classic oak
Tool Cabinet

Construction Details

OVERALL DIMENSIONS: 36¼"W x 20"D x 48"H

Build a companion fine tool chest starting on page 13

Drawers are constructed with tongue and dado joints

Tool cabinet is built from riftsawn and quartersawn oak. Read the article on page 16 for a few tips on wood selection

***NOTE:** Graduated drawers hold large and small items*

Solid brass knob

Drawers ride on full-extension drawer slides

Back is made with stub tenon and groove joinery

Tool cabinet made from riftsawn and quartersawn oak

Trays built using locking rabbet joints

Store bulky power tools on these heavy-duty pull-out trays

False tenons disguise screw joinery

Design option
Tool cabinet can be modified as a chest of drawers, see page 10

Frame and panel doors feature quartersawn oak panels

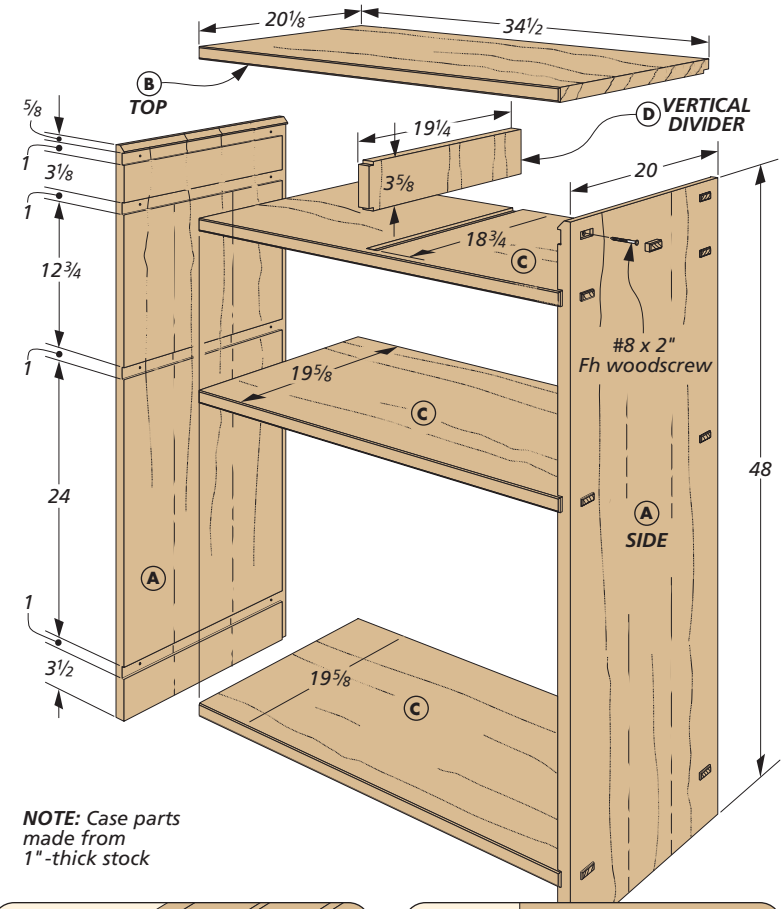
Design option
To make the tool cabinet mobile, turn to page 11

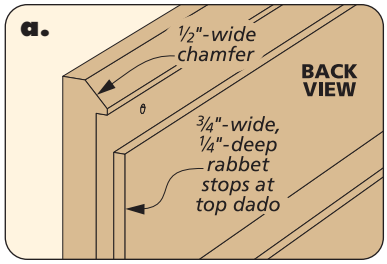
***Heavy-Duty Trays** hold portable power tools and other accessories. Now nothing will get lost in the back of the cabinet.*

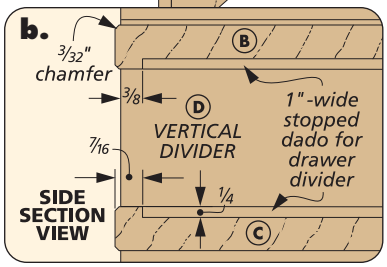
***Easy-Access Drawers** travel on smooth-riding slides. The shallow drawers make finding and organizing tools a snap.*

***False Tenons** give the look of more complex through-mortise and tenon joinery. Chamfered edges add a nice detail.*

lower case CONSTRUCTION







I like to think of this tool cabinet as the trusty sidekick to my workbench. I do most of my work at or near the workbench — everything from planing and routing, to trimming joints and assembly. So it's important to have all the tools I need close at hand.

When it comes to building a big project like this, it can be a little intimidating. So I find it's helpful to step back and break it down into sections so you don't get overwhelmed by the details. That's what I did here. The tool cabinet is made up of four different elements: the case, doors, drawers, and trays.

SOLID WOOD CONSTRUCTION. The first section of the cabinet to build is the case, as shown in the drawing at right. Since all the case members are the same thickness, I glued up all the parts at one time.

With such large solid-wood panels, it's a good idea to spend some extra time in selecting and arranging your stock for color, grain, and appearance. You can learn a few tips on wood selection by reading the article on page 16.

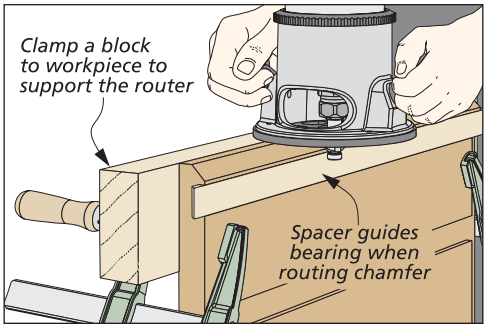
DADO JOINERY. At first glance, it looks like the case is built with through-mortise and tenon joinery. However, the tenons you see are simply plugs. They hide long woodscrews that secure the sides to the horizontal parts. Dadoes on the inside of the case help support the dividers. Using false tenons and screws gives you a traditional look without all the work.

The case is assembled with simple dado joints. You can cut the dadoes with either a table saw or hand-held router. It's not important how you cut the dadoes. But because the ends of the dadoes are visible, it is important that the bottoms of the dadoes are smooth and flat. For more on how to get flat-bottom dadoes (using either method) turn to page 18.

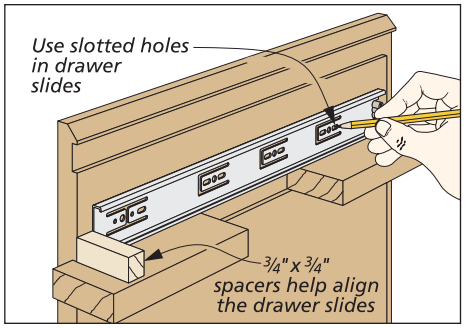
There's just one other thing to mention about the dadoes. They should match the thickness of the stock as close as possible for the tightest, strongest joint.

SIDE DETAILS. Before moving on to the dividers, there are a few more

Shop Tips: Chamfers and Slides



Routing the Chamfer. *A support board clamped to the case side and a spacer in the dado allow you to easily rout the chamfer.*



Drawer Slides. *Pre-drill the holes for the top drawer slides before assembly. Support blocks and a spacer keep things aligned.*

things you'll need to do to the sides. First, cut a chamfer along the top inside edge of each side panel. Take a look at the left box on the bottom of the previous page for a tip on the best way to do this.

The second thing to do is rout a rabbet on the back edge to hold a frame and panel back that is made later (detail 'a' on the previous page). This rabbet is stopped at the top divider dado and doesn't run the whole length of the side.

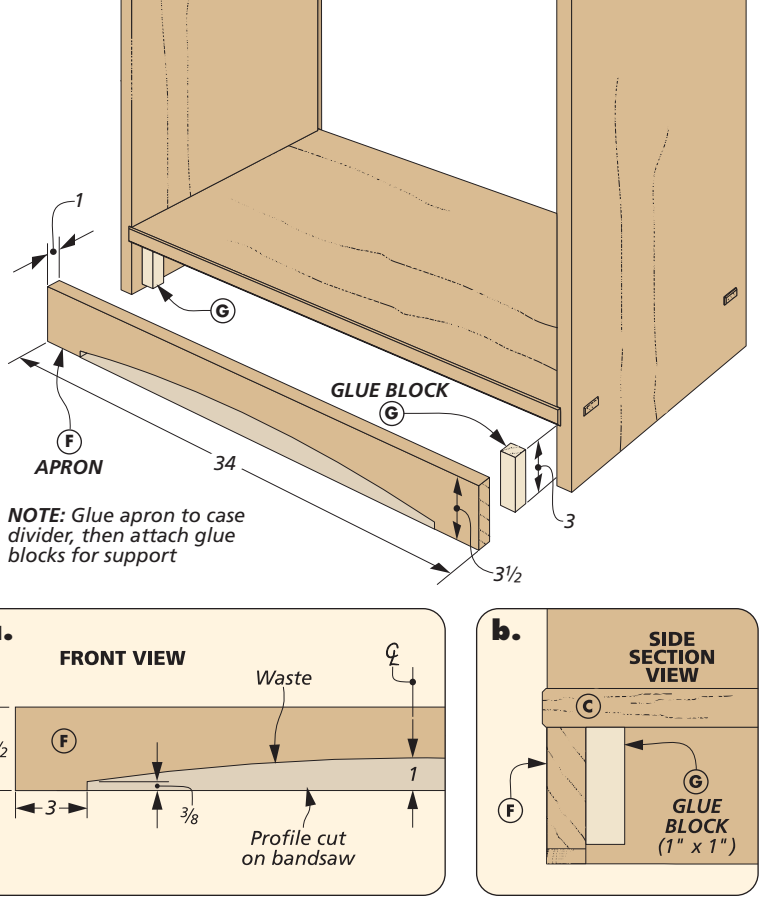
The last thing you'll need to do is rout small mortises in each side to hold some false tenons that hide woodscrews. I used a simple router template to do this. It's shown below and on page 20. Even though the case is going to be glued, the end-grain joints need some screws for reinforcement.

SIMPLE DIVIDERS. At this point, you can set aside the sides and work on the dividers. These are the horizontal panels that make the top, bottom, drawer, and cabinet dividers. You can see the dimensions for each divider in the drawing.

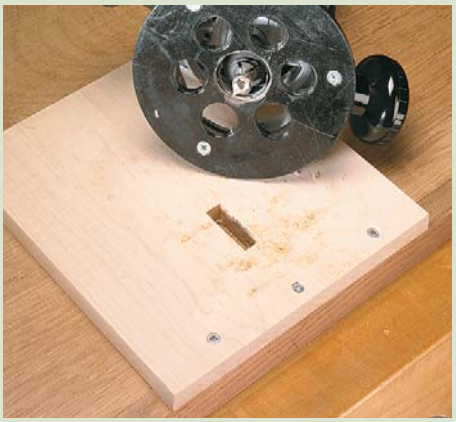
The front edge of each divider sits proud of the case sides and is chamfered on the front. Plus, the case top and upper drawer divider have centered, stopped dadoes cut in each panel to hold a short, vertical divider between a pair of narrow drawers, as you can see in detail 'b' on the previous page.

There's one last thing to do before assembling the case. I installed the drawer slides for the two upper drawers. I did this now because after the case is together, it will be nearly impossible to reach in the small opening and drill the holes and align the slides. Take a look at the right drawing on the previous page to see how I did this. The case can then be assembled.

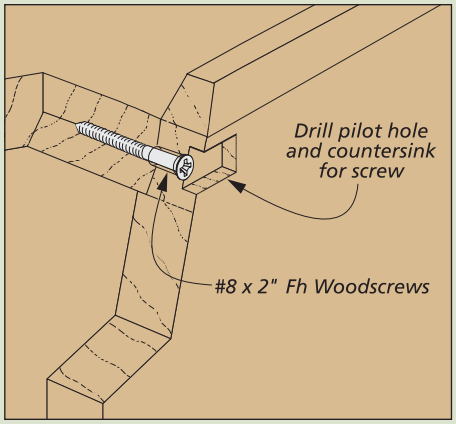
APRON AND GLUE BLOCK. To complete the front of the case, I added an apron at the bottom, as in the drawing above. It has a shallow arch and is glued to the divider above and a pair of glue blocks.



