edge, cut to lengths as needed
F	2	top & bottom dividers	maple	1/2	2 1/2	23 7/8	
G	2	side dividers	maple	1/2	2 1/2	15 1/2	
H	3	horizontal dividers	maple	1/2	2 1/2	23 7/8	
J	1	horizontal divider	maple	1/2	2 1/2	10 3/8	
K	1	horizontal divider	maple	1/2	2 1/2	13	
L	2	vertical dividers	maple	1/2	2 1/2	2 1/2	
M	1	vertical divider	maple	1/2	2 1/2	4 7/8	

hardware

2	no-mortise hinges	Lee Valley Tools #00H51.03
2	chest handles	Lee Valley Tools #06W02.01
2	ring pulls	Lee Valley Tools #00L02.02
2	magnetic catches	

MILLIMETERS

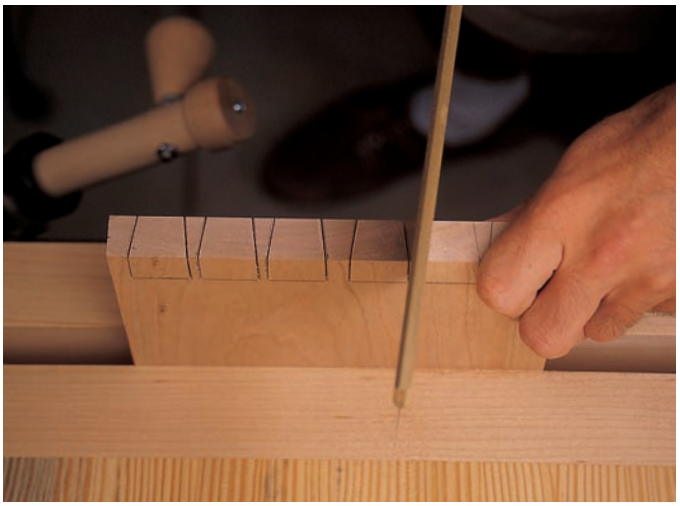
REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	top & bottom	cherry	19	191	670	cut 2mm long
B	2	sides	cherry	19	191	432	cut 2mm long
C	1	bottom/back	plywood	13	406	645	
D	2	cleats	maple	13	64	632	cut 45° bevel on one long edge
E	1	door	cherry/poplar	19	441	689	
	2	door E rails	cherry	19	76	619	
	2	door E stiles	cherry	19	51	432	
	1	door E panel	poplar	10	305	594	
		door E edging	cherry	10	25	1651	6mm roundover one edge, cut to lengths as needed
F	2	top & bottom dividers	maple	13	64	606	
G	2	side dividers	maple	13	64	394	
H	3	horizontal dividers	maple	13	64	606	
J	1	horizontal divider	maple	13	64	264	
K	1	horizontal divider	maple	13	64	330	
L	2	vertical dividers	maple	13	64	64	
M	1	vertical divider	maple	13	64	124	

hardware

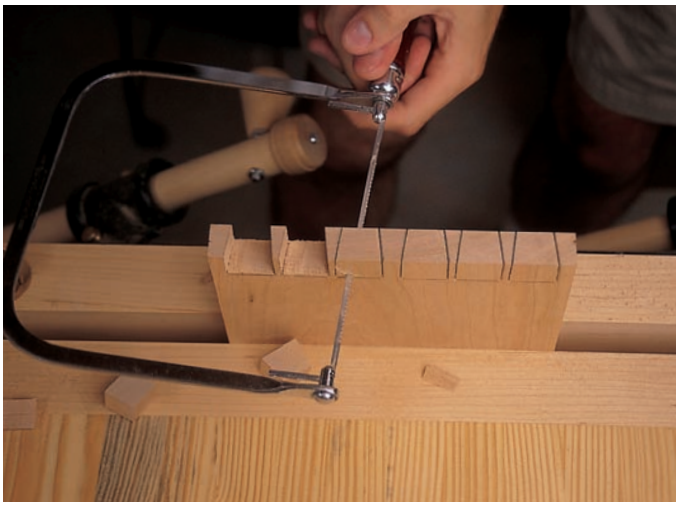
2	no-mortise hinges	Lee Valley Tools #00H51.03
2	chest handles	Lee Valley Tools #06W02.01
2	ring pulls	Lee Valley Tools #00L02.02
2	magnetic catches	

step 1 • Mark the length of your pins and tails on the ends of all your boards A and B. There's some debate as to whether you should mark exactly how long you want your pins and tails, a little less or a little more. I prefer to mark just a little more (no more than $^{1}/_{32}$") so the ends of the pins and tails stick out a bit when the joint is assembled. Then I come back and plane them flush after gluing up the case.

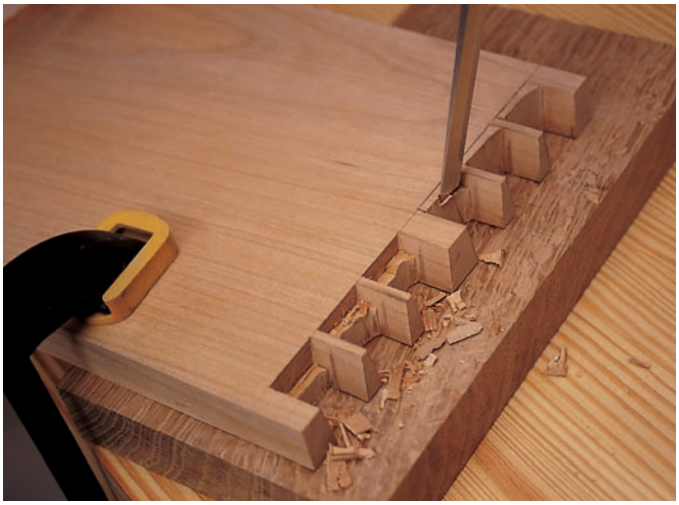
step 2 • As with all things in dovetails, there's a debate as to whether you should cut your tails (the male part of the joint) or the pins (the female part) first. Because I like to have narrow pins and wider tails, it's easier to cut the pins first. Lay out the location of the pins using a sliding T-bevel and cut them with a dovetail saw. Here are my four best tips for sawing straight lines. First, start your cut with the end of your thumb guiding the blade above the teeth.



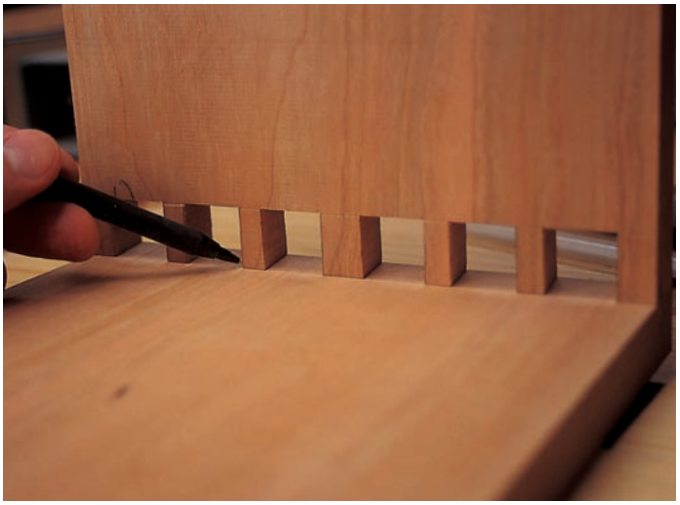
step 3 • Second, once the cut is started, hold the saw handle like you would hold a small bird that you are trying to prevent from flying away. Don't clench the handle; just keep enough pressure to prevent the saw from flying out of your hand. Third, never apply downward pressure with your hand; this will cause your blade to drift left or right. Let the saw do the cutting. And fourth, imagine the saw is longer than it really is so you take long smooth strokes.



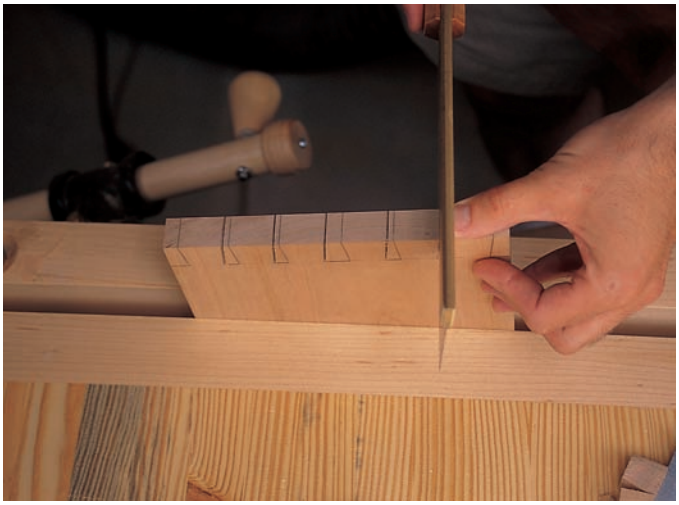
step 4 • With the pins defined, get out a coping saw with a fine-tooth blade and remove as much waste as you can from between the pins. The closer you get to the scribed line at the bottom of the joint, the less cleanup you'll have with a chisel. If you overshoot, you're cooked.



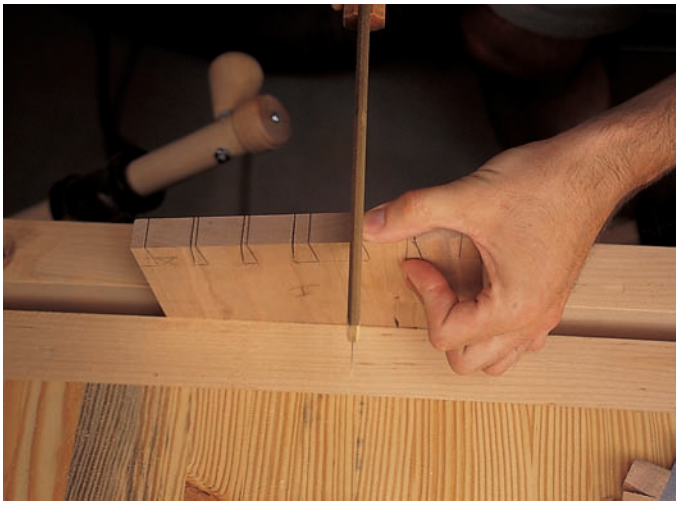
step 5 • Clamp your pin board to a piece of scrap and remove the rest of the waste using a sharp chisel and a mallet. I like to sneak up to the line on one side, sneak up to the line on the other and then clean up any junk in the middle. Clean out the corners of the pins using a sharp knife.



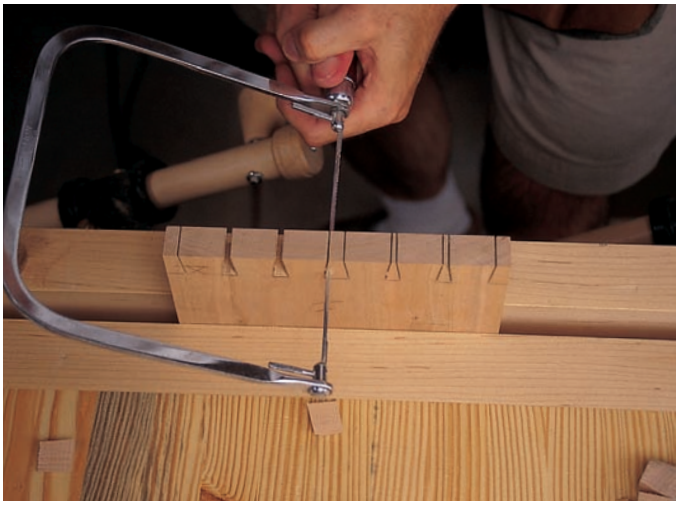
step 6 • Put your tail board on the bench with the inside face pointing up. Position its mate on top of your tail board and mark the locations of the tails using a mechanical pencil. Be careful not to shift either board during this step, or you should erase your lines and start anew.



step 7 • Transfer those lines on your tail board across the end using a square and down to the other scribed line on the outside face of the board. Clamp the tail board in a vise. Lately I've found that my joints are better if I skew the board in my vise so I'm actually cutting straight down — though the result is angled. Angle the board one direction and make half of the tail cuts. Remember to cut just ever-so-slightly outside the lines.

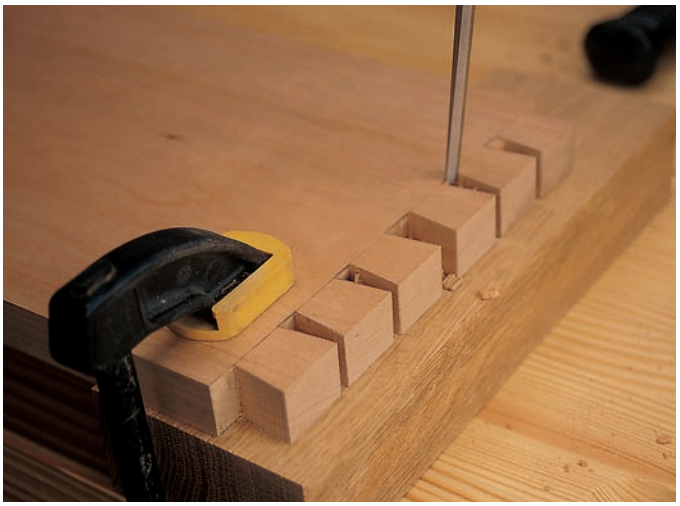


step 8 • Then turn the board around and clamp it at the same angle and make the remainder of the tail cuts. Some people say it's easier to clamp the board vertically and go for it. Give both a try and see what works best for you.



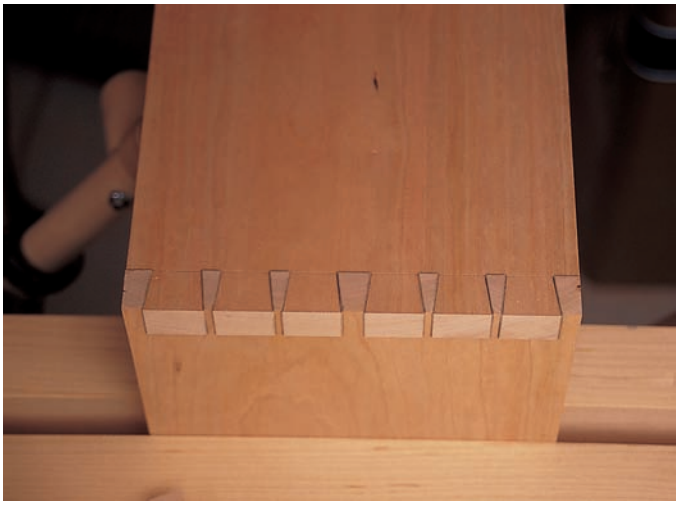
step 9 • Use your coping saw to remove the waste from between the tails. I've always found that short, light strokes are the most accurate and least likely to tear out the grain or overshoot the line.

step 10 • Now you need to slice off the ends of your tail boards. Clamp the board as shown in the photo and again use your thumb to help guide the first couple strokes of your cut. If you have a cross-cut backsaw, use that. Otherwise, your dovetail saw will do the job just fine.

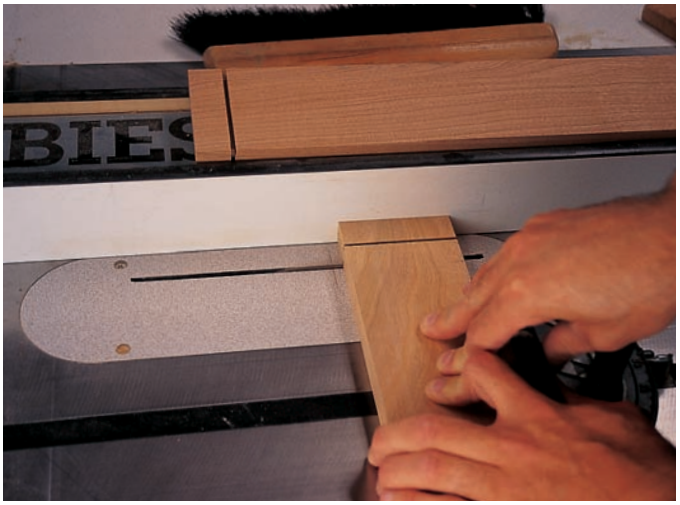


step 11 • Now remove the waste from between the tails using a chisel and a mallet. Remove the waste from the outside face of the board first and then remove the rest from the inside face. This will result in a neater joint if the grain buckles while you are chopping it. Again, clean up your corners with a knife.

step 12 • Now it's time for a test fit. Assemble the joint using a dead-blow mallet and a backing block to distribute your blows across the entire joint. If your joint is made correctly, you should be able to push it together most of the way using only hand pressure and need only a few taps to seat it in place. If it's too tight (a common malady), try shaving off a little on the inside faces of the pins — parts that will never show in the completed joint. Then ease the inside edges of the tails just a bit.



step 13 • This is the completed joint. You can see the pencil lines on my tails and how the ends of the pins and tails stick up just a bit. This makes it easier to trim them flush to the case, but more difficult to clamp up. More on that later. Cut the other joints and then dry assemble the case. Measure its width and length to determine how big your door E should be. You want the door to overhang the case by 1/16" on either end and 1/16" on the front, so size your parts accordingly.

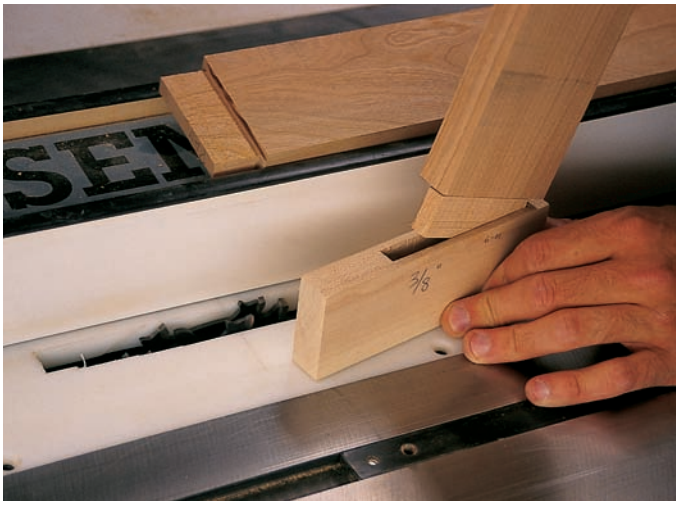


step 14 • As much as I enjoy handwork, I decided to cut the mortise-and-tenon joints for the frame and panel door E using my tailed apprentices (my power tools). I begin making this classic housed joint by cutting a sample mortise with my mortising machine. Then I cut all the tenons. The rule of thumb is that your tenons' thickness should be one-half the thickness of your stock. The door is 3/4" thick, so the tenons are 3/8" thick with 3/16" shoulders on the face cheeks. I begin making my tenons by setting the height of a crosscut saw blade to just a shade more than 3/16" and setting the fence so it's 1" away from the left edge of my saw blade.

step 15 • Now I raise the blade to 3/8" and define the edge shoulders in the same manner.

step 16 • Now install a dado stack in your table saw. These tenons are 1" long, so I like to put in enough chippers to make a 5/8" cut in one pass. Set the height of the dado stack to 3/16" and set the fence so it's 1" away from the leftmost tooth of your dado stack. Make several passes over the blade to remove the waste from the face cheeks.

step 17 • Now turn the rail on its edge and remove the waste from the edge cheeks in the same manner.



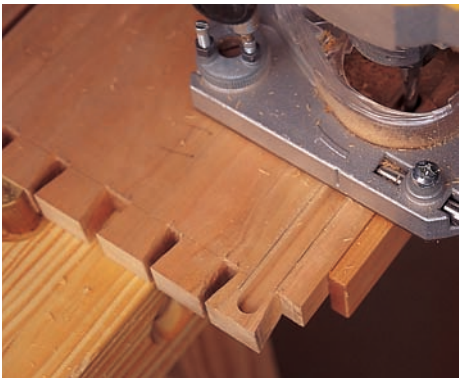
step 18 • Test the fit of your tenon in your test mortise. When satisfied with the fit, cut the tenons on all the rails this way, being sure to check the fit after cutting each one.

step 19 • Finally, raise the dado stack to $\frac{3}{8}$" and remove the remainder of the waste on the edge cheeks. The bigger edge shoulders ensure that you won't blow out the ends of your mortises while clamping up the door.

