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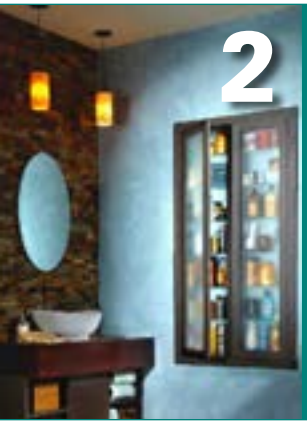
Instant Storage



Kitchen & Bath

Outdoor Storage

4 Laundry & Utility Rooms

5 Garage & Workshop

6 Closets, Bedroom & Entryway

Special Section: Simple Bookcases & More!

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ALL-TIME BEST STORAGE PROJECTS

All-Time Best Storage Projects

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CHAPTER

1 Instant storage

More storage — without more cabinets or drawers

When it comes to ingenious storage solutions, nobody beats our crew of editors and Field Editors. Here are 10 creative DIY ideas that will instantly and easily provide more storage without adding cabinets or drawers.

1 Kitchen window plant perch

Do you like having fresh herbs at your fingertips? Keeping them on your counter takes up valuable space and doesn't expose them to enough light. Instead, install a wire shelf between the upper cabinets flanking your kitchen window. You can set your plants where they'll get plenty of light without blocking the view. This also makes watering easy and keeps them readily available for snipping. Make sure to install the shelf high enough so you don't bump into it when you're working at the sink.

2 Under-sink storage bins

What's hiding under your kitchen sink? If the space under your sink is anything like ours, it's an overcrowded jumble of cleaning supplies, sponges and plastic bags. Here's a great way to store these items right on the door of the sink cabinet. Cut a plastic storage tub in half with a utility knife and screwed it to the inside of the cabinet door through the plastic lip at the top of the tub. Just make sure you position it so you can shut the cabinet door when all your bags and other supplies are in the bin.

3 Above-the-door shelves

The space above a doorway is an overlooked storage bonanza! It's the perfect spot for a cookbook cubby in the kitchen or a towel shelf in the bathroom. Consider adding a shelf or cubby over the doorways in your home office, laundry room and bedrooms too. You'll be surprised how many books, knickknacks and other items you can find room for in these valuable unused spaces.

4 Instant laundry room cubbies

If you don't have cabinets or shelves in your tiny laundry room, buy inexpensive plastic crates at a discount store and create your own wall of cubbies. Just screw them to the wall studs using a fender washer in the upper corner of each crate for extra strength. The crates hold a lot of supplies, and they keep tippy things like my iron from falling over.

5 Cabinet-end fruit basket

Oh, sure, you can just set your fruit bowl anywhere on your countertop. But you'll free up valuable counter space if you put your fruit in a basket on the end of an upper cabinet near your kitchen sink. The fruits and veggies will ripen nicely, and they'll look beautiful too. Wire baskets work well because they allow light and air to circulate for even ripening. You'll find them at discount, office supply and organization stores.

6 Toilet paper shelf

Buy a deep "shadow box" picture frame at a craft store and create a bathroom shelf. Apply a couple of coats of white enamel paint on the frame and hang it around your toilet paper holder. It gives you two convenient shelves for small items.

7 Clothes hanger holder

If you have shelves or cabinets above your washer or dryer, you've got the perfect spot to store clothes hangers. Just mount a towel bar to the bottom of the cabinets. This puts hangers at your fingertips so you can hang up shirts and slacks fresh from the dryer.

8 Pullout towel rack

Pullout towel racks are typically meant for kitchens, but they're also perfect for cramped bathrooms. They keep damp hand towels and washcloths off the counter so they can dry out of the way. You can find pullout towel racks at discount stores and online retailers.

9 Charger and cord pockets

Are you tired of rummaging through drawers and boxes trying to find the right cords and chargers for all of our electronic gadgets? Our solution is to use a clear vinyl over-the-door shoe organizer. Make labels for each pocket and put every item in its new home. Now you can find everything you need without getting frustrated.

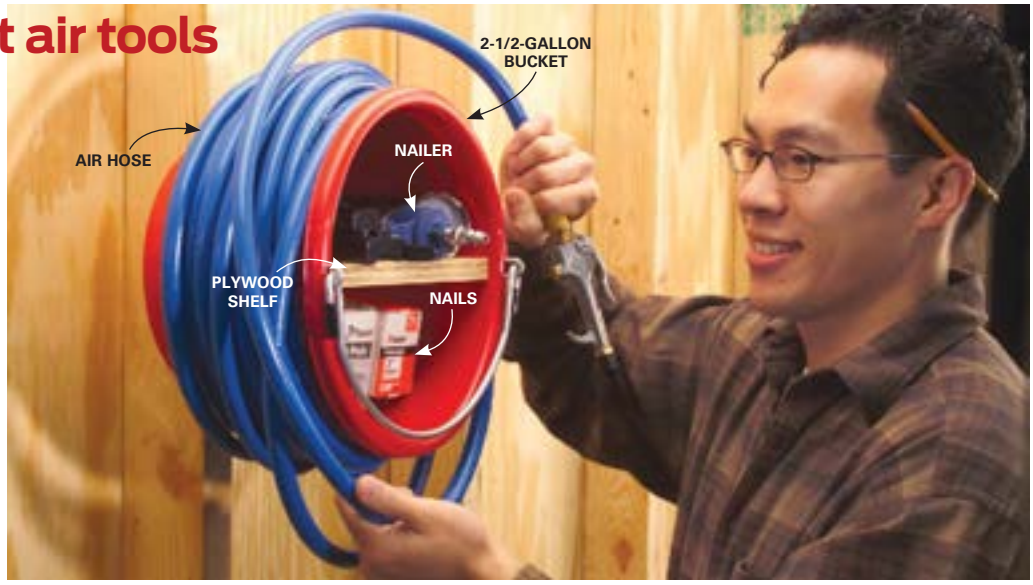
10 Add a spice shelf

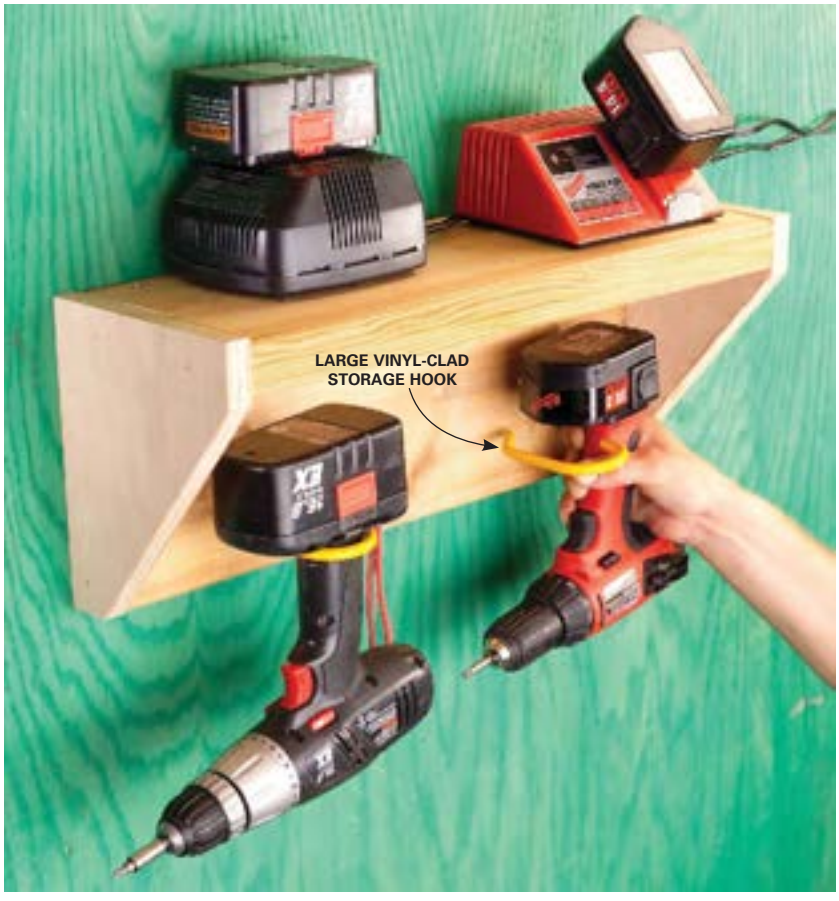
Spices are a pain to store. They get easily lost in your cabinets, so you end up buying duplicates when you can't find what you need. Here's a simple solution. Pick up a bag of adjustable shelf supports and a 1x4 board at a home center. Just measure the height of your tallest spices, measure down from your shelf, drill holes and mount your spice shelf on shelf supports. You'll put an end to buying three tins of poultry seasoning and more bay leaves than you'll use in a lifetime.

Tools and work areas

In-the-bucket air tools

A 2-1/2-gallon bucket is all you need to store air tools and hoses on a wall right by the air compressor. Screw a 3/4-in. plywood shelf inside the bucket to create two storage areas, then attach the bucket to the wall with a couple of lag bolts and washers. Load up the bucket with nailers, nails, tire pressure gauges and other accessories and coil the hose around it.



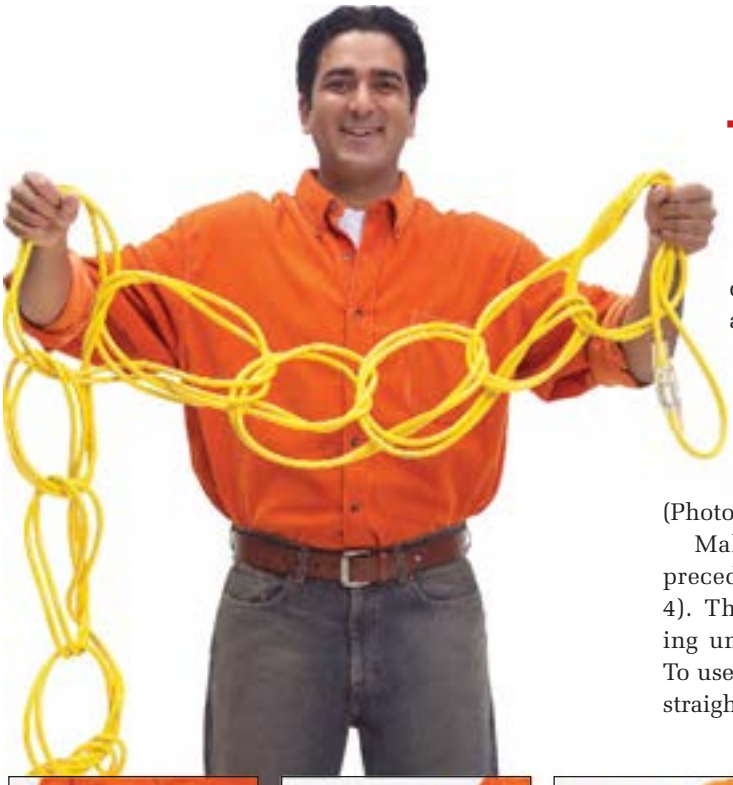


Cordless drill hangout

Here's a high and mighty way to prevent cordless drills from toppling off your workbench. Screw large vinyl-covered hooks (available at hardware stores and home centers) to a convenient spot on a wall or the side of a workbench and hang up those drills for safekeeping and easy access.

Cord holders

You can temporarily hang extension cords on ceiling joists or along the edge of your workbench with these holders made of 1-in.-diameter PVC pipe. Cut a slot in a 6-in. piece of pipe, drill screw holes, then cut it into 1-in. lengths. A hacksaw for cutting the pipe, an electric drill and a vise are all the tools you need.



Tangle-free cord storage

To keep cords tangle-free, use a method called a "daisy chain," which entails creating a series of loops that feed through each other, yet come apart tangle-free. It can reduce a 50-ft. cord to a more manageable length of about 8 ft.

Start by folding the cord in half. Then hold the ends of the cord in your left hand, make an 8-in. loop (Photo 1) and reach through the loop with your right hand to grab the cord about a foot past the loop. Pull the 12 in. of cord through the first loop, creating another loop (Photos 2 and 3).

Make more loops, pulling a new loop through each preceding one until you reach the end of the cord (Photo 4). Then make a loose loop to keep the cord from coming unraveled and feed it through the last loop (Photo 5). To use the cord, unfasten the last loop and pull on the cord to straighten it out.

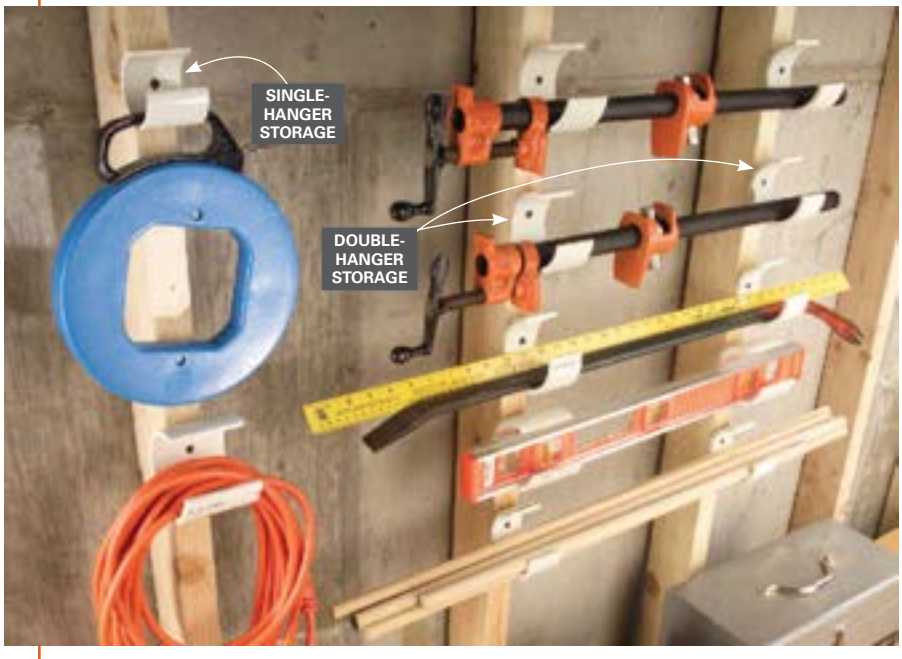
1 Fold the cord in half, then create a closed loop at one end.

2 Reach through the loop and grasp the cord.

3 Pull a section of cord back through the initial loop.

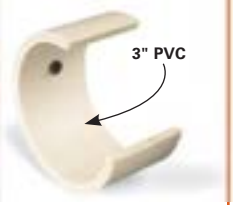
4 Continue making loops by pulling the cord through each newly created loop.

5 Make a final loop, then push it through the previous loop to hold it together.



PVC storage hangers

Cut 2-in. pieces of 3-in. PVC and saw away a 2-in. section so it looks like Pac Man. (Remember Pac Man?) Drill screw holes and attach the hangers to studs or shop walls. Space pairs for convenient horizontal storage of longer tools such as levels and glue clamps, and use single segments for ropes, electrical cords or anything else that you want securely stored yet easily accessible. Try this tip and you'll learn never to be peeved by leftover PVC.



PVC socket shelves

Here's a great way to use leftover pieces of PVC pipe. Cut them into various shorter lengths and glue them to a 4-in.-wide board with construction adhesive. Attach the boards to a shop wall with angle brackets bent downward 15 degrees or so. Then fill the pipe pieces with screws, nails, glue, spray paint and, sure, a hot cup of coffee.

With the shelves angling a little downward, it's easier to see and grab the contents. Two-inch pieces of 3-in.-diameter pipe are great for screws and nails, and 5-in.-long pieces of 1-1/2-in.-diameter pipe are neat holsters for pencils, files, paintbrushes and Popsicle sticks.

5-gallon bucket tool kit

I worked in the electrical trade for many years, and my 5-gallon bucket tool kit was my constant companion. I used an awl to poke holes around the perimeter for my screwdrivers and stored the rest of my tools in the bucket.


Donald F. Bower

Everything I needed was at my fingertips and easy to carry from job to job. I'm now 89 years old and I retired some time ago, but my tool kit is still on the job. It helps me with the chores that need doing around our house and 56-acre ranch.

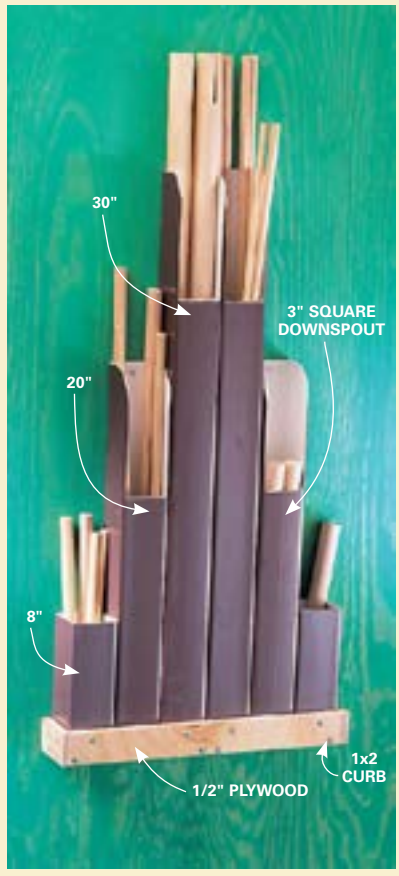
DONALD F. BOWER

Paper towel holder

If your laundry area is cramped, and the roll of paper towels you keep on the shelf near the sink keeps falling into the sink, slip a bungee cord through the roll and hanging it from the wire shelving. Works great!

Parachute bags

"Parachute" bags can hold nearly every type, size and style of fastener you'll ever need, all stacked up inside a 5-gallon pail. Whenever you travel (even up on the roof) to do any building, repairing or remodeling, the bag with the appropriate fasteners in it can easily go along. Parachute bags don't tip over and take up very little room, and a drawstring cinches off the top so nothing falls out—ever. They're an exceptional way to store and carry plumbing or electrical fittings or any other small parts that need to be kept separate. There are many varieties available now. Check home centers or just search for "parachute bag fastener" to see the varieties available online.



High-rise dowel storage

Organize all the far-flung sticks, dowels and molding scraps in your shop with one 10-ft. length of 3-in. square plastic downspout. Cut two 30-in. pieces to hold uncut dowels, two 20-in. pieces to store cut-offs, and two 8-in. pieces for shorter stubs. With a jigsaw, cut away the top 8 in. on one side of the 30- and 20-in. pieces so you can slide sticks in and out more easily. Glue the downspout pieces together with contact cement, then screw together a bottom and curb from 1/2-in. plywood and 1x2s to form a curb. Attach the curb to the downspouts with 3/4-in. sheet metal screws. Screw the whole unit to a shop wall, and put your sticks in order.

High and dry storage

Bike racks

Tired of that darn bike hanging in your way? Build this movable bike rack from a 2x4 and a pair of bicycle hooks. Cut four 3-1/2-in. blocks, stack two on top of each other, and screw them together. Now screw them on the end of a 4-ft. 2x4 and repeat the process for the other side. Drill a hole in the middle of the stacked blocks and screw in the bicycle hooks. Lay the rack across your garage ceiling joists, and hang your bike from the hooks. When you need to get behind the bike, simply slide the entire rack out of the way.

Closet pole and shelf brackets can also keep your bikes up and out of the way of car doors and bumpers. Just screw the brackets to the wall studs. Line the pole carriage with self-stick hook-and-loop strips so it won't scratch your bike frame.

Oversized twist ties

Leftover scraps of electrical cable can tie up or tie down just about anything. Twist a loop in the cable to make carrying or hanging up your bundle easier.

Fishing rods

This is for all you fishing addicts out there. When the season ends and the gear comes out of the truck, where do you store your rods? You can buy a fancy storage rack or make one of your own. But either way, you're giving up precious wall space until spring. Here's a quick solution: Screw short sections of wire shelving to your ceiling. If the handles don't fit, just clip out some of the wire with bolt cutters. Your rods will be safely out of the way until your next fishing trip.

Lattice rack

Plastic lattice works well for storing long lengths of miscellaneous pipe, trim, flashing and conduit. Just cut matching pieces, then screw 2x4 cleats to the ceiling and screw the lattice to the wall studs and cleats. Now you can quickly find those oddball leftovers instead of going to the hardware store and buying yet another piece.

Up, up and away

Put those joist spaces to use with this simple storage idea. Fasten eye screws to the joists and then cut lengths of chain to keep odd lengths of trim and pipe out of the way but easy to find. Open one side of the eye screw with pliers to slip the chain in place. Make the chain a bit longer for easy future expansion.

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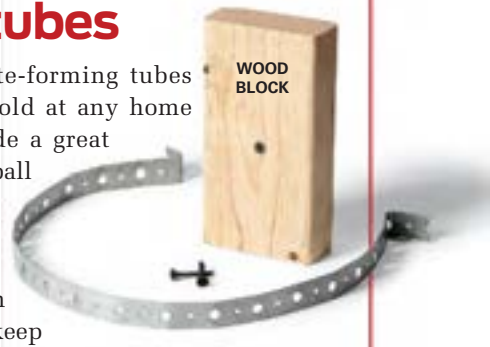
- For more great garage storage tips, search "garage storage."
- Need more space in a small kitchen? Search "kitchen storage."
- Find tons of clever storage ideas for your shop by searching "workshop storage."

Storage tubes



Cardboard concrete-forming tubes are inexpensive (sold at any home center) and provide a great place to store baseball bats, long-handled tools and rolls of just about anything. Rest the tubes on a piece of 2x4 to keep them high and dry. Secure each tube to a garage stud with a plumbing strap.

Overnight storage for painting tools

Plastic-wrapped paint roller

You don't have to wash out your paint roller if you'll be using it again tomorrow. Spread a 14-in.-long strip of plastic wrap on a flat surface and push the roller over the plastic. Seal the ends with twist ties.

Paintbrush

If that "quick" painting project didn't go as fast as you'd hoped and you need an extra day, seal your brushes in a freezer bag. As long as it's airtight, you can store brushes for up to a week without cleaning. But don't push it; any longer and they'll dry out and stiffen up, making cleanup that much harder.

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- There's a right way and a wrong way to do everything—even painting with a roller. Search for "roller tips."
- Thorough prep is the key to a lasting exterior paint job. Search for "paint prep."
- Protect against slop, splatter and spills. Search for "neater painting."

CHAPTER

2 Kitchen & Bath

Discover hidden storage

Look in your walls for extra space!

In almost every room of your house, you can find tons of storage space hidden between the two sheets of drywall. Simple stud-space cabinets like the two we show here are great for capturing some of this wasted space. We'll show you how to build them.

The basic shelf project is simple to build using common carpentry tools and a drill. We used a pocket hole jig, but this is optional. You can get excellent results by simply nailing the parts together. Even if you've never built a cabinet, you'll be able to finish the basic shelf project in a weekend.

The glass door cabinet is a bit more challenging and requires a few more tools. You'll need a table saw and a miter saw to make the precise cuts required. You'll also need a pocket hole kit to assemble the doors and a router with a 3/8-in. rabbeting bit to cut the recess for the glass. If you use concealed hinges like we did, you'll need a 35-mm Forstner bit to drill the hinge recess holes.

Basic version

Glass door version

Basic built-in shelves

Cut the hole first

Before you buy materials, choose the location for your built-in cabinet and cut the hole. Then you can adjust the dimensions if your wall studs aren't exactly 14-1/2 in. apart. Remember, your walls are full of pipes, wires and ducts, so you need to do a little detective work to find a good spot. The plumbing wall of a bathroom is probably a bad choice. Look for heat and cold air registers that could indicate ducting, and outlets or switches that mean there's wiring in the stud space.

When you find a spot you like, use a stud finder to make sure the studs are at least 14-1/2 in. apart. Then cut a small access hole to inspect the stud space (Photo 1). If there are obstructions, at least you'll only have a small patch to make. If the area is clear, cut the hole (Photo 2). Now measure the distance between studs and subtract 1/2 in. to determine the width of the cabinet. Measure from the surface of the wall covering—drywall or plaster—to the back of the opening and subtract 1/4 in. to determine the depth of your cabinet. If you have 2x4 walls with 1/2-in. drywall, you can build the cabinet box using standard 1x4 boards.

Build the box

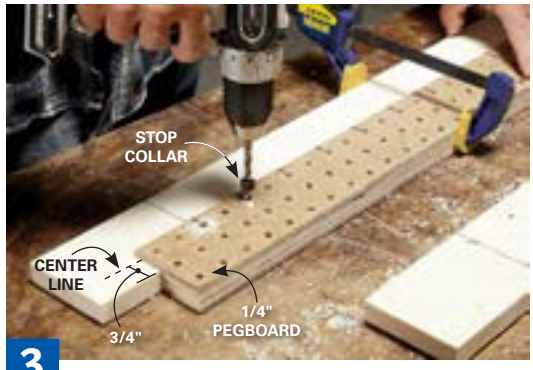
Cut the sides, top and bottom from 1x4 boards, or from whatever width boards you need. Then drill 1/4-in. holes for the shelf supports (Photo 3). Build a simple template from a strip of pegboard screwed to a strip of wood. Locate the center of a row of holes 3/4 in. from the edge of the wood strip. We chose to drill holes every 2 in.

What it takes

TIME: 4 hours, not including painting
COST: $60
SKILL LEVEL: Beginner to intermediate
TOOLS: Saw, level, tape measure, drill, drill bits.

1 **Before you cut the big hole...** Cut a small inspection hole and use a compact mirror and flashlight to peek inside the wall. Look for pipes, wires or other obstructions.

2 **Cut the hole.** Draw level lines between the studs and use a drywall keyhole saw to cut to the edges of the studs. Then saw along the studs and remove the drywall.



3 **Drill shelf support holes.** Construct a simple hole-boring template from a strip of pegboard with 1/4-in. holes. Center one of the pegboard holes on the line and clamp the template. Tighten a stop collar onto a 1/4-in. drill bit and drill holes for the shelf support pins.

Choose the spacing you prefer, and mark the holes accordingly so you don't get mixed up while you're drilling. Secure a stop collar to a 1/4-in. drill bit so that the shelf support holes are 3/8 in. deep. Set the two sides next to each other, lining up the ends, and draw a square line across the faces, 4-3/4 in. from the bottoms. Make an "X" to indicate the bottom of the sides so you don't get them reversed when you assemble the box. Then align the center of a pegboard hole with the line and clamp the jig before you drill the holes (Photo 3).

After you've drilled holes in both sides, assemble the box (Photo 4). Cut the plywood back to fit and nail it to the back of the box. Nail one side, then measure diagonally, or use a framing square to make sure the cabinet is square before you nail the remaining ends and side.

Cut the face frame parts, and assemble them with pocket screws (Photos 5 and 6). We built the face frame so that it overlaps the inside edge of the cabinet by 1/8 in. on all sides. Drill pocket holes in the cabinet sides and attach the face frame with pocket screws (Photo 7). If you don't own a pocket hole kit, simply nail the face frame parts to the cabinet with finish nails and fill the holes before you paint.

Cut the shelves to length after you've assembled the cabinet. Measure the distance between the sides and subtract 1/8 in. to determine the shelf length.

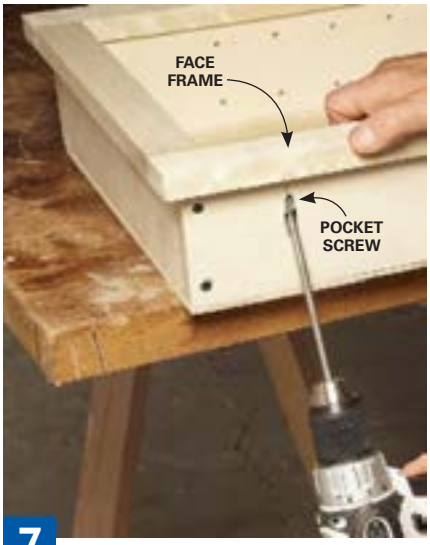
Mount the cabinet

Slide the cabinet into the opening and use a level to make sure it's level and plumb (Photo 8). Drive screws through the cabinet sides, or simply drive nails through the face frame to secure the cabinet.

4 **Screw the sides to the top and bottom.** Drill clearance holes in the sides. Screw the sides to the top and bottom.

5 **Drill pocket holes.** Clamp the pocket hole guide to the end of the face frame rail and drill holes with the special stepped drill bit.

6 **Assemble the face frame.** Clamp the stile to the rail and drive pocket screws to secure the joint.



7 **Attach the face frame to the box.** Drill pocket holes on the outsides of the cabinet box. Align the face frame and clamp it. Attach the face frame with pocket screws.

8 **Install the cabinet.** Level the cabinet and mount it by driving screws into the shelf support holes. Drive a pair of screws at the top and a pair at the bottom. Check for level and adjust by tightening or loosening opposing screws.

Glass door cabinet

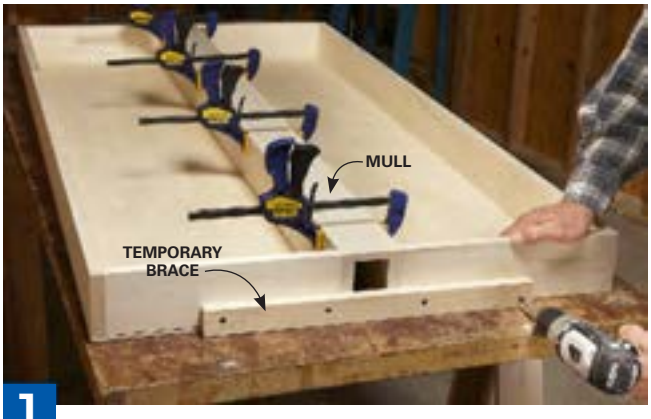
The doors on this cabinet are inset into the face frame and require a precise fit, making this project more challenging than the basic cabinet. You should have some woodworking experience to tackle this project. But because the doors are assembled with simple pocket screw joints and the hinges are fully adjustable, you don't have to be a cabinetmaker. You just have to measure and cut accurately.

Including the glass shelves and frosted glass inserts, hinges and other hardware, and the paintable boards, this project cost us about $300. If you keep at it, you'll be able to complete the cabinet in a weekend. Then you can spend weeknights painting it and install it the next weekend.

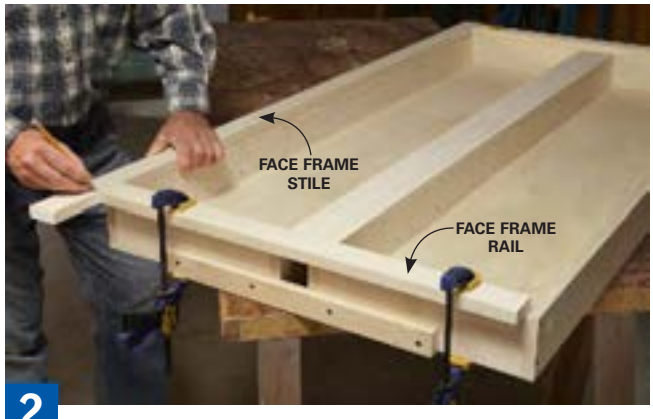
This cabinet spans one wall stud to fill two stud spaces. To allow this, we joined two basic cabinets with a mull that's 2 in. wide by 1/2 in. thick. You have to remove the strip of drywall covering the center stud for this cabinet to fit.

What it takes

TIME: 8 to 10 hours, not including painting
COST: $300, including frosted glass
SKILL LEVEL: Intermediate to advanced
TOOLS: Miter saw, table saw, drill, pocket hole kit



1 **Join the cabinet boxes.** Glue and clamp the 1/2-in.-thick mull between them. Screw temporary braces to the top and bottom to hold the cabinet steady until the face frame is installed.



2 **Fit the face frame parts to the cabinet.** Cut the top and bottom rails to fit between the cabinet sides. Clamp them in place temporarily. Then mark the length of the stiles and cut them. Assemble the face frame with pocket screws.

Start with the basics

Follow the instructions for the basic shelf unit for cutting the holes in the drywall and building the two cabinet boxes. Then join the two boxes by gluing the 1/2-in.-thick mull between them (Photo 1). Screw scraps of boards to the top and bottom of the cabinets to hold them steady. Remove these temporary supports after the face frame is installed.

Add the face frame

Unlike the basic cabinet above, the face frame for this cabinet must fit flush to the cabinet sides to accommodate the concealed hinges we're using. To make sure the face frame fits perfectly, cut the top and bottom rails to fit exactly between the sides of the cabinet. Align them with the inside edge of the box and clamp them temporarily. Then measure and cut the face frame stiles to fit (Photo 2). Now you can remove the face frame parts, drill pocket holes and join them with pocket hole screws. Keep the inside pocket holes at least 1/2 in. from the edge to avoid hitting them with the rabbeting bit when you rout the recess for the glass.

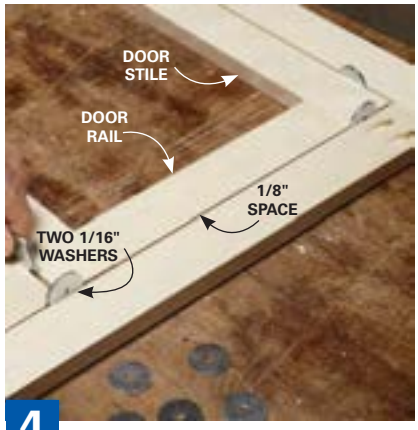
Build the doors

Inset doors are difficult because they have to be exactly the right size and perfectly flat. The trick to flat doors is to build them with straight and flat boards. Sight down the boards when you choose them at the lumberyard or home center to make sure they're flat and straight. Also, find lumber with straight grain if possible. The fewer knots and curvy grain patterns in the wood, the better it will be for doors.

The Materials List on p. 24 lists 1x6s. Cut 2-in.-wide strips from these on a table saw for the door parts. We cut our boards 1/16 in. oversize, stacked them alongside each other and ran them through our portable planer to remove the saw marks. If you don't have a planer or jointer to dress the edges of the boards, just make sure to use a sharp saw blade when you rip the parts, and then sand off any saw marks after you assemble the doors.

Use the face frame as a guide for building the doors. First cut four door stiles 1/4 in. shorter than the inside dimension of the face frame. Stack them tightly together inside the face frame and measure the remaining width (Photo 3). Subtract 3/8 in. from this measurement and divide by two to determine the length of

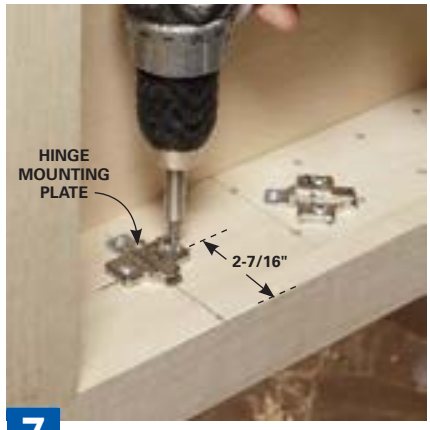
3 **Measure for the door rails.** Cut the four door stiles and stack them inside the face frame. Measure the remaining space and subtract 3/8 in. to determine the length of the door rails.



4 **Check the fit before you assemble the doors.** Arrange the door parts inside the face frame and wedge them with pairs of 1/16-in.-thick washers. Adjust the lengths if needed. When the fit is good, remove the parts and assemble the doors with pocket screws.

5 **Rout the glass recess.** Mount a 3/8-in. rabbeting bit in a router. Make two or three passes in a clockwise direction, increasing the depth gradually, to create a 1/4-in.-deep rabbet.

6 **Mark for the hinge mounting plates.** Rest the edge of the door on the cabinet and center it. Then transfer the hinge center marks to the cabinet sides to indicate the center of the mounting plates.



7 **Attach the mounting plates.** After marking for the center of the screws, attach the mounting plates to the cabinet sides. Check the fit of the hinges and doors by clipping the hinges to the mounting plates.

the four door rails. Cut the door rails. Then test-fit all the parts, using 1/8-in. spacer shims between the doors and the cabinet and between the pair of doors (Photo 4). Adjust the lengths if needed. Finally, join the rails and stiles with pocket screws.

The next step is to rout the recess for the glass. Mount a 3/8-in. rabbeting bit in your router and adjust the router to cut a rabbet about 3/16 in. deep. Rout the inside perimeter of each door, moving the router clockwise (Photo 5). Adjust the router to increase the cutting depth an additional 1/16 in. and make the final pass. Finish the rabbet by squaring off the corners with a sharp chisel.

Mount the doors

We used Blum 110-degree clip top hinges on the doors. These hinges provide three-way adjustments and have a built-in soft-close mechanism. You can save a few dollars by substituting a standard concealed hinge without the soft-close feature. This type of hinge requires a 35-mm recess in the door to accept the hinge, and a mounting plate on the cabinet.

Start by making three marks on the hinge side of each door to indicate the centers of the hinges. Mark the center of the door and 3-1/2 in. from the top and bottom. Then measure in 13/16 in. from the edge to mark the center of the 35-mm hinge bore. Use an awl or sharp nail to make a starting hole for the 35-mm Forstner bit. Before you drill the hinge recess holes, hold the door alongside the cabinet, center it so there's a 1/8-in. gap at each end, and transfer the hinge marks to the cabinet sides (Photo 6).

Next attach the hinge mounting plates to the cabinet (Photo 7). Draw a line 2-7/16 in. from the face of the cabinet to locate the hinge plate screws. Drill 35-mm x 1/2-in.-deep recesses in the doors with the Forstner bit at each hinge location (Photo 8). Practice on a scrap of wood first to gauge how deep to drill. Mount the hinges (Photo 9).

Test-fit the doors by clipping the hinges to the plates. You should be able to adjust the hinges until the doors fit perfectly. If not, you may have to plane or sand the door edges a bit. When you're happy with the fit, remove the hinges and plates so that you can paint the cabinet and doors before you install the glass panels and shelves.

8 **Drill concealed-hinge mounting holes.** Mark the hinge hole locations. Use an awl or nail to make a starting point for the Forstner bit. Drill recesses for the hinges in both doors.

9 **Mount the hinges on the doors.** Press the hinges into the 35-mm recesses and line them up so that the screw holes are parallel to the edge of the door. Attach the hinges with the screws provided.

10 **Install the glass.** After the paint dries, set the glass panels in the rabbet and apply a small, neat bead of clear silicone around the perimeter. Let the silicone cure overnight before mounting the doors.

11 **Install the cabinet and shelves.** Set the cabinet in the wall and level it. Then attach it with screws driven into the shelf support holes. Finish the project by clipping the doors to the hinge plates and installing the glass shelves. Use the hinge adjusting screws to adjust the doors until the space between them and the cabinet is even.

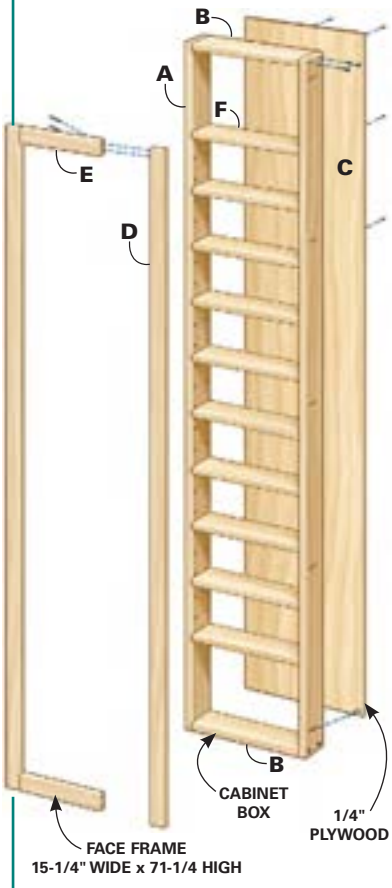
Install the glass and mount the cabinet

When the paint or other finish is completely dry, you can install the glass. Set the glass into the recess and apply a neat bead of clear silicone around the perimeter to hold it in place (Photo 10). Make sure to cut the tip of the caulk tube carefully to leave an opening about the size of a 6d finish nail. Let the caulk cure before you reinstall the doors. If you need to replace the glass, just slice the silicone bead with a utility knife.

Mount the cabinet in the wall (Photo 11). Then install the doors by clipping on the hinges. Finish by adjusting the hinges until the spaces between the doors and the cabinets are equal. Then install the glass shelves. We used nickel "spoon"-type shelf supports. To keep the shelves from slipping, we stuck clear vinly door bumpers to the top of each shelf support.

Figure A

Basic built-in cabinet



Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	2	3/4" x 3-1/2" x 70" sides
B	2	3/4" x 3-1/2" x 12-1/2" top and bottom
C	1	1/4" x 14" x 70" plywood back
D	2	3/4" x 1-1/2" x 71-1/4" face frame stiles
E	2	3/4" x 1-1/2" x 12-1/4" face frame rails
F	10	3/4" x 3-1/2" x 12-3/8" shelves

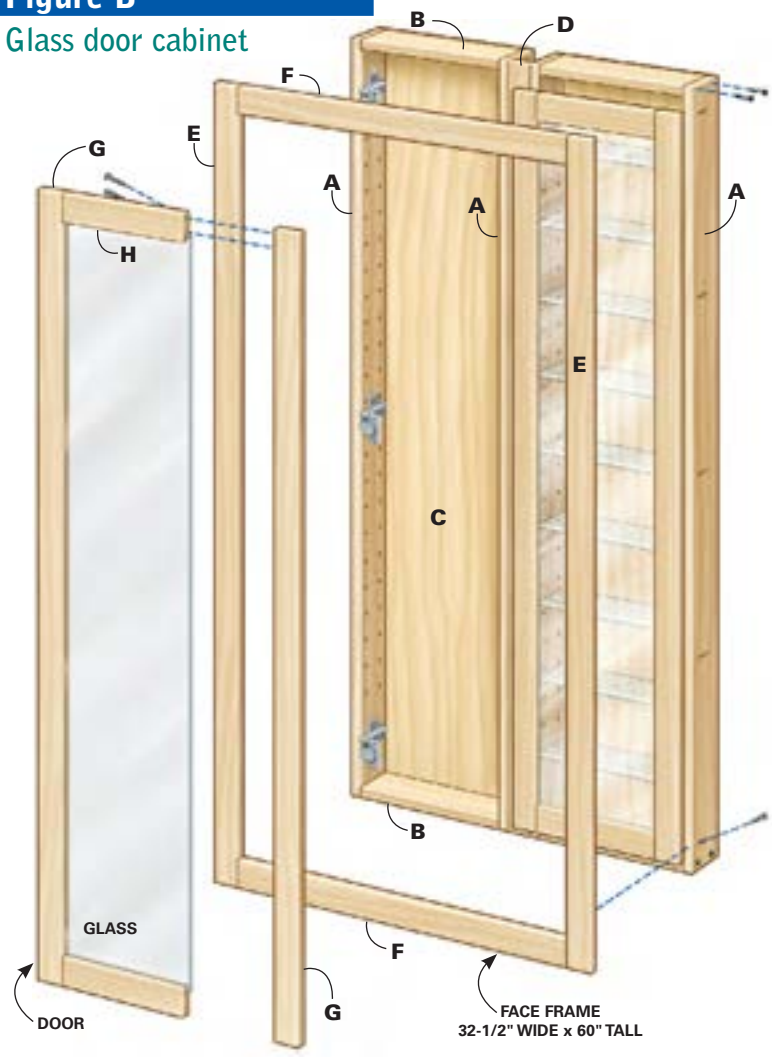
Materials list

QTY.	ITEM
2	1x2 x 8' paint or stain grade lumber
3	1x4 x 8' paint or stain grade lumber
1	2' x 8' x 1/4" plywood
Hardware	
40	1/4" shelf supports
12	1-1/2" wood screws
16	1-1/4" pocket hole screws
1	Small package No. 16 x 1" wire nails

You'll be surprised how much stuff fits in these shallow cabinets.

Figure B

Glass door cabinet



Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	4	3/4" x 3-1/2" x 57-1/2" sides
B	4	3/4" x 3-1/2" x 12-1/2" tops and bottoms
C	2	1/4" x 14" x 57-1/2" plywood backs
D	1	1/2" x 2" x 57-1/2" mull
E	2	3/4" x 2" x 60" face frame stiles*
F	2	3/4" x 2" x 28-1/2" face frame rails*
G	4	3/4" x 2" x 55-7/8" door stiles*
H	4	3/4" x 2" x 10-1/16" door rails*

**Cut to fit*

Materials list

QTY.	ITEM
1	1/2"x2" x 6' paint or stain grade lumber
2	1x2 x 8' paint or stain grade lumber
3	1x4 x 8' paint or stain grade lumber
1	2' x 8' x 1/4" plywood
Hardware	
6	Blum 110-degree clip top hinge (71B3750)*
6	Blum hinge mounting plates (B175H710)*
72	1/4" shelf supports
76	5/16" clear door bumpers
40	1-1/4" pocket hole screws
16	1-1/2" wood screws
1	Small package No. 16 x 1" wire nails

**Available online*

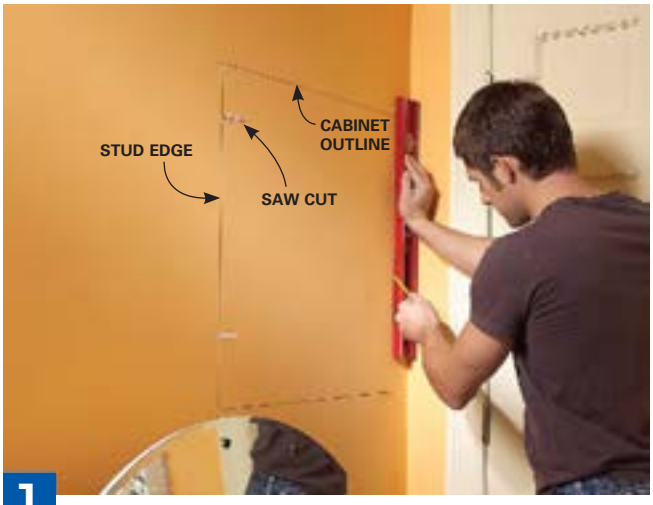
Glass	
2	Glass for doors: Measure rabbet recess and subtract 1/8" (check local codes regarding the need for safety glass)
18	Glass shelves: Measure width and subtract 1/8"

Behind-the-door medicine cabinet

The biggest challenge of installing a recessed cabinet is finding unobstructed stud cavities in an open wall. The wall behind the door is usually open, but make sure that pipes, ducts and wiring don't get in the way. To choose the location for the cabinet, begin by finding the studs with a stud finder. Hold the cabinet to the wall at the best height and mark the cabinet near one side of a stud. Find the exact location of that stud by sawing through the drywall until the blade is stopped (Photo 1). Use the cuts to define one cabinet side, and draw the cabinet outline.

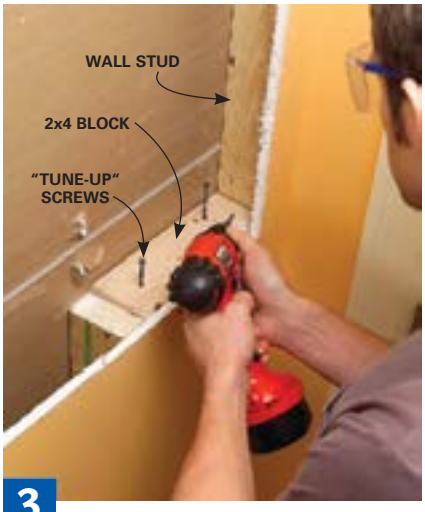
Cut out the drywall and then cut off the exposed stud (Photo 2). Add the framing, then screw the cabinet to the framing (Photo 5). Add trim around the edges if necessary to conceal the rough drywall edges.

