A Supplement to August Home Publications

The Complete SMALL SHOP

CONTENTS

The Complete SMALL SHOP

Wall-Mounted Bins


Router Bit Cabinet


Revolving Tool Station

SHOP INFO . . . Shop Layout & Storage

The ideal shop always has room for one more tool. And nothing gets in the way of anything else. But in all the shops I've set up, space (or the lack of it) has always been a consideration.

With all the tools and materials required for a project, a small shop can soon get crowded and cramped. Even so, there's no reason a small workshop can't work smoothly and efficiently. All it takes is a little planning.

WORK FLOW. The key to this planning is to think about how a typical project "flows" through the shop. Then establish an area for each part of the process.

For instance, when I bring lumber into the shop, it's handy to have a space to break it down into manageable pieces (see Breakdown Area in drawing below). This can be as simple as a pair of sawhorses and a circular saw. And if it's possible, I position tools used for stock preparation (like the jointer, table saw, and thickness planer) right nearby.

Once the stock is flat, straight, and square, the next step is to cut the joinery and shape the pieces. To make this go smoothly, I position the drill press, router table, and band saw near the workbench. By locating the workbench out in the open, there's access on all sides, making it easy to assemble the project and apply the finish.

Besides the way a project moves from one area to the next, there are a few other things to keep in mind as you lay out a shop. Is there any benefit to grouping tools together? What type of space requirements does each tool have? Where will you provide space for storage? And will each power tool have access to an electrical outlet? I find the best way to answer these questions is to plan a shop layout just as I would a project. And that process begins on paper.

LAYOUT

Rather than dragging heavy tools back and forth across the floor, it's much easier to shuffle paper to decide what arrangements will and won't work.

SCALE DRAWING. First, draw a floor plan of your shop to scale. Then cut paper templates of each tool (also to scale) and position them around the "shop."

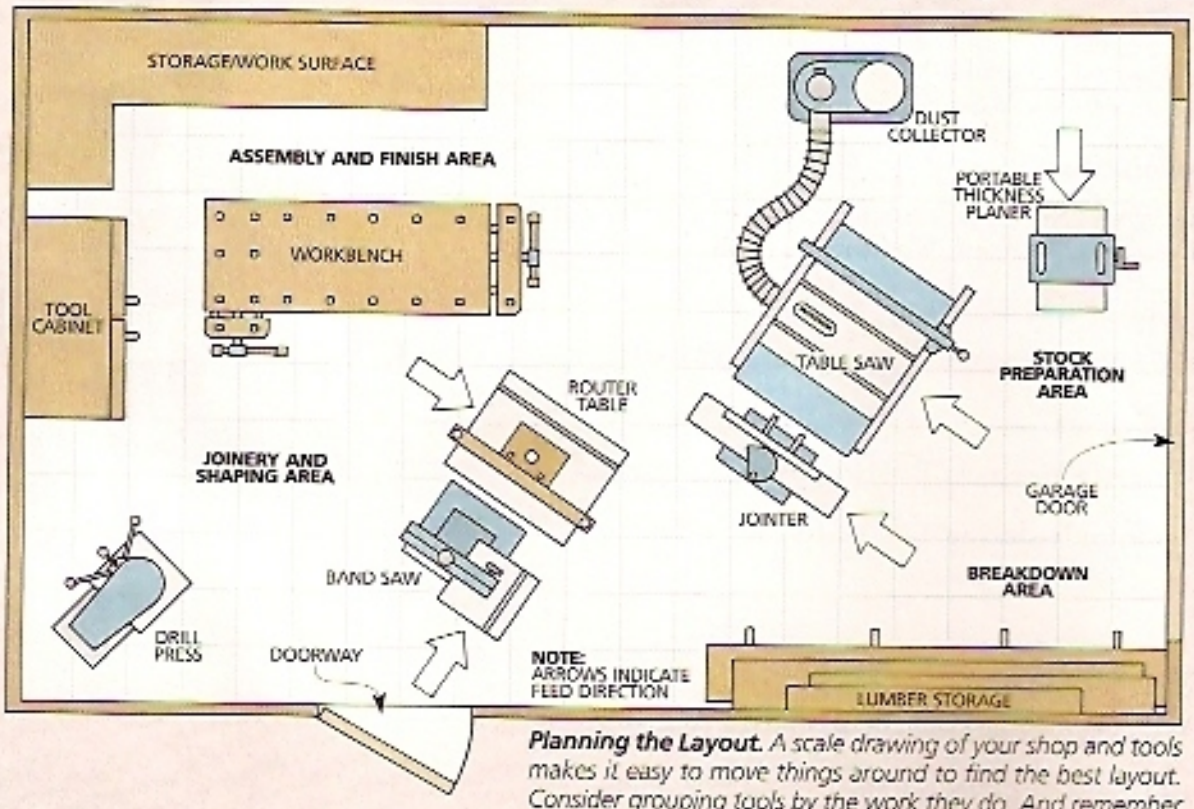
When sliding the templates around, one thing that can make a small shop work "big" is to group tools together.

JOB. One way of grouping that makes a lot of sense is to arrange tools by the job they do. For example, the table saw, jointer, and planer are all used during stock preparation, so it's convenient to cluster them together.

SUPPORT. You can also use tool groups to provide support for large workpieces. To give side support when crosscutting a long workpiece on the table saw, for instance, you can set your jointer next to it (see the far left photo on the opposite page.)

Or if your router table is the same height as (or a bit shorter than) your table saw, the top can easily double as an outfeed support.

SPACE. While a group of tools may look alright on paper, don't start muscling



Planning the Layout. *A scale drawing of your shop and tools makes it easy to move things around to find the best layout. Consider grouping tools by the work they do. And remember to provide infeed and outfeed room for each tool.*

them into place just yet. Each tool also has space requirements.

This isn't just the visible "footprint" of the tool. You need to include enough room to walk around and between tools as you move through the shop. And when you're laying out the shop on paper, it's easy to forget the extra space that's needed so the workpiece that feeds in (or out) of one tool doesn't bump into another one.

CENTER STAGE. Take the table saw, for instance. Because of the clearance required in front, back, and at the sides when cutting large workpieces, a table saw usually claims more than its fair share of space in the center of the shop. Even so, you can still work around these space requirements. Sometimes it's just a matter of positioning the table saw at a slight angle so longer workpieces feed into an open area of the shop (see drawing on opposite page).

The table saw isn't the only tool that can gobble up a lot of space. When running extra-long pieces through the jointer, band saw, router table, or planer, you might also need a sizable "run" at each end of the tool.

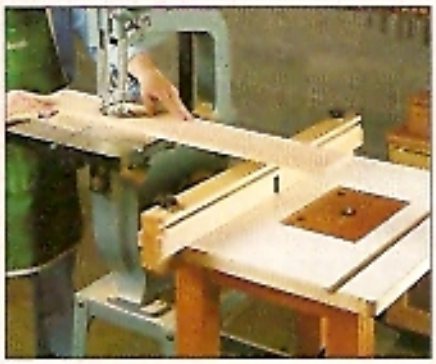
OVERLAP. One way to provide this space is to overlap the infeed and outfeed areas of two tools. For example, position a planer so the outfeed passes in front of the table saw.

Overlapping areas also works well with tools where the tables are at different heights. For instance, I park my band saw right next to the router table. This way, a workpiece feeding off the band saw passes above the shorter router table (see middle photo below).

DOORS AND WINDOWS. When planning infeed/outfeed requirements, don't overlook an opening provided by a door or window. Positioning a band saw or table saw near a door may be just the ticket for those extra-long pieces (see drawing on opposite page).

CORNERS. One last note on laying out your shop. The corners of a shop often get filled with excess clutter. But tucking a tool like a drill press into a corner can take real advantage of this wasted space. You can still drill holes in a long workpiece because of the distance between the adjoining walls (see right photo below).

Support Work With Another Tool. *A board clamped to the jointer fence supports workpieces on the table saw.*



Overlap Tool Heights. *Take advantage of different table heights by overlapping infeed/outfeed areas.*

Use Corners. *Even with this drill press tucked in a corner, you can still work with long workpieces.*

STORAGE

Finally, don' t overlook the need for storage when arranging your shop.

WALLS. The most obvious place to store things is to hang them on the walls. Make the most out of that space with a cabinet such as the Pegboard Storage rack on pages 12-15.

Placement. *For efficiency, it just makes sense to position a tool cabinet next to your workbench.*

AROUND TOOLS. Most stationary tools should have some storage nearby for accessories. This storage can often utilize space that would otherwise be wasted. The Drill Press Caddy beginning on page 16 and the Saw Cabinet on page 80 are a couple of examples.

AROUND THE BENCH. One of the most important "tools" in the shop is my workbench. But it doesn't do me much good if I have to walk across the shop to get tools. Situating a cabinet near the bench gives me easy access to both hand and power tools (see photo at left).

Another way to keep tools handy is to take advantage of the space below the bench. You can also use open floor space, as shown in the photo at right.

OVERHEAD. Besides looking below for storage, you can usually carve out a lot of space up above. The Overhead Racks on pages 26-28 offer several ideas for storing lumber up out of the way.

SMALL TOOLS. And since you don't use all your power tools all the time, consider building small tools that can be stored out of the way when they aren't in use. Two ideas are the Benchtop Router Table on page 56 and the Miter Saw Station on page 42.

Unused Space. *A wheeled box under your bench provides easily accessible storage for cutoffs or accessories.*

SHOP INFO . . . Small Shop Power Tools

Fitting a full complement of power tools into a small shop can be like packing a dozen sardines into a small tin. But it doesn't have to be that way. If the tools are selected and organized properly, you can have the tools and still have room to work. (For tips on how to arrange your tools once you've got them, see the Shop Info article on page 4.)

SELECTING TOOLS

The key to selecting a power tool is to determine first how much use it'll get. If it's used a lot, go with a full-size stationary tool. If it'll only be used now and then, you can save space by choosing a benchtop tool that can be stored out of the way when not in use.

Shown here are the power tools I'd buy (in order) if I were outfitting a small shop today, starting from scratch.

Note: Having a place to work is another thing to consider. So I'll address two more important "tools" on the page 7.

