

Tool Test: 12 Small Shop Tablesaws

#96 October 2002
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Tool Cabinet

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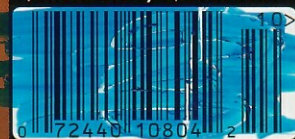
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Question & Answer

Edited by Dave Munkittrick

How Can I Avoid Kickback When Resawing on a Tablesaw?

Q. Is there a splitter that can be used for resawing on a tablesaw? Mine is hooked onto the blade guard so it won't work.

R. T. Jarvis

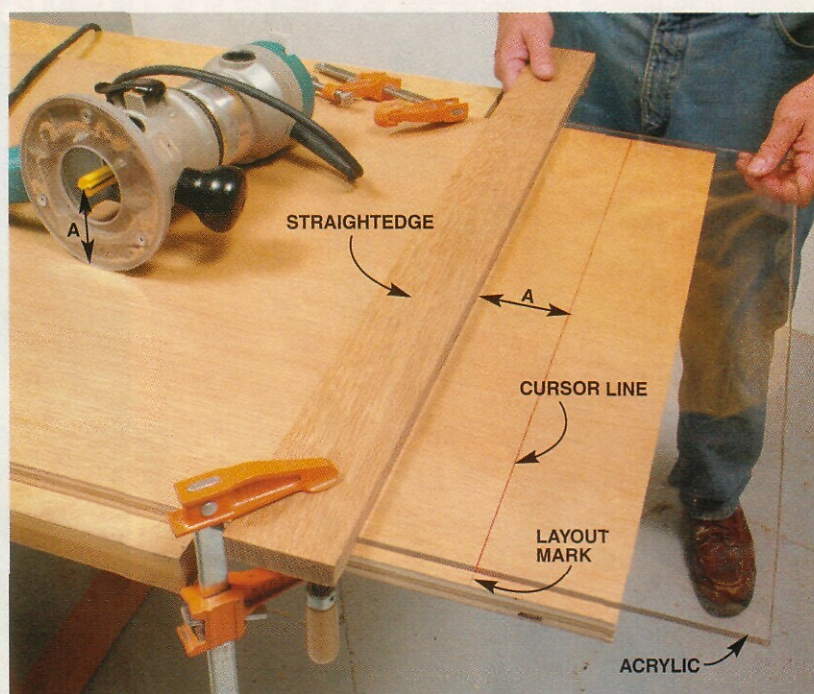
A. It's unfortunate but true; you can't use a conventional splitter for resawing on a table-saw. But, what you can do is glue a hardwood splitter into a zero-clearance throat plate. Just extend the opening in the top of the plate with a shallow 1/8-in.-wide dado and glue in a wedge of hardwood. The wooden wedge keeps the kerf open so it can't pinch the blade and cause a kickback.

It's essential that the splitter be aligned precisely with the saw blade. Here's how to do it: Lay a zero-clearance throat plate upside down on your saw with the blade extending up through the slot. (Be sure to have another throat plate in the saw.) Set the fence against the edge of the throat plate, lower the blade and make a 3/16-in.-deep cut. Glue the hardwood splitter into the slot. Sand the wedge so it's a touch thinner than the blade kerf and sharpen the leading edge just a bit. Now you won't have to sweat the dreaded pinch when you resaw.

HARDWOOD
SPLITTER

ZERO-CLEARANCE
THROAT PLATE

The blade guard must be removed for this cut. **Be careful.**



Quick Router Dado Setup

I shorten the time it takes to rout dados with a simple jig made from acrylic. A small, 6-in. x 24-in. piece will do. Mark the point where your router base will ride against the straightedge. Then, measure the exact distance from that point to the center of your router bit ("A" in the photo). Mark that distance in from the long edge of your acrylic rectangle. Use a sharp utility knife to score a line exactly parallel to that edge. Then, take a red, fine-point felt-tip pen and run it along the score to create a cursor.

To cut dados on your cabinet side, lay out the centerlines of each dado. Then, line up the red line on the acrylic with the dado centerline on the cabinet. Butt your straightedge to the acrylic and clamp it in place. Bingo! You're ready to rout.

Tony B. Amadeo

Sources See Page 102

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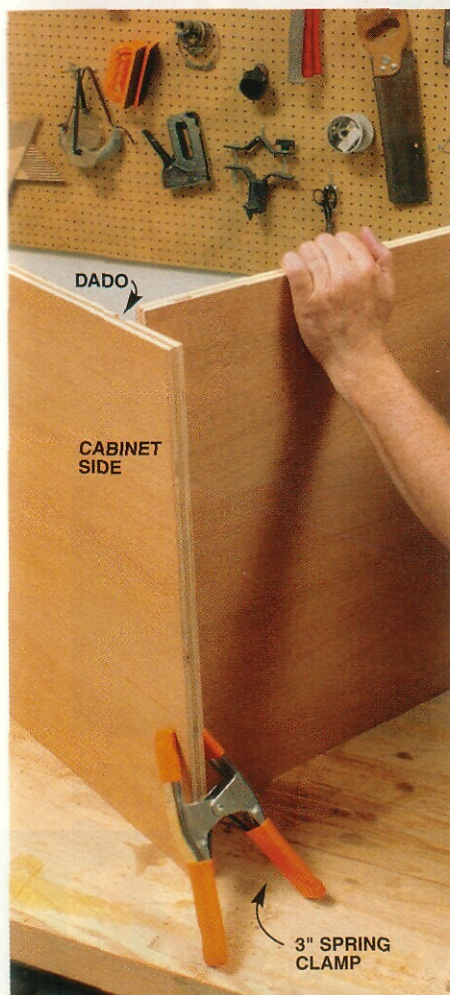
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Workshop Tips



Spring Clamps Reduce Glue-Up Stress

Gluing up a cabinet in a one-person shop can be stressful. Thankfully, I found a simple cure. A pair of 3-in. spring clamps make sturdy tripod supports on the ends of cabinet parts. They hold everything up while you fit the parts together. Now I don't break out in a cold sweat when it comes time to dry fit or glue up a cabinet. After all, woodworking is supposed to be relaxing, right?

Ron Seidel

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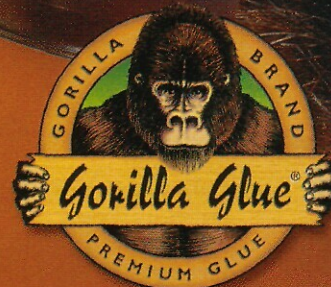
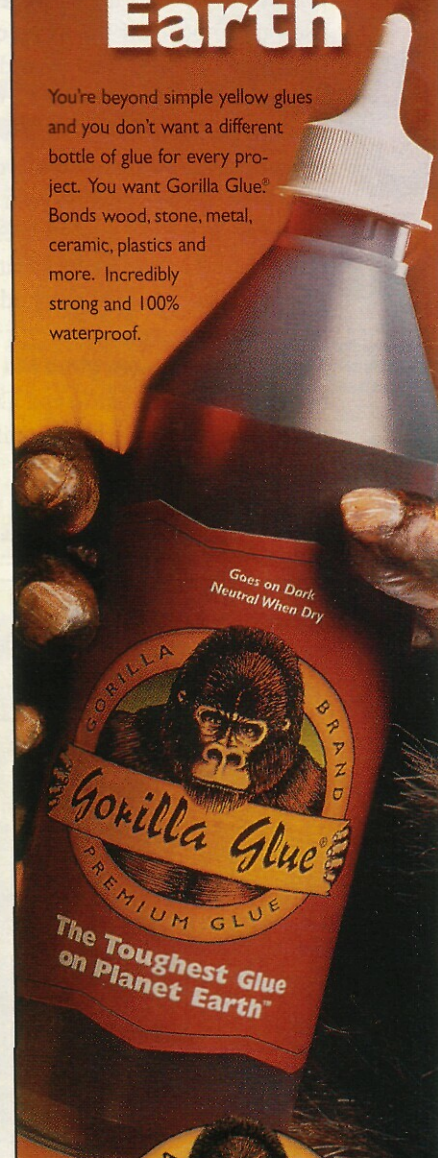
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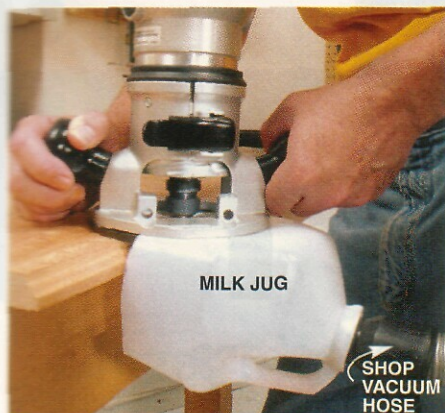
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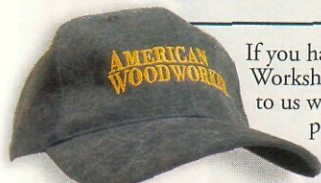
Workshop Tips



Milk Jug Dust Collection

Routing makes a real mess. But, here's a solution that won't cost you a dime. Take a 1-gallon milk or windshield-washer container and cut a hole in one side for a bit. Slice off the bottom with a utility knife. Cut back the three other sides so they line up with the centerline of your router shaft. Push a 1-in. vacuum hose onto the neck of the jug, fire up the vacuum and rout to your heart's content without having to sweep up afterward. *AW*

Spike Carlsen



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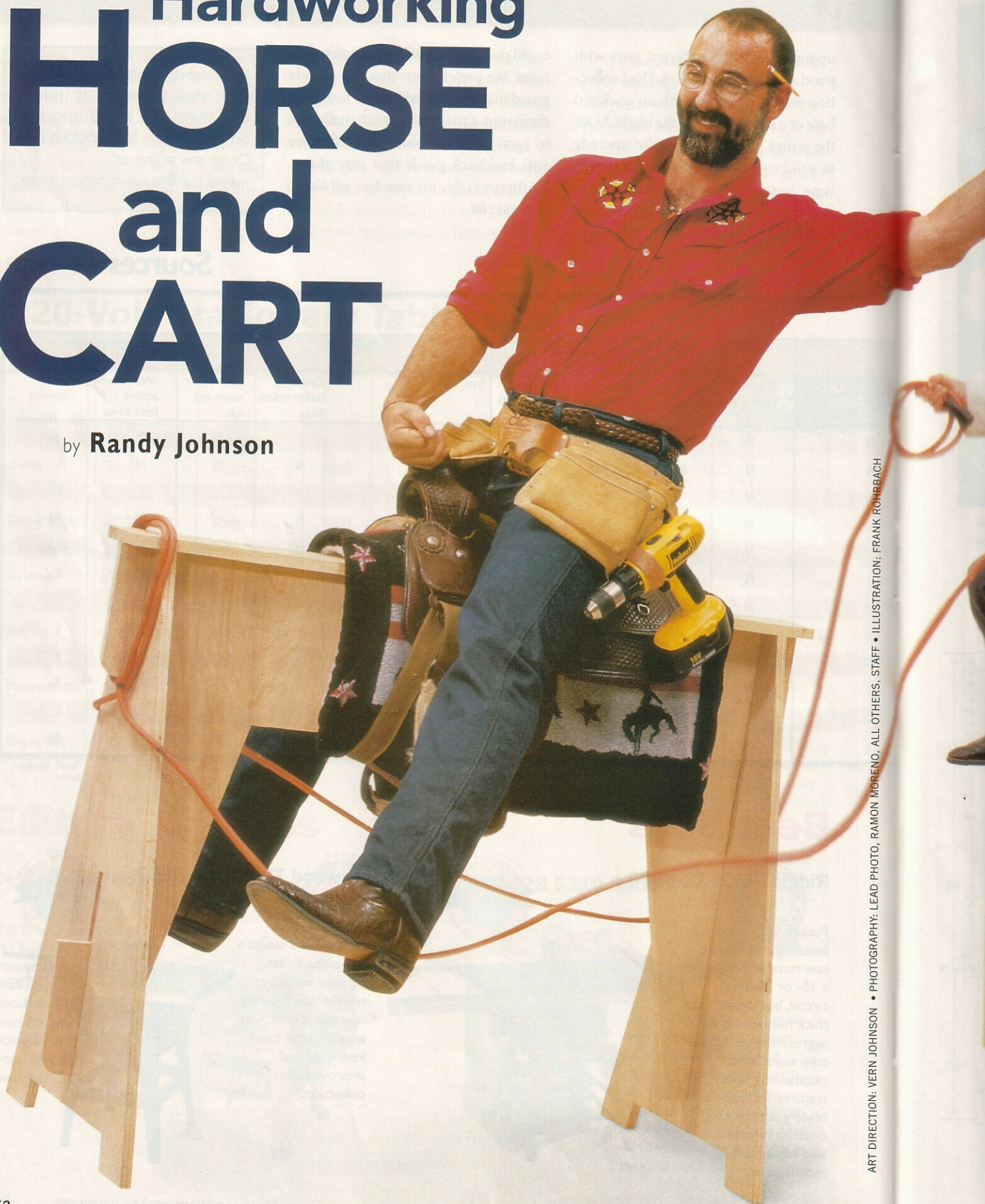
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Hardworking **HORSE** and **CART**

by **Randy Johnson**



ART DIRECTION: VERN JOHNSON • PHOTOGRAPHY: LEAD PHOTO, RAMON MORENO, ALL OTHERS, STAFF • ILLUSTRATION: FRANK ROHRBACH

Two great additions to any small shop

Do you spend a lot of time stacking, storing and pushing stuff around your small shop just to make room for the next phase of your project? Here are a couple of no-nonsense shop helpers that can make your small shop feel like the open prairie!

The knock-down plywood sawhorse is surprisingly strong and stable. You can work two of these horses hard and they won't get saggy backs or wobbly legs. Add an old door to the top and you have a slick and quick worktable. It only takes a single sheet of plywood, a jigsaw and a drill to make a matching pair of these steeds.

This shop cart is perfect for wheeling project parts from machine to machine or keeping your gear close at hand. If you build it to match the height of your tablesaw, you can also use it as an infeed or outfeed table. You only need to pony-up the dough for one sheet of plywood, and there's no fancy joinery to mess with. Giddyap!