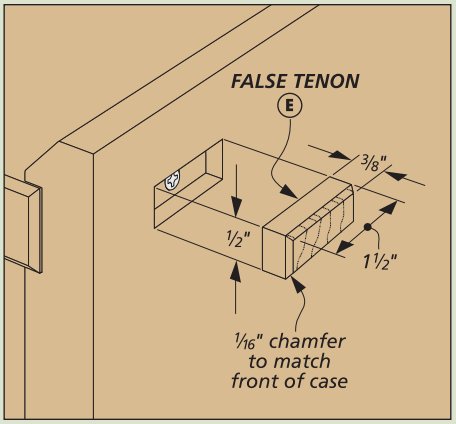
How To: Hiding Screw Joints With False Tenons



▲ A simple router template and a hand-held router are all it takes to cut the shallow pockets for the false tenons. To find out how to make the template, turn to Shop Notebook on page 20.



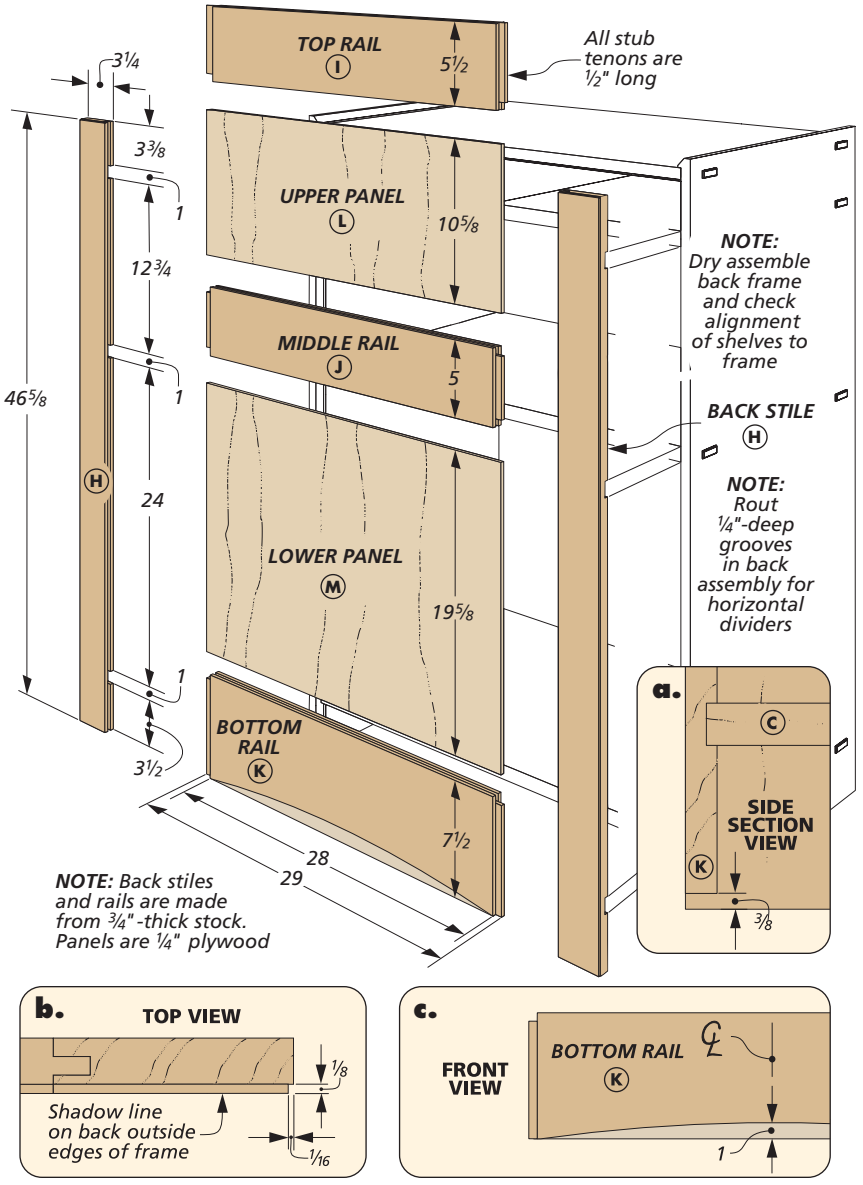
Woodscrew Reinforcement. *After routing the pocket for the false tenon, square up the corners with a chisel and drill a countersunk shank hole and pilot hole for the 2"-long woodscrew.*



Hide the Screws. *Chamfered false tenons fit snugly in the pockets routed in the cabinet sides and hide the woodscrews. Once they're made (turn to Shop Notebook on page 20), simply glue them in place.*

frame & panel

Case Back & Doors



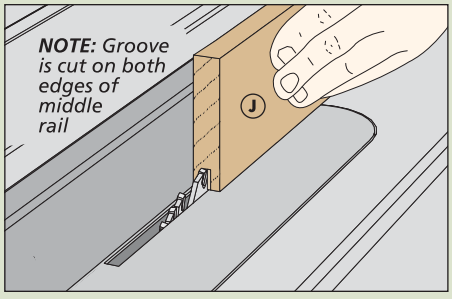
All that remains to complete the case of the tool cabinet is the back. The back assembly is made with simple stub tenon and groove joints. For step-by-step instructions on how to make this strong joint, take a look at the "How-To" below.

STRENGTHENING THE CASE. Besides closing in the case, the back also adds strength. You can see what I mean in the exploded view at right. First, it fits into the rabbets cut in the sides of the case. This prevents the case from racking. After the back is glued up, a series of dadoes and grooves are cut to fit over the horizontal dividers to keep the large case rigid and square.

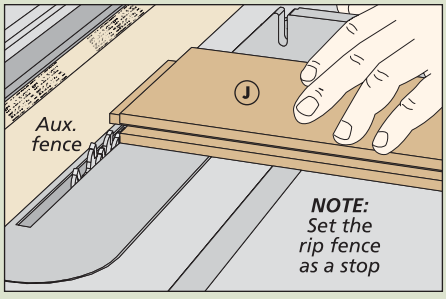
BUILDING THE BACK. I began by cutting grooves on the inside edges of the stiles and rails. Then stub tenons can be cut on each end of the rails. Note: The joinery for the door frames is identical to the back. To save time, you could cut the door rails and stiles here as well.

Once the joinery is complete, I cut a small arch in the bottom rail to match the front skirt, as shown in detail 'c.' Finally, ¼" plywood panels are cut to fit the grooves. Now the back assembly can be glued together (including the panels). Note: Bottom Rail (K) sits ⅜" up from the end of the rails, as in detail 'a.'. Finally, I routed grooves to fit over the dividers and a small shadow line around the outside edges, as in detail 'b.'

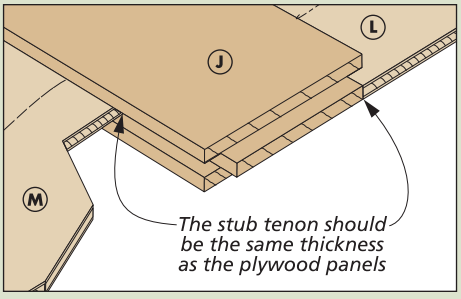
How-To: Stub Tenon & Groove Panels



Grooves. *The first step is to cut a ½"-deep, centered groove on the inside edge of the rails and stiles. The groove is sized to match the thickness of ¼" plywood.*



Tenons. *The next step is to cut the stub tenons on the ends of the rails. Position the rip fence as a stop and cut the stub tenons with a dado blade.*



Panels. *The center panels are sized to fit between the stiles and rails. Plywood panels can be glued in place. Solid-wood door panels are allowed to "float" in the grooves.*

Solid-Wood Doors

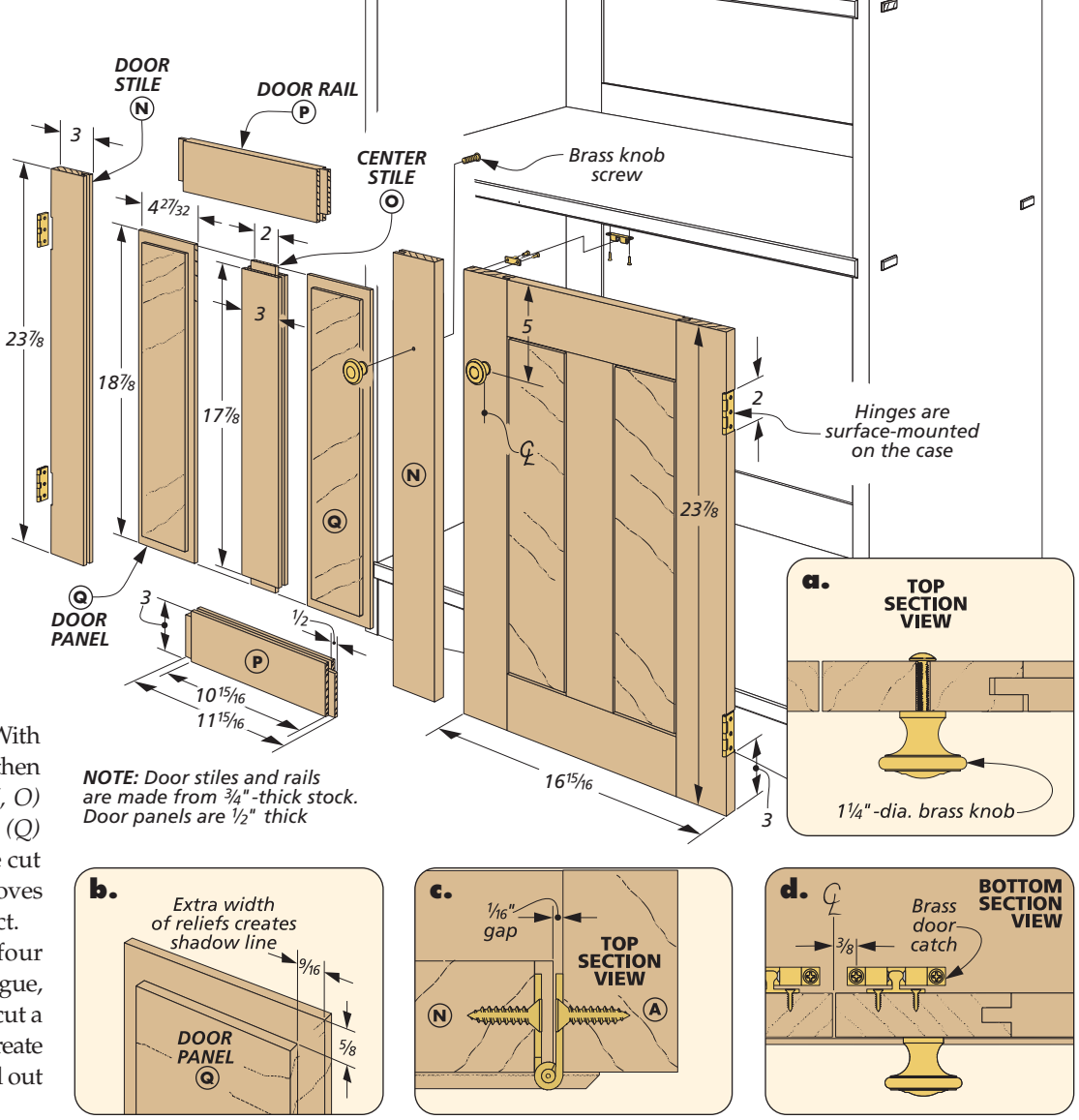
With the case complete, I moved on to building the doors. Like I mentioned earlier, the joinery here is the same as the case back. There's one difference between the doors and the back. The panels in the doors are solid wood, instead of plywood. They're solid wood for appearance. I wanted them to look as good when they were open as closed. And to make them stand out from the frame, I selected straight-grained (riftsawn) stock for the frame parts and used highly figured quartersawn wood for the door panels.