TIP:
Before you cut a full-size hole in the wall, cut a 6 x 6-in. hole and shine a flashlight inside to check for obstructions.



1 Outline the inset medicine chest to fall against a stud on one side and cut out the opening with a drywall saw.

2 Cut the intermediate stud flush with the drywall on the back side. Push it sideways to release the drywall screws on the back side and remove the stud.



3 Screw blocking to adjacent studs at the top and bottom of the opening. Drive temporary "tune-up" screws into the block to help position it.

4 Cut and tap in vertical backing flush with the drywall edge, then toe-screw it to the blocking.

5 Slip the cabinet into the opening and anchor it with pairs of 2-in. screws. Add trim if needed.

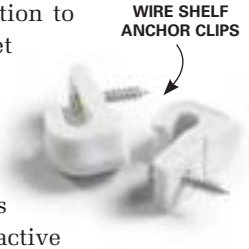
Easy bathroom storage tips

His-and-hers shower shelves

If you need more than shampoo and a bar of soap in the shower, here's how to provide space for all your vital beauty potions: Get a couple of those shelves that are designed to hang from a shower arm and hang them on cabinet knobs. Use No. 8-32 hanger screws to screw the knobs into studs or drywall anchors.

Swinging trash

Here's a space-saving solution to the bathroom wastebasket problem. Screw wire shelf anchor clips to the inside of the door and hook the lip of a small wastebasket right on the hooks. It's easy to use, it hides unattractive trash, and it frees up precious bathroom floor space.



Free space for an extra towel bar

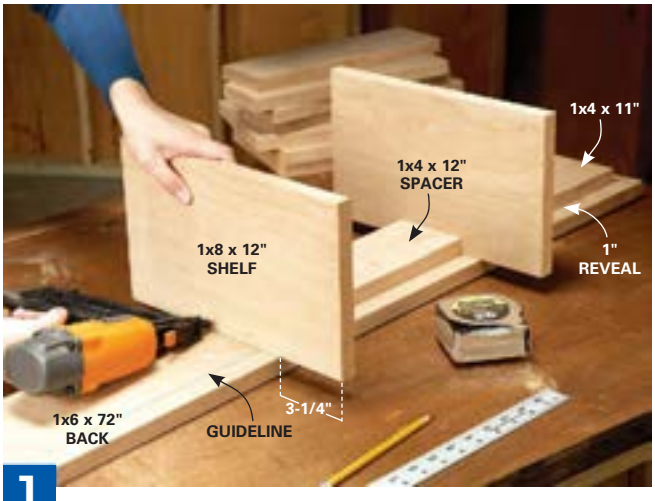
It seems like you never have enough wall space to put hooks or towel bars in your bathroom, so why not make your shower walls do double duty? Hang two shower curtain rods instead of one. Hang your shower curtain on the inside rod and use the second rod to hang towels. Plus, you can towel off in the shower—no more dripping your way to the towel bar.

Bathroom shelving unit

In a small bathroom, every single square inch counts. These shelves make the most of wall space by going vertical. The version shown here, made of cherry, cost about $100. But you can build one for less if you choose a more economical wood like oak or pine. All you need is a 6-ft. 1x4, a 6-ft. 1x6 and a 6-ft. 1x8.

Cut the middle spacers and the shelves 12 in. long. Cut the bottom spacer 11 in. long to allow for a decorative 1-in. reveal. Cut the top spacer to fit (the one shown was 7-1/4 in.). Measure 1 in. from one edge of the backboard and draw a guideline for the shelves and spacers along its length. Nail the bottom spacer in place, leaving a 1-in. reveal at the bottom edge. Center the first shelf by measuring 3-1/4 in. in from the edge of the backboard and nail it in place. Work your way up the backboard, alternating between spacers and shelves (Photo 1).

On the back side, use a 1/8-in. countersink bit to drill two holes, one at the top and one at the bottom of each spacer. Drill two holes spaced 1 in. from each side of the backboard into each shelf ledge. Drive 1-1/4-in. drywall screws into each hole (Photo 2). Paint or stain the assembled unit. If you'd like to clearcoat it, use a wipe-on poly or spray lacquer—using a brush would be really tough. Mount the unit on the wall with two 2-1/2-in. screws and screw-in drywall anchors. Drive the screws where they won't be seen: right below the bottom shelf and right above the top shelf.



1 Nail the spacers and shelves in place, starting at the bottom and working your way up. Place the bottom spacer 1 in. from the lower edge of the backboard.

2 Strengthen the shelves by driving screws through the backboard into the shelves and spacers. Drill screw holes with a countersink bit.

Kitchen rollouts

If you're tired of digging through cans and boxes to find a jar of tomato sauce hidden at the back of the cabinet, these rollout bins are the perfect solution. You can size them to fit inside any lower cabinet and customize them to suit the items you want to store.

Here you'll learn exactly how to build them. The bins are simply plywood boxes with adjustable shelves—very easy to build. Sizing the boxes and mounting them on drawer slides can be tricky, but the techniques shown here make those steps nearly foolproof.

Money, time and tools

All the materials for these three rollouts cost around $100. You could buy and install a manufactured system, but expect to spend more than twice as much.

You don't need advanced cabinet-building skills or tools to make your own rollouts—the joinery and assembly are simple. But a table saw is almost mandatory for fast, accurate, good-looking results. A pneumatic brad nailer will make the job faster and easier, although you can hand-nail or screw the parts together. Ordinarily, the side-mount drawer slides are tricky to install, but this project makes even that step foolproof, so don't let that part intimidate you. You'll be surprised how fast you can build yourself a few rollouts. Put in a full day and you'll be loading them with groceries that evening.

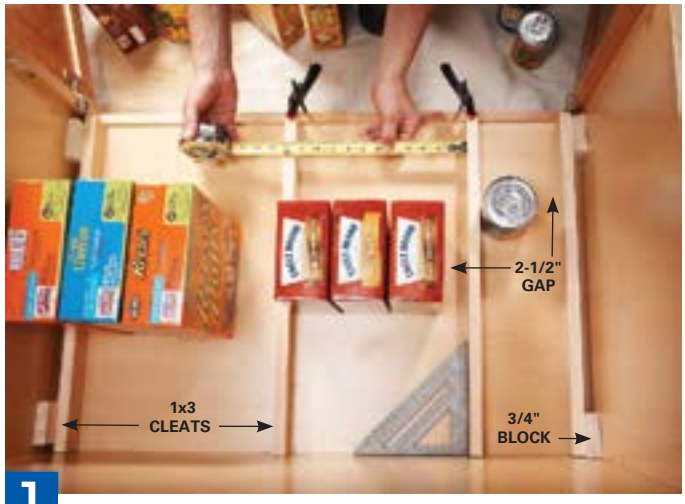
Sizing your rollouts

Everything you need for this project is available at home centers. You'll have to guess at the quantity of rollouts at this point so you can buy the proper number of drawer slides. One sheet of plywood will provide enough material for at least four rollouts. You can roughly figure one rollout for every foot of open base cabinet space you have. You can always return any uncut lumber or hardware you don't use.

To determine the width of your rollouts, gather the items you want to store. Cut the 1x3 cleats to length and space them from each side of the cabinet with 3/4-in. blocks (Photo 1). That space allows the rollouts to clear

Get more storage space—without remodeling

Lower cabinets offer the biggest storage spaces in most kitchens. But according to kitchen designers, the back half of this space is usually wasted—it's packed with long-forgotten junk or left unused because stored items are out of view and hard to reach. Rollout bins let you see and use the whole space.



1 Plan rollout widths by laying out the cleats along with the items you want to store. Space the end cleats with 3/4-in. blocks.

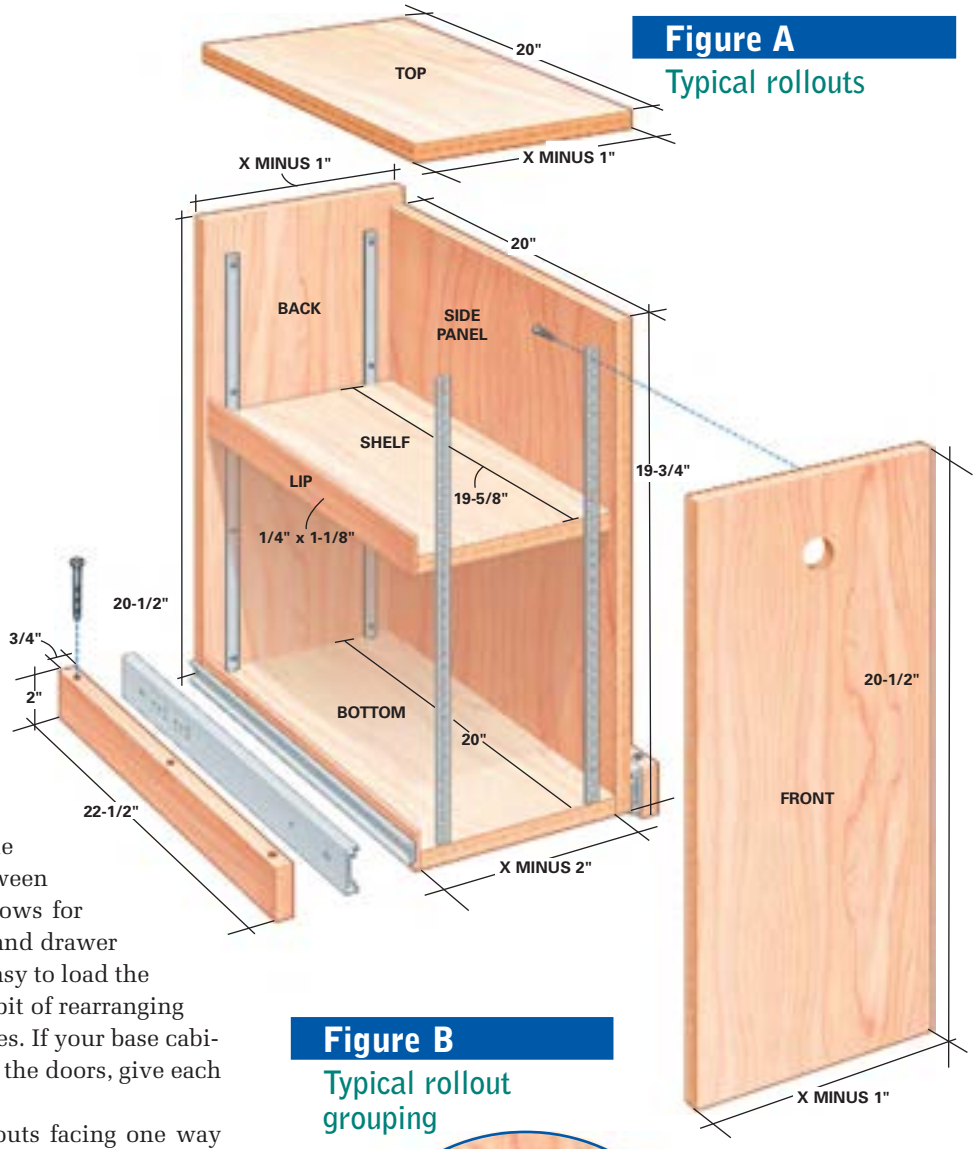
2 Assemble the boxes by gluing and nailing the front, top, back and bottom to the side panel and to each other. Nail the lip to the bottom shelf before assembling.

3 Drill 1-1/4-in.-diameter finger pull holes. Clamp a block against the back side to prevent splintering inside.

Materials list

QTY.	ITEM
1	1x3 the width of the cabinet (hold-down rail)
2'	1x3 (drawer slide cleats)
8'	1/4-in. x 1-1/8-in. mullion (base and shelf front lips)
4	2' shelf standards with clips
1 pair	90-lb.-rated full-extension side-mount drawer slides
1-1/2-in. pneumatic air nailer brads	
Wood glue	
Small box of 3-in. screws	
1-1/4-in. Forstner drill bit (for drilling finger pulls)	

Figure A
Typical rollouts



the doors and hinges later. Then start arranging the items you want to store, separating them with the cleats. Leave at least 2-1/2 in. between your items and the cleats. This allows for the clearance of wood thicknesses and drawer slides and 1/2 in. extra to make it easy to load the items and take them out. It takes a bit of rearranging and thought to arrive at the best sizes. If your base cabinets have vertical dividers between the doors, give each opening its own rollouts.

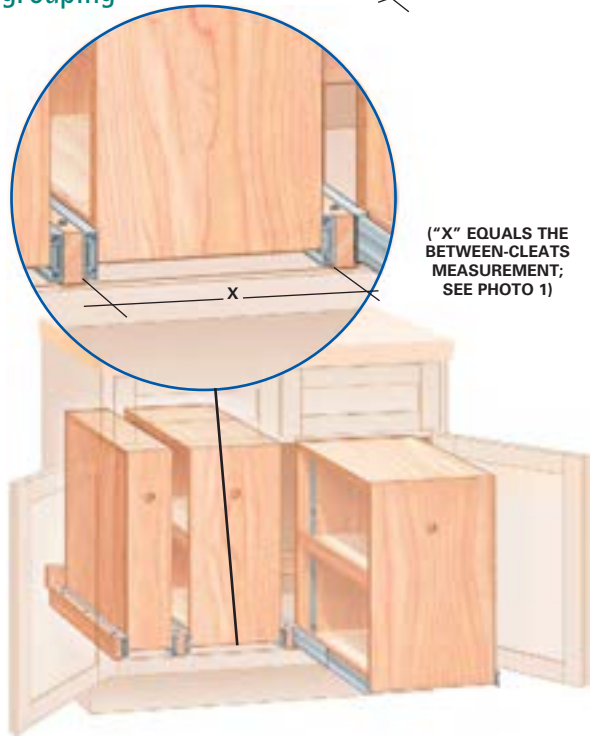
You'll probably have some rollouts facing one way and some the other. That's because rollout access may be blocked by neighboring cabinets at inside corners or because some cabinet doors don't swing all the way open. Determine the access direction while you assemble your rollouts. That's as simple as drilling the finger pull hole at the proper end. After the boxes are assembled, they'll work for either orientation.

Choosing the materials

Choose any 3/4-in. veneered interior plywood for your rollouts. Avoid construction plywood; it won't be as flat and may warp later. If you'd like your rollouts to match your cabinets, choose whatever type of wood does the job. The plywood end grain is sanded on these, but if you'd like a more polished look, buy iron-on edge banding to match the wood type and iron it on after assembling the boxes.

Buy nice, straight, knot-free 1x3s for the cleats—the wood type doesn't matter. Select 22-in. European side-mount drawer slides rated to support 90 lbs. They'll come with their own screws and installation directions that show you how they work.

Figure B
Typical rollout grouping



Cutting the parts

Most base cabinets are 22-1/2 in. deep and have a 21-in.-high opening (measured inside the face frame, not the cabinet interior). If your cabinets match these measurements, use the height and width dimensions shown in Figure A for all of the side panels. Also use Figure A for the lengths of each top, bottom, front and back panel and shelves. If your cabinets have shorter openings or are shallower, subtract those differences from the Figure A measurements to cut your parts. Calculate the rollout widths based on your layout work inside the cabinet (Photo 1). Subtract 1 in. from the distances between the cleats to get the width for each rollout's top, front and back panel. That'll leave the 1-in. clearance needed for the drawer slides. Subtract 2 in. to establish the width for each bottom panel and the adjustable shelves. That'll leave an additional 1-in. clearance for the thickness of the 3/4-in. side panel and the 1/4-in.-thick lip in the front.

Be especially careful when you lay out the cleats, measure openings and cut the rollout parts. European side-mount drawer slides leave very little room for error. It's best to use a table saw for all of the cuts and to double-check widths and lengths so the boxes will fit together perfectly and engage and operate smoothly in the slides.

Assemble the rollout boxes

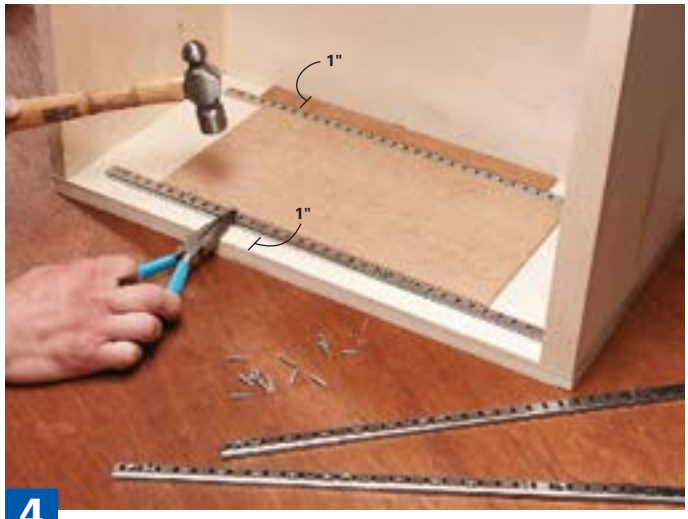
Glue and nail the lip on each bottom panel (and shelves) before assembling the rollouts. A thin bead of wood glue on each edge is all you need. Then hold the edges of each panel flush while you pin them together with 1-1/2-in. brads spaced about every 4 in. (Photo 2). Next, drill the 1-1/4-in.-diameter finger pull hole. A Forstner bit will make the neatest hole, but a sharp spade bit will work, provided you use a block on the back side to prevent splintering (Photo 3). The hole defines each rollout's open side.

Cut the 24-in.-long shelf standards down to 18 in. with a hacksaw. Look at the embossed shelf numbers to determine which end is the top and cut from that end. Nail the standards in place with the brads provided (Photo 4).

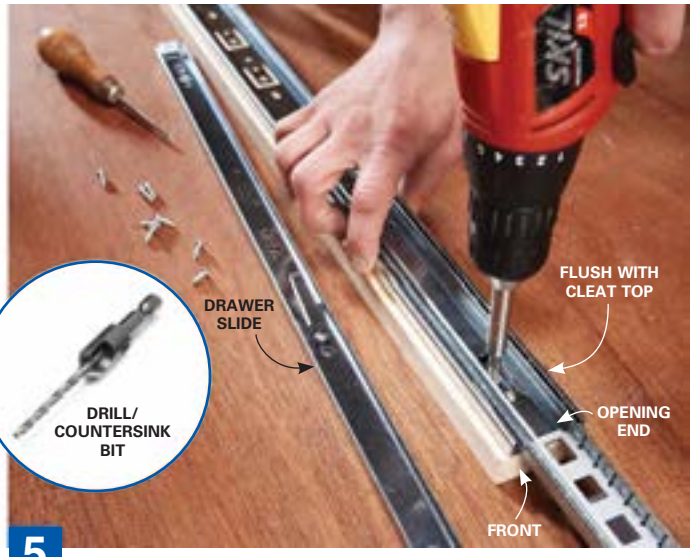
This is the best time to apply the finish of your choice to the rollouts. Lightly sand everything with 220-grit sandpaper and add the finish. These boxes have two coats of water-based polyurethane to protect the wood against dirty fingers and marks from cans.

Install the drawer slides and cleats

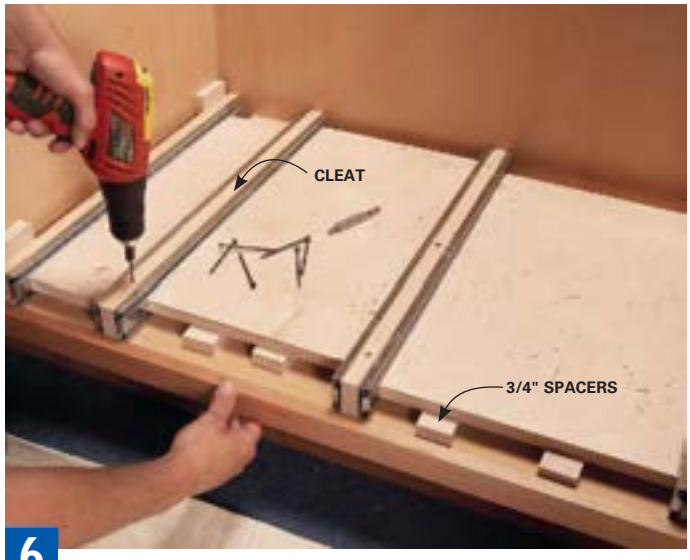
Rip the 1x3s down to 2 in. and then screw on the drawer slides (Photo 5). It's easiest to remove the drawer part of the slide to access the anchor holes. Hold the slides flush with the top and front of each cleat while you punch little starter holes with a scratch awl, and then send in the screws. Drive just one screw at a time so you can adjust



4 Nail shelf standards to the inside of the front and back of each box. Use spacers to position them.

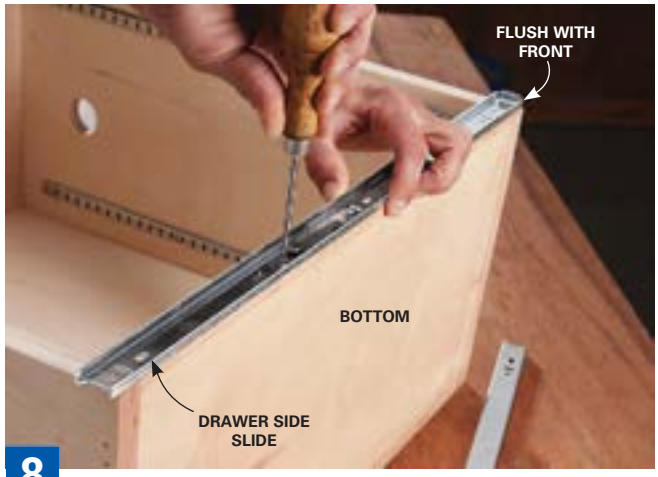


5 Screw the drawer slides to the cleats. Position each slide flush with the front and top of the cleat.



6 Predrill and screw the cleats to the cabinet. Use plywood scraps the same width as the boxes for perfect spacing.

7 Screw the hold-down rail to the cabinet back directly above the cleats with 1-5/8-in. screws.



8 Release the drawer slides from the cleat slides and screw them to the side of each box flush with the bottom and the front.

the placement as you add screws. You'll need right and left sides for the end cleats. Then remove the drawer side slides and lay the cleats in the cabinet.

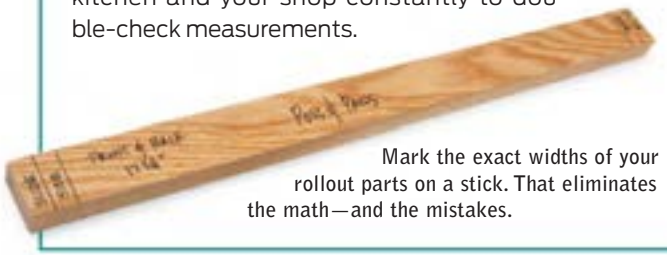
Begin with one of the end cleats and press it against the temporary 3/4-in. blocks while you drill three 1/8-in. pilot holes. A combination drill/countersink bit works great for this. Then screw the cleat to the cabinet floor with 3-in. screws (Photo 6). Space the next cleat with a leftover scrap from the first rollout top, front or back. That way the spacing between the drawer slides will be perfectly sized for smoothly operating rollouts. Hold the spacer up from the cabinet floor with 3/4-in. blocks so it'll be centered on the drawer slides. Hold the cleat snug, but not tight, against the spacer while you drill and then screw it to the cabinet floor. Repeat that step with the rest of the cleats. Skip the 3/4-in. blocks on the last cleat and just use the rollout spacer. Screw a 1x3 "hold-down" rail to the back side of the cabinet (Photo 7). It'll help hold the rollout cleats in place when you pull out heavily loaded rollouts.

Finally, disengage the drawer side slides and screw them to the bottom of each rollout flush with the bottom and front (Photo 8). Finish up by inserting each rollout, then load them up!

9 Slip the box-mounted slides into the cleat slides and push the box all the way in to fully engage the slides.

Avoid mistakes with a story stick

The most obvious way to size rollout parts is to measure the opening of the cabinet and then do the math. But that's a recipe for mistakes because it's easy to forget to subtract one of the components (like the width of the slides or the drawers) from the overall measurement. So try this: Forget the math and mark your measurements on a piece of scrap wood. It's a great visual aid that helps you prevent mistakes and having to walk between your kitchen and your shop constantly to double-check measurements.



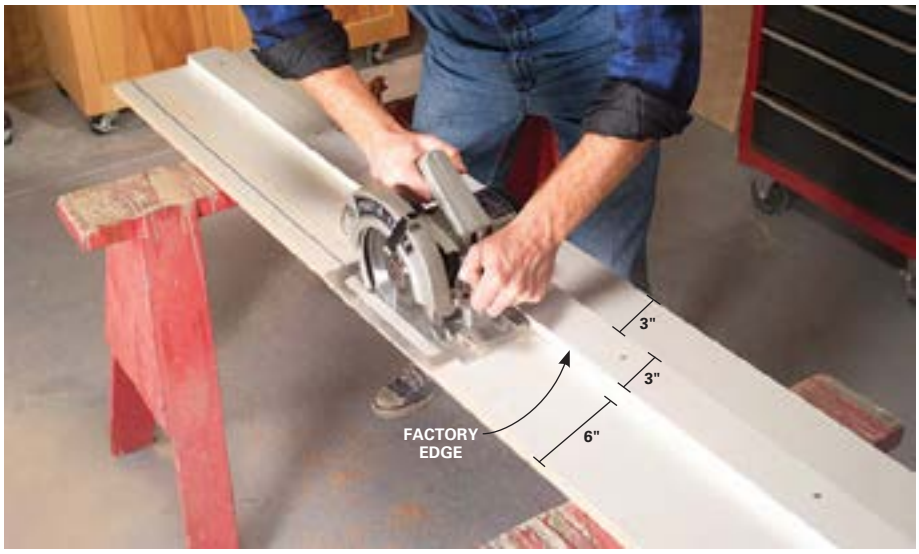
Mark the exact widths of your rollout parts on a stick. That eliminates the math—and the mistakes.

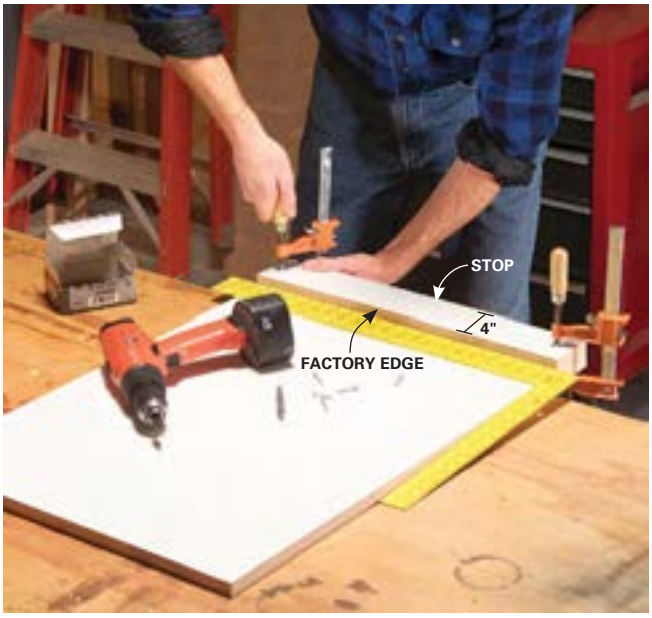
How to make rollouts with a circular saw

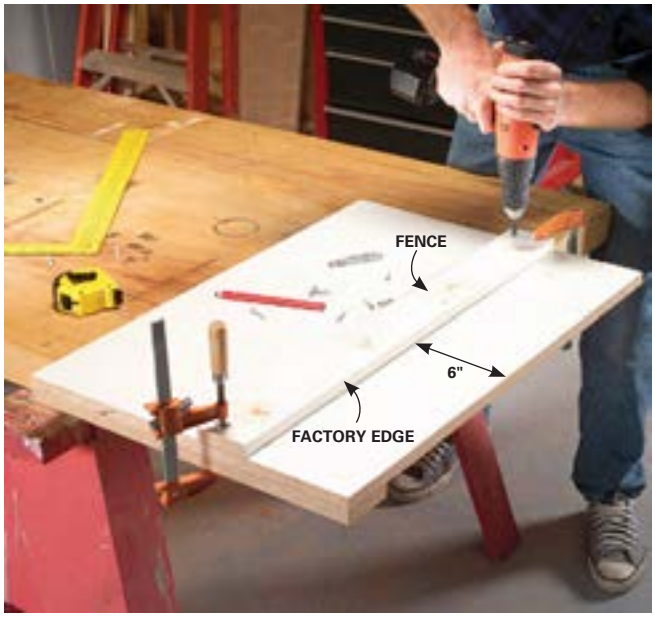
If you have a full-size table saw, great—you'll be able to use it for most of the plywood cuts. If you have a portable table saw, use it for the smaller ripping jobs like making the shelving and drawer parts. But you can also do a fine job with only a circular saw fitted with a plywood blade and a couple of simple, screw-together jigs made from cheap melamine closet shelving stock.

Ripping jig

Use an 8-ft. length of 16-in.-wide shelving to build the ripping jig. Draw a line 3 in. from the edge and cut along it with the circular saw. Screw this piece to the larger piece about 3 in. away from one edge with the factory edge facing the widest section of shelving as shown. Then use that edge as a guide to cut off the melamine. Now it's just a matter of lining up that edge with marks on plywood stock and clamping it to make perfect cuts up to 8 ft. long on any piece of plywood.







Crosscutting jig

You can use the ripping jig for crosscutting, too, but this crosscutting jig has the advantage of a stop on the bottom. Push the stop against the plywood, align it with the cutting mark and clamp for quick, accurate crosscuts. Make it from a 4-ft. length of 24-in.-wide melamine shelving (or plywood if wide shelving isn't available). Cut a 4-in.-wide strip for the stop from one end and another 4-in.-wide strip from one edge for the fence. Align the factory edge of the short piece with the factory edge at the other end of the shelving to make the stop. Then clamp and screw the two pieces together while checking alignment with a carpenter's square. Flip the jig over and measure from the long factory edge 6 in. to position and screw the long saw guide as shown. The key with both jigs is to use the straight factory edges for guiding the saw.

Installing cabinets

Kitchen cabinets aren't cheap, and while you shouldn't be afraid to install them, you don't want to screw them up, either. We asked Jerome Worm, an experienced installer, to show you what it takes to install basic box cabinets successfully. His tips can save you time and help you avoid costly mistakes on your next installation.

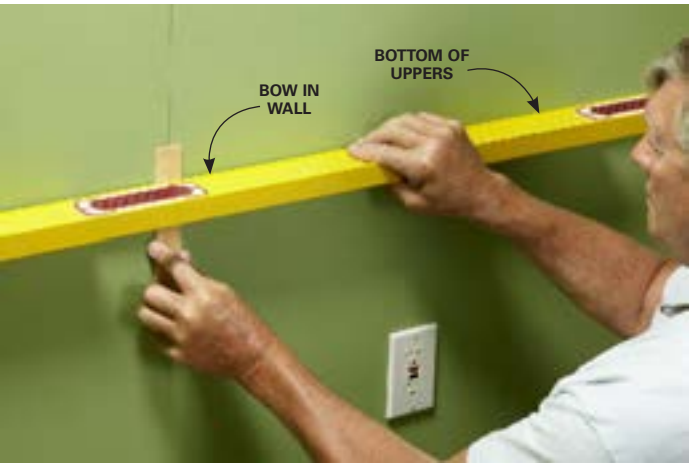
Jerome Worm has installed cabinets in hundreds of kitchens. These days, he can hang them in his sleep. Here are some of his best tips.

Mark up the wall first

Every good cabinet installation starts with a good layout. Jerome calls it "blueprinting" the wall. Here's how to do it: Measure from the highest point in the floor (see "Raise the Cabinets for Flooring," p. 37), and draw a level line marking the top of the base cabinets. Measure up 19-1/2 in. from that line and draw another line for the bottom of the upper cabinets. Label the location of the cabinets and appliances on the wall. Draw a vertical line to line up the edge of the first cabinet to be installed. Finally, mark the stud locations.

Remove the doors and drawers

Removing shelves, doors and drawers makes installation easier and prevents damage. Mark the location of the doors on painter's tape, and make a pencil mark at the top of the hinges so you have a good starting point when you reinstall them. Remember that many upper cabinets have no designated top or bottom. They can be hung either direction depending on which way you want the doors to swing. So decide that before you mark the hinges.



Shim extreme bows

Most of the time you can shim the cabinets as you go, but if there's an extreme bow in the wall (more than 3/8 in.), shim it out before you hang the cabinet. If you don't, you may accidentally pull the back off the cabinet while fastening it into place. Hold a level across the wall, and slide a shim up from the bottom (go in from the top when you're doing the top side) until it's snug. Then pin or tape it into place.

Start with the upper cabinets

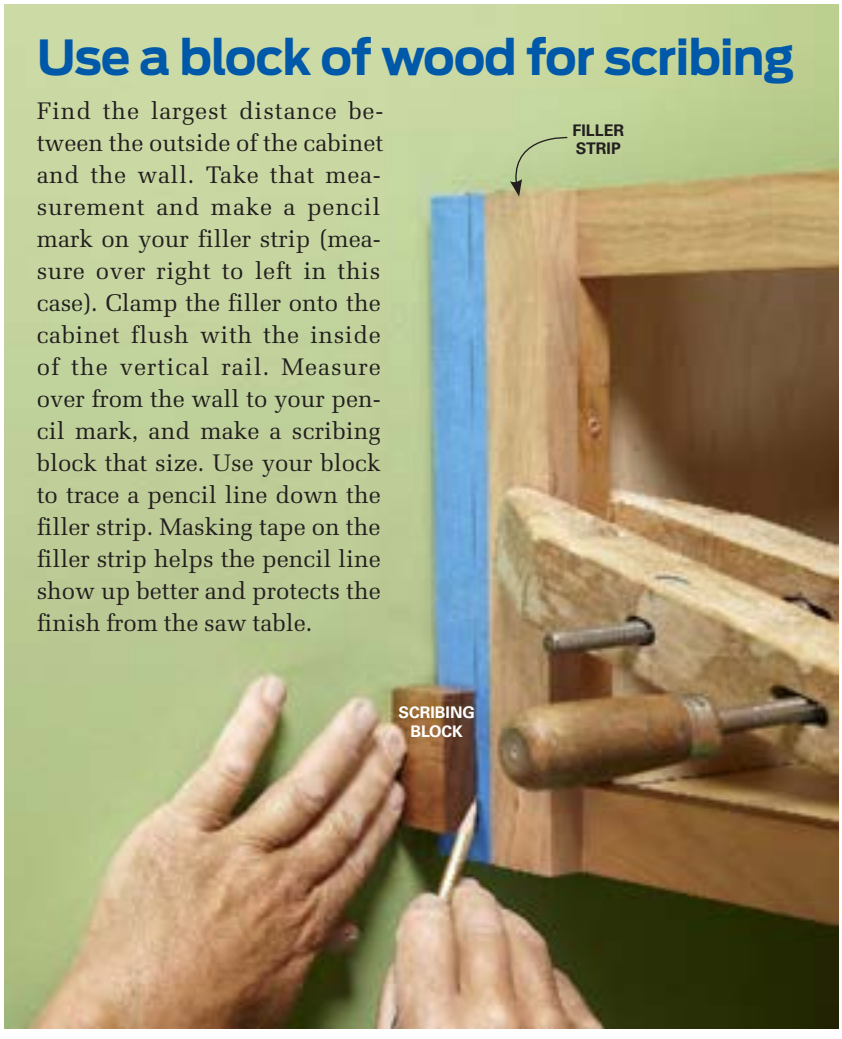
It's easier to hang the uppers when you're not leaning way over the base cabinets. Rest the uppers on a ledger board—it'll ensure a nice, straight alignment and eliminate the frustration of holding the cabinets in place while screwing them to the wall.

Clamp, drill and fasten

When connecting two cabinets to each other, line up the face frames and clamp them together. Both cabinets should be fastened to the wall at this point, but you may have to loosen one cabinet or the other to get the frames to line up perfectly. Jerome prefers hand-screw clamps because they don't flex, and less flex means a tighter grip. Predrill a 1/8-in. hole before screwing them together with a 2-1/2-in. screw. Choose the less noticeable cabinet of the two for drilling and placing the screw head.

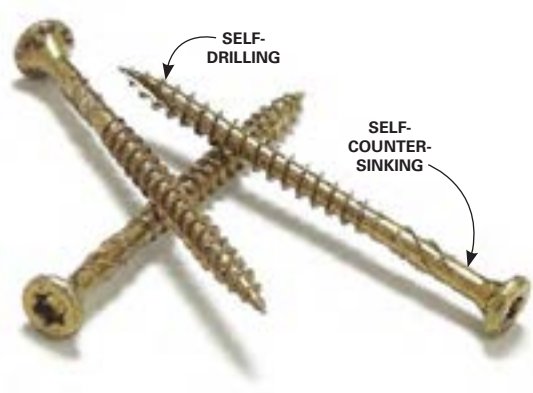
Use a block of wood for scribing

Find the largest distance between the outside of the cabinet and the wall. Take that measurement and make a pencil mark on your filler strip (measure over right to left in this case). Clamp the filler onto the cabinet flush with the inside of the vertical rail. Measure over from the wall to your pencil mark, and make a scribing block that size. Use your block to trace a pencil line down the filler strip. Masking tape on the filler strip helps the pencil line show up better and protects the finish from the saw table.



Mark the stud locations on upper cabinets

Jerome prefers to predrill the screw holes from the inside of the cabinet so the drill bit doesn't "blow out" the wood on the inside where it can be seen. Do this by marking the stud locations on the inside of the cabinet and drilling pilot holes. Start by finding the distance from the wall or adjacent cabinet to the center of the next stud. For 1/2-in.-thick cabinet walls, subtract 7/8 in. from that measurement, and measure over that distance from the inside of the cabinet. Make a pencil mark on both the top and the bottom nailing strip. The outside of the cabinet walls are not flush with the rest of the cabinet; that 7/8 in. represents the thickness of the cabinet wall and the distance the walls are recessed.



Use good screws

Jerome prefers GRK's R4 self-countersinking screw, which he calls "the Cadillac of screws." You'll pay accordingly, but why scrimp on screws when you're spending thousands of dollars on cabinets? Whatever you do, don't use drywall screws—they'll just snap off and you'll end up with an extra hole. You'll find them at lumberyards or online.

Fasten the back, then shim

Line up the base cabinets with the level line on the wall. Fasten the back of the cabinets to that line. Once the backs of the cabinets are level, use shims to level the sides. Take your time on this step—nobody likes to have eggs roll off a slanted countertop.

Use 2x2s to secure cabinets to the floor

Cabinets that make up islands and peninsulas need to be secured to the floor. Join the island cabinets and set them in place. Trace an outline of the cabinets on the floor. Screw 2x2s to the floor 1/2 in. on the inside of the line to account for the thickness of the cabinets. Anchor the island cabinets to the 2x2s with screws. If needed, place flooring blocks under the 2x2s.

Raise the cabinets for flooring

If the kitchen flooring is going to be hardwood or tile, and you're installing it after the cabinets, you'll have to raise the cabinets off the floor or the dishwasher won't fit under the countertop. Use blocks to represent the finished floor height, and add those distances to the guide line for the base cabinet tops. Hold the blocks back a bit from the front so the flooring can tuck underneath. Your flooring guys will love you for this.

Cut oversize holes

Cutting exact size holes for water lines and drainpipes might impress your wife or customer, but such precision is likely to result in unnecessary headaches for you. Cutting larger holes makes it easier to slide the cabinet into place and provides wiggle room for minor adjustments. No one's going to notice the oversize holes once the cabinet is filled with dish soaps, scrubbers and recycling bins.

Open glass shelves

Attractive glass shelves for storage and display

Converting a few of your wall cabinets to open shelving is a great way to create display space for dishes or to keep cookbooks and cooking supplies within easy reach. Anyone handy with a paintbrush can complete this project in a leisurely weekend. Don't forget to order the glass shelves about a week before you need them.

You'll need a screwdriver, hammer and tape measure as well as basic painting equipment like a paintbrush, putty knife, masking tape and sandpaper or a sanding sponge. Use a drill with a 9/32-in. bit to drill holes for the metal sleeves (Photo 3).

Some cabinets are easy to convert by simply removing the doors and ordering glass shelves. Others may require a little carpentry work, like removing a fixed shelf. Take a close look inside the cabinet to see whether there are hidden challenges. If it looks good, remove the doors and carefully measure for shelves. Measure from one side of the cabinet to the other and from front to back. Deduct 1/8 in. from these measurements to arrive at the glass size. Search online for "Glass" to find a company that will cut the glass and polish all of the edges. Cut the glass about 1/8 in. narrower than the opening. Ask the glass supplier what thickness you need for strength and safety. Longer spans require thicker glass.

While you're waiting for the glass to arrive, paint the cabinet interiors. Choose a color that matches or complements a floor or wall color. Preparation is the key to a long-lasting, perfectly smooth paint job. Photos 1 and 2 show the painting steps. If you're painting over melamine or another hard, shiny surface, make sure to thoroughly roughen the surface with 80-grit sandpaper and prime with shellac before brushing or spraying on the coats of paint.

Photo 3 shows the hardware used to support the glass shelves. If you don't have holes for the shelf pins, use a tape measure and square to mark the hole locations and bore 9/32-in. holes to accept the metal reinforcing sleeves.

1 Remove the cabinet doors and hinges. Fill all extra shelf bracket or hinge holes with a hardening-type wood filler. Allow this to harden, sand it smooth and apply a coat of lightweight surfacing compound to fill low spots left after the wood filler shrinks. Let the second coat dry. Then sand the entire cabinet interior with 80-grit sandpaper to provide a rough surface for the paint to grab.

2 Use masking tape to protect unpainted areas. Prime the interior with white pigmented shellac or other high-quality primer to keep the filler from showing through and to provide a binder for the final coats of paint. Sand the primer lightly with a fine sanding sponge after it dries. Remove the dust with a vacuum cleaner and brush on the final coats of paint.

3 Support glass shelves with metal shelf pins inserted into holes drilled in the cabinet sides. To prevent the pins from enlarging the holes, drill 9/32-in. holes and tap in metal sleeves. Then insert the metal shelf support pins in the sleeves and apply a self-adhesive round rubber pad to each pin to keep the glass shelves from sliding off.

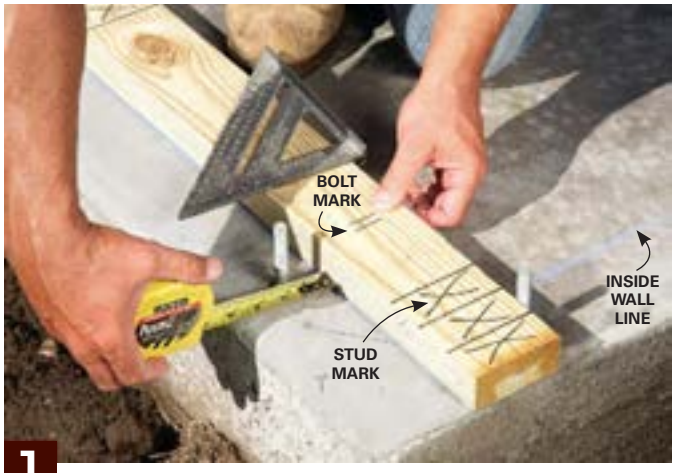
CHAPTER

3 Outdoor Storage

Garden shed

If you're a gardener, you'll love this 12 x 16-ft. shed. (And even if you don't garden, I bet you could put all this space to work.) There's plenty of room for all your tools and a planting bench under the windows. You can easily drive your riding mower through the huge sliding doors, or just open them wide for plenty of light and ventilation. Dormer windows provide overhead light, and a bank of end wall windows opens for even more fresh air. To reduce maintenance, we used solid PVC to trim the shed and build the sliding doors, and we covered the walls with fiber cement siding. The custom-size aluminum combination windows won't require anything but occasional cleaning.

In this article, we'll show you the basics of how to build the shed and the sliding doors. For more wall and roof framing details and information on building the sliding doors, go to familyhandyman.com/2011shed.



1 **Prepare the wall plates.** Measure from the chalk line to the center of the bolt and transfer this measurement to the plate to mark for drilling the bolt holes.

Money, time and tools

You can find most of the materials for this shed at home centers or lumberyards. However, the solid PVC trim boards may have to be special-ordered. We spent about $4,800 on the materials for this shed (not including the concrete slab), and the PVC trim accounts for a big chunk of that cost. If you substitute wood or composite trim, you could save about $1,000.

To build this shed, you'll need standard carpentry tools, including a circular saw and drill. A framing nail gun, miter saw and table saw will save you some time and effort but aren't necessary. We used a special Ridgid dust-collecting saw to cut the fiber cement siding, but a circular saw will also work–just wear a good dust mask.

If you've built a deck or other large construction project, you shouldn't have any trouble with this shed. The framing is straightforward, and with a few helpers you should be able to get the shell up in a weekend. Then expect to spend three or four busy weekends completing the project.

Getting started

In most areas, you'll need a building permit for a shed of this size. Check with your local building department to find out what's required. You'll probably have to locate the side and back lot lines so you can mark the spot for the new shed. For this you'll need a survey or plot plan. Ask at city hall—there may be a plot plan on file. To avoid delays, start this process at least a month before you plan to build. After the plans are approved, take them, along with a materials list, to the lumberyard or home center to order materials and work out a delivery schedule.

When you've staked out the location of the shed on your lot, you're ready to pour the concrete slab. We hired a contractor for this, but if you want to do it yourself, go to familyhandyman.com and search for "concrete slab" for complete instructions. A few days before you plan to dig, call 811 for instructions on how to locate buried utility lines.

2 **Build a wall, stand it and build another.** Frame the long walls first while the slab is wide open. When you stand and brace them, tilt them slightly outward. That gives you a little extra room when you stand the shorter walls.

Long-lasting and low-maintenance

We chose exterior materials that'll keep this shed looking great for decades. First, we covered the walls with 4 x 8 sheets of 5/16-in.-thick fiber cement. If you plan ahead, you can order this James Hardie stucco-look HardiePanel prefinished. We chose to paint ours on-site. Fiber cement is known for its superior paint-holding ability, so we expect the paint job to last a long time.

All the exterior trim, as well as the door frames, are solid PVC by Azek. The 18-ft. lengths mean you don't have to splice the fascia boards. And you don't have to search through the lumber for straight, good-looking pieces—all of it is straight and good looking. PVC trim is a little spendy, but you'll never have to replace it.

3 **Plumb and brace the walls.** Check for plumb with a long level at the corner. Push or pull the wall until it's plumb. Then nail on a diagonal brace to hold the wall plumb until the sheathing is installed.