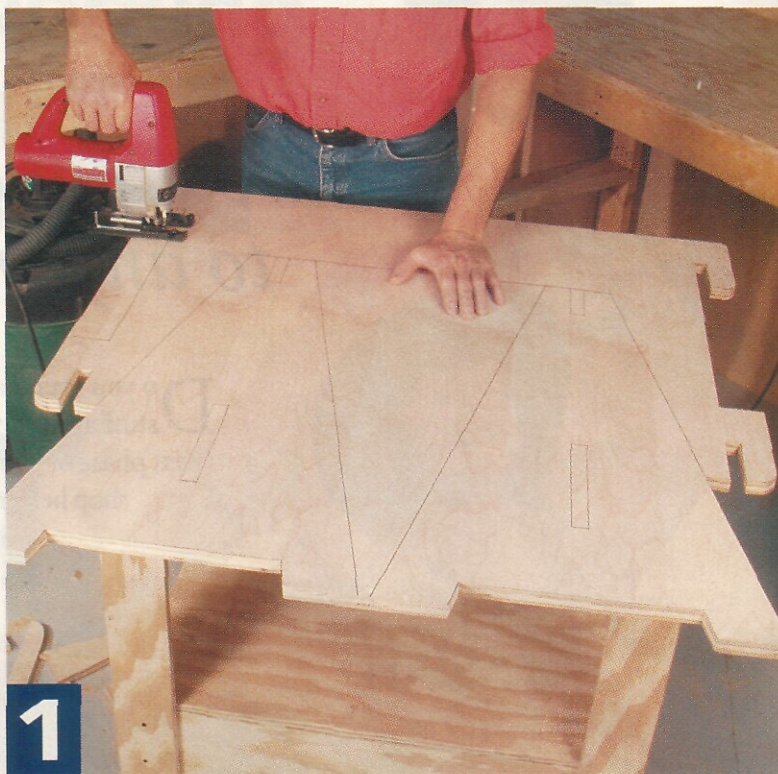


Mighty Knockdown Horses

These workhorses can carry a big load and come apart easily for flat, out-of-the-way storage. We've given you two size options (Figs. A and B). Of course you can adjust these measurements to any size that fits your needs. We used 3/4-in.-birch plywood for our horses because it's flat and strong. These horses are fun and quick to build. Here's how:

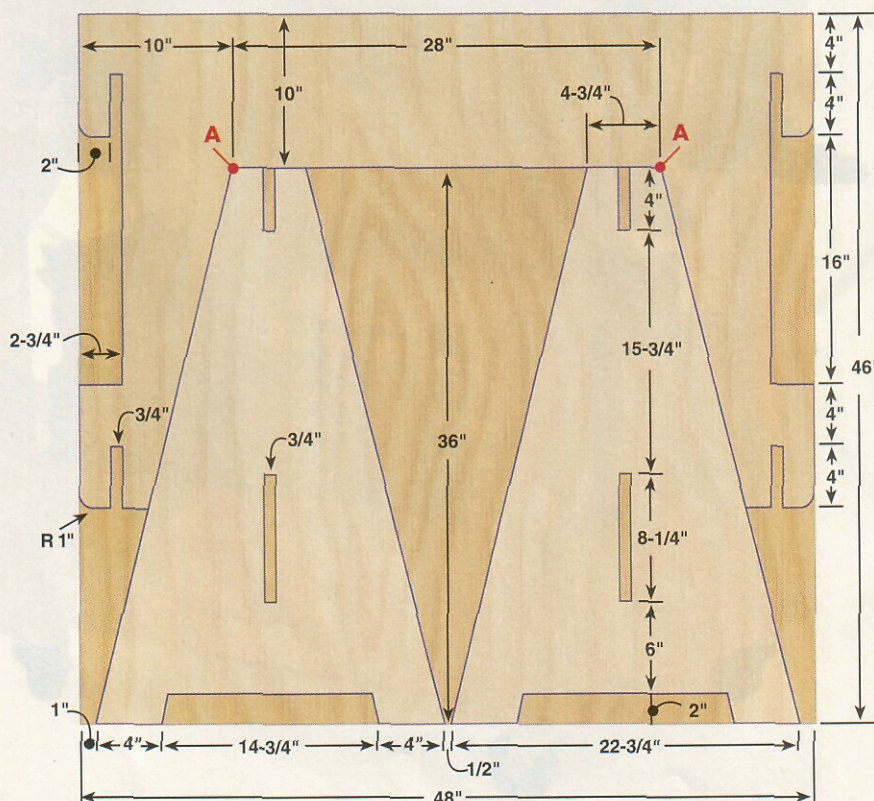
1. Begin by locating points A on your plywood (see Figs. A and B). Start your layout from these points and the rest of the layout will be an easy ride.
2. Use your jigsaw to cut all of the parts (Photo 1).
3. Once the parts are cut out, ease the edges with some sandpaper and simply slip the interlocking joints together (Photo 2).
4. Add a screw through each end to secure the parts (Photo 3).
5. Finally, add a 3/4-in.-thick top board (Photo 4). This board is replaceable if it gets chewed up when using the horses for sawing.

Special thanks to Holbert Miller for sending us this tip.



1 Saw out the horse parts with a jig saw. It's the best tool for the job.

Fig. A
Plywood Layout for 36-3/4" tall x 48"-long Horse



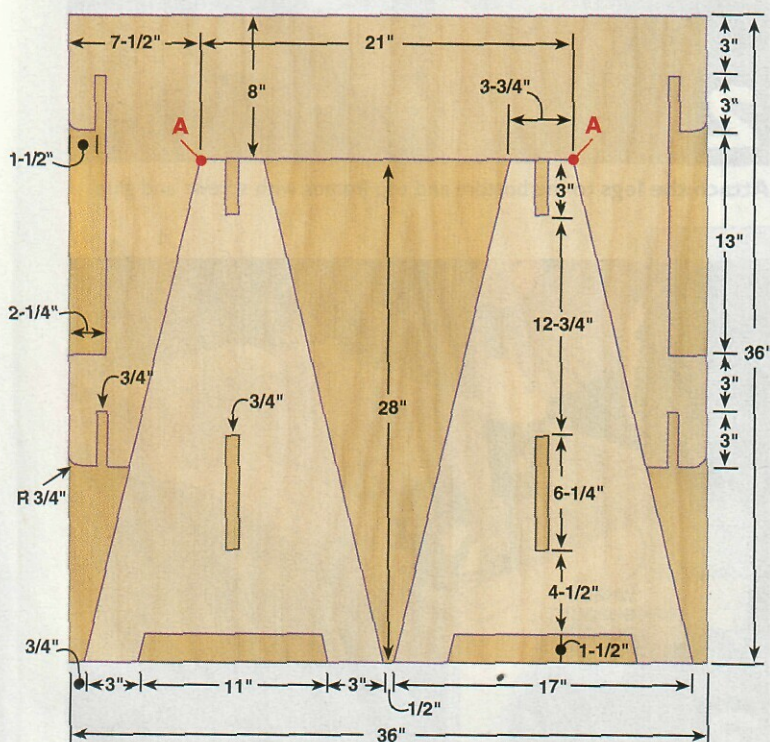


Assemble the horse parts. Once together, the interlocking joints are remarkably rigid.



Add a screw to each end. This is all it takes to keep the horse from coming apart when it's picked up and moved around.

Fig. B
Plywood Layout for 28-3/4" tall x 36"-long Horse



Attach a 3/4-in. top board. It provides a wider work surface and is replaceable if you damage it when sawing or drilling.



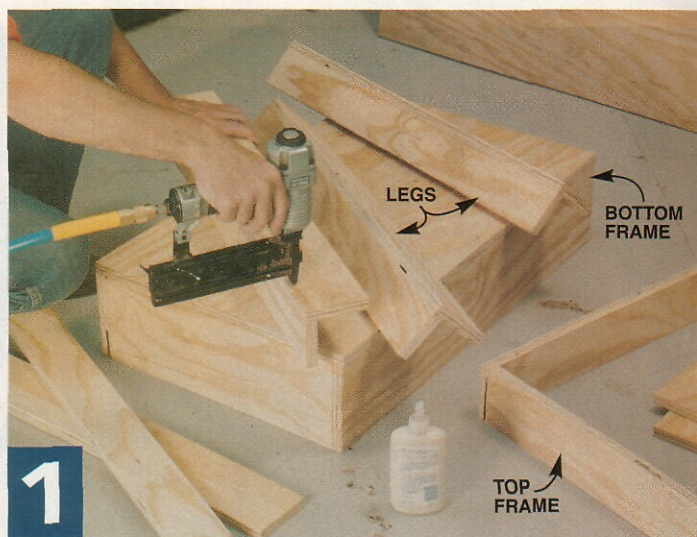
Trailworthy Shop Cart

We originally built several of these carts for the AW shop. They showed up in our how-to photos and some of you requested building plans. Here they are in seven easy steps:

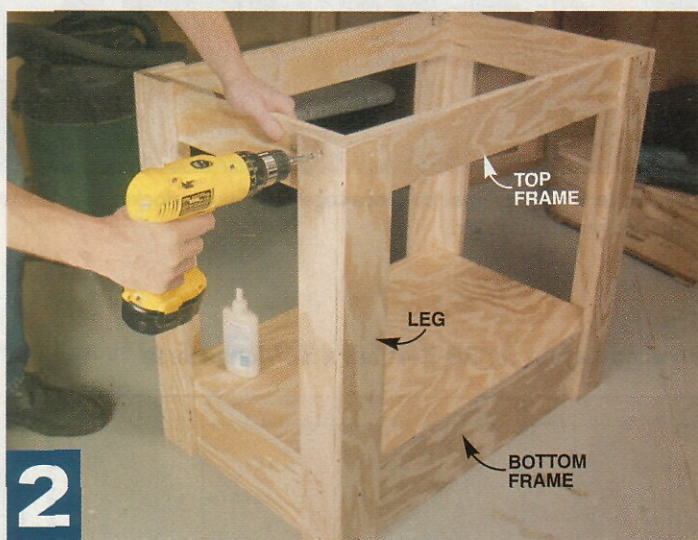
1. Cut out the parts according to the plywood layout (Fig. D).
2. Nail together the top frame (F and G).
3. Assemble the base frame (C and D) and attach the bottom shelf (E) with glue and nails. Use a router or belt sander to flush up the bottom shelf if it isn't flush with the outside of the base frame.
4. Glue and nail parts A and B together to form the legs (Photo 1).
5. Round over all the sharp plywood edges with a sander or a router equipped with a round-over bit. Pay special attention to the long edges on the legs, the top edge of the bottom shelf and the lower edges of the top frame. Rounded edges are easier on your hands and less likely to give you slivers.
6. Attach the assembled legs to the bottom and top frames (Photo 2). Then glue and nail on the top (H).
7. Finally, flip the cart over and add the wheel support boards (J). Screw on the casters and you're ready to roll (Photo 3).

AW

Sources See page 102



1 Nail and glue the parts together. Start with the top and bottom frames, and then the legs.



2 Attach the legs to the bottom and top frames with screws and glue.



3 Attach the wheel support boards and the casters to the bottom of the cart.

Fig. C
Exploded View

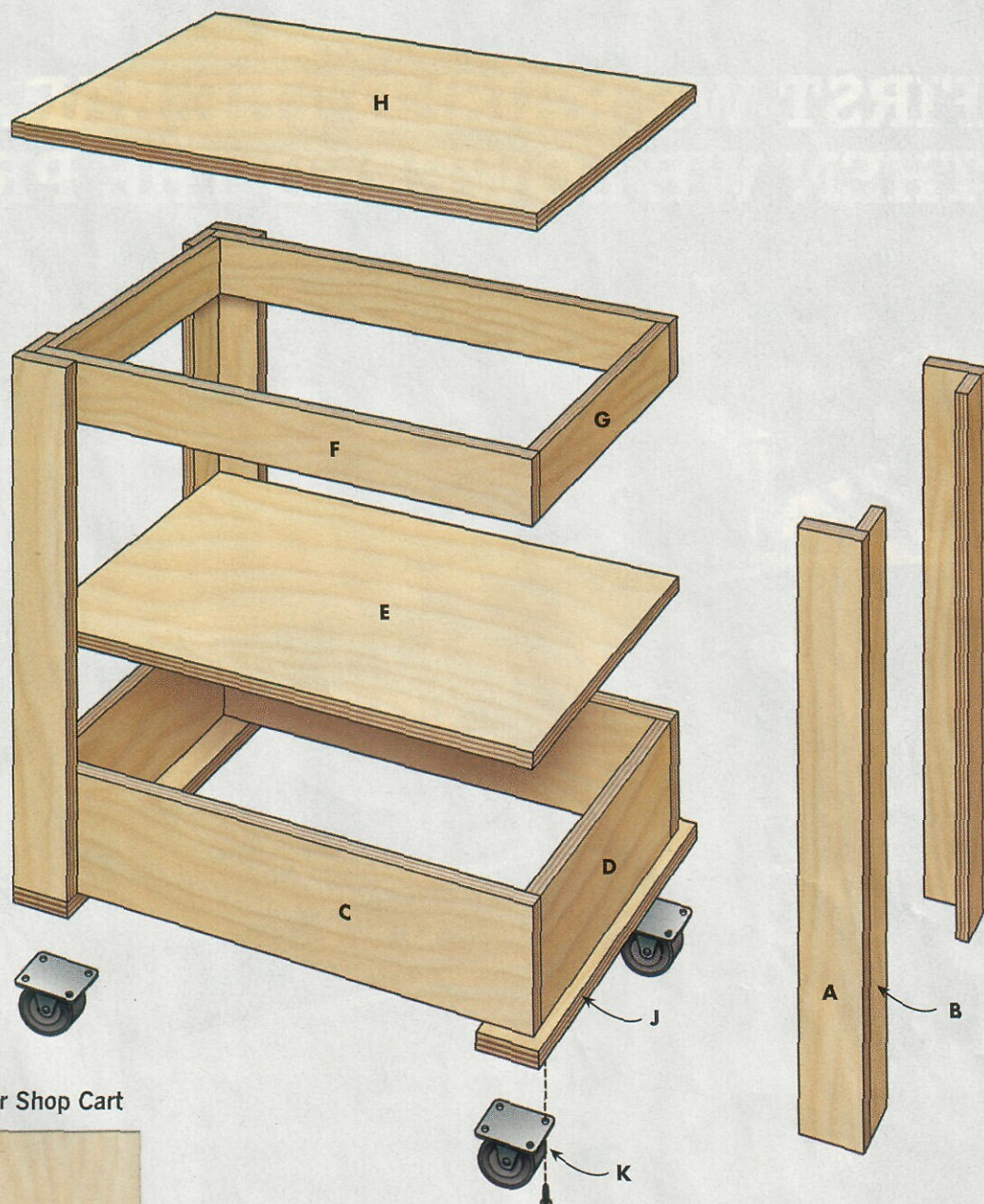
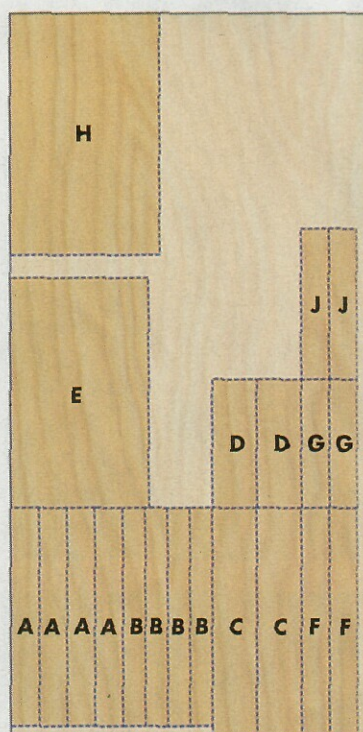


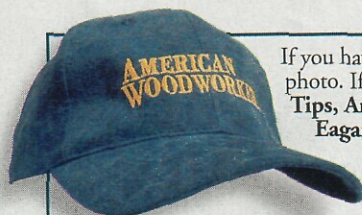
Fig. D
Plywood Layout for Shop Cart



Cutting List

Overall Dimensions 20"W x 32"L x 34-1/4"H

Part	Name	Qty	Dimensions T" x W" x L"
A	Side Legs	4	3/4 x 3-3/4 x 29
B	End Legs	4	3/4 x 3 x 29
C	Base Frame Sides	2	3/4 x 6 x 30-1/2
D	Base Frame Ends	2	3/4 x 6 x 17
E	Shelf	1	3/4 x 18-1/2 x 30-1/2
F	Top Frame Sides	2	3/4 x 3-3/4 x 30-1/2
G	Top Frame Ends	2	3/4 x 3-3/4 x 17
H	Top	1	3/4 x 20 x 32
J	Wheel Support Boards	2	3/4 x 3-3/4 x 20
K	3-in. Casters	4	



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Tool Cabinet

Tons of flexible storage for today's woodworking tools.