DEALING WITH WOOD MOVEMENT. With the parts cut to size, you can then cut the joinery on the *stiles (N, O)* and *rails (P)*. Because the *panels (Q)* are solid-wood pieces, they are cut slightly narrower than the grooves so they can expand and contract.

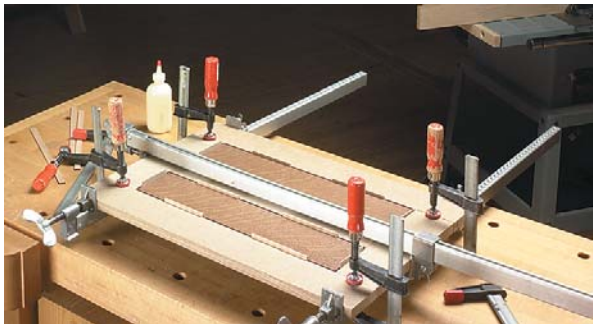
Next, I cut a rabbet on all four sides of the panels to form a tongue, as in detail 'b.' The rabbets are cut a little wider than the grooves to create a shadow line so that they stand out even more.

At this point, you can assemble the doors. I applied glue only to the stiles and rails. The panels need to "float" in the grooves to expand and contract. But to keep the panels centered in the frame, I applied a dot of glue at the top and the bottom of the panels and used some spacers while clamping. It's also a good idea to stain them as well, as you can see in the shop tips below.

HANGING THE DOORS. The doors can now be hung in the case. To do this, I cut shallow notches in the sides of the doors, as in detail 'c,' to hold the hinges. The notches are 1/8" less than the thickness of the hinge knuckle. The hinges will be surface mounted on the inside of the case. Then the doors can be trimmed to fit. All that's left is to attach the knobs and catches, as in detail 'd.'

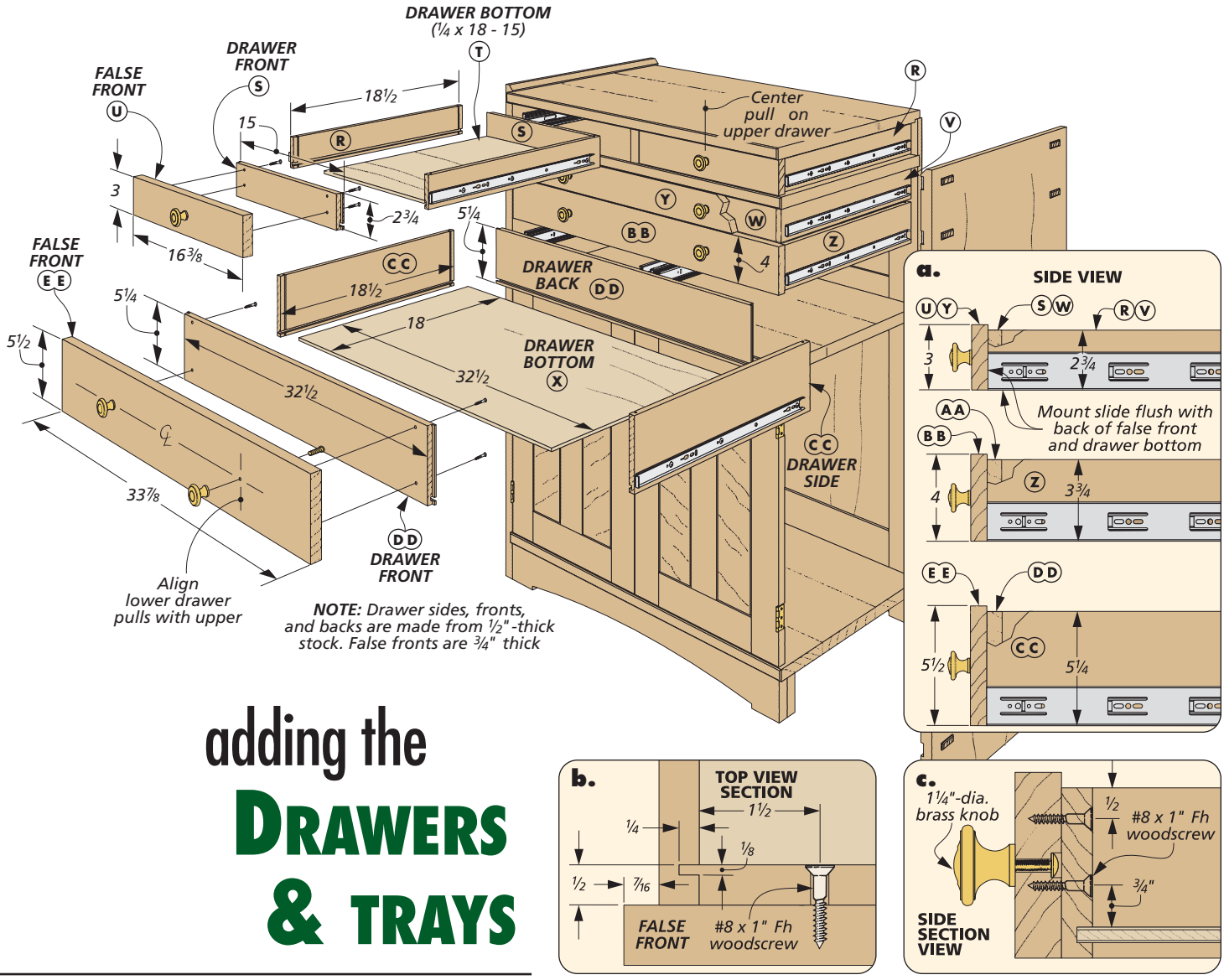


Shop Tips: Great Panels



▲ To keep the panels centered in the doors, I placed a dot of glue in the center of the tongue and used thin spacers while gluing up the door.

▲ Staining the panels before assembling the doors prevents unfinished areas from appearing as the panels expand and contract seasonally.



adding the DRAWERS & TRAYS

At this point in the construction, the tool cabinet is nearly complete. All that remains is to build the drawers and trays. The upper portion of the tool cabinet contains five drawers. The two trays divide the space behind the doors in the bottom of the cabinet (more on that later). Both the drawers and trays ride on full-extension, metal slides. While the construction is similar, there are a few differences to point out.

SIMPLE CONSTRUCTION. The drawing above shows how the drawers are made. Each drawer is nothing more than a shallow box with a false front. I built the box from maple and the false fronts from quartersawn white oak.

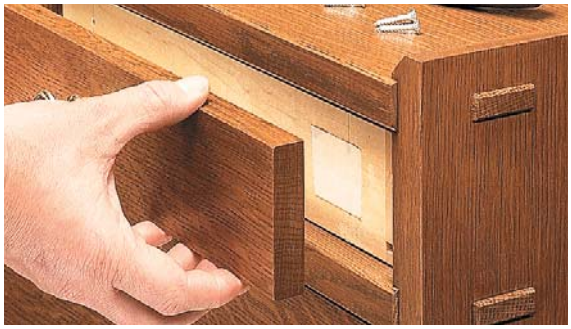
The boxes are built with simple tongue and dado joinery, as shown in detail 'b.' A dado is cut at the front and back of each side. A matching tongue is then cut on each end of the front and back.

Once the joinery is cut, you can then cut a groove on the inside face of all the parts to hold a ¼" plywood bottom. Then the drawer boxes can be glued up.

The next step is to attach the drawer slides. The full-extension slides come in two parts. One part is screwed to the side of the case. The second part is attached to the bottom edge of the drawer box.

FITTING THE FALSE FRONTS. Once the drawers are in place, I made and attached the false fronts. I wanted to end up with a 1/16" gap on all four sides (to match the doors) so I cut the false fronts slightly oversize and trimmed them to fit the opening. The photo at left shows a simple way to position the false fronts. When the false front is in the right spot, the tape holds it in place for drilling the screws holes, as shown in the tip at left. The last thing to do before attaching the false fronts, is to add the pulls, as in detail 'c.'

Shop Tip: False Front Fit



▲ *A few strips of carpet tape keep the false front positioned for the proper gaps and hold it firmly in place for drilling the screw holes.*

Heavy-Duty Trays

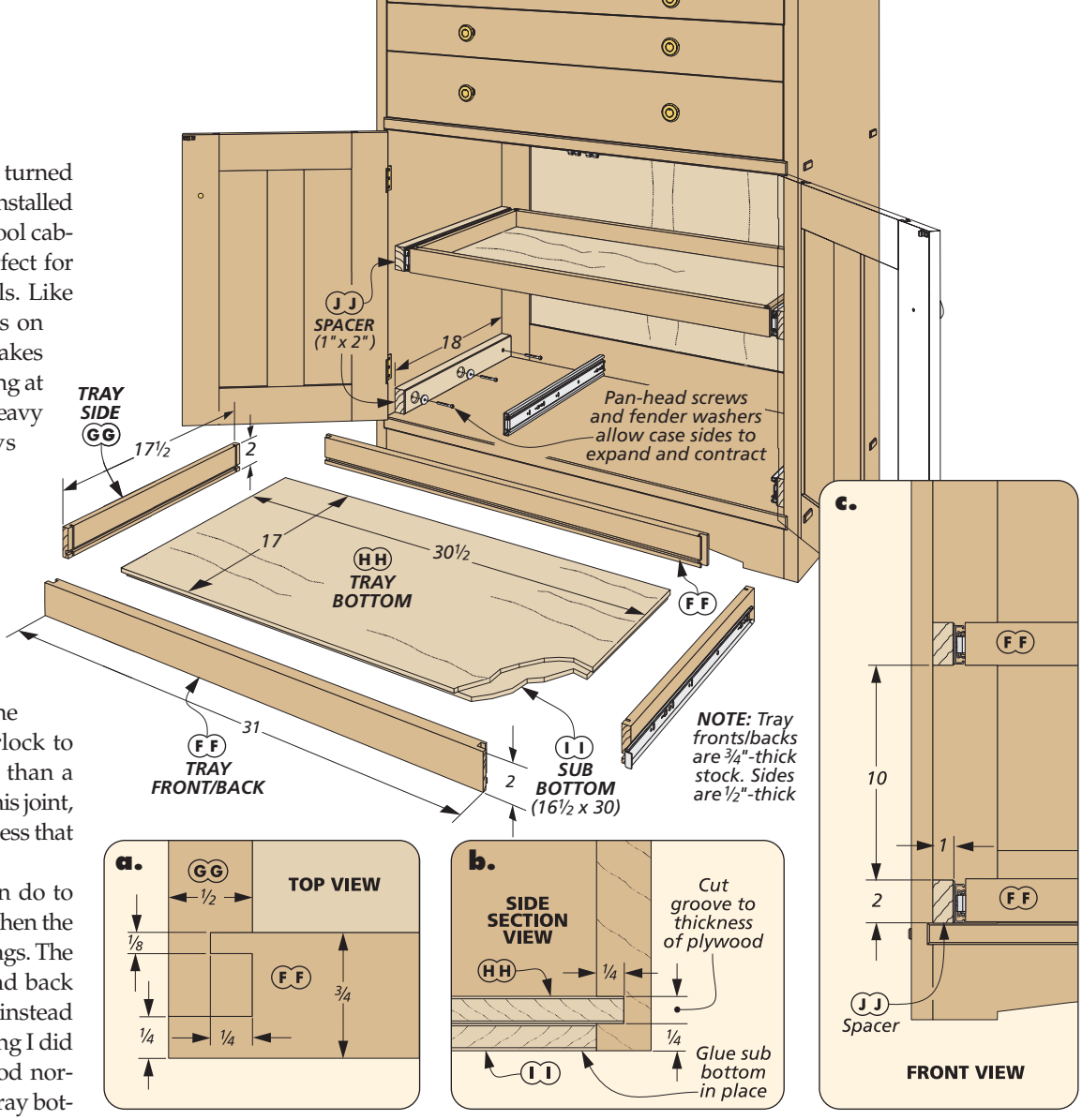
After making the drawers, I turned next to the trays that will be installed in the lower portion of the tool cabinet. This large space is perfect for storing portable power tools. Like the drawers, each tray rides on full-extension slides. This makes it a lot easier to find something at the back of the tray. Storing heavy tools here means the trays need to be strong enough to stand up to the weight.