Build the walls

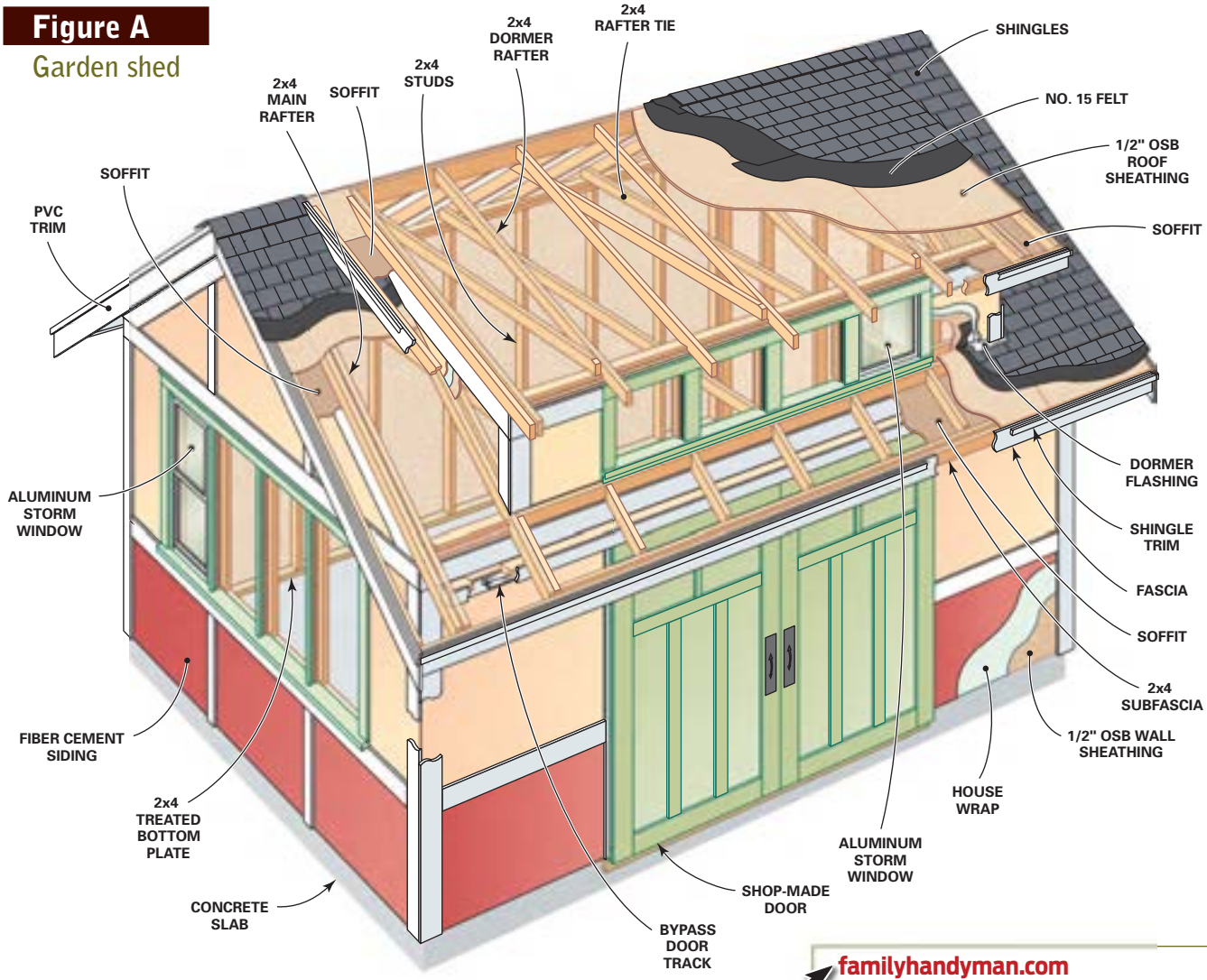
After the concrete cures for several days, you can start building the walls. The first step is to chalk lines on the slab, 3-1/2 in. from the edges to indicate the inside edge of the walls. Then cut the treated bottom plates and top plates to length and mark the stud locations on them. Photo 1 shows the layout marks and how to mark the plates for the anchor-bolt holes. Build and stand the two long walls and temporarily brace them (Photo 2). Lean the tops out slightly to make room for standing the end walls.

When all four walls are built and standing, nail the corners together, making sure the tops of adjacent walls are even with each other. Then nail the second top plates to the tops of the walls, overlapping them at the corners. Next plumb the walls and nail diagonal braces to the studs to hold the walls plumb until the sheathing is installed (Photo 3). Complete the walls by building the dormer wall and nailing it into place (Photo 4) and installing the sheathing (Photo 5).

4 **Set the dormer wall.** Building the dormer wall separately simplifies wall framing. Set it into place above the door opening. Nail temporary blocks to the lower wall to keep the dormer wall from sliding off as you nail it.

Figure A

Garden shed



OVERALL DIMENSIONS: 12' x 16'

familyhandyman.com

- For help with roofing and flashing, search for "roofing."
- To learn how to work with fiber cement, search for "fiber cement."
- For tips on installing PVC trim, search for "PVC trim."

Growing gardeners

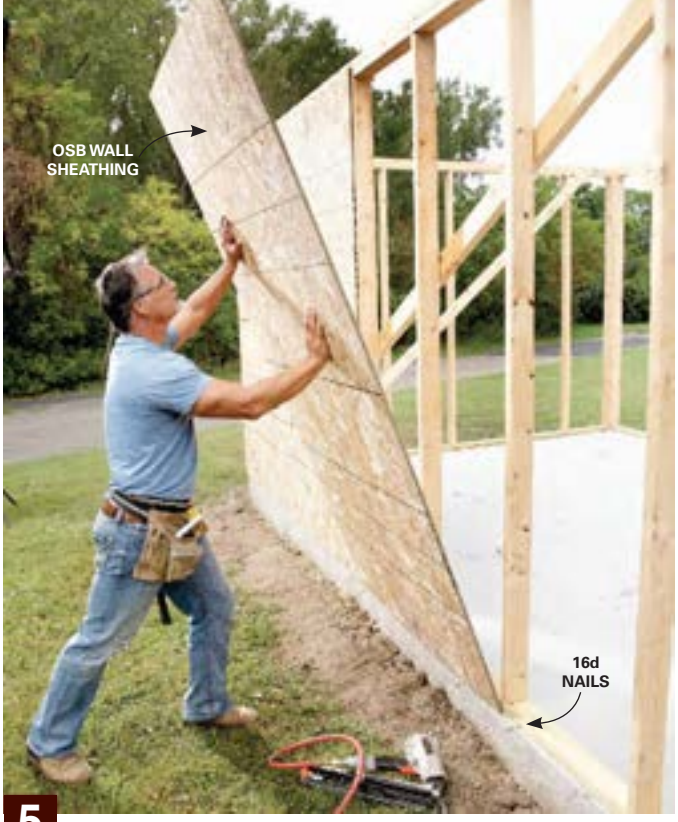
Tom Beson, principal of Pilot Knob Elementary School in Eagan, MN, couldn't be happier. His magnet school for science, technology, engineering and math started a raised bed gardening project for the kids and community. We were so impressed with the school's program that we donated this shed to the cause.

Principal Tom Benson, trying out the new shed.

Frame the roof

Use dimensions from Figure L (online) to cut the rafters. Before you install the rafters, sight down the walls to make sure they're perfectly straight. Push or pull the top of the walls into alignment and support them with temporary braces fastened to the bottom plate of the opposite wall if necessary. Cut the ridge board to length and mark the rafter positions on it. Nail temporary 2x4 supports to each end of the shed with their tops 50-3/4 in. above the top plate. Support the ridge on these while you install the rafters (Photo 6).

Install the rafters in pairs, lining them up directly over the studs (Photo 6). At the top plate, toenail through the bird's-mouth into the top plate to hold the rafters temporarily. Then install metal hurricane ties at each rafter. Fill in the short rafters that form the overhang over the siding doors. Then nail the 2x4 subfascias to the



5 **Sheathe the walls.** Nail sheathing to the studs. It's simpler if you support the sheathing on 16d nails wedged between the bottom plate and the slab.

rafter ends (Photo 7). Remember to rip a slight bevel on the lower edge of the subfascia (Figure G, online) so the soffit boards will fit tight to the rafter tails. To prevent the 8-ft. section of roof over the sliding doors from sagging, bend 2-ft.-long perforated metal straps to fit along the top of the short rafters and up the wall. Drive 3-in. construction screws every 4 in. through the straps and into the framing (Figure G1, online). Complete the roof framing by nailing the overhang rafters to the ridge and subfascias and installing 2x4 rafter ties between the front and the back walls to keep them from spreading (Figure A). Sheathe the main roof (Photo 8) before you install the overhang rafters on the dormer (Photo 9).

Finish the exterior siding and trim

We used James Hardie 5/16-in. stucco-look fiber-cement panels for the siding. Photo 10 shows cutting the panel with a special fiber-cement saw that has a built-in vacuum dust collection system. On the gable ends, remember to install a metal Z-flashing at the horizontal joint between panels. Wait to install the siding on the dormer until you've installed the dormer flashing, step flashing and shingles (Photo 13).

6 **Frame the roof.** Mark the rafter locations on the ridge board and prop it up with temporary supports. Nail the rafters to the ridge and top plate. Don't remove the supports until you've installed the rafter ties.

7 **Nail on the subfascia boards.** Align the top of the 2x4 subfascias with the top of the rafters. Start nailing at one end and have a helper at the other end raise and lower the board to line it up while you nail it.

8 **Sheathe the roof.** Nail temporary blocks to the subfascia to hold the first row of sheathing in place. Space the sheets 1/8 in. apart. If you don't leave gaps, you might get ridges that show through the shingles when the sheathing swells.

We used Azek solid PVC for all the exterior trim (Photo 11). Butt horizontal 1x6s tight to the soffit boards on the underside of the overhang and wrap them around the corner to extend across the end walls. Next, wrap the corners with 1x6s butted to this horizontal band. Make the windowsills by ripping 10-degree bevels on lengths of 1-in. x 3-1/2-in. PVC. When you install the notched sill, put shims under the inside edge to tilt the sill at a 10-degree angle so the bevel cuts on the front and back are vertical. Install the horizontal board under the windows after the sill is in place. Finish installing all the horizontal boards, and the trim boards that run along the roof angle on the end walls. Then cut and install the 1x4 battens to cover the seams in the siding.

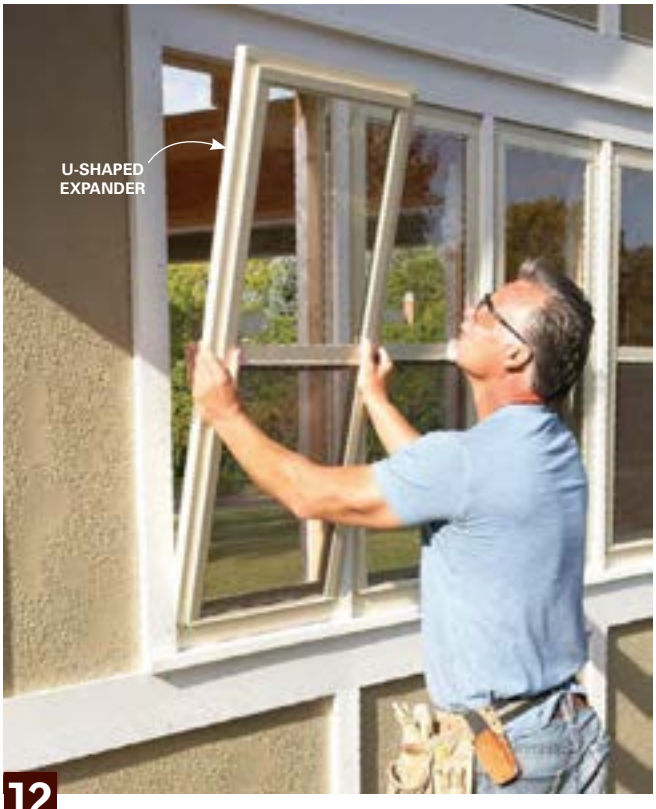
Mount the windows

When you've finished with the windowsills and trim, nail 1x2 stops to the studs on the sides and top of the window openings. We set the stops 1 in. behind the back of the trim and mounted the side windows by screwing through the U-shaped expander into the stops (Photo 12). The fixed windows in the dormer didn't have the expander channel, so here we set the stops even with the back of the trim and attached the windows by screwing through the thin flange into the stops. If you install another type of window, your stops may be in a different location. To order windows like ours, visit Allied Aluminum Windows online or check with local window companies. See the Materials List online for window ordering details.

9 **Finish the dormer framing.** Complete the sheathing on the main roof before adding the overhang rafter so you don't have to notch the sheathing to fit around the rafter.

10 **Cut and hang the siding.** Lay 2x4s over sawhorses to support the sheets while you cut. If you don't have a special saw, use your regular circular saw with a carbide blade. Fiber cement is tough on blades, so don't waste money on an expensive blade. Nail the siding to the studs.

11 **Trim with PVC boards.** Cut and nail the PVC trim just like wood. Use a sharp carbide blade on a miter saw to cut it, and stainless steel or hot-dipped galvanized nails to fasten the trim to the framing. Battens cover all the siding seams.



12 **Screw in the aluminum windows.** Apply a small bead of caulk to the stops and press the window against them. Slide the expanders tight to the opening and screw through them into the stops.

13 **Roof before siding the dormer.** Shingle the roof of the main structure before you side the dormer. This allows the siding to go over the top of the metal flashings.

14 **Build the doors.** Build the doors from PVC boards and fiber cement panels. Weld the overlapping PVC frame pieces with special PVC cement. Use screws to clamp the PVC and to provide extra reinforcement.

Build and mount the doors

The sliding doors consist of two layers of 3/4-in.-thick PVC boards that overlap at the corners for strength (Photo 14). Use special Azek brand PVC cement and screws to join the parts. Then fill the openings in the frame with 5/16-in. smooth fiber cement panels held in by 1/2 x 1/2-in. stops. Figure M online shows the door construction details.

Mount the sliding doors to the shed with Johnson bypass door hardware (see Materials List online for details). Attach the 2 x 1-1/2-in. track support to the wall with 4-in. lag screws driven into solid framing every 2 ft. Recess the lag screw heads so you can cover the support board with trim later. Then screw the aluminum tracks to the support board (Photo 15). Hang the doors on the track and adjust the hangers until the doors are even with each other and hanging squarely in the opening. To prevent the doors from sliding off the end or going past the middle, screw wooden stops into the channel on each end and in the center. The center stop is also necessary to secure the doors when a lock is installed. To keep the bottom of the doors from swinging out, screw a section of 1-1/4-in. angle iron to the full length of each door bottom. Then position a screw and washers on each side of the doors to capture the angle iron. See Figure N online for details. Finish the installation by covering the track and mounting board with a 1x4 trim board.

Finish it up

Shingle the dormer and cover the ridge with ridge shingles. For information on how to install shingles, go to familyhandyman.com and search for "roofing." Then paint the siding and trim. If you used solid PVC trim and want to paint it, make sure to use 100 percent acrylic exterior paint. We mounted a gate latch that accepts a padlock to secure the sliding doors.

15 **Mount the door track.** Use heavy-duty bypass door track and wheels to mount the doors. It rolls easily and is adjustable so you can line the doors up with each other.

Remote garden storage

Keep tools and supplies right next to your garden with this small storage house. It only takes a few hours to build, and can be made with pine or rough-sawn cedar as shown here.

Cut flat, dry 1x12s to the sizes in the Cutting list. Nail and glue the sides, base and back together, then attach the rafters and gables.

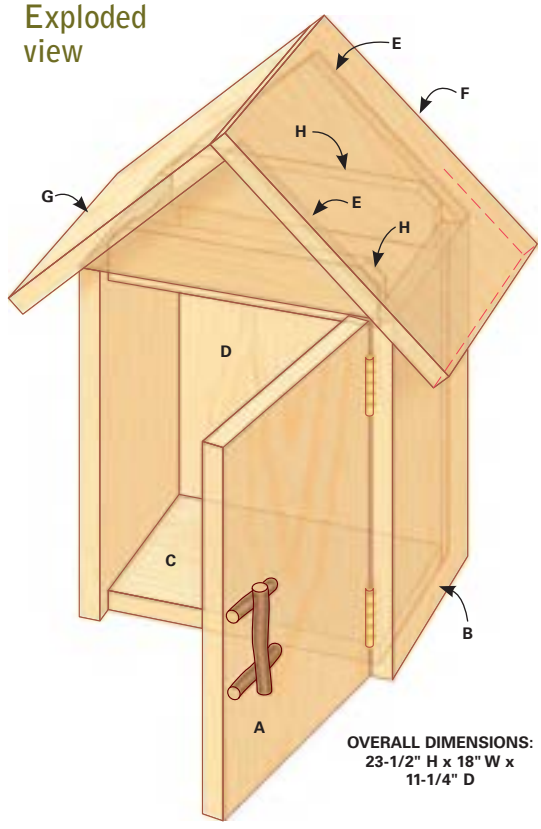
Fasten the shorter roof panel on one side, leaving 7/8-in. overhangs in the front and back. Caulk the top edge, then nail the long panel on.

Cut the hinge mortises into the door and side and hang the door. Stain or paint the wood inside and out to seal it. Use green branches for the handle, nailing them in place.

Make a rustic door handle from a tree branch. Nail the crosspieces to the door with brad nails, then notch the back of the handle so it sits flat on the crosspieces and nail it in place.

Figure A

Exploded view



Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	1	11" x 15-3/4" door
B	2	9-1/2" x 15-7/8" sides
C	1	11-1/4" x 8" bottom
D	1	11-1/4" x 15-7/8" back
E	2	12-3/4" x 6-1/2" gables
F	1	11-1/4" x 12-3/4" long roof panel
G	1	11-1/4" x 12" short roof panel
H	2	11-1/4" x 2-1/2" rafters

Note: All dimensions are for 3/4"-thick wood.

Materials list

QTY.	ITEM
2	1x12 x 8' cedar or pine
1	4x4 x 8' post
1 pr.	2" x 2" mortise hinges
1	Magnetic catch
1 lb.	1-1/2" galvanized finish nails

Easy outdoor storage tips

Cure newspaper delivery anxiety

If your newspaper comes at a different time each day, it's hard to know whether it's been delivered unless you hoof it out to the box and look inside. That's fine in nice weather, but it's no fun in the rain and cold. Here's how to stay warm and dry: Use a jigsaw to cut off the back of the newspaper delivery box. Replace it with a piece of clear Plexiglas, attaching it with a bead of silicone around the back edge of the box. Then all you have to do is look out your window to see whether the day's headlines are in the box waiting for you.

Outdoor doggy doo-doo holder

If you're a dog owner, getting rid of all those little bags of doggy doo-doo can be a pain. They get lost in the snow if you set them outside, and if you toss them directly in your outdoor garbage can, they fall to the bottom and get stuck until spring (yuck!). We use an old mailbox mounted on a post as our doo-doo collector. We stick a small shopping bag inside, toss in the little collection bags all week long and then tie up the larger bag and toss it in the garbage can.

Bulb storage solution

Tender bulbs that must be overwintered indoors are hard to keep organized. These include canna lilies, freesias, caladiums, gladioluses, dahlias and tuberous begonias. Keep track of who's who by storing them in egg cartons, with each bulb identified on the top of the carton. The cartons even have ventilation holes that help prevent rot and mildew.

Garden tool hideaway

A mailbox near your garden provides a convenient home for tools. Small mailboxes like this one are sold at hardware stores and home centers. King-size models are also available.

Quick & easy shed

Build a home for all your garden gear

If you need more space to store and organize your lawn and garden gear, consider this simple, elegant 5 x 12-ft. shed. It's large enough for wheelbarrows, lawn mowers and even a moderate-size garden tractor. And there's still plenty of room left over for garden hoses, tools and supplies, pots and other stuff. We also included a built-in bench for potting plants.

The shed will look good for years because it's built from durable cedar siding, pressure-treated wood and a 30-year steel roof. The front is attractive, but the back is all business—it's wide open for easy access and storage. But if leaving it open won't work in your yard, you can install doors (see p. 52).

Another nice feature of this shed design is that you can easily enlarge the plan. Build it up to 12 ft. deep and as long as you like. Even in larger sizes, the shed uses exactly the same techniques and materials. Just keep the post spacing under 6 ft., adding more posts as needed.

The following pages will show you how to assemble this shed, which requires no more skill than building a fence. We simplified the tough spots—laying out the posts, assembling the roof and marking the angles—so that you can successfully build it even if this is your first shed. This project is comparable in price to—but better and prettier than—a store-bought shed kit. You can complete the project in three easy weekends.

Siting your shed

If you build the shed and leave the back open, it's best to position the open back against a backdrop of foliage, a fence or a garage wall. That'll keep the finished side most visible and the clutter out of sight. Still, if security is an issue, you may not want to store especially valuable items there.

It's best to position your shed on a level site. The greater the slope, the more work you'll have leveling the floor. Our site sloped about 6 in. from one end to the other. The floor in this shed is simple concrete pavers laid over a 6-in. layer of level sand. It's inexpensive, drains well and can be cleaned with a few squirts from the garden hose. Other options are pouring a concrete slab or even framing in a deck-like floor. Whatever floor you choose, make sure it's higher than the surrounding yard to

keep runoff water out of the building.

You probably won't need a building permit for this shed because in most communities it will fall under the minimum size that requires a permit. But check with the building permit department at city hall to be sure.

Remember to keep your shed to the proper setback distance from your neighbor's property line. Even if you don't need a permit, it's important to check with your local building department to learn the setback rules and shed building requirements. In any case, call 811 before you dig to have underground utilities marked.

One-stop shopping for materials

You can buy everything you need at a home center and take it home in one (rather large) pickup load (see the Materials List, p. 52). All of the framing is standard construction lumber; just make sure to get treated posts and treated 2x4s for the bottom horizontal rail (Photo 5).

If the home center stocks metal roofing, it'll probably only have green, brown or white, but you can special order about 25 other colors and have the panels cut to length for a small extra charge. If you're comfortable cutting panels to length and are happy with stock colors, just buy 8-ft. lengths. Our roofing was special order and took a couple of weeks to arrive, so plan accordingly. Be sure to order *residential* ridge caps to match (Photo 13). Otherwise, you'll get the large ridge caps used on farm buildings. Also order the special roofing screws that are colored to match your roof.

Our siding is vertical "board-on-board" cedar; 1x12s overlaid with 1x6s. This is by far the most expensive feature of our shed. Substitute any type of siding you wish, either to save money or to match the siding on your home. The construction details are the same if you're using plywood siding. But if you use horizontal lap siding, substitute a 4x4 for the 2x4 around the bottom. Then add vertical studs every 16 in. between that and the top beam instead of the horizontal 2x4 framing we show.

You can use any window you wish, wherever you wish. We chose an inexpensive "barn sash" type window, available at most home centers or online (Photo 10). Add storm window hanger brackets and storm window adjusters and you'll have inexpensive windows that open like awnings to let the breeze flow through.

1 Build a 2x4 template to the shed dimensions, square it and mark the post locations with stakes. Set the template aside and dig 3-ft.-deep postholes.

2 Drop the posts into the holes, position them using the template, plumb them and screw them into place. Fill the holes with concrete.

3 Slide the template up 5 ft. and level it, screwing it to the posts. Recheck the posts for plumb and brace the assembly. Let the concrete harden overnight.

Materials list

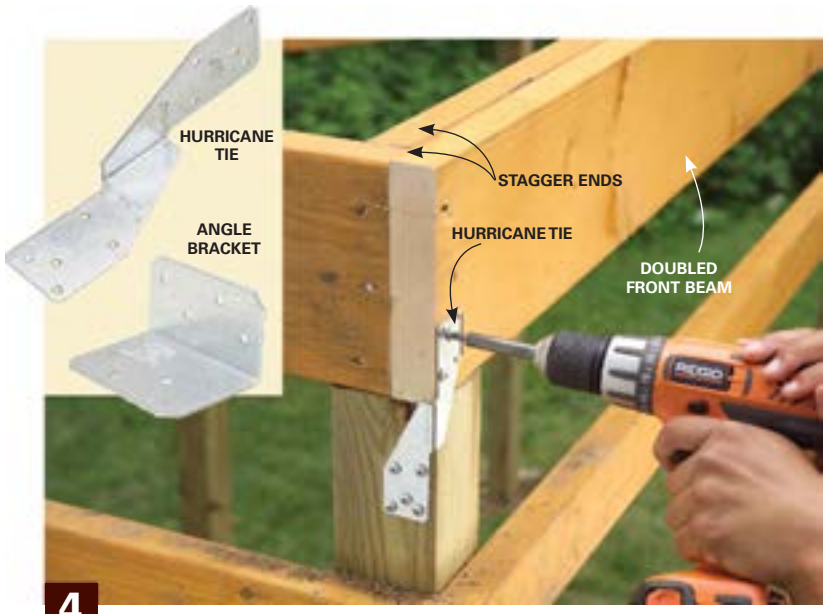
QTY.	ITEM & USE
6	4x4 x 10 (treated) for posts
1	2x4 x 10 (treated) for bottom rail (end walls)
1	2x4 x 12 (treated) for bottom rail (front wall)
2	2x4 x 10 for end wall framing
3	2x4 x 12 for front wall and window framing
5	2x8 x 12 for beams
6	2x4 x 10 for rafters
1	2x6 x 16 for ridge beam
6	2x4 x 16 for purlins
10	1x12 x 10 (cedar) for end wall siding
8	1x6 x 10 (cedar) for end wall siding
8	1x12 x 8 (cedar) for front wall siding
10	1x6 x 8 (cedar) for front wall siding
2	1x6 x 8 (cedar) for window jambs (all trim for two windows)
2	1x6 x 6 (cedar) for window jambs
4	1x4 x 8 (cedar) for window trim
8	60-lb. bags of concrete mix for footings

Metal roofing

10	56-in.-long sheets of steel roofing (roof panels)
2	10-ft. residential ridge cap
2	1-lb. boxes of roofing screws

Hardware

34	1-1/2 x 2-in. angle brackets (framing-to-post connections)
18	Hurricane ties (beam-to-post and rafter-to-beam connections)
2	Boxes of 1-1/4-in. joist hanger screws
2	1-lb. boxes of 16d nails
2	24-in. x 43-1/2-in. barn sash windows with handles
2	Pairs of storm window hanger brackets
2	Pairs of storm window adjusters



4 Cut the post tops to length. Then cut and assemble the 2x8 beams. Anchor them with hurricane ties.

5 Cut the rails to fit and fasten them between the posts with angle brackets. Frame the window openings to suit your windows.

Position the posts with a template

Screw a 2x4 template together as a guide for locating the posts (Photo 1). Make the inside dimensions of the frame exactly 5 x 12 ft. Square the template by racking until the diagonal measurements are equal and then add an angled brace to hold it square. Measure and mark the posthole positions on the template. Drive stakes at the post marks, remove the template and dig 8-in.-diameter holes with a posthole digger.

Screw the posts to the template to hold them plumb while you mix and pour the concrete. To make sure the tops of the posts are also perfectly aligned, unscrew the template and move it up about 5 ft. before the concrete hardens. Carefully level the template as you screw it to the posts; you'll use it later to gauge the post cut-off heights. Then plumb and brace the whole assembly (Photo 3). Leave the braces in place overnight and get back to work the next morning after the concrete has set up.

Adding doors

If you want to enclose your shed, you have a few options. You could build a wall covering half the back, framing and siding it just as you did the front. Then cover the other half with a pair of swinging doors or install one sliding door. For easier access, skip the wall and cover the whole back with two sliding "bypass" doors. Some home centers carry sliding door hardware designed for farm buildings. To shop online, search for "barn door hardware." If your shed has board-on-board cedar siding like ours, you can make doors that match the siding using rough-sawn plywood framed with rough-sawn boards.

Figure A

Shed

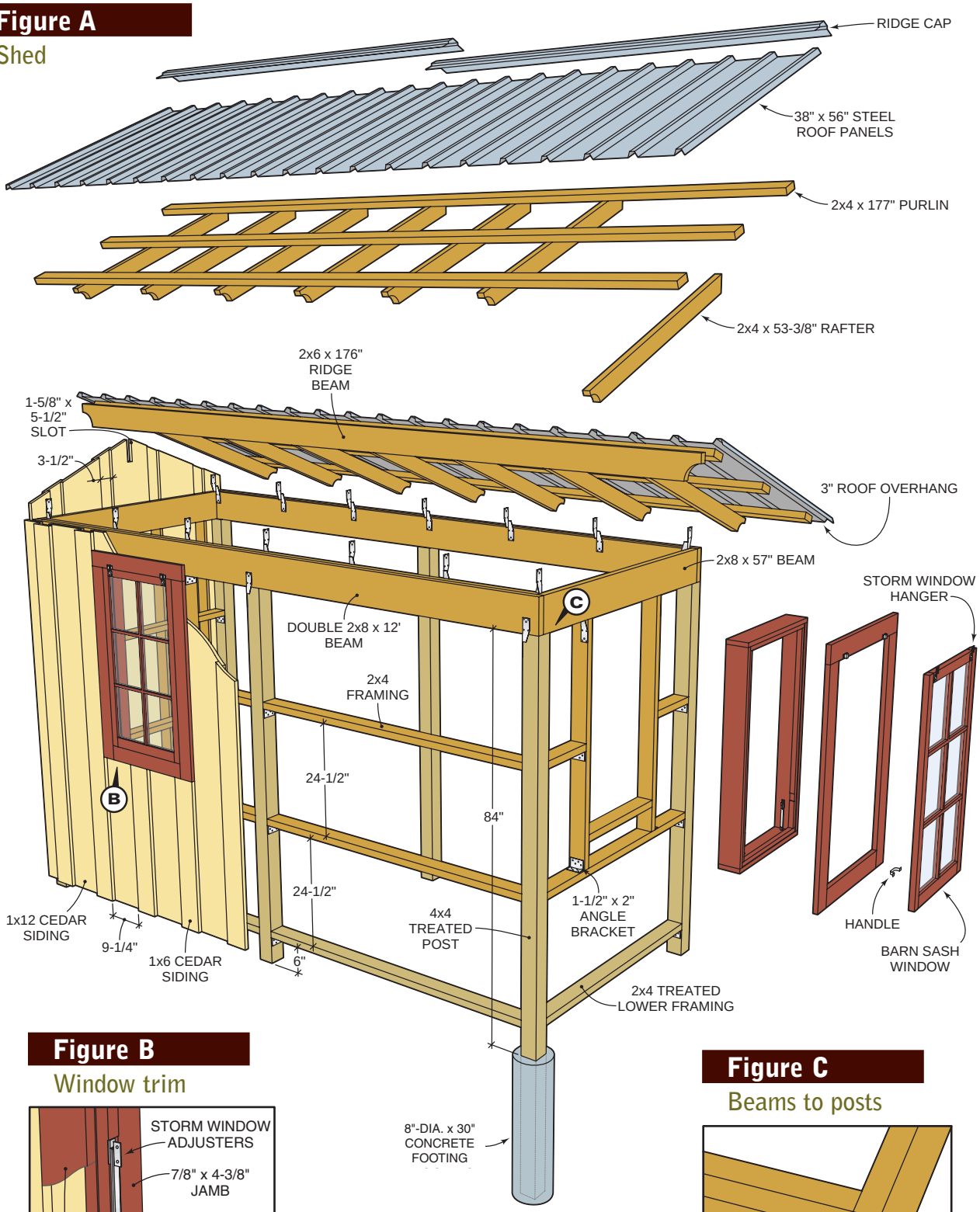
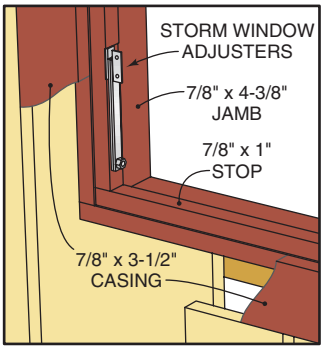


Figure B

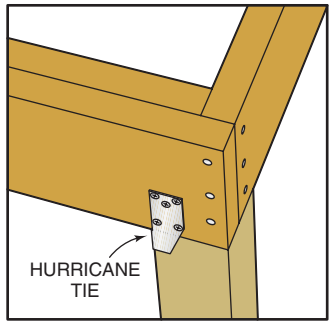
Window trim



OVERALL DIMENSIONS:
5' WIDE x 12' LONG x 9'4" TALL
(APPROX.)

Figure C

Beams to posts



Set the beams and frame the walls

Choose the post that's closest to the highest point on the ground and mark it 6 ft. 8 in. above your estimated finished floor height. You'll have to guess somewhat at this. The idea is to keep from bonking your head when you enter the shed. Cut off the post at the mark by cutting from two opposite sides with a circular saw. Then measure from the top of the template to the newly cut top. Match that distance to mark and cut the other posts to the same height. (This is why that template had better be level!) Preassemble the doubled 2x8 beams, toenail them on top of the posts and add the end 2x8s (Photo 4). Set 2x8 beams on the posts, toenail them in place and then anchor them with hurricane ties (Photo 4).

Now add the rest of the wall framing, using Figure A as a guide. It's easiest to toenail the 2x4s into place, then anchor them with angle clips (Photo 5).

Size window openings to fit your windows. If you're using barn sash windows, measure the width and height of the window sash and add 1-7/8 in. to each dimension to arrive at the rough opening size.

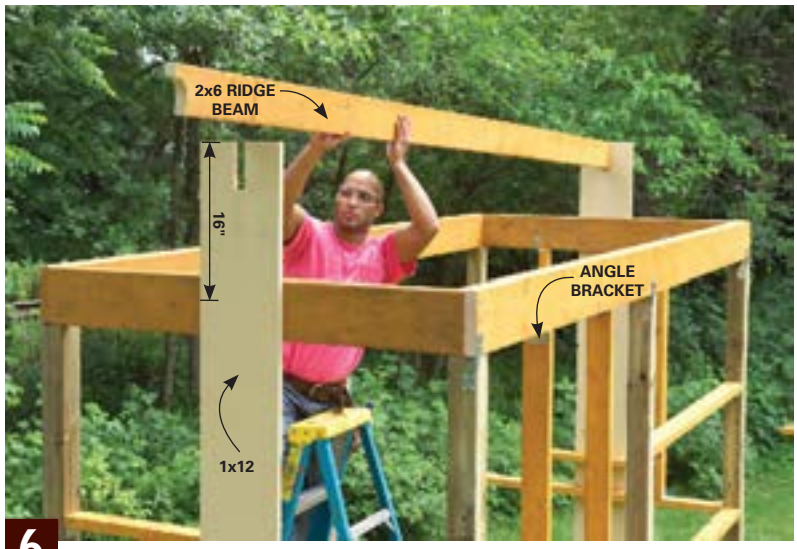
Frame a super-simple roof

Hand-framing a roof is usually challenging, but we've made the job foolproof with a simple trick: You use the siding to center and support the ridge board while you scribe, cut and install the rafters.

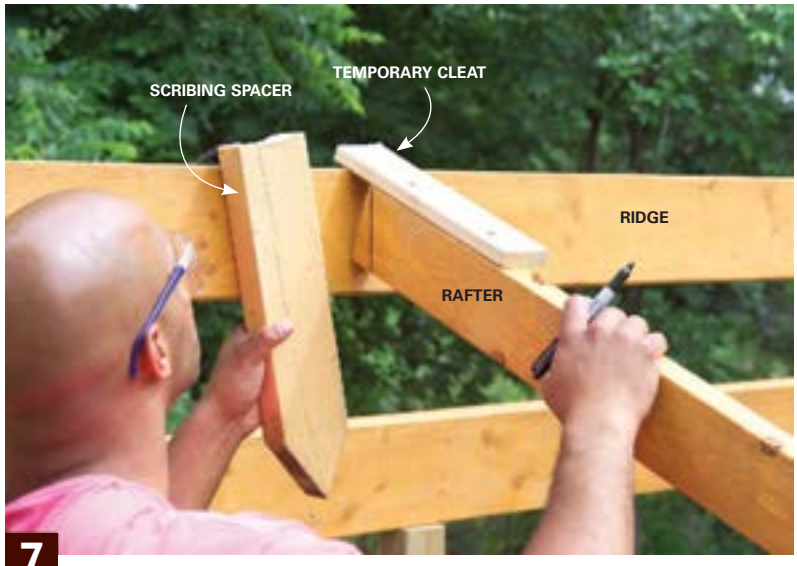
Start the roof by cutting a 5-1/2-in.-deep by 1-5/8-in.-wide slot at the ends of two 10-ft.-long 1x12s. Then cut the boards to length so the bottoms will be at least 2 in. above grade and the top will project past the beam 16 in. (Photo 6). Center, plumb and nail those boards to each end wall.

Cut a 2x6 ridge board to length and cut coves (we used a 1-qt. can for a pattern) at the ends with a jigsaw. Drop the ridge board into the slots, making the overhang equal at both ends (Photo 6). Eyeball the ridge board from one end. If there's a bow, straighten and brace it from the beams with a 2x4 (Photo 8).

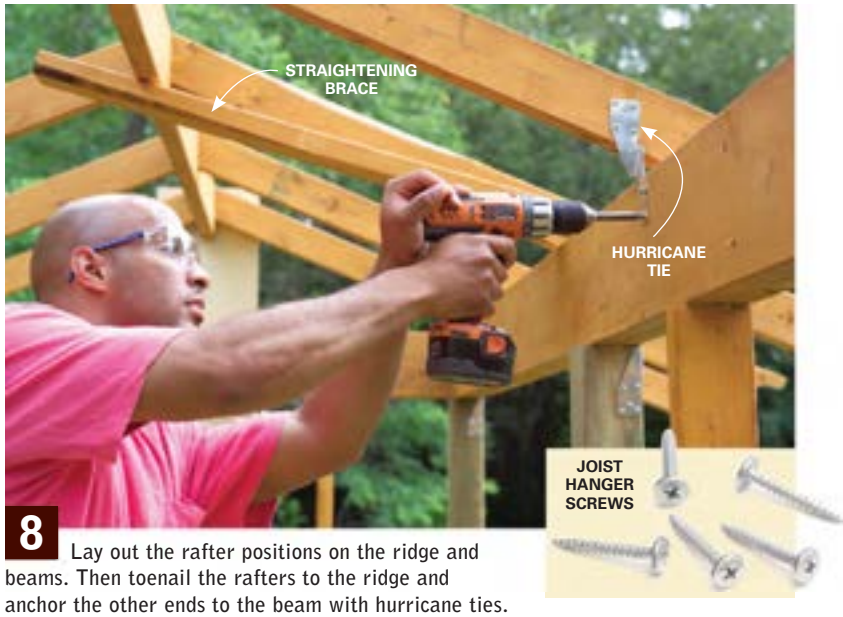
Scribe the first rafter angle by screwing a short cleat on the top. Then rest the board on the ridge and scribe the angle with a scrap 2x4 (Photo 7). Cut the angle and test the fit. Then cut it to length and add the decorative end cut. Use this rafter as a pattern to mark the rest and then cut and install them (Photo 8).



6 Cut a slot, then center and nail a 1x12 siding board to each end wall. Then drop the ridge board into the slots and center it.



7 Scribe the ridge angle cut on one of the rafters and cut it to length. Use it as a pattern to mark the other rafters.



8 Lay out the rafter positions on the ridge and beams. Then toenail the rafters to the ridge and anchor the other ends to the beam with hurricane ties.

Finish the siding

To save time, finish the ridge board, the rafter and all of the siding on all four sides before installation (we even stained the interior framing to brighten the inside of the shed). To inhibit rot, coat the freshly cut bottom ends of the siding boards before nailing the boards into place.

Begin siding by nailing up the 1x12 boards on the ends. Raise them 2 in. above the ground and run them long at the top (Photo 9). Fasten them in the center of each board with a single nail at each framing member (the overlapping 1x6s will hold the edges). Use a 2x4 block to space the boards 3-1/2 in. apart. That way the 1x6s will overlap 1 in. on both sides. Determine the length of each siding board on the front of the shed by measuring from the ground to the top of the beam and subtracting 2 in.

Install the window frame and exterior trim before you install the 1x6s. Rip the 1x6 jamb boards to 4-1/4 in. wide so they'll be flush with the outside of the 1x12s and the wall framing on the inside of the shed. (Use the leftover strips for the window stops; see Photo 10.) That way you can add the window trim around the openings and surround them with 1x6 siding for a nice, clean look (Photo 10).

Draw marks 1 in. from the edge of the 1x12s to help align the 1x6s. You can cheat the 1x6s left or right a bit if it helps them clear window openings or arrive at corners at a better point. Small variations won't be noticeable. Just make sure you have at least a 3/8-in. overlap and that you plumb each one with a level. Nail each side of the 1x6s through the 1x12 below it and into the framing. Use a reciprocating saw to cut off the long siding boards at the end walls flush with the end rafters (Photo 9). Or snap a chalk line on the outside and use a circular saw. Use the leftover pieces to fill in above or below the windows.

Hang the windows

Screw the hanger brackets to the windows. Then center the window in the opening to position and screw the bracket clips to the window trim. Shim the window sash so it's 1/4 in. back from the window trim and centered in the frame. Nail the 1x1 window stops to the jambs, holding them snug against the window sash (Photo 10). Add the storm window adjusters, following the instructions on the packaging.

9 Space and nail the siding to the end walls (Figure A). Trim it even with the rafters. Add the rest of the 1x12 siding.

10 Mount the storm window brackets to the window and trim and then hang the window. Nail 1x1 window stop tight against the window.

11 Cut the purlins to length, then center and nail them to each rafter with two 16d nails.

Screw down the metal roofing

Cut the 2x4 purlins to length and nail them to each rafter with two 16d nails (Photo 11). If they're twisted and won't lie flat, screw them down. Otherwise the metal roofing will deform or kink when you screw it down.

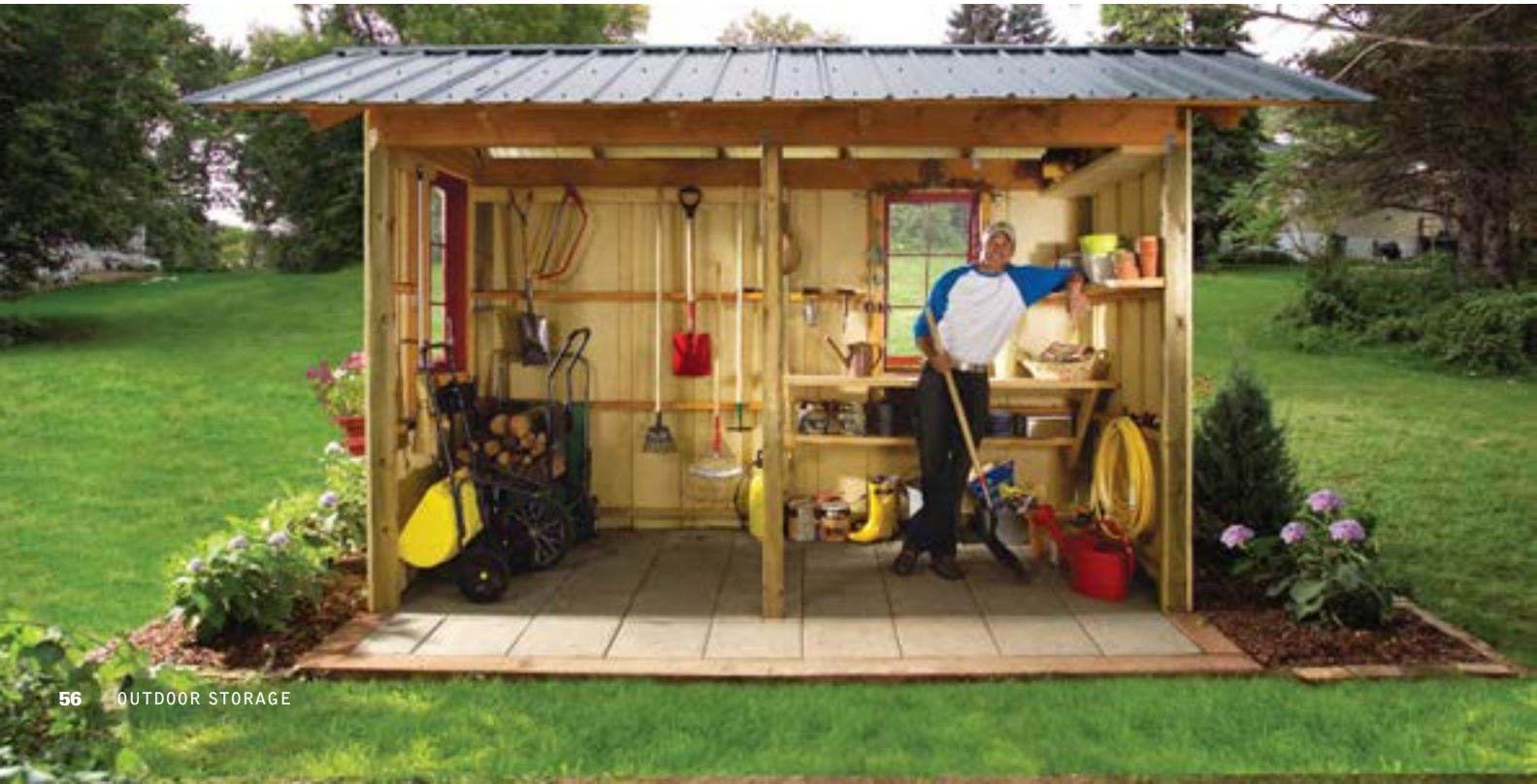
Nail together a 2x4 "L," push it against the bottom purlin and screw it into place from the underside so you can remove it later (Photo 12). This will hold the metal roof panels in place while you screw them to the purlins. If you need to cut roof panels, before installation cut them from the underside with a jigsaw and metal-cutting blade.

Starting at one end, lay the first panel in place, hanging one edge 3 in. over the purlin ends. Center the screws in the flat areas between the ribs and over the purlins. The screws are self-tapping; push down firmly as you run the screw gun and they'll drill their way through the metal and into the wood. Tighten them up until the special neoprene washer mushrooms against the metal. Measure carefully and keep all the screws exactly in line. It'll look bad if lines of screw heads wander all over the place. And if you drive a screw in the wrong place and miss the purlin, there's no good way to repair a screw hole.

Cut both pieces of ridge cap to length with a tin snips so they overlap 6 in. near the middle. Center and clamp the ridges while you screw them to the ribs of the underlying panels (Photo 13). It's best to predrill these holes with a 1/8-in. bit.

12 Screw a 2x4 "L" to the rafter tails tight against the bottom purlin. Then rest the roof panels against it and screw the panels to the purlin.

13 Cut both ridge caps to length, then center and clamp them into place. Screw them to every third rib.



CHAPTER

4 Laundry & Utility Rooms

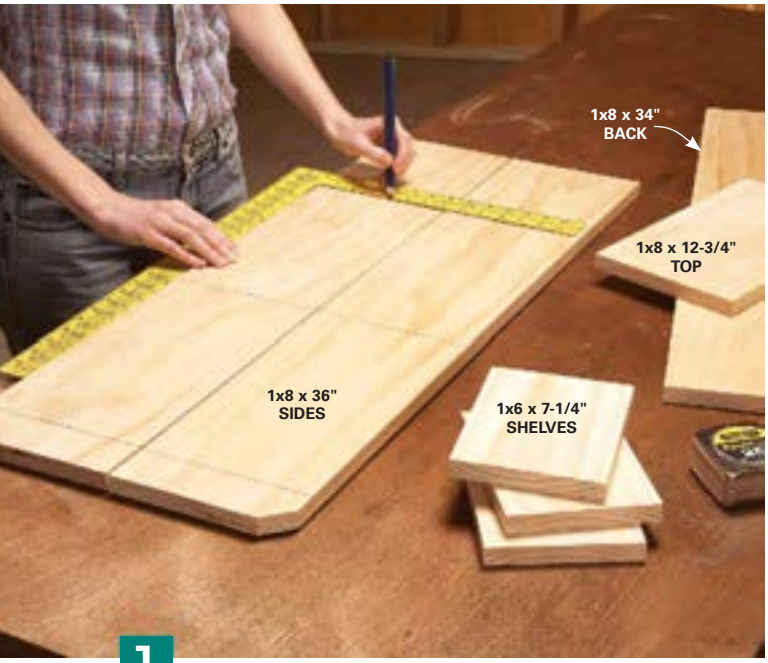
Stay organized, save space

Laundry room ironing center

To keep your ironing gear handy but out from underfoot, make this simple ironing center in a couple of hours. All you need is a 10-ft. 1x8, a 2-ft. piece of 1x6 for the shelves and a pair of hooks to hang your ironing board.