By George Vondriska and Dave Munkittrick

Old tool chests made by the masters utilized every square inch of space with custom-fit nooks and crannies for all of their hand tools. Today's woodworker needs a different kind of storage space, geared toward power tools. Our tool chest is just the ticket. It offers a massive amount of storage space that can be customized to adapt to your ever-changing arsenal of power tools.

The drawers are inexpensive and easy to make. We built them without mechanical slides and saved about \$140. Even without the slides, the drawers extend just shy of full length and glide like a dream.

We'll also introduce you to a timesaving technique for edge-banding casework. This technique eliminates the hassle of cutting and fitting edge banding one piece at a time, plus the nuisance of trying to sand the edge banding flush with the plywood carcass.

Our tool chest features cubbies for routers, sanders, a plate joiner and cordless drills. The drawers below store the supplies these tools depend on, plus the usual assortment of hand tools. The step-back design yields a small work surface where bits and sandpaper can be changed on the spot. Adjustable shelves above allow you to reconfigure the power-tool storage as you replace old tools and add new ones.

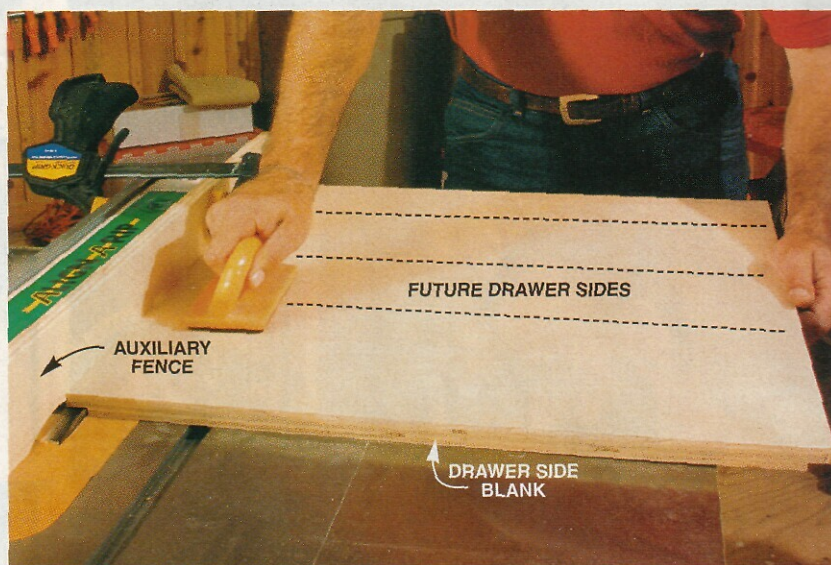
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Tool Cabinet

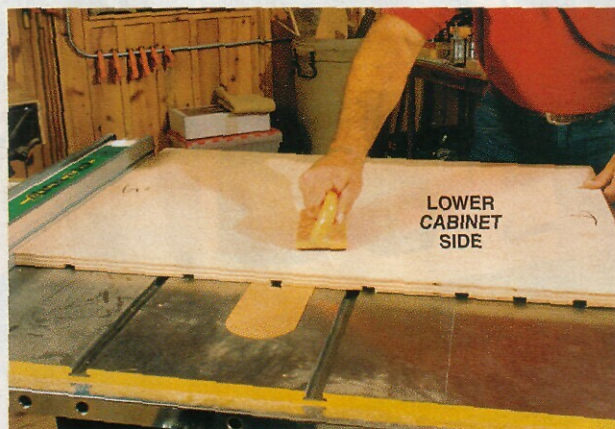
Tools and Materials

All you need to build this cabinet is a tablesaw, a stacking dado set and a drill. The entire project will cost less than \$350.

The cabinet and drawer boxes are made from 3/4-in.-birch plywood. Drawer bottoms and cabinet backs are 1/2-in.-birch plywood. Edge banding, drawer fronts and drawer runners are made from solid birch. Note: You can save \$30 to \$40 if you build the drawer fronts out of plywood. Also, this project is a perfect opportunity to use less-expensive No. 1 common birch. The small pieces make it easy to cut around any defects.



1 Rabbet the ends of both drawer blanks. It's easier and more accurate to rabbet seven drawer sides at a time and then rip the blanks to final size. Go ahead and rabbet the case sides while you're at it.



2 Dado the case sides for the drawer runners and the bottom shelf. Label the top and bottom to make sure you get the dados located correctly (see Fig. A).



3 Use clamps and a caul to add hardwood edge banding to the plywood after the dados and rabbets are cut. Don't forget to edge-band the bottom of the lower cabinet sides. They act like skids and protect the fragile plywood ends.



4 Glue the drawer runners into the carcass sides. Mark the dado for the bottom shelf so you don't accidentally glue a runner in the wrong place.



5 Add weights to the two sides set face to face to ensure the runners are seated completely in the dados. Use some scrap plywood to protect the case side from your weights.

Fig. A Dado Layout

Cut the dados in the top half first. Then rotate the piece and work from the bottom up. This keeps the dado blade close to the fence where it's easier and safer to feed the stock.

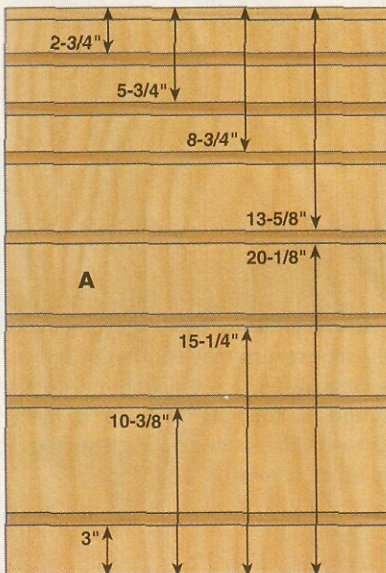
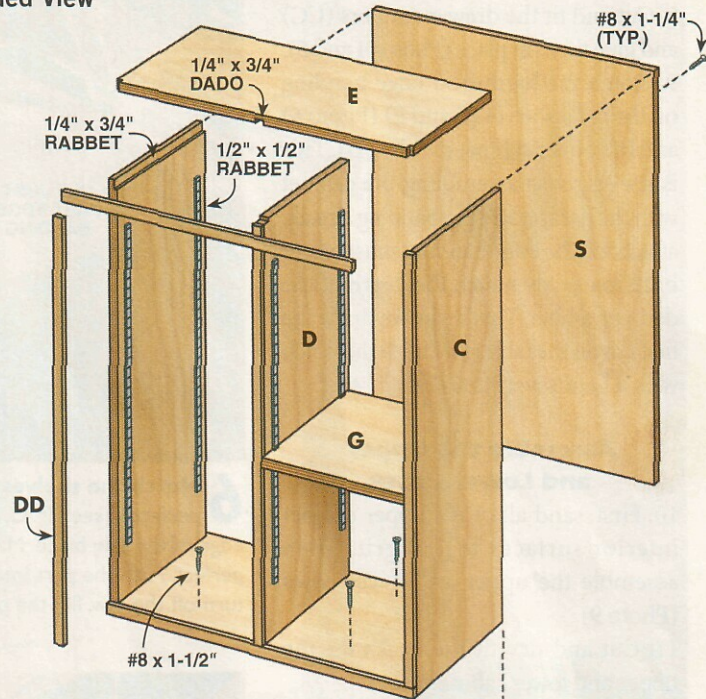
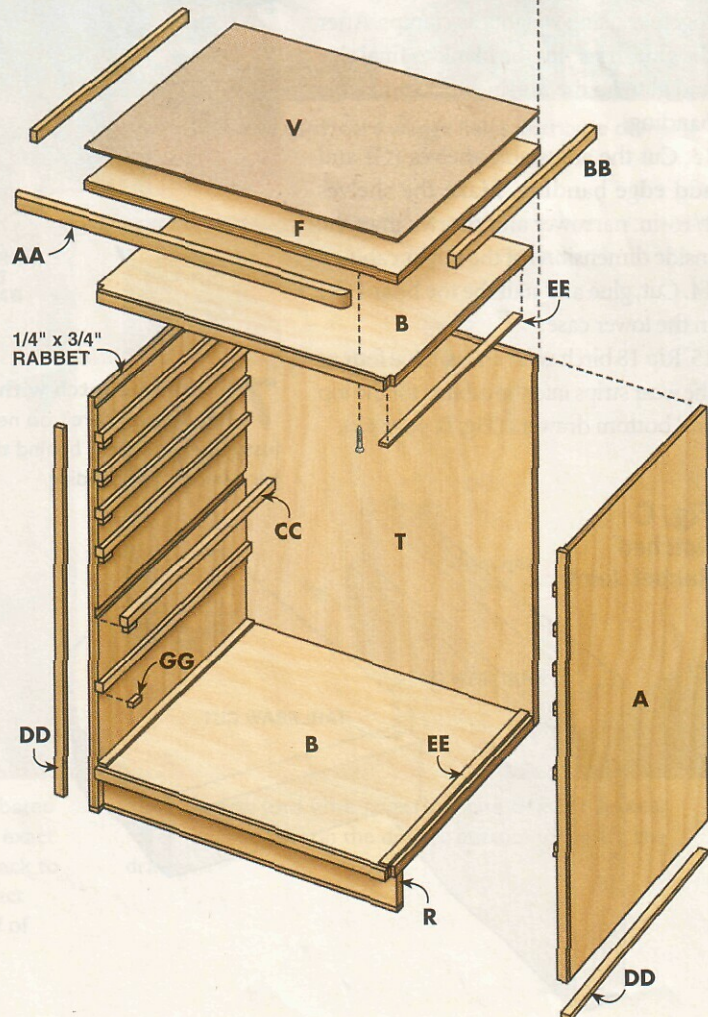


Fig. B Exploded View



Build the Cabinets

1. Rough-cut the plywood down to manageable sizes using a circular or jig saw.
2. Cut the cabinet parts (A, B, C and D) to finished size on the tablesaw. Label the top, bottom and back of the lower cabinet sides (A).
3. Cut two drawer-side blanks 23-1/4-in. long x 24-in. wide. Even though you don't need drawer parts *right now*, this allows you to rabbet the drawers and the cabinet sides together. The individual drawer sides are ripped from the blanks later.
4. Mount a dado blade in your tablesaw. Adjust the width of the dado set with shims to match the thickness of the plywood. Make test cuts and shoot for a snug fit that requires moderate hand pressure to seat the shelf in the dado.
5. Cut the rabbets for the cabinet tops and the drawer sides (Photo 1). Then cut the dados in the lower cabinet sides (Photo 2). Use the dado layout diagram (Fig. A) as a road map. Note: You may have to adjust the dado width to fit the hardwood runners.
6. Cut 1/2-in. x 1/2-in. rabbets for the backs (S and T) on the lower and upper cabinets.
7. Glue hardwood edge banding (Photo 3) onto the leading edge of the case parts. After the glue is dry, sand the edge banding flush with the plywood. If you've ever had to sand edge banding flush to a cabinet, you'll appreciate how much easier it is to do the job on the individual parts *before* assembly.



Tool Cabinet

8. Cut and fit the drawer runners (CC) and glue them in place (Photos 4 and 5).
9. Notch the hardwood edge banding on the fixed shelves (B and E) (Photo 6) and the upper cabinet divider (D). This is the secret to assembling the cabinet with the hardwood edge banding already attached. The edge banding must be cut back to exactly match the depth of the dado or rabbet. That's why we made the first cut on the tablesaw. Finish the notch with a handsaw (Photo 7).

Assemble the Upper and Lower Cases

10. First, sand all of the upper cabinet interior surfaces to 180 grit. Then assemble the upper and lower cases (Photo 9).

11. Cut and dry fit the backs for the upper and lower cabinets.

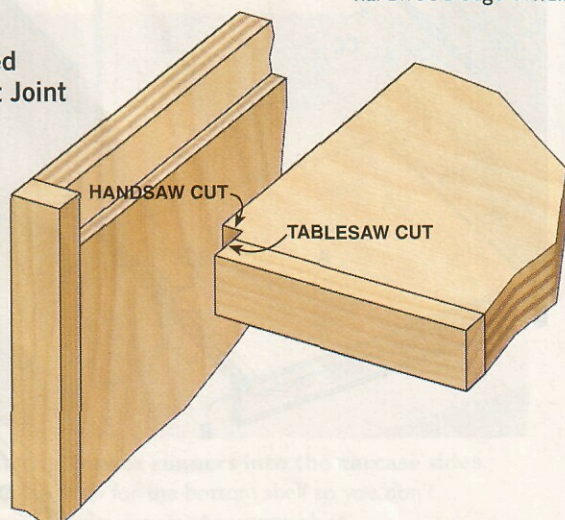
12. Cut and assemble the parts for the worktop (F and V). Stack and glue them together using weights as clamps. After the glue dries, cut the blank to final size and glue on the 3/4-in. hardwood edge banding.

13. Cut the adjustable shelves (G) and add edge banding. Make the shelves 1/16-in. narrower and shorter than the inside dimensions of the upper cabinet.

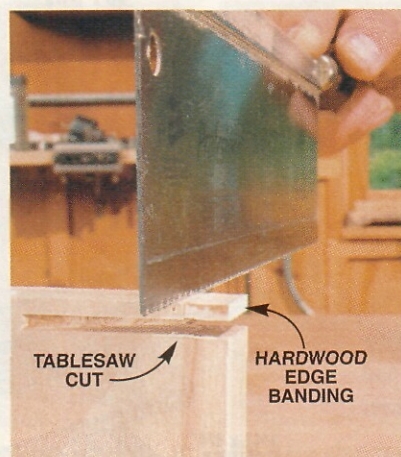
14. Cut, glue and nail the toe board (R) in the lower case.

15. Rip 18 birch wear strips. Glue four of the wear strips into the cabinet for the top and bottom drawers (Fig. B, page 63).

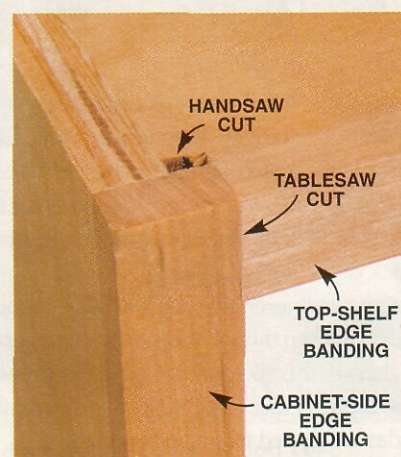
Fig. C
Notched
Rabbet Joint



6 Notch the shelves and dividers on the tablesaw, so they fit into the case sides perfectly (see Fig. C, below). Position the tablesaw fence 1/4-in. from the outside edge of the saw blade. Make test cuts in scrap and fine-tune the fence until the joint is perfect. Push the part into the saw far enough to cut the hardwood edge banding. Then, turn off the saw, flip the part over and cut the other corner.