BUILT FOR STRENGTH. There are two things you can do to beef up the construction. The first is the joinery. For the trays, I used a locking rabbet. In detail 'a,' you can see that the sides, front, and back interlock to create a joint more rugged than a tongue and dado. To make this joint, check out the three-step process that you see below.

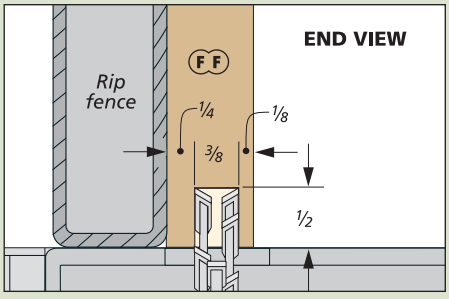
The second thing you can do to beef up the trays is to strengthen the materials. Here I did two things. The first is to make the front and back from $^3/_4$"-thick hard maple instead of $^1/_2$" material. The other thing I did was beef up the $^1/_4$" plywood normally used for drawer and tray bottoms.

To reinforce the tray bottom, I made it out of a double layer of $^1/_4$" plywood. The first layer is glued into a $^1/_4$" groove cut in the tray sides, front, and back. The second layer is then cut to fit underneath the first, as shown in detail 'b.' This makes the tray bottom much more rigid and less likely to flex under a heavy load of tools.

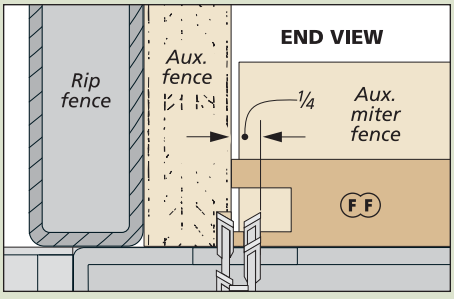
MOUNTING THE TRAYS. Finally, I installed the trays. In order for the trays to clear the doors, they're mounted to a pair of spacers (detail 'c'). The spacers are attached with screws and washers in oversize, counterbored holes to allow the case to expand and contract.



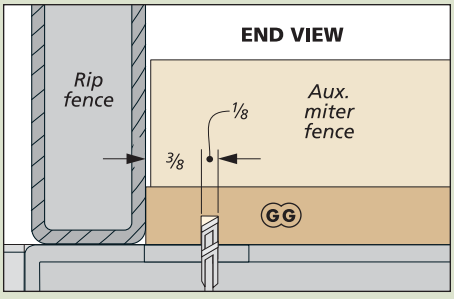
How-To: Locking Rabbet Joint



Slot. *To make a locking rabbet, start by cutting a slot in each edge of the front and back. The depth of the slot should match the thickness of the sides.*



Tongue. *Next, cut the inside tongue of the slot back. I set the rip fence as a stop and supported the workpiece with an auxiliary fence on the miter gauge.*



Dado. *The final step is to cut a dado in the side pieces. The dado should match the tongue on the front and back. The remaining tongue should just slip inside the slot.*

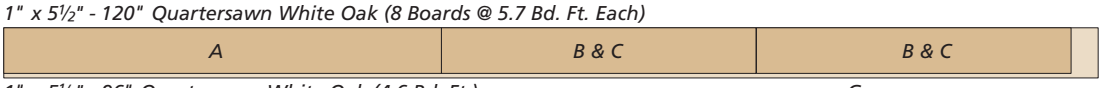
Materials, Supplies & Cutting Diagram

Classic Oak Tool Cabinet

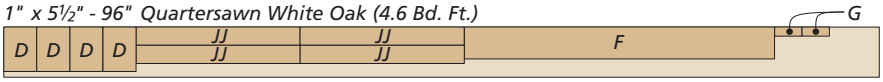
A	Sides (2)	1 x 20 - 48
B	Top (1)	1 x 20⅛ - 34½
C	Horizontal Panels (3)	1 x 19⅝ - 34½
D	Vertical Divider (1)	1 x 3⅝ - 19¼
E	False Tenons (16)	½ x 1½ - ⅜
F	Apron (1)	1 x 3½ - 34
G	Glue Blocks (2)	1 x 1 - 3
H	Back Stiles (2)	¾ x 3¼ - 46⅝
I	Back Top Rail (1)	¾ x 5½ - 29
J	Back Middle Rail (1)	¾ x 5 - 29
K	Back Bottom Rail (1)	¾ x 7½ - 29
L	Back Upper Panel (1)	¼ ply. - 29 x 10⅝
M	Back Lower Panel(1)	¼ ply. - 29 x 19⅝
N	Door Stiles (4)	¾ x 3 - 23⅞
O	Door Center Stiles (2)	¾ x 3 - 18⅞
P	Door Rails (4)	¾ x 3 - 11¹⁵⁄₁₆
Q	Door Panels (4)	½ x 4²⁷⁄₃₂ - 18⅞
R	Small Drawer Sides (4)	½ x 2¾ - 18½
S	Small Drawer Fronts/Backs (4)	½ x 2¾ - 15
T	Small Drawer Bottoms (2)	¼ ply. - 18 x 15
U	Small Drawer False Fronts (2)	¾ x 3 - 16⅜
V	Drawer Sides (2)	½ x 2¾ - 18½
W	Drawer Front/Back (2)	½ x 2¾ - 32½
X	Drawer Bottoms (3)	¼ ply. - 18 x 32½
Y	Drawer False Front (1)	¾ x 3 - 33⅞
Z	Drawer Sides (2)	½ x 3¾ - 18½
AA	Drawer Front/Back (2)	½ x 3¾ - 32½
BB	Drawer False Front (1)	¾ x 4 - 33⅞
CC	Drawer Sides (2)	½ x 5¼ - 18½
DD	Drawer Front/Back (2)	½ x 5¼ - 32½
EE	Drawer False Front (1)	¾ x 5½ - 33⅞
FF	Tray Fronts/Backs (4)	¾ x 2 - 31
GG	Tray Sides (4)	½ x 2 - 17½
HH	Tray Bottoms (2)	¼ ply. - 17 x 30½
II	Tray Sub Bottoms (2)	¼ ply. - 16½ x 30
JJ	Spacers (4)	1 x 2 - 18

- (10) 1¼"-Dia. Bright Brass Knobs w/Screws
- (2 pr.) 2" x 1⅜" Bright Brass Butt Hinges w/Screws
- (7 pr.) Accuride 18" Full-Extension Drawer Slides w/Screws
- (16) #8 x 2" Fh Woodscrews
- (20) #8 x 1" Fh Woodscrews
- (4) #8 x 1¾" Fh Woodscrews
- (8) #8 x 1½" Ph Woodscrews
- (8) #8 x ⅞" Fender Washers
- (2) 1¾" x ⁵⁄₁₆" Brass Ball Catches w/Screws

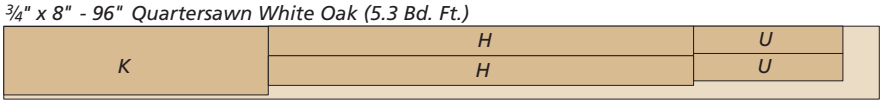
1" x 5½" - 120" Quartersawn White Oak (8 Boards @ 5.7 Bd. Ft. Each)



1" x 5½" - 96" Quartersawn White Oak (4.6 Bd. Ft.)

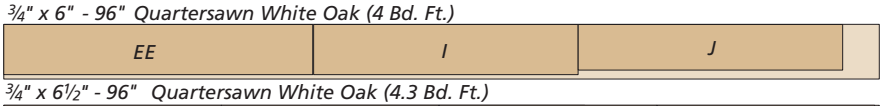


¾" x 8" - 96" Quartersawn White Oak (5.3 Bd. Ft.)

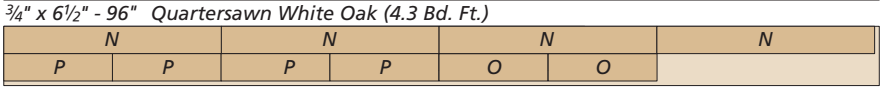


ALSO NEEDED: One - 48" x 48" sheet ¼" quartersawn white oak plywood; One - 48" x 96" sheet ¼" maple plywood

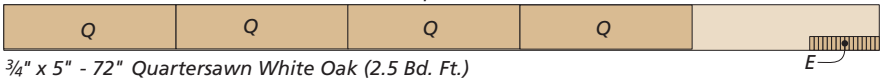
¾" x 6" - 96" Quartersawn White Oak (4 Bd. Ft.)



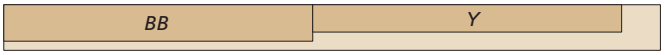
¾" x 6½" - 96" Quartersawn White Oak (4.3 Bd. Ft.)



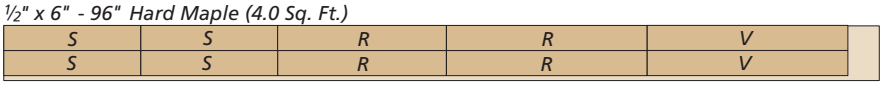
½" x 5" - 96" Quartersawn White Oak (3.3 Sq. Ft.)



¾" x 5" - 72" Quartersawn White Oak (2.5 Bd. Ft.)

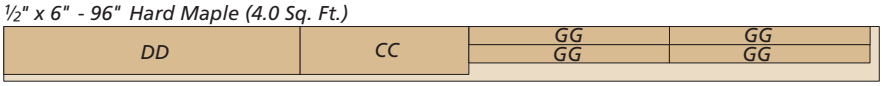


½" x 6" - 96" Hard Maple (4.0 Sq. Ft.)



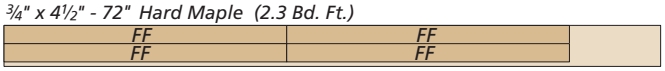
½" x 6" - 96" Hard Maple (4.0 Sq. Ft.)

½" x 6" - 96" Hard Maple (4.0 Sq. Ft.)



½" x 8" - 60" Hard Maple (3.3 Sq. Ft.)