TABLE SAW

If I could only have one power tool in my shop, it would be a good quality contractor's table saw.

I use my table saw all the time to rip, crosscut, and miter workpieces. It's great for cutting rabbets and dadoes. The large table top makes it easy and safe to cut sheet goods. And the flat table top can even be used when you're assembling the smaller parts of projects, such as doors and drawers.

Note: From time to time, you may need to move the saw around to make certain cuts. So it's also a good idea to invest in a set of casters or a mobile base. And check out the Saw Cabinet on pages 80-83 for a project that lets you store your saw's accessories conveniently.

DUST COLLECTOR

When working in a small, enclosed shop, you should be concerned about protecting your lungs from sawdust. (Refer to the Dust Control article on pages 36-37.) Since a table saw kicks up a lot of dust, your next purchase should be a two-stage dust collector to hook up to the saw.

Most small model two-stage collectors come with a quick-disconnect hose that makes it easy for you to connect to other tools with the same mated connector. And many dust collectors also come with casters so you can roll them out of the way easily when not being used.

There are a number of reasonably priced dust collectors available. But if your budget is tight, a shop vacuum can also be used. It should do an adequate job of reducing dust in the air.

ROUTER TABLE

I never realized how much of a necessity a router table was until I started using one. The router table in my shop gets used on practically every project I build.

Not only is it used for routing decorative profiles, but it's also great for routing rabbets, dadoes, and box joints. And with special router bits, you can even rout raised panels.

Although in many cases a hand-held router could also get the job done, I'm more comfortable with the control the router table offers with its larger table top, adjustable fence, and miter gauge. (Plans for a portable Benchtop Router Table begin on page 56.)

DRILL PRESS

Depending on how small your home workshop is, you may not be able to fit in more than the table saw, some sort of dust collection system and a router table.

But if you're going use your shop quite a bit and build a lot of different furniture projects, you'll be glad in the long run if you add more tools for extra versatility. The next tool I'd buy for a small shop would be a drill press. There are a couple of ways you can go here.

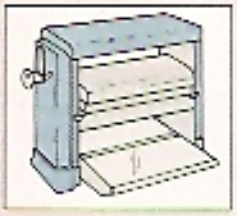
If you're only going to use a drill press for drilling holes, you might consider a small, benchtop model (see the photo on the opposite page). When it's not in use, you'll be able to lift it and store it out of the way in a corner or under a workbench.

But if you're going to drill a lot of holes, mortises, or use the drill press to do sanding, you might consider a larger, full-size model. It only takes a bit more space, plus you'll get a larger table top, a bigger motor, and a broader range of speeds to handle all the extra work.

Whichever drill press style you choose, the Drill Press Caddy on page 16 provides handy storage for bits and accessories.

THICKNESS PLANER

Having a thickness planer in the shop gives you more freedom and control. It means you won't always be limited to only the lumber thicknesses available at your local lumberyard. And there are times when you can actually save some money by buying your rough stock directly from a sawmill and then planing it to final thickness yourself.



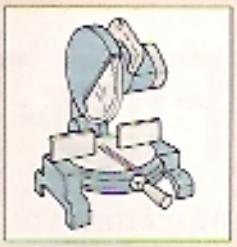
A thickness planer used to be found only in a professional cabinet shop. But the introduction of portable benchtop models made them affordable to most woodworkers.

You can choose from a number of quality benchtop thickness planers that can handle most of your planing needs.

COMPOUND-MITER SAW

A radial arm saw is a great tool for cross-cutting and mitering. But they take up a lot of space. And they're not portable.

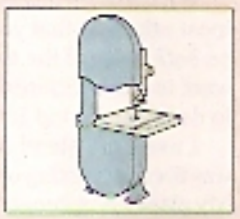
Compound-miter saws, on the other hand, are both compact and easy to move. Miter saws have been used primarily by trim and finish carpenters because of their portability and accuracy. But they're starting to find their way into many workshops for the same reasons. Although smaller, you'll find that a good miter saw will cost about the same as a radial arm saw. (You'll find a great way to improve the performance of any 10" compound miter saw with the portable Miter Saw Station on page 42.)



BAND SAW

My final tool of choice for the small shop is the band saw. A band saw is great to have around if you're going to cut a lot of curves and circles. Or if you plan to resaw lumber — which can save you money when you need thin stock.

Again, like the other tools, determine how much use a band saw will get and how much room you have available.



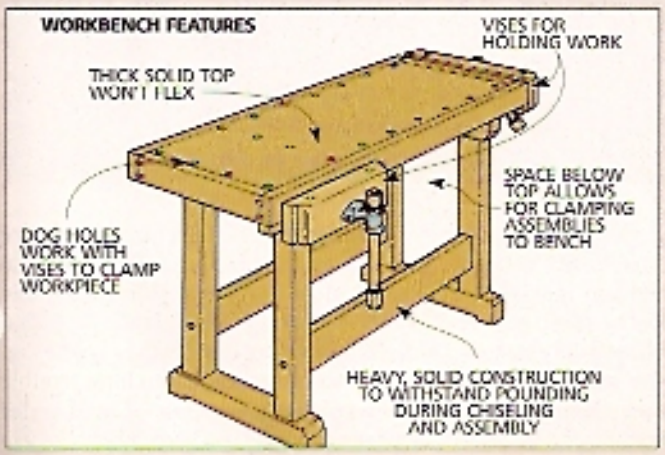
If you think you'll use a band saw a lot, choose a full-size model and add a mobile base. If it's only going to be used occasionally, a benchtop model will work just fine, and it will cost a lot less than a full-size saw.

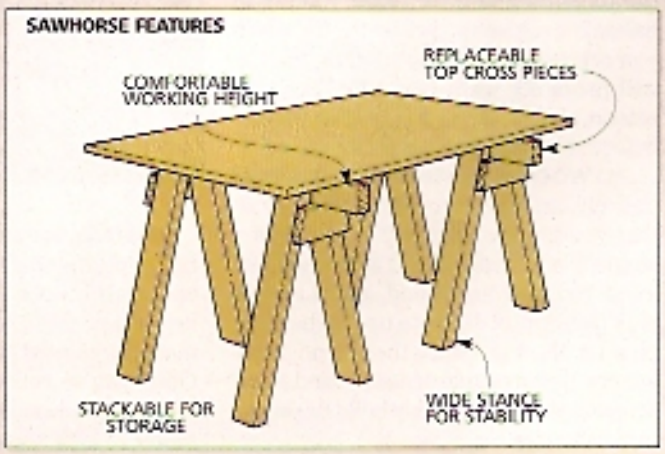
A PLACE TO WORK

Even thought they can't be considered hand tools, a solid workbench and a pair of sturdy sawhorses are essential tools to have in the shop.

Quite often they're one of the first things you'll build for your shop: the workbench for general woodworking, and the sawhorses to support and work on oversized projects. (And by just dropping a sheet of plywood on them, saw horses can even be used to create a quick, temporary work surface.

As when selecting power tools, you need to consider what type of work you plan to do in your shop and how you work. The drawings below show some features to consider whether you plan to buy these items or build your own.





Flip-Top Tool Stand

Maximize your shop's floor space by mounting two tools in one stand. And by putting the stand on wheels, you can roll it out of the way when the job is done.

Benchtop tools are great space savers, but they can still fill a small shop in a hurry. That became clear to me one day when I realized I had more tools than I had open bench tops to put them on. So after clearing out a small space to do some drawing, I came up with this tool stand. It does double-duty by flipping its lid.

What makes this stand different from most others is that you can mount tools on *both* sides of the top. Then when you want to use a different tool, all you have to do is flip the top 180°.

I used my stand to hold two tools I was tired of hoisting on and off my bench. My planer is fastened to one side and my power miter saw is on the other. But this stand would also be a great home for a grinder, benchtop jointer, sanding station, or even a dovetail jig.

LOCKING KNOBS. Once you've got the top flipped to the right tool, you want to make sure it stays put. So there's a built-in locking system made from readily-available hardware. Simply tighten a plastic threaded knob at each corner to secure the platform in place against the sides. That keeps it from rotating while you're using a tool.

ROTATING THE STAND. One thing to keep in mind as you use the stand is that the tools mounted to it aren't likely to balance each other perfectly. So when you release the locking system, the top will probably want to rotate. For this reason, always keep a firm grip on the tool before releasing the last lock.