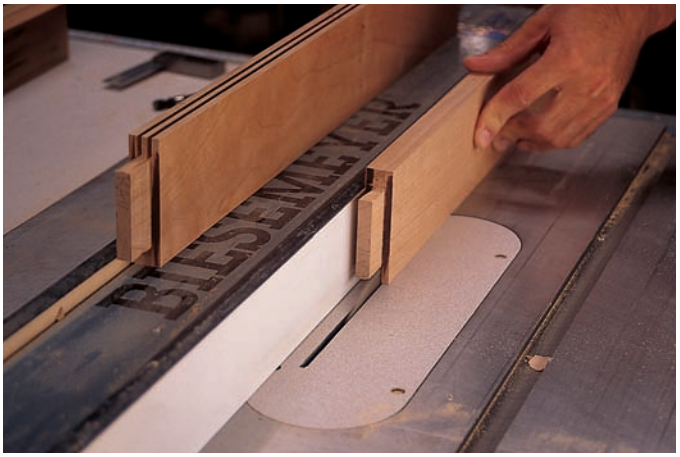
step 20 • Now use your tenons to mark exactly where your mortises should go on your stiles. I like this method because there is much less measuring, and therefore less room for error.

step 21 • Cut $\frac{3}{8}$"-wide by $\frac{11}{16}$"-deep mortises in the stiles. With a hollow chisel mortiser, you need to be careful about how you cut the joint. As you can see from the photo, I cut one hole, skip a space and then cut the next one. Later I come back and clean up the area between. If you cut all your holes right in a row, your chisel is more likely to bend or snap in a cut because it wants to follow the path of least resistance.

step 23 • Disassemble the case and cut the $\frac{3}{8}$"-deep groove for the $\frac{1}{2}$"-thick bottom C. I made the cut in two passes using a plunge router outfitted with a straight bit and an edge guide. On the pin boards, you can cut the groove through the ends because it won't show. Make sure you put the groove $\frac{1}{2}$" in from the bottom edge of the sides because you need room for the French cleat that attaches the cabinet to the wall.



step 24 • On the tail boards you will need to stop the groove in one of the tails as shown in the photo. The dovetail layout shown in the drawing allows you to put the groove solidly into a tail.

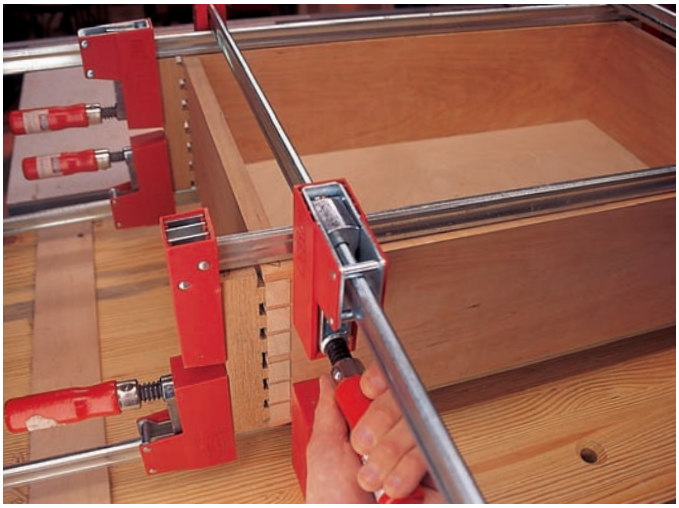


step 22 • Now cut the $\frac{3}{8}$" by $\frac{1}{2}$" groove on the door parts that will hold the panel. I use a rip blade in my table saw as shown in the photo. Don't worry about stopping the groove in the stiles. The hole won't show on the front because it will be covered by edging. On the back you'll almost never see it because that is where the hinges go. If the hole offends you, by all means patch it. Assemble the door E and make sure it fits on the case. When all is well, plane down or sand the panel for the door and glue up the door — making sure not to put glue in the panel's groove.

Slick Sole for Smoothing

When using a smoothing plane to prepare wood for finishing, you'll get better results if the plane's sole is waxed. The wax lubricates the sole and allows the plane to skim over the work. You use less effort, and the end result looks better because you're less likely to have to force the plane through the cut. I use inexpensive canning wax you can find at any grocery store that costs a few dollars for a box. Apply the wax in the pattern shown in the photo below. Then start working until you feel the plane becoming harder to move. Reapply the wax and get back to work.

step 25 • Now plane all the case pieces using a smoothing plane. A sharp smoother, such as this #4½", can virtually eliminate sanding. After planing down the case pieces, I'll hit them with some 220-grit sandpaper to remove any ridges left by the plane.

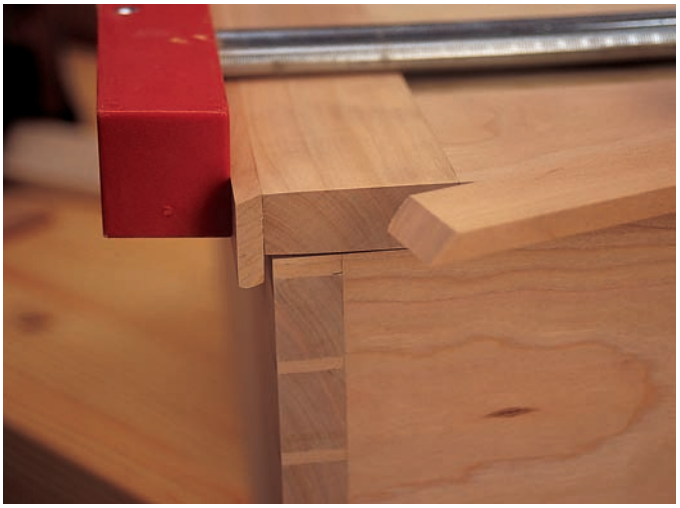


step 26 • You'll need to make some clamping blocks as shown in the photo to clamp the tails firmly against the pin boards. These are easy to make using a handsaw or band saw. Apply a little bit of glue to the tails and knock the case together. Don't forget to slide the bottom in its groove when three sides are in place. Clamp up your case using the clamping blocks and let it sit for at least 30 minutes.

step 27 • When the glue in the case is dry, remove it from the clamps and plane down the dovetail joints. A sharp low-angle block plane is perfect for this job. The low angle is particularly effective with end grain.

step 28 • Now it's time to make the dividers for the planes. This is the easy part. I assembled the dividers using just screws to make sure I could change the configuration in case my plane collection ever changed. The first step is to screw the four outermost pieces together and plane them down so they fit snugly inside the case.

step 29 • As you install the interior dividers, it's a good idea to double-check your initial measurements against the real thing. I had a rude shock when my #4 was wider than I had anticipated. When everything works, screw all the parts together using No. 8 × 1" screws. Then screw the whole thing into the cabinet. I ran the screws in from the back side of the cabinet.



step 30 • The $\frac{3}{8}$" by 1" edging creates a dust seal around the edge of your toolbox and gives the piece a nice finished look. I cut a $\frac{1}{4}$" roundover on the inside edge of the edging as you can see in the photo. Miter the ends, then glue and nail the edging to the door's edges.

step 31 • Install the hardware, such as the no-mortise hinges, catches, pulls and chest handles. Don't forget to drill pilot holes for your hardware or your brass screws will self-destruct as you try to drive them.

Planes at Rest: On Their Soles or Their Sides?

One of the big debates among plane users is whether to place hand planes on their soles or their sides when you're not using them at your bench. Traditional carpenters would place them on their sides to protect the plane's iron from becoming dinged. Many woodworkers have picked up this tradition, and it's frequently passed from master to apprentice (as it was to me).

But it might not be necessary. Recently I was convinced by a fellow craftsman that it's better to place planes on their soles when you are working at your bench. Here's the rationale. The old carpenter's saw applied to work on the job site, where you could never be certain about where you were setting your plane (this was back when you might actually see planes on a job site). So placing the plane on its side protected the iron from the grit and gravel that could cover any flat surface in a newly built home. Also, carpenters say putting planes on their sides prevents the iron from being pushed back into the plane's body, which is what could happen when a plane is rested on its sole.

Woodworkers, however, work on a wooden bench — far away from cement dust and gravel. So they say it's best to place an unused plane on its sole to prevent the iron from getting dinged by another tool on the bench. What about the iron getting pushed up into the plane's body? If you think about this statement for a moment, you'll see how ridiculous it is. The plane's iron is secured tightly enough in the plane's body to withstand enormous pressure as the plane is pushed through your work. It should be child's play for the iron to stay in one place with only the weight of the plane pushing it down.

Other woodworkers have come up with other solutions that work, too, including placing the planes sole-down over the tool well of their bench. Or they rest the sole on a thin wooden strip that holds the iron slightly above the bench. But I don't mess with that. After undoing years of training, I now put my planes sole-down on the bench.

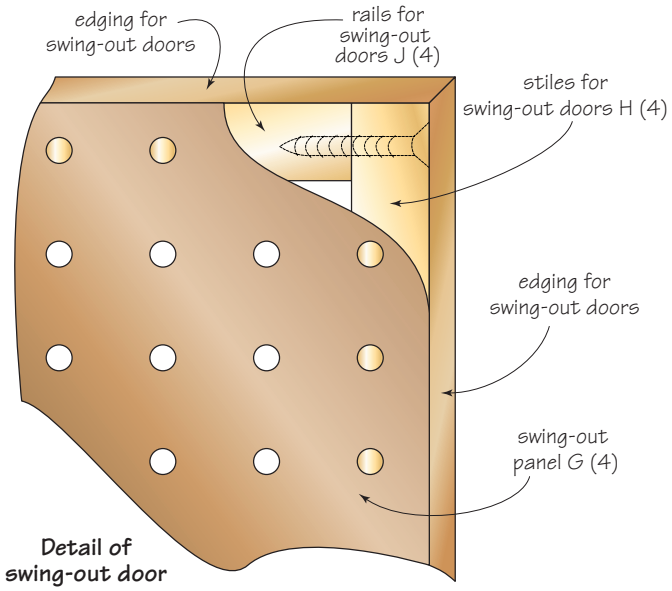
I had access to some gorgeous cherry that had been air-drying for about two years. It came from coworker's backyard and each board was over 20" wide. I used two of the boards for the floating panels in the doors. I trimmed off the white sapwood and left the large cracks. As you can see, it is beautiful!

This cabinet opens up to 9' wide, so there is plenty of room for tools. (The entire cabinet uses about three-fourths of a 4' × 8' sheet of pegboard.) I know home woodworkers who swear by pegboard for storing everything, so this cabinet pays homage to them. The continuous hinges are strong and will support the weight of the tools just fine.

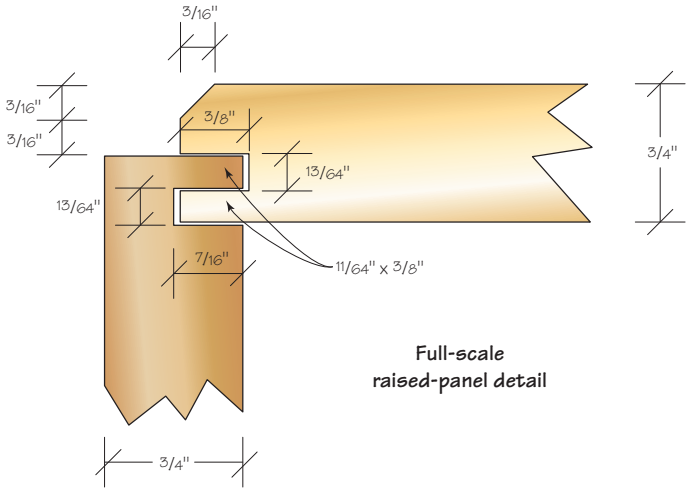
I chose to make the cabinet body and doors using dovetails because of their tremendous strength and because they look cool.

PROJECT 11

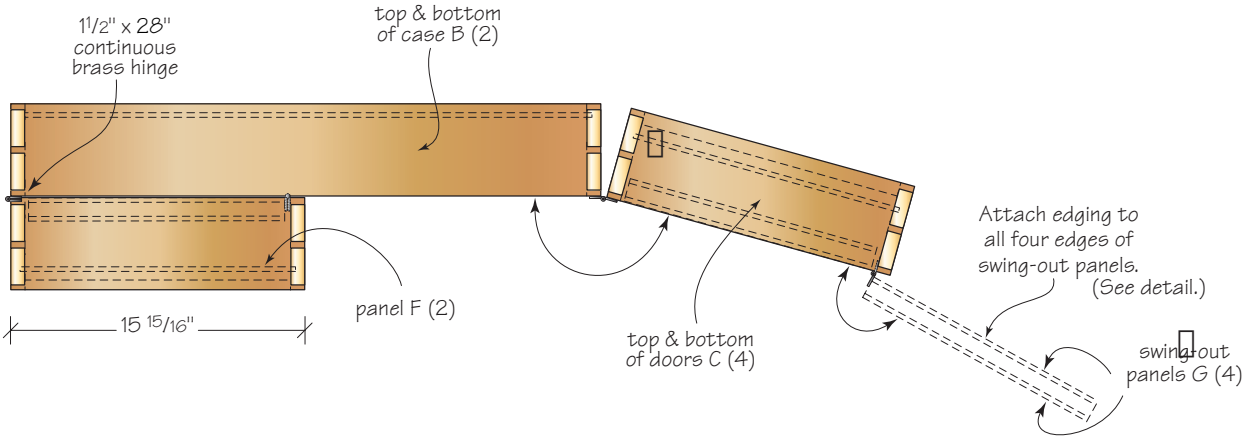
pegboard-lover's cabinet

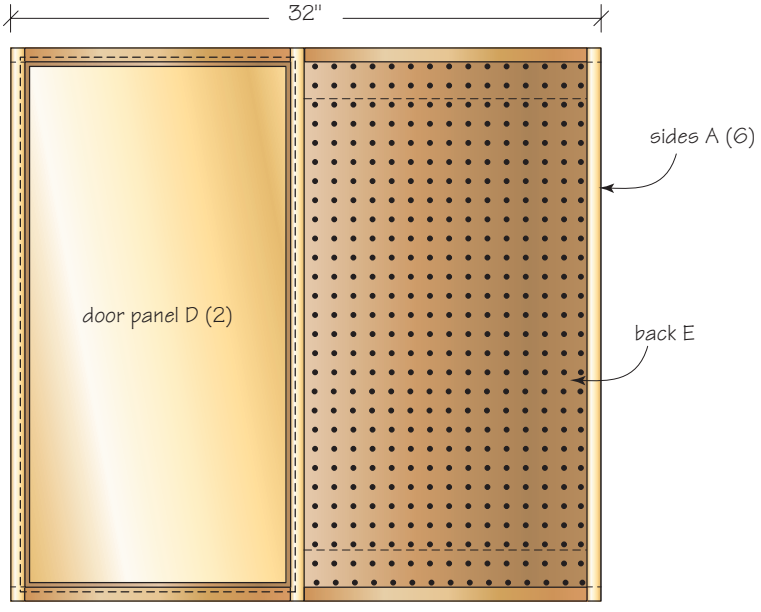


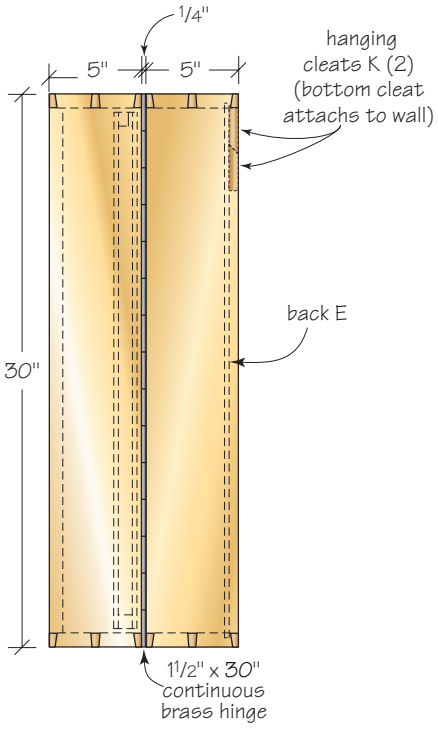
Detail of swing-out door



Full-scale raised-panel detail







INCHES materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	6	sides	cherry	3/4	5	30	
B	2	top & bottom of case	cherry	3/4	5	32	
C	4	top & bottom of doors	cherry	3/4	5	15 15/16	
D	2	door panels	cherry	3/4	15 5/16	29 1/8	
E	1	back	pegboard	1/4	31	29	
F	2	panels	pegboard	1/4	14 15/16	29	
G	4	swing-out panels	pegboard	1/4	13 7/16	27 1/2	
		edging	cherry	1/4	1 1/4	192	cut to lengths as needed to edge the swing-out doors
H	4	stiles	poplar	3/4	3/4	27 1/2	material for subframe
J	4	rails for swing-out panels	poplar	3/4	3/4	11 15/16	material for subframe
K	2	hanging cleats	maple	3/4	2 1/2	30 1/2	cut 45° bevel on one long edge

hardware

- 2 continuous hinges 3/16" × 1 1/2" × 30"
- 2 continuous hinges 3/16" × 1 1/2" × 28"
- 2 magnetic catches

MILLIMETERS

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	6	sides	cherry	19	127	762	
B	2	top & bottom of case	cherry	19	127	813	
C	4	top & bottom of doors	cherry	19	127	405	
D	2	door panels	cherry	19	389	721	
E	1	back	pegboard	6	787	737	
F	2	panels	pegboard	6	379	737	
G	4	swing-out panels	pegboard	6	341	699	
		edging	cherry	6	32	5m	cut to lengths as needed to edge the swing-out doors
H	4	stiles	poplar	19	19	699	material for subframe
J	4	rails for swing-out panels	poplar	19	19	303	material for subframe
K	2	hanging cleats	maple	19	64	775	cut 45° bevel on one long edge

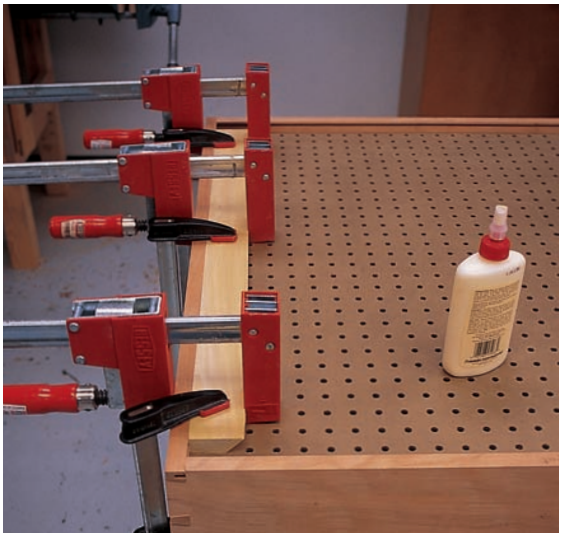
hardware

- 2 continuous hinges 5mm × 38mm × 762mm
- 2 continuous hinges 5mm × 38mm × 711mm
- 2 magnetic catches

STEP-BY-STEP construction

step 1 • This was some very nice cherry I lucked into. I cut off one edge and straightened it on the jointer. I was then able to cut door panels that were over 15" wide. The wood hadn't been stickered and stacked properly to dry, so I had to remove a fair amount of material to get the panels flat.

Cut out all the cabinet and door parts, then lay out and cut the dovetails. See project eight, steps one through three for details on using the table saw to cut dovetails. Then cut the grooves for the back panel. When gluing the cabinet together, be sure to install the back panel at the same time.