7 Finish the notch with a handsaw. There's no need to be fussy here—just cut behind the hardwood edge banding.



8 Careful notching of the edge banding creates a perfect fit between the mating parts. The notched shelves allow you to sand the hardwood edge banding flush to the plywood parts before assembly.

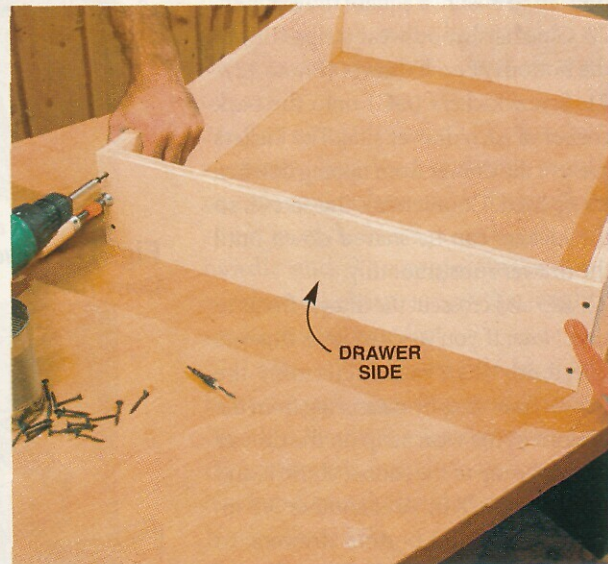
**This “notched” joint
simplifies building
a cabinet with
edge-banded plywood.**



9 Assemble the upper and lower cabinets with glue and clamps. A caul with a cardboard wedge helps distribute clamping pressure across the bottom shelf. Measure diagonals to check for square.



10 Measure the cabinet opening minus the rabbeted ends of a pair of drawer sides to determine the exact length of your drawer fronts and backs. Hold the sides back to back so one rabbet fits over the cabinet side; then subtract 1/8 in. from this measurement. In this case, measuring off of assembled parts is more accurate than working out the dimension mathematically.



11 Screw and glue together the drawer boxes. Then, screw on the drawer bottom to square the drawer.

Build the Drawers

16. Determine the final length for the drawer box fronts and backs (Photo 10). Crosscut two 24-in.-wide plywood drawer blanks to that length, and set them aside with the two drawer-side blanks you rabbeted earlier. You now have a total of four blanks you'll rip into individual drawer parts. Note: If you've sized your drawers differently than ours, you can determine the exact width of each drawer box part by measuring the distance from the top of the drawer's runner to the bottom of the runner above it. Subtract 1-1/8-in. clearance for the drawer bottom, wear strips and the kicker that will be attached to the top of the drawer side.

17. Rip the drawer parts from each blank.

18. Dry-fit and clamp one drawer and measure for the drawer bottom (U). Cut the drawer bottoms making sure each one is dead-on square. You'll be relying on them to square the drawer boxes.

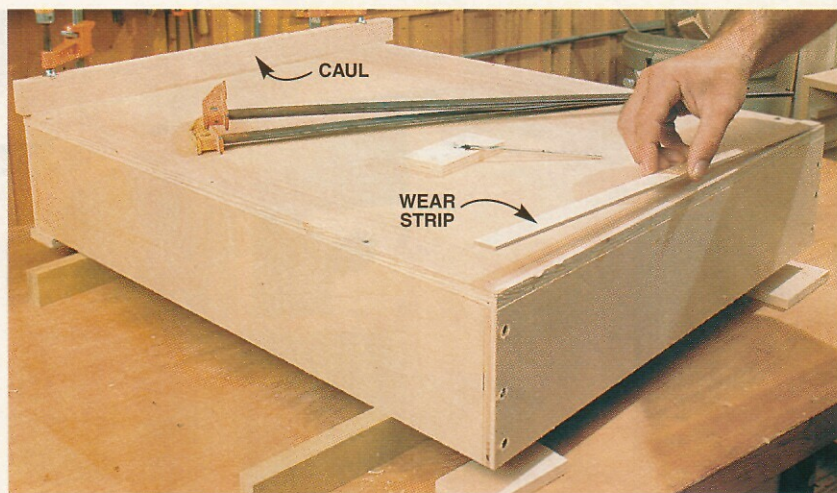
19. Glue and screw together each drawer box (Photo 11). Add the bottoms, making sure the edges of the drawer box are flush with the edges of the bottom to ensure a square drawer.

20. Glue hardwood wear strips (EE) to the bottom of each drawer (Photo 12).

21. Screw kickers (GG) onto the back corner of each drawer side. The kickers prevent the drawer from tipping down as it's opened. Countersink the screws so the kickers can be shaved down until the drawer runs smoothly.

22. Rip and crosscut the drawer fronts to size. Note: If you've sized your drawers differently than ours, determine the drawer front sizes by measuring from the bottom of the wear strip on the drawer box to the top of the runner above it, and subtracting 1/8 in. Add another 3/8 in. onto the top and bottom drawers, so they overlay the top and bottom shelves. Make each drawer front 1/4-in. narrower than the case.

23. Attach the drawer fronts to the boxes (Photo 13). Note: Use double-faced tape to position the top drawer where clamping is impossible.



12 Glue birch wear strips to the bottom of each drawer. Use a caul to distribute clamping pressure.

13 Attach the drawer fronts, using a shim to set the gaps between them. Start at the bottom, and use a pair of spacer blocks to set the front so it overlaps the bottom shelf by 3/8 in. Work from the bottom up, keeping the bottom edges of the drawer fronts approximately flush with the drawer bottoms. Screw them on as you go.

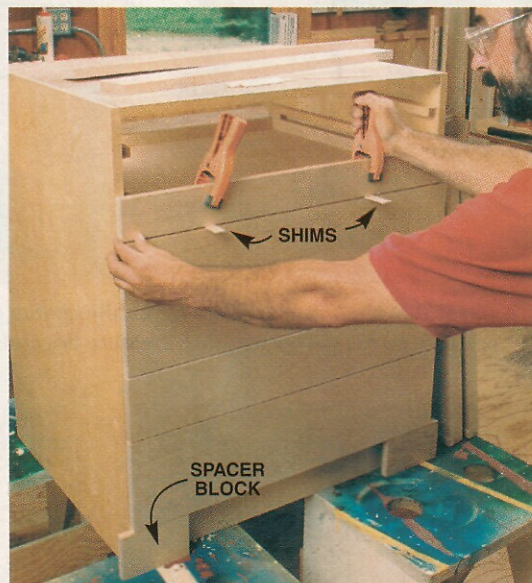
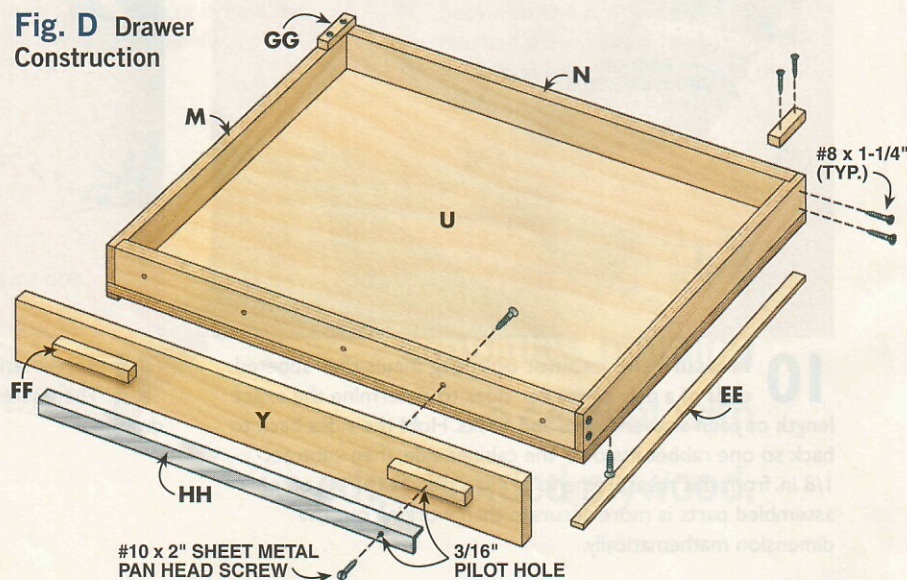


Fig. D Drawer Construction

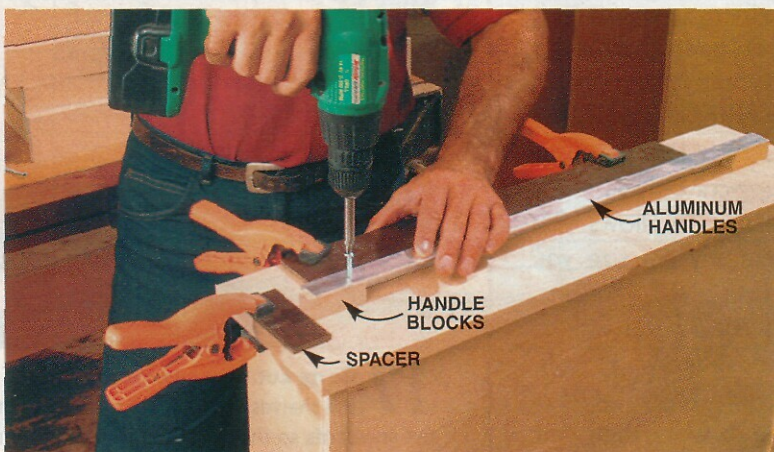




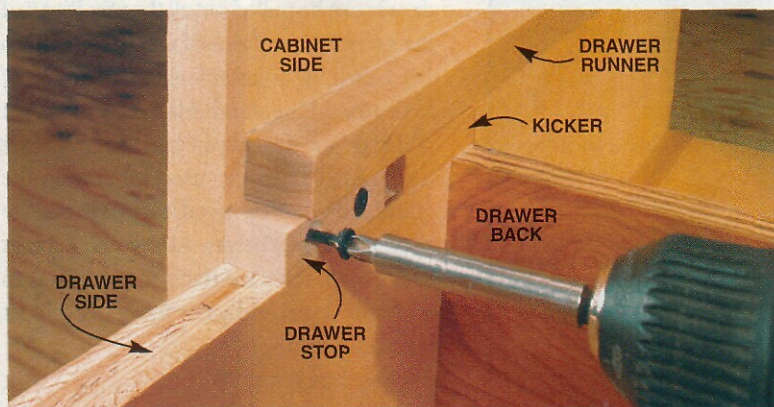
I don't believe it! All the drawers are too big, even though I followed the Cutting List to the letter!

Here's a problem that can result from cutting all your parts at once from a Cutting List.

This drawer is too big for the case. Slight variations in the depth of the dadoes and rabbets can add up quickly and affect part sizes. When fitting drawers, it's better to take measurements from the case to guarantee a good fit.



14 Screw the handles to the front of the drawers. Spacers make sure the handles go on straight and level.



15 Screw drawer stops into each opening so you won't drop your drawers. The kickers hit the stops before the drawer can be pulled all the way out. Don't use glue because you may want to remove the drawer some day.

24. Remove the drawers and finish the inside of the cabinets. Apply a minimum of two coats of polyurethane. Don't forget to finish the drawer boxes and runners. The polyurethane helps make the drawers glide smoothly.

25. Cut the aluminum angle for the handles (HH) to length. The aluminum can be easily cut with a hacksaw. Use a file or fine sandpaper to knock off any burrs.

26. Cut handle blocks (FF) for the aluminum handles. Use double-faced tape to position them inside the handles so 1/4 in. of the block projects past the handle end. The projecting wood eliminates a sharp corner that might snag a passing pant leg.

27. Locate and drill two 3/16-in. pilot holes through each aluminum handle (Fig. D). Mount the handle assembly on the drawer fronts using a spacer block to center the handles and handle block (Photo 14).

Put It All Together

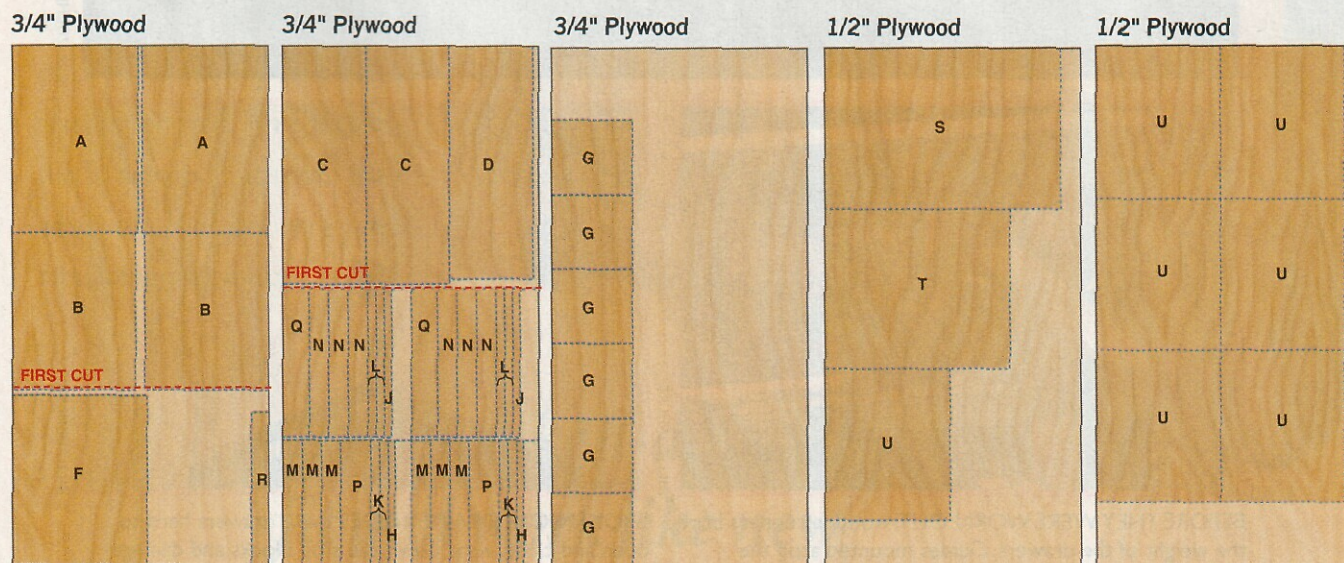
After the finish is dry, rub a little wax onto the drawer runners, wear strips and kickers to help the drawers slide easily. Set the drawer stops (Photo 15). The kickers hit the stops before the