¾" x 4½" - 72" Hard Maple (2.3 Bd. Ft.)



high-style Chest of Drawers

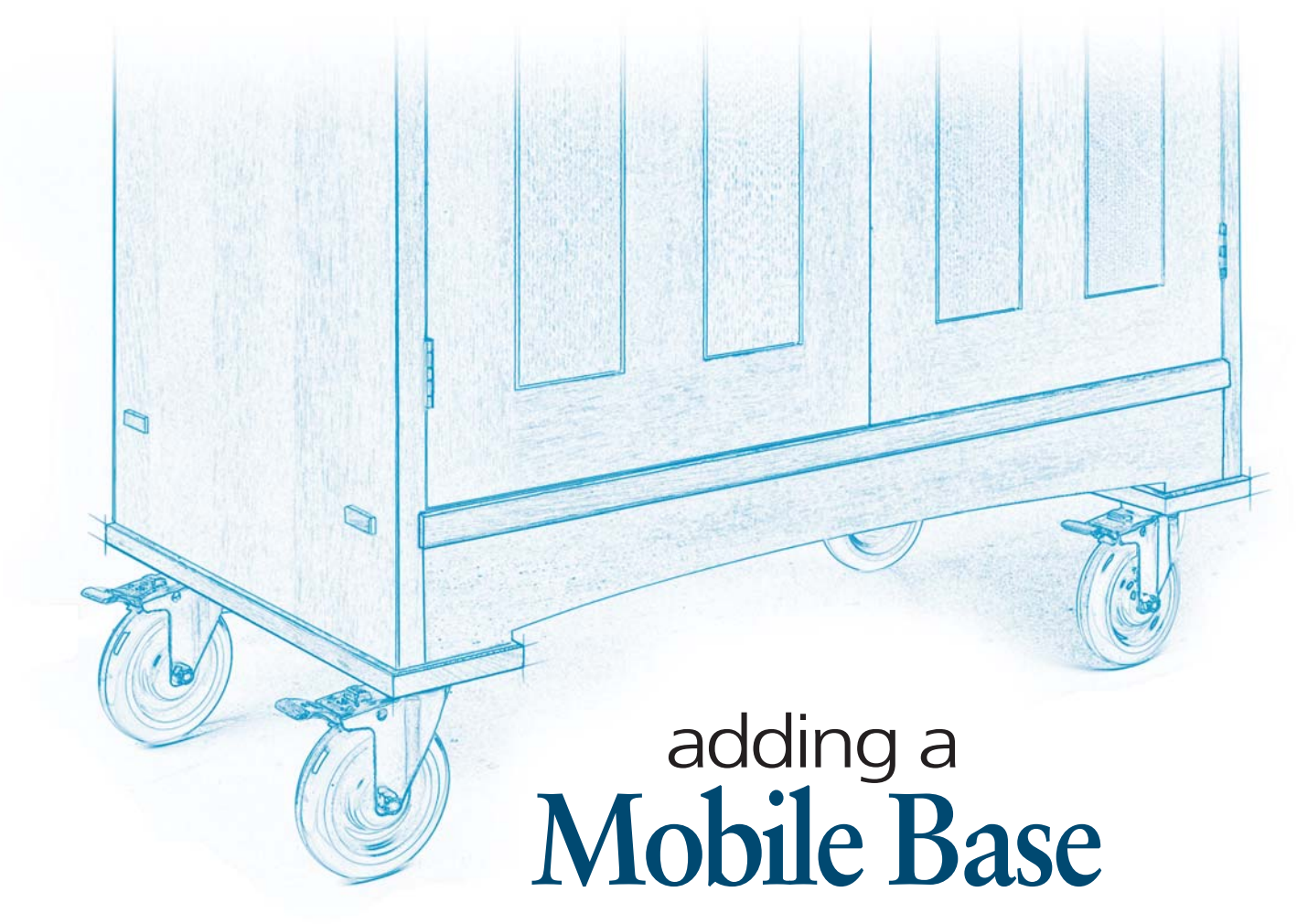
Even though it's a shop project, the heirloom tool cabinet looks good enough to be a piece of furniture. And with a few changes, you can easily transform this tool cabinet to a handsome chest of drawers, as shown in the drawing at right.

You can replace the doors and trays at the bottom with a few drawers. Since the drawers in the upper part aren't all the same size, it's a good idea to size the new drawers a little different as well. The first two, lower drawers are a little deeper than the ones above it. And the bottom drawer is even larger. To keep things simple, they all share the same construction as the five upper drawers.

Added Materials & Supplies

A	Drawer Sides (4)	½ x 6¾ - 18½	
B	Drawer Fronts/Backs (4)	½ x 6¾ - 32½	
C	Drawer Bottoms (3)	¼ ply. - 18 x 32½	
D	False Fronts (2)	¾ x 7 - 33⅞	
E	Bottom Drawer Sides (2)	½ x 9½ - 18½	
F	Bottom Drawer Fronts/Backs (2)	½ x 9½ - 32½	
G	Bottom Drawer False Front (1)	¾ x 9¾ - 33⅞	

- (3 pr.) 18" Full-Extension Drawer Slides w/Screws
- (6) 1¼" Bright Brass Knobs w/Screws
- (12) #8 x 1" Fh Woodscrews

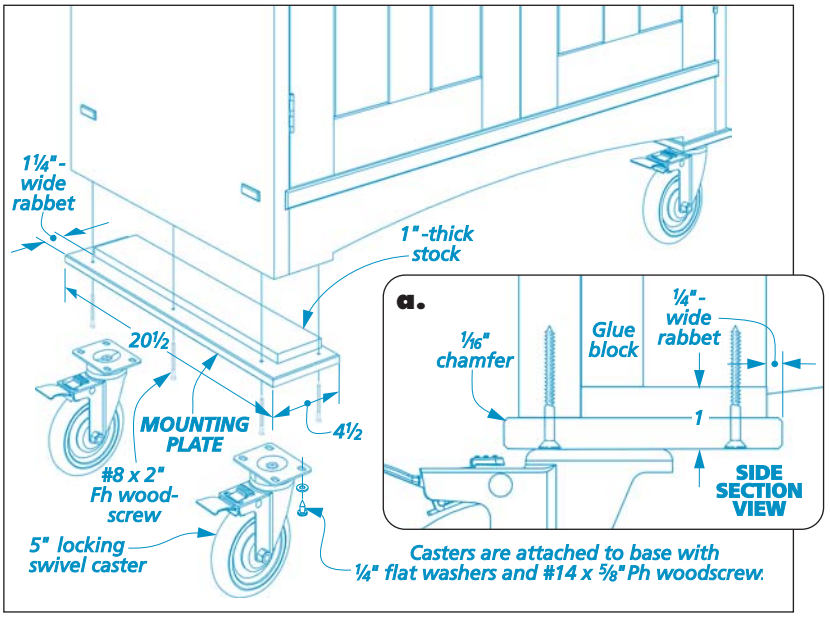


adding a Mobile Base

Positioning the tool cabinet near your workbench is a great way to keep your tools organized and close at hand. But sometimes it's nice to have those same tools close by when you're working on the other side of your shop.

To get around this problem, I added four casters to make the tool cabinet mobile. In the drawing at right you can see what I'm talking about. The casters make it easy to roll the cabinet wherever you need it. They should also be large enough to roll over power cords and other stuff laying around on the floor.

For better balance, the weight of the cabinet should be distributed evenly over the casters. To do that, the casters are attached to a pair of mounting plates. To keep the plates in place, there's a wide rabbet cut on three sides. This rabbet registers against the front, back and sides. Then to keep the plates from sticking out like a sore thumb, they should share the same chamfer details as the rest of the cabinet.



Added Materials & Supplies

A	Mounting Plates (2)	1 x 4½ x 20½

- (10) #8 x 2" Fh Woodscrews
- (4) 5" Locking Swivel Casters
- (16) #14 x ⅝" Ph Woodscrews
- (16) ¼" Flat Washers

Materials, Supplies & Cutting Diagram

DESIGNER'S NOTEBOOK

Classic Oak Tool Cabinet — Chest of Drawers Option

A	Drawer Sides (4)	½ x 6¾ - 18½	
B	Drawer Fronts/Backs (4)	½ x 6¾ - 32½	
C	Drawer Bottoms (3)	¼ ply. - 18 x 32½	
D	False Fronts (2)	¾ x 7 - 33⅞	
E	Bottom Drawer Sides (2)	½ x 9½ - 18½	
F	Bottom Drawer Fronts/Backs (2)	½ x 9½ - 32½	
G	Bottom Drawer False Front (1)	¾ x 9¾ - 33⅞	

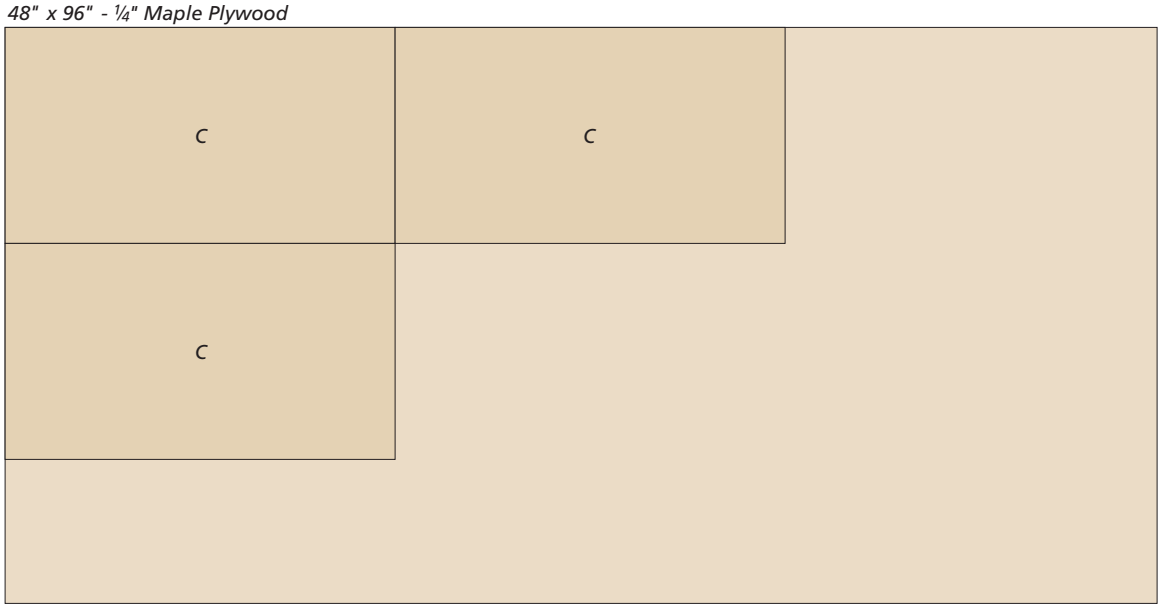
- (3 pr.) 18" Full-Extension Drawer Slides w/Screws
- (6) 1¼" Bright Brass Knobs w/Screws
- (12) #8 x 1" Fh Woodscrews

½" x 10" - 120" Hard Maple (8.3 Sq. Ft.)

½" x 7" - 120" Hard Maple (2 Boards @ 5.8 Sq. Ft. Each)

¾ x 10" - 120" Quartersawn White Oak (8.3 Bd. Ft.)