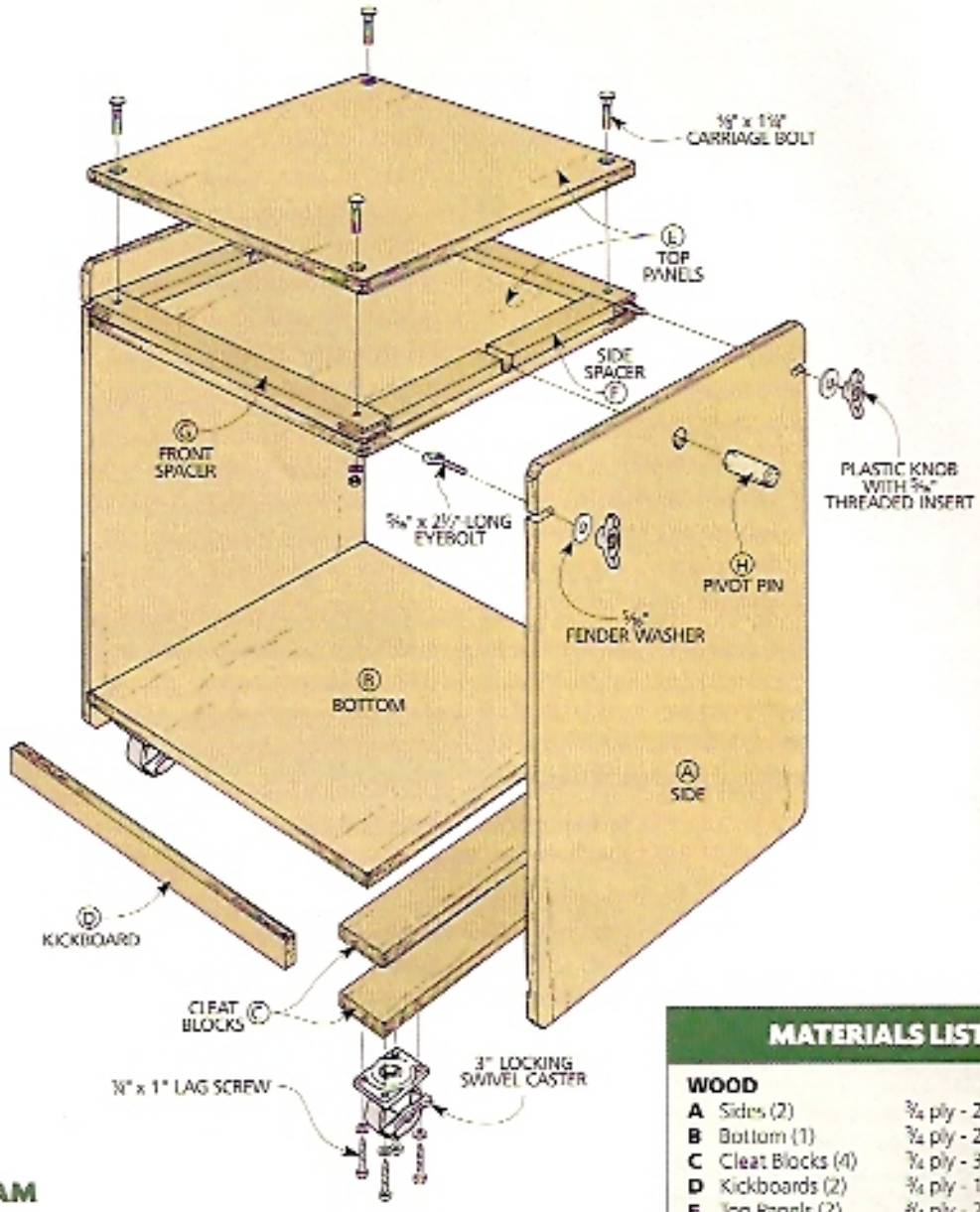
PLYWOOD. The stand is built almost entirely out of plywood. And it's sized so that you can cut all the pieces out of a single 4' x 8' sheet. You'll also need just a few strips of hardwood, and a couple short lengths of dowel to use as the pivot pins for the top. Since there's no fancy joinery (just a couple of dadoes and some screws), you can probably build this stand in about a day.

CASTERS. In a small shop, mobile tools help you maximize space. But putting two tools on one stand can make for a heavy unit. So to make the stand easy to move, I mounted it on heavy-duty casters. Once you've rolled the stand to where you need it, just step on a lever on each caster to lock it in place.

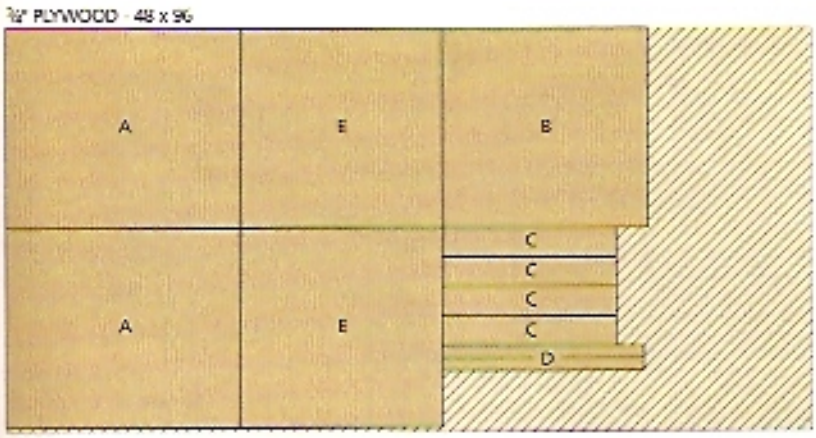
HARDWARE. The bulk of the hardware used in this project should be easy to find at most hardware stores or home centers. However, the plastic threaded knobs and swivel casters may not be carried by some stores. If you have trouble finding them, a number of mail order sources are listed on page 112.

EXPLODED VIEW

OVERALL DIMENSIONS:
25¼W x 23⅜D x 31⅝H



CUTTING DIAGRAM



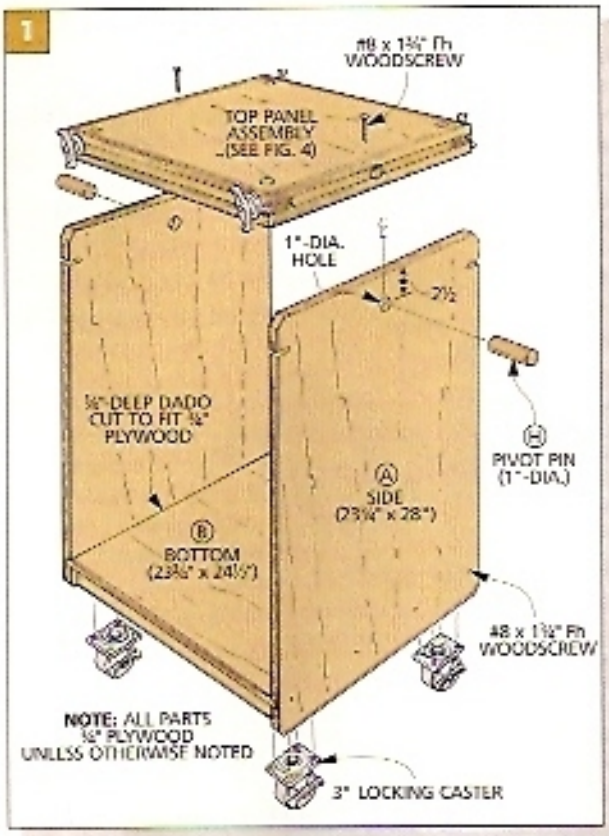
MATERIALS LIST

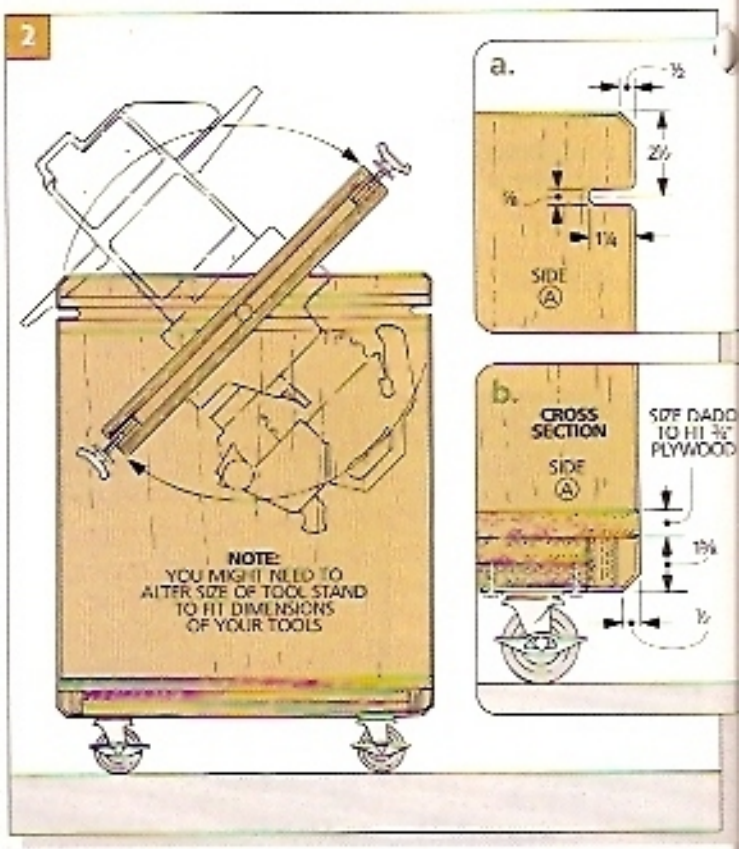
WOOD

A	Sides (2)	¾ ply - 23¾ x 28
B	Bottom (1)	¾ ply - 23¾ x 24½
C	Cleat Blocks (4)	¾ ply - 3½ x 20¾
D	Kickboards (2)	¾ ply - 1½ x 24
E	Top Panels (2)	¾ ply - 23¾ x 24
F	Side Spacers (2)	¾ x 2 - 19¾
G	Ft./Bk. Spacers (2)	¾ x 2 - 24
H	Pivot Pins (2)	1"-dia. dowel x 3

HARDWARE SUPPLIES

(10) No. 8 x 1¾" Fh woodscrews
(4) 3" locking swivel casters
(16) ¼" x 1" lag screws
(16) ¼" washers
(4) ⅜" x 1¾" carriage bolts
(4) ⅜" washers
(4) ⅜" nylon lock nuts
(4) 5/16" x 2½"-long eyebolts
(4) 5/16" fender washers
(4) Plastic knobs w/ 5/16" threaded inserts





BASE

The base of the stand is nothing more than a couple of ¾"-thick plywood sides (A) joined by a bottom (B) *(Fig. 1)*. Then cleats are added to the bottom, and casters are fastened to the cleats.

Note: Before starting construction, measure the bases and the heights of the tools you plan to mount to the stand. You may have to alter the stand's dimensions to accommodate your tools.

After the sides and bottom are cut to size, the sides can be notched and drilled for the locking hardware and top pivot pins *(Figs. 1 and 2a)*. To cut each slot, I drilled a ⅜"-dia. hole to mark the end, then removed the waste with a jig saw.