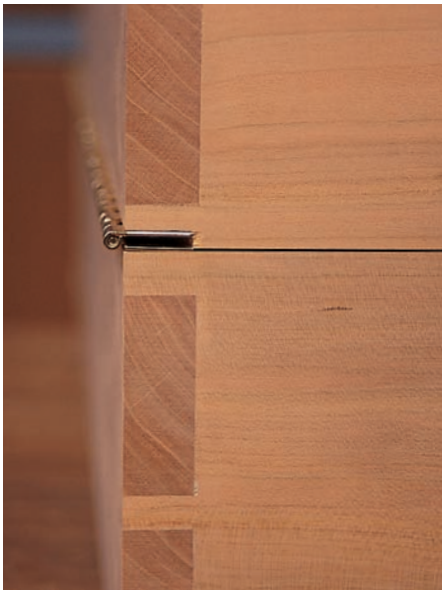
step 2 • After installing the back panel, glue the hanging cleat K to the back E and top panel B. Then, for extra strength, insert screws through the top panel into the cleat. Countersink the screws and use plugs to cover the screw heads.

step 3 • Offset the door panels D by cutting a groove in the edge of the door panel. For this cabinet, I just used a square-toothed blade and reset the fence until I had the proper groove width. Cut the corresponding grooves in the door tops C, bottoms C and sides A at the same time. See the technical drawing detail.

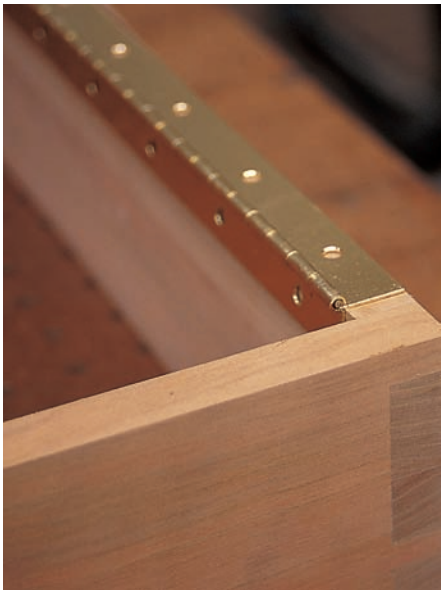
step 4 • Tilt the saw blade to 45° and cut the bevel on the top edges of the door panels. My saw blade tilts to the right, so this might look a little awkward to you right-handers. (Of course, if your saw blade tilts to the left, your setup would look just the opposite of the one shown above.) You could also use a block plane to cut the bevels. Assemble the doors as you did the cabinet body. Be sure to capture the panels in the grooves in the door tops, sides and bottoms as you glue the door together. Do not apply any glue to the panels.

step 5 • I know what you're thinking — where does he get all those clamps? Suffice it to say, you can never have too many clamps. Cut the frame parts for the hinged panels to length. Using butt joints, screw or staple them together. Then, cut the pegboard panels ¼" oversize and glue them to the frames. You can glue all four panels to the two frames at the same time, using your trusty bench horses. I put paper between the panels so that any glue that happened to leak through the pegboard holes wouldn't stick everything together. If you spread the glue evenly on the frame members and let it sit for a minute, it gets slightly tacky and has much less of a tendency to seep into other areas. When the glue dries, trim the pegboard flush to the edges of the frames. Then glue the cherry edging to the frames. I glued opposite edges on at the same time, trimmed the ends flush, then glued the other opposing edges to the frame. You could miter the ends of the cherry edging if you prefer.

step 6 • Cut a rabbet in the door the same depth as the thickness of the continuous hinge. Attach the hinge with three screws each (top, middle and bottom) in the door and the cabinet. Close the door and check the alignment. Adjust by installing screws in different holes. Check alignment again. Mark the holes so you'll know which ones to put the screws into first after you've finished the cabinet and are putting it back together.



step 7 • This shows the cabinet door in its closed position.



step 8 • Attach the continuous hinge (for the swing-out panels G) to the inside face of the door with three screws.

step 9 • Cut a spacer the same thickness as the hinge and put it between the face of the door and the swing-out panel. This will hold the panel in alignment while the screws are inserted into the edge of the swing-out panel.

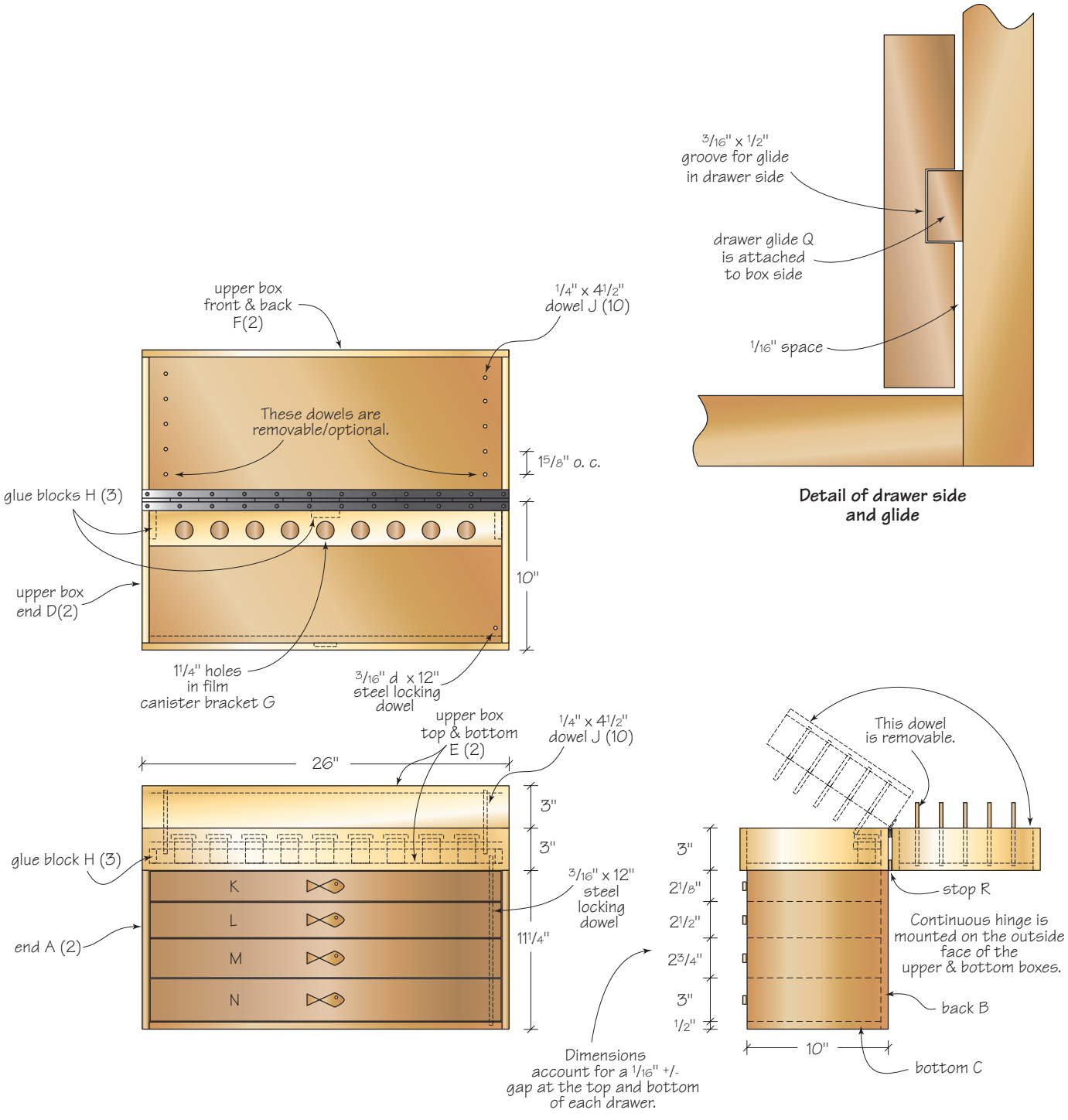
step 10 • When the swinging door is attached, it should close flush with the inside face of the door. The barrel of the hinge will be proud to the surface of the inside door face. This allows the swing-out panel to open fully.

PROJECT 12

fly-tying box

This box isn't exactly a tool chest, but I know lots of woodworkers who are fly fishermen (and women). There are some very specialized tools and supplies for tying flies, and I haven't seen too many boxes made in which you could store all these supplies.

This box is made of Baltic birch plywood, which is very solid, so you don't have to worry about wood movement. It's made to take out in the field. If a rainstorm comes up or you just want to take a break, you can relax under shelter and tie some flies and other bugs!



Detail of drawer side and glide

INCHES materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	ends	Baltic birch ply	1/2	10	11 1/4	
B	1	back	Baltic birch ply	1/2	11 1/4	25	
C	1	bottom	Baltic birch ply	1/2	9 1/2	25	
D	2	upper box ends	Baltic birch ply	1/2	6	9	upper box will be cut in half to create the upper bin and lid
E	2	upper box top & bottom	Baltic birch ply	1/2	9	25	
F	2	upper box front & back	Baltic birch ply	1/2	6	26	
G	1	film canister bracket	Baltic birch ply	1/2	2 1/2	25	drill 9, 1 1/4"-dia. holes, evenly spaced, for canisters
H	3	glue blocks	Baltic birch ply	1/2	1	2	locate one at each end of canister bracket and one in middle of bracket
J	10	dowel rods	hardwood	1/4 d		4 1/2	
K	1	drawer front	Baltic birch ply	1/2	2 1/8	24 7/8	
	1	drawer K back	Baltic birch ply	1/2	2 1/8	23 7/8	
	2	drawer K sides	Baltic birch ply	1/2	2 1/8	9	
L	1	drawer front	Baltic birch ply	1/2	2 1/2	24 7/8	
	1	drawer L back	Baltic birch ply	1/2	2 1/2	23 7/8	
	2	drawer L sides	Baltic birch ply	1/2	2 1/2	9	
M	1	drawer front	Baltic birch ply	1/2	2 3/4	24 7/8	
	1	drawer M back	Baltic birch ply	1/2	2 3/4	23 7/8	
	2	drawer M sides	Baltic birch ply	1/2	2 3/4	9	
N	1	drawer front	Baltic birch ply	1/2	3	24 7/8	
	1	drawer N back	Baltic birch ply	1/2	3	23 7/8	
	2	drawer N sides	Baltic birch ply	1/2	3	9	
P	4	drawer bottoms	plywood	1/2	8 1/2	23 7/8	
Q	8	drawer glides	maple	1/4	15/32	9	
R	1	stop	maple	3/16	3/4	26	

hardware

- 4 drawer pulls (fish-shaped if you like)
- 1 3/16" dia. × 12" steel dowel rod
- 1 continuous hinge
- 2 sash handles
- 2 drawbolts

STEP-BY-STEP construction

step 1 • Cut all parts to dimensions. Glue the upper box ends D to the upper box top E. Use the upper box bottom E as a spacer to hold the ends square. If the top panel is slightly bent, put the bend to the inside of the assembly.

step 2 • Glue the upper box bottom E to the top/ends assembly. If the bottom panel is slightly bent, put the bend to the inside of the assembly.

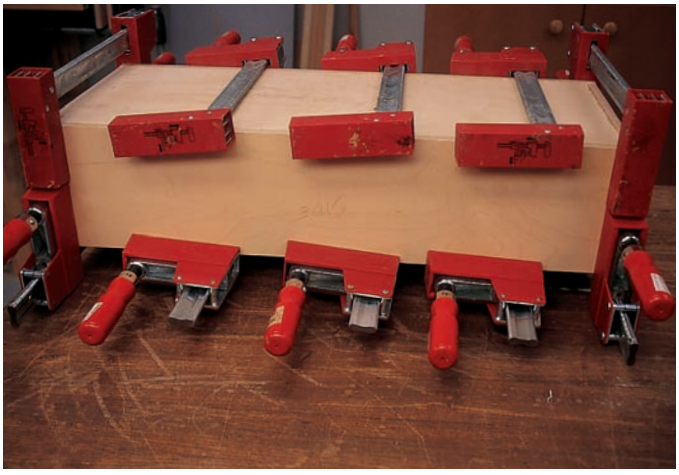
MILLIMETERS materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	ends	Baltic birch ply	13	254	285	
B	1	back	Baltic birch ply	13	285	635	
C	1	bottom	Baltic birch ply	13	242	635	
D	2	upper box ends	Baltic birch ply	13	152	229	upper box will be cut in half to create the upper bin and lid
E	2	upper box top & bottom	Baltic birch ply	13	229	635	
F	2	upper box front & back	Baltic birch ply	13	152	660	
G	1	film canister bracket	Baltic birch ply	13	64	635	drill 9, 32mm-dia. holes, evenly spaced, for canisters
H	3	glue blocks	Baltic birch ply	13	25	51	locate one at each end of canister bracket and one in middle of bracket
J	10	dowel rods	hardwood	6 d		115	
K	1	drawer front	Baltic birch ply	13	54	632	
	1	drawer K back	Baltic birch ply	13	54	606	
	2	drawer K sides	Baltic birch ply	13	54	229	
L	1	drawer front	Baltic birch ply	13	64	632	
	1	drawer L back	Baltic birch ply	13	64	606	
	2	drawer L sides	Baltic birch ply	13	64	229	
M	1	drawer front	Baltic birch ply	13	70	632	
	1	drawer M back	Baltic birch ply	13	70	606	
	2	drawer M sides	Baltic birch ply	13	70	229	
N	1	drawer front	Baltic birch ply	13	76	632	
	1	drawer N back	Baltic birch ply	13	76	606	
	2	drawer N sides	Baltic birch ply	13	76	229	
P	4	drawer bottoms	plywood	13	216	606	
Q	8	drawer glides	maple	6	12	229	
R	1	stop	maple	5	19	660	

hardware

- 4 drawer pulls (fish-shaped if you like)
- 1 5mm dia. × 305mm steel dowel rod
- 1 continuous hinge
- 2 sash handles
- 2 drawbolts

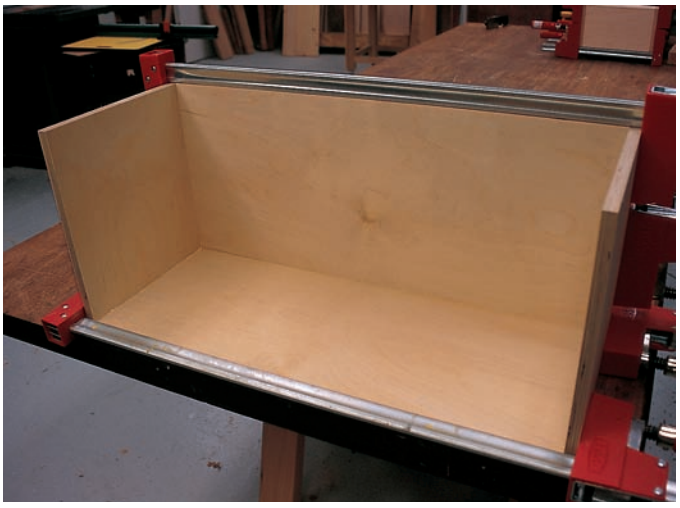
step 3 • Put a temporary spacer in the middle of the assembly. This will push the top and bottom panels flat (if you have assembled the box with the bends to the inside). After this assembly is cut in half to create a lid and upper bin section, you can remove the temporary spacers.



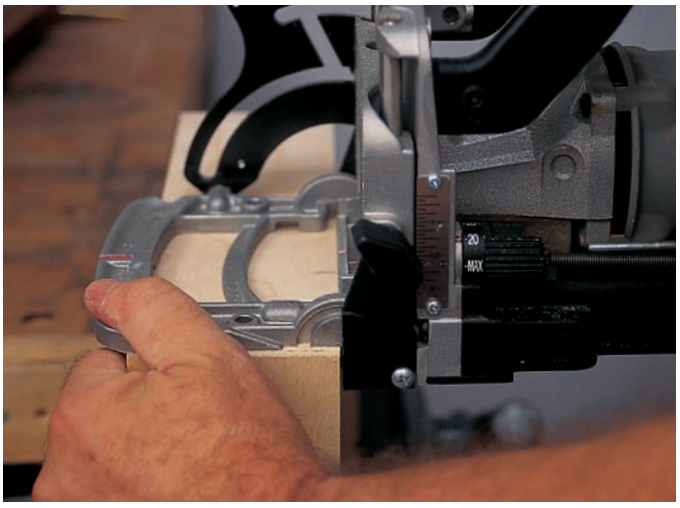
step 4 • Glue the upper box front and back panels F to the box assembly. I am using butt joints throughout this assembly. With the multiple sides coming together, the assembly is quite strong. If it was dropped off a building, yes, it would probably come apart, but for a fly-tying box the joinery is adequate.

step 5 • When gluing the back B to the bottom C of the lower box, use a caul that is curved. Note the space at the ends of the caul. When the clamps are applied, the caul will be pulled to the back, applying pressure to the center of the panel and at the ends. Only two clamps are needed.

step 6 • When the space is gone between the ends of the caul and the back B, you've got enough clamping pressure.



step 7 • Glue the ends A to the bottom/back assembly. Be sure all edges align.

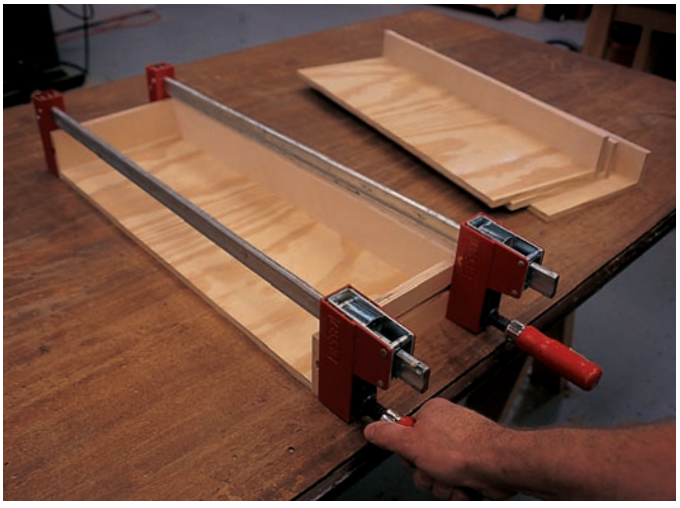


step 8 • Now, cut the upper box (the one you assembled in steps one through four) in half, creating a lid and upper bin section. This photo shows biscuit slots being cut into the bottom of the upper bin. Cut matching slots in the top edges of the side and back panels of the lower assembly. Attach the upper bin to the lower box assembly with #10 biscuits.

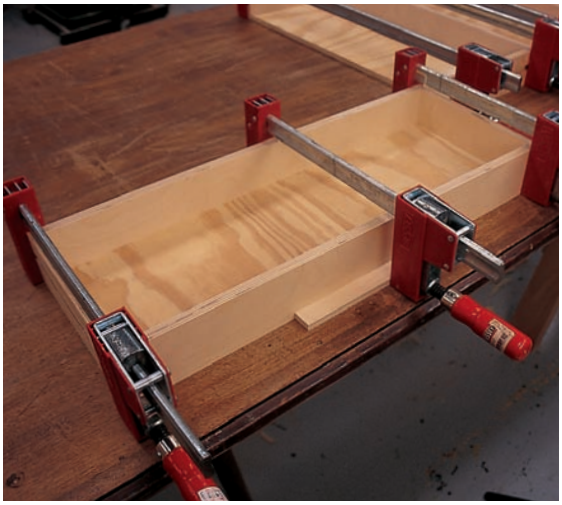
step 9 • Make the film canister bracket G as illustrated in the technical drawings and materials list. Locate and glue the three glue blocks H in place as shown in the drawing, then install the canister bracket.

step 10 • To build drawers K, L, M and N, first glue the drawer bottoms P to the drawer backs. I used some scrap plywood for the drawer bottoms, but you certainly could cut them out of the Baltic birch.