CUTTING LIST

Overall 80" H x 33" W x 27" D

Part	Name	Qty.	Dimensions	Notes
3/4" Plywood				
A	Lower Side	2	23-5/8" x 34-1/2"	
B	Lower top & bottom	2	23-1/8" x 29"	
C	Upper Sides	2	15-5/8" x 44"	
D	Upper Divider	1	15-1/8" x 43"	
E	Upper top & bottom	2	15-1/8" x 29"	
F	Worktop Substrate	1	25-1/4" x 31-1/2"	Cut 1/4-in. oversize before assembly
G	Adjustable Shelves	6	15-1/8" x 13- 3/4"	
H	Drawer Sides	2	3/4" x 23-1/4"	All drawer sides are cut from two 23-1/4 in. x 24-in. blanks
J	Drawer front & back	2	3/4" x 27-1/2"	All drawer fronts and backs are cut from 24-in. wide blanks. Measure actual cabinet to determine length
K	Drawer Sides	4	1-1/8" x 23-1/4"	All drawer sides are cut from two 23-1/4 in. x 24-in. blanks
L	Drawer front & back	4	1-1/8" x 27"	All drawer fronts and backs are cut from 24-in. wide blanks. Measure actual cabinet to determine length
M	Drawer Sides	6	3" x 23-1/4"	All drawer sides are cut from two 23-1/4 in. x 24-in. blanks
N	Drawer front & back	6	3" x 27-1/2"	All drawer fronts and backs are cut from 24-in. wide blanks. Measure actual cabinet to determine length
P	Drawer Sides	2	5-3/8" x 23-1/4"	All drawer sides are cut from two 23-1/4 in. x 24-in. blanks
Q	Drawer front & back	2	5-3/8" x 27-1/2"	All drawer fronts and backs are cut from 24-in. wide blanks. Measure actual cabinet to determine length
R	Toe Board	1	3" x 28-1/2"	Add hardwood edge to protect bottom edge of plywood
1/2" Plywood				
S	Upper Back	1	29-1/2" x 44"	Measure actual cabinet opening before making final cut
T	Lower Back	1	29-1/2" x 34-1/2"	Measure actual cabinet opening before making final cut
U	Drawer Bottoms	7	23-1/4" x 28-1/2"	Use assembled drawer for final dimensions
1/4" Tempered Hardboard				
V	Worktop	1	25-1/4" x 31-1/2"	Cut 1/4-in. oversize before assembly
3/4" Birch				
W	Drawer Front	1	2-3/8" x 29-1/2"	Keep drawer fronts slightly oversize until final fitting
X	Drawer Front	2	2-7/8" x 29-1/2"	
Y	Drawer Front	3	4-3/4" x 29-1/2"	
Z	Drawer Front	1	7-5/8" x 29-1/2"	
AA	Worktop Edge Banding	1	1-1/8" x 33"	
BB	Worktop Edge Banding	2	1-1/8" x 25-1/4"	Cut 1/4-in. long and trim after assembly
CC	Drawer Runners	14	1" x 23-1/2"	
DD	Edge Banding	50 ft.	3/8" x 3/4"	Cut edge banding slightly wider than the thickness of your plywood
EE	Wear Strips	18	1/8" x 3/4" x 23-1/4"	
FF	Handle Blocks	14	3/4" x 7/8" x 2-1/2"	
GG	Drawer Kickers & Stops	28	1/2" x 3/4" x 2"	
1" Aluminum Angle				
HH	Handles	7	26" long	

Fig. E Cutting Diagram



Restore a



BILL ZUEHLKE



BILL ZUEHLKE

BEFORE THEY WERE WORN OUT, wooden runners bore the weight of the drawers. Guides mounted atop the runners controlled side-to-side movement and glued-on blocks stopped the drawers flush with the front.



BILL ZUEHLKE

BROKEN-OFF DRAWER SIDES make drawers hard to open and close, wear down the stop blocks and damage the drawer bottoms.

Chest of Drawers

By Tim Johnson

At first glance, the broken-down chest of drawers (at left) looks like a lost cause—a wreck even by garage-sale standards. After all, it's been sitting out in Uncle Ed's garage forever, and the drawers haven't budged for years.

Surprise! A closer look indicates that this chest is a perfect candidate for rescue. Its solid-wood case is sound. The joints are still tight and there's no sign of dry rot. The top isn't badly warped or split. It needs cosmetic repairs, but more than anything, the drawers need rebuilding, and you can do that.



BILL ZUEHLKE

*Make broken-down drawers
fit and work like new*

Wooden Drawers Wear Out

Lots of great old dressers are available at reduced prices, just because the drawers don't work. Knowing how to make repairs makes it possible for you to get a fantastic piece at a bargain price.

Although they may look quite a bit different than the dresser shown here, most old chests of drawers share similar simple construction on the inside. All of the parts (drawer sides, runners, guides and stops) are wood.

On 19th-century American pieces, these hidden parts are usually made from woods chosen for economy or workability, rather than durability. Even when the cases are made of hardwoods like walnut and cherry, the secondary woods are almost always pine, poplar or basswood—lightweight woods that wear down with use.

Rebuilding Drawers is Satisfying

Rebuilding four worn-out drawers is a time-consuming project. But making those cantankerous old drawers open and close effortlessly is highly satisfying. So is rescuing an heirloom-quality piece of furniture.

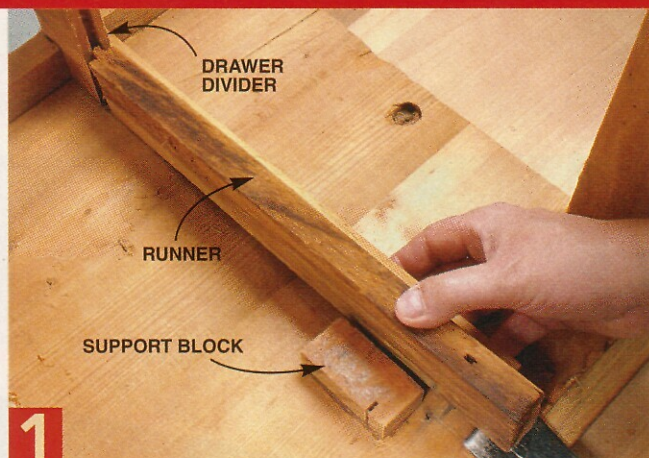
Drawer-rebuilding and problem-solving go hand in hand. Be prepared to do things a bit differently than we show, depending on how your chest of drawers is constructed. First, we'll rebuild the inside of the chest (Photos 1 through 7). Next, we'll repair the drawers (Photos 8 through 13). Finally, we'll fit the repaired drawers into the rebuilt chest (Photos 14 through 20).

We'll use a combination of hand and power tools to do the job, including a tablesaw and a Japanese-style pull saw, a plunge router, a hand plane and sharp chisels. A carpenter's square, a try square and a sliding-bevel square are necessary for layout. Our replacement pieces are made from straight-grained hard maple, so they'll last much longer than the original components.

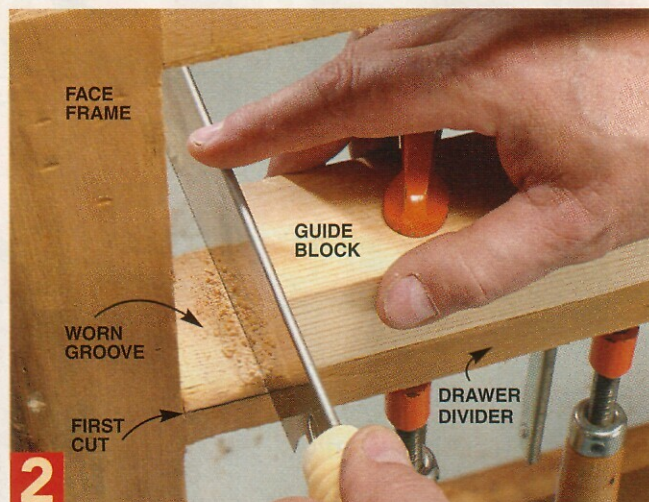
First, Remove the Top and Back

Repairing the drawer runners and guides is much easier when the chest's top and back are removed. Tops are usually fastened with screws through the chest's top rails (front and back). You may also find screws pocket-holed through the sides.

If nails have been added, you'll have to pry the



1 REMOVE THE RUNNERS. First, use a hammer and chisel to break the runner from the support block. Then, break the tongue-and-groove joint at the front by prying the runner away at the back, where it's probably just nailed to the case.



2 SAW SQUARE SHOULDERS on both sides of the groove worn into the drawer divider. Use a squarely cut block to guide the saw.

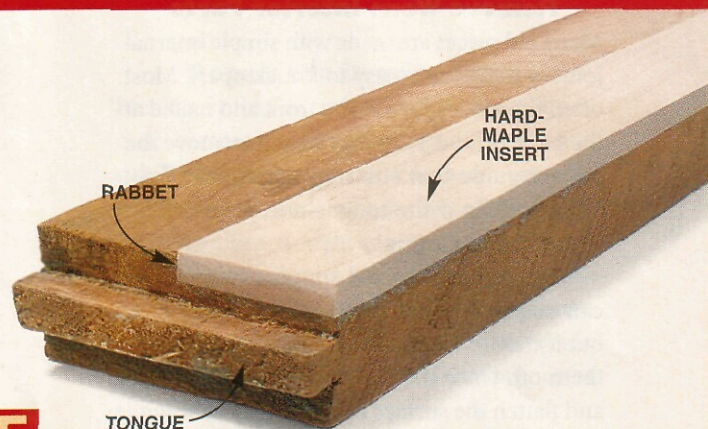


3 CHISEL OUT THE WASTE, to create a flat-bottomed dado. Then glue in a patch, with the grain direction of the patch the same as the divider.

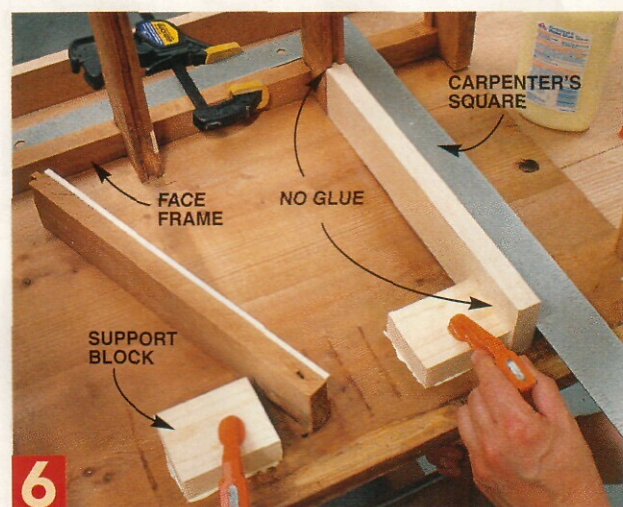
THE RUNNERS AND DRAWER DIVIDERS



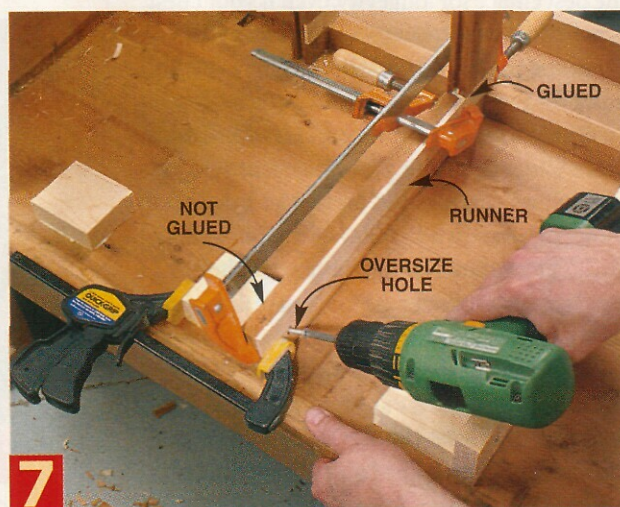
4 PARE THE PATCH FLUSH with the divider, using sweeping strokes with a sharp chisel held flat on the divider.



5 RENEW WORN RUNNERS with hard-maple inserts. First, cut rabbets wide and deep enough to remove the wear. Then, glue in the inserts and plane them flush with the remaining original surface. If the runners are too far gone, make new ones.



6 GLUE BLOCKS to the cabinet to support the runners. First, install the runner, without glue, and square it, using a carpenter's square clamped to the face frame. Orient the block's grain direction so it matches the side of the case.



7 INSTALL THE RUNNER. Glue and clamp the joint at the front. At the back, don't use glue. Just screw the runner to the cabinet, toenailing it against the support block through an angled, oversize hole. This construction allows the chest's solid-wood side to expand and contract.

*Many old chests
are simply made
and easy to
repair*

top loose after you've removed the screws. Once you've gotten the top off, pull the nails out through its bottom side. Don't try to back them out through the top. Their heads are likely to blow out the surrounding wood.

Opening the back of the chest can be as easy as knocking off nailed-on boards. Be sure to mark them first, for reassembly.

If the back is glued to the sides, the joints may not break cleanly. Gently pry each joint apart, while soaking it with hot water to soften the glue. Take your time.

Restore a Chest of Drawers

Remove Worn Interior Parts

Many old pieces are made with simple internal joinery that's fairly easy to knock apart. Most often the rail is glued at the front and nailed at the back (Photo 1). It may help to remove the drawer guide that sits atop the runner first. Make repairs if the tongue-and-groove joint doesn't break cleanly.

Next, remove the old support blocks. You can usually knock them off with a hammer, but if they're firmly attached, it's better to saw them off. Once they're gone, remove the glue and flatten the surface by planing or sanding.

Repair the Drawer Dividers

The drawer dividers take a beating from use, which shows as worn-in grooves. A new, more durable wear surface is a must. Hard maple is the best choice for longevity, even if your chest is made of cherry, walnut or mahogany. However, when you apply finish, you'll have to disguise the maple by adding color.

With a square, mark the divider for a dado that's wider than the groove, and as wide as your chisel (usually 3/4 in. to 1 in.). Saw the inner shoulder while holding the blade flush against a clamped-on guide block (Photo 2). Hold the blade against the face frame as you cut the outer shoulder. Here, the unbacked portion of your Japanese saw works best.

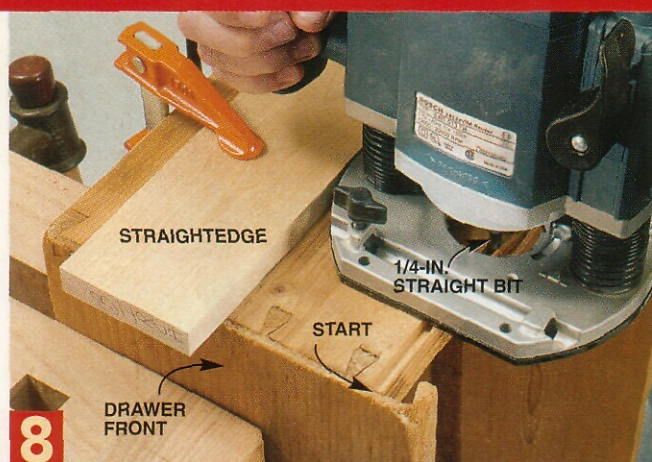
Once the shoulders are cut, create the dado with a sharp chisel (Photo 3). Then, glue in a hard-maple patch, cut so its grain direction matches the divider. After the glue has dried, pare the patch flush (Photo 4).

Rebuild and Install the Runners

Examine the runners to decide whether to repair or replace them. If the wear isn't severe, the runner can be repaired (Photo 5). However, if the wear on the runner's top extends below the tongue on its front, the runner needs to be replaced. When making new runners, cut the tongues on the tablesaw, using a miter gauge and a stop block.

Fabricate, locate and fasten new support blocks for the runners inside the chest (Photo 6). Thick blocks are best—just make sure they don't interfere with the drawer opening. Once the support blocks are in place, install the new or repaired runners (Photo 7).