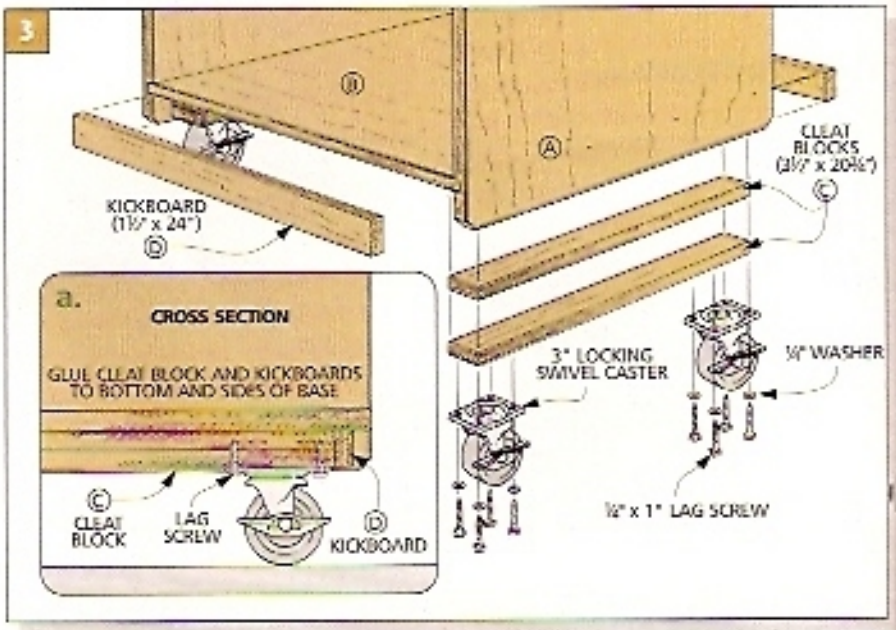
A ¼"-deep dado cut on the inside face of each side holds the bottom in place. But before assembling the three case pieces, small chamfers are routed all around the sides pieces and on the front and back edges of the bottom *(Fig. 2b)*. I also knocked off the sharp corners of each side panel by cutting a ½" chamfer on each corner. Once this is done, the sides can be glued and screwed to the bottom.

CLEATS AND KICKBOARDS. In order to strengthen the bottom of the base and make it more rigid, cleat blocks and kickboards are added. The cleat blocks also provide extra thickness for the lag screws that hold the casters.

The cleats (C) are glued up from two pieces of ¾" plywood *(Fig. 3)*. These are glued in place against the sides and bottom. Then plywood kickboards (D) are glued to the ends of the cleats at the front and back of the base.

CASTERS. To allow the tool stand to be moved around easily but locked in place when in use, a locking swivel caster is added to each corner. (See page 112 for sources.)

To mark the positions for the pilot holes for each caster, simply hold the caster in place and mark through the holes in the caster's plate. After drilling 5/32"-dia. pilot holes, the casters can be attached to the cleat blocks with ¼" x 1" lag screws *(Fig. 3)*.



TOP

Once the base is finished, all that's left is to build the top for the tool stand. The top is made out of two layers of plywood with hardwood spacers sandwiched in between *(Fig. 5)*. This extra thickness helps keep the base from racking when the locking knobs are tightened.

Cut the two plywood top pieces (E) to size first. Then the side spacers (F) and front and back spacers (G) are cut to size from ¾"-thick hardwood.

In addition to separating the plywood layers, the front and back spacers serve another purpose. Notches cut in the ends of these pieces house the eyebolts that lock the top in place *(Figs. 4 and 5)*. These notches can be cut on the table saw. Sneak up on their width until the eyebolts fit smoothly in the notches without being forced in place.

Once these notches are cut, the plywood top pieces and the spacers can be glued up. Then holes for the locking hardware can be drilled *(Fig. 5)*. To keep the hardware below the surface of the plywood, drill a counterbore for the head of each carriage bolt and for each washer and lock nut *(Fig. 5)*.

LOCK-DOWNS. With the exception of the large plastic wing nuts, the lock-downs at each corner of the top use common hardware. An eyebolt fits into the slot cut in each corner of the top and is held in place by a carriage bolt, washer, and nylon lock nut *(Fig. 5)*.

A large fender washer and plastic wing nut are threaded onto the eyebolt *(Fig. 5)*. The wing nuts are then tightened down against the sides to lock the top in place (see photos above).

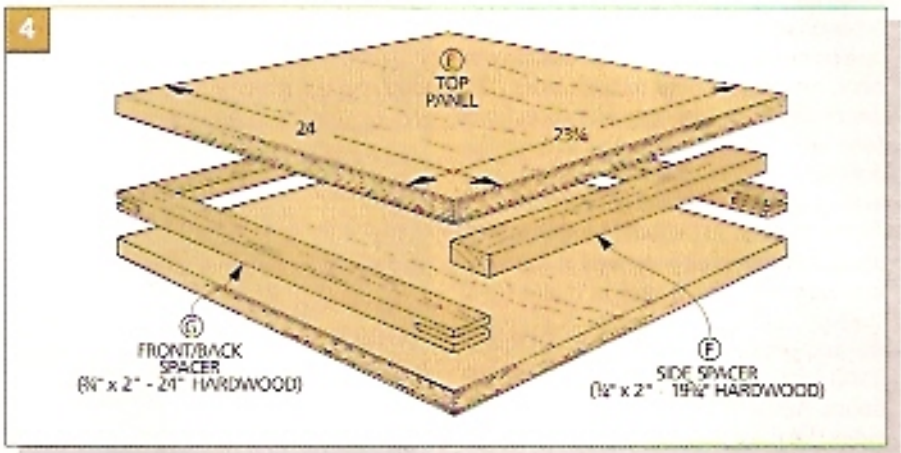
PIVOT PINS. All that's left to complete the stand is to attach the top to the base. The top rests on a pair of pivot pins (H) that pass through the sides of the base and into holes drilled in the edge of the top *(Fig. 6)*. To locate the pivot pin holes in the edge of the top, just place the top between the sides of the base and secure it in place with the locking hardware. Now, using the hole in each side of the base as a guide, drill holes into the edge of the top.

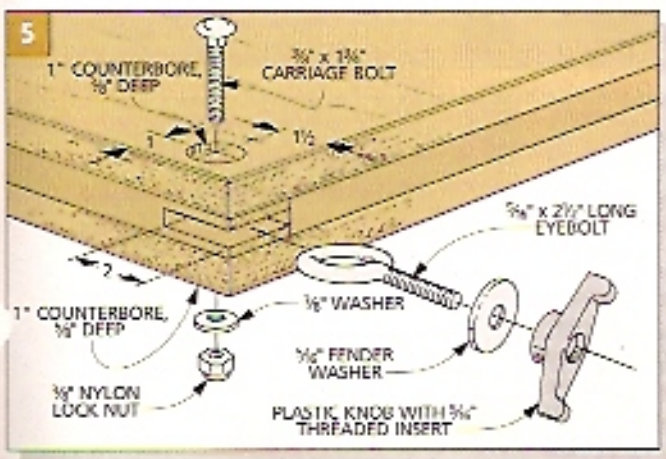
The pivot pins are nothing more than short sections of 1"-dia. hardwood dowel. After chamfering the ends, the pins can be slipped through the sides and into the top. Then each one is secured by a single screw *(Fig. 6a)*.

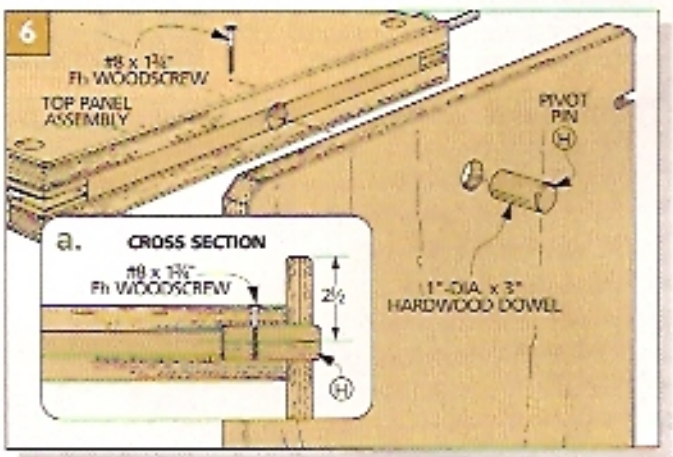
To use the stand, simply mount a tool on each side of the top using lag screws. Then to flip the top around, just loosen the wing nuts in each corner, swing the eyebolts out of the notches in the base sides, and carefully rotate the top. Then before using the tool, make sure to slide the eyebolts back in place and firmly tighten down the wing nuts. ■

To lock the top in place, tighten the knob at each corner against the side.

To flip the top, loosen the knobs and swing the eyebolts out of the notches.







Pegboard Storage

This cabinet isn't just some framed pegboard hung on the wall. Its secret is revealed as you open the doors and find plenty of hidden room to hang tools and accessories.

When I first showed this rack to a friend of mine, his initial reaction was short and sweet, "Looks nice." But then I swung open the outer door to reveal two more pegboard panels inside. His eyebrows rose a bit. Then, when I swung the rear door open to reveal a fourth pegboard panel, plus storage on the wall behind the rack, he finally said, "Wow!"

All told, there is almost 22 square feet of pegboard and wall storage space in this wall-mounted rack. And best of all, it takes up less than seven square feet on the shop wall.