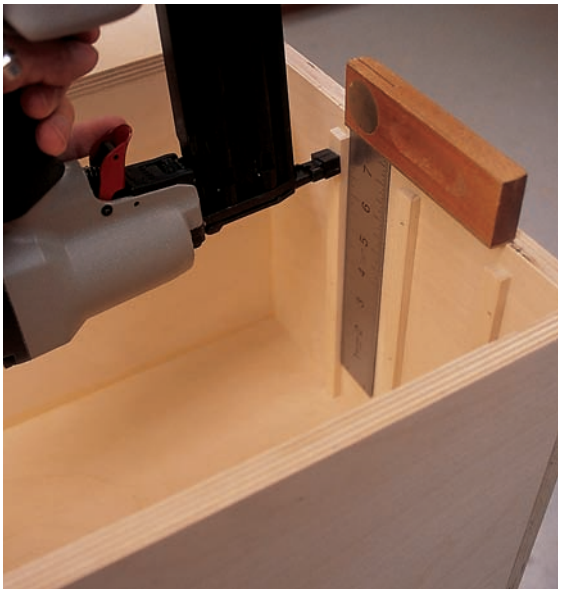
step 11 • Cut the grooves in the drawer sides for the drawer glides Q.



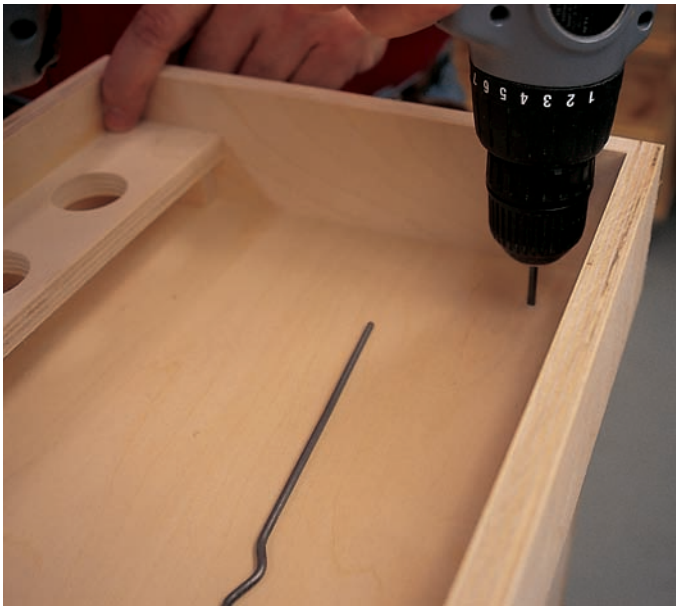
step 12 • Glue the sides to the drawer bottom/back assembly.



step 13 • Finally, glue the drawer fronts to the rest of the drawer box assembly.



step 14 • Carefully lay out the location of the drawer glides Q. I assembled the drawers first, then I was able to accurately locate the drawer glides. Glue and pin (or screw) them in place. Be sure the glides are square to the front of the cabinet. Take your time.



step 15 • Drill a $^{3}/_{16}$"-diameter hole toward the front of the upper bin. Continue the hole down through each drawer bottom. Then drill a hole halfway through the bottom C. Measure carefully so that all these holes line up with each other. Thread a $^{3}/_{16}$" steel dowel through the holes in the top bin, all the drawer bottoms and into the bottom panel. This will keep the drawers from coming open while moving the box.

step 16 • After drilling the hole in the upper bin bottom, I used a rod to mark the first hole in the top-drawer bottom. After that, measuring where the holes are located will work just fine. Drill holes for the wooden dowels in the lid. Then finish the box. Attach the lid with a continuous hinge. I located the hinge flat on the outside back of the box. This allowed screws to be inserted into the plywood through the layers of the plies, which gives a much better purchase for the screws, rather than inserting them into the end grain of the plywood. When the lid is opened, it rests against the wooden stop R attached to the back of the upper bin section. This stop holds the lid level with the upper bin, creating a nice workspace. Attach the drawer pulls of your choice. I chose some wooden fish pulls. (I believe they're smallmouth bass.) Finally, attach the sash handles and the drawbolts.


PISSTON
DEWALT

PROJECT 13

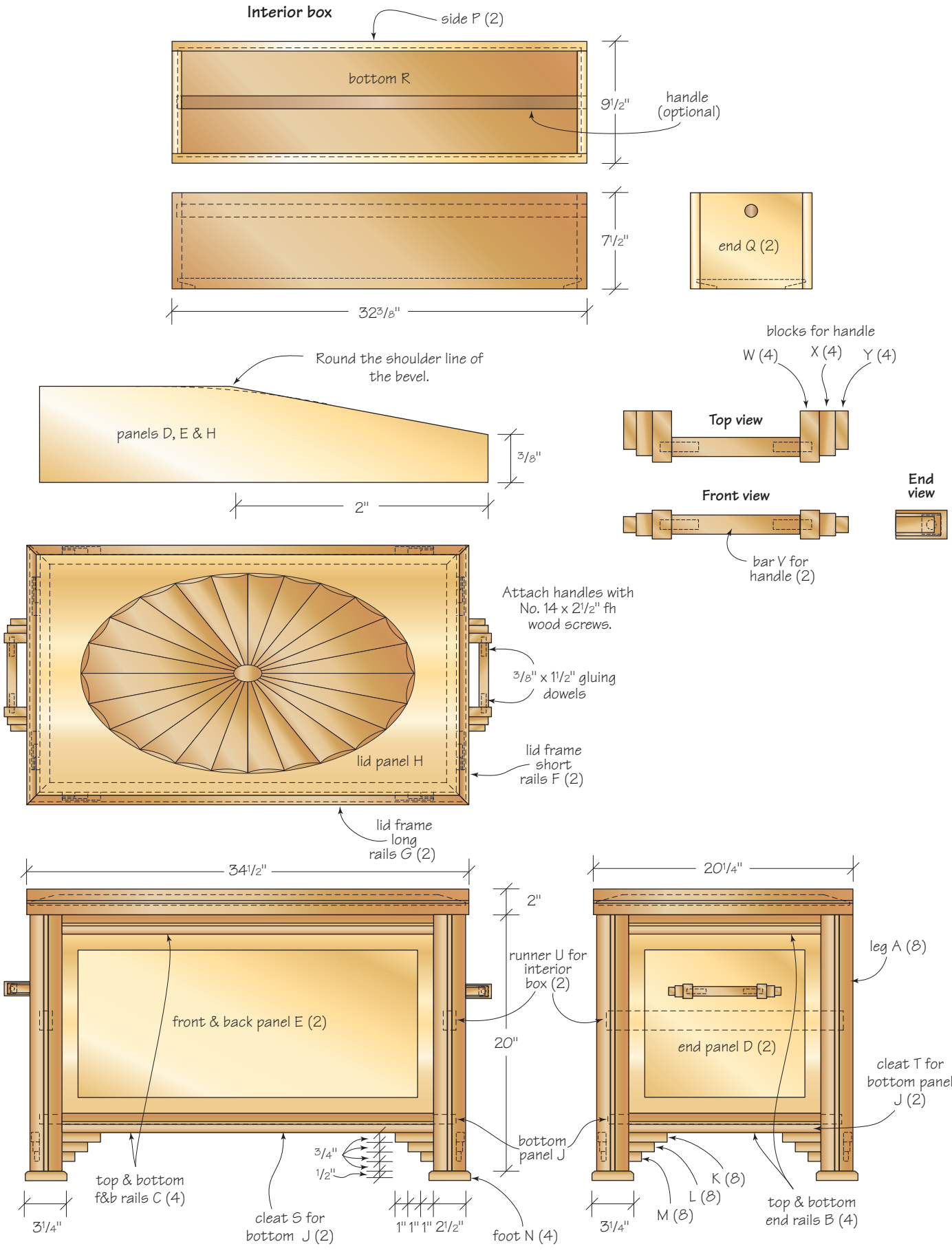
southwestern chest

This chest will hold a ton of hand power tools. There is also a drop-in box that either can serve as a sliding box inside the chest or, with a handle inserted, can be used as a tool tote.

The Southwestern style is one you can choose to copy, or you can make this in a Shaker, Arts & Crafts or contemporary style to suit your own personal tastes. After all, a tool chest should reflect and incorporate the personality of its builder.

I had a lot of fun laying out and carving the pattern in the lid. I used sugar pine to build the chest because it's easy to carve and it's light in weight. If you use a heavier wood, such as oak or cherry, you might want to put casters on the feet so you can move it easily.

The carved horse in the photo at left was inspired by the Palomino restaurant's logo. It took me three weeks over a four-year time span to carve the horse. I didn't want to rush myself!


Interior box
side P (2)
bottom R
9 1/2"
handle (optional)
7 1/2"
end Q (2)
32 3/8"
Round the shoulder line of the bevel.
panels D, E & H
3/8"
2"
blocks for handle
W (4)
X (4)
Y (4)
Top view
Front view
End view
bar V for handle (2)
Attach handles with No. 14 x 2 1/2" fh wood screws.
3/8" x 1 1/2" gluing dowels
lid panel H
lid frame short rails F (2)
lid frame long rails G (2)
34 1/2"
20 1/4"
2"
runner U for interior box (2)
leg A (8)
front & back panel E (2)
20"
end panel D (2)
cleat T for bottom panel J (2)
bottom panel J
3/4"
1/2"
top & bottom f&b rails C (4)
cleat S for bottom J (2)
1" 1" 1" 2 1/2"
foot N (4)
3 1/4"
K (8)
L (8)
M (8)
top & bottom end rails B (4)
3 1/4"

INCHES materials list

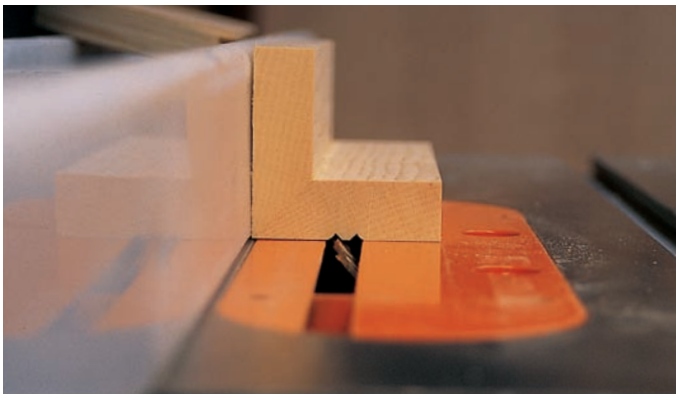
REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	8	legs	pine	3/4	2 1/2	20	45° miter cut on one long edge
B	4	top & bottom end rails	pine	3/4	1 1/2	16	
C	4	top & bottom f&b rails	pine	3/4	1 1/2	30	
D	2	end panels	pine	3/4	14 3/4	16	
E	2	front & back panels	pine	3/4	14 3/4	30	
F	2	lid frame short rails	pine	3/4	2	20 1/4	45° miter cuts on both ends
G	2	lid frame long rails	pine	3/4	2	34 1/2	45° miter cuts on both ends
H	1	lid panel	pine	3/4	19 1/2	34	
J	1	bottom panel	pine	3/4	18 1/4	32 1/2	
K	8	moulding pieces at feet	pine	3/4	5/8	3	
L	8	moulding pieces at feet	pine	3/4	1/2	2	
M	8	moulding pieces at feet	pine	3/4	3/8	1	
N	4	feet	pine	3/4	3 1/4	3 1/4	
P	2	sides for interior box	pine	3/4	7 1/2	32 3/8	
Q	2	ends for interior box	pine	3/4	7 1/2	8	
R	1	bottom for interior box	pine	3/4	8 3/4	31 7/8	
S	2	cleats for bottom panel J	pine	1	1	32 1/2	
T	2	cleats for bottom panel J	pine	1	1	16 1/4	
U	2	runners for interior box	pine	1	1 1/2	18 1/2	
V	2	bars for handle	pine	3/4	3/4	5 1/2	
W	4	blocks for handle	pine	3/4	1 1/8	2	
X	4	blocks for handle	pine	5/8	7/8	1 3/4	
Y	4	blocks for handle	pine	1/2	5/8	1 1/2	
Z	4	filler blocks for legs	pine	1 3/4	1 3/4	3	
AA	8	cleats at feet	pine	1/2	1/2	2	
BB	8	cleats at feet	pine	1/2	1/2	2	45° miter cut on one end

hardware

- 1 pair trunk strap hinges Rockler #50732
- 1 chain for lid
- 1 broom handle (optional)
- 4 3/8" × 1 1/2" gluing dowels
- 4 No. 14 × 2 1/2" flathead wood screws

STEP-BY-STEP construction

step 1 • Cut the leg parts A. Then, tape the mitered edges as shown in the technical illustration for project one. Here is another way to hold the parts while the glue dries.



step 2 • Tilt your table saw blade to 45°. Set the blade height so that the blade edge is barely above the tabletop. Run some test pieces to find the V-groove depth that you like. By setting the fence properly, you can make one cut, flip the piece end for end and make the second cut. This assures that the V-groove pattern is centered on the legs. Do the same on all the rail parts B, C, F and G. (You will need to reset the fence to get the pattern centered on the rails because they are narrower.) This technique works best with a square-toothed ripping blade.

MILLIMETERS materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	8	legs	pine	19	64	508	45° miter cut on one long edge
B	4	top & bottom end rails	pine	19	38	406	
C	4	top & bottom f&b rails	pine	19	38	762	
D	2	end panels	pine	19	375	406	
E	2	front & back panels	pine	19	375	762	
F	2	lid frame short rails	pine	19	51	514	45° miter cuts on both ends
G	2	lid frame long rails	pine	19	51	876	45° miter cuts on both ends
H	1	lid panel	pine	19	495	864	
J	1	bottom panel	pine	19	464	826	
K	8	moulding pieces at feet	pine	19	16	76	
L	8	moulding pieces at feet	pine	19	13	51	
M	8	moulding pieces at feet	pine	19	10	25	
N	4	feet	pine	19	83	83	
P	2	sides for interior box	pine	19	191	822	
Q	2	ends for interior box	pine	19	191	203	
R	1	bottom for interior box	pine	19	222	810	
S	2	cleats for bottom panel J	pine	25	25	806	
T	2	cleats for bottom panel J	pine	25	25	412	
U	2	runners for interior box	pine	25	38	470	
V	2	bars for handle	pine	19	19	140	
W	4	blocks for handle	pine	19	29	51	
X	4	blocks for handle	pine	16	22	45	
Y	4	blocks for handle	pine	13	16	38	
Z	4	filler blocks for legs	pine	45	45	76	
AA	8	cleats at feet	pine	13	13	51	
BB	8	cleats at feet	pine	13	13	51	45° miter cut on one end

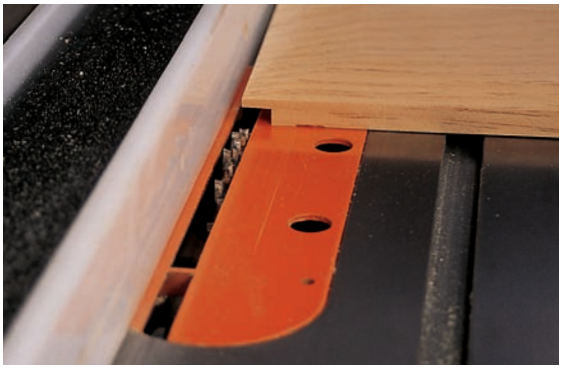
hardware

- 1 pair trunk strap hinges Rockler #50732
- 1 chain for lid
- 1 broom handle (optional)
- 4 10mm × 38mm gluing dowels
- 4 No. 14 × 64mm flathead wood screws

step 3 • Set up a dado cutter to cut a ¼"-wide by ½"-deep groove in the legs and all rails.

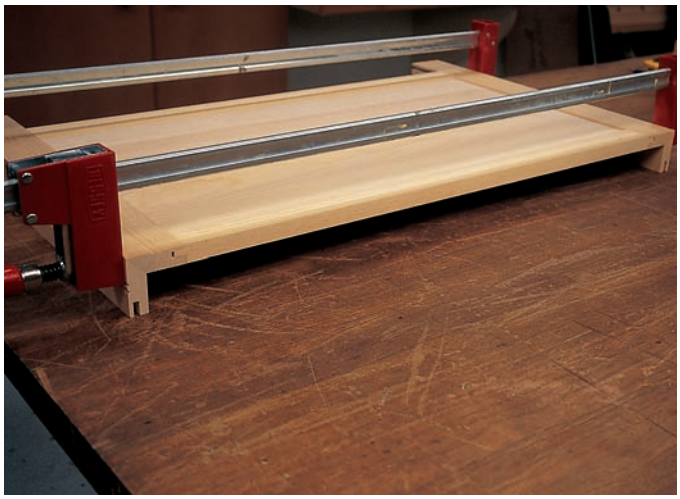
step 4 • Use the same dado head to cut the tenons on the rails.

step 5 • Set the saw blade tilt to 5° and cut the bevels on the ends D, front and back E, lid H and interior box bottom R panels. Don't make the shoulder offset cut on the end panels D and front and back panels E. (I did make the offset cut on panel R. No reason, I just chose to do it that way.) Sand the shoulders smooth on the panels. (See detail in technical illustration.) This is a scary-looking setup. Use your guards and be careful!

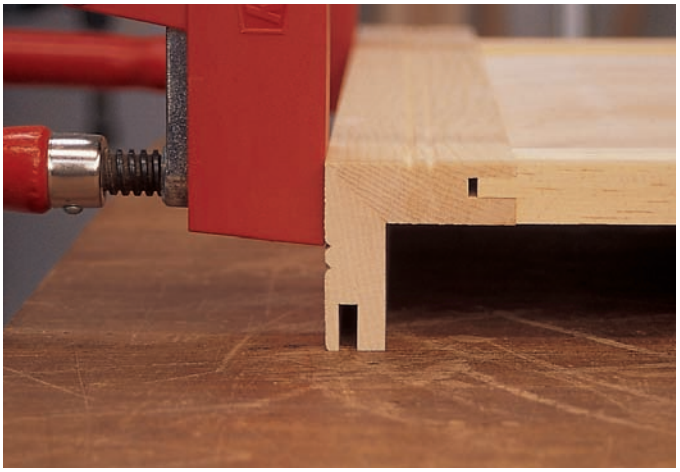


step 6 • Cut rabbets on the panels to create a tenon that will fit into the grooves of the frame parts.

step 7 • Assemble the front and back panels E with the rails C and the legs A.



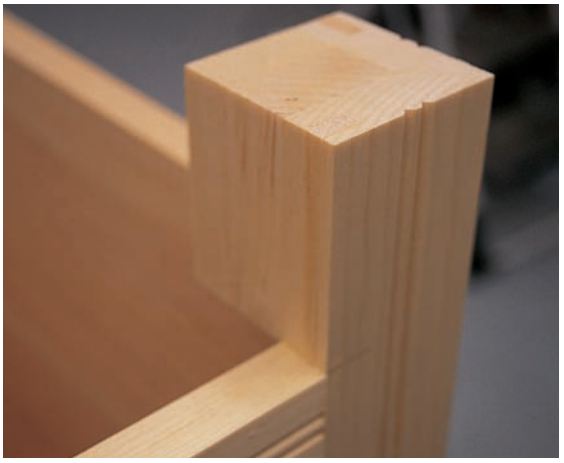
step 8 • Clamping is very easy in this operation.



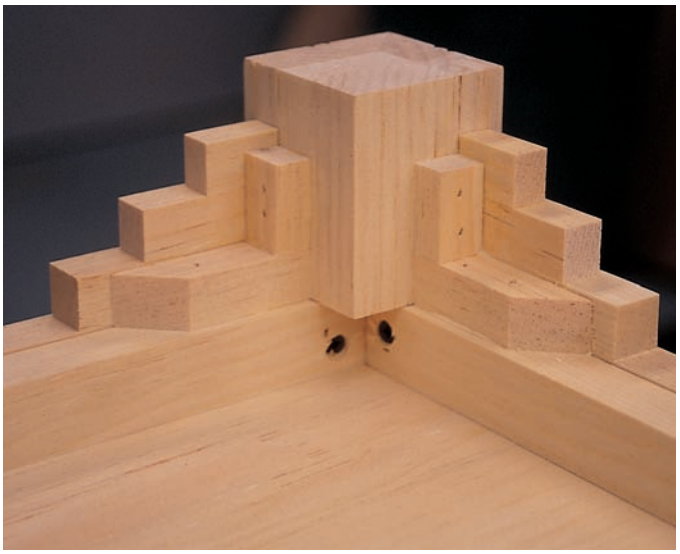
step 9 • Be sure the legs A are square to the frame rails C.

step 10 • When the glue on the front and back panels E is dry, connect the two panels with the end panels D and rails B. When I assembled this framework I put a spot of glue at the center of the ends of the floating panels. This helps hold the panels in place, but still allows them to move with seasonal changes. (The center will always stay fixed.)