48" x 96" - ¼" Maple Plywood



Fine Tool Chest

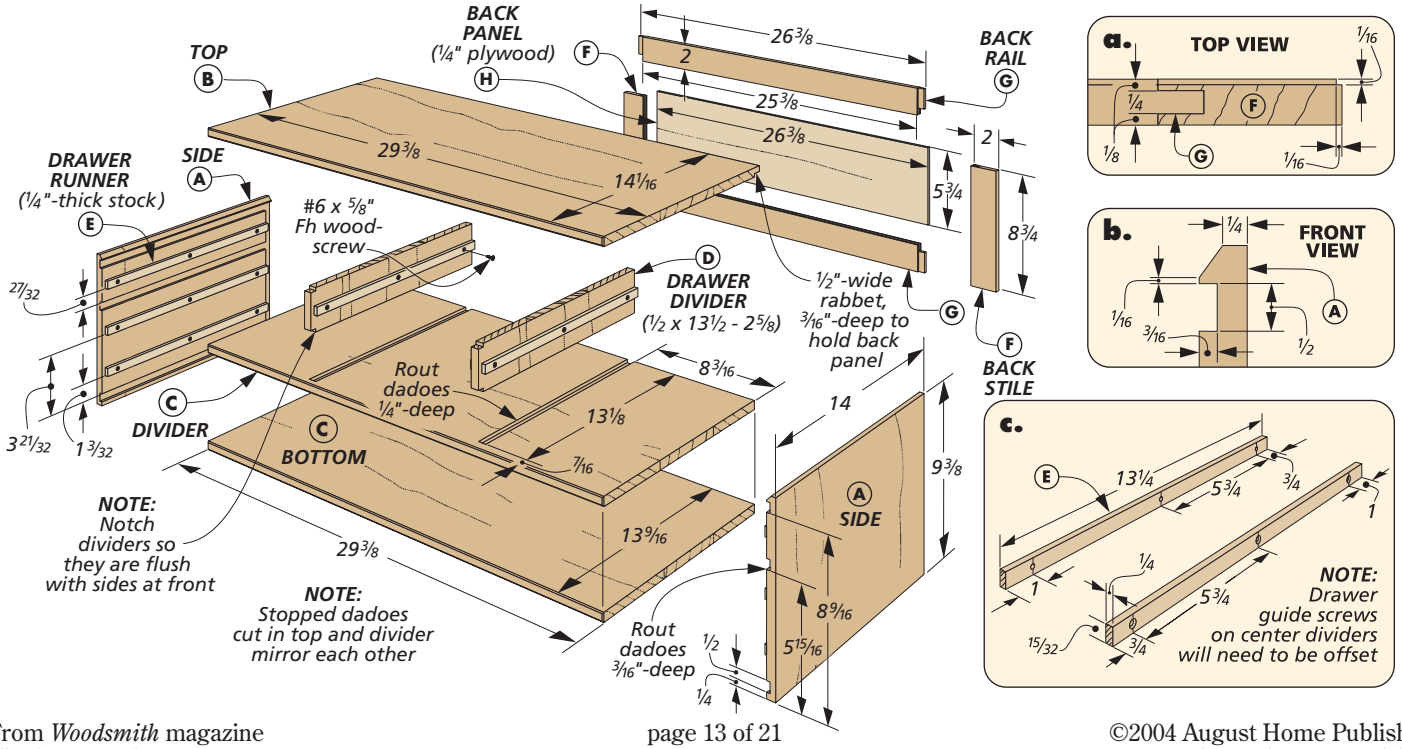
It's the perfect place for your best hand tools and works great alone or sitting on the tool cabinet.

When it comes to keeping and organizing my favorite hand tools, I wanted to make a special case for them. So I built this tool chest. You can build it to sit on top of the tool cabinet shown on page 1, or your workbench. The construction of this chest is very similar to the tool cabinet — just on a smaller scale, as in the exploded view below.

BUILDING THE CASE. To build the tool chest, I started by assembling the case. The ½"-thick top, bottom and divider are joined to the chest sides with 3/16"-deep dadoes.

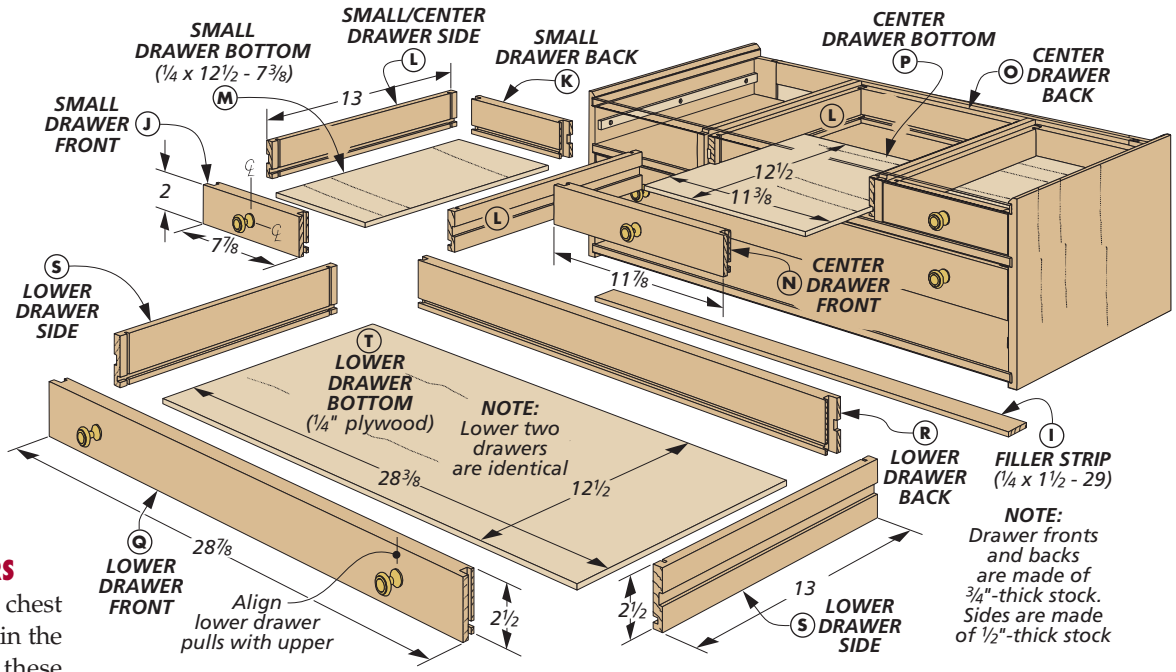
A pair of stopped dadoes in the top and divider hold drawer dividers for three narrow drawers. They're notched at the front so that they'll sit flush with the sides, as in the exploded view. The horizontal parts all have a small chamfer cut on the front edges to match the chamfer on the top of the sides.

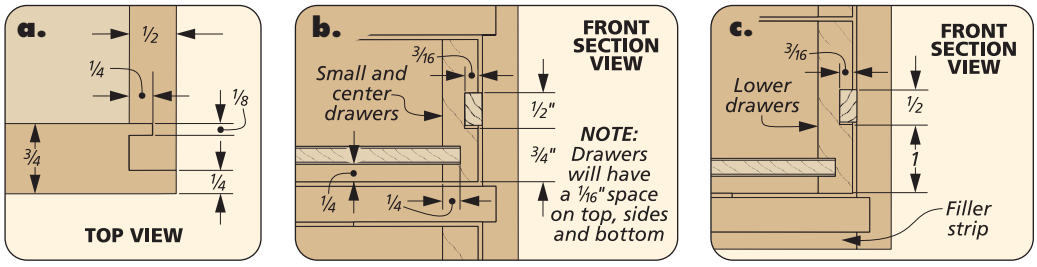
The frame and panel back of the tool chest is glued into a stopped



rabbet cut in the case sides. A small rabbet cut on the outside edges of the frame creates a shadow line, as in detail 'a' on page 13.

Before the case can be assembled the drawer runners should be installed, as in detail 'c' on the previous page. The openings are too small to do this after the case is glued up. The last piece to install on the case is a small *filler strip (I)* under the bottom (drawing at right).





BUILDING THE DRAWERS

The five drawers in the tool chest are much smaller than those in the larger tool cabinet. Because these drawers are small, I didn't use false fronts. Here, the drawer fronts are made from oak and the sides and backs of the drawers are made from maple, since only the drawer front is visible when it's closed.

The drawers are shallow so that everything inside is in plain sight when I open a drawer. However, the drawers still need to be as strong as possible. So I used locking rabbets to join the parts.

SIMPLE JOINERY. Since the drawers are built with the same joinery, (only the drawer part sizes are different), it makes sense to cut the joinery for the drawers, as in detail 'a' above, all at once.

Before assembling the drawers, you'll need to cut some grooves. First I cut a groove on the inside face of all the parts. It's sized to hold a ¼" plywood bottom.

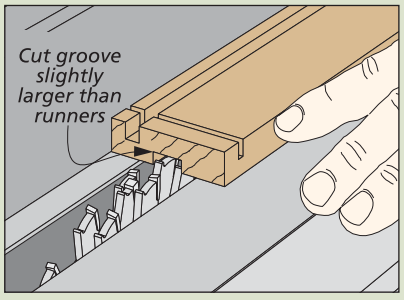
A second and larger groove is cut on the outside of drawer sides. This groove will fit over the drawer runners in the case. I positioned the groove so that there is an even gap at the top and bottom, as in detail 'b.' To do this, I cut a few test pieces so that I could check the setup.

Once the grooves are cut, you can go ahead and cut the drawer bottoms and glue up the drawers. There's just one more thing to do. You'll need to notch out the drawer back so that the drawers will fit over the runners. You can see how I did this in the drawing below.

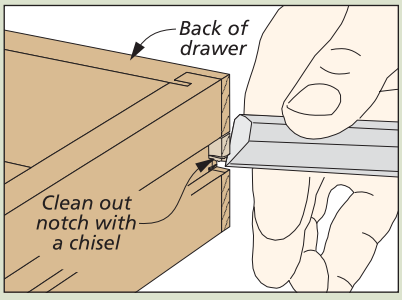
Finally, I added the brass pulls. They're a smaller version of the knobs I used on the tool cabinet. W

How-To: Wood Drawer Guides

Drawer Guides. *The drawers in the tool chest slide on wood runners mounted in the case. The runners fit in grooves cut on the drawer sides. A little wax will make them slide even smoother.*



Groove. *After cutting the joinery for the drawer parts, I cut a groove in the drawer sides. The groove is sized slightly larger than the runner.*



Notch. *To allow the drawer to slide onto the runner, you'll need to cut a notch in the drawer back. I used a hand saw and a chisel to do this.*

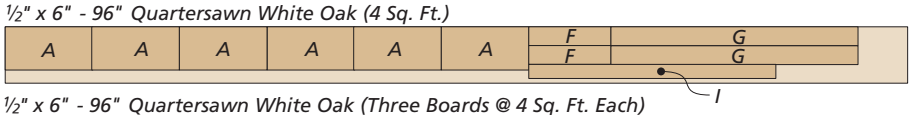
Materials, Supplies & Cutting Diagram

Fine Tool Chest

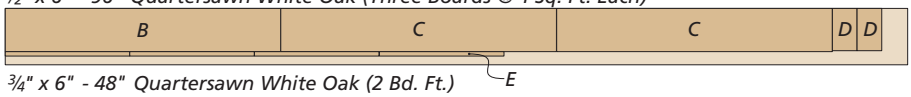
A	Sides (2)	½ x 14 - 9⅜
B	Top (1)	½ x 14 1/16 - 29⅜
C	Divider/Bottom (2)	½ x 13 9/16 - 29⅜
D	Drawer Dividers (2)	½ x 13½ - 2⅝
E	Drawer Runners (10)	¼ x 15/32 - 13¼
F	Back Stiles (2)	½ x 2 x 8¾
G	Back Rails (2)	½ x 2 x 26⅜
H	Back Panel (1)	¼ ply. - 26⅜ x 5¾
I	Filler Strip (1)	¼ x 1½ - 29
J	Small Drawer Fronts (2)	¾ x 2 - 7⅞
K	Small Drawer Backs (2)	¾ x 2 - 7⅞
L	Small/Center Drawer Sides (6)	½ x 2 - 13
M	Small Drawer Bottoms (2)	¼ ply. - 12½ x 7⅜
N	Center Drawer Front (1)	¾ x 2 - 11⅞
O	Center Drawer Back (1)	¾ x 2 - 11⅞
P	Center Drawer Bottom (1)	¼ ply. - 12½ x 11⅜
Q	Lower Drawer Fronts (2)	¾ x 2½ - 28⅞
R	Lower Drawer Backs (2)	¾ x 2½ - 28⅞
S	Lower Drawer Sides (4)	½ x 2½ - 13
T	Lower Drawer Bottoms (2)	¼ ply. - 12½ x 28⅜

- (7) 1"-Dia. Bright Brass Knobs w/Screws
- (30) #6 x ⅝" Fh Woodscrews

½" x 6" - 96" Quartersawn White Oak (4 Sq. Ft.)