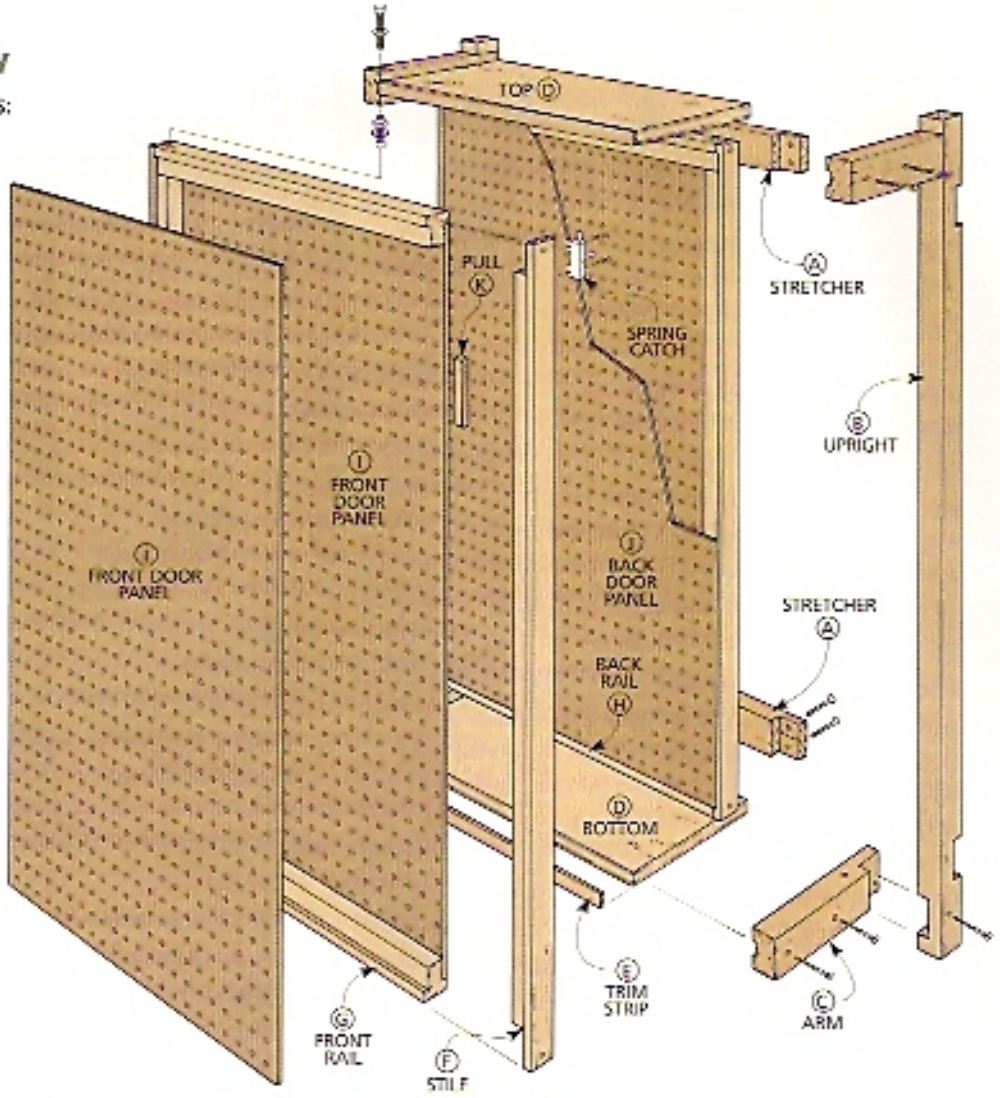
DOORS. The doors are just simple wood frames (I made mine with sturdy Douglas fir) with pegboard panels screwed in place on each side. They pivot on a pair of bolts at the top and bottom corners. To allow access to both sides, the doors swing out in opposite directions (see the photos below). And to keep the doors closed, I've mounted a spring catch to the top of each wood door frame.

MATERIALS. You should be able to pick up all the materials you need at the local lumberyard. The frame is made from "two-by" material. A 3/4"-thick plywood top and bottom help brace the frame so it will support a load of tools hung on the doors. And a full sheet of pegboard provides the door panels.

Finally, the pegboard allows you to easily rearrange the hooks and tool holders to where you need them.

EXPLODED VIEW

OVERALL DIMENSIONS:
24W x 10½D x 41¾H



MATERIALS LIST

WOOD

A	Stretcher (2)	1½ x 2 - 24
B	Uprights (2)	1½ x 2 - 41¾
C	Arms (4)	1½ x 2 - 10½
D	Top/Bottom (2)	¾ ply - 10¼ x 21½
E	Trim Strips (2)	¼ x ¾ - 21½
F	Stiles (4)	1½ x 1½ - 36
G	Front Rails (2)	1½ x 1½ - 23
H	Back Rails (2)	1½ x 1½ - 22
I	Front Door Panel (2)	¼ pgbd. - 23 x 35
J	Back Door Panel (2)	¼ pgbd. - 22 x 35
K	Pull (1)	⅜ x ½ - 5

HARDWARE SUPPLIES

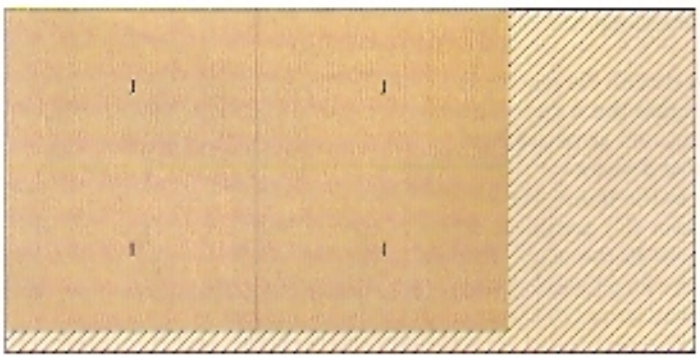
(80) No. 10 x ½" Fh woodscrews
(16) No. 8 x 2½" Fh woodscrews
(8) No. 8 x 1¼" Fh woodscrews
(8) No. 8 x 1¼" Fh woodscrews
(4) ¼" x 3½" lag screws
(4) ¼" x 2½" hex bolts
(4) ¼" T-nuts
(4) ¼" washers
(4) ¼" fender washers
(4) ¼" x ½"-long bronze bushings
(2) Left-hand spring catches

CUTTING DIAGRAM

1½ x 5½ - 96 (5.5 Bd. Ft.)

1½ x 5½ 96 (5.5 Bd. Ft.)

¼" PEGBOARD - 48 x 96



¾" PLYWOOD - 24 x 24

FRAME

I started construction of the pegboard storage unit by cutting the pieces for the U-shaped frame that supports the two swinging doors.

FRAME. This sturdy frame is made from "two-by" material that's been ripped to a width of 2". (I used Douglas fir.) A ¾"-thick plywood top and bottom provide extra strength to support the doors *(Fig. 1)*. The frame is held together with simple (yet strong) lap joints. This joint is easy to make with a dado blade in the table saw by cutting a series of notches in the frame pieces.

The first pieces to make are a pair of stretchers (A) used to attach the rack to the wall. Once they are ripped to width (2") and cut to length (24"), the stretchers are rabbeted on each end to leave ¾"-thick tongues *(Fig. 2)*.

Next, cut two uprights (B) to a finished length of 41¾". Then, to accept the tongues on the stretchers, dadoes are cut in the back edge of the two uprights (B). These dadoes are 3½" from each end of the upright *(Fig. 2)*.

Another pair of 2"-wide dadoes are cut on the inside face of each upright to accept a pair of short arms (C) *(Figs. 1 and 2)*. Then the doors are attached to these arms later.

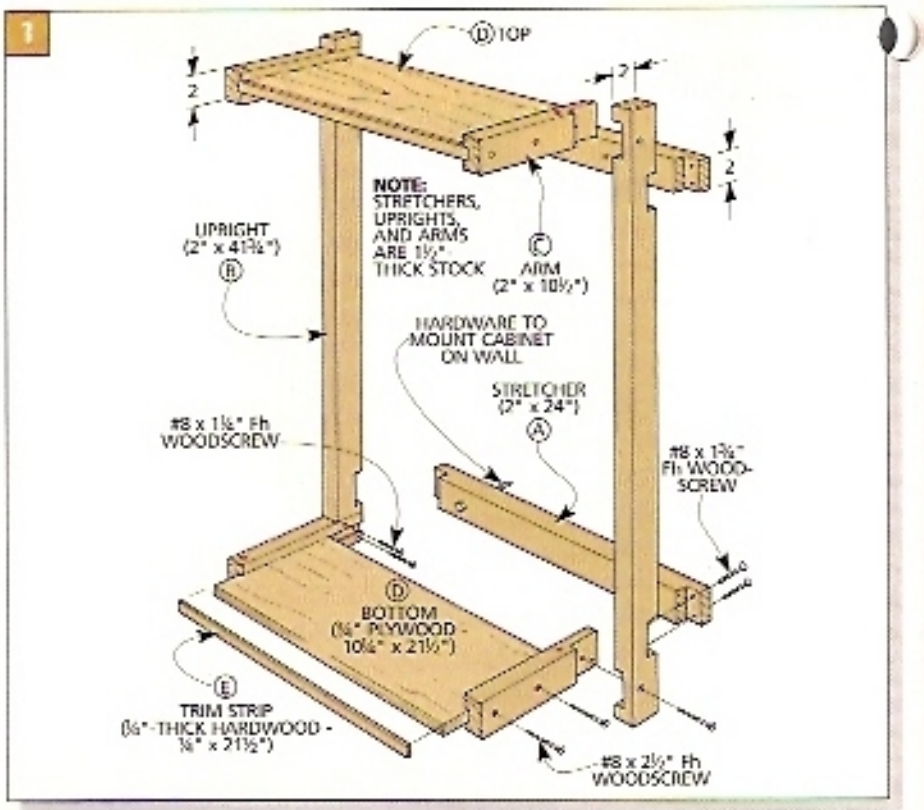
Once the dadoes are cut in the uprights, all four of the arms are rabbeted on one end to leave a ¾"-thick tongue *(Fig. 2)*.

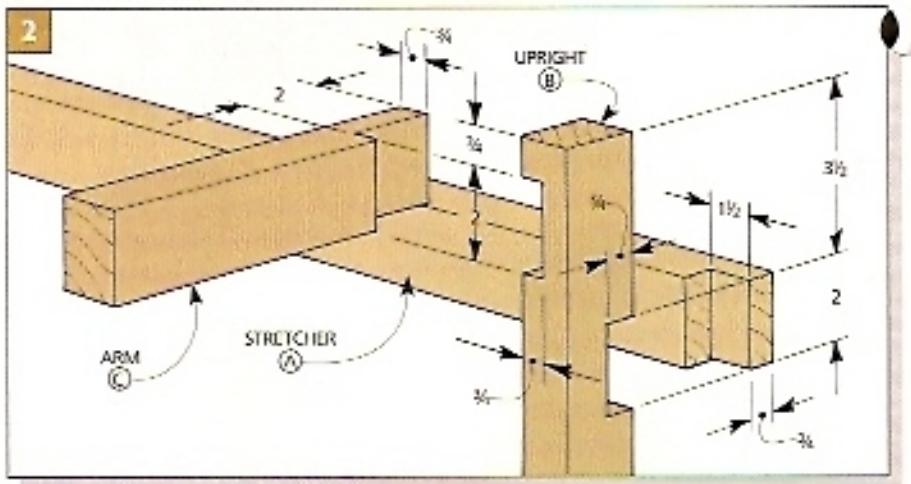
Before assembling the frame, it's easiest to drill a ¼"-dia. hole in each arm for a pin that will allow the doors to pivot *(Fig. 3)*. Note that the holes are located toward the front of the left arms, and to the rear of the right arms. I used the drill press to make sure the holes were straight up and down.