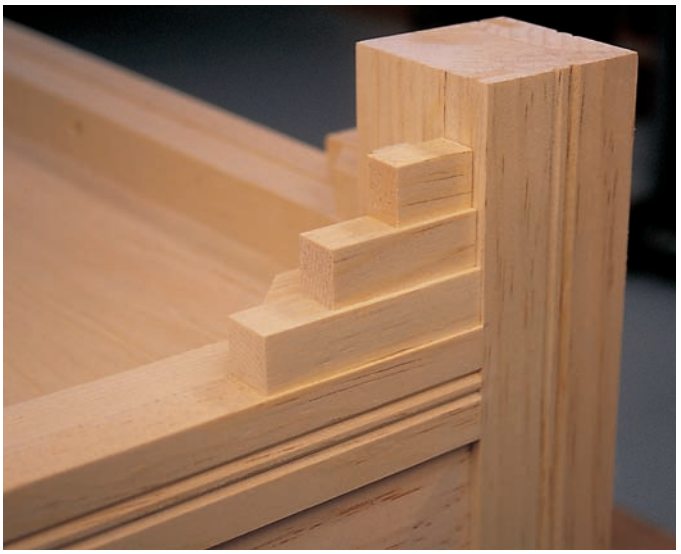
step 11 • Cut four 1¾" × 1¾" × 3" blocks Z. Glue them inside the legs at the bottom. This helps strengthen the legs.



step 12 • I found it easier to cut the grooves in step three along the entire length of the legs and later fill in the exposed grooves with some strips of wood.



step 13 • Cut all the small mouldings K, L and M in long strips, then cut them to length. I glued the three stacked mouldings together first, then I glued them in place and added the cleats AA and BB.

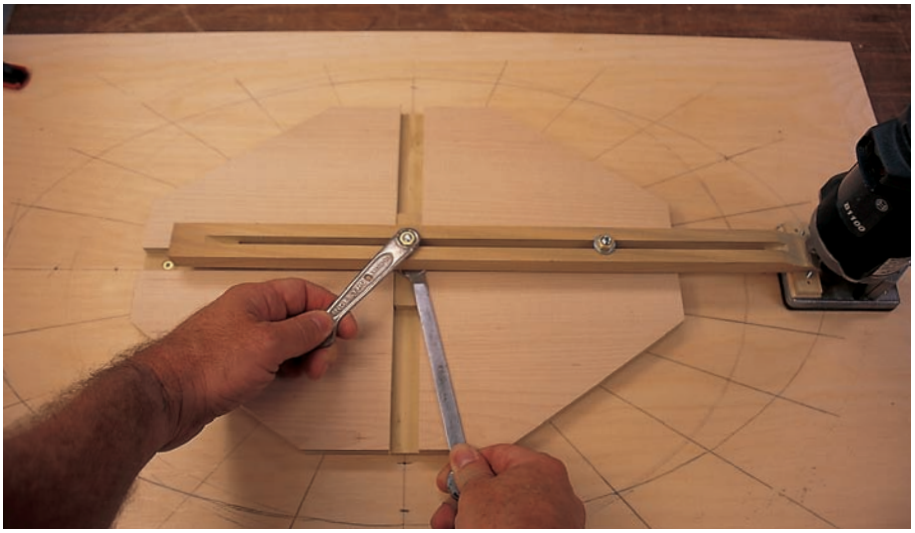


step 14 • This is what the mouldings look like from the front. The small pieces are flush to each other on the back, but because they are different widths, this creates the offset, stair-stepped look. It creates a nice visual pattern that has lots of movement and shadow lines. Add the feet blocks N at this time. Don't glue the blocks, just screw them into place on the ends of the legs.

step 15 • Attach the 1" × 1" cleats S and T to the bottom inside edges of the bottom front and back rails C. Then, set the bottom panel J on these cleats and attach it with screws inserted into oversize pilot holes. Also, leave a $\frac{1}{8}$" space on either side of the panel. This will allow the panel to move with seasonal changes.

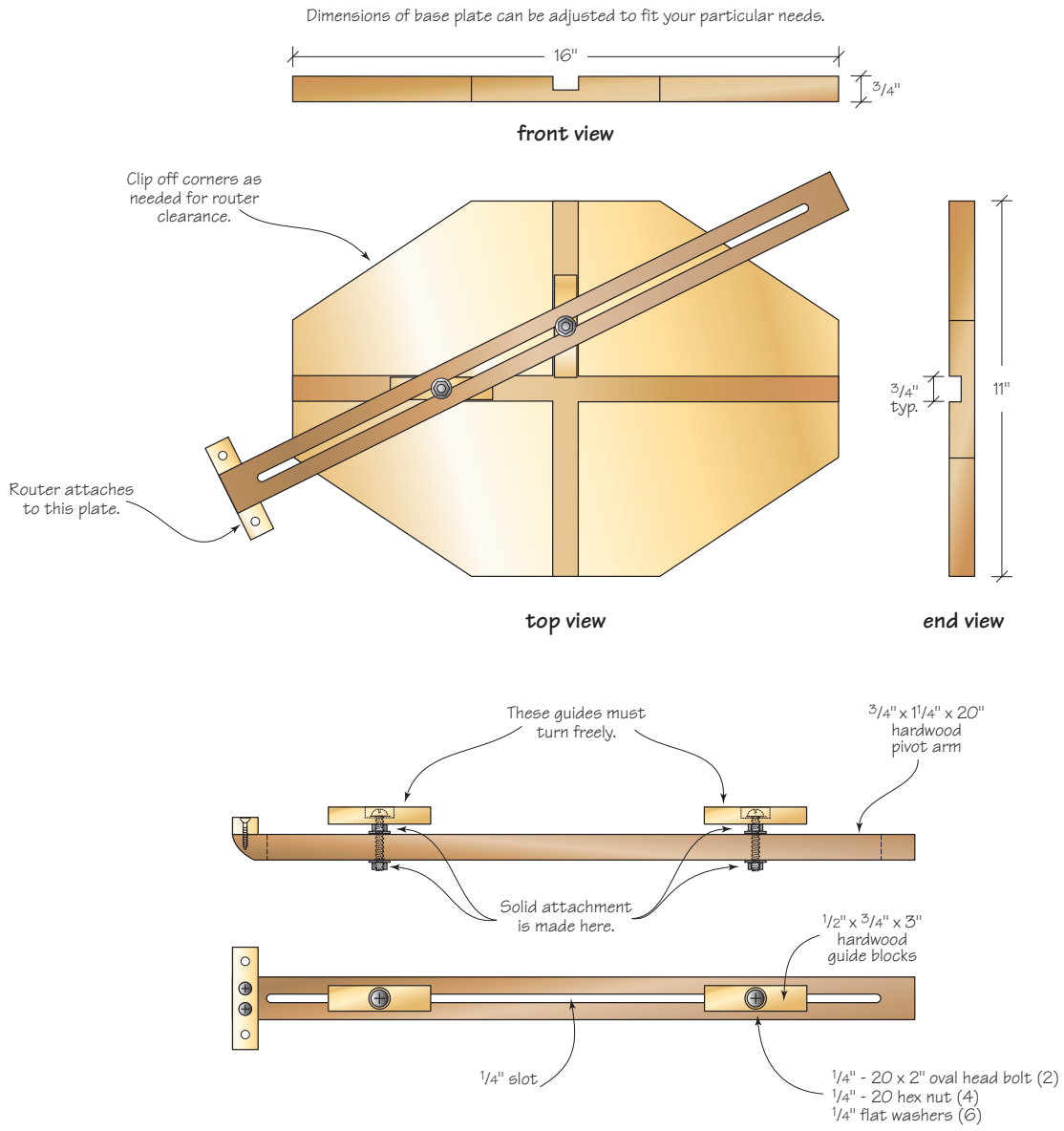
step 16 • Glue and screw the runners U in place. Yes, you can glue them to the floating panel and to the legs. These runners are located in the center of the end panels D. The panels will still be able to move with the seasons. By securing the runners this way, it will hold the panels solid, so the handles can be attached to the panel. The chest can be lifted with no worries of the panels moving and putting undue pressure on the upper rails.

step 17 • After I drew the pattern on the lid panel H, I needed to find a way to cut a perfect ellipse with a V-grooving router bit. I made this jig, which worked flawlessly. (Sometimes you just get lucky.) See the technical drawings for details.



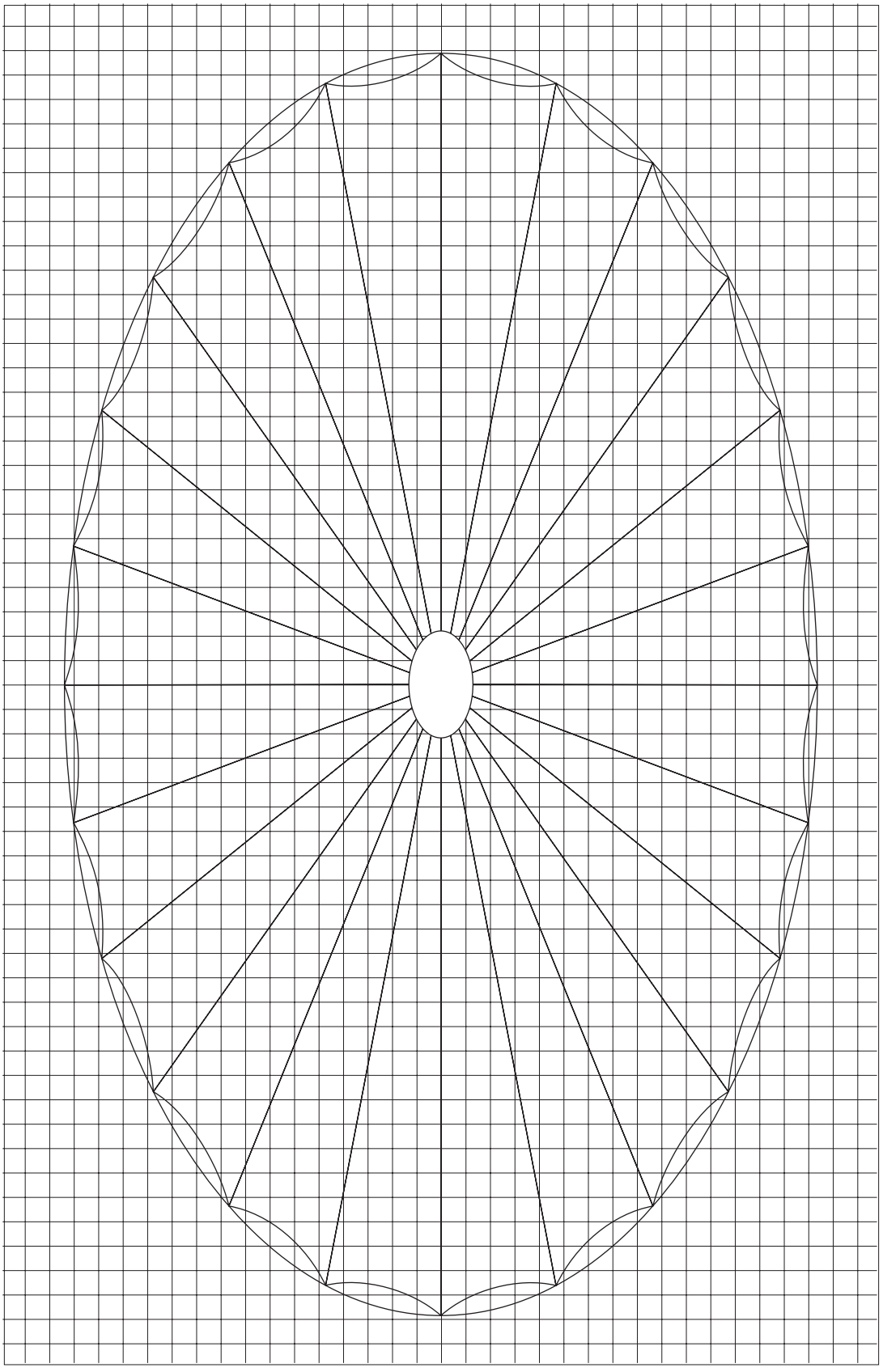
step 18 • The key to using this jig is setting the width and height limits of the pattern. The router will then follow the paths set by the sliding blocks. An ellipse is an angled cross section of a cone and has constantly changing radii. This jig will create a perfect ellipse.

step 19 • I screwed the jig to the panel. The holes mostly disappeared when I routed the straight-line V-grooves in the next step. Rout the ellipse, then remove the jig from the panel.



step 20 • I then routed straight-line V-grooves. Stop at the outer edges of the ellipse line and don't rout across the small ellipse in the center of the pattern.

step 21 • When carving the fan pattern, I found it helpful to turn off the overhead lights and use just one incandescent bulb to create shadows. These shadows clearly show how smooth or rough the surfaces are. As you carve the fan pattern, the center ellipse will start to form.

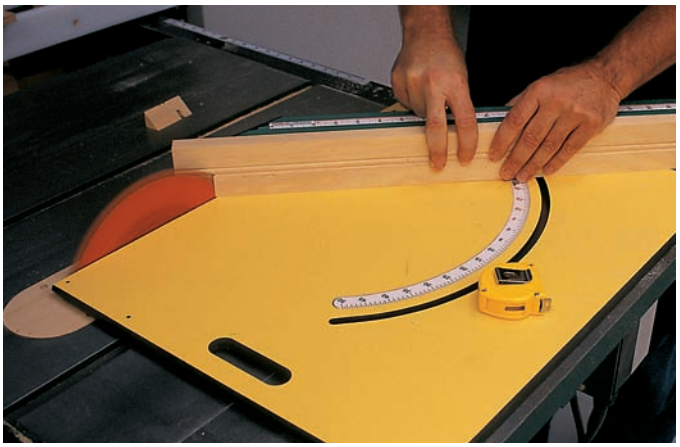


Each square represents 1/2".

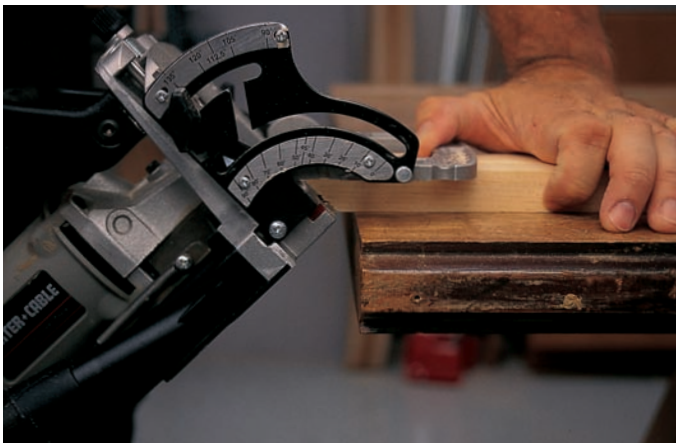
For full-size pattern enlarge 320%.

step 22 • I chose to sand the pattern smooth rather than leaving the tool marks, as I had originally intended.

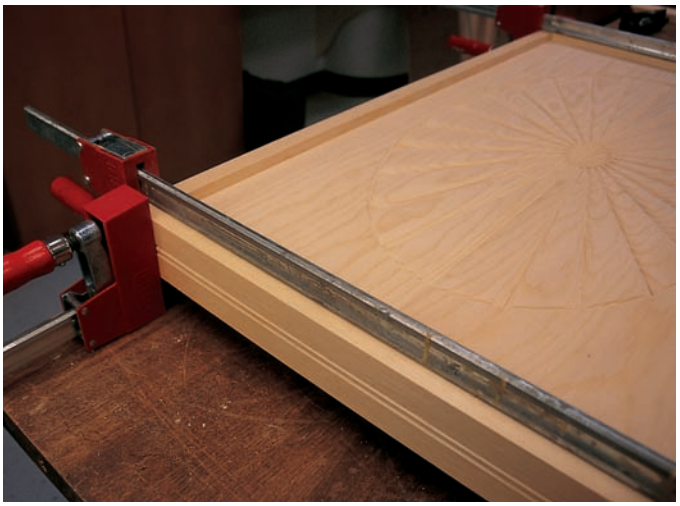
step 23 • The angle of this photo makes the center ellipse look almost round, but it is indeed a true ellipse. I chose to use a small gouge and scoop out the shape. I did leave the tooling marks here.



step 24 • After the pattern is carved in the lid panel H, cut the miters on the ends of the rails F & G.



step 25 • You can strengthen the miters by inserting a biscuit at each miter joint.

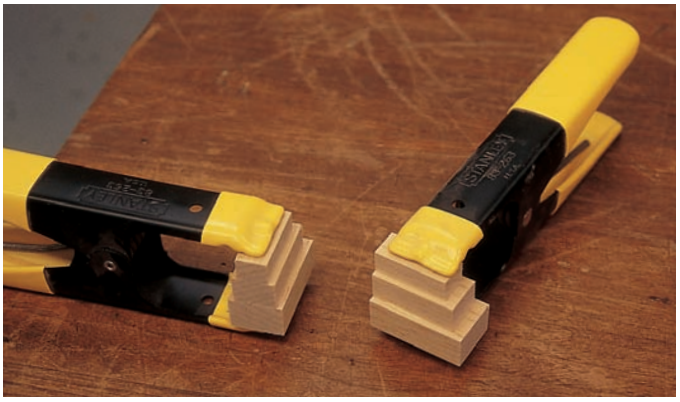


step 26 • Clamp the miters from two directions to close the joint tightly. This will be a strong joint.

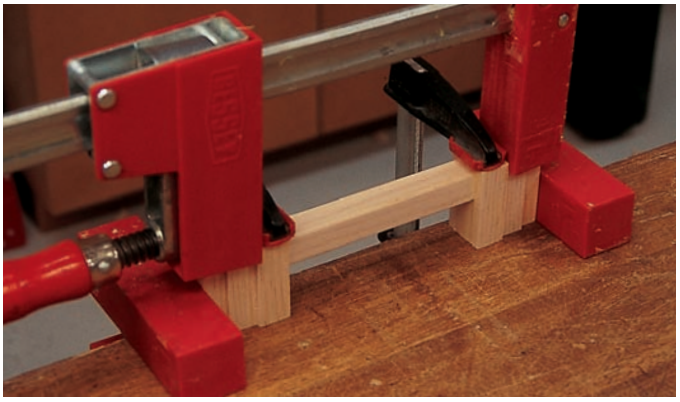
step 27 • Cut the interior box parts P and Q to size. Cut the groove for the bottom panel R, and glue and screw the box together, capturing the bottom.

step 28 • I wanted to put a raised-panel bottom in the box. I don't know why; it just seemed like the thing to do!

step 29 • I cut off a broom handle, sanded off the green paint and rounded the ends slightly. Drill a through-hole in one end of the box and a stopped hole in the other end. Insert the handle in the box, and you've got a tool tote you can use to carry the tools you need for a job outside of the shop.



step 30 • Glue the blocks W, X and Y together to form the ends of the handles. Then drill a $\frac{3}{8}$" hole in the assembly and in the ends of the bars V. See the technical drawing for details.



step 31 • Use $\frac{3}{8}$" × $1\frac{1}{2}$" gluing dowels to attach the end block assemblies to the bars V. After you've applied the finish to the box and handles, attach the handles to the end panels. Then, set the lid on the box, align it and attach the trunk strap hinges. The trunk strap hinges are made to automatically stop the lid a little past 90° when it is opened. I installed a chain on the inside of the lid and chest so the lid wouldn't open too far and bend the hinges. If you plan on storing heavy tools in the chest, I would recommend putting casters on the feet.

tip >> A WHITEWASHED FINISH

The finish for this chest was not difficult to do, and it added a lot to the overall look and feel of the chest. I wanted to add some depth to the wood, the V-grooves, the mouldings and the carving.