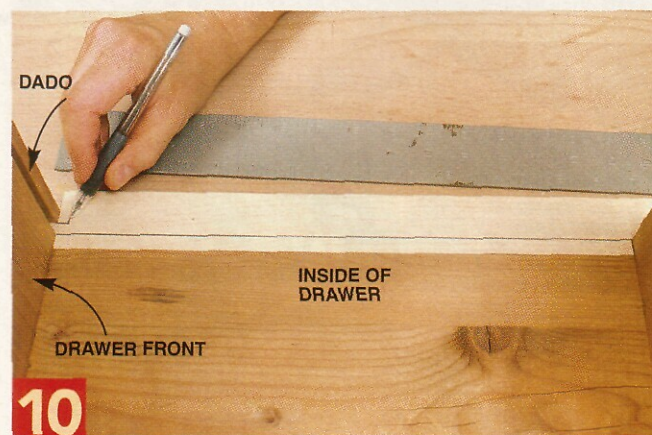
REPAIR THE DR



8 REMOVE THE BROKEN EDGE of the drawer side, using a plunge router and a clamped-on straightedge. Start behind the drawer front and stop before you cut into the back. Remove the remaining waste with a sharp chisel.

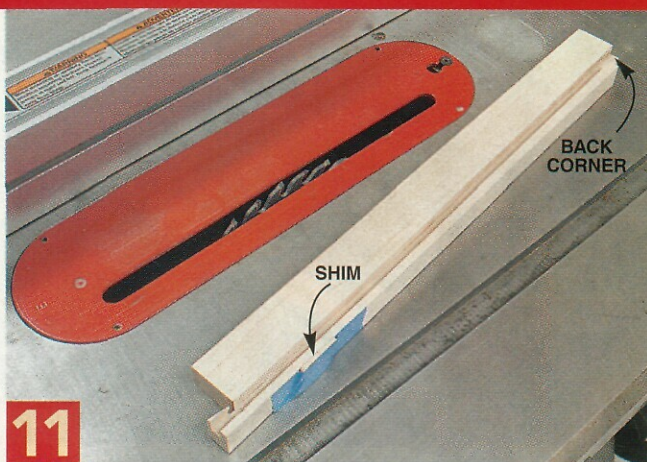


9 CUT A REPLACEMENT PIECE TO FIT. Mark the front dovetail and back corner on the extra-wide replacement piece, using a square and a sliding bevel to transfer the angle. Then, cut to the lines, using a bandsaw or handsaw.



10 MARK THE DADO for the drawer bottom, using a straightedge. At the back, the top of the dado aligns with the bottom of the drawer. Your second mark indicates the dado's width.

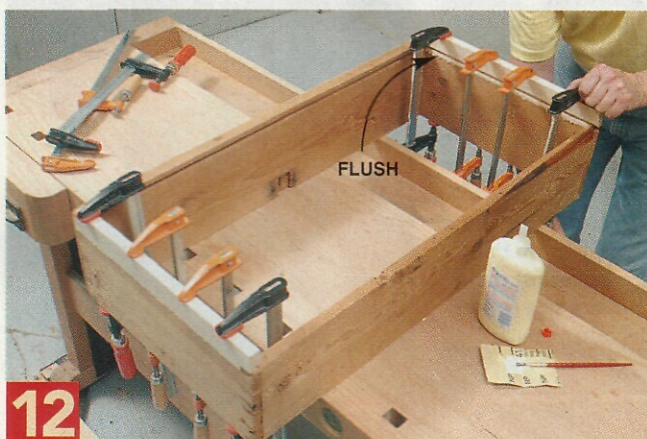
THE DRAWER SIDES



11

CUT THE DADO for the drawer bottom using a regular blade. If the dado needs to run at a slight angle to the edge, shim the replacement piece. Adjust the angle by sliding the shim toward the front or the back. When you make the cut, both the shim and the back corner of the workpiece must ride against the fence. If your saw's fence is too short (in front of the blade or behind it), clamp on a long-enough subfence.

CAUTION: The blade guard must be removed for this cut.



12

GLUE ON the replacement pieces. Make sure that their inside faces are flush with the drawer sides.



13

PLANE THE REPLACEMENT FLUSH. Skewing your plane so it rides on the drawer side keeps the planed surface flat. Work from front to back, with the grain.

Repair the Drawer Sides

Breakage often occurs at the drawer-bottom dado, because it creates a weak spot in the drawer side. The best repair reinforces the drawer side with stronger wood on both sides of this dado.

Rout a clean, straight edge, parallel to the top of the drawer side and at least 3/8-in. above the drawer-bottom dado. Set the router's plunge depth to match the thickness of the drawer side and rout to full depth in several shallow passes (Photo 8).

Cut your hard-maple replacement pieces extra wide and mill them slightly thicker than the drawer sides. They'll be cut down and planed flush after installation. If you're restoring a hand-made drawer, check the thickness of every side. They'll probably vary.

Before marking each replacement piece (Photo 9), orient it so the grain runs from front to back on the outer face and also on the bottom edge. This makes final hand planing easier and safer. Planing from front-to-back (with the grain), you won't risk blowing out the drawer front.

Cut and dry-fit the replacement piece. Then, from inside the drawer, mark the location of the drawer-bottom dado (Photo 10). Remove the replacement piece and extend the marks indicating the dado to its front and back edges. Use these marks to set the tablesaw fence. At the back, the top of the dado aligns with the notch. Your reference lines may not be parallel to the edge of the replacement piece. If they aren't, use a shim to align the dado correctly before cutting (Photo 11).

Handmade drawer bottoms may be different thicknesses, so don't use your dado set to cut the dado. Instead, use a regular blade and cut the top edge of the dado first. Then reset the fence and make additional passes to widen it, using the drawer bottom itself to test the width.

After gluing on the replacement pieces (Photo 12), plane them flush (Photo 13).

Level the Chest

It's common for an old chest to sit crooked, because its feet have worn down unevenly. For the drawers to operate smoothly, the chest has to sit level. Before fitting the drawers, set your chest on a flat surface. Gluing shims under the worn feet is the easiest way to level it.

Fit the Drawers

Cut the drawer sides down in width so they'll just fit inside their openings (Photo 14). Leaving the sides a bit wide has two advantages. First, it lifts the drawer front off the divider, for smoother operation. Second, it allows fine-tuning of the drawer's position in the opening, so you can reduce the gap at the top. (Old drawers, especially wide ones, often have shrunk, leaving an unsightly space.)

Add Drawer Guides and Stop Blocks

Clamp a couple boards across the drawer opening, one at each end. Install the drawer and mark the runner (Photo 15). Remove the drawer and draw a line from your mark to the edge of the face frame. Use this line to locate the guide (Photo 16).

You'll find drawer stops in different places on old chests, but usually they're mounted on the divider, behind the drawer fronts.

Make sure your replacement stops are thin enough for the drawer bottoms to clear. Don't try to clamp right away—clamp pressure will cause the stop to skate around on the wet glue. A "rub" joint is better. Apply glue and seat the block, rubbing it side-to-side a couple of times, while holding it snug against the back of the drawer front (Photo 17). Let it sit for about five minutes (until the glue tacks) and *then* add a clamp. Check again to make sure there hasn't been any movement.

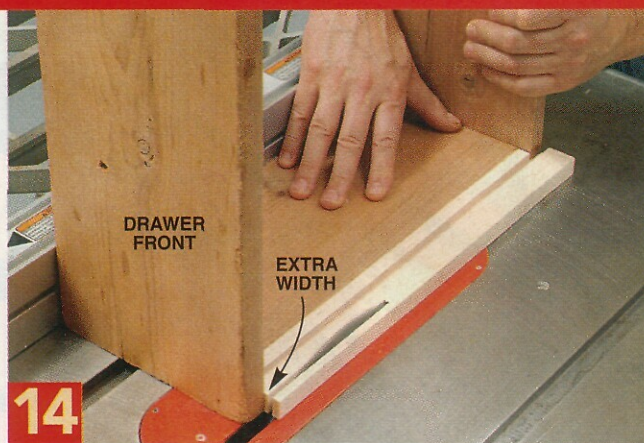
Extend the Drawer Bottoms

Widening the shrunken drawer bottoms is easy (Photo 18). Use screws to fasten the bottom to the drawer back, so it's easy to remove. The tongue-and-groove joint at the front allows the bottom to expand and contract. It's best to do your final fitting with the drawer bottoms installed, but not fastened, so they're still easy to remove.

Final Fitting

First, make adjustments so the drawer fronts fit well in their openings. If you live where there are seasonal changes in humidity, plan to leave at least a 3/32-in. gap at the top, for expansion. Super-wide drawers may need more space. You may also have to make this top gap wider to balance the gap at the bottom. If these situations require additional tablesaw cuts, you'll have to

FIT THE DRAWERS



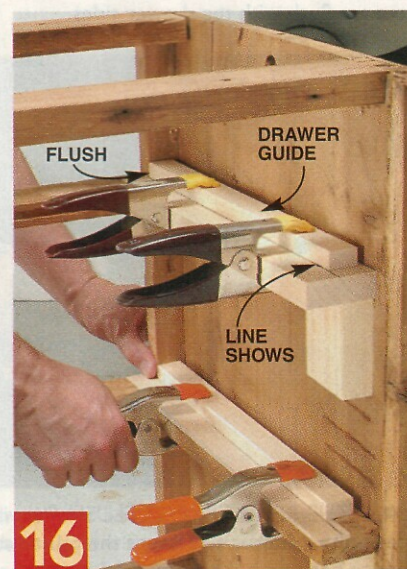
TRIM THE DRAWER SIDES to fit, about 1/16-in. narrower than their openings in the chest. These initial cuts should leave the sides extending below the drawer front. This extra width leaves enough material for fine-tuning the drawer's fit in the opening.

CAUTION: The blade guard must be removed for this cut.

MARK THE DRAWER'S WIDTH on the runner, so you can install the guides. Hold the drawer flush across the front, using blocks clamped to the dividers, and snug against the side of the opening. Move the drawer against the opposite side to mark the other runner.



MOUNT THE DRAWER GUIDES flush at the front, but leave the lines showing at the back, so the drawer won't bind.



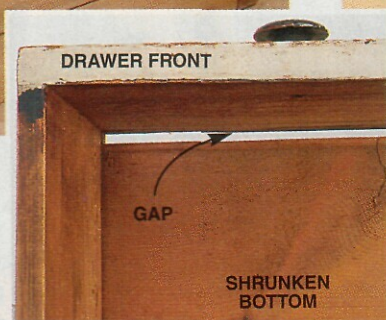
AWERS IN THE CHEST



17 GLUE DRAWER STOPS to the front dividers. With the bottomless drawers held flush with the front of the face frame, simply butt the stops behind the drawer fronts.



18 ELIMINATE A SHRINKAGE-CAUSED GAP by adding a piece to the drawer bottom. Plane it flush and rabbet the ends after the glue dries.



remove the drawer bottoms.

Next, check from the back of the chest to see if both sides of the drawers (with the bottoms installed) rest on the runners. If all the drawers are off by similar amounts, the chest is probably the culprit, so re-level it. If only one or two drawers are off, they're probably a bit twisted. Hand planing solves the problem (Photo 19).

When the drawers fit well, smooth the drawer-side bottoms with a hand plane or by sanding. Chamfer the sharp edges and put a big chamfer on the back ends, so it's easier to slip the drawers in the chest.

Finally, shellac and wax all of the runners, guides and drawer-side bottoms (Photo 20).

*Making
cantankerous
old drawers
operate
smoothly is
truly gratifying.*

Get Rid of that Musty Smell

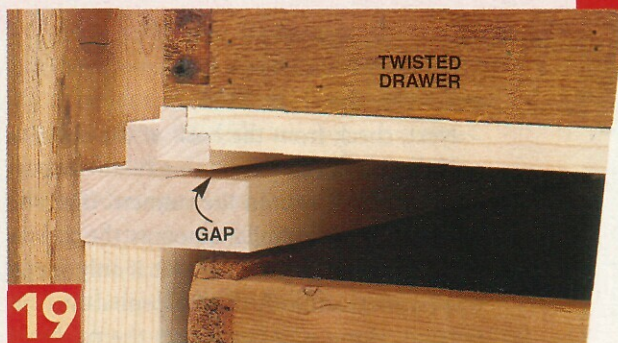
The sour smell that often accompanies an old chest of drawers is enough to make one hesitate to use it for clothes. But you needn't worry—there's a simple fix.

That bad odor isn't anything inherently nasty, like mold or mildew. It's the smell of basswood, which was frequently used for drawer parts 100 years ago.

To get rid of the smell, brush a coat of shellac on the drawers, inside and out, including both sides of the drawer bottoms. The shellac will seal the basswood and eliminate the odor. Check the cabinet back, too, and give it a good shellacking if it's made of the same smelly stuff.



Restore a Chest of Drawers



19 FINE-TUNE THE DRAWER SIDES. It's not unusual for old drawers to be slightly twisted. If the back end of one side is high, plane down the back end of the other side until they both rest on the runners.



20 BRUSH A COAT OF SHELLAC on the runners and guides. Then sand with 280-grit sandpaper and apply a coat of paste wax. Do the same to the sides and bottom edges of the drawers, and they'll slide like glass.

The furniture doctor is in! What repair would you like to see in an upcoming issue of *American Woodworker*? Send your ideas to aweditor@readersdigest.com

Sources See page 102

The New Finish

The paint adorning Uncle Ed's chest of drawers wasn't worth saving. The topcoats were latex paint, neither old, nor patinated; just crummy. A little sleuthing indicated that the chest is made of pine and that original finish, an opaque brown color hidden underneath the paint, was also badly deteriorated. Clearly, the best course of action was to remove the paint so we could apply a fresh finish. Because the lower paint layers almost certainly contained lead, we took this chest to a professional for stripping.

After stripping, we let the chest dry completely before making repairs. We reglued a couple of minor cracks and replaced a couple of broken-off pieces, including the broken escutcheons (key hole covers). We also bought pine replacement knobs. We chipped all the old white putty (which doesn't stain well) from the nail holes. Then we filled all the holes and crevices with pine-colored plastic wood filler.

We sanded everything thoroughly with a random-orbit sander, starting with 80-grit paper and working up to 180 grit. Then we sanded by hand with 150 grit, to remove any machine-made sanding marks. Sanding lightened the pine noticeably.

Our "professional's secret" finish is nothing more than a couple coats of Zar "Provincial" oil-based wood stain (it's pigmented, just like glaze), applied over a coat of Zinsser's SealCoat universal sealer (which is dewaxed shellac).

This off-the-shelf shellac-and-glaze method is foolproof. The stain goes on evenly, and you can blend areas that don't match. If something goes wrong, you can remove the stain with mineral spirits and try again.

After sanding the SealCoat with 280-grit paper, we applied the first coat of stain, wiped it off uniformly and let it dry overnight. We applied the second coat of stain judiciously, using a combination of wiping, stippling and dry-brushing, to blend uneven spots, including our new-wood repairs and replacement pieces.

After the stain was thoroughly dry, we brushed-on two coats of Zar's antique flat oil-based polyurethane. We sanded the first coat with 280-grit paper before applying the final coat. **AW**





Photo Frames by the Dozen

By Randy Johnson

Two jigs let you crank them out flawlessly!

Everyone I know has a drawer stuffed with photos that are waiting to be framed. What often keeps us from getting those treasures up on the wall is the high cost of professional framing.

If you've ever tried making picture frames, I'll bet you got frustrated cutting the miters and clamping the corners. We've got the perfect solution.

We've designed a great looking two-part frame that's downright cheap and easy to make. The pieces are small, so you can use up some of that scrap wood you've been unable to part with. Plus, with our surefire mitering and clamping jigs, you can make frames by the dozen.