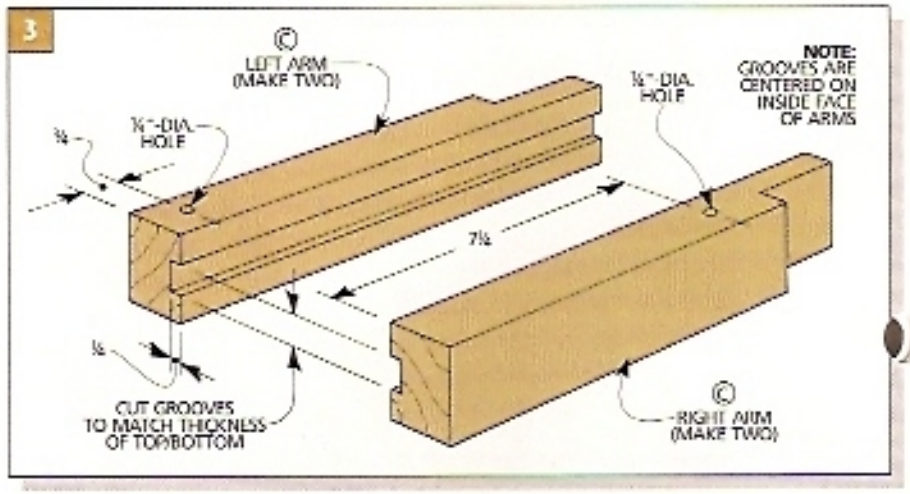
After the holes are drilled, a shallow groove is cut in each arm to accept the ¾"-thick plywood top and bottom added later. These grooves are centered on the inside faces of the arms, opposite the rabbets cut earlier.

ASSEMBLY. Now that all the joinery is cut, you can assemble the frame. The stretchers, uprights, and arms are held together with glue and screws.

To add rigidity to the frame, the plywood top and bottom (D) are cut to fit between the grooves in the arms. But before gluing and screwing them in place, I added hardwood trim strips (E) to cover their front edges *(Fig. 1)*.







DOORS

With the frame complete, you can start working on the two doors. They're just simple wood frames that are rabbeted on both sides to accept the ¼" pegboard panels *(Fig. 4)*.

The overall height of the doors is the same. But the back door is 1" narrower so it swings past the front door when you open it *(Fig. 4d)*.

Determining the length of the frame pieces is easy. The stiles (F) on each door are identical in length. They are cut to provide ⅛" clearance at both the top and the bottom. (Mine were 36" long.) But the front rails (G) are 1" longer than the back rails (H). (This takes into account the overall width of the doors and the joinery that holds them together.)

With the frame pieces cut to length, matching rabbets are cut on both sides to hold the pegboard panels *(Fig. 4a)*. And notches in the ends of the stiles accept the rails *(Fig. 4b)*.

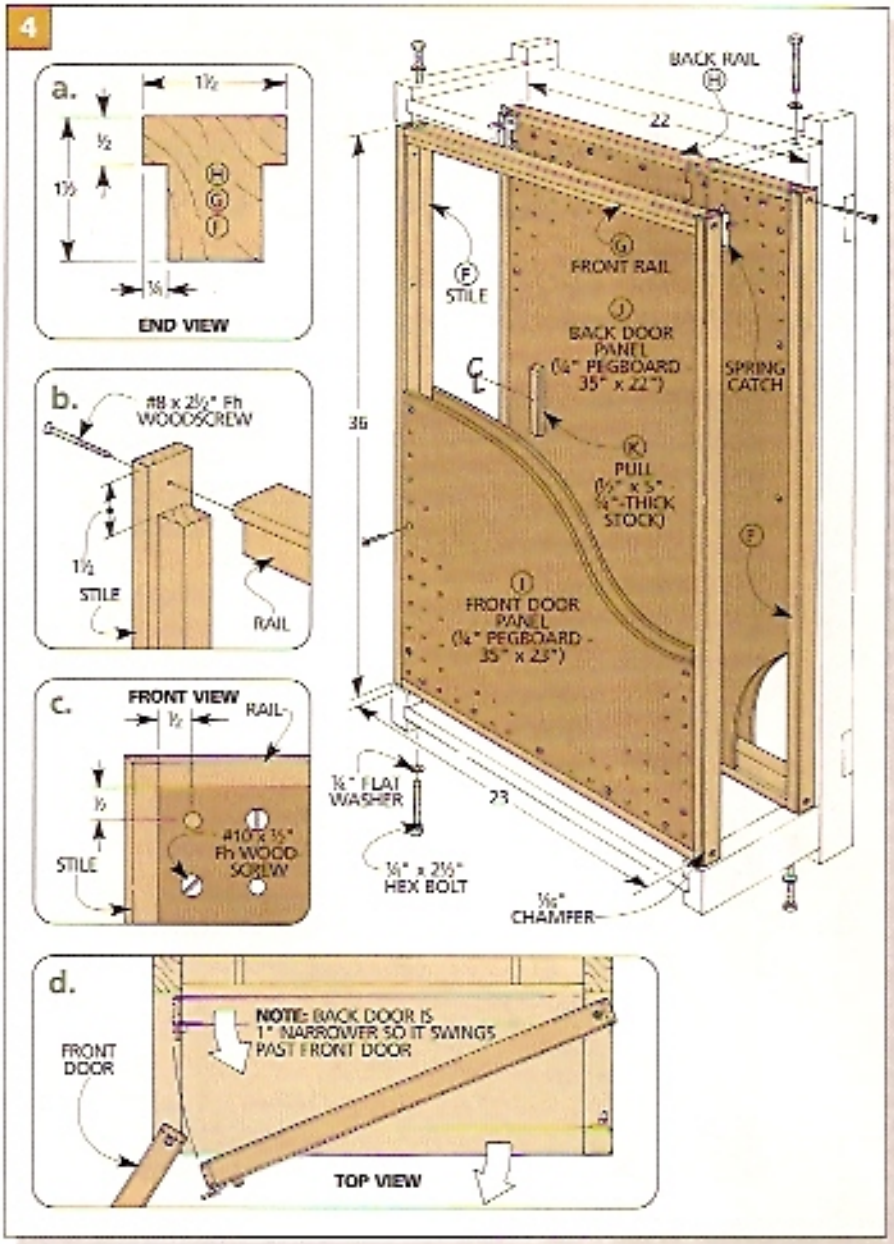
Once the frames were assembled, I eased the edges by routing 1/16" chamfers around the frames *(Fig. 4)*.

PANELS. After screwing the frame pieces together, it's just a matter of cutting front (I) and back door panels (J) to fit between the rabbets.

Note: Cut the pegboard so the holes are ½" from the outside edge *(Fig. 4c)*.

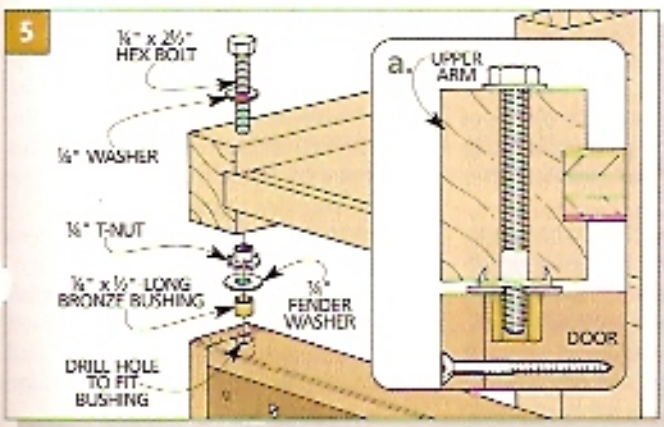
Next, a scrap pull (K) is glued to the front of the back door. The pull is just a ½" x 5" piece, cut from ¾"-thick stock.

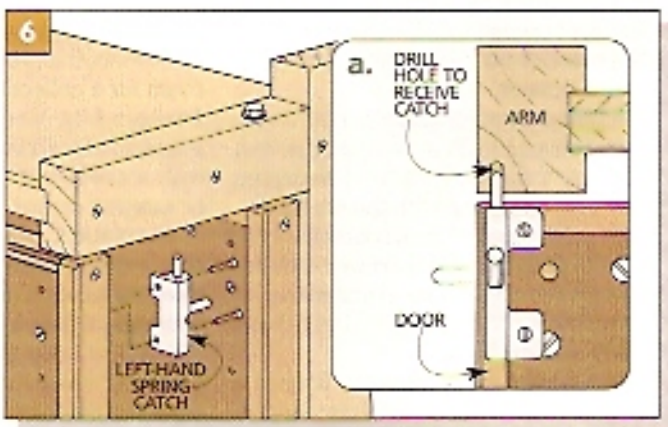
ATTACH DOORS. All that's left is to attach the doors. They pivot on two hex bolts that pass into bronze bushings installed in the top and bottom edges of each door *(Figs. 5 and 5a)*. These bolts pass through holes in the arms (drilled earlier) and thread into T-nuts in the inside faces of the arms.



Finally, to lock the doors in place, a hole is drilled in each upper arm for a spring-loaded catch *(Fig. 6)*.

Note: One catch mounts to the back of the front door. The other is on the front of the back door *(Fig. 4)*. ■





Drill Press Caddy

By clamping to the drill press column, this caddy uses wasted space to keep your bits and other accessories close at hand. The trays pivot out for easy access.

Storing drill bits and accessories in a place convenient to my drill press has always been a problem. It's nice to be able to put them in a drawer or cabinet below the tool. That way, they're kept clean and organized. But if you're using a floor-model drill press, there isn't room to put a drawer.

A tray mounted to the drill press is more convenient, but you run the risk of having things fall off, or of sweeping away drill bits along with the shavings.