After sanding, apply a coat of sealer. After it dries, sand it smooth. Then stain the chest with a medium-dark brown oil-based stain. Because the wood is partially sealed, the stain will be absorbed evenly. Let the stain sit for 1 minute, then wipe off the excess completely with a clean rag. This will add just the right amount of color to serve as a background for the white stain to be applied later.

After the stain has dried overnight, apply a whitewash oil-based stain. Apply this stain liberally and let it sit for 2 to 3 minutes. The whitewash might pickup traces of the brown stain. That's ok. Wipe off the color gently, leaving some of it in the V-grooves, at the corners where the mouldings butt up to the legs and in the nooks and crannies of the carving. Also, leave enough of this stain to give the whole piece a whitish, weathered look. Let this stain dry overnight.

Finally, apply two or three top coats. The more top coats you apply, the shinier the finish will become.

When I started this book, this was the first project I built. I knew it would be involved. The chest itself is a basic two-door box with some drawers.

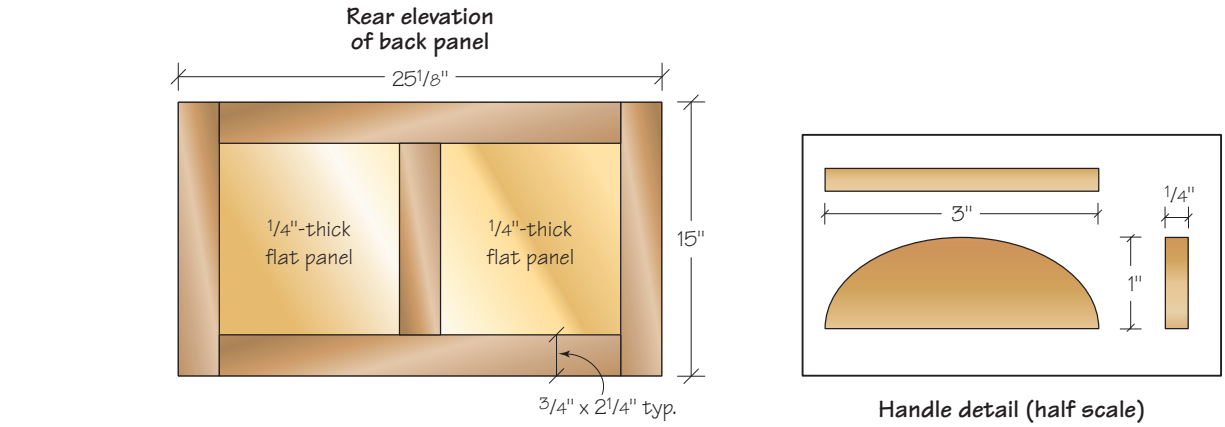
What makes the chest what it is, is the curved front — which led to the overall design. The rounded edges of the top, bottom and feet soften the look and feel of the chest. When the curved doors are opened, they invite you to open the drawers.

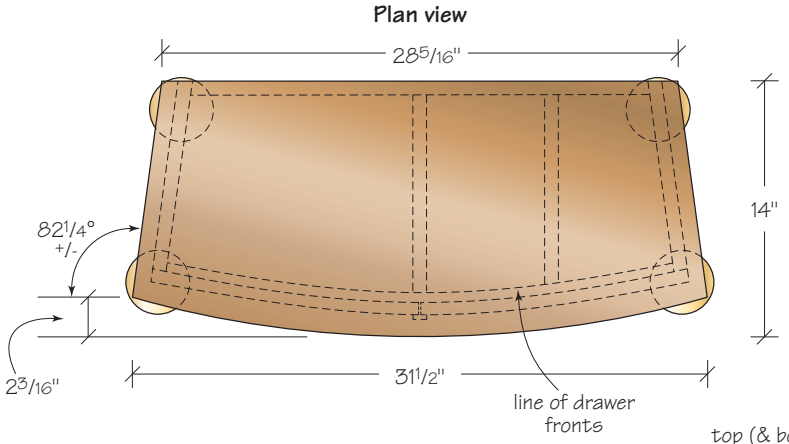
I had been saving this walnut and curly maple for just the right project. Whenever I looked at the wood, I just couldn't bring myself to cut into it. Then I realized that this was the project for this wood! There comes a time when you have to decide that this is it, and go for the project. I wasn't disappointed in the least and never looked back.

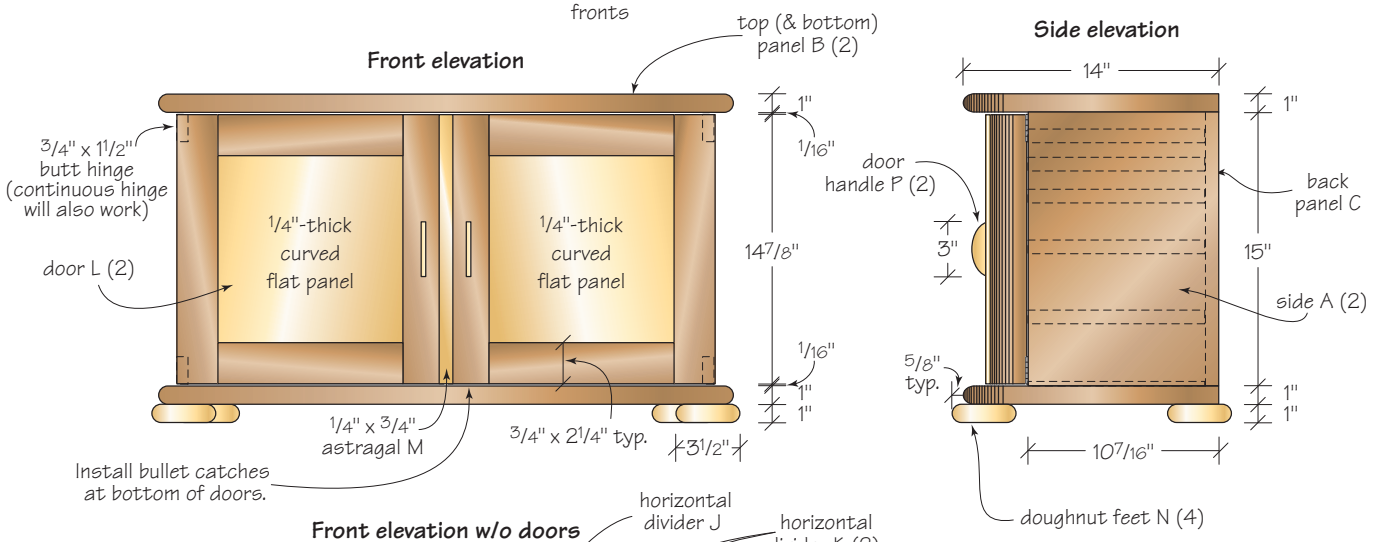
PROJECT

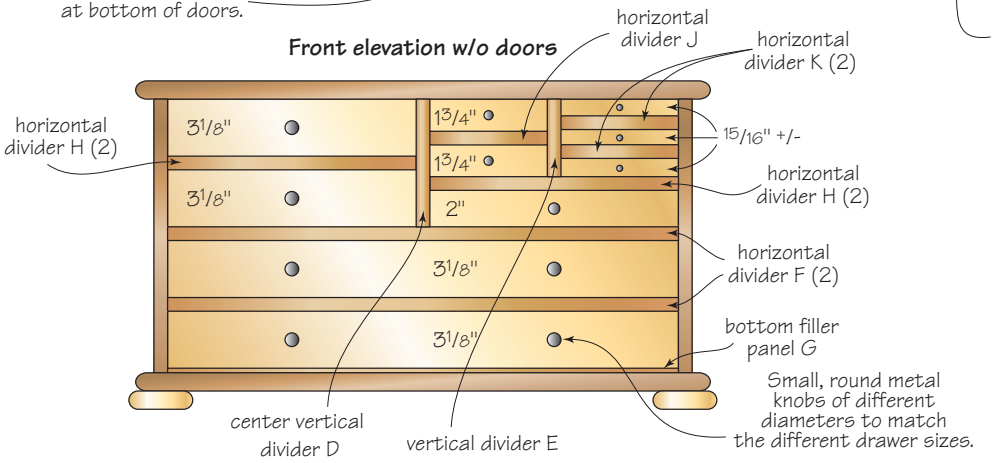
14

curved-front chest


Rear elevation of back panel
25 1/8"
1/4"-thick flat panel
1/4"-thick flat panel
15"
3/4" x 2 1/4" typ.
3"
1/4"
1"
Handle detail (half scale)


Plan view
28 5/16"
14"
82 1/4° +/-
2 3/16"
31 1/2"
line of drawer fronts


Front elevation
top (& bottom) panel B (2)
3/4" x 1 1/2" butt hinge (continuous hinge will also work)
door L (2)
1/4"-thick curved flat panel
1/4"-thick curved flat panel
1"
1/16"
14 7/8"
1/16"
1"
1"
1/4" x 3/4" astragal M
3/4" x 2 1/4" typ.
3 1/2"
Install bullet catches at bottom of doors.
Side elevation
14"
door handle P (2)
back panel C
3"
15"
side A (2)
5/8" typ.
1"
1"
1"
10 7/16"
doughnut feet N (4)


Front elevation w/o doors
horizontal divider J
horizontal divider K (2)
horizontal divider H (2)
3 1/8"
3 1/8"
1 3/4"
1 3/4"
2"
15/16" +/-
horizontal divider H (2)
3 1/8"
horizontal divider F (2)
3 1/8"
bottom filler panel G
Small, round metal knobs of different diameters to match the different drawer sizes.
center vertical divider D
vertical divider E

INCHES materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	sides	walnut	3/4	10 1/2	15	bevels will be cut on the sides to finished size
B	2	top & bottom	walnut	1	14	31 1/2	
C	1	back panel	walnut	3/4	15	25 1/8	bevels will be cut on the sides to finished size
	2	back panel C stiles	walnut	3/4	2 1/4	15	
	1	back panel C stile	walnut	3/4	2 1/4	11 1/2	
	2	back panel C rails	walnut	3/4	2 1/4	21 5/8	cut the rails long, assemble panel and cut to size
	2	back panel C panels	curly maple	1/4	10 1/16	11 1/2	
D	1	center vertical divider	poplar/curly maple	3/4	10 7/8	7 H	grain runs vertically, width includes 1/4" × 3/4" curly maple strip on front edge of panel
E	1	vertical divider	poplar/curly maple	3/4	10 3/8	4 1/4 H	grain runs vertically, width includes 1/4" × 3/4" curly maple strip on front edge of panel
F	2	horizontal dividers	poplar/curly maple	3/4	10 7/8	27 13/16	all the horizontal dividers are edged with curly maple and the grain runs left to right (or right to left); this allows the solid-wood top, bottom, vertical and horizontal dividers to move together with seasonal changes
G	1	bottom filler panel	poplar/curly maple	1/4	10 7/8	27 13/16	
H	2	horizontal dividers (l&r)	poplar/curly maple	3/4	10 7/8	13 1/2	
J	1	horizontal divider	poplar/curly maple	3/4	6 7/16	10 7/8	
K	2	horizontal dividers	poplar/curly maple	3/4	6 1/4	10 5/16	
L	2	doors	walnut/curly maple	3/4	14 5/8	14 7/8	
	4	door L stiles	walnut	3/4	2 1/4	14 7/8	
	4	door L curved rails	walnut	3/4	2 1/4	11 1/8	
	2	door L curved panels	curly maple	1/4	10 7/8	11 3/8	
M	1	astragal	curly maple	1/4	3/4	14 7/8	
N	4	doughnut feet	curly maple	1	3 1/2dia		
P	2	door handles	curly maple	1/4	1	3	see illustration for handle detail

hardware

- 2 pairs butt hinges 3/4" × 1 1/2"
- 2 bullet catches
- 6 3/4" dia. sash knobs
- 1 5/8" dia. sash knob
- 2 1/2" dia. sash knobs
- 3 3/8" dia. sash knobs

tip >> MAKING DRAWERS FOR THE CURVED-FRONT CHEST

All of the drawers have 1/2" plywood bottoms, poplar sides and laminated poplar and white oak fronts. (If you have another species of wood you would like to put on the drawer fronts, that's your option!) Drawer sizes are determined by measuring the assembled chest. I did not use any drawer runners. If you want to use drawer runners, cut a groove in the bottom of the drawer and attach a hardwood strip to the bottom of each drawer space. I would recommend doing this before assembling the cabinet or the drawer cases.

MILLIMETERS materials list

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
A	2	sides	walnut	19	267	381	bevels will be cut on the sides to finish size
B	2	top & bottom	walnut	25	356	800	
C	1	back panel	walnut	19	381	638	bevels will be cut on the sides to finish size
	2	back panel C stiles	walnut	19	57	381	
	1	back panel C stile	walnut	19	57	292	
	2	back panel C rails	walnut	19	57	549	cut the rails long, assemble panel and cut to size
	2	back panel C panels	curly maple	6	256	292	
D	1	center vertical divider	poplar/curly maple	19	276	178 H	grain runs vertically, width includes 6mm x 19mm curly maple strip on front edge of panel
E	1	vertical divider	poplar/curly maple	19	264	108 H	grain runs vertically, width includes 6mm x 19mm curly maple strip on front edge of panel
F	2	horizontal dividers	poplar/curly maple	19	276	706	all the horizontal dividers are edged with curly maple and the grain runs left to right (or right to left); this allows the solid-wood top, bottom, vertical and horizontal dividers to move together with seasonal changes
G	1	bottom filler panel	poplar/curly maple	6	276	706	
H	2	horizontal dividers (l&r)	poplar/curly maple	19	276	343	
J	1	horizontal divider	poplar/curly maple	19	164	276	
K	2	horizontal dividers	poplar/curly maple	19	158	262	
L	2	doors	walnut/curly maple	19	371	378	
	4	door L stiles	walnut	19	57	378	
	4	door L curved rails	walnut	19	57	282	
	2	door L curved panels	curly maple	6	276	289	
M	1	astragal	curly maple	6	19	378	
N	4	doughnut feet	curly maple	25	89	89	
P	2	door handles	curly maple	6	25	76	see illustration for handle detail

hardware

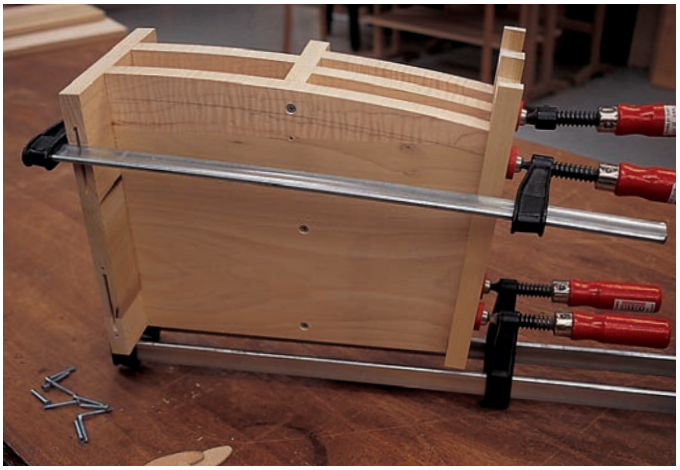
- 2 pairs butt hinges 19mm × 38mm
- 2 bullet catches
- 6 19mm dia. sash knobs
- 1 16mm dia. sash knob
- 2 13mm dia. sash knobs
- 3 310mm dia. sash knobs

STEP-BY-STEP construction

step 1 • Before starting this project, study the technical drawings carefully. Try to visualize how all the parts will fit together and how they relate to each other. Draw the outline of the top B on your wood and cut it out as accurately as you can. Smooth the curved front edge, then trace the bottom B, using the top as a pattern. Rough-cut it out and use the top as a routing template.

Draw all the side, divider, door, drawer and back panel lines on the top panel. (See the plan view in the technical drawings.) This will be your guide for sizing all the parts for the rest of the project. Use the front, curved edge of the top as a reference to draw the lines for the doors, drawer fronts and horizontal divider front edges. (A combination square or marking gauge works best for doing this.)

step 2 • Glue a 2"- to 3"-wide strip of curly maple (or the decorative wood of your choice) to the front edge of these pieces. Using your top as the guide for sizing, cut out the vertical dividers D and E, the horizontal dividers F, H, J and K, and the bottom filler panel G.



step 3 • After you've created all the dividers, start with the right-hand set and assemble them using biscuits.

step 4 • Cut the sides A to size. Again, use the top as your guide for determining the bevel angles on the front and back edges. Use the divider assembly (from step three) as a template to locate the biscuit slots in the right-hand side.

step 5 • Glue the rest of the drawer body together using biscuits. Note the spacers between the horizontal dividers. These assure the assembly is the same on both sides. (There is a very slight amount of adjustability, if needed, when using biscuits.)

step 6 • Cut out the frame parts for the back panel C. I usually use a single, square-toothed ripping blade to cut grooves for frame and panel construction. Adjust the fence so you can flip the parts end for end and end up with a $\frac{1}{4}$" groove. This ensures the groove will be centered in the frame parts.

step 7 • I use the same square-toothed blade to cut the tenons on the rails and center stile. Set the fence to the required tenon length and set the blade height, so that when you flip the part face for face you will have a centered tenon that is the correct thickness.

step 8 • After the back panel C is assembled, fit it between the side panels A. Then, glue it in place. Round over the side and front edges of the top and bottom panels B. Then, using biscuits, attach the bottom B to the drawer case assembly. Fit the bottom filler panel G into the bottom of the chest and glue it in place. Finally, attach the top B to this assembly using the same setup as shown in the photo.

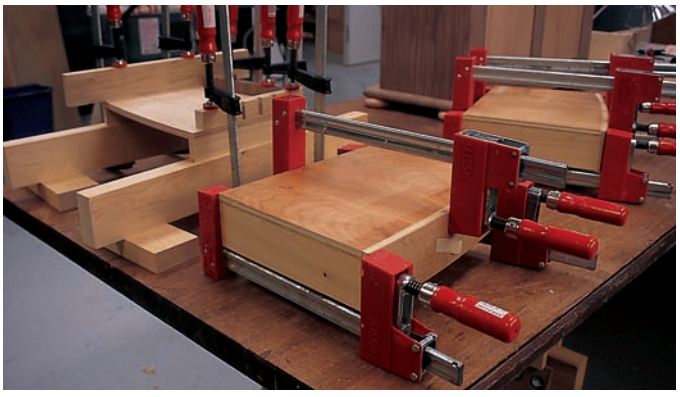
step 9 • Make the doughnut feet N (without the holes!). Draw circles on the material and rough-cut the feet using a band saw or jigsaw. If you have access to a stationary sander, this is a simple way to perfectly round the feet: Drill a hole in the center of the foot. Drive a 16d nail into a scrap board and clamp the board to the sander's table. Insert the nail into the foot, and set the jig so the wood barely touches the sanding belt. Start the sander and slowly turn the foot. You could rig your belt sander to do the same procedure. Clamp the sander sidewise in your bench vise and use the benchtop as the sander table.

step 10 • Round over the edges of the feet to create the bullnose. Do this in two or three steps, raising the bit a little higher for each cut. If you are not comfortable with this setup, use a wood rasp to round over the edges. (Actually, this setup is safe. The ends of the fences are set as close to the router bit as possible to keep the opening very small. The right-hand fence acts as a brace to steady the work and your hands.)