The frame and jigs shown here are set up for 8 x 10 or smaller photos. By using

different mats, you can use one frame size for different-size photos. You can also make the frame and jigs larger or smaller to custom-fit almost any size picture.

Tools and Materials

To make the frames you will need a table-saw, a router and router table, plus a dado blade and router bits. To build the jigs you will also need a hand drill, jigsaw, hacksaw and a few spring clamps.

After you get your frames built and finished, check out our article on "Tips for Better Picture Frames," AW #88, August 2001, page 48. You'll find helpful information on cutting mats, mounting photos and artwork and installing glass.

Our frame design is perfect for holiday gift making because it fits a wide variety of photos.



Two small photos mounted with a twin mat in a walnut frame.



4 x 6 photo mounted with a double mat in a mahogany and walnut frame.



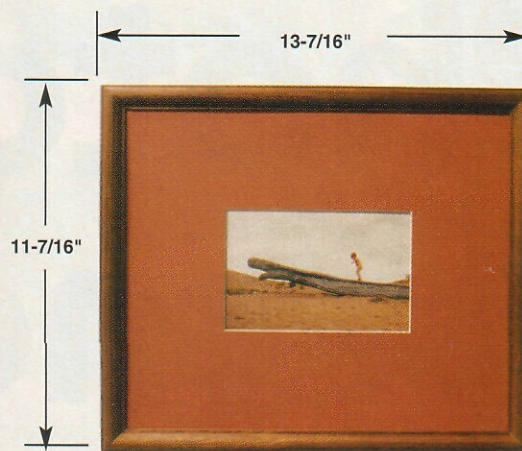
5 x 7 photo mounted with a vertical mat in a maple and walnut frame.



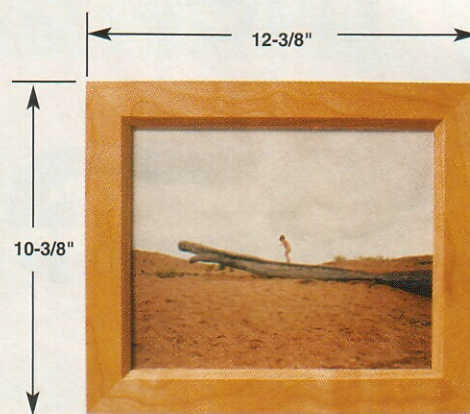
8 x 10 photo mounted without a mat in a cherry and walnut frame.



Our frame design has two parts, which can be made of different woods or even used as two separate frames!



Outer-Frame



Inner-Frame

Fig. A
Outer-Frame Profile

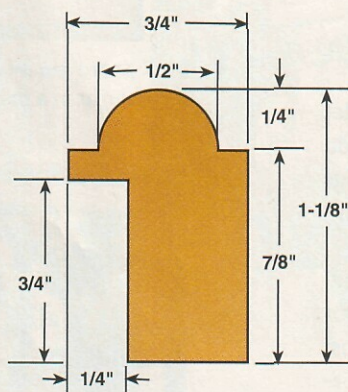


Fig. B
Inner-Frame Profile

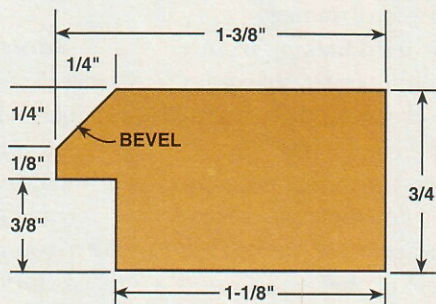
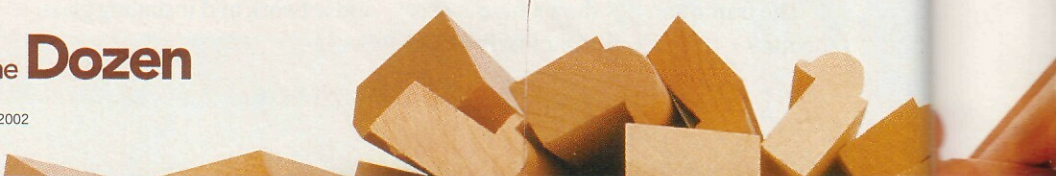
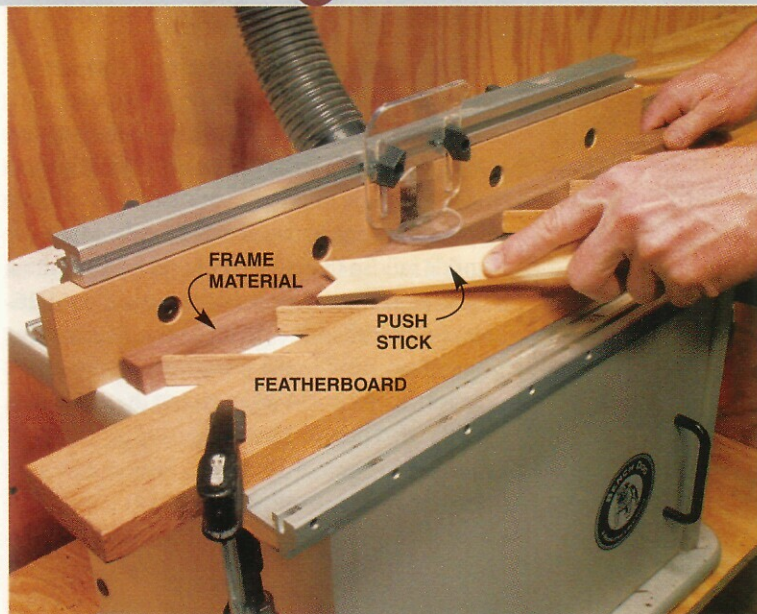


Photo Frames by the Dozen



Machining the Frame Material



- 1** Rout the frame profiles on your router table. Keep things safe by using featherboards and push sticks.

Use a bullnose router bit to cut the round profile on the outer frame.

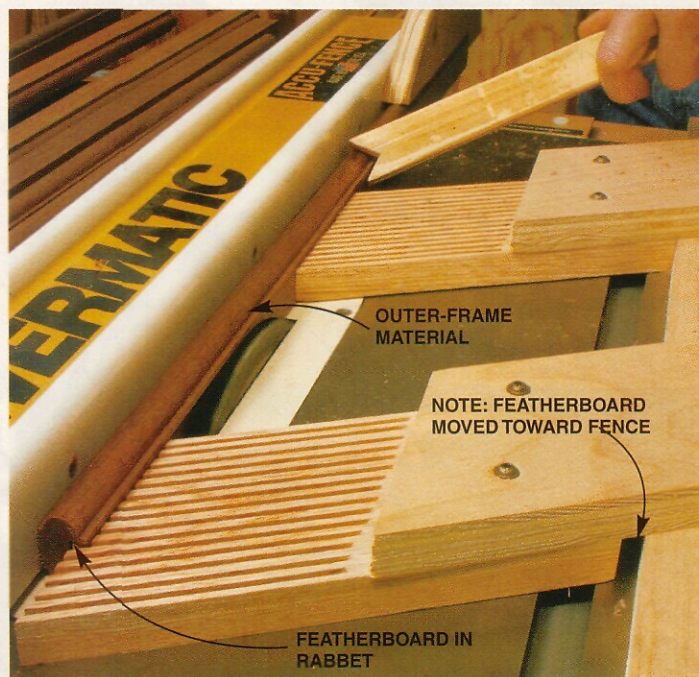


Use a chamfer router bit to cut the bevel on the inner frame.



- 2** Cut the rabbet in the inner-frame material with a dado blade. Use a zero-clearance insert to fully support the frame material and featherboards to keep the material against the fence while making the rabbet.

Caution: Blade guard must be removed for this cut.



- 3** Cut the rabbet in the outer-frame material. Adjust the outfeed featherboard so it rides inside the rabbet.

Caution: Blade guard must be removed for this cut.

Making and Using the Miter Sled



This tablesaw sled makes perfect miters every time. You'll be able to quickly cut accurate multiple frame parts. Start by cutting all the parts for the sled (Fig. C, Detail 1, page 85). You'll have to size the guide rails to fit your tablesaw because slot sizes vary between saw brands. Make the guide rails so they slide freely, yet have minimal side-to-side movement. Make them about 1/16-in. thinner than the depth of the slots in your tablesaw. Also make a pair of 1/8-in.-thick spacer strips to use when gluing the guide rails to the sled board (Photo 4).

4 Make a miter sled for cutting the frame pieces. Begin by gluing the guide rails to the sled board. The 1/8-in. spacer strips hold the guide rails slightly above the top of the table. Use a piece of tape to mark the center of the saw blade and align the center of the sled board with this mark. Flush the edge of the sled board with the table edge. Add some weight to the top and allow the glue to dry.

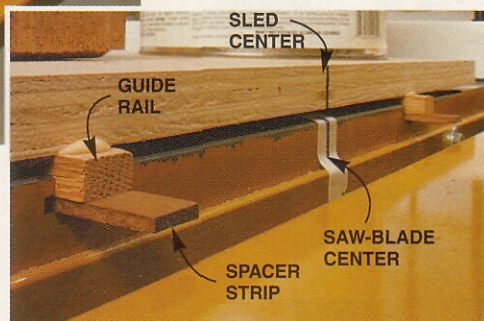


Fig. C
Miter Saw Sled

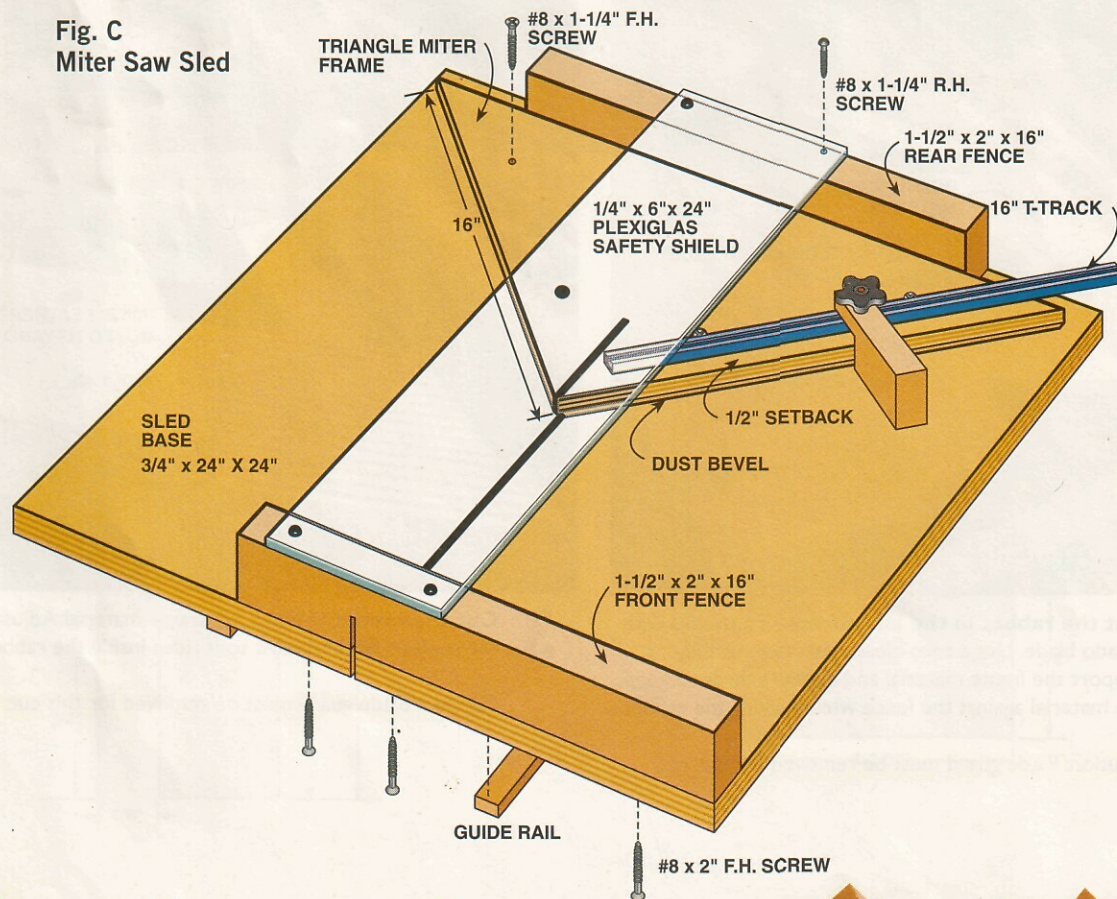


Photo Frames by the Dozen



After attaching the guide rails, add the front and rear fences. Put the sled on your tablesaw with the blade raised about 1 in. Now slide the saw sled into the blade until the plywood is cut to about half of its width.

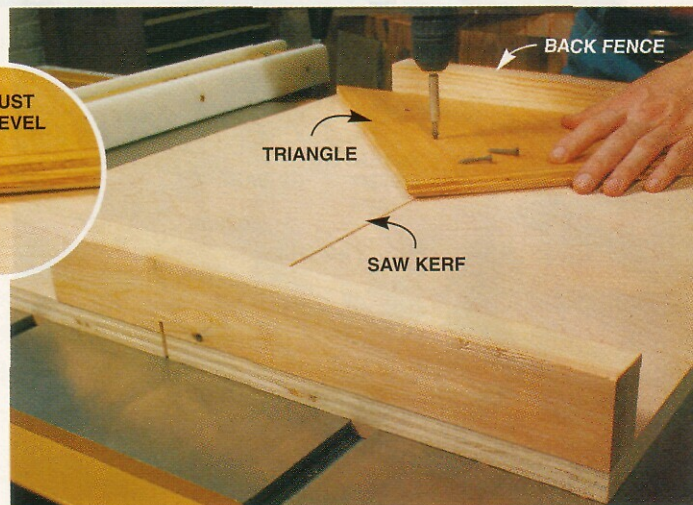
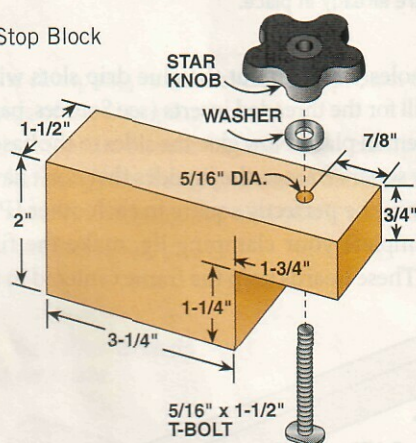
Next, make the plywood triangle. Start with a 16-in.-square piece of plywood and cut it diagonally with a jigsaw. Don't forget to rout the dust bevel on the bottom side of the triangle. This bevel helps prevent sawdust from building up against the triangle and causing miter-fitting problems (see Oops!, page 87).

Center the triangle on the saw kerf and attach it to the sled base with screws (Photo 5). Complete the saw sled with the addition of the T-track, adjustable stop block and the safety shield (Photo 6).