To solve this problem, I combined the benefits of the enclosed drawer with the convenience of a column-mounted tray — the result is the shop-made Drill Press Caddy shown above.

The design is very simple. It's just a pair of trays (one shallow and one deeper) sandwiched between a top and a base. Using a carriage bolt as a pivot, the trays swing open to provide access. Dust can't get in, and your accessories are just an arm's reach away.

SIZE. The caddy may look small, but it holds more than you might think. There's room for a collection of larger bits, like Forstner bits. You'll also have plenty of space to store your regular bits along with accessories, such as a circle cutter or sanding drums.

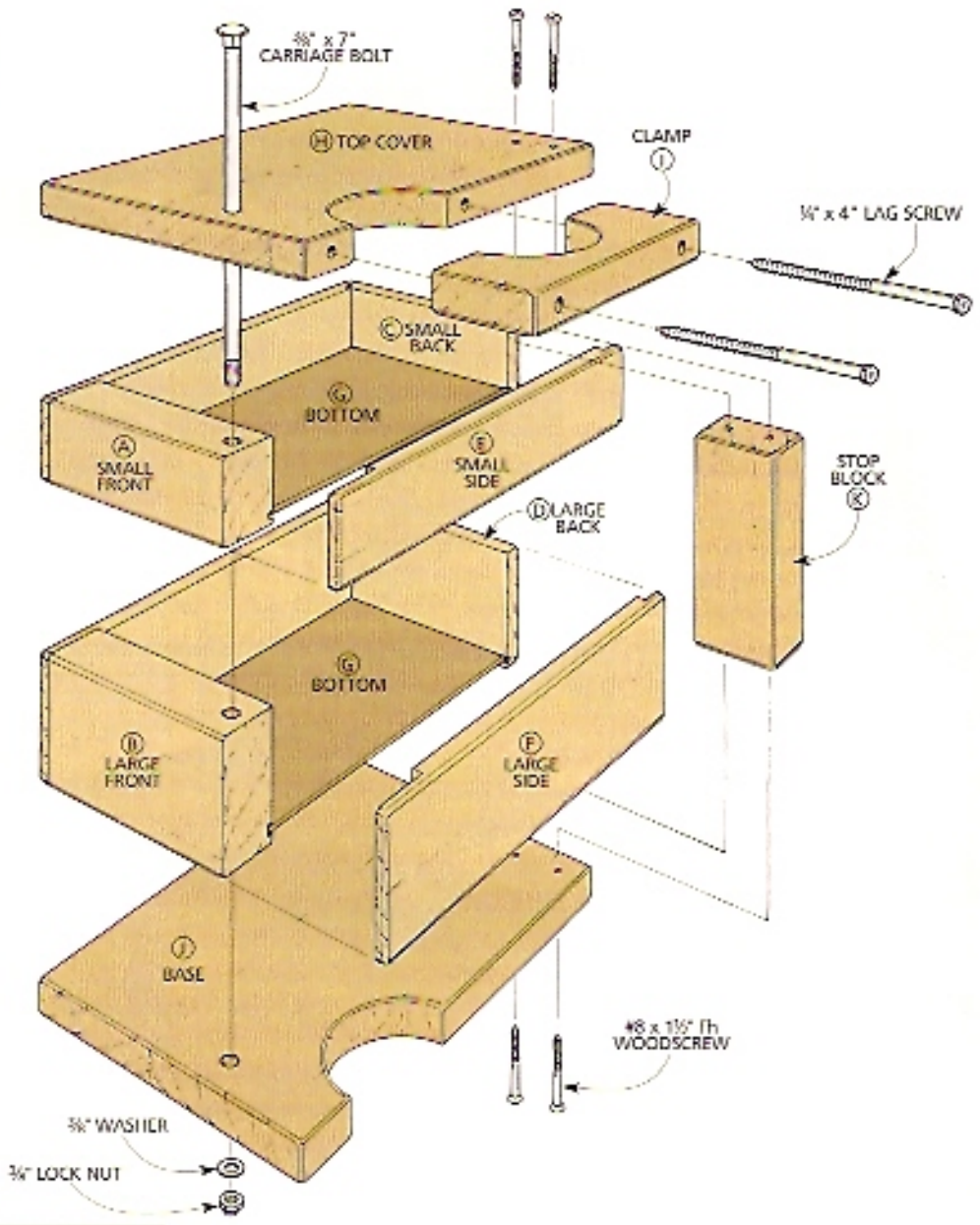
MATERIALS. You can probably make this project from scrap material you have on hand. The sides, top, bottom, and back of the trays are ½"-thick stock. This helps keep the weight of the unit down. (I used maple for my caddy.) However, the fronts of each tray are made from 1½"-thick stock. This is needed to provide enough thickness to hold the carriage bolt that serves as a pivot for the trays. (Regular "2 by" lumber could be used for these parts.)

CLAMP. The caddy is held securely to the drill press column by a simple shop-made clamp that starts as part of the caddy's oversized top cover. After the clamp is cut from the cover, the two pieces are screwed back together with the column between them.

POWER TOOL SELECTION. A drill press (with or without a caddy) is just one of several tools that can be useful for a small shop. For help in selecting the most appropriate tools for your space and budget, see the Shop Layout and Storage article on page 4.

EXPLODED VIEW

OVERALL DIMENSIONS:
10⅛W x 11D x 6H



MATERIALS LIST

WOOD

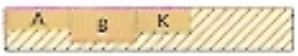
A	Small Front (1)	1½ x 1¾ - 5½
B	Large Front (1)	1½ x 2¾ - 5½
C	Small Back (1)	½ x 1¾ - 5½
D	Large Back (1)	½ x 2¾ - 5½
E	Small Sides (2)	½ x 1¾ - 11
F	Large Sides (2)	½ x 2¾ - 11
G	Bottoms (2)	⅛ hdbd - 5⅛ x 9¼
H	Top Cover (1)	¾ x 10½ - 11
I	Clamp (1)	¾ x 2⅜ - 6 rough
J	Base (1)	¾ x 10½ - 11
K	Stop Block (1)	1½ x 2 - 4½

HARDWARE SUPPLIES

(4) No. 8 x 1½" fh woodscrews
(2) ¼" x 4" lag screws
(1) ⅜" x 7" carriage bolt
(1) ⅜" washer
(1) ⅜" lock nut

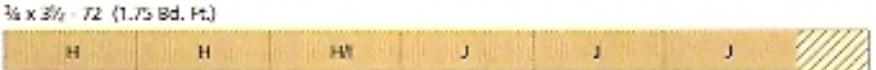
CUTTING DIAGRAM

1½ x 3½ - 24" (.9 Bd. Ft.)



½ x 3½ - 72" (1.75 Sq. Ft.)

¾ x 3½ - 72" (1.75 Bd. Ft.)



¼" HARDBOARD - 12 x 12

TRAYS

To build the caddy, start by making the two trays. The upper tray is shallow, while the bottom tray is deeper.

The only unusual thing about this is that the front of each tray is slightly thicker than the sides and the back. This provides extra strength for the carriage bolt that passes through the fronts of the trays as a pivot pin.

FRONTS. The first step is to make the 1½" thick fronts (A, B). The length of both fronts is the same (5½"). The only difference here is the width (height) of these pieces *(Fig. 1)*.

BACKS AND SIDES. With the fronts cut to size, the next step is to make the backs and sides. To keep the trays as light as possible, I cut the backs (C, D) and sides (E, F) from ½" stock *(Fig. 1)*.

RABBETS. Next, the ends of the sides (E, F) have to be rabbeted to accept the fronts and backs. Each of these rabbets are ¼" deep, but since the fronts and backs are different thicknesses, make sure the widths of the rabbets match these pieces *(Fig. 1)*.

GROOVE. With the rabbets complete, cut ⅛"-deep grooves on the inside faces of the fronts, backs, and sides to hold the ⅛" hardboard bottoms *(Fig. 1a)*.

To determine the size of the bottom (G), dry-assemble a tray. Then measure the inside length and width and add ¼" to each dimension. Next, cut two bottoms to this size and glue up the five pieces for each tray *(Fig. 1)*.

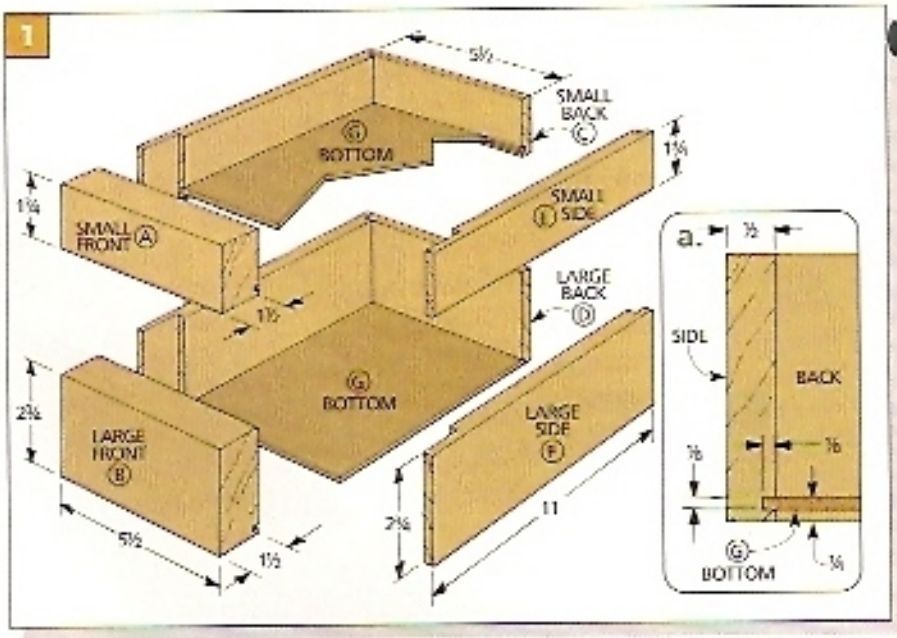
TOP COVER & BASE

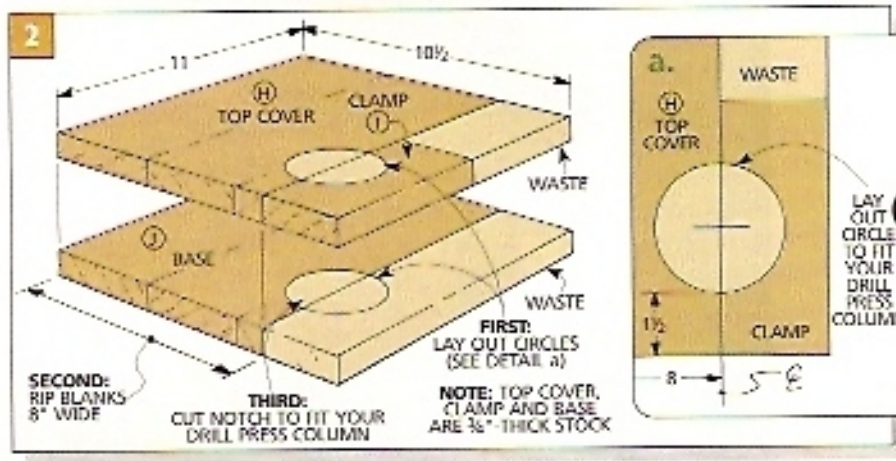
After you've glued up the trays, begin working on the top cover (H), clamp (I), and base (J). The top and clamp are cut from one wide piece and are used to mount the caddy to the drill press column.