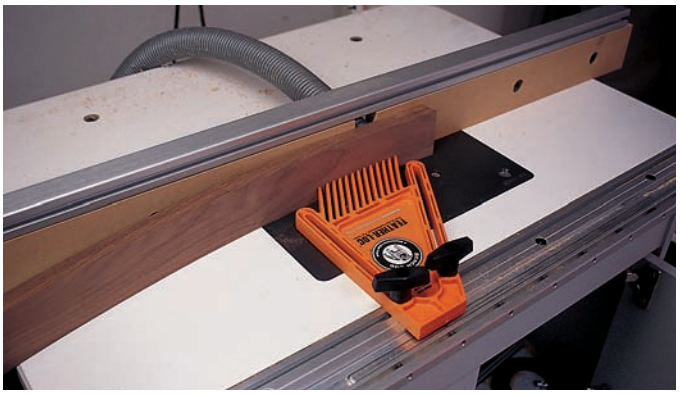
step 11 • To finish-sand the feet, thread a $^{3}/_{16}$" hanger bolt into the hole in the center of the foot. Chuck the machine-threaded end of the hanger bolt into a power hand drill. Clamp the drill in your vise. Turn on the drill and lock it. Sand the feet, progressing to 220-grit sandpaper. This fine sanding really brings out the grain of the curly maple! Attach the feet to the chest using a screw through the center hole. Use no glue.

step 12 • Check your drawing on the top of the top panel B. Make a bending jig to the correct radius for the drawer fronts. To save wood, I laminated three layers of ⅛"-thick poplar and used one layer of ⅛"-thick white oak to make the drawer fronts. You can use whatever wood you like for the drawer fronts. I used white oak because it bends better than the walnut or curly maple, and I just happened to have some scraps of it in my wood stash. As I've said before, these are your personal tool chests, so do what you like!

step 13 • Before fitting the drawer fronts, cut the plywood drawer bottoms and fit them into their respective openings. Allow for the thickness of the drawer fronts. Then, fit each of the drawer fronts. When you are happy with the fit, cut the drawer sides and backs. Use the drawer bottoms as your template for cutting these parts. (The sides and backs will be glued on the top of the bottoms.)

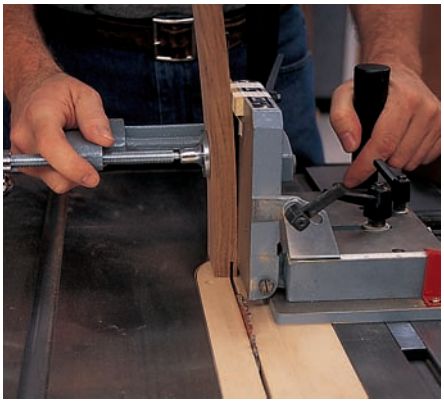


step 14 • The back and sides are being glued to the drawer bottom in the upper left of this photo. The curve of the bottoms and the inside radius of the drawer fronts should match. This means that very little stress is placed on the drawer fronts when they are glued into place, as shown on the other two drawers. If there is too much stress on the drawer fronts, they could come unglued from the bottoms.



step 15 • Cut ⅛"-thick strips of walnut for the curved rails for the doors L. Laminate them using the same method as you used for gluing the drawer fronts. (However, you will need a different lamination jig with a different radius.) While you're gluing the rails, make some scrap rails to use for practicing your grooving and cutting. After you have sized the rails, cut the groove for the curved panel using a straight-cutting router bit. You don't need a curved fence for this operation. The point of contact on the fence behind the router bit will be just fine. Slowly feed the rail through the setup. I would recommend that you practice on some scrap material if you don't feel totally comfortable with this operation.

step 16 • Cut the rails to length. Hold the rail "flat," right next to the saw blade and make the cut. Butt the ends of the rails to the stiles and hold them on your drawing. If the joint looks like it will match the curve, then you're ready to cut the tenons on the ends of the rails. When I say that the joint looks like it matches the curve, remember that you will need to shape the stiles to continue the curve of the rail through the rest of the door.



step 17 • Cut the tenons on the curved rails. Using a tenoning jig is the easiest. Hold the end of the rail flat on the saw table next to the tenoning jig and simply measure the distance from the top of the jig to the rail. Cut a spacer to fit and you're all set.

step 18 • Set a stack of wedges against the miter gauge fence and under the rail so the end rests squarely against the saw fence. Then make the outside cheek cut for the tenon.

step 19 • Cutting the cheeks on the inside of the rails is just the opposite of the previous step. Put a spacer under the end of the rail and secure it to the miter gauge fence.

step 20 • Now for the fun part — making the curved panels. I created the $\frac{1}{4}$"-curved panel by coopering it. First, thickness the flat panels to $\frac{5}{32}$". Plane some scrap wood to the same thickness, then slice the curly maple and the scrap wood into $1\frac{1}{4}$"-wide strips. I know there is a mathematical way to determine the bevel angle that should be cut on the edges of the strips, but I just used the scrap-wood strips in a trial-and-error method. Use your full-scale drawings on top B to be sure the curve is correct by placing the strips on end, butted together. When all is correct, cut the bevels on all the maple strips. Be sure to keep the strips in order, so the grain pattern will match when you glue the strips together. You can cut these bevels either on the table saw or on the jointer. Lay all the strips faceup and tape all the edges together. (See project one, steps three and four and the technical illustration.) Then turn the assembly facedown and apply glue in the bevel joints.

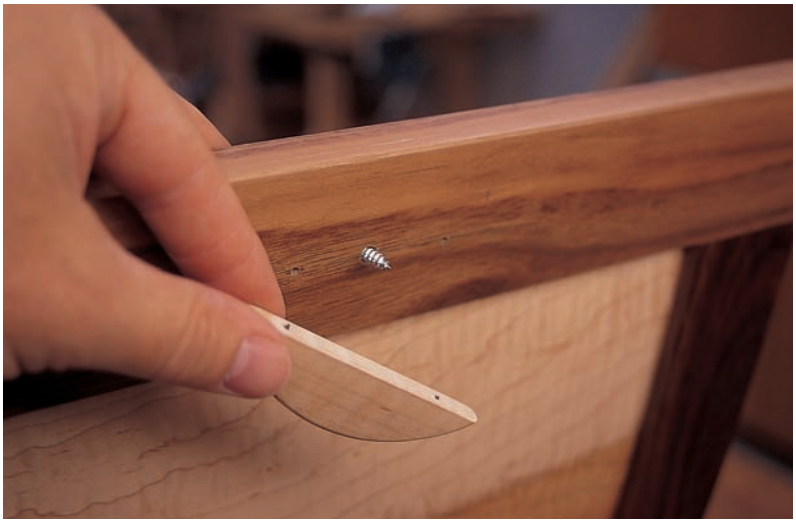
step 21 • Lay out your clamps on a flat surface and lay the panel facedown on the clamps. Apply just enough clamping pressure to pull the bevels together. The panel will begin to arch, but the tape will keep the strips aligned. By putting a little weight in the middle of the panel, you can counter the outward pressure and pull the bevel joints tightly together. After the glue has dried, use a low-angle block plane or scraper to smooth the peaks of the bevel joints. Use a curved scraper for the inside of the panel to hollow the strips so the curve becomes smooth. A random-orbit sander works well to sand it all smooth. When sanding the inside of the curve, let the panel rock back and forth as you sand across it with the sander. Sanding the outside or front of the panel is much easier. Check the fit of the panels in the curved rail grooves. Carefully scrape or sand the panels until they fit into the grooves.

step 22 • Layout the door stiles and clamp them together. Mark where the rails will join the stiles. This helps keep the framework square when gluing it all together.

step 23 • Dry assemble the frames and panels before you apply the glue. Make sure all the parts fit together. At final glue-up, make sure the doors are perfectly square and flat. A curved door can multiply these little errors at fitting time.

step 24 • I used two butt hinges at the very top and bottom of the doors. A continuous hinge would look nice on this chest, also. Lay the hinge on the front edge of the chest's side and draw around its plate. Score the cutout with a utility knife. Use a chisel to cut the mortise.

step 25 • By putting the hinges up in the corners, they are less noticeable.



step 26 • Sometimes the simplest solution is the best. I fussed and fussed with handles for this chest. I finally decided that a simple, half-round piece of curly maple with the edges rounded over just like the top and bottom panels was the solution. I put two small nails in the handle with the sharp ends protruding a little to keep the pulls from moving.


metabo
Plus
metabo

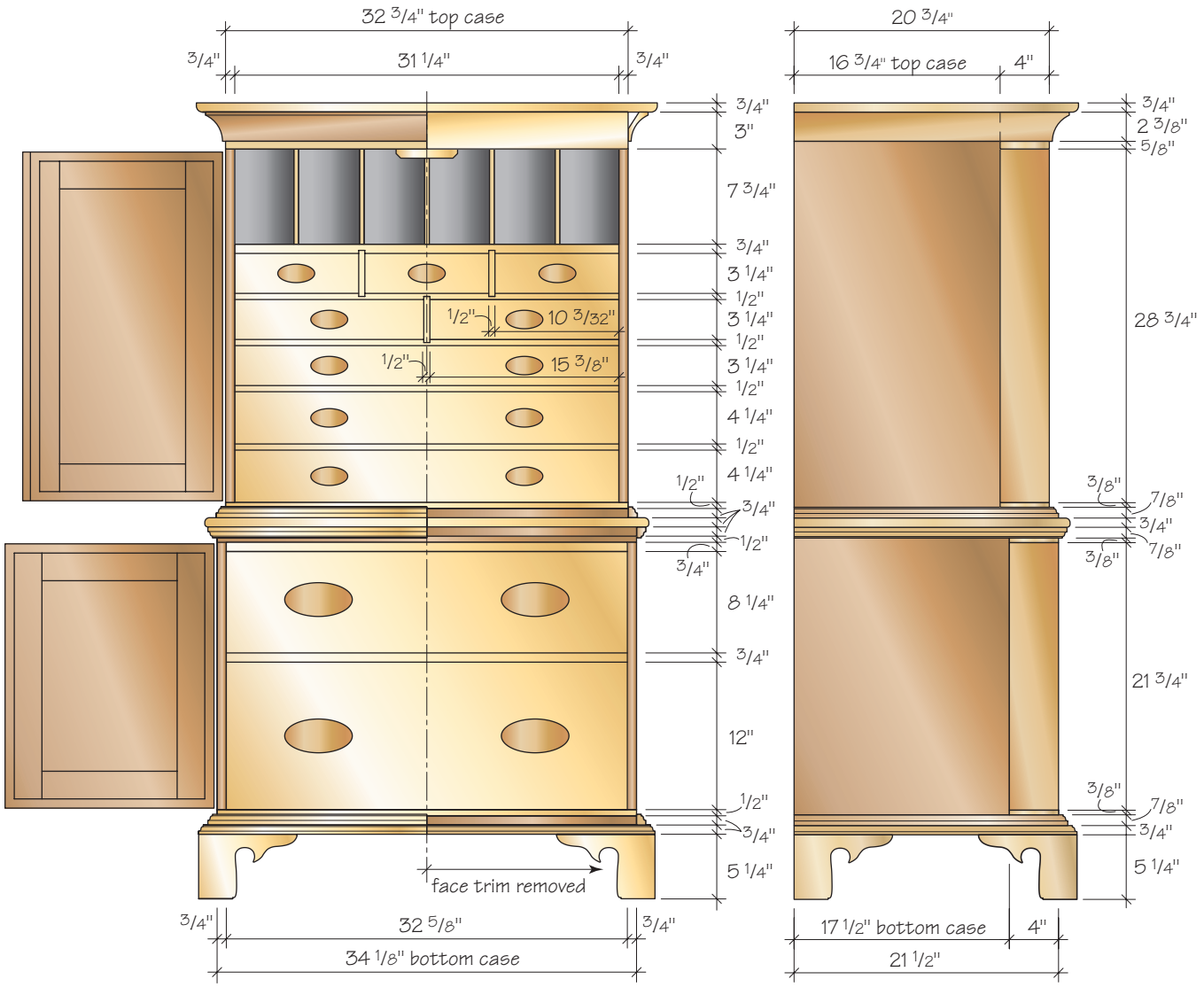
PROJECT 15

21st-century tool cabinet

BY GLEN HUEY

I've been making a living building fine furniture with my dad Malcolm in a too-small shop for the past ten years, and we have finally decided to move the business into a larger shop. As potential clients would be visiting the location, we decided to build a piece to show off our work.

That's how this tool cabinet came about. We decided the cabinet should be for a 21st-century woodworker. With space for modern and antique tools, this tool cabinet will keep things in order for another 100 years.



Front elevation — doors open **Profile**

After a number of discussions we determined that the case should be two pieces, an upper and a lower cabinet, with four deep-set doors for storing tools, as well. When opened, the cabinet would array our most-used tools with easy access, while less-attractive and less-used tools would be stored in drawers. We decided I would build the upper section and Dad would build the lower case.

Much like the process when the Transcontinental Railroad was built, Dad and I eventually decided to work separately on our individual pieces, knowing that they were supposed to meet in the middle. Happily, it worked.

This project should be adapted to your tool needs. While you can follow the construction and concepts, the sizes are likely to be different for your shop.

INCHES materials list

QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
Lower Cabinet						
2	sides	maple	3/4	17 1/2	24 1/4	
2	top & bottom	poplar	3/4	21 1/2	34 1/8	
1	bottom filler	maple	1/2	7 1/4	34 1/8	
1	top filler	maple	1/2	7 1/4	34 1/8	
1	front drawer divider	maple	3/4	3	33 1/8	
1	rear drawer divider	poplar	3/4	3	33 1/8	
1	base frame front	maple	3/4	3	37 1/8	45° both ends
2	base frame sides	maple	3/4	3	23	45° both ends
1	base frame back	poplar	3/4	2 1/2	34 1/8	1 1/2" TBE
6	front & side feet	maple	3/4	8	5 1/4	
2	rear feet	poplar	3/4	7	5 1/4	
4	door extension sides	maple	3/4	3 1/4	21 1/2	
4	door ext top & bottom	maple	3/4	3 1/4	16 1/2	
4	door front stiles	maple	3/4	3	21 1/2	
2	door front rails	maple	3/4	3 7/8	14 1/8	1 1/4" TBE
2	door front rails	maple	3/4	2 7/8	14 1/8	1 1/4" TBE
2	door panels	maple	1/2	12	15 3/8	1/4" × 3/8" rabbets
1	waist moulding, front	maple	3/4	3 3/4	36	45° both ends
2	waist moulding, sides	maple	3/4	3 3/4	22 1/2	45° one end
1	moulding under waist	maple	3/4	7/8	84	cut to fit
1	moulding above feet	maple	3/4	7/8	84	cut to fit
2	upper drawer sides	poplar	1/2	8	14 1/4	
2	upper drwr front & back	poplar	1/2	8	31 3/4	
1	upper drawer face	mahogany	3/4	8 1/4	32 1/2	
2	lower drawer sides	poplar	1/2	11 5/8	14 1/4	
2	lower drwr front & back	poplar	1/2	11 5/8	31 3/4	
1	lower drawer face	mahogany	3/4	12	32 1/2	
2	drawer bottoms	plywood	1/2	14	31 1/4	
1	back	poplar	1/2	22 3/4	33 3/8	4 boards
Upper Cabinet						
1	moulding above waist	maple	3/4	7/8	84	cut to fit
2	sides	maple	3/4	16 3/4	33	
2	top & bottom	poplar	3/4	20 3/4	32 3/4	
1	subtop	maple	3/4	20	31 5/8	
1	bottom front filler	4"maple/ 2 1/8"mahog	1/2	8	31 1/4	
1	cubby bottom	ply w/ 2 1/8"mahog	3/4	14 3/4	32	
5	cubby dividers	maple	3/8	12	8 1/8	
4	drawer dividers	mahogany	1/2	2 1/4	31 5/8	
3	vertical drawer dividers	mahogany	1/2	1	3 3/4	
3	center drawer runners	poplar	1/2	2	13	half-lap w/divider
3	center drawer guides	poplar	1/2	5/8	11 1/2	
6	side runners	poplar	1/2	3/4	12 3/8	
4	housed side runners	poplar	1/2	3/4	12	
2	rear drawer dividers	poplar	1/2	2 1/4	31 5/8	

QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
Upper Cabinet cont'd						
1	vertical back support	poplar	3/4	3	13 3/8	
1	filler @ crown	maple	1/2	2 1/4	48	cut to fit
1	crown	maple	3/4	3	90	cut to fit
1	cornice top moulding	maple	3/4	3 1/4	90	cut to fit
4	door extension sides	maple	3/4	3 1/4	28 5/8	
2	right door ext top & bott	maple	3/4	3 1/4	16 3/8	
2	left door ext top & bott	maple	3/4	3 1/4	15 1/8	
4	door front stiles	maple	3/4	3	28 5/8	
4	door front rails	maple	3/4	3	13	1 1/4" TBE
2	door panels	maple	1/2	11	23 1/4	1/4" × 3/8" rabbets
12	top/2nd/3rd drawer sides	poplar	1/2	3 1/8	12	
3	top drawer backs	poplar	1/2	2 1/2	10	
3	top drawer fronts	mahogany	3/4	3 1/4	10	
3	top drawer bottoms	plywood	1/4	12	9 1/2	
2	2nd-row drawer backs	poplar	1/2	2 1/2	15 5/16	
2	2nd-row drawer fronts	mahogany	3/4	3 1/4	15 5/16	
2	2nd-row drawer bottoms	plywood	1/4	12	14 3/4	
1	3rd-row drawer back	poplar	1/2	2 1/2	31 1/2	
1	3rd-row drawer front	mahogany	3/4	3 1/4	31 1/8	
1	3rd-row drawer bottom	plywood	1/4	12	30 1/2	
4	4th/5th drawer sides	poplar	1/2	4 1/8	12	
2	4th/5th drawer backs	poplar	1/2	3 1/2	31 1/8	
2	4th/5th drawer fronts	mahogany	3/4	4 1/4	31 1/8	
2	4th/5th drawer bottoms	plywood	1/4	12	30 1/2	
1	back	poplar	1/2	32	31 3/8	5 boards
Drawer Edge Inlay						
	top three rows	maple	1/8	1/2	240	cut to fit
	4th & 5th rows	maple	1/8	3/4	144	cut to fit
	lower section	maple	1/8	1	180	cut to fit
11	upper section ovals	walnut	1/8	1 1/2		
4	lower section ovals	walnut	1/8	2 3/4		

KEY: TBE = tenon on both ends

hardware

■ 2	Accuride 14" full-extension slides	Rockler #32805
■ 1	1 1/2" × 48" continuous hinge (lower section)	Rockler #19291
■ 1	1 1/2" × 72" continuous hinge (upper section)	Rockler #19316
■ 2	barrel bolts	Rockler #30923
■ 4	rosette pulls w/1" backplate, 3" bore	Horton Brasses # H-10S
■ 11	stirrup pulls w/1" backplate	Horton Brasses # H-83
■ 2	latches	Horton Brasses # SL-3
■ 2	1/4" washers	
■	rare earth magnets	Lee Valley Tools