Cut the back, sides, shelves and top. Align the sides and measure from the bottom 2 in., 14-3/4 in. and 27-1/2 in. to mark the bottom of the shelves (Photo 1). Before assembling the unit, cut a 1 x 1-in. dog ear at the bottom of the sides for a decorative touch.

Working on one side at a time, glue and nail the side to the back. Apply glue and drive three 1-5/8-in. nails into each shelf, attach the other side and nail those shelves into place to secure them. Clamps are helpful to hold the unit together while you're driving nails. Center the top piece, leaving a 2-in. overhang on both sides, and glue and nail it into place (Photo 2). Paint or stain the unit and then drill pilot holes into the top face of each side of the unit and screw in the hooks to hold your ironing board. Mount the shelf on drywall using screw-in wall anchors.



1 Place the sides next to each other and mark the shelf positions. For easier finishing, sand all the parts before marking and assembly.

2 Glue and nail the back and shelves between the sides, then add the top. After painting or staining, screw on hooks for the ironing board.

Simple laundry organizer

Make laundry day easier with this shelf for all your detergents, stain removers and other supplies. Build this simple organizer from 1x10 and 1x3 boards. If you have a basement laundry room, you may need to cut an access through the shelves for your dryer exhaust.

Minimize liquid detergent mess

Dripless liquid detergent containers always drip just a little. Keep it under control with a special shelf on the corner of the laundry tub. Just cut a 1-1/2-in. aluminum angle long enough to support the front edge of the container, then glue it to the tub with silicone caulk. Rest the container on the ledge and drips will just fall into the laundry tub instead of creating a gooey mess somewhere else.

Joist-space space-saver

Don't waste all that space between joists in a basement or garage. Screw wire shelving to the underside of the joists. An 8-ft. x 16-in. length of wire shelving takes 15 minutes to install with a pack of plastic clips.

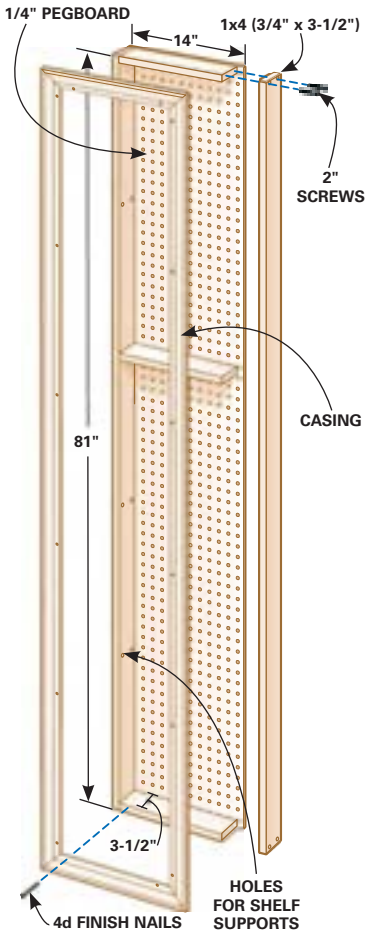
Screw a wire closet shelf to the underside of joists to create a shelf that's strong, easy to see through and won't collect dust.

Behind-the-door shelves

Stud-space cabinet

When you can't find a convenient nook for a set of shelves, you can often create one by recessing the shelves into the wall itself. Choose the location before you build the project to make sure it will fit. Start by looking for a space with no obvious obstructions. Locate the studs with a stud finder. Some stud finders can also locate electrical wires and plumbing pipes inside walls. When you've found a promising spot, cut a 6-in.-square inspection hole between the studs. Use a flashlight and a small mirror to inspect the stud cavity for obstructions. You often can modify the size of the cabinet to avoid obstructions.

When you find a good space, mark the perimeter of the opening and use a drywall keyhole saw to cut it out. Measure the opening and subtract 1/4 in. from the height and width to determine the outer dimensions of your cabinet.



For standard 2x4 stud walls with 1/2-in.-thick drywall, build the cabinet frame from 1x4s that measure 3-1/2 in. wide (see illustration). If your walls are different, adjust the depth of the frame accordingly. Then add a 1/4-in. back. Screw 1/4-in. pegboard to the back so you can hang stuff from pegboard hooks.

Add casing that matches the trim in your house. Drill holes into the sides to accept shelf supports. Shelf supports fit in 3mm, 5mm or 1/4-in. holes depending on the style.

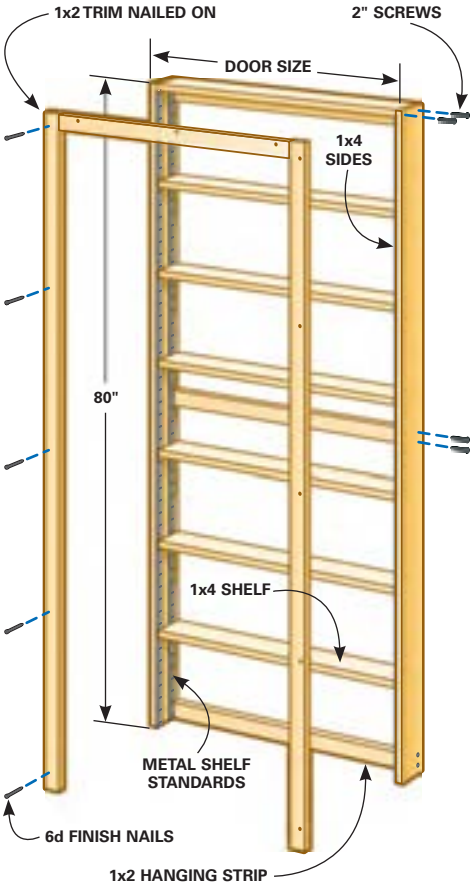
Install the cabinet by slipping it into the opening, leveling it and nailing through the trim into the studs on each side. Use 6d finish nails placed every 12 in. along both sides.

Bonus storage space! Take a few hours and remove the drywall from between two studs, then construct a shallow cabinet to fit the space.

Shallow cabinet

The space behind a door is a storage spot that's often overlooked. Build a set of shallow shelves and mount it to the wall. The materials cost less than $50 and you'll be finished in just a couple of hours. Measure the distance between the door hinge and the wall and subtract an inch. This is the maximum depth of the shelves. Use 1x4s for the sides, top and shelves. Screw the sides to the top. Then screw three 1x2 hanging strips to the sides: one top and bottom and one centered. Nail metal shelf standards to the sides. Complete the shelves by nailing a 1x2 trim piece to the sides and top. The 1x2 dresses up the shelf unit and keeps the shelves from falling off the shelf clips.

Locate the studs. Drill clearance holes and screw the shelves to the studs with 2-1/2-in. wood screws. Put a rubber bumper on the frame to protect the door.



Build shallow shelves to fit behind the door in your laundry room, utility room or pantry.

Closet rod and shelf

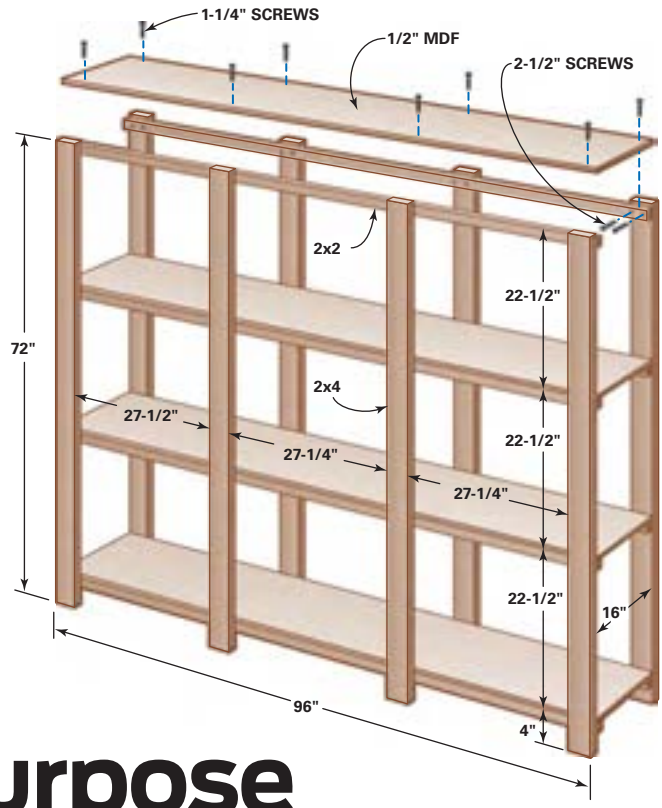
This project will save you hours of ironing and organizing. Now you can hang up your shirts and jackets as soon as they're out of the dryer—no more wrinkled shirts at the bottom of the basket. You'll also gain an out-of-the-way upper shelf to store all sorts of odds and ends.

Just go to your home center and get standard closet rod brackets, a closet rod and a precut 12-in.-deep melamine shelf. Also pick up some drywall anchors, or if you have concrete, some plastic anchors and a corresponding masonry bit. Follow the instructions in Photos 1 and 2.

1 Draw a level line about 78 in. above the floor and locate the studs behind the drywall. Fasten at least two of your closet rod brackets into wall studs (4 ft. apart) and then center the middle bracket with two 2-in.-long screws into wall anchors (inset).

2 Fasten your 12-in.-deep melamine shelf onto the tops of the brackets with 1/2-in. screws. Next, insert your closet rod, drill 1/8-in. holes into the rod, and secure it to the brackets with No. 6 x 1/2-in. sheet metal screws.

Build sturdy, simple shelves, custom sized to hold boxes or other storage containers.



Sturdy multipurpose storage shelves

Store-bought shelving units are either hard to assemble, flimsy or awfully expensive. Here's a better solution. These shelves are strong, easy to build and inexpensive. The sturdy shelf unit is sized to hold standard records and storage boxes. If you want deeper storage, build the shelves 24 in. deep and buy 24-in.-deep boxes. If you prefer to use plastic storage bins, measure the size of the containers and modify the shelf and upright spacing to fit.

Refer to the dimensions above to mark the location of the horizontal 2x2 on the back of four 2x4s. Also mark the position of the 2x4 uprights on the 2x2s. Then simply line up the marks and screw the 2x2s to the 2x4s with pairs of 2-1/2-in. wood screws. Be sure to keep the 2x2s and 2x4s at right angles. Rip a 4 x 8-ft. sheet of 1/2-in. MDF, plywood or OSB into 16-in.-wide strips and screw it to the 2x2s to connect the two frames and form the shelving unit.

You can modify the sturdy storage shelves above and create a great-looking storage center.

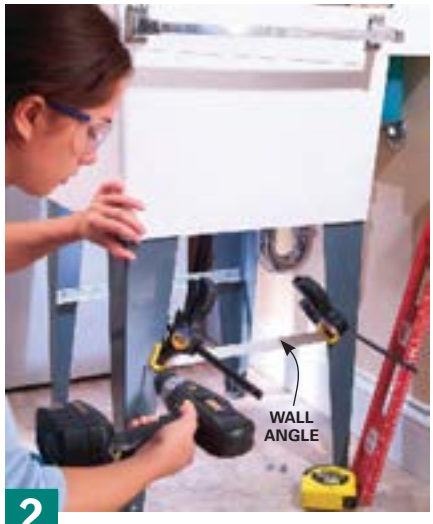
Simply add one shelf and change the 22-1/2-in. measurement to 14 in. and the 4-in. measurement to 6 in. Apply the finish of your choice.

Overall dimensions:
62-1/2" tall x 96" wide x 19" deep

Under-sink shelf

Tired of moving all that stuff under the sink to mop the floor? Just buy a melamine closet shelf from a home center and a length of suspended-ceiling wall angle (sorry, it only comes in 10-ft. lengths, but it's cheap and can be cut for transport). Also pick up four 1/2-in. No. 8-24 bolts, washers and nuts. Follow Photos 1 – 3.

1 Using an aviation snips, cut two lengths of suspended ceiling angle to support the under-sink shelf.



2 Clamp pieces of ceiling angle or aluminum angle to your sink legs (about 11 in. from the floor) and drill through with a 3/16-in. bit. Insert 1/2-in.-long No. 8-24 bolts from the inside and thread on acorn nuts to cover sharp bolt edges.

3 Cut a shelf from the 3/4-in. melamine board and drop it onto the angle braces. Notch the shelf if the sink trap is in the way. Paint the raw edges of the board to protect them from moisture.

CHAPTER

5 Garage & Workshop

Giant garage cabinet

At 7 ft. tall, 2 ft. deep and 16 ft. long, this cabinet not only holds a ton of stuff, but also handles bulky items that other cabinets can't: camping gear, benchtop tools, outdoor toys. You can even hang off-season clothes inside on hooks. The big sliding doors keep it all neatly hidden and provide instant, easy access.

With birch doors and trim and AC plywood on the partitions, the project cost roughly $1,000. Simply substituting oak or lauan doors and replacing the AC plywood with oriented strand board (OSB) would trim the cost by several hundred dollars.

How fast is this project? If you stick to it, you could complete most of it in a day. Plan a second day to complete the details and get started on the finishing. In addition to standard hand tools like a tape measure, level, framing square and Speed Square, you'll need a circular saw and drill. A power miter saw and pneumatic trim nailer would simplify the trim work but aren't necessary.

This cabinet was designed to accommodate six doors and fit against the right wall, but you can easily modify it to suit your needs. You can make the cabinet wider or narrower by changing the number or size of the doors. Reverse the plan if you want to mount it against the left wall instead. You could also build the cabinet tight to the ceiling, but you'll have to reverse the order of construction. To do that, start by fastening the ceiling frame to the studs and to the ceiling. Then mount the uprights to the walls. And finally build the base, including the plywood floor, and bolt it to the uprights and the wall.

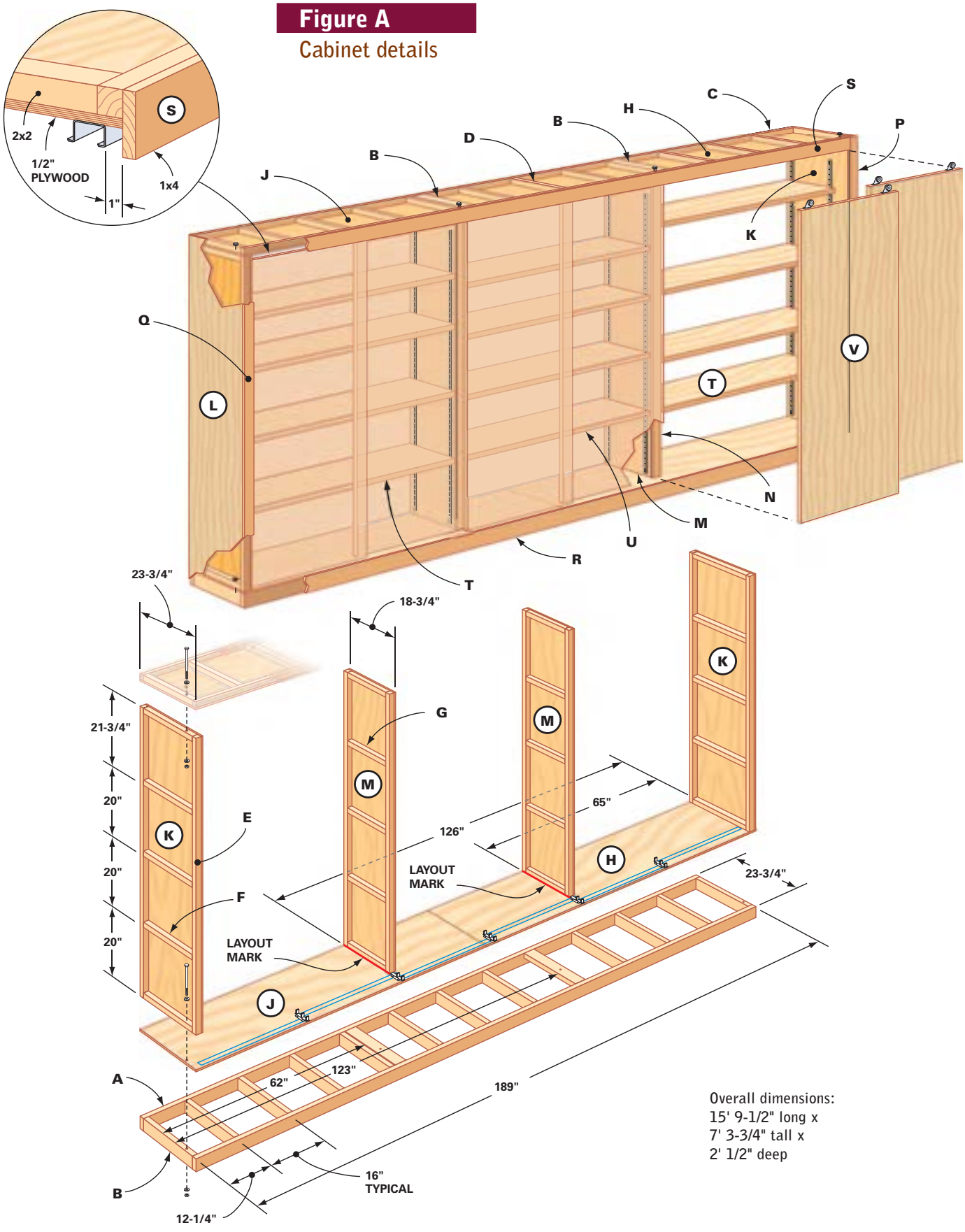
If you have block or concrete walls in your garage, attach the base, uprights and top frame with lag shield anchors and lag screws or expanding concrete anchors. If

It's just a big box with closet doors

Don't let the size of this project fool you. It may be big, but you can build it in a weekend. The cabinet is just a basic box: nothing more than simple framing covered with plywood. Installing the doors is exactly like installing sliding closet doors. You only need inexpensive hollow-core doors and sliding door hardware.

Figure A

Cabinet details



Overall dimensions:
15' 9-1/2" long x
7' 3-3/4" tall x
2' 1/2" deep

Materials list

QTY.	ITEM
2	2x4 x 16' spf (spruce, pine, fir) lumber
2	2x2 x 16' spf lumber
2	2x4 x 8' spf lumber
15	2x2 x 8' spf lumber
6	4' x 8' x 1/2" plywood
3	1x3 x 8' trim board
1	1x4 x 8' trim board (trim to fit)
1	1x4 x 16' trim board
1	1x6 x 16' trim board (rip to 4" width)
6	36" hollow-core bifold doors

QTY.	ITEM.
6	1-3/8" x 32" x 80" hollow-core doors
24	1/4" x 4" lag screws
24	1/4" washers
200	3" deck screws
1 lb.	1-1/2" finish nails
1 lb.	2" finish nails
16	Hollow wall anchors
2	6" x 5/16" hex head machine screws
6	4" x 5/16" hex head machine screws
8	5/16" hex head nuts

QTY.	ITEM
16	5/16" washers
2	Construction adhesive (tubes)
12	6' shelf standards
36	Shelf clips
2	Johnson 2200-096 96" track*
6	Johnson 2216 single wheel hanger*
6	Johnson 2238 single wheel hanger*
5	Johnson 2135 bypass door guide*

**Available at home centers or online at johnsonhardware.com.*

you build the cabinet against open studs, you'll have to install horizontal blocking between the studs in areas where the uprights don't align with an existing stud.

Build the base

The most critical part of the project is getting the base square, level and straight before you screw it to the wall. If your wall is bowed (like most), you'll have to shim behind the frame before bolting it to the wall.

Start by snapping a level chalk line on the wall to indicate the top of the lower frame. This cabinet was positioned about 24 in. above the floor. Next, use a stud finder to locate and mark the studs. Cut temporary 2x4 legs that rest on the floor and extend to 3-1/2 in. below the chalk line, and then screw them to the wall. Make another set of legs about 1/4 in. shorter than the first set to support the front edge and add a cleat to each one (Photo 1). Assemble the base (Figure A) with nails or screws and rest it on the legs. Attach the front legs through the cleat with screws and attach

Tip

Hollow-core doors are stiff and inexpensive, so they make great shelves for projects like this one. Shown are 18-in.-wide bifold closet doors. You can't cut a hollow-core door to a different width, but you can cut it to any length you like and plug the hollow end. Support the shelves with adjustable metal shelf standards and brackets.

Plug the cut end of a hollow-core door by gluing in a block of wood. Chisel out the cardboard webbing inside the door to make space for the block.

Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	2	2x4 x 189" bottom frame
B	16	2x4 x 20-3/4" crosspieces
C	2	2x2 x 189" top frame
D	12	2x2 x 20-3/4" crosspieces
E	8	2x2 x 81-3/4" upright frame
F	10	2x2 x 20-3/4" upright crosspieces
G	10	2x2 x 15-3/4" upright crosspieces
H	2	1/2" x 23-3/4" x 96" top and bottom plywood
J	2	1/2" x 23-3/4" x 93" top and bottom plywood
K	3	1/2" x 23-3/4" x 81-3/4" upright plywood

KEY	QTY.	SIZE & DESCRIPTION
L	1	1/2" x 23-3/4" x 87-3/4" outside upright plywood
M	4	1/2" x 18-3/4" x 81-3/4" upright plywood
N	2	3/4" x 2-1/2" x 81-3/4" upright trim
P	1	3/4" x 3-1/2" x 87-3/4" upright trim (trim width to fit)
Q	1	3/4" x 2-1/2" x 87-3/4" upright trim
R	1	3/4" x 4" x 185" horizontal trim (trim length to fit)
S	1	3/4" x 3-1/2" x 185" horizontal trim (trim length to fit)
T	8	1-3/8" x 18" x 60" shelves (cut bifold doors)
U	4	1-3/8" x 18" x 58" shelves (cut bifold doors)
V	6	1-3/8" x 32" x 80" doors

the base to the wall with a temporary screw at each end.

Using a level, adjust the height of the front legs by shimming under them until the frame is level from front to back on both ends. Next, nail small blocks of 1/2-in. plywood to both ends of the base and stretch a string or chalk line between them. Use a third block of 1/2-in. plywood to check the distance between the front 2x4 and the string (Photo 1). Add shims between the wall and the frame as needed to create a consistent 1/2-in. space between the string and the front 2x4. If your wall is straight, you won't have to add any shims. Lag-screw the frame to the studs (Photo 1). Finish the base by nailing on the plywood.

Bolt on the uprights

Cut the 2x2s to length and screw them together to form the frames for the uprights. To provide maximum rigidity, spread a bead of construction adhesive on the face of the 2x2s before nailing plywood to one side of each frame. To ensure the frames are square, be careful to cut the plywood square and line it up with the frame before nailing. Use the measurements in Figure A to locate the partitions, and make square layout lines on the plywood base with a framing square. Use a 4-ft. level to extend the layout lines up the wall.

Where uprights don't align with wall studs, use screw-in drywall anchors to secure them (Photo 2). These anchors aren't supporting the cabinet. They simply hold the uprights in position until the top is installed.

Since the uprights hold up the base, they have to be securely bolted to the base. With a spade bit, drill a 3/8-in. hole through the bottom 2x2, base plywood and 2x4 frame. Connect the outside uprights to the base with 6-in. hex-head machine screws, washers and nuts, and the center uprights to the base with 4-in. versions. You'll repeat this process at the top after installing the top frame (Photo 3).

Install the top

The top frame has the same dimensions and layout as the base frame but is made from 2x2s instead of 2x4s. As you cover the frame with plywood, use

1 Support the base frame with temporary legs and screw it to wall studs. Use a string line and shims to make sure the front edge is perfectly straight.

2 Fasten the uprights to the wall with screw-in drywall anchors. Make sure each upright is plumb and squared with the base.

3 Set the top on the uprights and bolt it to them. Also bolt the uprights to the base. Then nail plywood panels to the uprights to enclose the framing.

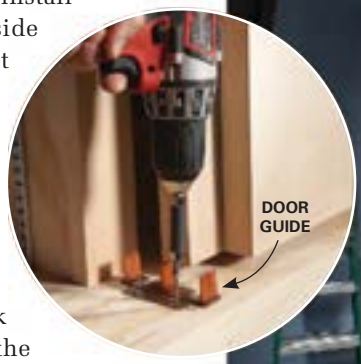
the plywood edges as a guide to make it straight and square.

Locate and mark the studs along the line where the top will be. Then lift the top onto the uprights (plywood side down), align the ends and lag-screw the frame to the wall. If your situation is like most, with just a narrow 6-in. space (Photo 3) between the cabinet top and the ceiling, this part is no fun! But it's crucial that the top be securely fastened to studs. Add shims between the wall and the frame if there are gaps. Then bolt the top to the uprights and nail the second side of the plywood to all the uprights (Photo 3). Shown here is birch plywood on the exposed left side to match the doors. This outside plywood piece is 6 in. longer than the interior plywood to cover the top and bottom framing.

Install the trim and hang the doors

Start by cutting trim boards to cover the uprights and nail them on with 2-in. finish nails (Photo 4). Trim a 3-1/2-in.-wide board to fit tight against the wall. Complete the trim by cutting and installing the top and bottom (horizontal) boards to fit between the ends.

Mount the door track 1 in. from the back side of the top trim (Photo 5). This cabinet has two 8-ft. tracks. The ends were cut so there would only be one joint in the center of the track. Mount the hangers. Then tilt the doors and hook the wheels onto the track to install them (Photo 7). If you're having trouble installing the front doors, loosen the adjusting screws on the wheels and extend them to maximum height. After installing the doors, crawl inside the cabinet and readjust the wheels so the doors hang level and are even with each other. Finish the door installation by installing the door guides. Locate them where the doors overlap, centered 2-5/8 in. back from the front edge of the trim.



With the shelves in, all that's left to do is brush on two coats of polyurethane, load up your new storage space, and say goodbye to that mess in your garage.

4 Dress up the front edges of the base and uprights by nailing on trim boards. The top trim overhangs the top to hide the door track.

5 Screw the door tracks to the top, using spacers to position them. Make sure the sections of track align perfectly where they meet so the doors slide smoothly.

6 Screw two rollers to the back of each door. Later, you can loosen the screws to raise or lower the door for a perfect fit.

7 Tilt the doors to hook the rollers onto the track. Hang three doors on the inner track and three on the outer. Install door guides at each upright and halfway between them.

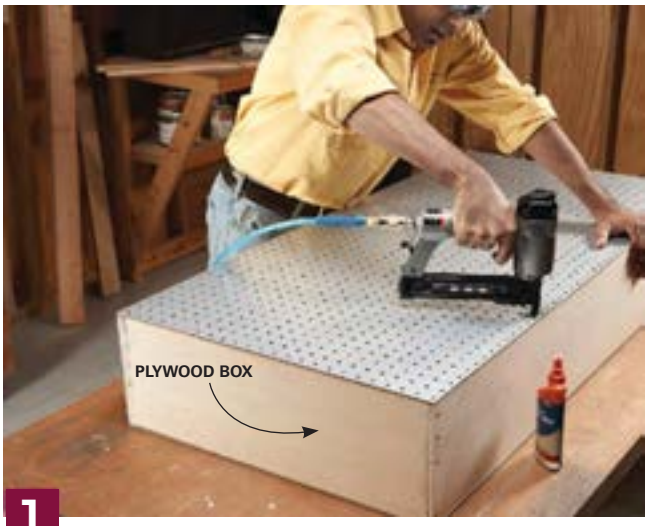
Clever catchall cabinet

Get hanging storage and shelving with this two-hour project

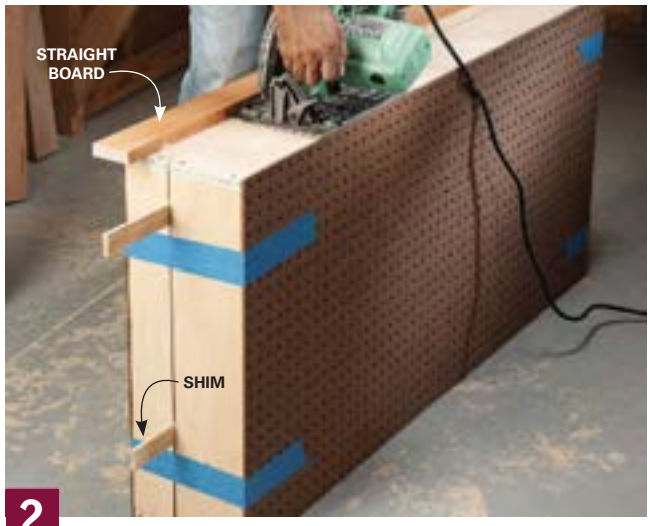
Use this wall cabinet to store just about anything, including hand tools, paint supplies and small boxes of fasteners and hardware. The build-a-box-and-cut-it-in-half technique is simple, and then all you have to do is face-mount a full-length continuous hinge. It couldn't be easier. And the result is a sturdy, practical wall-hung cabinet.

Materials for one of these cabinets cost about $60 to $70, but you could reduce the price per cabinet by buying 4 x 8-ft. sheets of pegboard and plywood and building several cabinets instead. Start by cutting 8-in. strips of plywood and screwing them together to form a 2-ft. by 4-ft. box. Place screws accurately as shown in Figure A to avoid hitting them when you cut the box in two (Photo 2). Also be sure to orient the pegboard so the good side faces out on the front and in on the back. Be careful to cut the pegboard pieces perfectly square and with straight sides so you can use them as a guide for straightening the box sides and squaring the box as you nail on the pegboard (Photo 1).

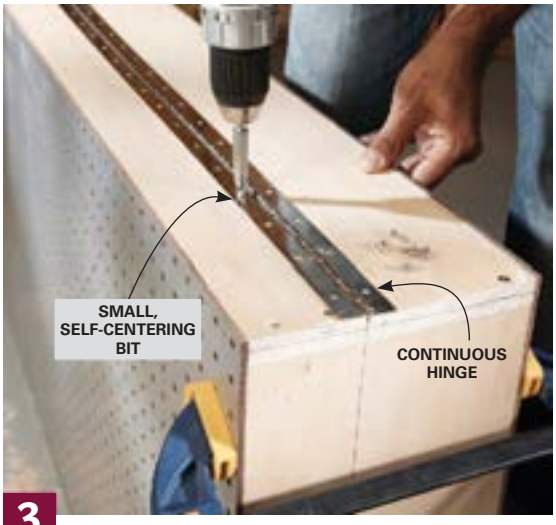
To cut the box into two pieces, begin by tacking a straight board to the box sides as a saw guide. Position the guide so the cut runs 3 in. from the front edge of the box and falls between the screws. Set the saw blade to cut 7/8 in. deep. Align the guide carefully on each side so the cuts meet in the corners. Before you make the final cut, use shims and tape to hold the cabinet together, and keep them on until the cut is complete (Photo 2). Figure A shows the cabinet dimensions and details as well as the rack to hold paint roller covers. Screw two 3-in.-wide strips of 3/4-in. plywood to the back of the cabinet. These provide a stronger hanging surface, and they space the cabinet from the wall to allow the use of pegboard hooks on the cabinet back. Mount the cabinet by driving 1/4-in. by 3-in. lag screws through the hanging strip into wall studs.



1 Build a simple box and cover both sides with pegboard. Remember to face the good side of the back pegboard to the inside of the box.



2 Cut the box in two using a guide board for a perfectly straight cut. Before the final cut, use shims and tape to hold the box together.

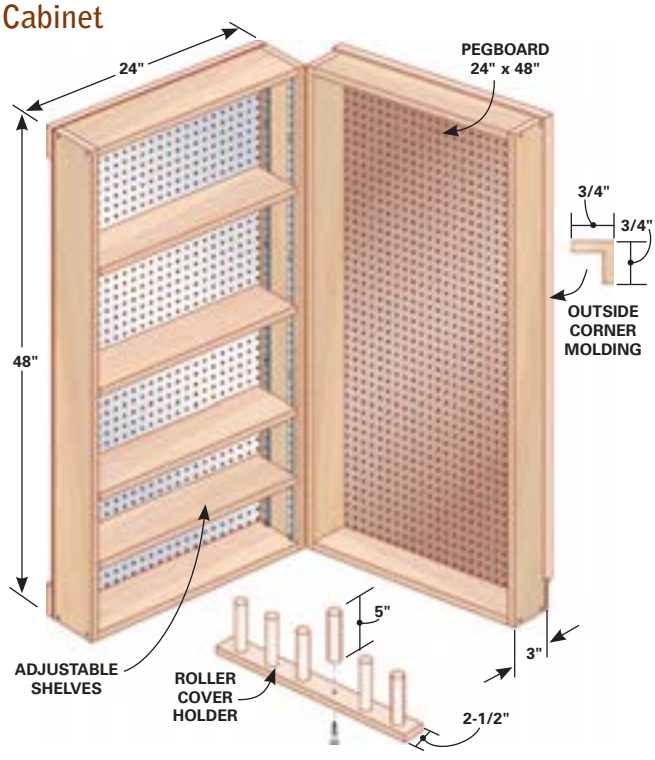


3 Mount the door on the cabinet with a continuous hinge. Hold it in place with one screw on each end. Then use a small, self-centering bit to make pilot holes for the remaining screws.

4 Trim the door with corner molding. Mark the inside of the molding at cabinet corners and turn the molding face down on the miter saw to cut the miter.

Figure A

Cabinet



Materials list

QTY.	ITEM
1	4' x 4' x 3/4" plywood
2	2' x 4' pegboard
14'	3/4" outside corner molding
24	1-5/8" screws
1	1-1/2"-wide x 48" continuous hinge
4	48" metal shelf standards
16	Shelf clips
1	Small hook latch
1 lb.	1" brads
	Wood glue

You'll also need 3 ft. of closet rod if you want to add the roller cover holder.

Fold-up workbench

Extra work surface when you need it; extra parking space when you don't

What it takes

Time: One day, not including the paint and varnish
Cost: About $150, including the hardware but not the finish
Skill level: Beginner to intermediate
Tools: Circular saw, drill and jigsaw

The last time I stopped in at my sister's house, my brother-in-law was on the garage floor putting together a tricycle for his grandson. They had recently moved into a new house, and apparently his last workbench hadn't made the trip. I decided to build him a new one.

Space was a major consideration. I wanted to build a bench big enough to be useful, but there was only a few feet between the garage wall and the front of their parked cars. Money was also a concern—I didn't want to spend a lot of it. He is, after all, my brother-in-law. Finally, I wanted something easy and fun to build. I came up with an inexpensive design with a top that will work fine for smaller jobs. It has an additional top that folds up for those larger projects...like assembling a tricycle.

—Mark Petersen, Senior Editor

Build the top and bottom

Cut the 3/4-in. plywood parts to size following the cutting diagram (p. 77). Cut a 15-in. x 8-ft. strip out of the 1/4-in. plywood to use as drawer bottoms. The leftover is the perfect width for the back (E); it just needs to be ripped down to length. Don't cut the drawer fronts until after the workbench carcass is assembled.

Cut the 2x4s that make up the top and bottom frames (F and G). Assemble them with two 3-in. screws into each end. The studs I used were made from Douglas fir, which is strong but brittle, so to prevent splitting, I predrilled the screw holes with a 1/8-in. bit. Fasten the plywood top and bottom (A and C) to the frames with 1-5/8-in. screws. I countersunk the screws on the top so I could fill them with wood filler. I used wood glue in addition to screws throughout this project.

Attach the sides

Lay the top upside down and attach the sides (B) with six 1-5/8-in. screws. Flip the sides and top upside down and set it on the flattest surface available, then attach the bottom with 1-5/8-in. screws as well. Try to position the wood with the fewest flaws toward the front (Photo 1).

Fasten the shelf and drawer divider

Cut a couple of scrap 2x4s to the same height as your drawer divider (D). Use the divider on one side and the 2x4 scraps on the other as guides to achieve the proper height for your shelf (C). Predrill 1/8-in. holes through the plywood into the shelf before installing the four 1-5/8-in. screws (see Photo 2). Use a framing square to mark the location of the drawer divider. Predrill holes through the plywood and into the divider before securing it in place with four 1-5/8-in. screws on both the top and bottom.

Attach the back

Use a framing square to make sure everything is all

1 **Assemble the main components.** Lay the top upside down and attach the sides with six 1-5/8-in. screws. Then flip the whole thing over and attach the bottom. Try to position all the wood so the best sides are facing the outside and top.

2 **Add a shelf.** Temporarily support the shelf using the drawer divider and a couple of 2x4 scraps. To avoid splitting the plywood shelf, predrill holes through the sides and into the shelf before fastening with screws.

3 **Install the drawer guides.** Install the bottom drawer guides first, and then cut a scrap of plywood to act as a spacer for the upper guides. Fasten the guides with glue and trim-head screws.

Figure A

Simple workbench

Overall Dimensions:
60-1/2" wide x 34-3/4" high x 32" deep (or 16" deep, folded)

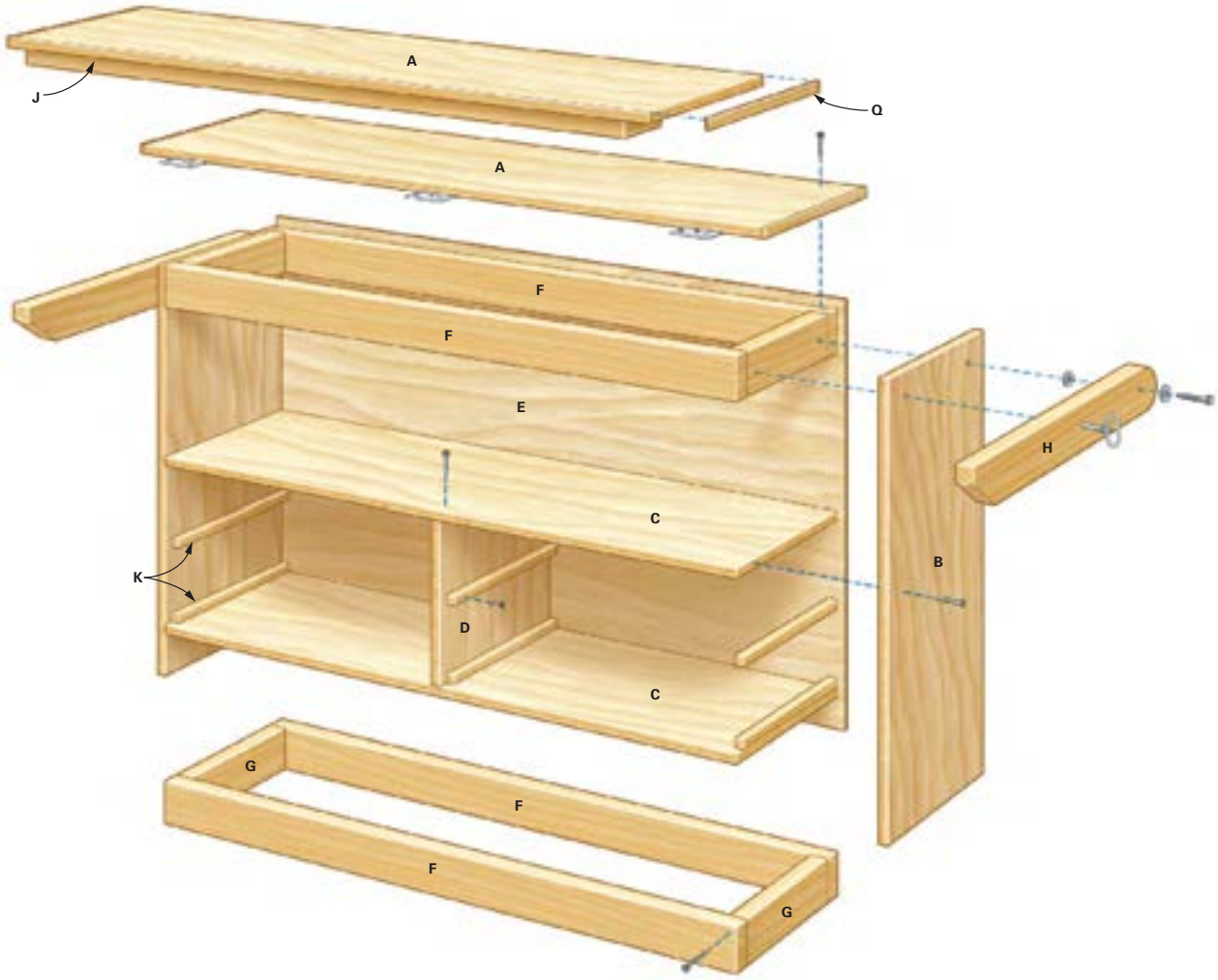
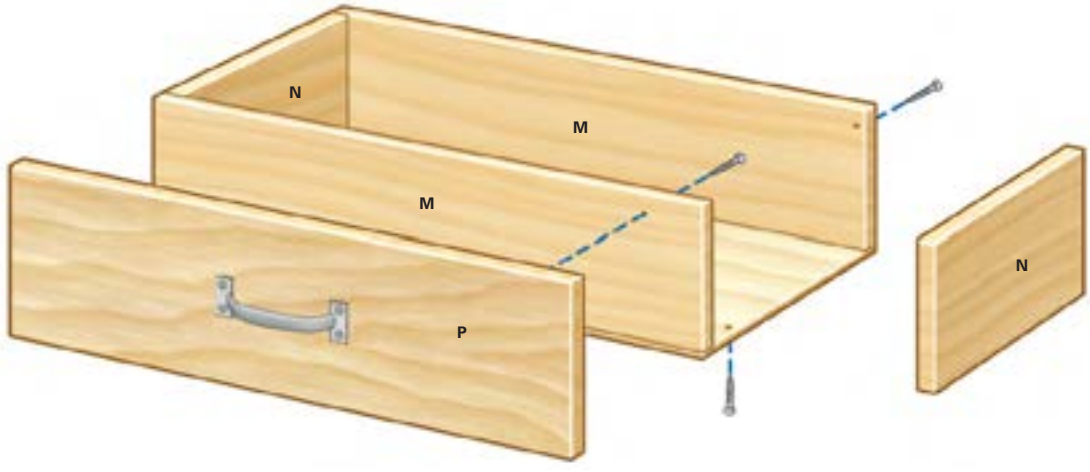


Figure B

Drawer construction



Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	2	60" x 15-3/4" bench tops
B	2	34" x 15-3/4" sides
C	2	55-1/2" x 15-3/4" bottom and shelf
D	1	13-1/4" x 15-3/4" drawer divider
E	1	57" x 32-7/8" x 1/4" back
F	4	55-1/2" x 1-1/2" x 3-1/2" front/back of frames
G	4	12-3/4" x 1-1/2" x 3-1/2" frame sides
H	2	30-1/2" x 1-1/2" x 3-1/2" support arms
J	1	55-1/4" x 1-1/2" x 3-1/2" benchtop brace
K	8	15" x 3/4"x 7/8" drawer guides
L	4	15" x 27-1/4" x 1/4" drawer bottoms
M	8	27-1/4" x 3/4" x 5-1/2" drawer front/back
N	8	13-1/2" x 3/4" x 5-1/2" drawer sides
P	4	27-1/4" x 6-1/2" plywood drawer fronts
Q		Screen mold/plywood edging cut to fit

Materials list

QTY.	ITEM
2	4' x 8' x 3/4" BC plywood
1	4' x 8' x 1/4" BC plywood
5	2x4 x 8' studs
4	1x6 x 8' No. 2 pine
2	1/4" x 3/4" x 8' pine screen mold
3	3-1/2" door hinges
1 lb.	3" self-drilling exterior grade wood screws
1 lb.	1-5/8" self-drilling exterior grade wood screws
1 lb.	1-1/4" trim screws
2	3/8" x 4-1/2" lag screws
4	3/8" fender washers
2	1/2" hitch pins
4	Drawer pulls
1	Bottle of wood glue
1 qt.	Primer
1 qt.	Enamel paint
1 qt.	Polyurethane

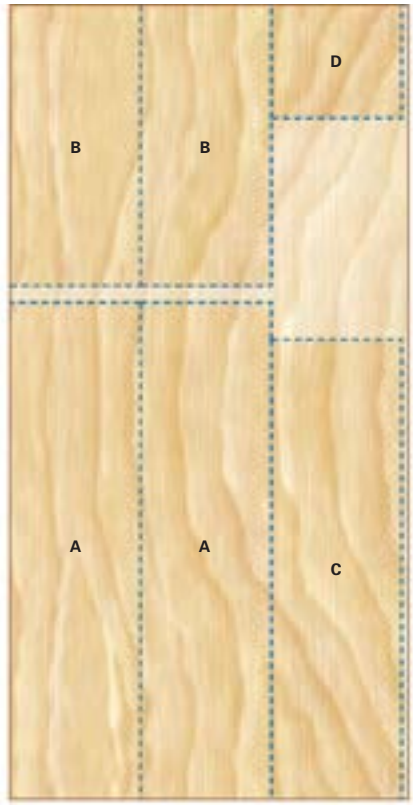
squared up before you fasten the back (E). If you don't have a framing square, you can measure diagonally from top to bottom both ways. If the numbers aren't the same, tweak it one way or the other until they are. Don't glue the back on—you'll want to be able to remove it when it's time to paint and stain. Predrill the holes, then fasten the back with 1-1/4-in. trim screws.

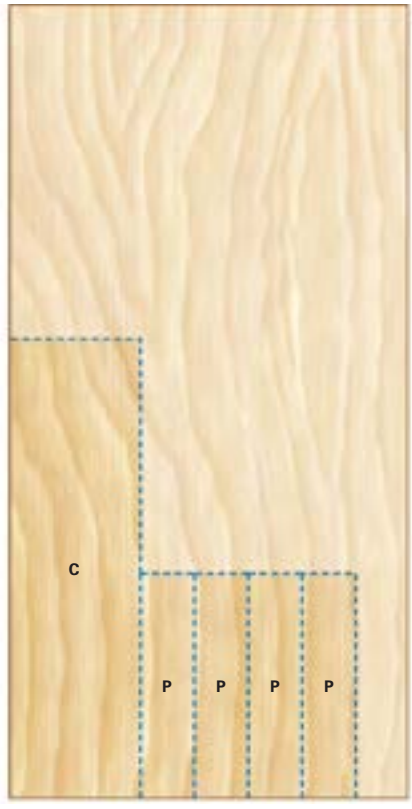
Build your drawers

Make your drawer guides (K) out of 1x6s. Rip them down to 7/8 in. and align them all so the drawers will rest on the larger side. Rip down a sacrificial chunk of plywood to 5-7/8 in. to use as a spacer to achieve the proper height for the drawer guides (Photo 3). Screw the guides on with 1-1/4-in. trim screws. Don't forget the glue; screws alone won't be sufficient to hold a drawer full of heavy tools.

Cutting diagrams

1/4" plywood diagram not shown.





There is enough plywood left over on this project to build all the drawer frames, but 1x6s happen to be the perfect size. So for a few extra dollars, you don't have to rip down a bunch more plywood. Build the drawer boxes so there is at least a 1/8-in. gap on each side of the drawer. Use 1-5/8-in. screws to assemble the frames and 1-1/4-in. screws to attach the bottom.

Install the folding top

Flip the bench upside down, and butt the folding top (A) tight up against the permanent one. To ensure that the screws start straight, mark the hinge screw locations with a pencil, and use a nail set to create a starter hole. Use 3/4-in. screws to fasten the hinges to the folding top—the ones that come with the hinges will likely poke through.

Cut and assemble the support arms

After cutting the support arms (H) to length, use a compass to mark a half-circle on one end of the arms, and then trim them with a jigsaw. Cut a 45-degree angle on the other side. With the bench still upside down and the support arm clamped down about 1 in. in from the back of the bench, predrill a 1/4-in. hole for the lag/pivot screw. Start the hole at the center of the circle you made at the end of the arm. Drill through the arm and into the bench.