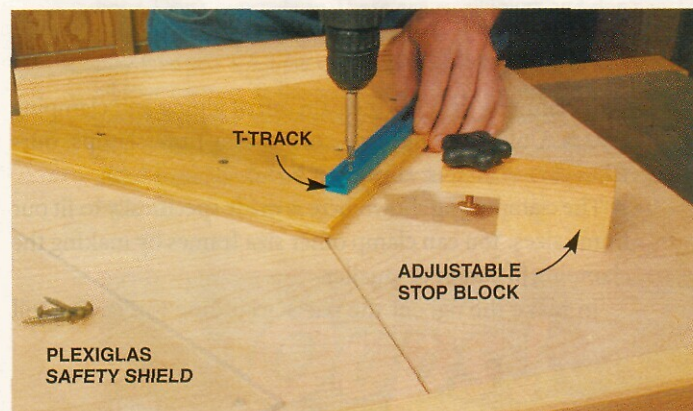
Cutting frame parts with this miter sled is a simple two-step process (Photos 7 and 8).

Detail 1

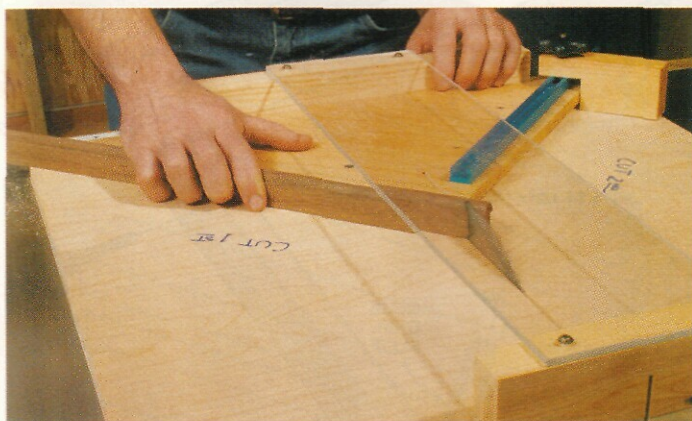
Adjustable Stop Block



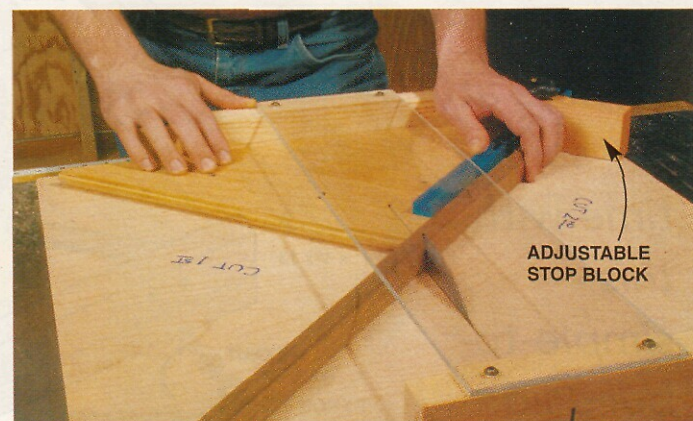
5 Center the tip of the plywood triangle with the middle of the saw kerf and against the rear sled fence. The dust bevel on the bottom edge prevents dust buildup.



6 Screw the T-track and the safety shield in place. Add the stop block and the sled is ready to use.

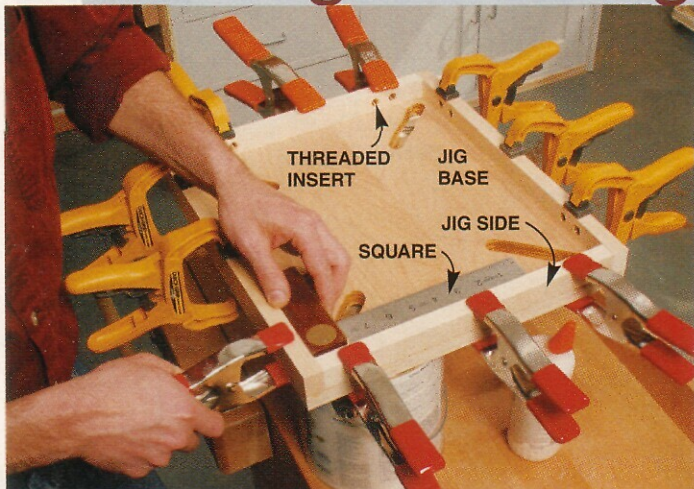


7 FIRST CUT
Cut the first miter with the frame material on the right side of the miter sled. We marked our miter sled to remind us of the cutting order.

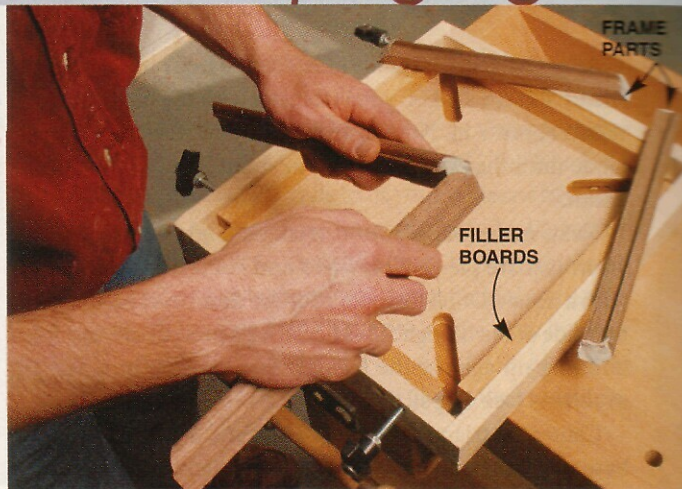


8 SECOND CUT
Cut the second miter with the frame material on the left side of the miter sled. Set the adjustable stop block for the required lengths.

Making and Using the Clamping Jig



9 Make a clamping jig to help assemble the frames. Glue and clamp the sides to the jig base. Make sure the inside of the sides without threaded inserts are perfectly square to each other.



10 Rub glue on the end grain of your frame parts. Let it dry about 10 or 15 seconds. If it seems to soak in a lot, add a little more glue, rub again and let the parts rest for another 5 or 10 seconds. When the glue seems a bit tacky (no longer runny) you can put the parts in the clamping jig. Note that the filler boards are already in place.

This clamping jig takes the pain out of gluing and clamping miters. Unlike the old one-corner-at-a-time clamps, ours takes care of all four corners at once!

The clamping jig shown here is made specifically to fit our frame sizes. You can clamp other size frames by making the clamping jig larger or smaller.

To make the jig, cut the parts according to Fig. D. Drill

3/4-in. holes, then cut out the glue drip slots with a jigsaw. Next, drill for the threaded inserts (see Sources, page 102) and screw them in place. Now glue the sides to the base. To ensure perfectly square frames, the jig sides that don't have threaded inserts must be perfectly square to each other (Photo 9).

To complete your clamping jig, make the filler boards (Fig. E). These boards keep the frame centered in the jig, help

You can clamp all four corners at the same time with this simple-to-build jig.

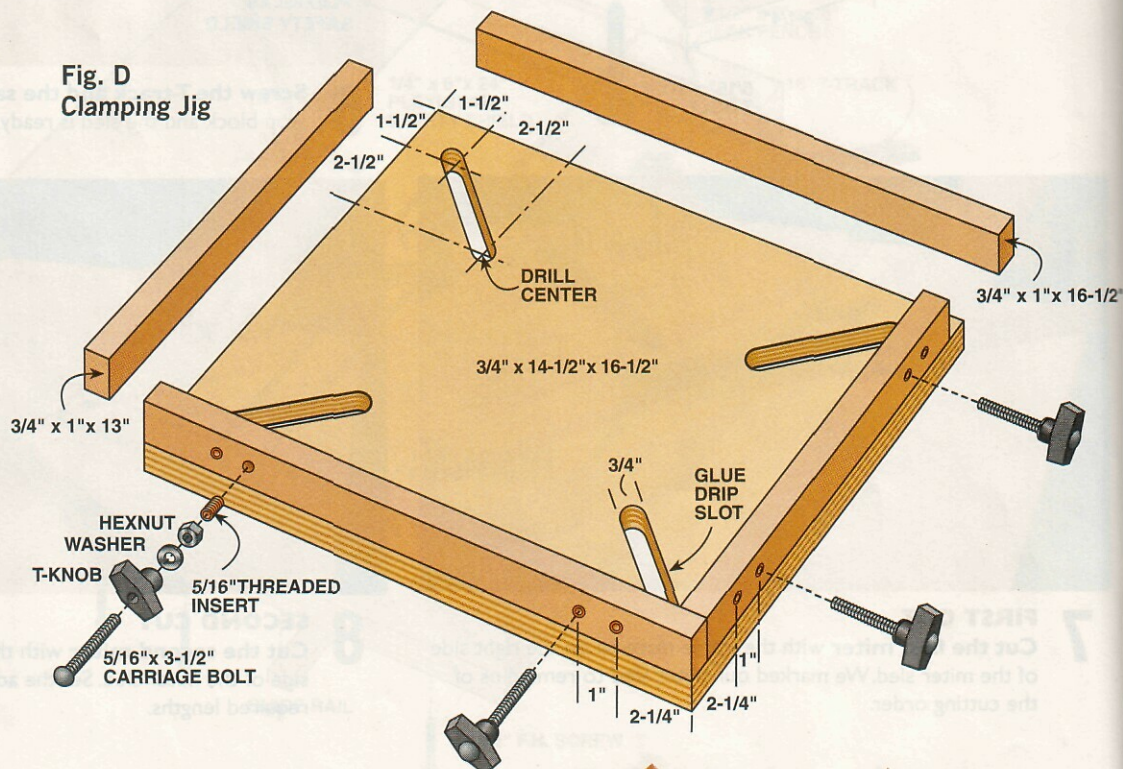
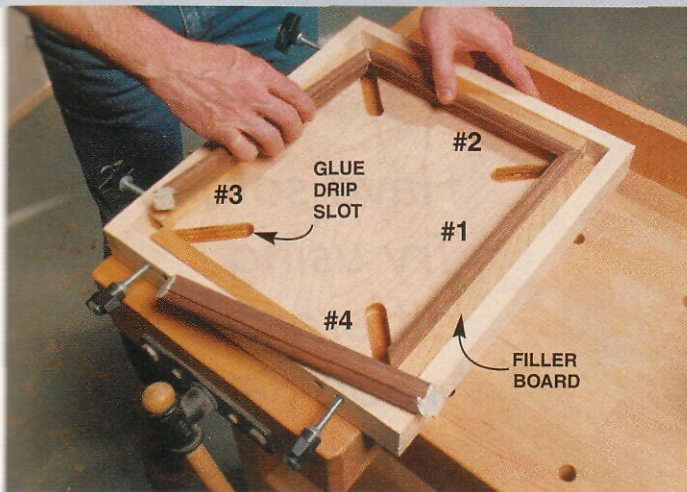


Photo Frames by the Dozen

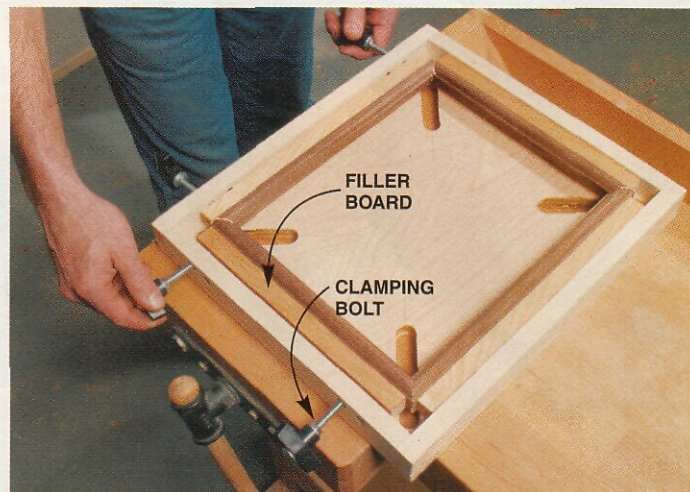
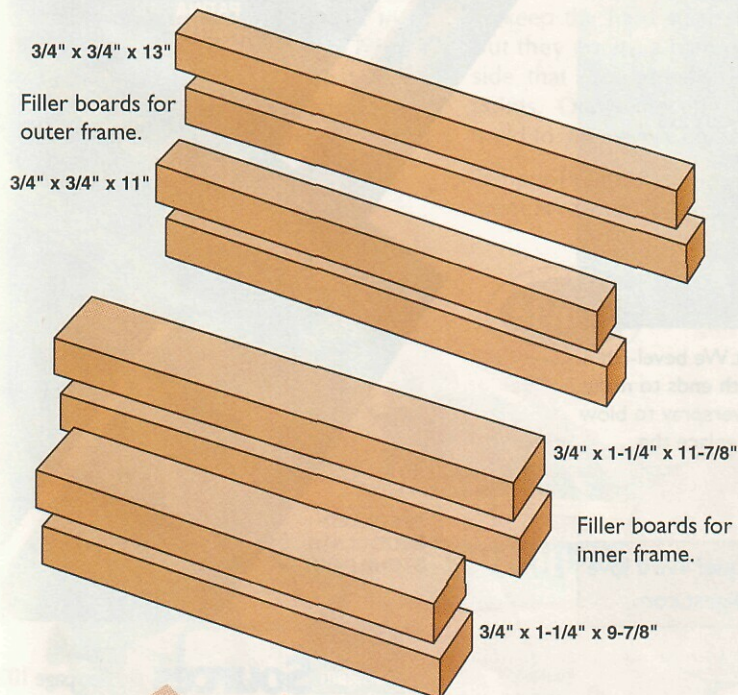


11 Assemble the frame in the clamping jig one part at a time. Start with the long side, part 1, and add parts 2, 3 and 4 in order. Line up the miters and you're ready to apply clamping pressure.

distribute the clamping pressure evenly and protect the frame from the ends of the clamping bolts.

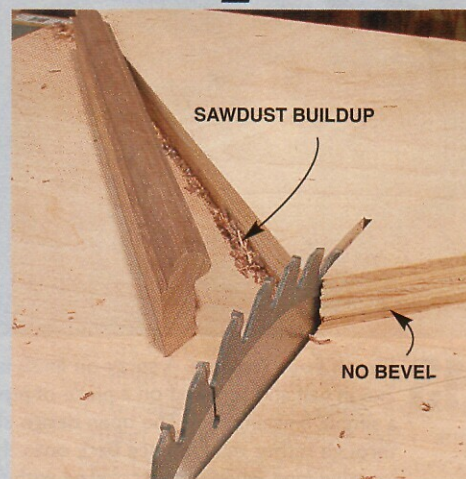
Follow the steps in Photos 11 and 12 to clamp up your frames. If clamping one frame at a time seems too slow for you, make several clamping jigs and you'll really be in the production business.

Fig. E
Clamping Jig Filler Boards
Make two of each size.



12 Apply clamping pressure a little bit at a time. Turn each clamp lightly at first. Double-check that the miters are still lined up and then apply more pressure. When the risk of slippage seems to be gone, apply firm pressure to the clamping bolts. Don't overtighten. These are small joints and don't require a ton of clamping pressure to bring them together. It may take you a couple of frames to get the hang of clamping all four corners at the same time, but once you do you'll be amazed at how fast you can make perfect frames. After the glue dries, sand the frames. The inner and outer frames can be glued together before finishing or brad-nailed together after finishing.

Oops!



Sawdust buildup can keep your frame material from laying tightly against the triangle fence. This causes miter-alignment problems later on. We learned this the hard way when we built our prototype miter sled (photo, above). That's why it's important to bevel the bottom of the triangle fence to give the sawdust a place to go.