MILLIMETERS materials list

QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
Lower Cabinet						
2	sides	maple	19	445	616	
2	top & bottom	poplar	19	546	867	
1	bottom filler	maple	13	184	867	
1	top filler	maple	13	184	867	
1	front drawer divider	maple	19	76	841	
1	rear drawer divider	poplar	19	76	841	
1	base frame front	maple	19	76	943	45° both ends
2	base frame sides	maple	19	76	584	45° both ends
1	base frame back	poplar	19	64	867	38mm TBE
6	front & side feet	maple	19	203	133	
2	rear feet	poplar	19	178	133	
4	door extension sides	maple	19	82	546	
4	door ext top & bottom	maple	19	82	419	
4	door front stiles	maple	19	76	546	
2	door front rails	maple	19	98	359	32mm TBE
2	door front rails	maple	19	73	359	32mm TBE
2	door panels	maple	13	305	391	6mm × 10mm rabbets
1	waist moulding, front	maple	19	95	914	45° both ends
2	waist moulding, sides	maple	19	95	572	45° one end
1	moulding under waist	maple	19	22	2134	cut to fit
1	moulding above feet	maple	19	22	2134	cut to fit
2	upper drawer sides	poplar	13	203	362	
2	upper drwr front & back	poplar	13	203	806	
1	upper drawer face	mahogany	19	209	826	
2	lower drawer sides	poplar	13	295	362	
2	lower drwr front & back	poplar	13	295	806	
1	lower drawer face	mahogany	19	305	826	
2	drawer bottoms	plywood	13	356	793	
1	back	poplar	13	578	848	4 boards
Upper Cabinet						
1	moulding above waist	maple	19	22	2134	cut to fit
2	sides	maple	19	425	838	
2	top & bottom	poplar	19	527	832	
1	subtop	maple	19	508	803	
1	bottom front filler	102mm maple/ 54mm mahog	13	203	793	
1	cubby bottom	ply w/ 54mm mahog	19	375	813	
5	cubby dividers	maple	10	305	206	
4	drawer dividers	mahogany	13	57	803	
3	vertical drawer dividers	mahogany	13	25	95	
3	center drawer runners	poplar	13	51	330	half-lap w/divider
3	center drawer guides	poplar	13	16	292	
6	side runners	poplar	13	19	315	
4	housed side runners	poplar	13	19	305	
2	rear drawer dividers	poplar	13	57	803	

QUANTITY	PART	STOCK	THICKNESS	WIDTH	LENGTH	COMMENTS
Upper Cabinet cont'd						
1	vertical back support	poplar	19	76	340	
1	filler @ crown	maple	13	57	1219	cut to fit
1	crown	maple	19	76	2286	cut to fit
1	cornice top moulding	maple	19	82	2286	cut to fit
4	door extension sides	maple	19	82	727	
2	right door ext top & bott	maple	19	82	416	
2	left door ext top & bott	maple	19	82	384	
4	door front stiles	maple	19	76	727	
4	door front rails	maple	19	76	330	32mm TBE
2	door panels	maple	13	279	590	6mm × 10mm rabbets
12	top/2nd/3rd drawer sides	poplar	13	79	305	
3	top drawer backs	poplar	13	64	254	
3	top drawer fronts	mahogany	19	82	254	
3	top drawer bottoms	plywood	6	305	242	
2	2nd-row drawer backs	poplar	13	64	389	
2	2nd-row drawer fronts	mahogany	19	82	389	
2	2nd-row drawer bottoms	plywood	6	305	375	
1	3rd-row drawer back	poplar	13	64	800	
1	3rd-row drawer front	mahogany	19	82	790	
1	3rd-row drawer bottom	plywood	6	305	775	
4	4th/5th drawer sides	poplar	13	105	305	
2	4th/5th drawer backs	poplar	13	89	790	
2	4th/5th drawer fronts	mahogany	19	108	790	
2	4th/5th drawer bottoms	plywood	6	305	775	
1	back	poplar	13	813	797	5 boards
Drawer Edge Inlay						
	top three rows	maple	3	13	6096	cut to fit
	4th & 5th rows	maple	3	19	3658	cut to fit
	lower section	maple	3	25	4572	cut to fit
11	upper section ovals	walnut	3	38		
4	lower section ovals	walnut	3	70		

KEY: TBE = tenon on both ends

hardware

■ 2	Accuride 356mm full-extension slides	Rockler #32805
■ 1	38mm × 122cm continuous hinge (lower section)	Rockler #19291
■ 1	38mm × 183cm continuous hinge (upper section)	Rockler #19316
■ 2	barrel bolts	Rockler #30923
■ 4	rosette pulls w/25mm backplate, 76mm bore	Horton Brasses # H-10s
■ 11	stirrup pulls w/25mm backplate	Horton Brasses # H-83
■ 2	latches	Horton Brasses # SL-3
■ 2	6mm washers	
■	rare earth magnets	Lee Valley Tools

Everything In Its Place

The case pieces were dovetailed together, with the solid-wood shiplapped backs set into rabbets. Many of the drawers are divided by, and glide on, individual mortise-and-tenon web frames that are dadoed into the sides.

After looking at the tools that we wanted to store, we determined that the best use of the case storage area was mostly drawers. Shelves are easier to make, but tools tend to wander toward the back of the cabinet. Drawers allow you to look down into the storage area and quickly find the tool you're looking for. They also give the cabinet a cleaner look.

Rather than risk hanging the planes on the doors (where they could fall off if the door was jostled), we designed spaces for the four larger bench planes we use often (and room to add two more) above the drawers at the top of the cabinet.

All the smaller tools went into the doors, with a variety of ways to hang or store them. Router bits are stored in a bit holder that fits onto a ledge in the doors. Cup hooks were used to hang some drawknives and scrapers, and the drill bits are stored in a box temporarily attached to the door with rare earth magnets. Also, chisels and gouges are firmly suspended using these magnets. (The magnets are countersunk into a wood strip so they are hidden.)

The Shaker pegs attached to the lower left door offer a great storage answer for sanding belts and many other "hanging" tools. Also, a Shaker candle box has been adapted in size to hold random-orbit sanding discs.

A $\frac{1}{4}$"-tall riser block has been added to the back of each plane cubby to lift the front end of the plane far enough to keep the blade from touching the bottom of the cubby. With shorter-length planes, you can make the riser block in an "L"-shape that will keep the plane's handle within easy reach of the front of the cabinet, rather than sliding too far into the cubby.

SHAKER-STYLE STORAGE
Dragging this 18th-century concept into the 21st century is shown most easily in the doors. At the left, Shaker pegs and a variation on a Shaker candle box take care of electric sanding needs. The belts hang neatly out of the way, and the random-orbit disc sheets can be arranged into a "coarse" box and a "fine" box and taken to the work as necessary. Below, router bits and most-often-used router accessories are within easy reach. Purchased router bit holders drop into specially fitted niches in the door for easy access.

If you need a visual image to help you lay out your door storage, start with a blank piece of paper that is the size of the door interiors and lay your tools on it until you're happy with the arrangement and spacing.

Rare earth magnets, buried in the strips attached to the right-hand door, hold the chisels and gouges to the door tightly, but allow easy removal. The drill bit holder, lower left, is also held in place with magnets. The cubby-holes for planes keep everything tidy but accessible, and also do double duty for a brad nailer.

CONSTRUCTION

The rear view and enlarged view in the technical drawings show many of the details of the construction and simplify the built-up mouldings.

Start construction by gluing up and trimming to size the panels for the sides, tops and bottoms for both sections.

After the panels are sized, cut dadoes in the sides to accommodate the drawer runners. Use the diagrams to locate the dividers and cut the dadoes in the sides.

Both cabinets have ½"-thick shiplapped backs made from multiple boards. To accommodate the back thickness, cut a ½" × ⅝" rabbet on all four sides.

Next, cut through-dovetails to join each cabinet's sides, tops and bottoms. Glue up both carcasses; be sure to check them for squareness as you go.

Glue the front and rear drawer dividers in place on the lower cabinet. Unlike the upper cabinet, the drawers in the lower unit use heavy-duty full-extension drawer slides.

When you attach the dividers, glue the front divider in place, but leave the runners and rear divider joint loose. This will allow for seasonal wood movement in the sides of the case.

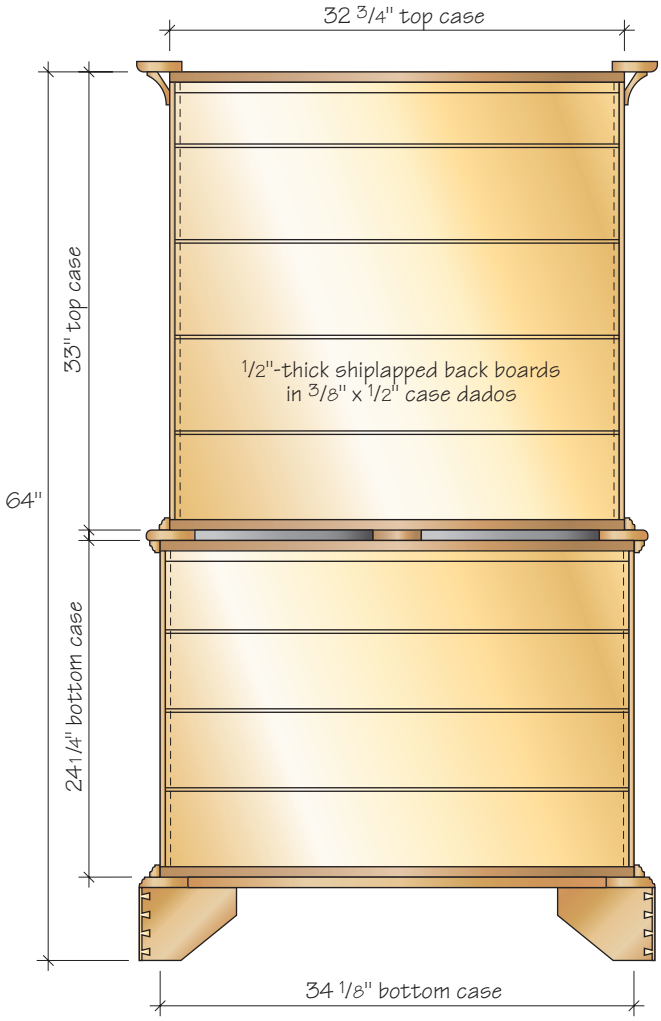
The cubby bottom also serves as the top divider of the drawer section, so the leading edge should be mahogany to match the other dividers. You can also make the bottom front filler, which is made up of a maple and a mahogany piece.

Next, mark and cut the dadoes for the cubby dividers in the subtop and the cubby bottom. Also, the top and second rows of drawers require three drawer runners that are half-lapped onto the dividers — two for the top tier of drawers, and one for the second tier. The front dividers are half-lapped only to the rear of the rail, and then dadoed to accept the vertical drawer dividers, visible from the front of the cabinet. You also can cut the mating half-laps on the drawer runners at this time.

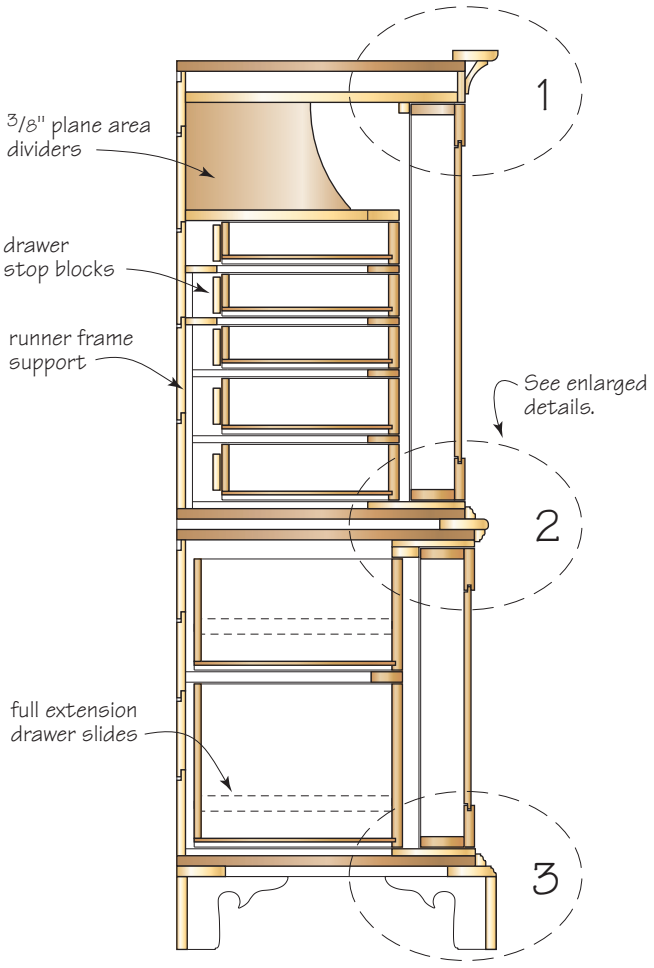
Dry fit all the parts. Start with the plane cubbyhole section, then work down to the two upper tiers of drawer dividers. Finally place the lower drawers, front dividers and the runners in place. If everything fits well, take it apart and do it all again with glue.

As with the lower cabinet, seasonal wood movement is a concern, so glue the front dividers and guides in place, but leave the rear dividers loose. On the lower runners, use screws in slotted holes to let the wood move.

step 1 • Ready for glue, the upper case shows the extended top and bottom, the dovetailed sides and the dado grooves for the drawer dividers.



Back elevation



Section

step 2 • Note the subtop panel at the top of this photo taken from the back. The space formed by the subtop allows room to mount the crown moulding without affecting the interior function of the cabinet. You can also see the front drawer dividers, side runners and rear drawer dividers in place.

DRAWERS

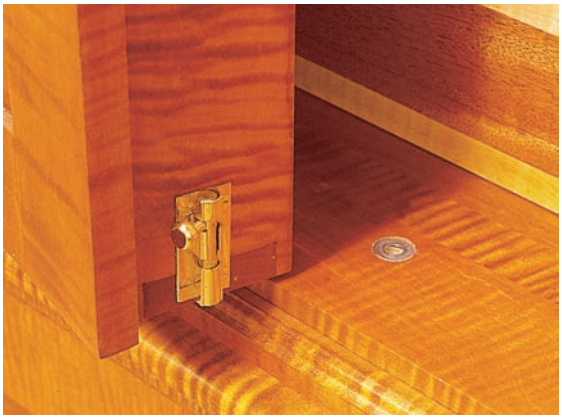
The drawers in the upper section are built with the fronts attached to the sides using half-blind dovetails. The drawer backs attach to the sides with through-dovetails. The bottoms of the drawers are inserted into grooves cut in the sides and fronts, ½" up from the bottom edge. The bottoms slide below the lower edge of the drawer back, and then are nailed in place to the drawer backs.

While the upper drawers ride on, and are supported by, drawer runners attached to the cabinet sides, the lower drawers ride on full-extension drawer slides. Because of this, the drawer fronts, or faces in this case, extend ½" beyond the drawer sides on either side to hide the drawer slides. The easiest way to do this was to simply make a drawer box, with dovetailed ½"-thick sides, front and back and the same bottom arrangements as on the upper drawers. The ¾"-thick mahogany, maple and walnut drawer fronts are then screwed to the drawer box front once the proper spacing is determined.

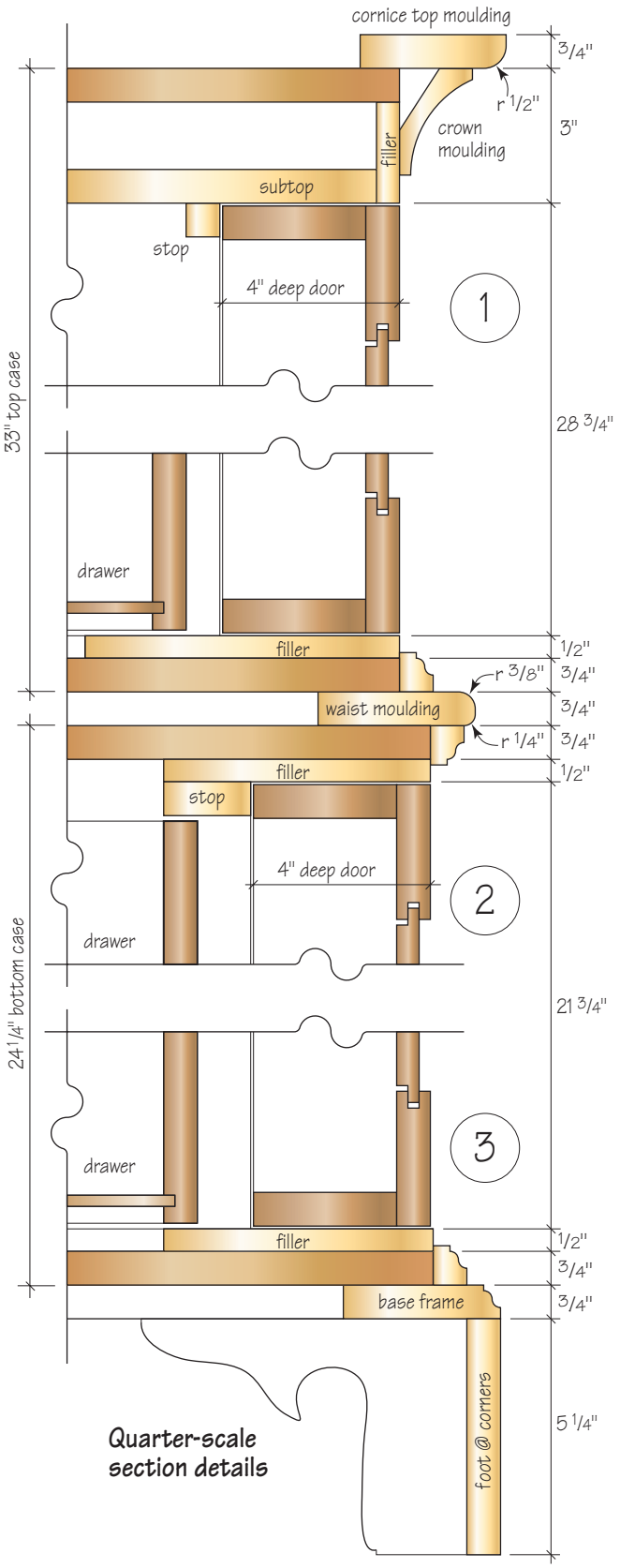
step 3 • The lower cabinet is shown with the left door held in place while the hinge is attached. The doors themselves are small cabinets, with a frame and panel door front attached to a dovetailed frame. Because the door is captured by the cabinet (top and bottom), and flush to the sides, you want to make sure you've got the door the right size before you glue it up. Adjusting afterward is tricky. To give yourself a little room, notice that the door front overhangs the frame a little to allow some fitting. Also, the doors' faces extend beyond the dovetailed extension at the center of each pair. This leaves room for the barrel slide catches holding one of each pair of doors.

step 4 • After assembly and finishing, but before the back is in place, you have a chance to see all the pieces come together from their less-attractive angle. The smaller drawer dividers and supports are plainly visible here.

step 5 • With the upper case flipped over, you can see the top and subtop extending beyond the cabinet, with the filler, top cornice moulding and crown moulding ready to be put in place.



step 6 • The color for the piece is a water-based aniline dye (Moser's Golden Amber Maple from Woodworker's Supply, 800-645-9292 or www.woodworker.com). Then top-coat the piece with multiple coats of sprayed-on satin-finish clear lacquer. One note: To achieve the natural tiger maple detail on the drawer fronts, finish with Danish oil. The left-hand doors are held in place with a sliding catch.



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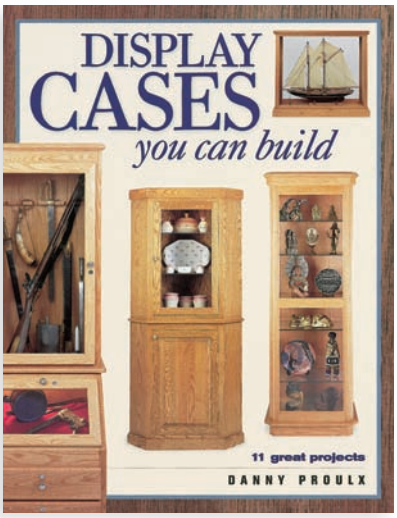

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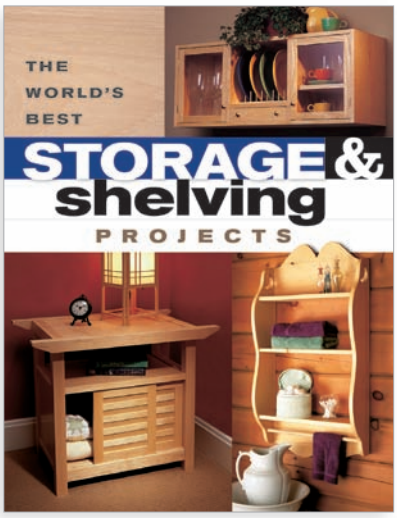

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