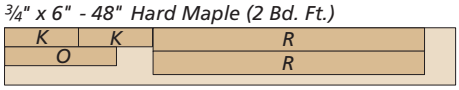


½" x 6" - 96" Quartersawn White Oak (Three Boards @ 4 Sq. Ft. Each)

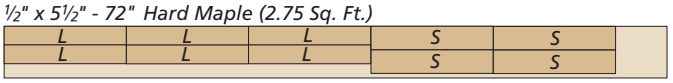


¾" x 6" - 48" Quartersawn White Oak (2 Bd. Ft.)

¾" x 6" - 48" Hard Maple (2 Bd. Ft.)



½" x 5½" - 72" Hard Maple (2.75 Sq. Ft.)



ALSO NEEDED: One - 24" x 48" sheet ¼" riftsawn oak plywood; one 48" x 48" sheet ¼" maple plywood

putting your Best Face Forward

Discover what makes the difference between a good project and a great one — go with the grain.

Whenever we feature an heirloom project in *Woodsmith*, one of the comments we usually hear is, "That looks great. What kind of wood did you use?" In the case of the tool cabinet on page 1, the short answer to that question is white oak. But that's really only part of the story.

In order to understand how the choice of wood affects the look of a project, you have to go beyond the type (species) of wood and consider other factors like grain appearance, board selection, and even the way the lumber is cut. And this is especially true with oak.

THE GOAL. Because the tool cabinet is going to see some heavy use in the shop, oak seemed like a natural choice. But the only problem with oak is that it can have very pronounced grain patterns that would detract from the clean, simple lines of the design.

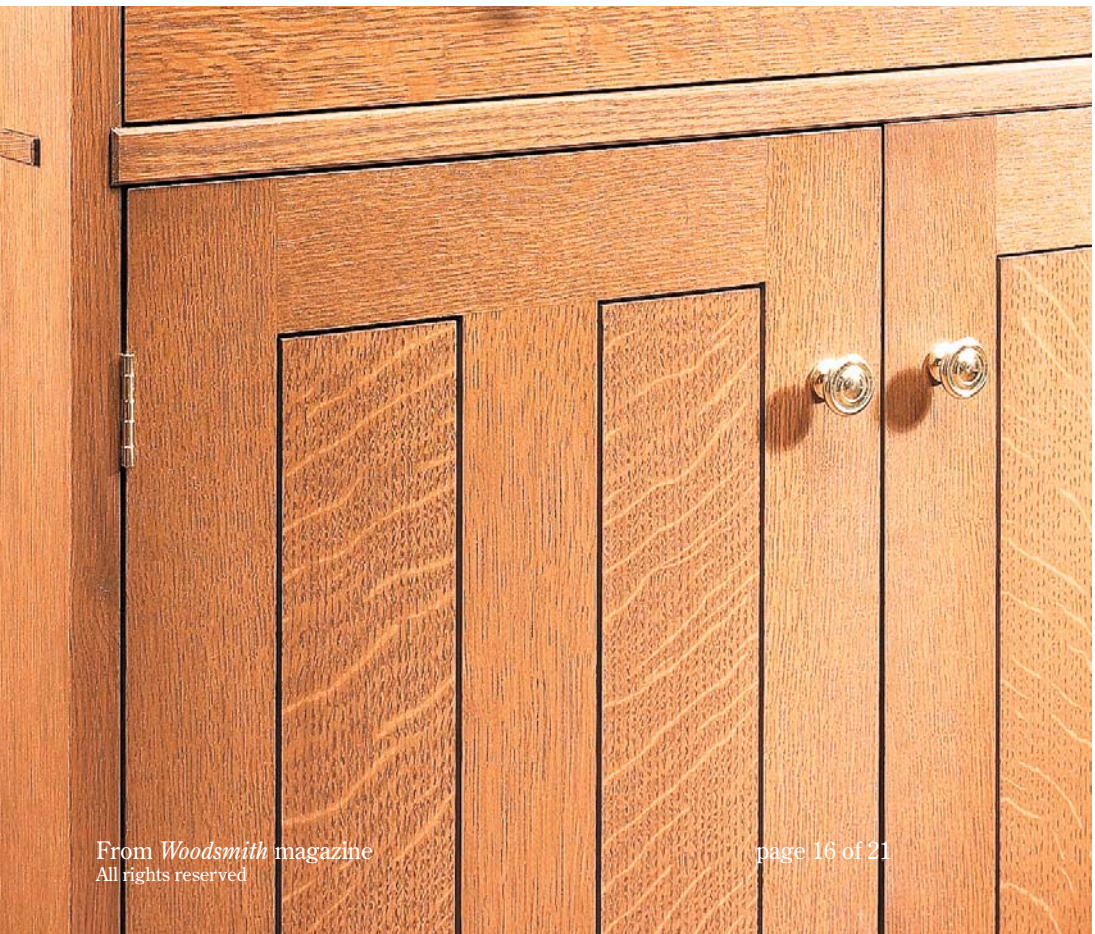
The solution was to use only boards having nice, straight grain. But finding boards like this isn't just a matter of luck — it all has to do with the way the boards are cut from the log at the saw mill.

Most logs are flatsawn — so the boards end up with the wavy, "cathedral" grain that is characteristic of oak. But since I didn't want this look for the tool cabinet, I used riftsawn and quartersawn lumber instead. (See *Designer's Notebook* on following page for more on this.)

RIFTSAWN. Riftsawn lumber has straight, uniform grain. This is the type of lumber I chose for the major parts of the tool cabinet — the case sides, top, and bottom, as well as the door rails and stiles.

To see the difference that riftsawn lumber makes in the appearance of a project, take a look at the photos at the top of the next page. The first photo shows a tool cabinet made entirely out of flatsawn lumber. You can see how the wild grain patterns run in every direction. It almost makes you dizzy just to look at it. And notice how little details like the door panels and the through tenons on the side of the case are almost lost in the shuffle.

By contrast, take a look at the second photo, which shows the same tool cabinet but this time built with riftsawn lumber. The straight, even grain complements the design of the project and leads your eye to the details that you want to be



noticed. The look is a lot more subdued and understated.

Aside from the appearance it makes on the project, using riftsawn lumber has some other benefits. For one, riftsawn lumber is more stable than flatsawn lumber. This really makes a difference when you're dealing with wide, solid-wood panels like the sides, top, and bottom of the case.

The straight grain of riftsawn lumber also makes it a lot easier to hide jointlines when gluing up a panel out of several boards. This can be nearly impossible to do with the wavy grain of flatsawn boards.

QUARTERSAWN. While riftsawn lumber was the perfect choice for the main parts of the tool cabinet, it would start to look a little monotonous if I used it for the entire project. To add a little contrast, I used quartersawn oak for the door panels and drawer fronts. As you can see in the photo on the previous page, the quartersawn effect of the oak adds just the right amount of accent — the same way that a highly-figured veneer would. The key is to use it sparingly.

BRINGING IT ALL TOGETHER. So how do you incorporate these ideas into the next project you build out of oak? First, try to visualize how the different types of grain appearances will affect the look of your project. You might even want to draw some sketches to help you get an idea. Then after selecting your lumber, carefully lay out your pieces on each board before you actually cut them in order to match color and grain pattern. Finally, label the pieces as you go so you can keep everything organized. It's a little more work, but the results really pay off in the finished project.

▲ The wild, wavy grain of the flatsawn lumber used to build this project takes away from the clean lines of the design.

▲ The straight, even grain of riftsawn and quartersawn lumber allows the finer points of the design to shine through.

DESIGNER'S NOTEBOOK

It's All In the Grain

What you see at right are three white oak boards that might have come from the same tree but have a very different appearance. It's all in how they were cut from the log.

Most oak you'll come across is flatsawn. These boards are just sliced from the log in order without regard to the orientation of the growth rings. They'll usually have an arch or "cathedral" grain pattern.

If the saw operator first cuts the log into quarters and then carefully resaws these quarter logs, the lumber produced looks very different. Quartersawn oak is cut so that the annual rings are perpendicular to the face. This produces a straight-grained board with large, crossgrain flakes.

A slight variation on quartersawing is riftsawing. Again the log is first quartered, then boards are cut with the annual rings at 30 to 60 degrees to the face (left board). Riftsawn oak will have a very straight grain without the bold flakes of quartersawn oak.

It's unlikely that you'll find anything but flatsawn oak at your local home center. But a lumber dealer that specializes in hardwoods will probably also carry riftsawn and quartersawn oak, or at least be able to order some for you.

all about

getting a Flat-Bottom Dado

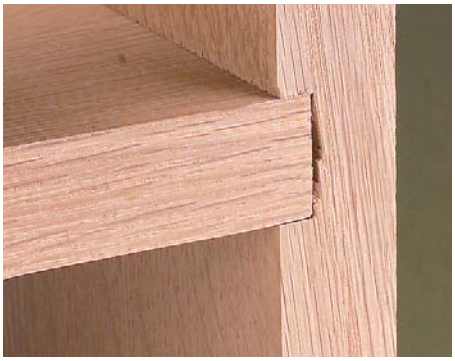
The best way to get a flat-bottom dado on a table saw is to use a router.

When it comes to cutting dadoes, I usually turn to the table saw. The main reason is I can cut full-depth dadoes quickly. The table saw is also pretty easy to setup — it's just a matter of setting the rip fence or adjusting the miter gauge.

THE PROBLEM. That doesn't mean the table saw is perfect. Take a look at the photos below and you can see what I mean. Inexpensive adjustable or "wobble" dado sets will leave a rounded bottom, as shown in the left photo.

While the quality of cut is better with more expensive "stacked" dadoes, the bottom can still be uneven and the blades often leave score marks on the bottom of the dado, as in the middle photo. This isn't a big deal if the ends of the joint will be covered. But when it's exposed, you want it to be perfectly flat and smooth.

THE SOLUTION. So how do you do it? I've found the best solution to be a combination of a hand-held router



Bad. A wobble dado set leaves a concave surface which can create large, unsightly gaps. Not only is this ugly, but the joint is not as strong.

Better. With stacked dado sets, the outside blades can leave score marks on the sides of the dado. While this doesn't weaken the joint, it's still noticeable.

Best. To get the tightest, best-looking dado joint, use a dado clean-out bit in a hand-held router. The top-bearing bit is guided by the sides of the dado.

and a table saw, as you can see in the top photo on the previous page. The secret behind this technique is an inexpensive router bit.

The bits are called dado clean-out bits. And as the name implies, they have one purpose and one purpose only — to cut perfectly clean and flat dadoes. To do that, the bottom of each bit has two cutting flutes that are ground dead flat. But what makes them different is that the carbide-tipped flutes are short (only 3/16"), as shown in the photo at right. Making the cutter length so short reduces the vibration, giving you a cleaner cut.

CHOOSING THE RIGHT BIT. The bits come in three cutting diameters (1/2", 5/8", 3/4") to fit a variety of dado sizes. To find out where to get the bits, turn to "Sources" on page 21. I like to use a bit that's a little narrower than the dado. This way, I can rout up and down both sides cleaning up the bottom of the dado. Trying to use a bit the same size as the dado could cause it to bind.