Next, install the lag screws with a washer on both sides of each arm. Check to see that they swing back and forth freely. You may have to trim a little off if they rub on the bench top. When you drill holes for the hitch pins, make sure you avoid the 3-in. screws that hold the top frame together (Photo 6).

Fasten the brace board and screen mold

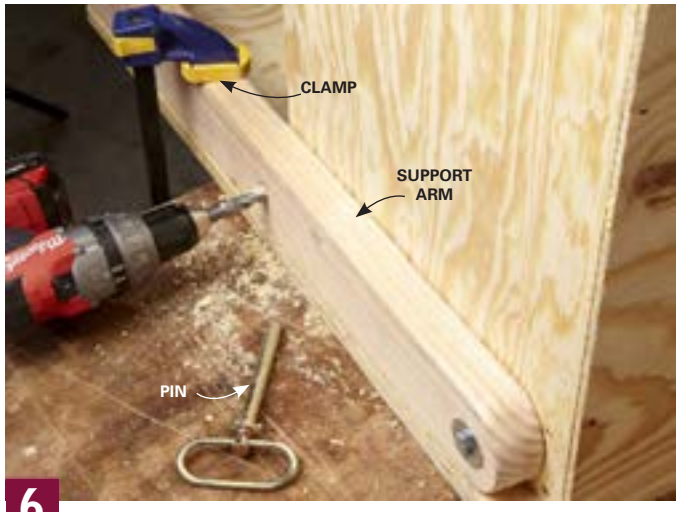
Glue, clamp and screw on the benchtop brace board (J). The brace board should be at least 1/4 in. shorter than the opening of the area above the shelf. If you countersink 3/8-in. holes in the bottom of the brace, 1-5/8-in. screws will work from the bottom up. Screen molding (Q) helps protect the exposed plywood edges of the bench tops. Install the molding with the folding top up. Leave a small gap between the two tops so the molding doesn't bind when the top is folded down. Use glue and brad nails, or use a trim gun if you have one.

Finishing

To finish the workbench carcass, I used a primer formulated for raw wood, and enamel paint for durability. Be sure to paint the bottom to prevent moisture from wicking up into the raw wood. I used satin polyurethane for the tops and drawer fronts. I also used poly on areas the drawers come in contact with (painted parts tend to stick together). If the drawers start to bind, try a coating of shellac on the drawers and drawer guides.

4 **Position drawer fronts perfectly.** With the drawer box in place, position the front with shims. Fasten the pulls with 1-1/4-in. screws. Those screws will hold the front in place so you can pull the drawer out and add more screws from inside.

5 **Install the folding top.** Flip the bench upside down and push the folding top tightly up to it. Use 3/4-in. screws to connect the hinge to the bench top so they don't poke all the way through.



6 **Drill the pin hole.** Make sure the folding top is clamped securely to the support arm before you drill a hole for the hitch pin. When drilling a hole this big, it's easier to start with a pilot hole about half the size.

Grab & go tool storage

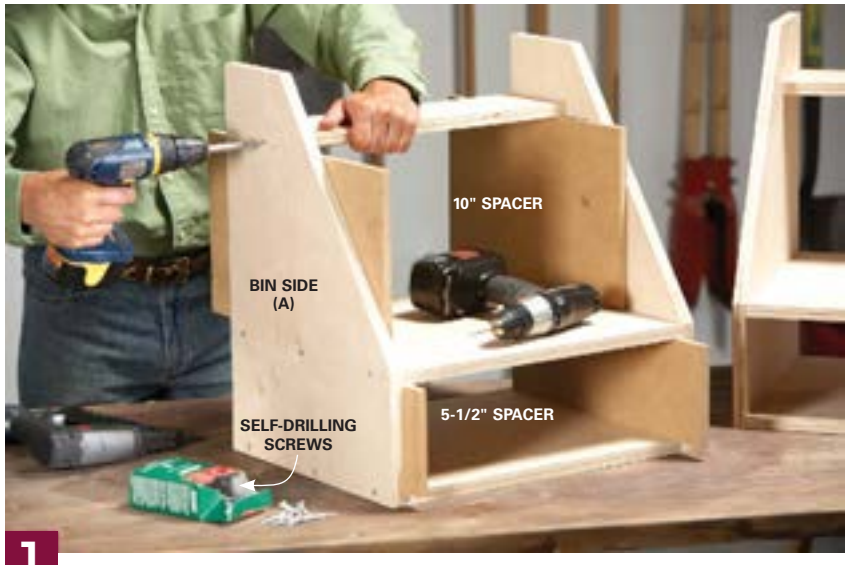
Roll your tools right where you need them

Do you spend too much time looking for tools on shelves scattered around your garage? If so, this grab-and-go tool cabinet is the answer. You corral all your power tools and accessories in one place and roll them around your garage or shop. The pullout table is great for doing quick repairs, prepping tools and sorting parts. The drawers are removable totes that you can carry to your work area.

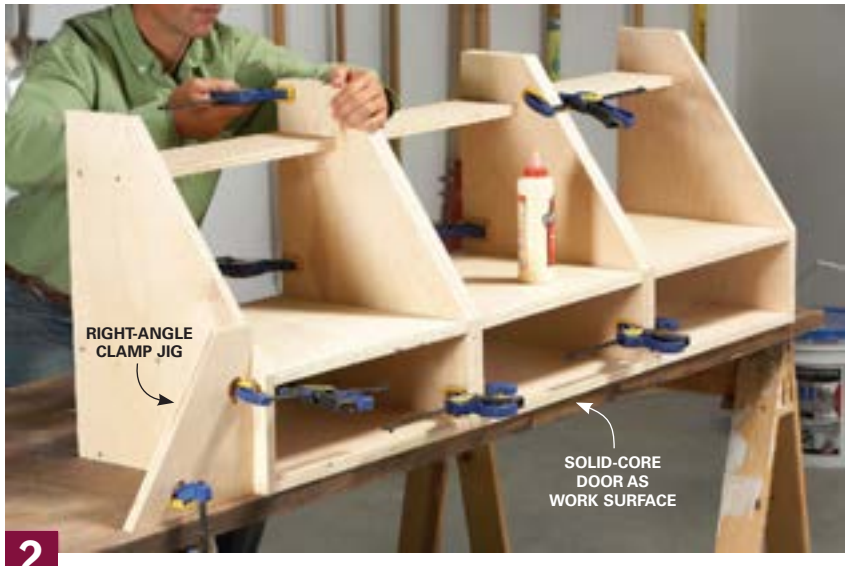
You'll also like how easy it is to build. All the parts are glued and screwed together with simple butt joints and overlays. Just build the top section of tool bins first, then build the lower shelving unit to slide under.

Materials list

QTY.	ITEM
4	3/4" hardwood plywood
2	1/2" hardwood plywood
40'	1/4" x 3/4" screen molding
20'	1/4" x 1-1/2" lattice
5'	3/4" x 1-1/2" (hardwood table edging)
5'	1x8 hardwood (drawer facing)
5'	1x4 hardwood (table front)
2	14" ball-bearing drawer slides
4	3" swivel casters
3	5" drawer pulls
2	8"-wide drawer pulls
1 pint	Wood glue
1 box	No. 8 x 1-1/4" screws
1 box	No. 8 x 1-1/2" screws
16	5/16" x 1-1/2" lag screws
1 box	1-1/4" 18-gauge nails



1 **Build the bins.** Position the shelves with spacers and tack them in place with a brad nailer. Then add screws for strength.

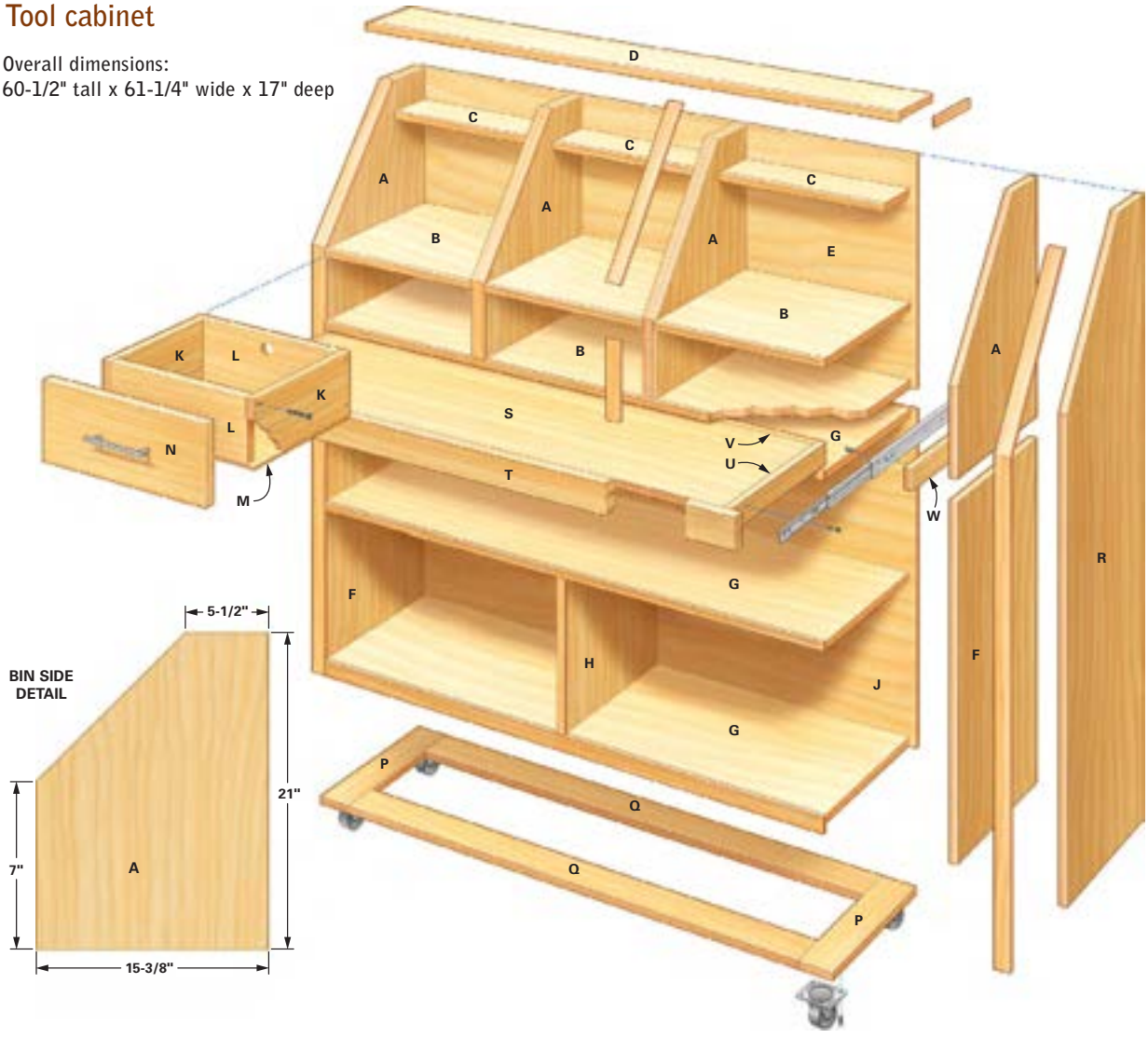


2 **Join the bins.** Line them up on a flat surface, then glue and clamp them together. A homemade squaring jig holds the bins square until the back is on.

Figure A

Tool cabinet

Overall dimensions:
60-1/2" tall x 61-1/4" wide x 17" deep



Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	6	3/4" x 15-3/8" x 21" bin sides
B	6	3/4" x 15-3/8" x 18" bin shelves
C	3	3/4" x 5" x 18" upper bin shelves
D	1	3/4" x 7" x 60-3/4" top
E*	1	1/2" x 21" x 58-1/4" upper assembly back
F	2	3/4" x 15-3/8" x 32" lower unit sides
G*	3	3/4" x 15-3/8" x 56-7/8" lower unit shelves
H	1	3/4" x 15-3/8" x 14-13/16" lower unit vertical partition
J*	1	1/2" x 32" x 58-1/4" lower unit back
K	6	1/2" x 15-3/8" x 5-1/4" drawer sides
L*	6	3/4" x 17" x 5-1/4" drawer fronts and backs
M*	3	1/4" x 15-3/8" x 17-7/8" plywood drawer bottoms

KEY	QTY.	SIZE & DESCRIPTION
N	3	3/4" x 6-5/8" x 19-1/4" hardwood drawer face
P	2	3/4" x 3-1/2" x 15-3/4" plywood side base supports
Q*	2	3/4" x 3-1/2" x 51-3/16" plywood front and back base supports
R	2	3/4" x 15-7/8" x 55-7/8" plywood finished sides
S*	1	3/4" x 14-5/8" x 54-3/8" plywood pullout table
T*	1	3/4" x 3-1/4" x 58-1/4" hardwood table face
U*	2	3/4" x 1-1/2" x 15-3/8" hardwood table side edging
V*	1	3/4" x 1-1/2" x 54-3/8" hardwood table back edging
W	2	3/4" x 2" x 15-3/8" plywood spacers

** Measure and cut to fit*

Time, money and materials

You can easily build the cabinet in one weekend and then apply the finish and install the hardware the next. Figure on spending about $400 for the entire project including hardware and finish. We chose 3/4-in. birch plywood for the main structure and 1/2-in. plywood for the backs and drawer sides. You'll also need hardwood for the drawer fronts and the edges of the pullout work surface. You can dress up the look with simple moldings to cover the exposed plywood faces.

Build the upper bins first

Cut the plywood parts according to the Cutting list on p. 81. Assemble each of the three bins as shown in Photo 1. To make assembly faster, we used self-drilling screws, which means you won't need a pilot hole or a countersink. However, drill a shallow starter hole with a 3/32-in. bit to keep the tip of the screw from wandering off the mark as you start to drive the screw.

When you join the three bins (Photo 2), you'll need a work surface that's absolutely flat; an old flush panel door on sawhorses works perfectly for this. Finish the bin unit by gluing and nailing the top into place (Photo 3).

Making the drawers fit

Measure the openings in the bottom of the bins and then downsize the drawer about 1/8 in. in total height and width. Since the drawers don't have slides, this will give you just the right clearance. Take into account the thickness of the plywood drawer bottom. Sometimes "1/4-in. plywood" is actually 3/16 in. thick.

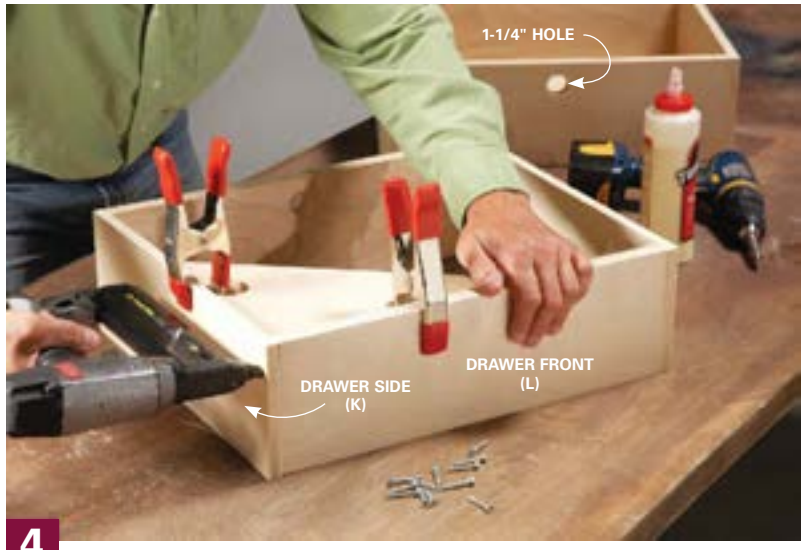
Build the lower shelving section

Measure the width of the top assembly and then cut the parts for the lower shelving unit so it'll be exactly the same width. "Three-quarter-inch" plywood isn't exactly 3/4 in. thick; it's actually 23/32 in. That's why it's critical to measure.

Screw the sides to the shelves using Figure A as your guide. Install the lower partition (H) halfway between the bottom and middle shelf. Cut the 1/2-in. plywood back and check the assembly for square, then glue and nail it to the back of the sides and shelf.

To reinforce the bottom shelf, rip 3-1/2-in. strips of 3/4-in. plywood (parts P and Q) and glue and nail them to the bottom of the assembly. Screw the casters to the strips.

3 **Add the back and top.** First, glue and nail on the back. Then sand the front edges of the bins so they're flush. Finally, glue and nail on the top.



4 **Build the drawers.** Tack them together with nails and glue, then add screws. A squaring jig makes square assembly easy. Drill holes through the back of each drawer to act as a handle.

5 **Mount the slides for the pullout table.** Glue and nail spacers to sides, then add the slides. This is a lot easier to do before you attach the sides to the bins.

Combine the two sections

Mount the drawer slide that will support the pullout table (Photo 5). Then lay the upper unit onto its back and glue and screw the outer sides (R) to the bin sides (A). You may need to shim underneath to bring the sides perfectly flush.

Next, slide the lower unit into the upper until it contacts the spacers (W). Align the faces of the lower assembly with the outer sides (R) and drive the screws from the inside. You'll need nine screws per side.

At this stage, the project has acquired considerable heft, so get someone to help you tip it upright.

Nail on the edging

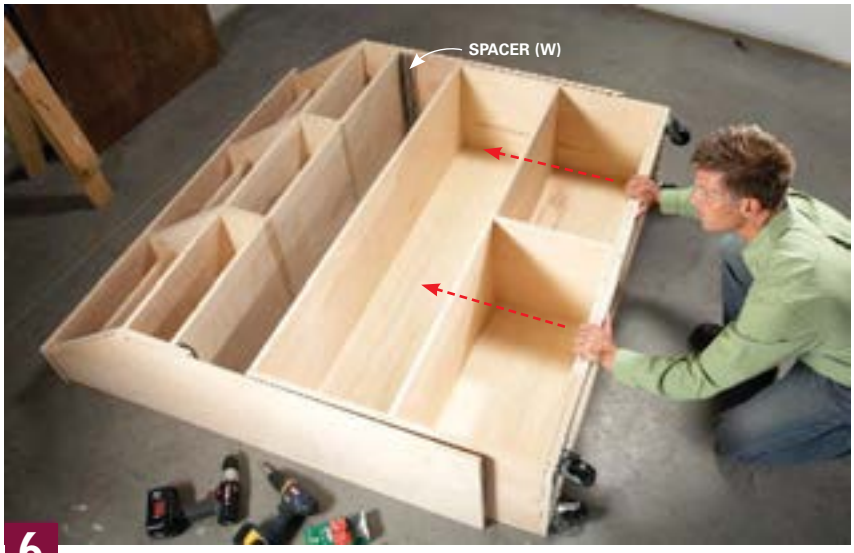
Now you can cut and glue the edge banding to the exposed plywood edges. We used screen molding for the 3/4-in. faces and 1/4-in.-thick lattice for the double-thick faces. You may need to rip the lattice to fit. Keep in mind that you don't want the trim to hang over and obstruct the drawer openings, so be sure to flush the edging with the plywood.

Finishing touches

With the unit nearly finished, you can now make the pullout table. Carefully measure the distance between the side spacers. Subtract 1 in. from this measurement (1/2-in. clearance for each drawer slide) and build the table to this precise width. Now you can cut and screw the drawer faces to the front of the drawers. Be sure you have 1/4-in. clearance between the bottom of the drawer faces and the pullout table. Align the edges of the outer drawer faces so they're even with the table front.

For a fast, easy finish, use a wipe-on polyurethane or Danish oil. Use a brush to get into tight areas and then a lint-free rag to wipe the finish. Let dry and give it a second coat.

TIP:
To make sure your drawers don't get trapped inside their openings before you install the fronts, press a strip of masking tape onto the inside front of the drawer and let it hang past the drawer. You can pull on the tape if you accidentally close the drawer.

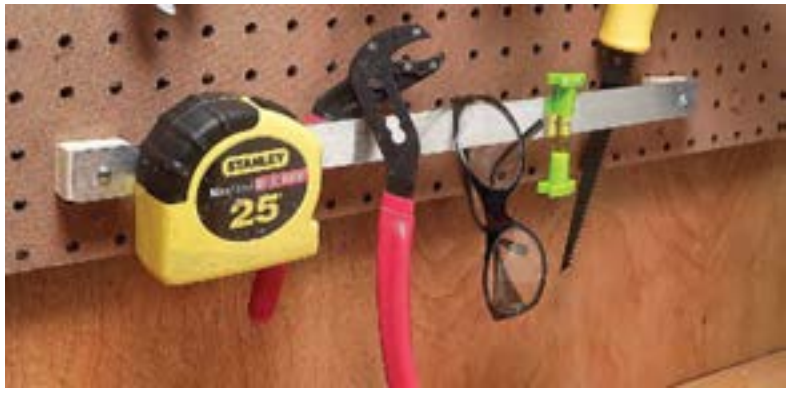


6 **Combine the upper and lower units.** Slide the lower unit into the upper unit until it makes contact with the spacers. Screw the lower unit to the sides.

7 **Cover exposed plywood edges.** If the trim is a bit too wide, you can shave it slightly with your table saw. Glue and nail the edging into place.

Storage tip: Tape and glasses hanger

A 1/8-in.-thick strip of steel or aluminum fastened to a wall or workbench with 3/4-in.-thick spacers makes a great holder for tape measures, safety glasses and other stuff that doesn't hang easily on hooks.



Air compressor loft

Nestle your compressor into a corner of the floor and measure the size of the shelf you need to fit it. Leave an extra 2 in. of room at the front where you can screw on a 2x2 lip to "corral" the compressor so it won't walk over the edge while it's running. Then measure the height of the compressor to determine the proper distance from the ceiling to the shelf so the compressor has enough clearance.

To build the shelf, start by fastening 2x6 ledger boards to the studs with 5/16-in. x 4-in. lag screws driven into each stud. Screw down a chunk of 3/4-in. plywood on top of the 2x6s for the compressor floor and another chunk on the underside for a storage shelf. A strategically placed 3-in. hole makes it easy to drain the tank from underneath. To really complete this air tool station, solder 1/2-in. copper tubing and attach it to the compressor with a swivel "snubber" hose. Connect an air hose reel for compact hose storage for long-distance needs and a curlicue-style hose for air-at-your-fingertips bench work.

CHAPTER

6 Closets, Bedroom & Entryway

Triple your closet space!

If you have to dig through a mountain of clothes to find your favorite sweatshirt, it's time to take on that messy closet. This simple-to-build system organizes your closet with shelf, drawer and hanging space for your clothes, shoes and accessories. Buying a closet system like this would cost you at least $500, but you can build this one for about half that.

This system is really just four plywood boxes outfitted with shelf standards, closet rods or drawers. Here it is built for an 8-ft.-wide closet with an 8-ft. ceiling, but it'll work in any reach-in closet that's at least 6 ft. wide if you adjust the shelf width between the boxes or change the box dimensions.

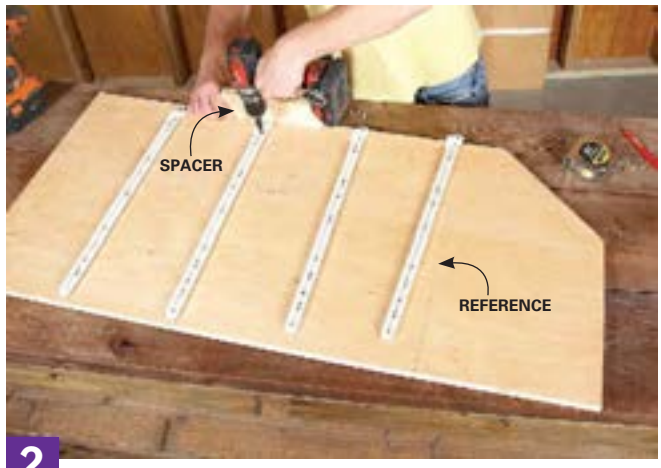
Time, money and materials

You can complete this project in a weekend. Spend Saturday cutting the lumber, ironing on the edge banding and applying the finish. Use your Saturday date night to clean everything out of the closet. That leaves you Sunday to build and install the new system.

Materials list

QTY.	ITEM
3	4' x 8' x 3/4" plywood
1	4' x 8' x 1/2" plywood
1	4' x 8' x 1/4" plywood
1	8' closet rod
2 pkgs.	Edge banding (iron-on veneer)
4 prs.	20" drawer slides
10	6' shelf standards
10	Closet rod flanges
1	Wire basket
1 box	2-1/2" screws
1 box	1-5/8" trim screws
1 box	1-1/4" screws
1 box	1" screws
1 pint	Wipe-on poly

1 **Finish now, save time later.** Prefinishing gives you a faster, neater finish because you'll have fewer corners to mess with. Apply two coats of polyurethane quickly and smoothly with a disposable paint pad.



2 **Preinstall drawer slides.** Attaching slides is a lot easier before the boxes are assembled. Position the slides using reference lines and a spacer. Remember that there are left- and right-hand slides, usually marked "CL" and "CR."

3 **Gang-cut the standards.** Cutting 16 standards one by one with a hacksaw would take hours. Instead, bundle two or more together with tape and cut them with a jigsaw.

4 **Nail first, then screw.** If you have a brad nailer, tack the boxes together to hold the parts in position. Then add screws for strength.

This entire system was built with birch plywood. The total cost, including the hardware for the drawers, shelves and closet rods, was about $250 (see Materials List). You could use MDF or oak plywood instead of birch. Everything you need for this project is available at home centers.

Cut and prefinish the parts

Start by cutting all the parts to size following Figure C and the Cutting list on p. 89. The corner box sides are slightly narrower than 12 in., so you can cut off dings and dents and still cut four sides from a sheet of plywood.

You won't be able to cut the shelves that fit between the boxes to length until the boxes are installed (the shelves need to be cut to fit), but you can rip plywood to 11-7/8 in. and cut the shelves to length later.

Once the parts are cut, apply edge banding (iron-on veneer) to all the edges that will be exposed after the boxes are assembled (Figure A). Build a jig to hold the parts upright. Place a part in the jig. Then cut the edge banding so it overhangs each end of the plywood by 1/2 in. Run an iron (on the cotton setting) slowly over the edge banding. Then press a scrap piece of wood over the edge banding to make sure it's fully adhered. Trim the edges with a veneer edge trimmer. Visit familyhandyman.com and search "edge banding" for instructions.

Lightly sand the wood and your closet rod with 120-grit sandpaper. Wipe away the dust with a tack cloth, then use a paint pad to apply a coat of polyurethane on everything except the drawer parts (Photo 1). This inexpensive pad will let you finish each part in about 20 seconds. Let the finish dry, then apply a second coat.

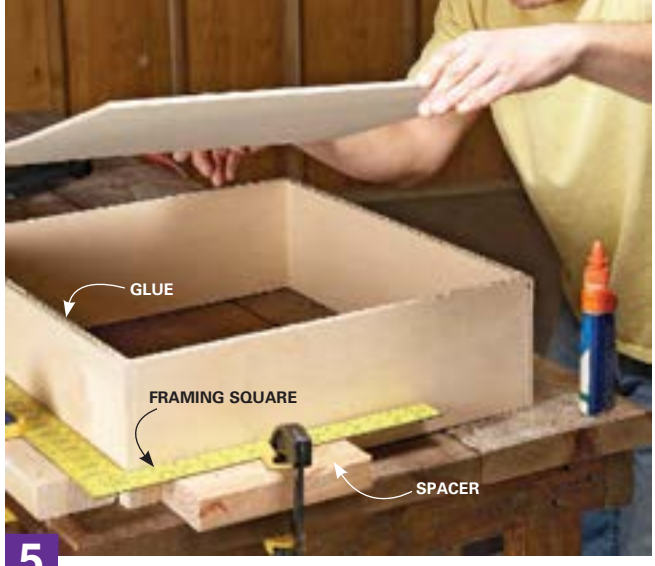
Attach the hardware

It's easier to install the drawer slides and the shelf standards that go inside the boxes before you assemble the boxes. Use a framing square to draw reference lines on the drawer unit sides for your drawer slides (see Figure A). The slides are spaced 8 in. apart, centered 8-3/4 in. down from the top of the box. Keep the slides 3/4 in. from the front edge (this is where the drawer faces will go). Use a 7/64-in. self-centering drill bit to drill pilot holes and screw the slides into place (Photo 2).

You'll need your wire basket now (available at home centers). Attach the glides for the basket 3 in. below the drawer slides. If your basket is narrower than 22-1/2 in., screw a cleat to the box side so the basket will fit.

Now attach the shelf standards. You can cut them with a hacksaw, but an easier way is to use a metal blade in a jigsaw. Place two or more standards together so the numbers are oriented the same way and the standards are aligned at the ends. Tape the standards together where you're going to make the cut, then gang-cut them with your jigsaw (Photo 3).

Screw the standards to the inside of the box sides, 1 in. from the edges. Keep the standards 3/4 in. from the top (that's where the box tops go). Be sure the numbers on the standards are facing the same way when you install them—this ensures the shelves will be level.



5 **Square the drawer boxes.** If the boxes aren't square, the drawers won't fit right or glide smoothly. Drawers take a beating, so assemble them with nails and glue.

Figure A

Closet storage system

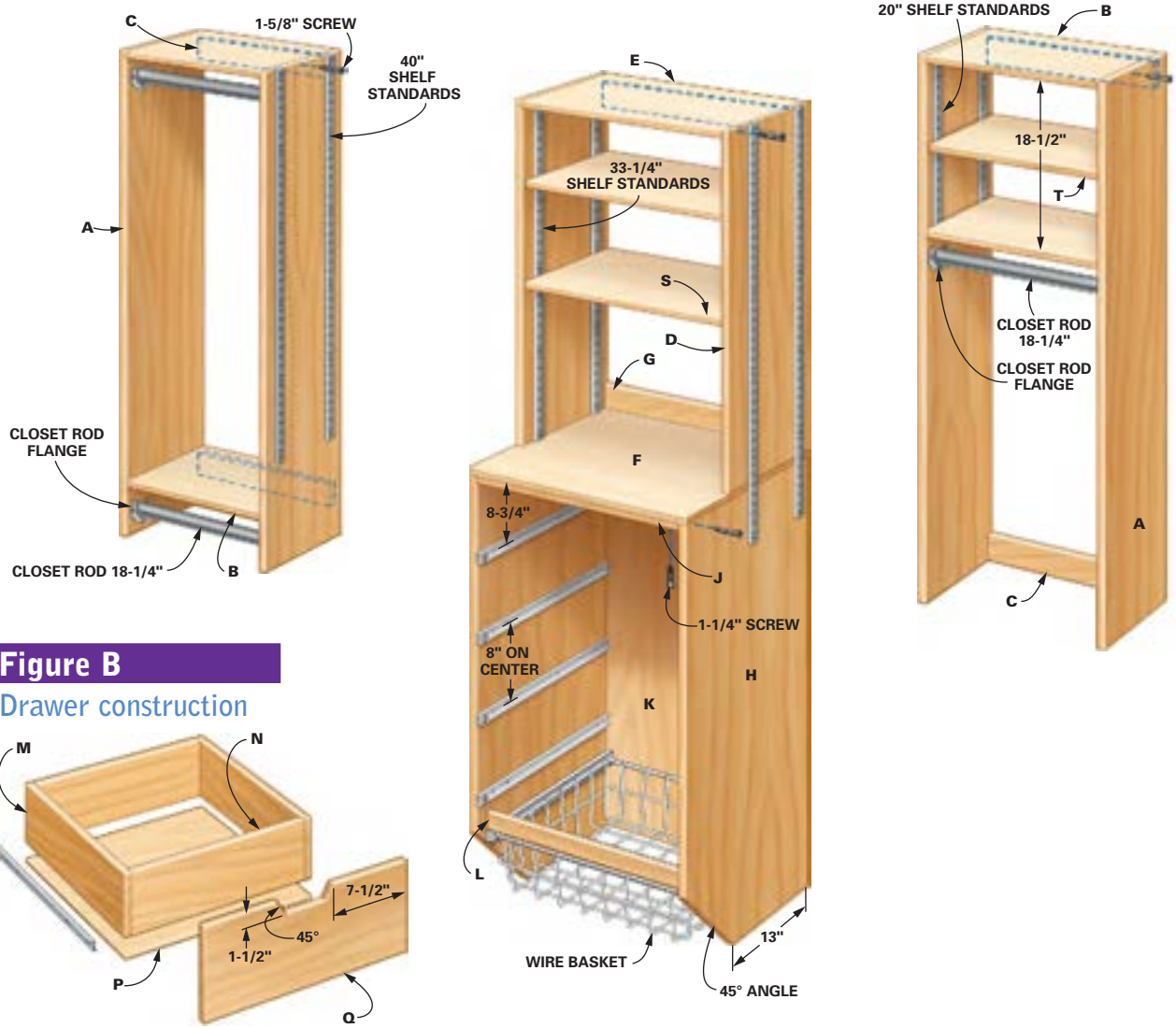


Figure B

Drawer construction

Assemble the boxes

Use a brad nailer to tack the boxes together following Figure A and Photo 4. If you don't have a brad nailer, use clamps. Then screw the boxes together. Use 1-5/8-in. trim screws because the screw heads are small and unobtrusive (you can leave the screw heads exposed). Here are some tips for assembling the boxes:

- Attach the screw strips to the box tops first, then add one side, then the bottom shelf, and then the second side.
- Drill 1/8-in. pilot holes to prevent splitting. Stay 1 in. from edges.
- If your cuts are slightly off and the top, bottom and sides aren't exactly the same width, align the front edges.
- The boxes will be slightly wobbly until they're installed in the closet, so handle them with care.
- The middle bottom box has a back. Square the box with the back, then glue and tack the back in place.
- After the corner boxes are assembled, screw shelf standards to the side that doesn't abut the wall (it's easier to install the standards before the boxes are installed).

Build the drawers

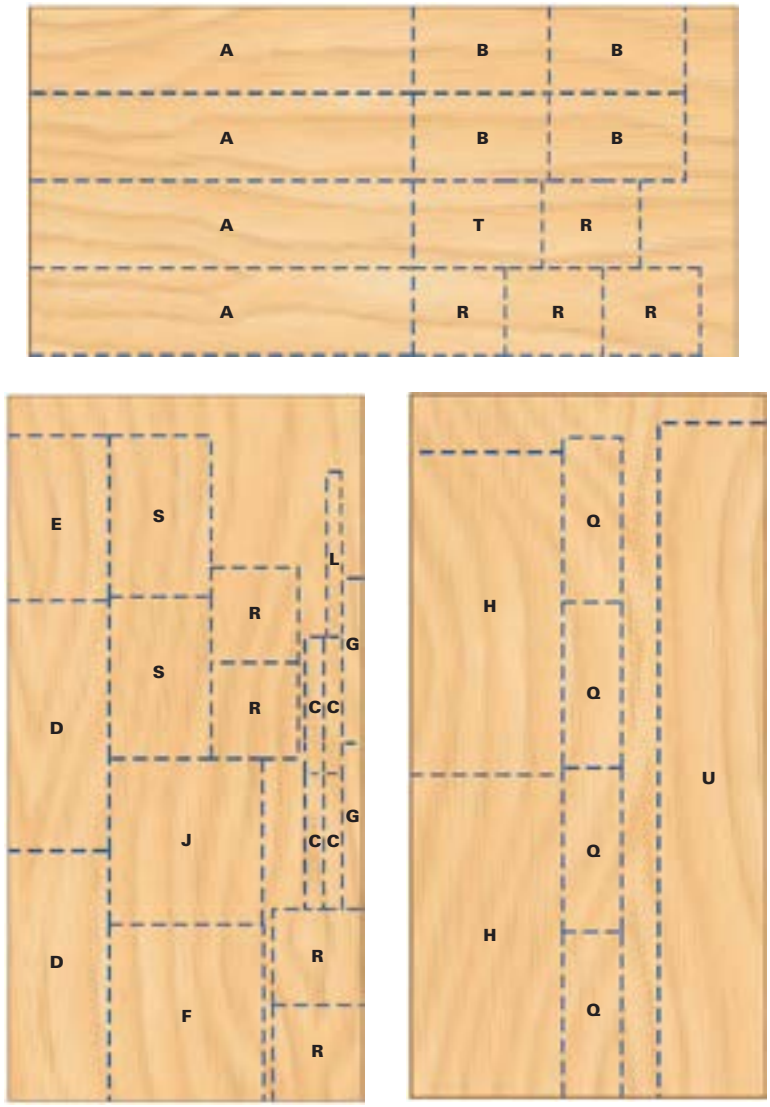
Cut the drawer sides and bottoms (see Cutting list, below). Assemble the sides with glue and 1-in. screws. To square the drawers, set adjacent sides against a framing square that's clamped to your work surface. Glue and tack the drawer bottom into place (Photo 5). Then set the drawer slides on the drawers, drill pilot holes and screw the slides into place.

Install the drawers in the box. Getting the drawer faces in their perfect position

Figure C

Closet system cutting diagrams

This shows only the 3/4-in. plywood. The 1/2-in. and 1/4-in. plywood sheets are for the drawers and back.

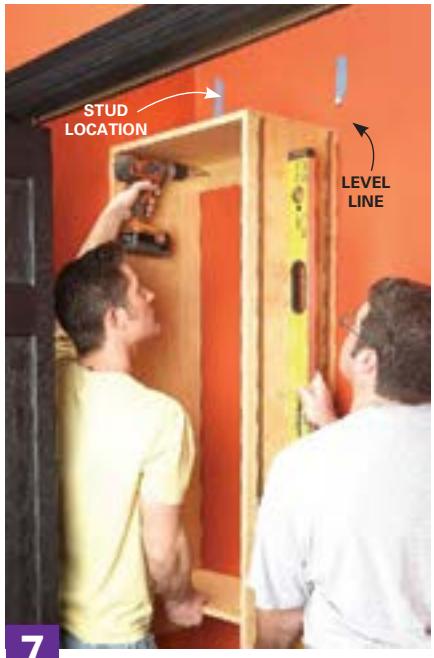


Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	4	3/4" x 11-7/8" x 52" corner box sides
B	4	3/4" x 11-7/8" x 18-1/2" corner box tops and bottom
C	4	3/4" x 2-1/2" x 18-1/2" corner box screw strips
D	2	3/4" x 13-7/8" x 34" shelf unit sides
E	1	3/4" x 13-7/8" x 22-1/2" shelf unit top
F	1	3/4" x 21" x 24" shelf unit bottom
G	2	3/4" x 2-1/2" x 22-1/2" shelf unit screw strips
H	2	3/4" x 20-3/4" x 44" drawer unit sides
J	1	3/4" x 20-3/4" x 22-1/2" drawer unit top
K	1	1/4" x 24" x 44" drawer unit back

KEY	QTY.	SIZE & DESCRIPTION
L	1	3/4" x 2" x 22-1/2" drawer unit cleat
M	8	1/2" x 6" x 20" drawer sides
N	8	1/2" x 6" x 20-1/2" drawer fronts and backs
P	4	1/4" x 20" x 21-1/2" drawer bottoms
Q	4	3/4" x 7-3/4" x 22-1/4" drawer face
R	8	3/4" x 11-7/8" adjustable shelves, cut to length (not shown)
S	2	3/4" x 13-7/8" x 22" adjustable shelves for shelf unit
T	1	3/4" x 11-7/8" x 18" right corner box adjustable shelf
U	1	3/4" x 14-1/4" x 96" top shelf (not shown)

6 **Center the drawer faces perfectly.** Stick the faces to the boxes with double-sided tape. Then pull out the drawer and drive screws from inside the box.



7 **Square the drawer boxes.** If the boxes aren't square, the drawers won't fit right or glide smoothly. Drawers take a beating, so assemble them with nails and glue.

8 **Center the drawer faces perfectly.** Stick the faces to the boxes with double-sided tape. Then pull out the drawer and drive screws from inside the box.

is tricky business. If the faces are even slightly off-center, the drawer won't close properly. To align them, place double-sided tape over the drawer front. Starting with the top drawer, center the drawer face in the opening (Photo 6). You should have about a 1/8-in. gap on both sides and the top. Press the face into the tape. Take out the drawer and clamp the face to the drawer to keep it stationary. Drive two 1-in. screws through the inside of the drawer into the face.

Hang the boxes in the closet

Now install the boxes. Start by drawing a level line in the closet, 11 in. down from the ceiling. This will give you just over 10 in. of storage space above the closet system after the top shelf is installed. Then mark the stud locations on the wall with tape.

Don't assume your closet walls are plumb—they're probably not. So you can't just place a box in a corner without checking for alignment. Hanging the boxes is a two-person job, so get a helper. Start with the corner boxes. Align the top of the box with your level line on the wall. Have your helper plumb the box with a level while you drive 2-1/2-in. screws through the screw strip into the wall at the stud locations (Photo 7). Attach the other corner box the same way.

Find the center of the wall, then make a mark 12 in. on one side of the center mark. That's where your shelf unit will go. Again, have your helper plumb the box while you align it with your marks and screw it to the wall.

Prop up the drawer unit on spacers so it's tight against the shelf unit. Align the edges, then clamp the boxes and screw them together (Photo 8). Drive screws through the screw strip into the wall.

Then place the top shelf over the boxes. This shelf barely fit into place. If yours won't fit, you'll have to cut it and install it as two pieces. Make the cut near one end, over a corner box, so it's not noticeable. Screw the shelf to the box tops with 1-1/4-in. screws.

Then attach shelf standards along the sides of the shelf and drawer units (Figure A). Cut the adjustable shelves to length to fit between the corner boxes and the middle boxes. Finally, screw the closet rod flanges into place, cut the closet rod to size and install the rods.

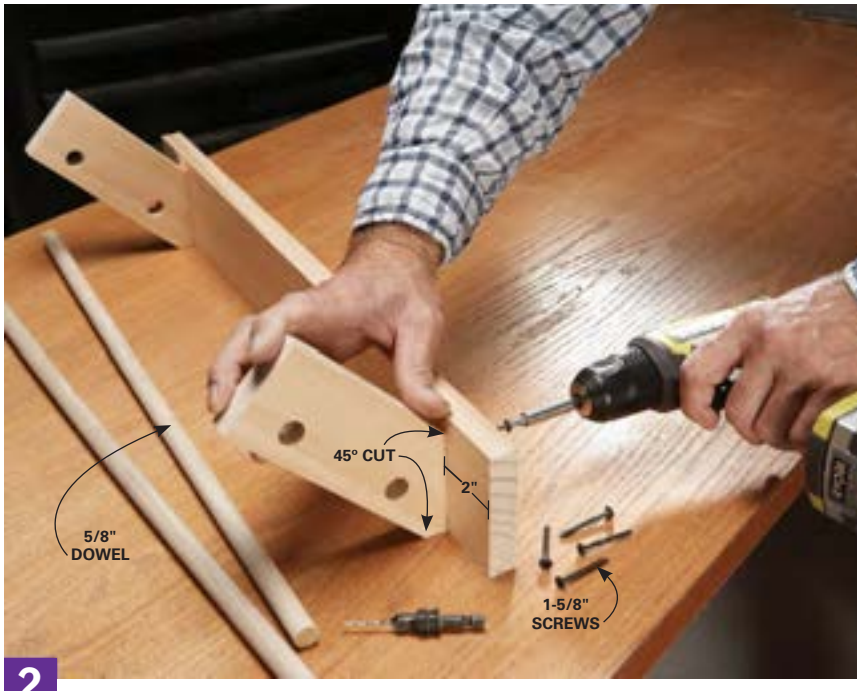
1 Clamp the 1x3 support to a piece of scrap wood as you drill the holes to prevent the wood from splintering.

Shoe ladder

Without constant vigilance, shoes tend to pile up into a mess next to entry doors. Untangle the mess with a simple, attractive shoe ladder that keeps everything from boots to slippers organized and off the floor.

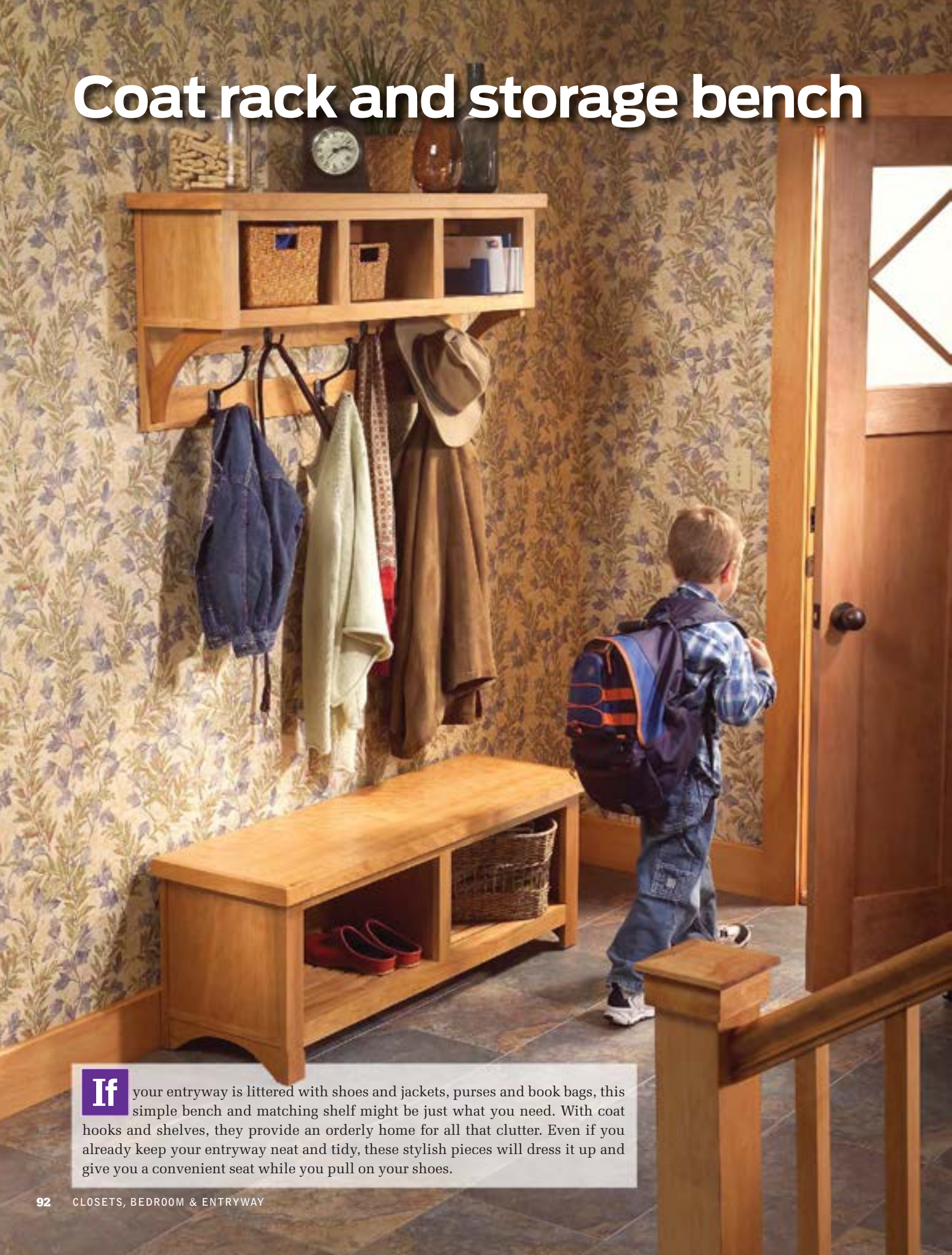
Cut and drill the dowel supports (Photo 1), then screw them to 1x4s (Photo 2). Cut the 1x4s to fit your shoes and the available space—an average pair of adult shoes needs 10 in. of space. Nail or glue the dowels into the dowel supports, leaving 2 in. (or more) extending beyond the supports at the end to hang sandals or slippers.

Apply finish before you mount the shoe ladder to the wall. Screw the shoe ladder to studs or use heavy-duty toggle-bolt style anchors to hold it in place.



2 Predrill through the back of the 1x4 into the 1x3 supports, then glue and screw the pieces together.

Coat rack and storage bench



If your entryway is littered with shoes and jackets, purses and book bags, this simple bench and matching shelf might be just what you need. With coat hooks and shelves, they provide an orderly home for all that clutter. Even if you already keep your entryway neat and tidy, these stylish pieces will dress it up and give you a convenient seat while you pull on your shoes.

Here we'll show you how to build both pieces from raw lumber to finishing. These projects were designed for fast, easy building; they're basically plywood boxes with decorative parts added. There's no tedious precision work, no intricate joinery. Even the curved parts are simple to make. If you're an intermediate woodworker, you can handle this project, and if you have only a little woodworking experience, this is a good "step-up" project.

Time, money and tools

Building this set will take you two or three days, plus a few hours of finishing work. These pieces were built from cherry boards and cherry plywood. Cherry is expensive—made from oak, maple or birch this project will cost much less. For a more rustic look, use pine and plywood and spend even less.

This project requires two special tools: a table saw to rip solid wood to width and a pocket screw jig to make strong butt joints. If you don't own a pocket screw jig, buy one. It's a good investment and is easy to use. In addition, you'll need a drill, miter saw, random orbital sander and jigsaw. An air-powered 2-in. brad nailer isn't absolutely necessary, but it'll save lots of time and give you better results.

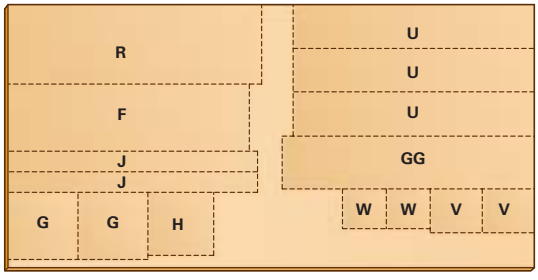
The bench begins as a box

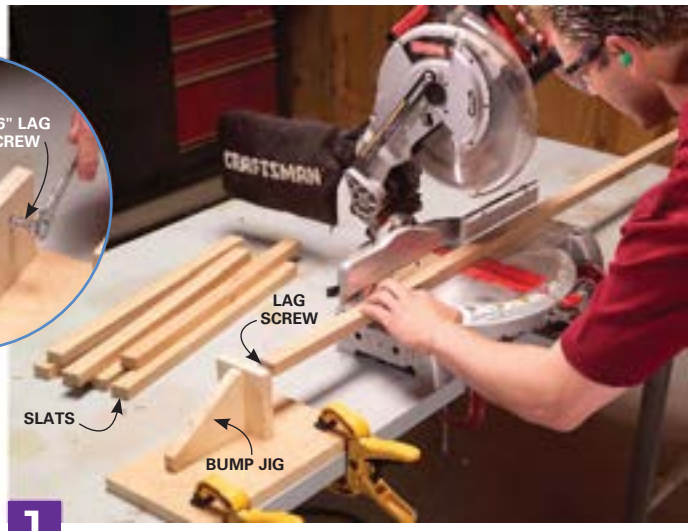
The box that forms the core of the bench is made mostly from 3/4-in. plywood. For the floor of the box, a grille was made from solid wood slats. You could save a couple of hours by using a 12-in. x 44-in. piece of plywood instead, but a slatted grille looks better.

Rip the grille parts to the widths shown in the Cutting list (p. 95) and then cut them to length. All the slats (A) must be precisely the same length, so make a simple bump jig from plywood scraps and a lag screw (Photo 1). Clamp your miter saw and the bump jig to your workbench and make the repetitive cuts.

Pocket screws make assembling the grille fast and easy (Photos 2 and 3). For tips on using a pocket screw jig, visit familyhandyman.com and search "pocket screws."

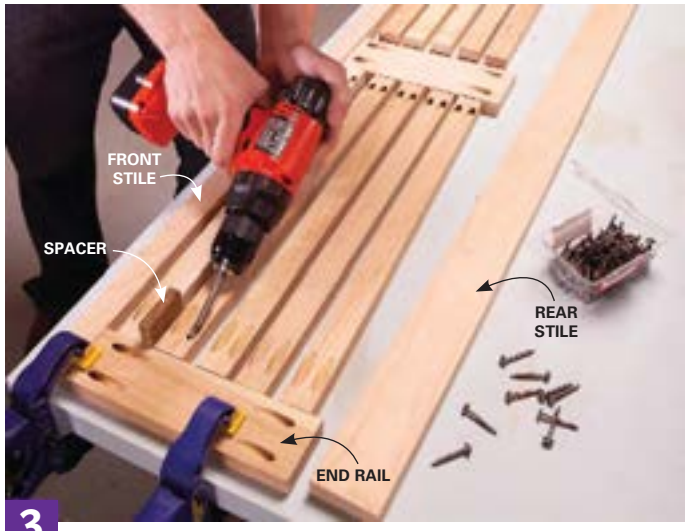
Plywood cutting diagram





1 Rip the parts for the grille. Cut all the slats to identical lengths using a bump jig. Make fine length adjustments by turning the lag screw in or out.

2 Drill pocket holes in the grille parts. To avoid confusion, lay out the grille with the best-looking side of each piece face down. Put each part back in place after drilling.



3 Assemble the grille with pocket screws. Screw the front stile to one end rail first, then position the slats using a 7/16-in. spacer. Attach the rear stile last.

Figure A

Bench details

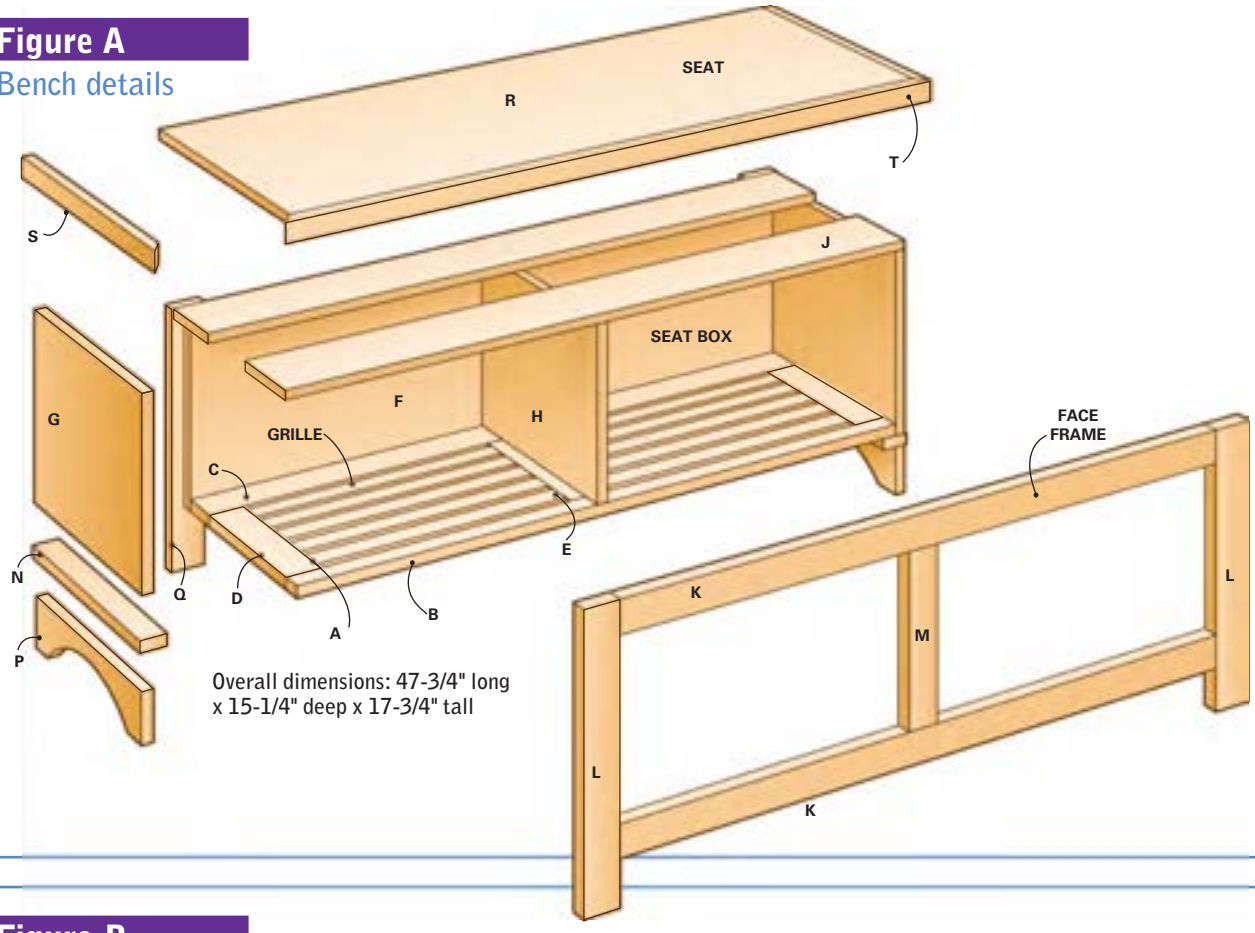
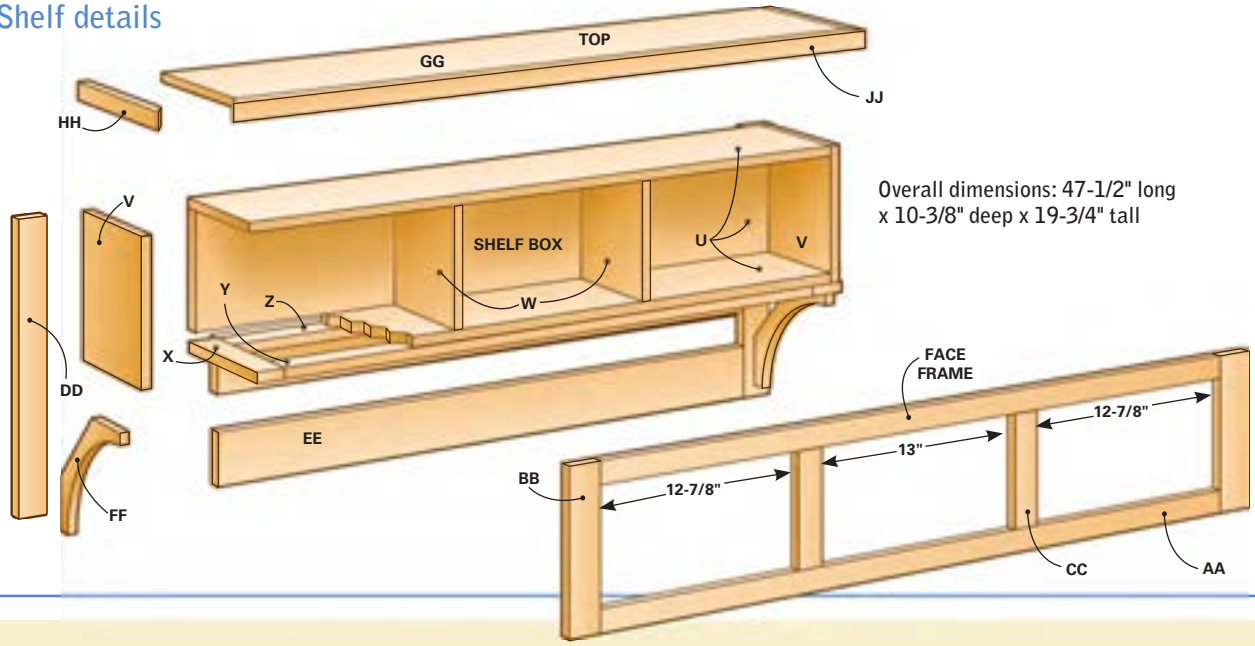


Figure B

Shelf details



Materials list

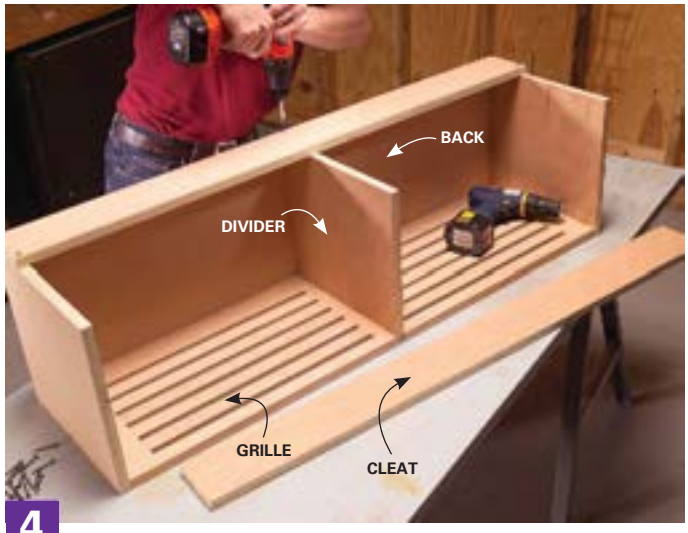
ITEM	QTY.	ITEM
4' x 8' sheet of 3/4" plywood	1	Wood glue
Solid wood (36 linear feet of 1x6)	18 board ft.	Wood filler
1-1/4" screws		Spray lacquer
1-3/4" and 2" brads		Coat hooks (3 large and 2 small)
3/4" plastic or cloth feet		Pocket screw jig (available at home centers or online)

Cutting list

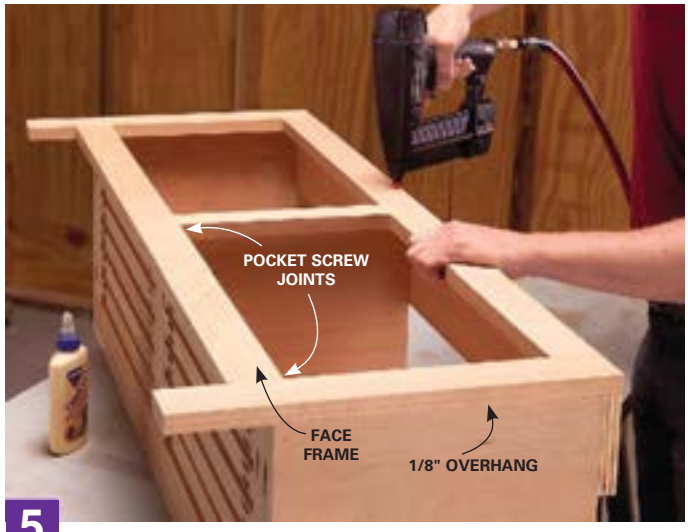
KEY	PCS.	SIZE & DESCRIPTION
A	10	1-1/8" x 18-1/4" (slats)
B	1	1-1/8" x 44" (front stile)
C	1	2-1/4" x 44" (rear stile)
D	2	2-1/4" x 8-5/8" (end rails)
E	1	3" x 8-5/8" (middle rail)
F	1	12-1/4" x 44" (back panel)
G	2	12-1/4" x 12-3/4" (end panels)
H	1	11-1/2" x 12" (divider)
J	2	3-3/4" x 45-1/2" (cleats)
K	2	2" x 41-1/4" (upper and lower rails)
L	2	2-1/4" x 17" (front legs)
M	1	1-3/4" x 10-1/4" (middle stile)
N	2	1-1/2" x 12-3/4" (rungs)
P	2	3-1/4" x 12-3/4" (arches)
Q	2	2-1/4" x 17" (rear legs)
R	1	14-1/2" x 46-1/4" (seat panel)
S	2	1-1/2" x 15-1/4" (side bands)
T	1	1-1/2" x 47-3/4" (front band)
U	3	8" x 44" (top, bottom, back)
V	2	8" x 9-1/2" (end panels)
W	2	7-1/4" x 8" (dividers)
X	2	2" x 8" (stiles)
Y	1	1-1/4" x 41-3/4" (front rail)
Z	1	2" x 41-3/4" (rear rail)
AA	2	1-1/2" x 41-3/4" (upper and lower rails)
BB	2	2" x 10-1/4" (end stiles)
CC	2	1-1/2" x 7-1/4" (divider stiles)
DD	2	2" x 19" (rear stiles)
EE	2	3-1/2" x 41-3/4" (coat hook rails)
FF	2	3-1/2" x 11-1/2" (brackets)
GG	1	9-5/8" x 46" (top panel)
HH	2	1-1/4" x 10-3/8" (side bands)
JJ	1	1-1/4" x 47-1/2" (front band)

Use wood glue on your pocket screw joints later in this project, but skip the glue when you assemble the grille—removing excess glue from between the slats is nearly impossible. When the grille is complete, sand all the joints flush with a random orbital sander and a 100- or 120-grit disc. Then switch to a 150- or 180-grit disc and sand the entire surface. Use this same sanding sequence on all the solid-wood bench and shelf parts.

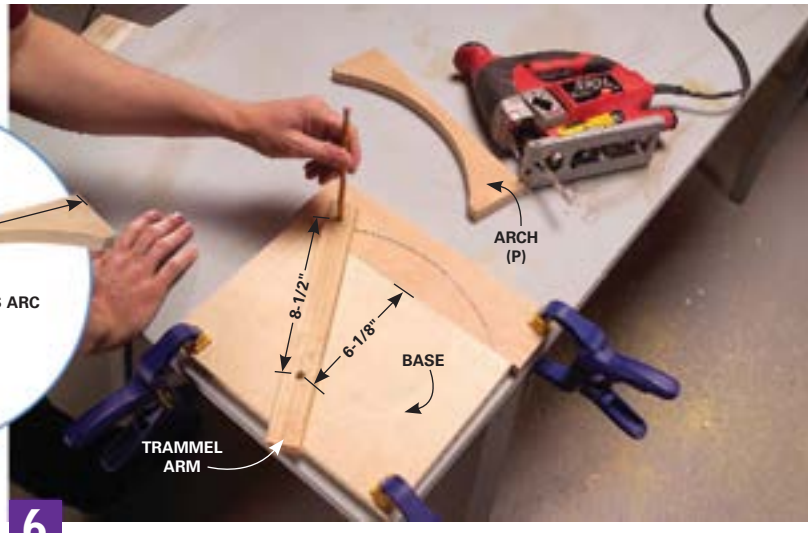
Cut the plywood box parts following the Cutting list. If you don't have a table saw, use a circular saw and straightedge. Lightly sand the plywood parts with 150-grit sandpaper before you assemble the box with glue and brads (Photo 4).



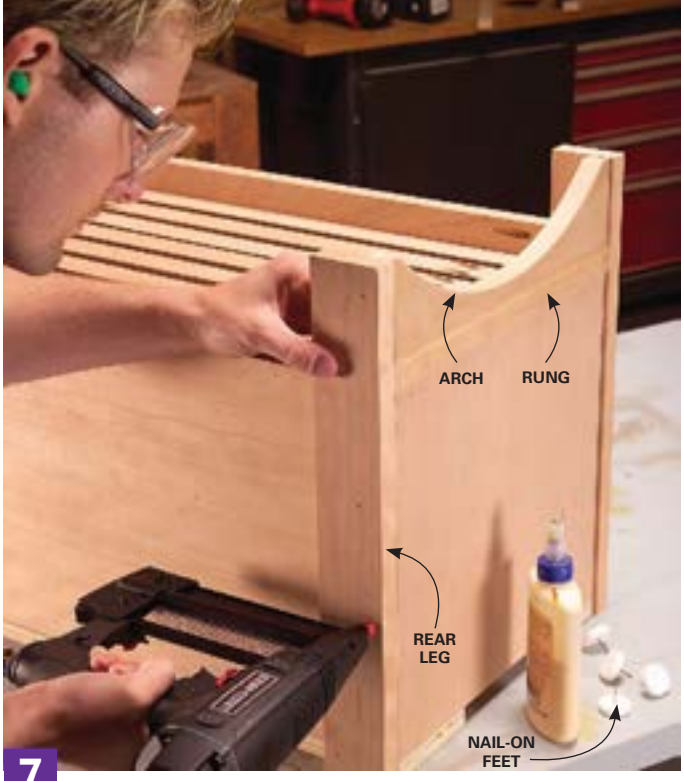
4 Cut the plywood parts and assemble the seat box, sides, back, partition and grille with 1-3/4-in. brads and glue. Predrill and screw the cleats to the top of the box.



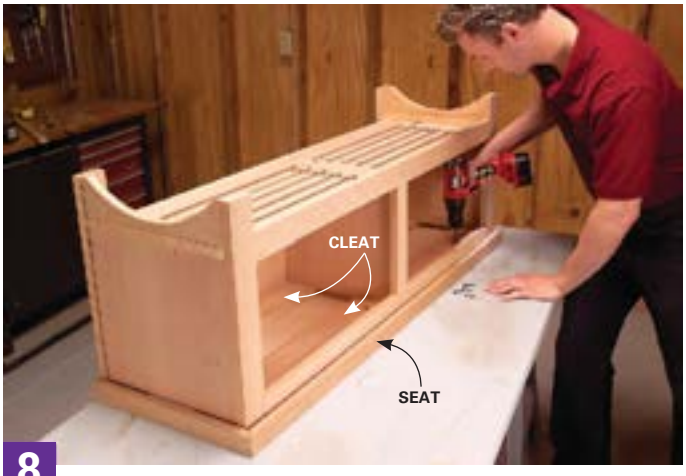
5 Assemble the face frame with glue and pocket screws and nail it to the seat box. Remember that the face frame overhangs the sides of the box by 1/8 in.



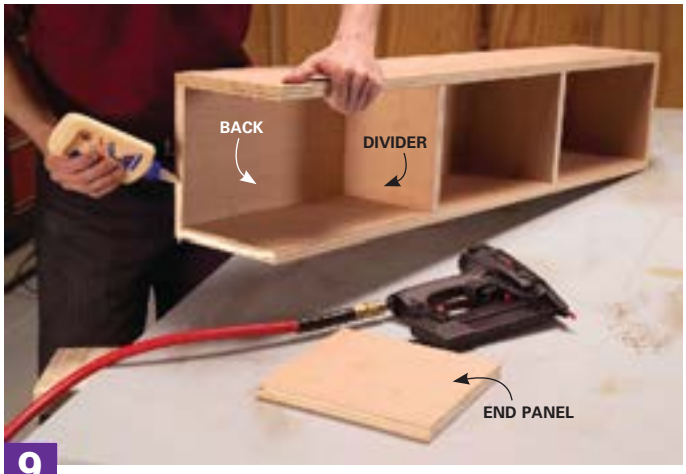
6 Draw an 8-1/2-in.-radius arc using an arc jig. Cut the arch with a jigsaw and sand it smooth. When you cut the arch to length, trim from both ends to center it.



7 Nail the rungs to the underside of the box. Then add the arches and rear legs. Add plastic feet or felt pads after the glue sets.



8 Cut the seat from plywood and cover three edges of it with solid wood. Fasten the seat to the bench with 1-1/4-in. screws driven through the cleats.



9 Cut out the shelf box parts. Glue and nail the bottom to the back first. Then add the dividers, the top and finally the end caps.

Add parts to the box

To complete the bench, you just make up the remaining parts and attach them to the box. Assemble the face frame with glue and pocket screws and sand the joints flush. Always make sure your parts fit the box correctly before you apply any glue. When you attach the face frame to the box (Photo 5), make sure the lower rail is flush with the top of the grille. It's OK if the upper rail isn't perfectly flush with the cleat, since that joint will be covered by the seat later.

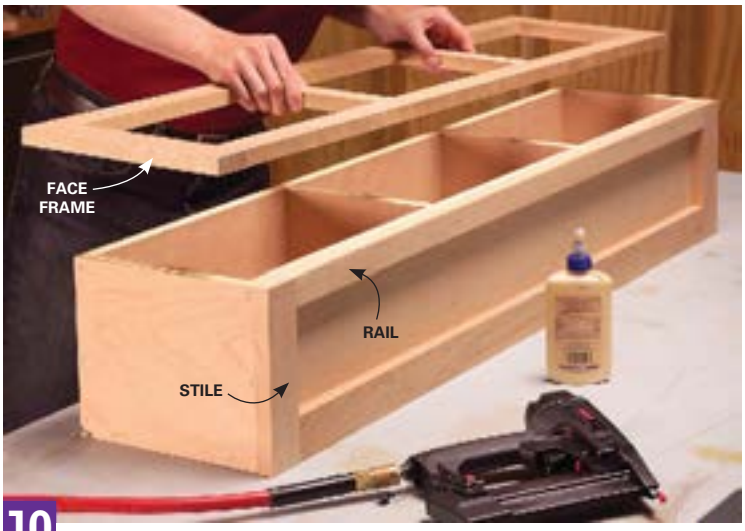
Next, make a trammel to mark the arches (P) that fit under the bench sides (Photo 6). Use a 1-1/2-in. x 12-in. scrap for the trammel arm. Drill a 5/16-in. pencil hole near one end of the arm, then drill a 1/8-in. screw hole 8-1/2 in. from the center of the pencil hole. For the trammel base, use an 8-in. x 12-in. scrap of 3/4-in. plywood. Drill a screw hole 6-1/8 in. from the long edge of the base and screw the arm to the plywood. Mark and cut the arches from pieces of wood 3-1/4 x 14 in. long. Then cut rungs (N). Don't rely on the Cutting list when you cut the rungs and arches to length—instead, set them into place and mark them flush with the back of the bench. Glue and nail them into place and add the rear legs (Q; Photo 7). We nailed 3/4-in. plastic feet to our bench. Plastic can stain wood finishes. So if you plan to put your bench on a wood floor, use cloth or felt pads instead.

The seat (R) is simply a slab of plywood banded on three sides with solid wood (S, T). Mitering the banding accurately can be difficult and frustrating. Make the joints tight by trial and error. Start by mitering parts about 1/8 in. too long. Hold them in place to check the

Furniture assembly with a brad nailer

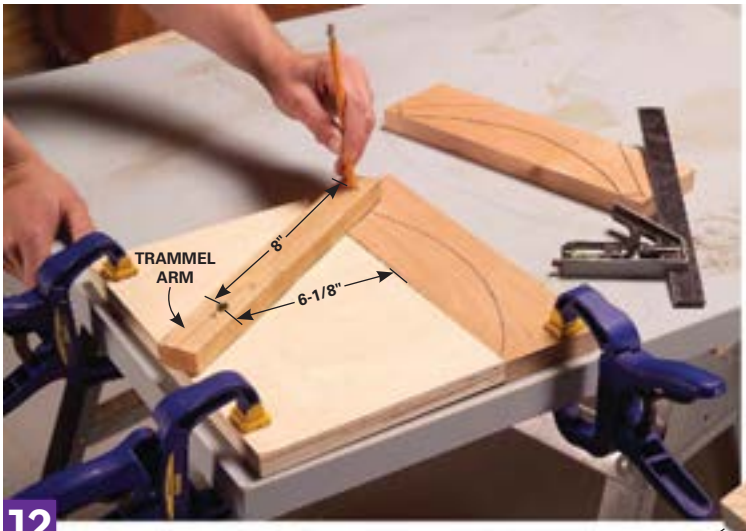
The skinny nails driven by a brad nailer aren't strong enough to hold furniture together. With brad nails alone, this bench and shelf would eventually fall apart. So use wood glue wherever you shoot brad nails. Glue gives the joint its permanent strength; brads simply hold the parts together while the glue sets. You could do that with clamps, but brads are faster and more convenient. You'll have to fill every nail hole later (see "A no-curse strategy for invisible nail holes," p. 97), so drive only enough brads to force the parts tightly together.

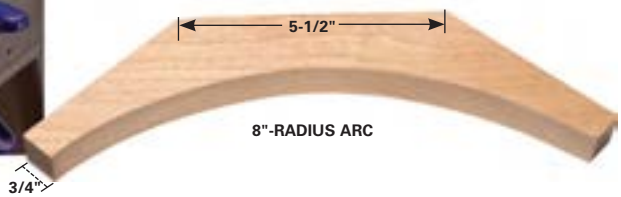
The number of brads you need depends on how well the parts fit together. Our bench face frame was perfectly straight and flat, so it required only six brads. Our shelf face frame had some warped areas and required a dozen brads to draw it tight against the box. You may even find spots where no amount of brads will force parts together. In that case, a well-placed clamp or two will hold parts tight until the glue sets.



10 Nail rails and stiles directly to the underside of the shelf box. Assemble the face frame with pocket screws and nail it to the front. After the glue sets, sand all the joints smooth.

11 Assemble the back frame with pocket screws, sand the joints flush, and fasten it to the shelf box. Then assemble the shelf top and attach it with glue and brads.





12 Draw an 8-in.-radius arc for the shelf brackets using the arc jig. Cut the arches using a jigsaw and the straight cuts with a miter saw set at 45 degrees.

A no-curse strategy for invisible nail holes

The wood fillers that fussy carpenters use to hide nail holes in trim aren't a good choice for furniture projects. They stay soft for years, so they're not sandable and they can rub off on clothing. Fussy furniture makers prefer fillers that dry hard. These sandable fillers are often labeled "stainable," but they usually absorb more or less than the surrounding wood, leaving light or dark dots at each nail hole.

If you want to avoid nail dots, try this technique that works every time. The key is to make the patches lighter than the surrounding finish and darken them later. These extra steps may sound like a lot of trouble, but they add only a few minutes to the process:

- Buy the lightest color of wood filler available.
- Before you fill the holes on your project, shoot a few nails into a wood scrap and fill those holes. When dry and sanded, the filler must be no darker than the wood.
- Apply stain or clear finish to the test scrap first. In most cases, the nail patches remain lighter than the wood. If they turn darker, "pretreat" them so they absorb less finish. Mix two drops of wood glue with a drop of water and apply the thinned glue to the patches with a fine-tip artist's brush. Keep glue off the surrounding wood. After about 30 minutes, lightly sand each nail patch.
- Stain and finish the wood as usual. But before you apply the final coat of clear finish, use a fine-tip marker to darken each nail patch. An art supply store is the best source for a wide variety of colors. With two or three different markers, you can match the differing wood tones in your project and the nail holes will be invisible to everyone but you.

fit, then readjust the angle on your miter saw and shave a hair off the parts again and again until they fit perfectly. Although mitered joints look best, you may prefer to band the seat with square-cut wood if you don't have experience with miters. Screw the seat to the bench without glue (Photo 8) so you can remove the seat while finishing the bench.

Build the shelf just like the bench

In terms of construction and techniques, the shelf is just a smaller variation of the bench. It starts with a plywood box (Photo 9). The top, bottom and back of the box are identical parts (U). Be sure to place the back between the top and the bottom pieces. Add rails and stiles to the underside of the box, then assemble and attach the face frame (Photo 10). The back frame (Photo 11) provides a mounting surface for coat hooks later. Make the shelf top just as you made the bench seat: Wrap a piece of plywood (GG) with solid wood banding (HH, JJ). When you nail the top to the shelf box, use plenty of glue—the top will support the entire weight of the shelf when you hang it on the wall (see Photo 14). Draw the arc for the shelf brackets using the same arc jig you used to make the bench arches—just be sure to reposition the screw 8 in. from the pencil hole (Photo 12). If you don't have a clamp that's long enough to hold the bracket against the shelf box (Photo 13), tack it into place with 2-in. brads.

A fast finish

If you remembered to sand all the parts before assembly, you won't have much prep work before finishing. Just fill the nail holes and inspect all the glued joints for glue smudges.

Cherry usually doesn't take stain evenly, so you can skip the stain and applied a clear finish only. With the bench and shelf's corners and cramped spaces, brushing a finish on them would be a nightmare. Choose a spray-on lacquer finish. Lacquer is one of the fastest, easiest finishes to apply. Here's how to use it:

- Wear an organic vapor respirator and spray the lacquer outdoors or in the garage with the door open. Lacquer contains nasty solvents.
- Spray on two very light coats, wait 30 minutes and lightly sand with 220-grit paper.
- Vacuum off the sanding residue and apply two or more light coats until you get the look you want. There's no need to sand between coats unless specks of dust settle on the finish.

Let the finish harden overnight before you add the coat hooks and hang the shelf (Photo 14).

13 Glue, position and clamp the upper end of each bracket and fasten the other end with screws driven from behind. Predrill so you don't split the bracket.

14 Level and screw 2-in. x 8-in. cleats to wall studs. Set the shelf on the cleats and screw through the back of the shelf into the cleats using 1-1/2-in. brass screws and finish washers.

Adjust bypass closet doors

There's no reason to put up with sticking bypass closet doors, or doors that have uneven gaps against the jambs—especially since they're so easy to fix. Usually the mounting bracket screws have loosened up, making the door sag and rub against the carpet or floor.

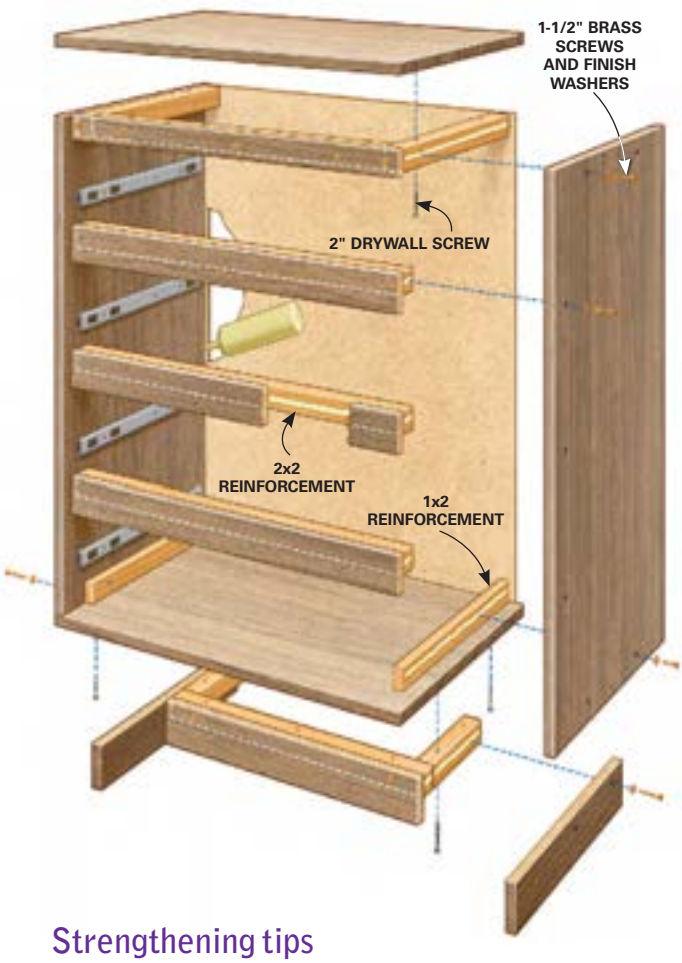
To fix it, you'll have to work from inside the closet, so get a flashlight and screwdrivers. Start by pushing one door closed against the jamb. Hold it against the jamb while you adjust the brackets as shown. Do the same on the other door. If the screw holes are stripped, just move the bracket over a few inches and remount it.

1 **Square the door.** Push the door against the jamb and lock it in place with shims at both corners.

2 **Tighten screws.** Remount in new screw holes if necessary. Then test the door to make sure it rolls smoothly.

Upgrade flat-pack furniture

Flat-pack furniture is the type that comes in a flat box, requires assembly, and is often so inexpensive and convenient compared to DIY furniture that it's irresistible. Some brands are better than others, but cheaper versions can get wobbly or fall apart after a few years of normal use. That doesn't mean you shouldn't buy it. With some 2x2s and 1x2s, screws and a bit of glue, you can reinforce the piece. It's the connections that generally fail because the particleboard just isn't as strong as real wood. Use any or all of these tips to strengthen the connections and help your furniture last.



Strengthening tips

- Choose 2x2s that are straight. No twists.
- Use construction adhesive or polyurethane glue wherever finished surfaces meet each other or meet raw wood.
- Use wood glue for joining raw wood surfaces.
- Use screws with matching finish washers for exposed screws.
- If the whole piece is wobbly, disassemble the whole piece to remove the back. Then use glue instead of nails to reattach the back.
- Bar clamps will make many of the fixes much easier.

Wire shelving made easier

Wire shelving is popular because of its price, flexibility and ease of installation. Wire shelving can be designed to meet almost any need at a fraction of the cost of a custom built-in system. And while installing wire shelving isn't quite a no-brainer, you don't need to be a master carpenter or own a fully equipped cabinet shop to get it done. We picked the brain of a pro for these tips to help you on your next installation.

MEET THE PRO

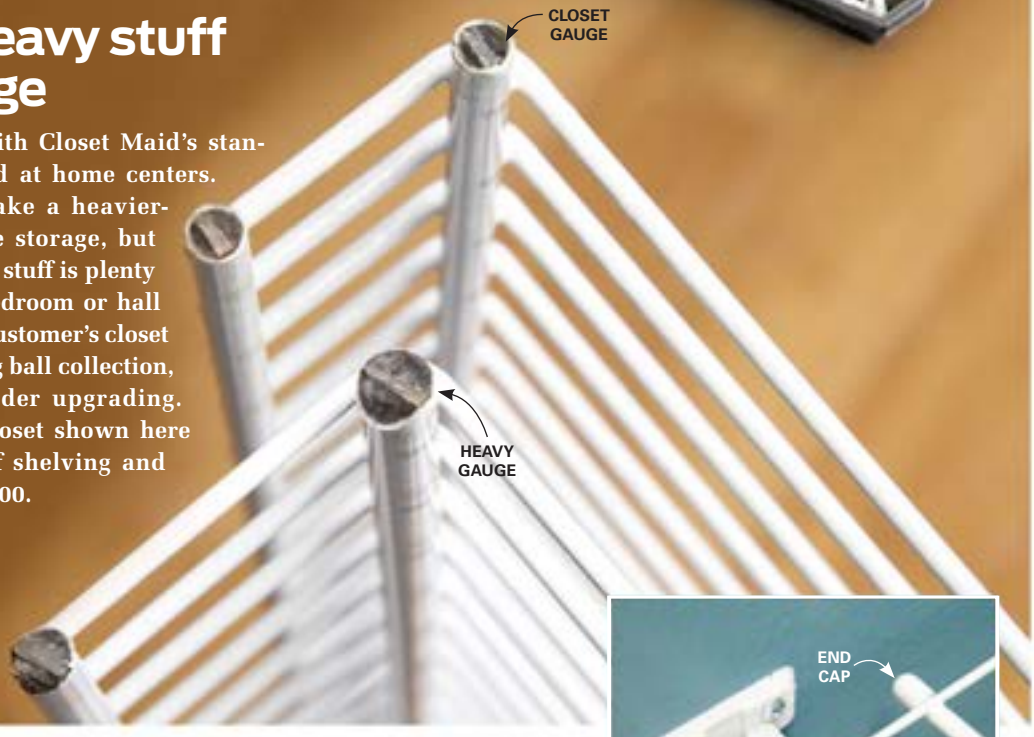
Over the past 15 years, Tim Bischke has hung wire shelves in thousands of closets. His jobs have ranged from simple one-shelf reach-in closets to elaborate walk-in wardrobe sanctuaries. When you've hung that many shelves, you can't help but know what you're doing.

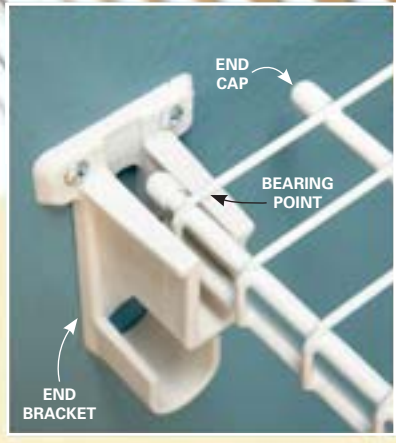
Buy extra pieces

Even if you're just planning to build one closet shelf, have extra parts on hand. It takes a lot less time to return a few wall clips than it does to stop working to make a special trip to the store for just one. And plans change, so if you or your customer decides to add a section of shelving, you'll be prepared.

Leave the heavy stuff for the garage

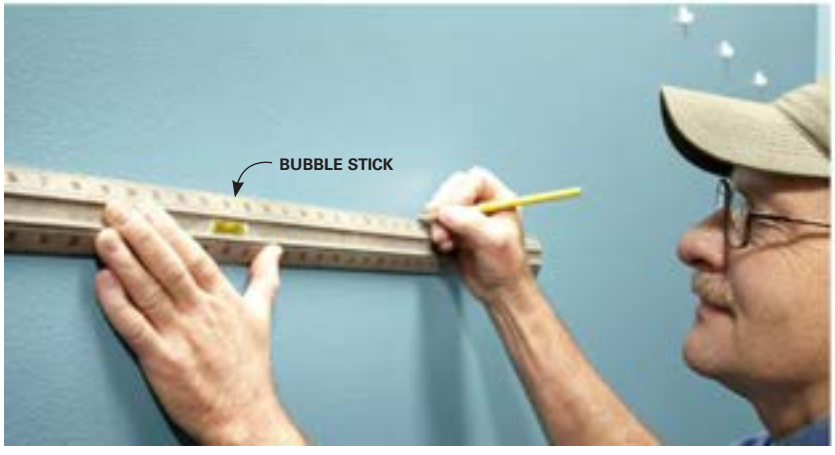
Tim primarily works with Closet Maid's standard wire shelving, sold at home centers. Most manufacturers make a heavier-duty product for garage storage, but Tim feels that the regular stuff is plenty strong for the average bedroom or hall closet. However, if your customer's closet is going to store a bowling ball collection, you may want to consider upgrading. The materials for the closet shown here (approximately 22 ft. of shelving and rod) cost about $150 to $200.





Measure an inch short

When cutting the shelf, measure wall to wall, and subtract an inch. This allows for the thickness of the end brackets plus a little wiggle room. It's the top, thinner wire that actually supports the shelf, and one wire per end is enough. Cutting exact lengths will only earn you wall scratches and a trip back to the cutting station.



Lay it out with a bubble stick

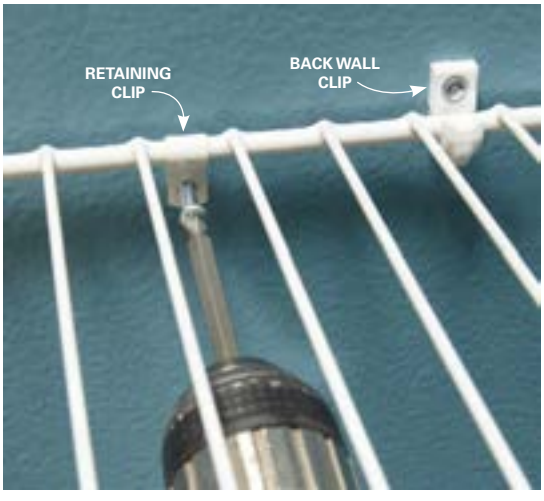
Tim uses a bubble stick rather than a level. A bubble stick is like a ruler and a level rolled into one. Holding a level against the wall with one hand can be frustrating. Levels are rigid, and they pivot out of place when resting on a stud that's bowed out a bit. A bubble stick has a little flex, so it can ride the imperfections of the wall yet still deliver a straight line. You can get one at hardware stores or online.

Use a template on the end brackets

Tim's first template was nothing more than a 1x3 with a couple of holes drilled in it. He rested a torpedo level on top of the board and marked the end bracket locations with a pencil. The template he's using here has a built-in level and allows him to drill the holes without marking them first. At $190, this is for guys who do lots of closet shelving. But if that's you, it's a great investment. You can order one from your local Closet Maid dealer.

Space the angle brackets evenly

Tim considers aesthetics when installing his angle brackets. If a shelf only needs one bracket, he'll find the stud closest to the center. If two or three brackets are required, he'll try to space them evenly, making sure that at least one bracket toward the center is hitting a stud.

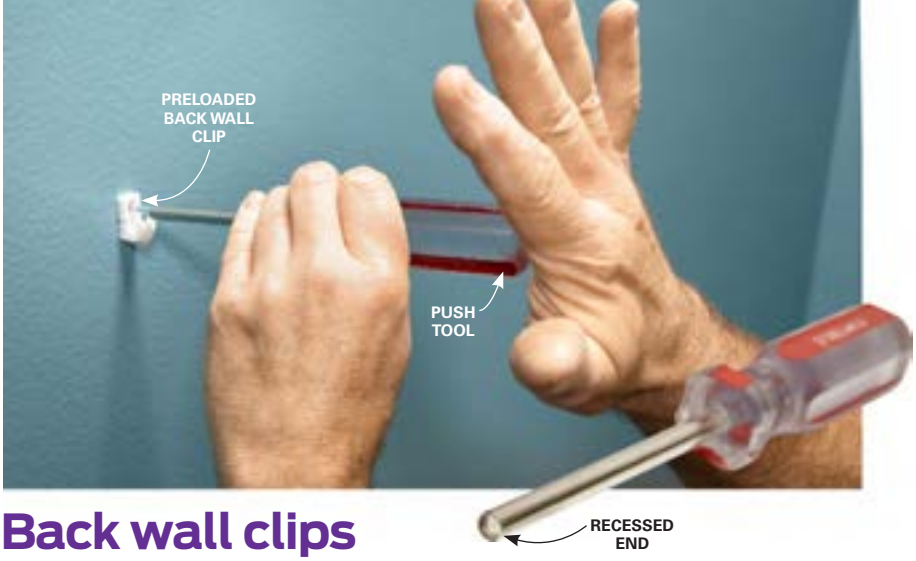


Avoid upheaval

Back wall clips are designed to support the shelf, but if there are a bunch of clothes hanging on the front of the shelf with nothing on top to weigh them down, the back of the shelf can lift. To keep the shelf in place, Tim installs a retaining clip in a stud near the middle of the shelf. One clip toward the middle of an 8-ft. shelf is plenty.

A bolt cutter works best

Cut your shelving with a bolt cutter. It's quick and easy, and it makes a clean cut. To make room for the cutter, Tim uses his feet to hold the shelving off the ground.



Back wall clips don't need to hit studs

It may go against your every instinct, but hitting a stud when you're installing the back wall clips slows the process down and isn't necessary. After marking their locations, Tim drills a 1/4-in. hole and pops the preloaded pushpin in with a push tool. He loves his push tool. It has a little indentation in the tip that won't slip off the pin when it's being set in the drywall. The occasional wall clips that do land on studs need to be fastened with a screw instead of a pin. You can order a push tool from your local Closet Maid dealer.

Hanger sliding freedom

One common complaint about wire shelving is that it restricts the movement of the hangers because the hangers are stuck between the shelves. That's why Tim always offers the upgrade of a hanger rod. Most manufacturers make some version of one. A hanger rod allows clothes to be slid from one end of the closet to the other, even past an inside corner. This upgrade will add about 30 percent to the cost of the materials on a standard shelf design. Make sure the type of shelving you buy will work with the hanging rod hardware you plan to use.

Pegboard prevents tipping

When Tim installs wire shelving in pantries, he likes to cap the top of the shelves with white 1/4-in. pegboard. This stops the skinnier items from tipping over. He uses white zip ties to hold the pegboard in place. A 4 x 8-ft. sheet costs less than $20 at most home centers, which makes it an inexpensive option.