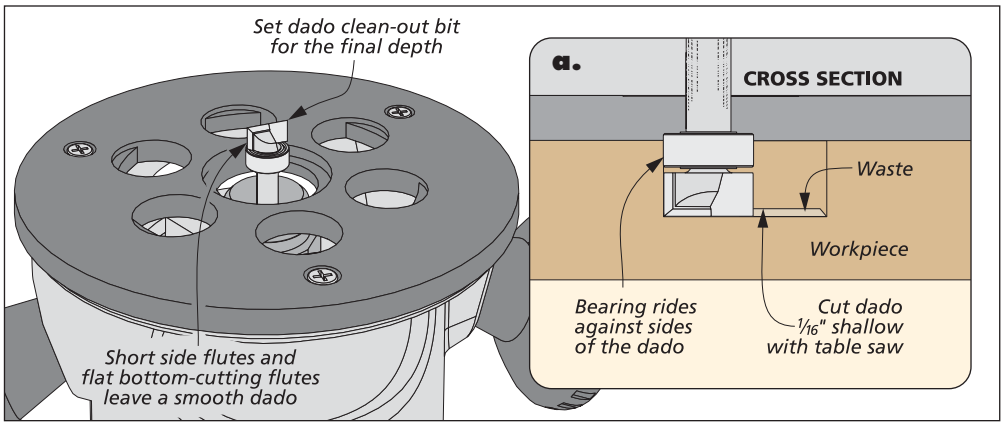
What makes this technique so easy is that the sides of the dado cut on the table saw act as a template for the guide bearing. Here's how it works: Because of the short cutting length, you only need a shallow dado for the bearing to ride on. The great thing about this is that I don't have to make any jigs and there's very little setup.

TRIMMING A DADO. Cutting a dado this way takes advantage of the strengths of both the table saw and the router. To cut a flat-bottom dado, start by using the table saw with a dado set to quickly remove most of the waste. It will also cut flat, smooth sides that will guide the router bit. The only thing you'll do differently is to cut the dado slightly shallower than final depth of the dado (about 1/16").

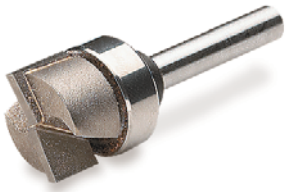
▲ The flat-bottom dado clean-out bits come in several sizes to match the width of the dado.

Next, install the router bit and set it for the final depth of the dado, as shown in the drawing below. Then set the router on the workpiece and turn it on. Bring the bit into the dado with the bearing riding on the edge of the dado, as illustrated in detail 'a.' Make a pass up one side and back down the other. That's all there is to it.

ONLINE EXTRA
video workshop



Shop Tool: Dado-Cutting Bit



▲ The dado bit is guided by a top-mounted bearing and has a longer cutting length than the clean-out bit.

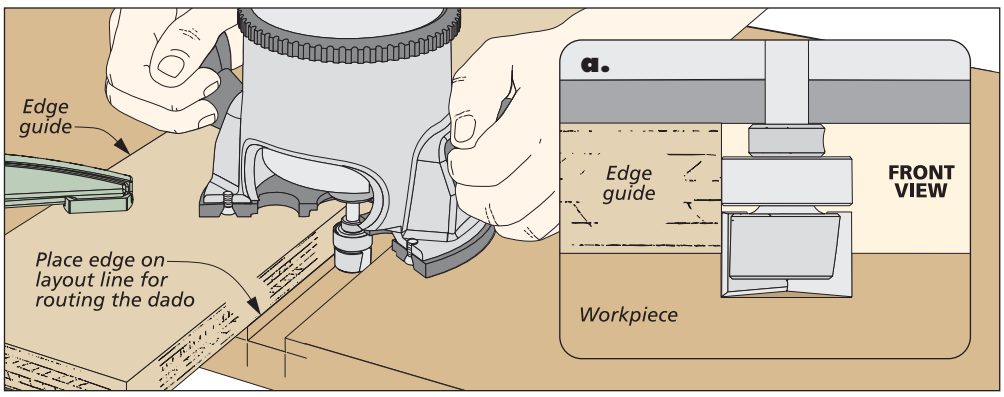
After using the dado clean-out bits shown above, I came across a similar bit that can be used to rout the entire dado. As you can see in the photo at right, this dado-cutting bit doesn't look all that different from the dado clean-out bits.

But there's an important difference to notice. The side cutting flutes are longer, which lets you take a bigger bite while routing dadoes. Yet it's still much shorter than straight bits to reduce vibration, resulting in a cleaner cut.

TAKING OUT THE GUESSWORK. One of the challenges of using an ordinary straight bit to rout dadoes is calculating the offset from the edge guide to the layout line. But with the top-mounted bearing on the dado bits, the edge guide can be placed right on the layout line, as illustrated in the drawing below.

Like the clean-out bit, you can get the bits in several cutting diameters (1/2", 5/8", 3/4", 1"), so you can match the bit to your dado size.

CUTTING A DADO. To rout a dado, set the depth just slightly less than the full cutting depth of the bit and take the first pass, as illustrated in detail 'a.' If your dado needs to be deeper, you can lower the bit and make another pass.



SHOP NOTEBOOK

Shallow Mortise Jig

One of my favorite features on the tool cabinet are the false tenons that accent the sides (right photo). They really draw your attention and give the cabinet a "hand-crafted" look.

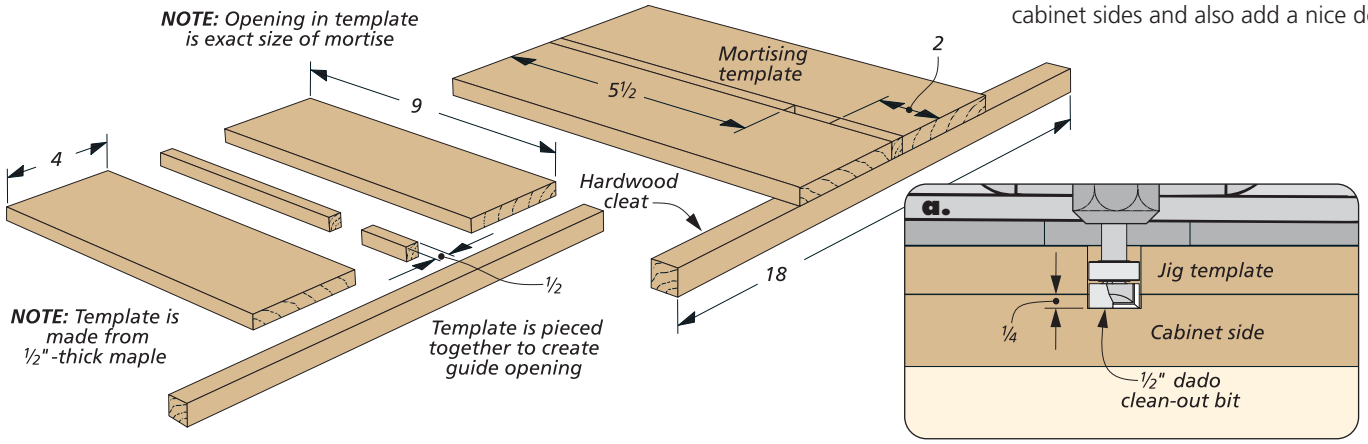
But I didn't want to knock myself out cutting all these mortises by hand. Routing them seemed like the best way to go. And for this job, I built the simple mortise jig that you see in the drawing below.

The jig is designed to be used with the dado cleanout bit shown on page 10. Since this bit will cut flush to the template, the guide opening is sized to the mortise.

The easiest way to create an accurate opening is to piece the template together, as shown in the drawing below. When you glue the pieces together, you can leave an opening the exact length and width of the mortises. A cleat fastened to the template spaces the mortise at the correct distance from the edge of the cabinet sides.

To use the jig, just clamp it in place with the opening over the position of the mortise (detail 'a'). After routing the mortises, I left the jig in place while I used a sharp chisel to square the corners.

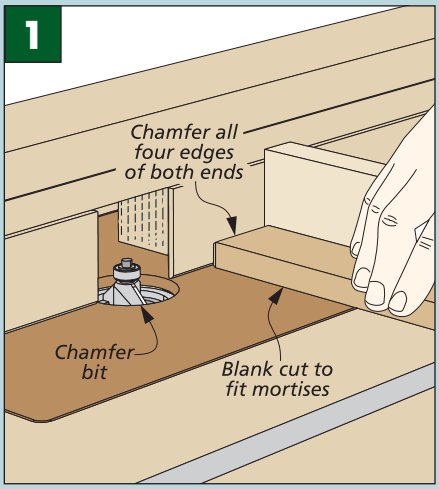
The false tenons hide the screws in the cabinet sides and also add a nice detail.

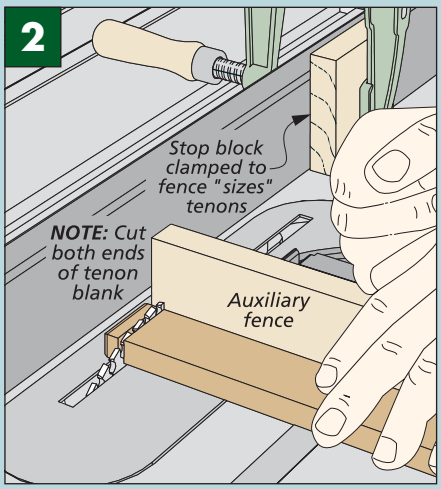


How-To: Make Chamfered False Tenons

The challenge to making the chamfered false tenons for the tool cabinet lies in their small size. Once they're cut to their final ⅜" length, there's just not much to hold on to when trying to chamfer the ends. The solution is to chamfer first, then cut them to length.

I started with a blank of wood sized to fit the mortises and long enough to make all 16 tenons. At the router table, I chamfered all four edges of both ends (Fig. 1). Then I took the blank to the table saw. Here I set up the fence with a stop block in front of the blade (Fig. 2) to gauge the length and cut each end off of the blank. Now repeat the process until all 16 tenons are completed.





Sources

TOOL CABINET & CHEST

For such a large project, the tool cabinet doesn't really require much in the way of special hardware. The common items (screws and washers) can be found at any good hardware or home improvement store. I ordered all of the other supplies I needed from Rockler.

First, you'll need 7 pairs of 18" *Accuride* full extension drawer slides in black (#89690). To install the doors, I purchased a nice pair of 2" bright brass butt hinges (#25767). And a couple of easy-to-install brass ball catches (#28613) will keep the doors closed.

Finally, you'll need some 1¼" -dia. bright brass knobs (#35477) for the doors and drawers. If you want to put your cabinet on wheels, the 5"-dia. red swivel casters (#31858) that I used came from Rockler.

To build the small tool chest, I only had to purchase a few screws and seven 1"-dia bright brass knobs (#35477).

DADO CLEAN OUT BITS

The handy ½" dado clean out bit (#5382) that I made good use of on the tool cabinet came from MLCS. Give them a call for more infomation.

WOODSMITH PROJECT SUPPLIES

We now feature hardware from ROCKLER in many of our new project kits. To order, please use our toll-free order line, see below. It's open Monday through Friday, from 8 AM to 5 PM Central Time. Before calling, please have your VISA, MasterCard, Discover, or American Express card ready.

If you would prefer to mail in an order, please call the toll-free phone number below for more information concerning shipping charges as well as any applicable sales tax.

1-800-444-7527

www.woodsmith.com

MAIL ORDER SOURCES

Similar project supplies may be ordered from the following companies:

Rockler
800-279-4441
rockler.com
Brass Ball Catches, Brass Knobs, Drawer Slides, Hinges, Knurled Brass Knobs, Swivel Casters

Woodsmith Store
800-835-5084
Amana Router Bits, Brass Knobs, Drawer Slides, Freud Router Bits, Rockler Hardware

Freud Tool
800-334-4107
freudtools.com
Router bits

MLCS
800-533-9298
mlcswoodworking.com
Router bits

Woodworker's Supply
800-645-9292
woodworker.com
Brass Knobs, Drawer Slides, Router Bits