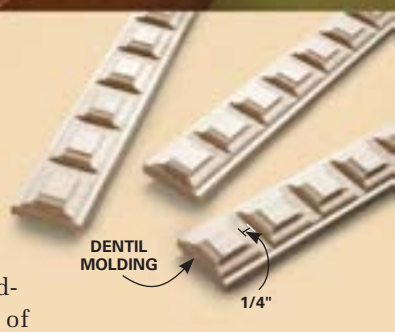
Closet nook shelves

Salvage the hidden space at the recessed ends of your closets by adding a set of shelves. Wire shelves are available in a variety of widths. Measure the width and depth of the space. Then choose the correct shelving and ask the salesperson to cut the shelves to length for you or cut them yourself with a hacksaw or bolt cutter. Subtract 3/8 in. from the actual width to determine the shelf length. Buy a pair of end mounting brackets and a pair of plastic clips for each shelf.

Disappearing bed

The bed in this guest room is like a big drawer. Riding on fixed casters, it glides into the unfinished attic on the other side of the wall. A plywood box in the attic shields the bed from dust, and a bookshelf connected to the bed frame hides the wall opening. Guests get a comfortable bed, and when they leave, there's space for storage and crafts. (Designed by reader Brandon Dempster)

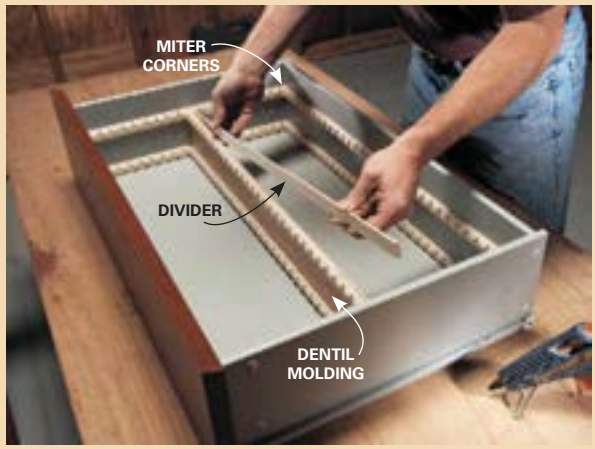
Drawer dividers



Here's a fast, inexpensive way to organize a messy drawer.

Cut standard dentil molding the width and length of your drawer, aligning the dentil slots on opposite sides. Glue or brad-nail the strips into place—one strip for dividers up to 2 in., two strips for larger dividers. For dividers, use oak or pine mull strip (sometimes called lattice) or rip 1/4-in. plywood.

Dentil molding and 1/4-in.-thick mull strip are available at most home centers and lumberyards. Sand the mull strip smooth with fine sandpaper, then wipe off all the dust. The wood can be left unfinished, or finished before it's installed in the drawer.



Glue dentil molding around the inside of the drawer and slip in dividers. Use additional molding to divide the space further.

Special Section

Simple Bookcases & More!

No-excuses bookcase

Think you can't build it? Think again

There are lots of reasons why a DIYer might not tackle a project like this one. So before building this bookcase, I made a list of them and eliminated each one as I streamlined, simplified and economized the design. The result is a bookcase with the look of a masterpiece, but without the complications. If you've done smaller woodworking projects, you're ready to tackle this one.


CROWN MOLDING


BUN FEET


ADJUSTABLE SHELVES

What it takes

TIME: 2 weekends
COST: $500
SKILL LEVEL: Intermediate
TOOLS: Table saw, drill, miter saw, router or router table.

David Munkittrick is a Field Editor and an airline pilot turned professional woodworker.

Excuses eliminated

Don't have the skills?
The hardest parts of furniture making have been eliminated from this bookcase. There are no miter cuts and no complicated joinery.

Don't have the money?
The total materials bill is about $500. That's about one-third of what you would pay for a store-bought bookcase of similar size and quality.

Don't have the time?
Depending on how fast you work, you can build it in a weekend or two. Add a few hours of finishing work and you're done.

Don't have the tools?
If you have basic woodworking tools, you're ready to build this bookcase. You don't need any exotic or pro-grade equipment.

Don't have the shop space?
This big bookcase consists of three smaller sections that can be assembled in even the smallest shop. You'll need an 8 x 8-ft. area of open floor space to preassemble the sections, but you can do that anywhere (even on your driveway) and then disassemble them to complete the project.

Build the cabinets

First, cut all your 3/4-in. plywood parts (A – K) to size. If shop space doesn't allow you to slice up plywood on a table saw, you can do a fine job with a circular saw and a straightedge (Photo 1). Cut rabbets along the back edges of the sides (A and B). These rabbets create a recess so the edges of the backs aren't visible from the sides. I cut the rabbets using a router and a rabbeting bit that makes a 1/4-in. cut. Set the bit to a depth of 3/8 in. Next, drill holes in the bookcase sides (A and B) for the adjustable shelves (Photo 2).

With the plywood parts cut and drilled, it's time to assemble the bookcase. All you need is a drill to drive screws. There's no glue to mess with. Most of the screw holes in this bookcase are covered by adjoining pieces. The exposed screws are in the tops and invisible from floor level. If the top of your bookcase will be seen from above (from a staircase, for example), fill the screw holes after final assembly and paint the filler black to match.

Make a couple of I-beam spacers to hold the sides in position while you attach the subtops and subbases (E and J). Build the spacers out of scrap. Be sure the final length of the I-beam holds the sides at the correct outside dimension.

Simply screw the subtops and subbases to the sides (Photo 3). The tops and bases (C, D and H) are then positioned and screwed into place. On the smaller side cabinets, remember to keep the tops and bases flush with the cabinet sides where they butt up against the larger center cabinet. The tops and bases overhang the subtops and subbases by 1/4 in. at the back. This creates a rabbet to house the back. Next, cut and fit the backs (L and M).

Trim the tops and bases

I trimmed the parts C, D, E, H and J using one of my favorite tricks: Glue on the raw, square trim first, then shape it with a router. This approach has two advantages: Square stock is easier to cut and clamp than a fancy trim profile, and you don't have to miter the corners.

There are a few steps to take before you glue on and rout the trim. First, fire up your table saw and cut 3/4 x 3/4-in. stock (you'll need about 50 linear ft.). Lay the cabinets on their backs and clamp

1 **Slice up the plywood.** A circular saw guided by a straightedge works almost as well as a table saw. For a straightedge, use the factory-cut edge from a sheet of plywood. For clean cuts, use a fresh blade with a tooth count of at least 40.

2 **Drill shelf support holes.** Bore the holes using pegboard as a guide. A stop block—simply a wood scrap with a hole drilled through it—prevents drilling too deep. If your pegboard is short, reposition it using a pair of router bits to align and lock the pegboard into holes you've already drilled. For a different approach to drilling shelf holes, see p. 113.

them together. Fit the corner blocks where the side cabinets meet the center cabinet (see Photo 4). These corner blocks allow you to butt the trim into the blocks at inside corners and eliminate the need for miters. For a closeup of the blocks, see the photo "Bun feet" on p. 106.

Here's the process: Start with the bases. Cut and fit the corner blocks (FF and GG) on the bottom of the side cabinets first. Lay them in position. No glue yet. Measure and cut your center cabinet side trim (DD and EE) so it butts up tight to the corner blocks and is flush with the front edge of the plywood (Photo 4).

Disassemble the bookcase and attach the trim. Go slow here. Rather than take everything apart at once, take one of the side bookcase tops off and glue and add the trim. Do the same with the other side top, then the subtops and base assemblies. Note that the side trim on parts E and J runs past the back edges by 1/4 in. to hide the backs (L and M).

With the molding stock square, it's easy to lose track of which side is up and what router profile gets put on which piece. I recommend making two piles: one for the ogee profile (subtops and subbases) and one for the simple chamfer (tops and bases). Also, clearly mark which side of the trim gets routed. The underside of the top parts and the top side of the base parts are routed. When you're sure you know which trim gets what cut on which face, go ahead and rout your profiles (Photo 5). Use any 45-degree chamfer bit that will cut at least 5/8 in. deep. For the ogee, I used a Bosch No. 85586M. Although you can use a handheld router, a router table makes it all easier. To see how to build an inexpensive table, search for "router table" at familyhandyman.com.

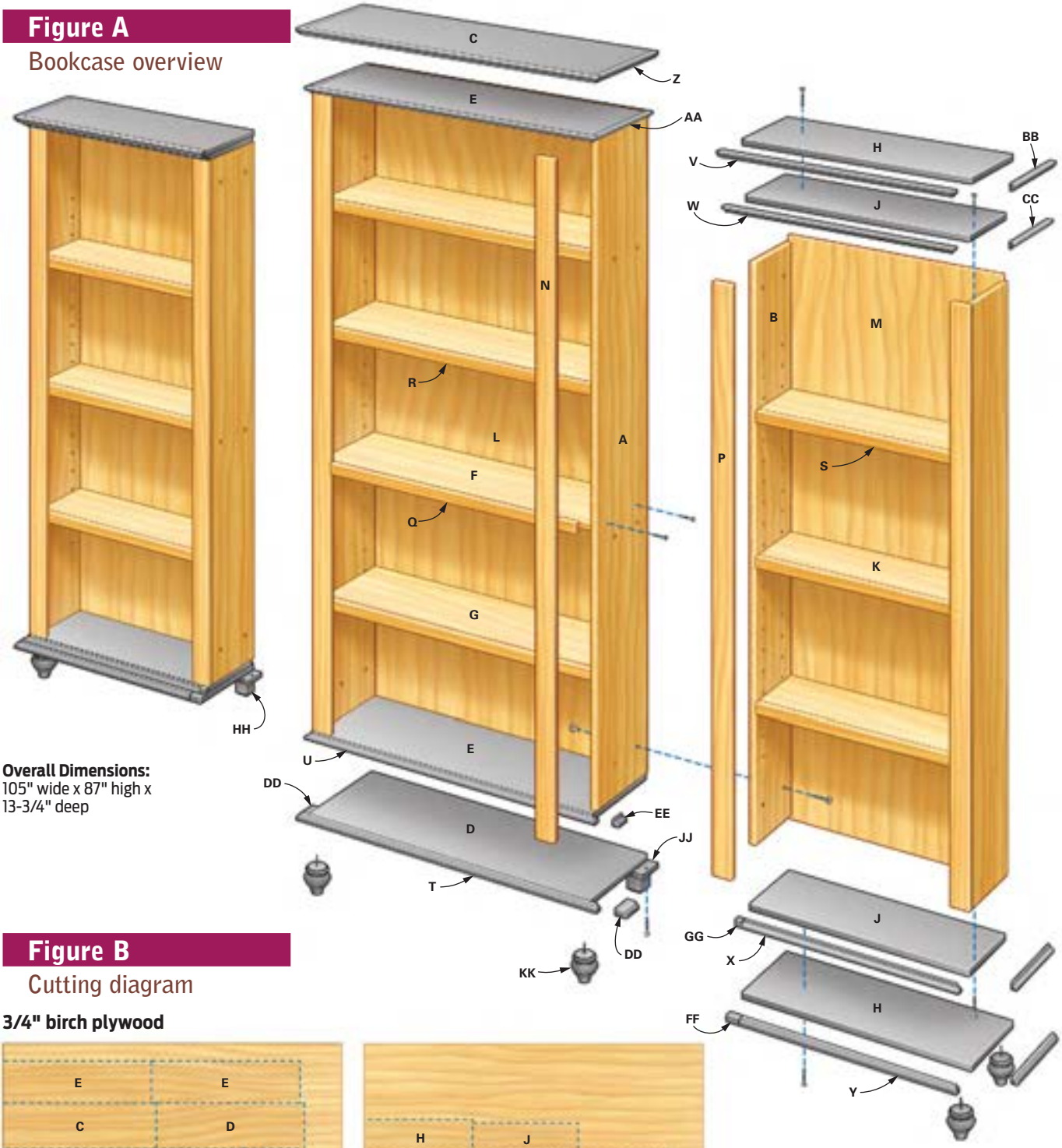
An easy finish for problem woods

Some types of wood—pine, maple, birch and others—absorb stain unevenly, creating an ugly, blotchy finish. To sidestep that problem, I skipped the initial staining step and used a "glaze" finish instead.

Here's how: First, I brushed on two light coats of gloss polyurethane, sanding lightly after each coat. Then I applied a glaze. I used General Finishes Mission Oak gel stain (available online), but other gel stains or products intended specifically for glazing are available. The glazing process is just like staining: Brush it on and wipe off the excess. Then add two more coats of polyurethane over the glaze. This process is no more difficult than staining but avoids blotchiness and gives the wood a deeper, richer glow.

Figure A

Bookcase overview

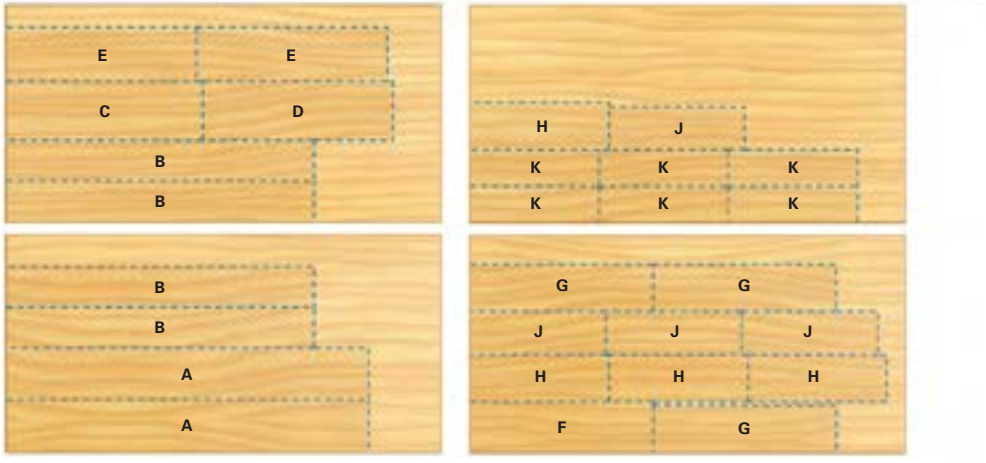


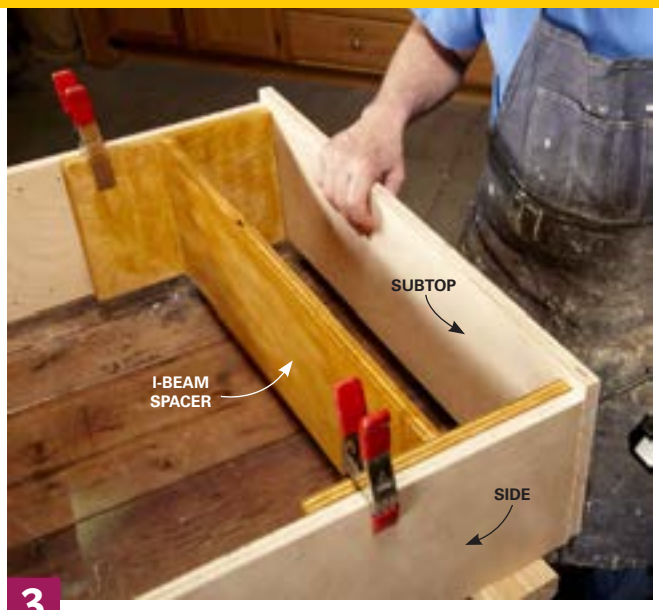
Overall Dimensions:
105" wide x 87" high x
13-3/4" deep

Figure B

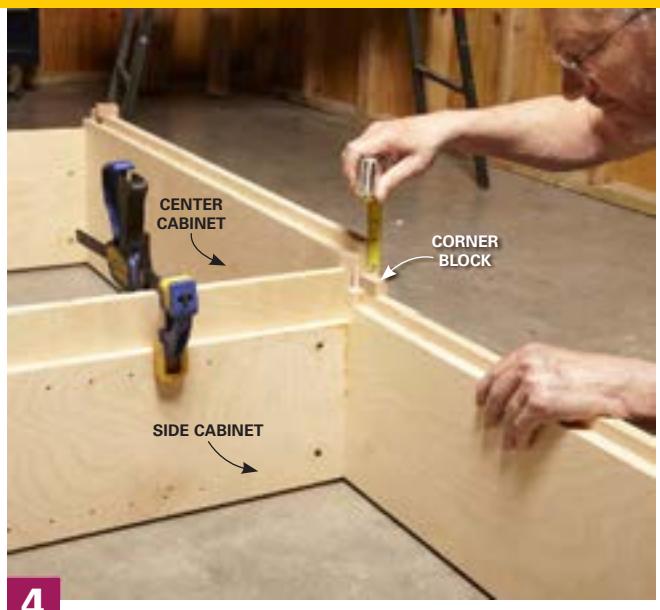
Cutting diagram

3/4" birch plywood

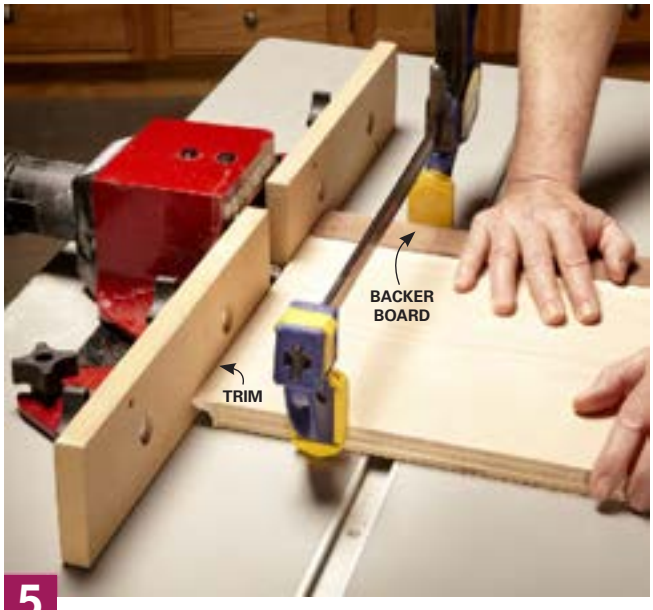




3 **Assemble the shelf boxes.** Screw the subtops and subbases to the sides. A plywood beam spacer takes only a few minutes to make and holds the sides in perfect alignment.



4 **Position the corner blocks.** Lay the shelf units on their backs and clamp them together. Place the corner blocks where the side cabinets meet the center cabinet. The blocks allow the trim to meet at inside corners without miters.



5 **Edge the plywood, then rout.** Glue square trim to the plywood, then shape it with a router or router table. This creates perfect outside corners without cutting miters. A backer board prevents splintering at the end of the cut.

6 **Drill the feet.** Bore holes for the dowel screws using a guide to steer the drill bit straight into the foot. The guide is simply two wood scraps glued together to form an "L."

With all the trim attached and routed, reassemble the cabinets. It may seem like a pain, but it's the best way to make sure you've done everything right before you finish. Also, having the tops and bases on the cabinets will automatically position the stiles on the cabinets. This is a good time to drill holes and join the side cabinets to the center cabinets with connector bolts.

Separate the three cabinets and glue on the stiles (N and P). While the glue sets, go ahead and drill and mount the feet (Photo 6). Be sure the feet are set so the sides bear down directly onto the feet.

Finish and final assembly

Disassemble the cabinets one last time and sand all parts to 180-grit. Sanding and finishing a collection of flat parts is a breeze compared to working with an assembled bookcase.

7 **Assemble it in place.** You can move the bookcase to its new home in three sections. Or you can make moving it even easier by disassembling each section into small, easy-to-handle parts. Join the sections with connector bolts.

Prime and paint the upper and lower parts. Satin black spray paint works great. With the finish complete, you're ready to reassemble the bookcase in place. Again, the beauty of this design is that you can take the individual parts to where the bookcase will reside and assemble it there (Photo 7).

There, you're done. No excuses.

Materials list

ITEM	QTY.
4' x 8' x 3/4" birch plywood	4
4' x 8' x 1/4" birch plywood	3
1x6 birch boards	40 ft.
*Bun feet	6
3/8" x 3" dowel screws	6
Connector bolts and cap nuts	12
Adjustable shelf supports, wood glue, 1-5/8" screws, finishing supplies	

**Search online for "bun feet."*

Cutting list

3/4" birch plywood (4 sheets)

KEY	QTY.	DIMENSIONS	NAME
A	2	11-1/2" x 80"	Center cabinet sides
B	4	9" x 68"	Side cabinet sides
C	1	12-15/16" x 43-3/8"	Center cabinet top
D	1	12-15/16" x 42"	Center cabinet base
E	2	12" x 42"	Center cabinet subtop/subbase
F	1	11-1/4" x 40-1/2"	Center cabinet fixed shelf
G	3	10-7/16" x 40-3/8"	Center cabinet adjustable shelves
H	4	10-7/16" x 30-11/16"	Side cabinet tops/bases
J	4	9-1/2" x 30"	Side cabinet subtops/subbases
K	6	8" x 28-1/2"	Side cabinet adjustable shelves

1/4" birch plywood (3 sheets)

L	1	41-1/4" x 81-1/2"	Center cabinet back
M	2	29-1/4" x 69-1/2"	Side cabinet backs

3/4" birch hardwood

N	2	2-1/4" x 80"	Center cabinet stiles
P	4	2" x 68"	Side cabinet stiles
Q	1	1-1/2" x 37-1/2"	Center cabinet rail
R	3	1-1/2" x 40-3/8"	Center cabinet adjustable shelf trim
S	6	1-1/4" x 28-1/2"	Side cabinet adjustable shelf trim
T	2	3/4" x 45"	Center cabinet top/base front trim
U	2	3/4" x 43-1/2"	Center subtop/subbase front trim
V	2	3/4" x 31-1/2"	Side cabinet top front trim
W	2	3/4" x 30-3/4"	Side cabinet subtop front trim
X	2	3/4" x 30"	Side cabinet subbase front trim
Y	2	3/4" x 29-7/8"	Side cabinet base front trim
Z	2	3/4" x 13-3/4"	Center cabinet top side trim
AA	2	3/4" x 13"	Center cabinet subtop side trim
BB	4	3/4" x 10-1/2"	Side cabinet top/base side trim
CC	4	3/4" x 9-3/4"	Side cabinet subtop/subbase side trim
DD	2	1-1/2" x 1-3/4"	Center cabinet base side trim
EE	2	3/4" x 1-3/4"	Center cabinet subbase side trim
FF	2	3/4" x 1-1/2"	Side cabinet base corner block
GG	2	3/4" x 3/4"	Side cabinet subbase corner block

2" birch

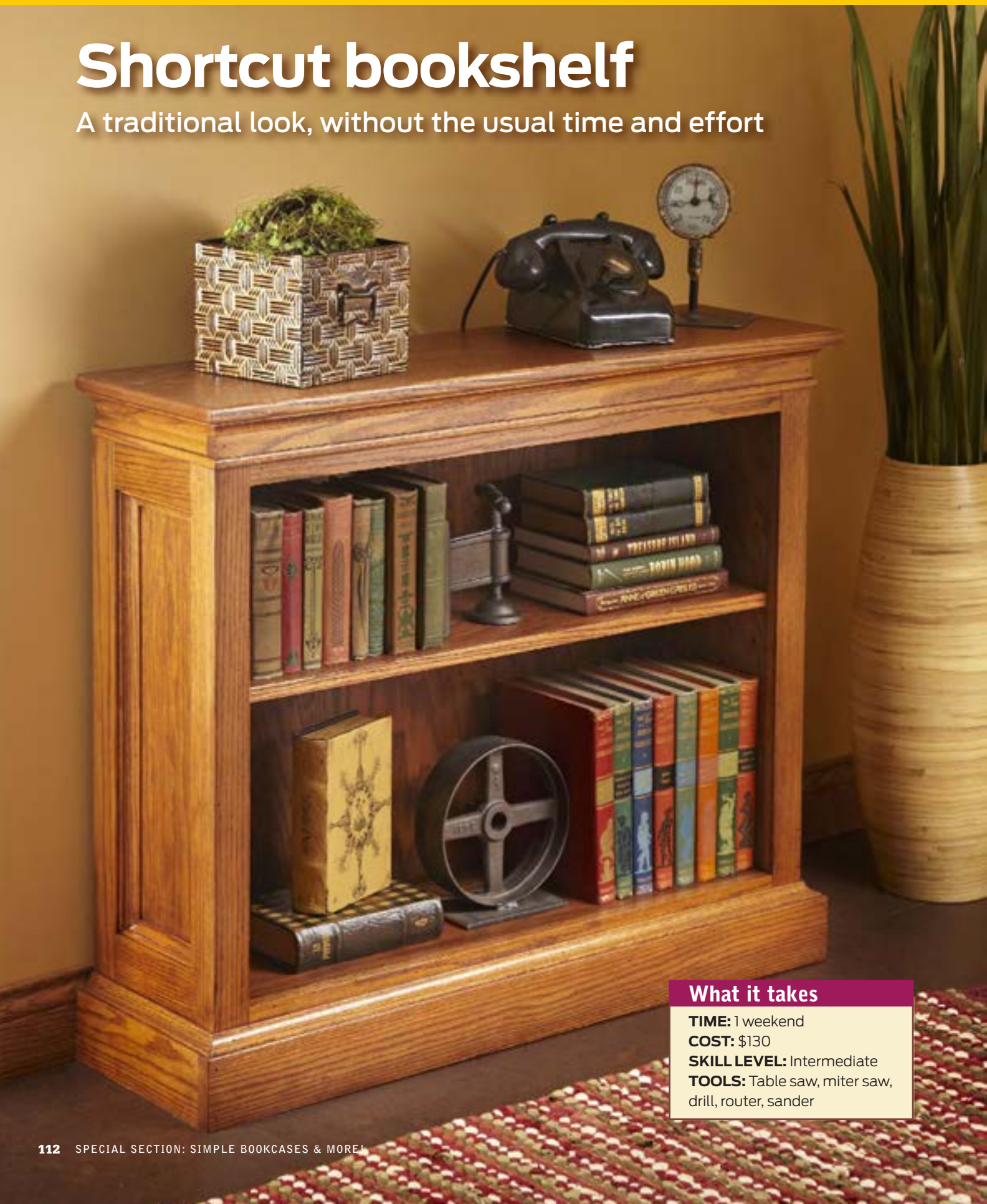
HH	2	2-3/4" x 2-3/4" x 3-1/4"	Back feet
JJ	2	4" x 6"	Back feet plates

Soft maple

KK	6	3-1/4" x 4"	Bun feet

Shortcut bookshelf

A traditional look, without the usual time and effort



What it takes

TIME: 1 weekend
COST: $130
SKILL LEVEL: Intermediate
TOOLS: Table saw, miter saw, drill, router, sander

Gary Wentz
Editor in Chief

There's nothing I like better than spending weeks on a complicated woodworking project. But I rarely have time for that. So instead, I take shortcuts that produce handsome results but simplify the whole project. This little bookcase showcases some of my favorite shortcuts: Some save time, some minimize mistakes and others are low-effort paths to high style. It all adds up to a project you can build in a day, though finishing will add a few hours after that. You'll find all the materials in stock at most home centers.

Build the box and shelves

To get started, cut the 3/4-in. plywood box parts as shown in the cutting diagram on p. 115. The grain on the box lid (B) runs the "wrong" way, but it's well below eye level and only your pets will see it. To avoid splitting the plywood, drill pilot holes before you screw the box together (Photo 1). No need for glue; three screws at each joint will make the box plenty strong, and you won't have to deal with glue squeeze-out.

Drill holes for adjustable shelf supports (Photo 2). For another approach to positioning the holes, see p. 108. I made two shelves, used only one and tucked the other away in a nearby closet—better to have a second shelf than to wish for it later. When you edge the shelves (Photo 3), cut the strips of screen molding a bit longer than the shelves and trim off the excess after the glue sets. To complete the box, add the back (D). Make sure to cut the back perfectly square so you can use it to square the box. After cutting the back from a half sheet of 1/4-in. plywood, you'll have more than enough left over to cut the spacers you'll need later (see Photos 5 and 7).

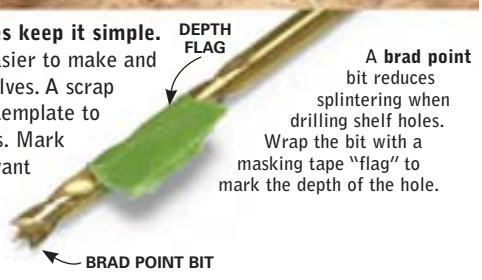
Add rails, stiles and trim

"Rails" are the horizontal parts that frame the outside of the shelf box; "stiles" are the vertical parts. Cut solid wood boards to the widths given in the Cutting list (p. 114). Nail the corner stile parts (E and F) together with 1-1/2-in. brads (Photo 4). Next, cut the spacers that go behind the side rails and stiles. I made all my spacers 1/8 in. smaller than the parts that go over them. The purpose of the spacers is to make the rails and stiles protrude an extra 1/4 in. from the sides of the shelf box. Without them, the 3/4-in. cove molding (see Photo 6) would be flush with the faces of the rails and stiles—and that would look bad.

Glue and nail the spacers with 1/2-in. brads, then switch to 1-1/2-in. brads for the rails and stiles (Photo 5). Trying to fit a rail between stiles that are already

1 **Nail the box first, then screw.** Holding corners together while driving screws is clumsy. So tack the corners together with a brad nailer first. The nails will hold the parts in position while you add screws for strength.

2 **Adjustable shelves keep it simple.** Adjustable shelves are easier to make and finish than stationary shelves. A scrap of pegboard is a perfect template to position the support holes. Mark the pegboard holes you want to use and label the end of the template that goes against the bottom shelf.

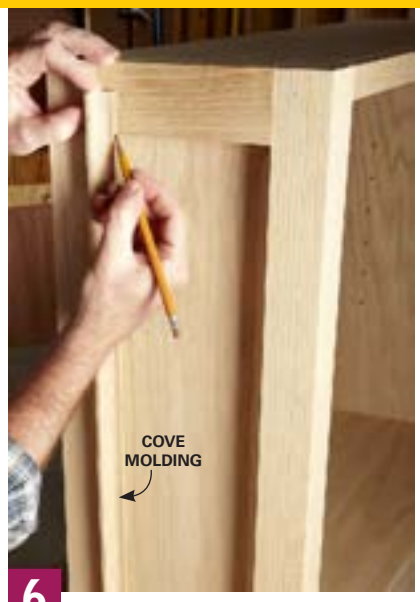


A **brad point** bit reduces splintering when drilling shelf holes. Wrap the bit with a masking tape "flag" to mark the depth of the hole.

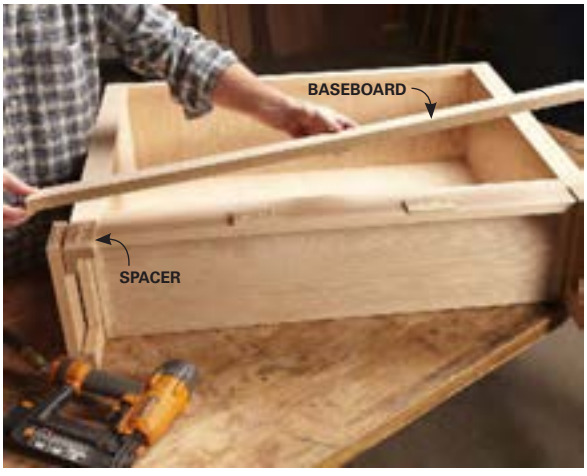
3 **Easy shelf edging.** Spread a light bead of glue over the front edges of the shelves. Set the screen molding in place and "clamp" it with masking tape. Pull the tape tight as you apply it.

4 Assemble corner stiles, then cut to length. Start with corner stile parts (E and F) that are about an inch longer than their final length. That way, you don't have to worry about aligning the ends as you join them. Then trim the ends to length.

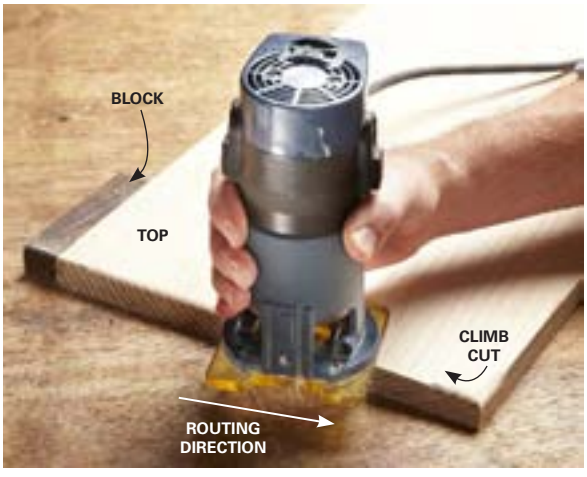
5 Attach rails and stiles instantly. Traditional rails and stiles require clamps and time-consuming joinery. A brad nailer eliminates that whole process. Just glue and tack the spacers into place, then glue and nail on the rails and stiles. Use only enough nails to hold the parts in place while the glue sets.



6 Classic style, the simple way. Common cove molding gives the sides a classic frame-and-panel look. Miter one end of each piece and hold it in place to mark it. Cut the piece a hair long and test the fit. If it's too long, take it back to the miter saw and shave off a smidgen.



7 Use basic boards for the base. The base of the shelf unit is just boards topped off with cove molding. Glue and tack on spacers, then add the baseboards. Sand the joints flush and add the cove molding.



8 Shape the top—without wrecking it. A wide slab of solid wood is expensive, so take extra steps to avoid mistakes. To prevent splintering at the front corner, make a reverse-direction "climb cut." Screw blocks to the back corners to prevent gouging as you begin and end routing.

Cutting list

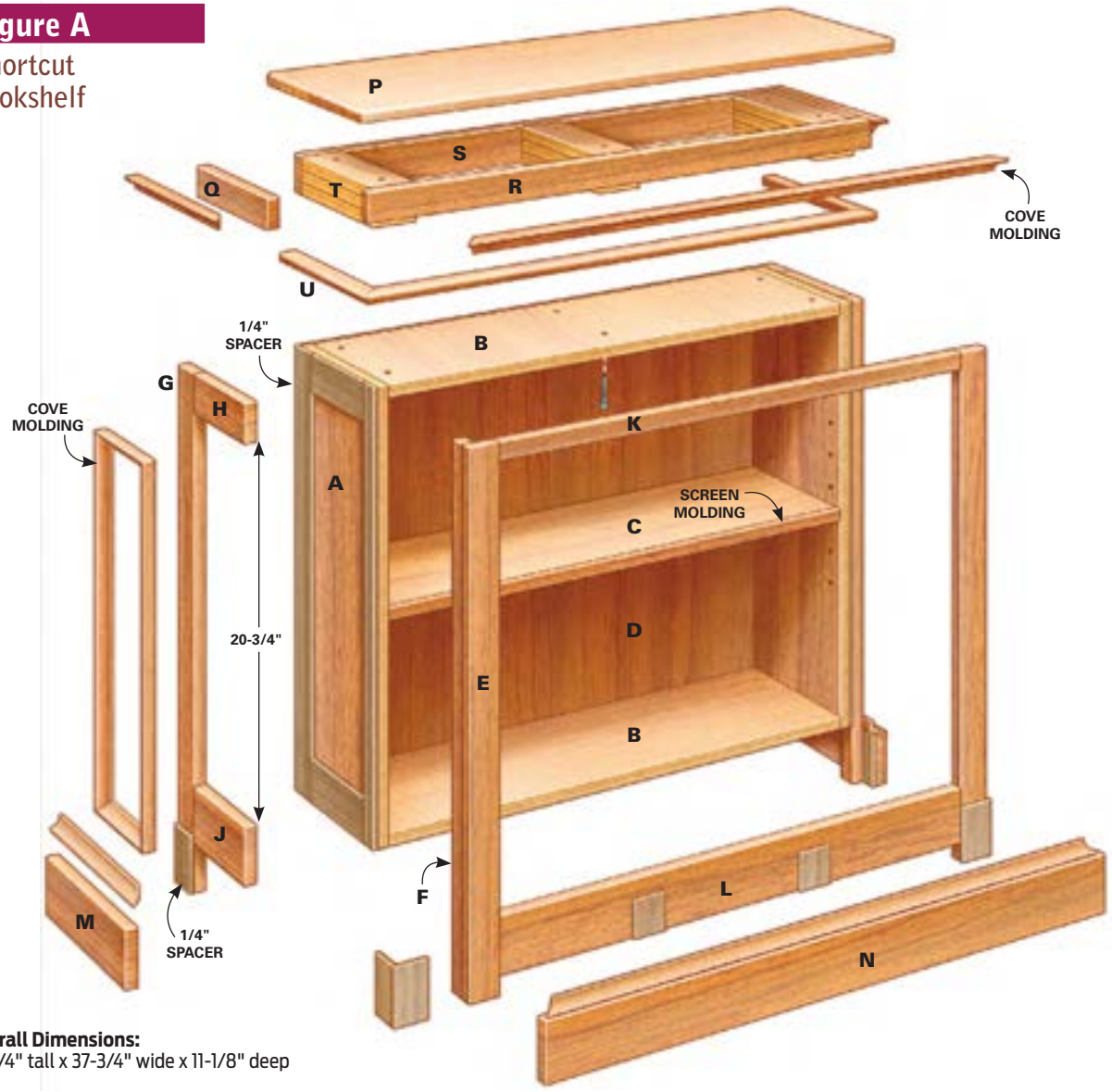
KEY	QTY.	SIZE & DESCRIPTION
A*	2	3/4" x 9" x 25-1/4" sides
B*	2	3/4" x 9" x 32" box bottom and lid
C*	2	3/4" x 8-3/4" x 31-7/8" shelves
D*	1	1/4" x 25-1/4" x 33-1/2" back panel
E	2	3/4" x 1-7/8" x 29-1/4" front stiles
F	2	3/4" x 1-1/8" x 29-1/4" front side stiles
G	2	3/4" x 1-7/8" x 29-1/4" rear side stiles
H	2	3/4" x 2-1/4" x 6-1/4" upper side rails
J	2	3/4" x 3-1/4" x 6-1/4" lower side rails
K	1	3/4" x 1" x 31-3/4" upper front rail
L	1	3/4" x 3-1/4" x 31-3/4" lower front rail
M	2	3/4" x 3-1/4" x 10-1/4" side baseboards
N	1	3/4" x 3-1/4" x 37-1/2" front baseboard
P	1	3/4" x 11-1/8" x 37-3/4" top
Q	2	3/4" x 1-3/4" x 9-1/4" frame sides
R	1	3/4" x 1-3/4" x 35-1/2" frame front
S*	1	3/4" x 2-1/4" x 34" frame back
T	9	3/4" x 2-3/4" x 8-1/2" filler blocks
U	3	1/2" x 1" (cut to fit) bead molding

**Plywood parts. All other parts are solid wood.*

fastened is difficult, and you won't get tight joints. Here's how to avoid that: Nail on one of the corner stiles, followed by the side rails (H and J) and then the rear side stile (G). Note that the lower rail overhangs the box by 1 in. Next, lay the box on its back, set the front rails

Figure A

Shortcut bookshelf



Overall Dimensions:
32-1/4" tall x 37-3/4" wide x 11-1/8" deep

Materials list

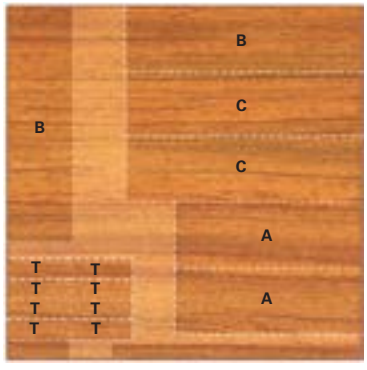
QTY.	ITEM
1	4' x 4' x 3/4" oak plywood
1	4' x 4' x 1/4" oak plywood
16'	1x6 oak boards
4'	1x12 oak board
3'	1/2" x 3-1/2" oak board
20'	3/4" oak cove molding
6'	3/16" x 3/4" oak screen molding

Wood glue, 1-1/4" screws, 2" screws, 1/2" brads, 1-1/2" brads, adjustable shelf supports, finishing supplies.

Figure B

Plywood cutting diagram

(3/4-in. plywood)



(K and L) in place and check the fit of the other corner stile. Shorten the front stiles if necessary and nail them into place. Then nail on the second corner stile, followed by the side rails and stiles.

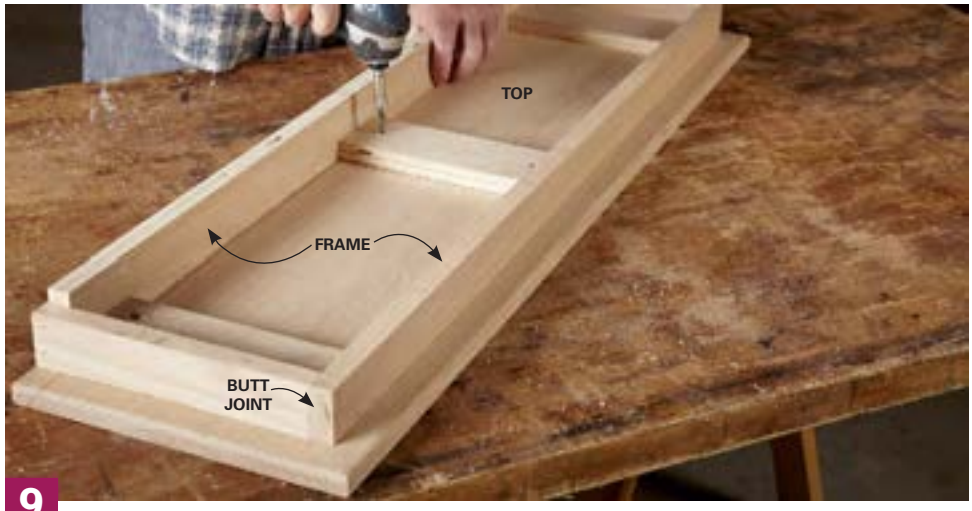
With all the rails and stiles in place, you're ready to install the cove molding (Photo 6). To avoid tedious work later, sand all the molding before you start cutting it. Installing the molding is the slowest phase

of the project because cutting it to the right length on the first try is almost impossible. Instead, you'll cut each piece, test-fit it and shave it shorter until it fits. Don't nail any of the moldings until they're all in place. Then attach the baseboards (Photo 7) and add cove molding above them.

Crown the box with a fancy top

Don't be fooled by the large number of small parts that make up the top assembly—it's showy but not difficult. Start by rounding the edges of the top (P) with a 1/4-in. round-over bit (Photo 8). Then assemble plywood and solid wood parts of the frame with nails and glue. When you drill pilot holes to screw the frame to the top (Photo 9), mark the depth with masking tape on your drill bit so you don't poke through the top.

Shape the bead molding with a 1/8-in. round-over bit (Photo 10). Keep in mind that the 3-ft. length of molding is just barely enough for the front piece; there's no room for error. To complete the top assembly, add the cove molding and the filler blocks (Photo 11). Fasten on the top with 2-in. screws (Photo 12) and you're ready for finishing. I used General Finishes Mission Oak stain (available online) followed by three coats of wipe-on poly (satin).



9 **No need to miter the frame.** The square-cut butt joints at the corners of the frame make cutting and joining the parts a lot easier. (The same goes for the baseboards shown in Photo 7.) Assemble the frame with glue and nails, then center the assembly and screw it to the underside of the top.

10 **Make bead molding in five minutes.** Round over both edges of a 1/2-in.-thick board, sand the edges and then cut the completed moldings off the board.

11 **Simple moldings for a fancy top.** Trim the frame with cove molding and homemade bead molding. Then glue in two layers of plywood filler blocks. The blocks allow the top to be screwed to the shelf box.

12 **A screwed-on top is better.** Mount the top with screws only—no glue. That way, you can remove it for easier sanding and finishing. Center the top and drive screws through the box lid and into the filler blocks.

Cheapskate furniture

The secret is to start with kitchen cabinets!

How cheap?

Materials for the TV stand cost $160, the storage cabinet $175, the entry bench $100!

As a world-class penny pincher, I've found that stock cabinets are the key to low-cost, good-quality furniture. I get handsome, sturdy, real-wood furniture for the cost of assemble-it-yourself pieces sold at discount stores. And the advantages go way beyond saving money. Cabinets make furniture building incredibly quick and easy by eliminating the difficult, fussy process of building and hanging doors.

In the following pages, I'll show you how to build three weekend furniture projects. Along the way, you'll see different methods of covering the sides and tops of cabinets and adding legs, feet or a base. You can mix and match these various approaches to build your own furniture with the look and function you want.

Gary Wentz
Editor in Chief

Finding cabinets

Used cabinets from remodeling jobs are my first choice for furniture projects (they're free!). I also like damaged cabinets from the local salvage store (cheap!). The trouble with these tightwad options is that the cabinets are already finished, and finishing raw wood to match the factory finish is tough. To get around this, I've painted the furniture or stained the new wood surrounding the cabinets a contrasting color for a two-tone look.

When neither paint nor a two-tone look is suitable, I buy unfinished stock cabinets like the ones shown in this article. Home centers usually carry one style only and one wood species only (typically oak). For the projects shown here, I used 12-in.-deep "upper" cabinets ranging in cost from $30 to $60 each. The cabinets you find may not be exactly like mine, so you may have to alter the measurements given in my plans.

TV stand

With technology changing so fast, it didn't seem smart to sink a lot of money into a TV stand. But inexpensive stands didn't have the features I wanted: enclosed storage and lots of shelves for electronic components. This stand gives me those things, plus it's rock solid. Some inexpensive stands are rated to support 75 lbs. or less. This thing would hold a V-8 engine block. It's sized for a 42-in. TV, but you could easily make it bigger by spacing the cabinets farther apart or choosing wider cabinets. It's taller than most stands, which may be good or bad, depending on your situation. The materials cost me about $160.

Build up the cabinets

A TV stand based on the standard 12-in. depth of upper cabinets would have a top and shelves that are too shallow for some TV bases and electronic components. To add depth to the stand, extend the backs of the cabinets using plywood frames. I extended the cabinets by 3 in.

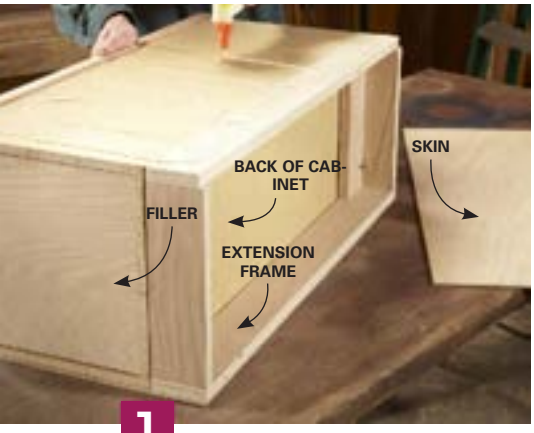
Assemble the extension frames using nails or screws and a little glue. Note that one side of the frame (G) is 1/4 in. narrower than the other (H). That creates a recess for the 1/4-in. plywood back (S). Next, skin the cabinet sides with 1/4-in. plywood (Photo 1). After spreading glue, I tacked the plywood in place with a couple of brad nails and then weighted it down with paint cans. Also glue the fillers (E) into the recesses at the top and bottom of the cabinets. Fillers give you a solid core to drive screws through when you screw the cabinets to the base and top—without them, screws might pop right through the flimsy 1/2-in. particleboard of the cabinets.

The base and top

The base starts with a plywood frame constructed much like the extension frames: nails or screws, plus glue. Top off the frame by gluing on 1/4-in. plywood (L). Now you're ready to wrap the frame with solid wood facing using one of my favorite woodworking shortcuts: Instead of routing the facing, then fussing with mitered corners, glue on the facing before you rout and just form simple 90-degree butt joints at corners. Sand the corners flush and then rout the facing (Photo 2). You'll get tight, perfect corners—fast.

I used a 1/2-in.-radius cove bit and cut to a depth of 1/2 in. That's too deep for a single router pass, so I made three passes, removing and replacing the breakout block after each pass.

To make the base top, use the same wrap-and-rout procedure. Round the top and bottom of the banding (Figure A) with a 3/8-in. round-over bit. Again, use a breakout block to prevent splintering. Repeat this entire process to build the top of the stand, which is simply a larger version of the base top. To complete the top, add scraps of plywood and cove molding on the underside (Photo 3).



1 Extend the depth and cover the sides. "Skin" the sides with plywood after you screw extension frames to the cabinets. The frames give the TV stand extra shelf depth for electronic components and create a cavity for wires behind the cabinets. Also glue fillers into the recesses at the top and bottom of the cabinets.

2 Build the base. Rout a decorative cove after the base is assembled. That gives you perfect corners without fussy miter cuts. To avoid splintering at the corner, clamp on a breakout block.

3 Make the top. Edge the plywood top with solid wood and round the edges with a router. Glue scraps of plywood to the underside of the top and add cove molding.

Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	2	12" x 12" x 30" cabinets
B	1	3/4" x 16" x 41-1/2" top
C	2	3/4" x 5" x 41" top front & back
D	2	3/4" x 5" x 5-3/4" top sides
E	4	3/4" x 10-3/8" x 10-3/8" fillers
F	8	3/4" x 3" x 10-1/16" frame rungs
G	2	3/4" x 2-3/4" x 30" frame inner sides
H	2	3/4" x 3" x 30" frame outer sides
J	2	1/4" x 14-1/4" x 30" outside panels
K	1	3/4" x 15" x 40" base top
L	1	1/4" x 15-1/2" x 41" base sub top
M	2	3/4" x 3-1/4" x 41" base front & back
N	3	3/4" x 3-1/4" x 14" base rungs
P	2	3/4" x 3-1/2" x 15-1/2" base facing*
Q	1	3/4" x 3-1/2" x 42-1/2" base facing*
R	2	1/4" x 14" x 30" inside panels
S	1	1/4" x 18-1/2" x 29-7/8" back panel
T	2	3/4" x 1-1/2" x 17" back cleats*
U	4	3/4" x 13-1/2" x 16-7/8" shelves

**Base facing, cleats and all bandings are solid wood cut from 1x4 boards. Bandings are 3/4" x 1". All other parts are plywood.*

Materials list

QTY.	ITEM
2	12" x 12" x 30" cabinet
1	3/4" x 4' x 8' oak plywood
1	1/4" x 4' x 4' oak plywood
2	1x4 x 8' oak boards
8'	3/4" oak cove molding

1-1/4" and 2" screws, wood glue,
Ebony stain and wipe-on poly

Cheap trick: Routed finger pulls

A recess cut with a 1/2-in. cove bit lets you open doors with your fingertips. No hardware needed. Sometimes—like with this TV stand—that's a sleek design choice. And sometimes, it's a big money saver: I recently cut finger pulls in a whole set of laundry room doors and drawers. Compared with the cost of knobs (even inexpensive ones), that saved almost $100.

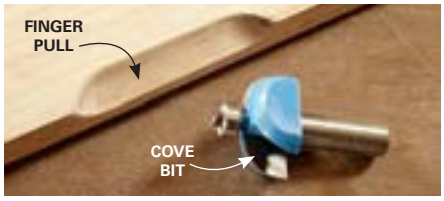
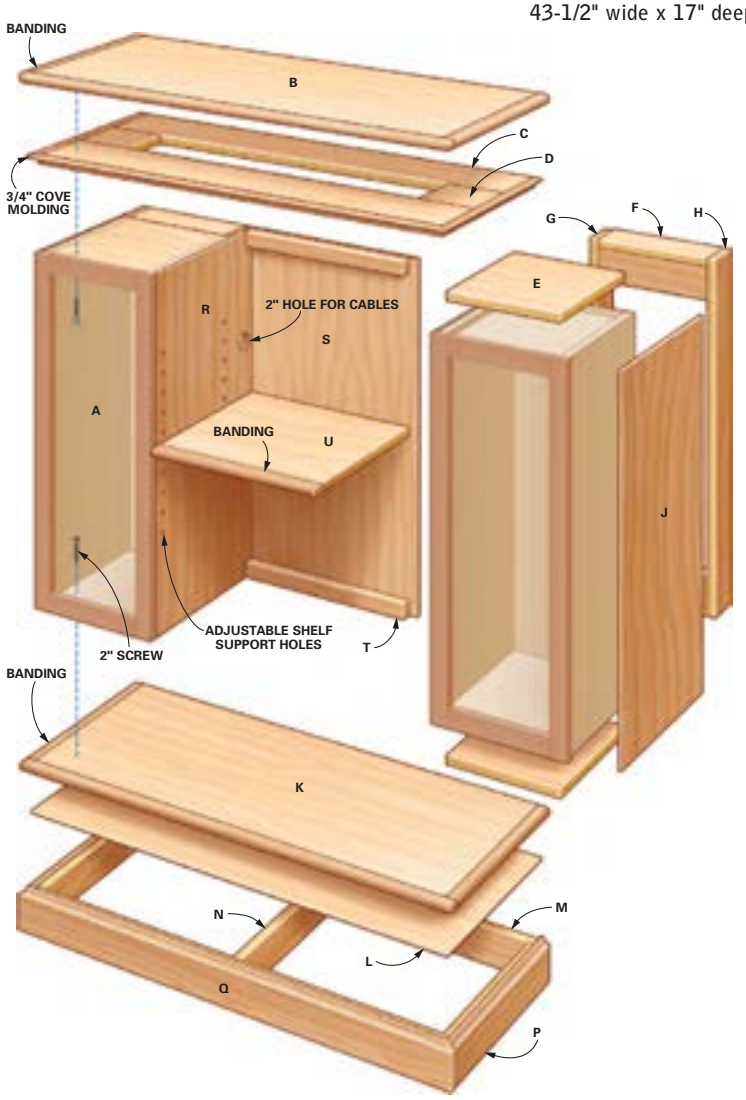


Figure A

TV stand

Overall dimensions:
35-3/4" tall x
43-1/2" wide x 17" deep



Assembly and finishing

Assemble the entire stand to make sure all the parts fit together correctly. Use screws only—no glue! This TV stand is heavy, and screws will allow quick disassembly for moving.

Screw the cabinets first to the base, driving screws from inside the cabinet boxes (see Figure A). Then set the top in place and fasten it the same way before adding the back panel (S).

Measure between the cabinets and subtract 1/8 in. to determine the width of the shelves. To make the shelves, glue banding to a long piece of plywood and rout it with a round-over bit, just as you did to make the top. Then cut the plywood into sections. The shelves rest on adjustable supports. I drilled 2-in. holes into the extension frames for cables to exit behind the stand. Those holes also provide a nook to stuff excess wires into.

Next, disassemble the stand for finishing. I applied two heavy coats of ebony stain followed by two coats of wipe-on poly. Later, with the stand assembled and in place, I drove a single screw through the top cleat (T) into a wall stud—insurance against tipping forward.

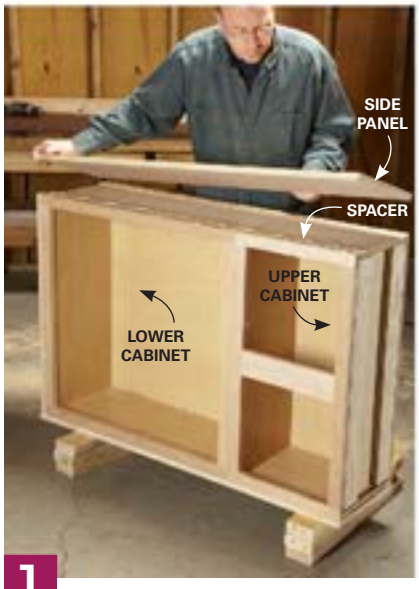
Storage cabinet

This is my favorite cabinet furniture project because it's so versatile. Use it to store books, small appliances, games and more. Assembly is amazingly fast and easy when you use a brad nailer and glue. My materials cost was about $175.

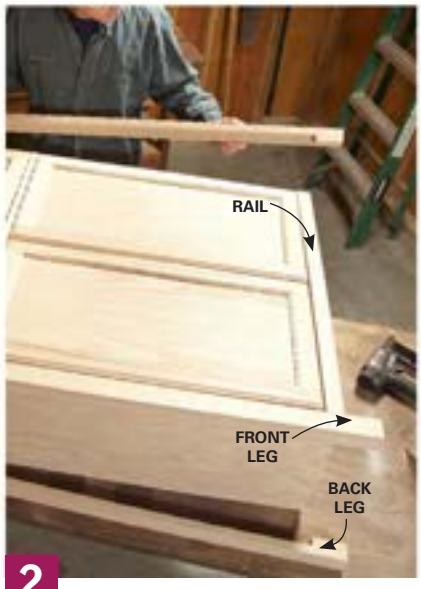
First, screw the face frames of the two cabinets together. Drill pilot holes and drive screws through the lower face frame into the upper. Then lay them on one side and hold a straightedge across the fronts of the face frames to be sure they form a straight, flat surface. I had to slip a strip of cardboard between the two cabinet boxes to get the face frames aligned.

Next, add spacer strips that match the thickness of the protruding edge of the face frames. For my cabinets, I cut strips just a hair thicker than 1/4 in. from a 2x4. Cutting thin strips on a table saw can be tricky, even dangerous. For tips, go to familyhandyman.com and search for "ripping safely."

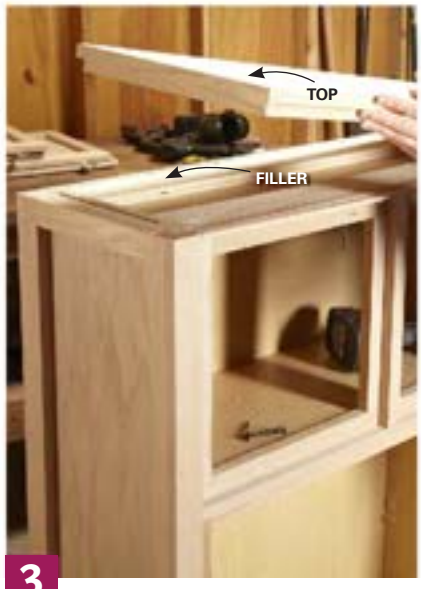
Fasten the strips with plenty of glue and a few brad nails. Then add the side panel (Photo 1). Make sure the front edge of the panel is perfectly flush with the



1 **Cover the sides.** Screw two cabinets together and glue spacer strips to the sides. Then glue on the side panels. Tack the panel into place, positioning nails where they'll be hidden by the legs or rails later.



2 **Add the legs and rails.** Attach one of the front legs, then dry-fit the rails and the other leg. When they all fit right, glue and tack them in place. Follow the same dry-fit routine for the side rails and the back legs.



3 **Top it off.** Glue the two layers of the top together. To attach the top, drive screws from inside the cabinet, through the fillers and into the top.

face frames, and remember that the panel overhangs the lower cabinet by 1 in. Follow the same steps on the other side.

Lay the unit on its back and check that the doors are centered on the cabinets and in line with each other before you add the legs and rails. The doors on my cabinets were a mess—I had to slip paper spacers behind one of the hinges and completely reinstall another.

Now you're ready to glue and nail on the legs and rails (Photo 2). Glue front leg parts (L, M and N) together, then add them to the cabinet. The top rail (T) is too thin to nail to the face frame, so just nail it to the center stile (S) and clamp it in place until the glue sets. Then remove the doors, finish-sand the whole chest and add the top, which is just two layers of plywood edge-banded and glued together (Photo 3).

Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	1	12" x 30" x 15" cabinet
B	1	12" x 30" x 30" cabinet
C	1	3/4" x 13-3/4" x 35" top*
D	1	3/4" x 13-1/8" x 33-3/4" sub top*
E	2	3/4" x 3" x 28-1/4" fillers*
F	4	1-1/2" x 45" spacers (thickness varies)
G	2	3/4" x 12" x 46" side panels*
H	4	3/4" x 1-1/2" x 9-1/4" side rails
J	2	3/4" x 1-3/4" x 49" back legs
K	2	3/4" x 1-3/4" x 3" back leg blocks
L	2	3/4" x 1" x 3" front leg blocks
M	2	3/4" x 1" x 49" front leg sides
N	2	3/4" x 1-3/4" x 49" front legs
P	1	3/4" x 1-1/2" x 30" rail backer*
Q	1	3/4" x 1-1/2" x 29-1/2" bottom rail
R	1	3/4" x 5/8" x 29-1/2" middle rail
S	1	3/4" x 7/8" x 14-3/8" stile
T	1	3/4" x 1/4" x 29-1/2" top rail

**Plywood parts*

Materials list

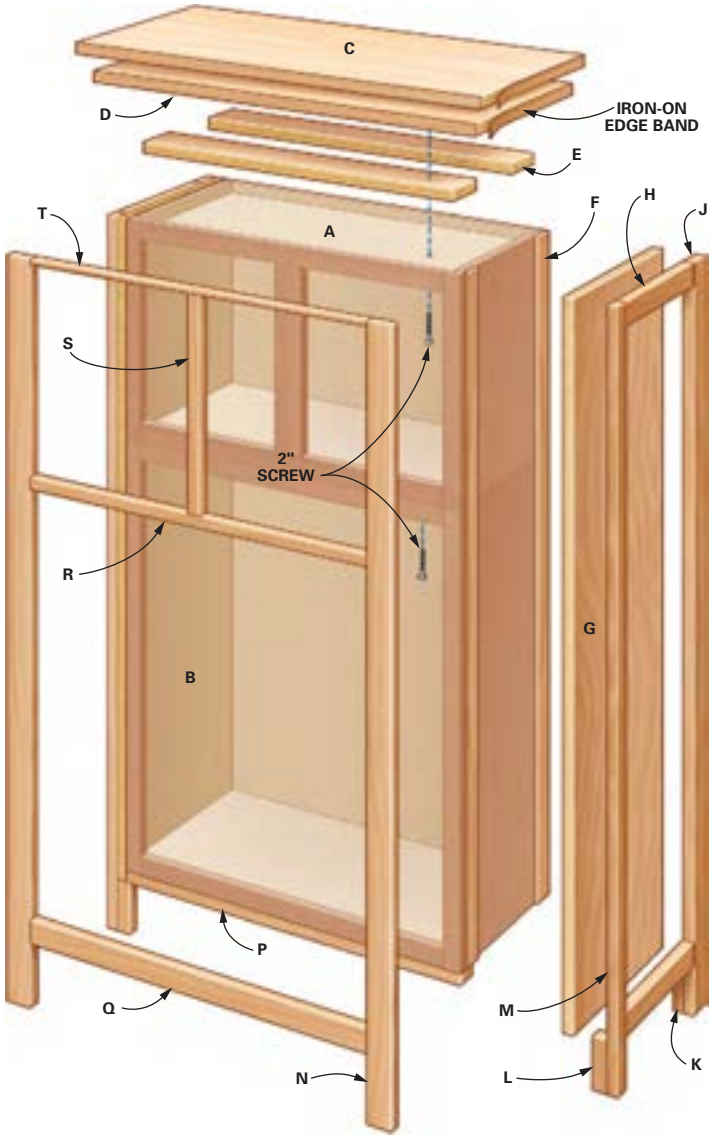
QTY.	ITEM
1	12" x 15" x 30" cabinet
1	12" x 30" x 30" cabinet
1	3/4" x 4' x 8' oak plywood
30'	1x6 oak

Edge band, knobs, wood glue, 2" screws, Early American stain, wipe-on poly

Figure B

Storage cabinet

Overall dimensions:
50-1/2" tall x 35" wide x 13-3/4" deep



Cheap trick: Edge banding

Every cheapskate should learn how to use iron-on edge band. It's the easiest way to cover plywood edges, and it makes inexpensive plywood look like solid wood. The top on this chest, for example, used less than $20 worth of plywood. Solid wood would have cost more than twice as much. To see how easy it is, go to familyhandyman.com and search for "edge band.

Entry bench

This just might be the easiest piece of furniture I've ever built. And the handiest, too: Besides the storage space, it's the perfect perch for slipping on your shoes. The building materials cost about $90. The upholstery supplies cost $10 to $40.

I covered the sides of the cabinet the same way I skinned the sides of the TV stand cabinets (see Photo 1, p. 118), but used primed beadboard paneling instead of 1/4-in. plywood. The next step is to build a base (parts E, G and H) and wrap it with trim.

Your local home center may not carry the same chair rail molding I used, but it will have a similar profile. Glue fillers into the recess at the top and bottom of the cabinet. (Actually, most stock cabinets don't really have a "top" or "bottom"—just pick one.) Then screw the base to the spacers and add the bun feet (Photo 3).

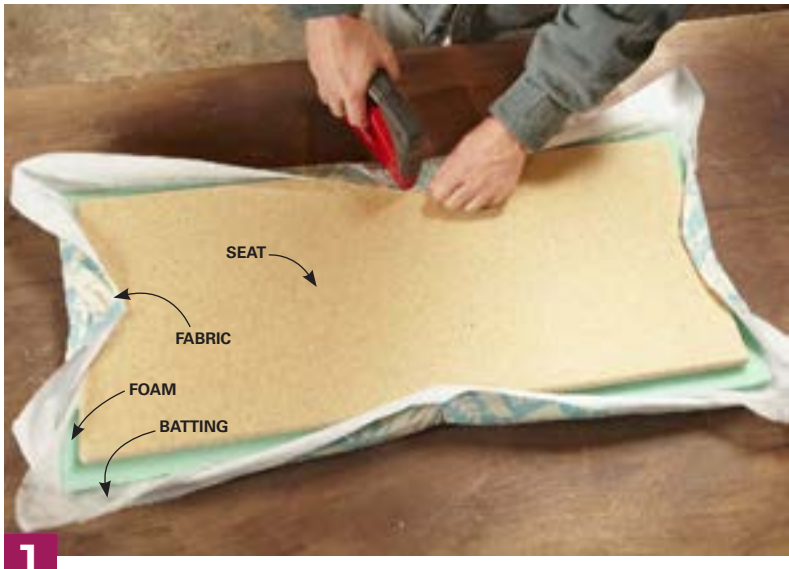
Cheap trick: DIY bun feet

There are lots of online sources for bun feet, but I wasn't going to spend a lot of money when I could make my own for free. I gathered up some 3/4-in.-thick wood scraps, glued two layers together and cut out circles with a hole saw. After sanding the rough edges, I screwed each foot to a scrap of wood to hold it securely and rounded both sides with a round-over bit. A 3/4-in. round-over bit will cost you just as much as factory-made bun feet would. But spending on tools is always the right thing to do, even for a cheapskate.

I used 3/4-in. particleboard for the seat, though plywood or MDF would work just as well. For a better-looking upholstery job, round all the corners and edges of the seat like I did. A router and 1/4-in. round-over bit work best, but a sander will work too.

Cut the foam to size so it overhangs all four sides of the seat by about 1 in. and glue it to the seat. Spray adhesive is the standard glue for this job, but I just dribbled a few lines of wood glue onto the seat—that saved me $5—and then set the seat onto the foam.

Cut the batting so it overhangs the seat by about 3 in. and the fabric so it overhangs by 4 in. Then stretch and staple the fabric (Photo 1). There are a few ways to deal with seat



1 **Upholster the seat.** Lay out the fabric, batting and foam. Stretch and staple the fabric to the seat, starting at the middle of each side and working toward the corners.

Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	1	12" x 30" x 15" cabinet
B	1	3/4" x 13-1/2" x 31" seat
C	4	3/4" x 3" x 28-1/4" fillers
D	2	3/16" x 11-1/4" x 15" side panel
E	1	3/4" x 12-3/4" x 30" base
F	3	1-5/8" chair rail molding (cut to fit)
G	2	3/4" x 3-1/2" x 9-1/4" base side
H	1	3/4" x 3-1/2" x 30" base front

Materials list

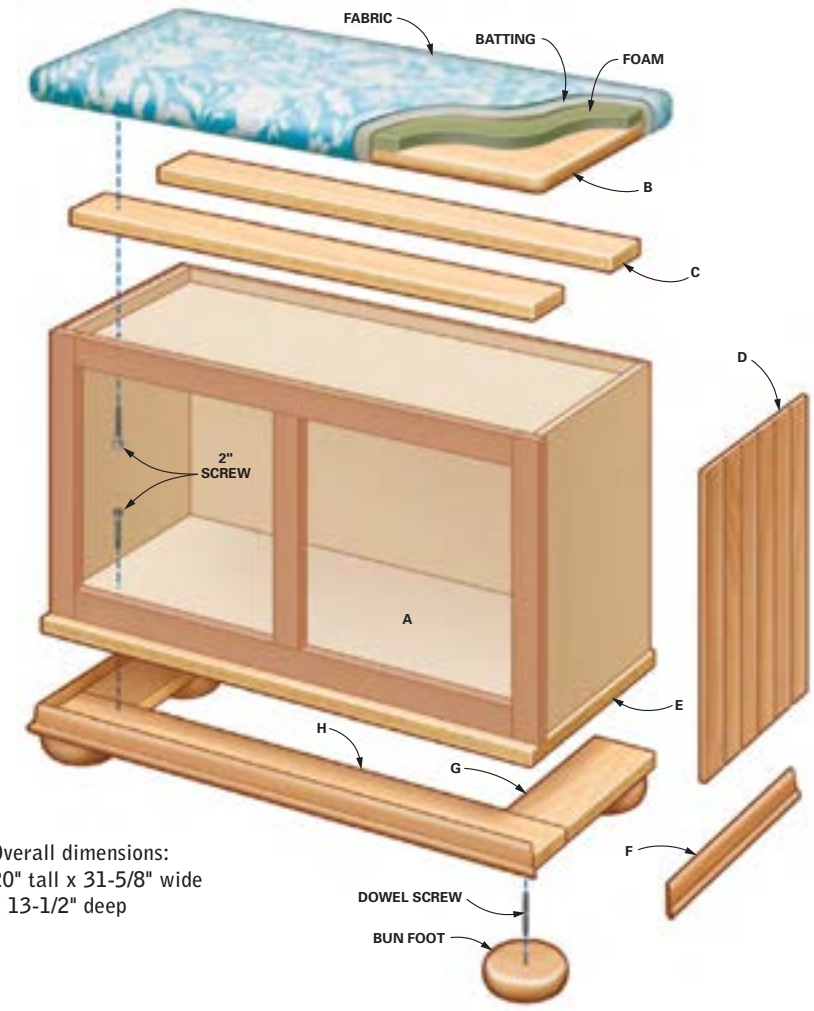
QTY.	ITEM
1	12" x 15" x 30" cabinet
1	3/4" x 4' x 4' plywood
6'	Chair rail molding
1 sheet	3/16" beaded paneling
2' x 3'	Fabric, batting, 1" foam

Scrap wood for bun feet, wood glue, cabinet knobs, 2" screws, dowel screws

corners. Photo 2 shows the method I find easiest. Don't worry about mistakes—the nice thing about upholstery work is that you can always pry out staples and fix mistakes. To fasten the seat to the cabinet, drive screws through the cabinet and fillers and into the seat.

Figure C

Entry bench



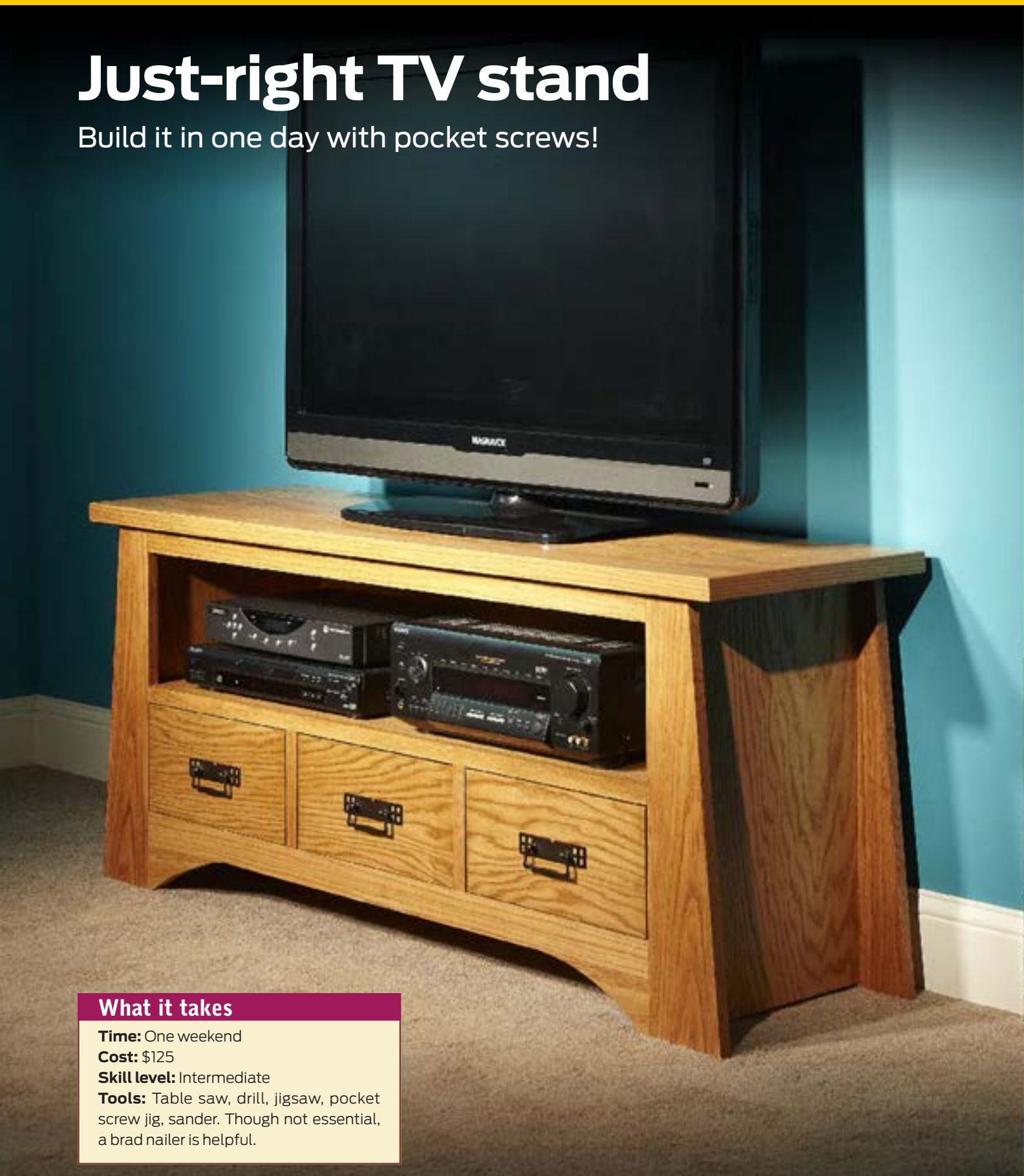
Overall dimensions:
20" tall x 31-5/8" wide
x 13-1/2" deep

2 **Staple the corners last.** Fold the fabric inward to create an "ear." Then pull the ear back, staple it and cut off the excess fabric.

3 **Add the bun feet.** Drive dowel screws halfway into the bun feet. Drill pilot holes in the bench base 2-1/4 in. from the edges and then screw in the bun feet.

Just-right TV stand

Build it in one day with pocket screws!



What it takes

Time: One weekend
Cost: $125
Skill level: Intermediate
Tools: Table saw, drill, jigsaw, pocket screw jig, sander. Though not essential, a brad nailer is helpful.

David Radtke is a Field Editor from Minneapolis.

Looking at TV stands, I felt like Goldilocks: Some models were too expensive, some were too flimsy, and others were too modern for a traditional home. None of them were just right. So I designed and built this one. It accommodates a flat screen up to 55 in. and has plenty of space for components.

For speed and simplicity, I assembled this TV stand with pocket screws. It took just one day to build and another to finish. The materials for our oak stand cost about $125 at the home center. If you choose cherry, birch or maple, expect to spend about $100 more.

Build the face frame and back

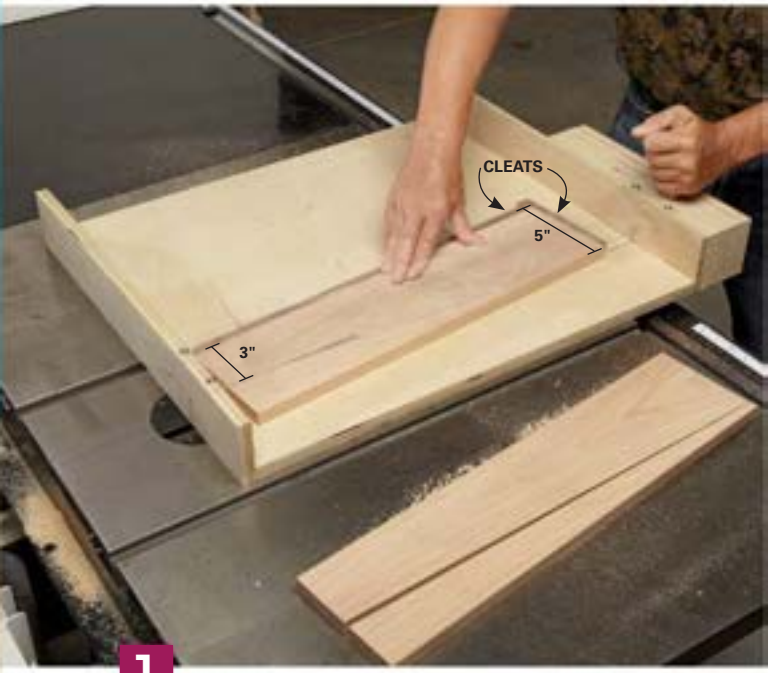
I built a deluxe sled to cut the tapered legs (Photo 1), but any jig that slides along the table saw fence on one side and holds the board at the correct angle on the other side will do the job. To find the angle, just measure and mark 3 in. in at the top and 5 in. in at the bottom of your 23-in.-long 1x6 blank. Align these marks with the saw kerf in the jig and tack your cleats to the jig. With this setup, you can cut exact repeats all day long.

To add a bit of extra rigidity to the front frame, the lower rail has curved braces at the bottom. To make this bracket shape, just cut blocks from scrap and glue them to the ends of the lower rail. Once the glue is dry, sand

Get a pocket screw jig

If you're an aspiring woodworker and don't yet have a pocket screw jig, buy one now. Once you have it, you'll find yourself reaching for it nearly every time you assemble a project. There are a lot of models available, ranging from about $30 up to $200. For techniques and pocket screw projects, go to family-handyman.com and search for "pocket screws."

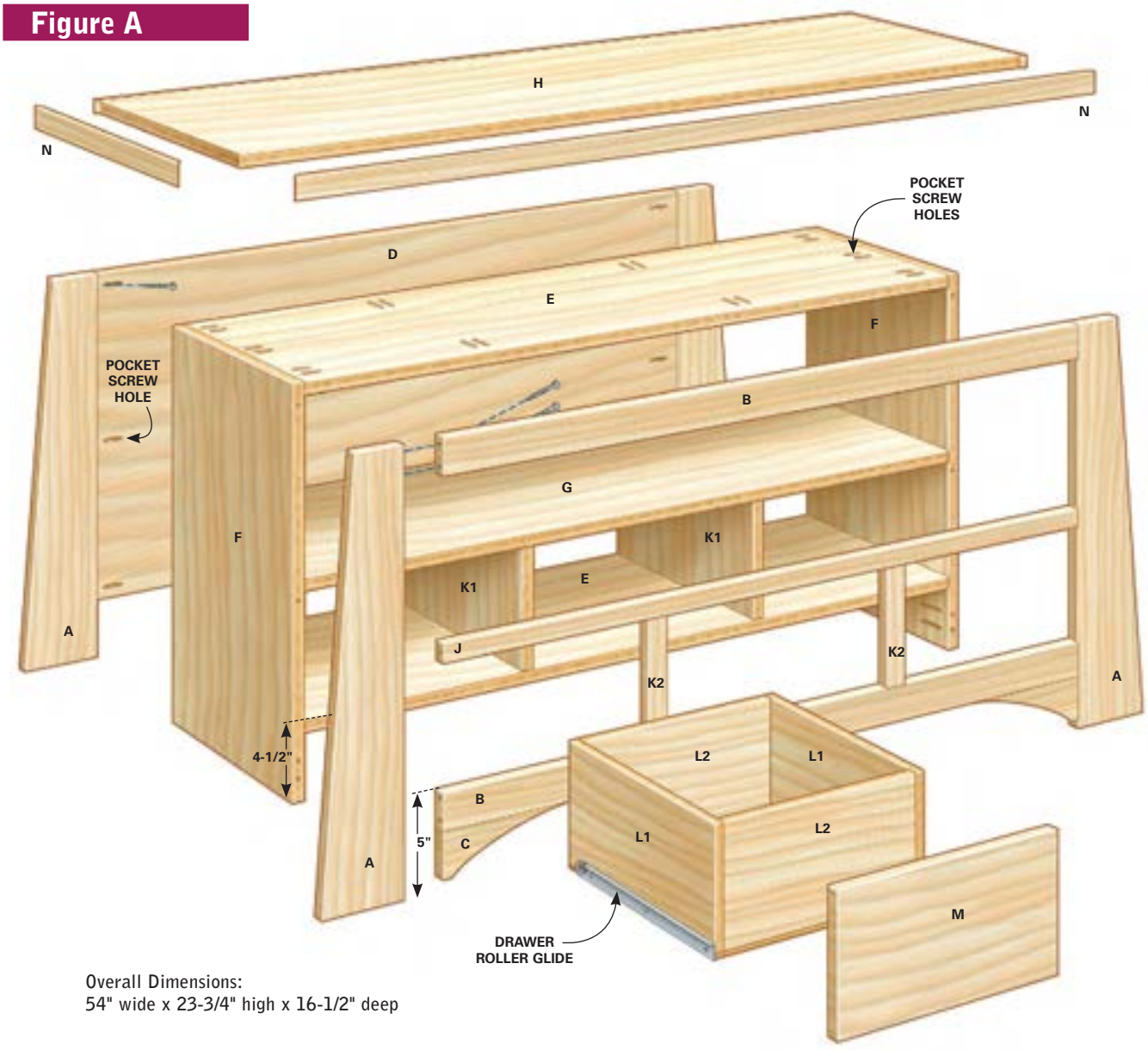
With pocket screw joinery, you don't need an arsenal of expensive clamps.



1 **Cut the tapered legs.** Your tapering jig doesn't have to be as elaborate as this one; a slab of plywood with cleats to hold the leg in position will do.
Caution: You may have to remove your blade guard for this cut, so be extra careful.

2 **Cut the curved lower rail.** Glue blocks to the ends of the rail, sand the joints flush and then cut the curves. Use the first offcut to mark the other curve.

Figure A



Overall Dimensions:
54" wide x 23-3/4" high x 16-1/2" deep

Cutting list

KEY	QTY.	SIZE & DESCRIPTION
A	4	3/4" x 5" x 23" legs
B	2	3/4" x 2" x 44" rails
C	2	3/4" x 2-1/2" x 8" brackets
D	1	3/4" x 20" x 44" back
E	2	3/4" x 13-1/2" x 46" subtop and base
F	2	3/4" x 13-1/2" x 22-1/2" sides
G	1	3/4" x 13-1/2" x 46" shelf
H	1	3/4" x 16" x 54" top
J	1	3/4" x 1" x 44" shelf face
K1	2	3/4" x 7" x 13-1/2" dividers
K2	2	3/4" x 1" x 6-3/4" divider faces
L1*	6	1/2" x 5-3/4" x 13" drawer sides
L2*	6	1/2" x 5-3/4" x 11-7/8" drawer fronts and backs
L3*	3	1/4" x 13" x 12-7/8" drawer bottoms
M*	3	3/4" x 6-1/2" x 13-3/4" drawer fronts**
N*	2	1/4" x 1-1/4" x 96" edge facing

** Measure and cut to fit*

*** Apply iron-on edge banding*

Parts listed in red are solid wood rather than plywood.

Materials list

QTY.	ITEM
1-1/2	3/4" x 4' x 8' oak plywood
1	1/2" x 4' x 4' oak plywood
1	1/4" x 4' x 4' oak plywood
2	1x6 x 8' oak
3	12" bottom-mount drawer slides
1 pkg.	1-1/4" pocket screws (fine thread)
1 pkg.	1-1/4" pocket screws (coarse thread)

the joint smooth and trace the curve. The exact shape isn't a must; I used a flexible steel ruler and bent it to make a smooth curve along the block from bottom to top. Next cut the shape (Photo 2) and smooth it with a drum sander or a sanding block. Drill the pocket holes in the back side of the rail ends and the edges of the plywood back (Photo 3). Assemble the face frame (Photo 4) with the legs tapering to the outside. The back is constructed in virtually the same manner as the face frame. But instead of having an upper and a lower rail like the front frame, the back frame has a solid panel fastened between the outer legs.

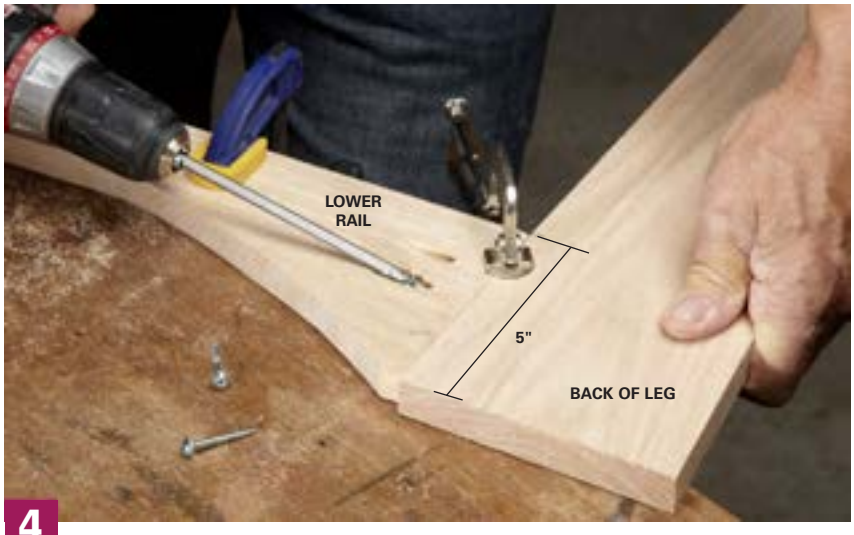
Assemble the cabinet

Cut the sides and the three shelves from 3/4-in. plywood following the Cutting list on p. 126. Drill all pocket holes into the shelf, the subtop and the base (E). The subtop and the base have the same drilling pattern. For the shelf, don't drill holes in the lengthwise edges, only on the ends. Also drill pocket holes in the sides to attach the face frame and back later (see Photo 6). Position the subtop and the base against the sides. Make sure the top of the base (E) is 4-1/2 in. from the lower edge of the sides. Screw the subtop, the base and the shelf to the sides (Photo 5).

Set the cabinet on 1/2-in. spacers and drive pocket screws into the legs (Photo 6). Next attach the front face frame in the same manner, then align and screw the subtop to the face frame. Then carefully flip the assembly upside down and attach the base to the front and back frames as well. Alignment is critical at the base, so measure to prevent any sagging.

With the cabinet upside down, cut 9-1/2-in. spacers and install the shelf (Photo 7). Then add the dividers, nailing them into place through the base and on the underside through the shelf. Be sure the dividers are evenly spaced in the opening. Glue and nail the shelf face (J) and the divider faces (K2) in place. Cut the plywood top (H) and glue and nail the edging to the top. With the cabinet still inverted, position the top under the assembly, and screw it to the subtop with 1-1/4-in. screws.

3 **Drill pocket holes.** Choose the best-looking side of each rail and bore pocket holes in the other side. Also bore pocket holes in the back panel.



4 **Assemble the face frame.** Be sure to join the rails to the non-tapered sides of the legs. Join the legs to the back panel the same way.

5 **Build the cabinet.** Join the upper and lower shelves to the sides. Clamp a block to the sides to keep the parts from drifting as you drive screws.

Build and mount the drawers

The drawers are just simple boxes made from 1/2-in. plywood with 1/4-in. plywood bottoms. To size the drawer width, measure the openings between the divider faces. Subtract 1 in. from this width to determine the drawer widths (1/2-in. clearance for each drawer slide). Make sure the drawer height is at least 3/4 in. shorter than the opening height.

In order to fasten the drawer slides to the cabinet, you'll need to add 1-1/2-in. x 1-in. x 13-1/2-in. cleats onto the base (E) between the front and back legs. You'll also need to cut 1/8-in. x 1-1/2-in. x 13-1/2-in. spacers and glue them to the sides of the dividers (K1). The cleats and spacers will allow the drawer glides to align with the faces of the shelves and the legs.

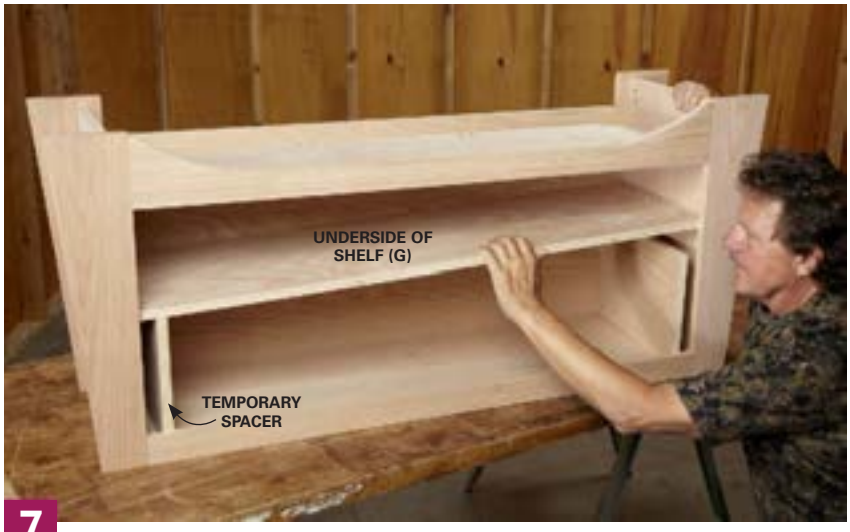
Fasten the drawer slides to the drawer bottoms (Photo 8) and to the cabinet. Position the front of the slide so the drawer sits back 3/4 in. from the face of the cabinet. To finish the drawers, measure the opening of each drawer, subtract 1/4 in. from the height and width and cut the plywood drawer faces to that dimension. Attach iron-on edge banding to the drawer front and trim and sand the edges. To see how, go to familyhandyman.com and search for "edge band."

With the drawers placed in the cabinet, apply double-stick tape to the front of the drawer assembly. Carefully align the drawer face to the drawer with 1/8-in. spacers resting between the faces and the lower rail. Press the drawer fronts (M) into place and then screw them from inside the drawer box. Check the fit and then drill the holes for the drawer pulls.

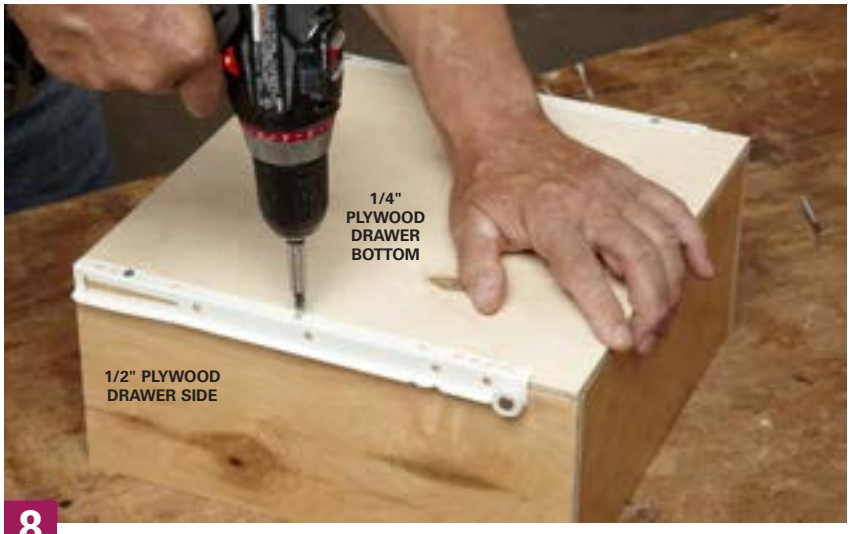
Finishing

Sand the project with 150-grit sandpaper. Be sure to blend the edge banding and ease any sharp edges. Vacuum the project and then wipe it down with a clean cloth moistened with mineral spirits to remove residue. I finished the stand with stain, plus three coats of Minwax Wipe-On Poly, and let it cure for a full week before installing components. I then positioned the components, planned the cable routes and drilled generous 2-in. holes in the back of the stand for wiring.

6 **Add the back.** Set the cabinet on 1/2-in. spacers and attach the back with pocket screws. Attach the face frame the same way.



7 **Install the shelf.** With the stand upside down, set the shelf on 9-1/2-in. temporary spacers and screw it into place. Then install the dividers below the shelf.



8 **Build the drawers.** After assembling the simple plywood drawer boxes, mount the drawer slides. Add the drawer fronts after installing the drawers.

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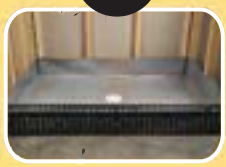
PrePitch™
is a unique tool that creates the proper sub floor slope needed underneath the pan liner to manipulate the water towards the weep holes that are an integral part of shower floor drains.



Kirb-Perfect®
is a stay-in plastic form designed to eliminate the possibility of any nails puncturing the liner on the top or inside walls of shower curbs.

Quick-Pitch®
is a stay-in place screeding guide system that guarantees a properly pitched shower floor every time regardless of size and shape.

GOOF PROOF SHOWER®
Installation System

StringA-Level™ Simultaneously Attach and Level a Continuous Stringer

GOOF PROOF SHOWER WALLS

Simultaneously attach and level a continuous stringer on which to stack heavy or large format tile vertically.

Walls

e Outside

R e piece

Corner Shower Seat Fastest GOOF PROOF installation

GOOF PROOF SHOWER SEAT

- Easily Adjustable width 24" or 30"
- Six pre-drilled Mounting holes
- Level vials ensure correct pitch
- Waffle pattern assures optimal tile adhesion
- Full width tile support ledge

Measure

Fasten

Tile

Designed for New and Retro fit/Existing Installations

Download your QR code reader of choice, launch it to view video.

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The clutter-free life

There's a place for everything, and in *All-Time Best Storage* we'll show you where that place is and how to build it. With simple step-by-step instructions, clear photos and detailed plans, you'll learn how to:

- Create more storage space in a crowded closet
- Build a giant cabinet big enough to hold almost everything in the garage
- Turn unused wall space into storage, medicine cabinets and more
- Open up kitchen cabinets with super-efficient rollouts
- Build a garden shed for yard and garden equipment
- Conquer entry-door chaos with coat racks and shoe storage
- Make a rolling work table with room for tools and materials
- Organize your laundry area
- Create inexpensive storage cabinets and bookshelves
- Install wire shelving like a pro and much more

Inside you'll also find storage tips for every room in the house, along with ideas and inspiration to help you find solutions to all your storage problems.

All-Time Best Storage is presented by the editors of *Family Handyman* —the world's largest and most-loved home improvement brand.