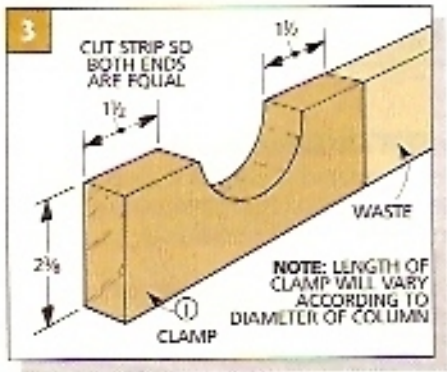
Start by edge gluing enough ¾"-thick stock to form two blanks *(Fig. 2)*.

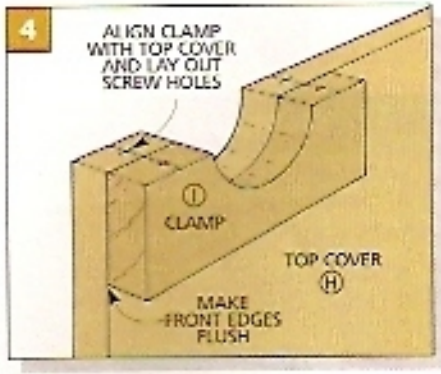
The length of the top cover and base is the same as the length of the trays (11"). But to allow the caddy to fit around the drill press column, the top cover and base are cut 4½" wider than the trays (10½") *(Fig. 2)*.

NOTCHES. A section of the top cover becomes the clamp (I) that's used to hold the caddy to the drill press column. To make this clamp, first lay out a circle on both blanks. Then rip the top cover and base through the center of the circle (to a width of 8") *(Fig. 2a)*.









Now cut out the half-circle notches with a jig saw. Then use a drum sander to sand up to the line. Finally, trim the cut-off section of the top cover to form the clamp piece *(Fig. 3)*.

MOUNTING HOLES

The only thing left is to drill holes for the lag screws that attach the clamp to the top cover. To make sure that these holes are aligned, lay out the hole locations on both the top cover and clamp at the same time *(Fig. 4)*.

When drilling the holes, an auxiliary fence on the drill press table helps support the workpiece. With the fence in place, drill two ¼" shank holes through the clamp *(Fig. 5)*. Then, drill two ⅜" pilot holes in the top cover *(Fig. 5a)*.

ASSEMBLY

The top cover, trays, and base are all joined with a long carriage bolt. The carriage bolt serves as a pivot pin that allows the trays to swing out.

PIVOT HOLES. To make sure all the holes for the carriage bolt align for all the pieces, I used a simple positioning jig. It's just a pair of cleats clamped to the drill press table *(Figs. 6 and 7)*.

To position the cleats, first mark the location of the hole on one of the trays *(Fig. 6a)*. Then position a drill bit directly over the mark you just made and temporarily clamp the cleats along the front and side of the tray *(Fig. 6)*.

Next, drill a pivot hole in each tray. Then without moving the positioning cleats, drill holes through the top cover and the base *(Fig. 7)*.

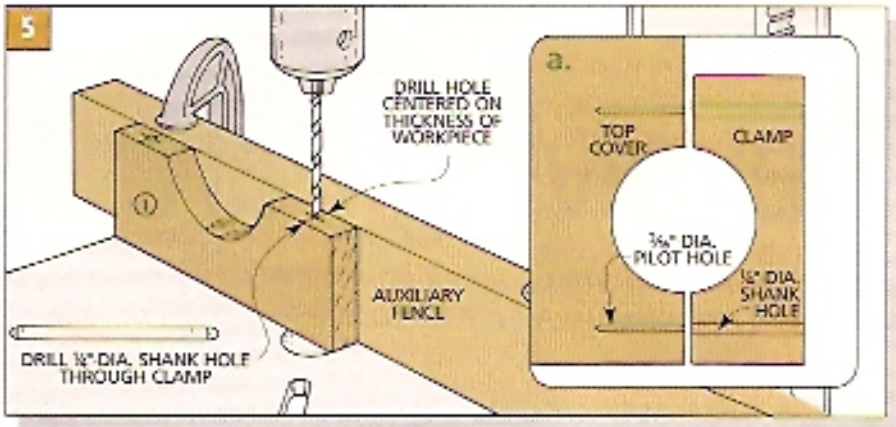
STOP BLOCK. To help keep the trays aligned when they're closed and to tie the top cover and base together, I added a stop block (K).

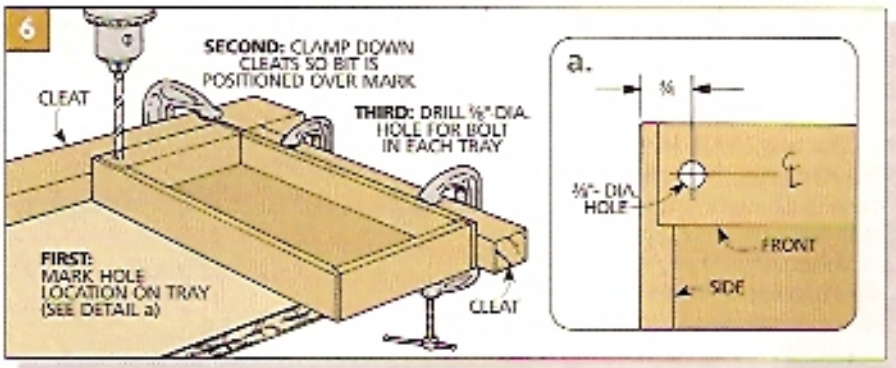
This block is cut from 1½"-thick stock, and its length is the same as the combined height of the trays (4½") *(Fig. 8)*. To determine the width of the block, subtract the width of the trays from the width of the top cover (in my case, this was 2").

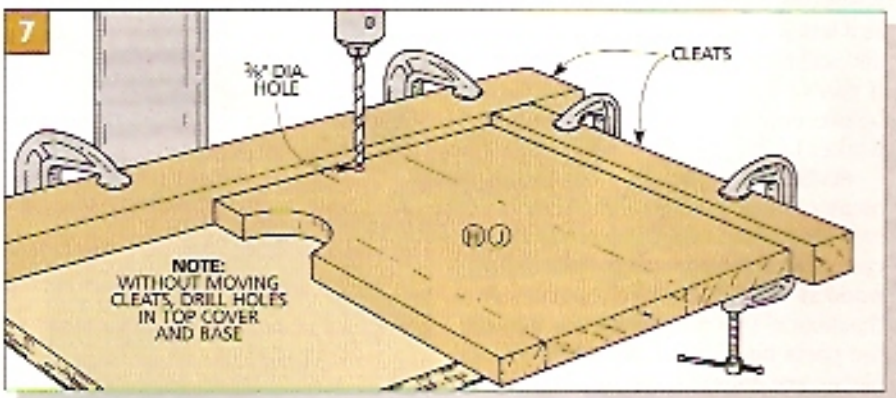
CHAMFERS. Before assembling the caddy, I eased the sharp edges by routing ⅛" chamfers on all the parts. Then I wiped on two coats of tung oil finish to give it some protection.

ASSEMBLY. Once the finish is dry, bolt the top cover, trays, and base together with a ⅜" carriage bolt and a lock nut *(Fig. 8)*. Then position the stop (J) and screw it in place *(Fig. 8)*.

MOUNTING. All that's left is to mount the caddy to your drill press column. To do this, simply attach the clamp to the top cover (H) using a pair of 4"-long lag screws *(Fig. 9)*.

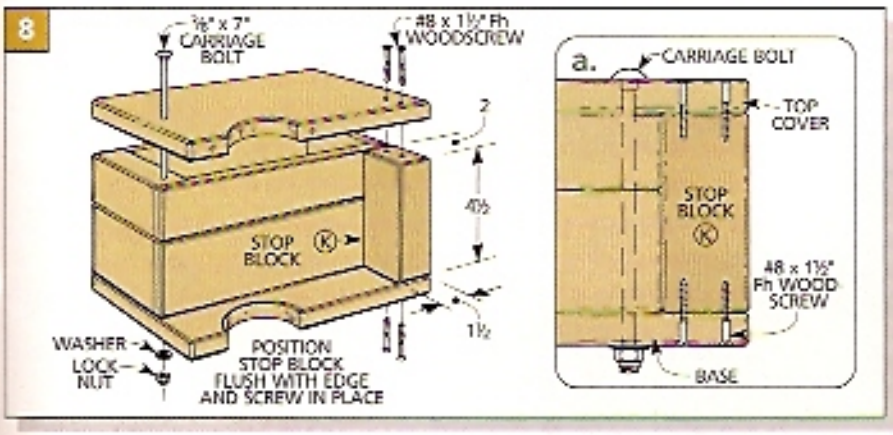


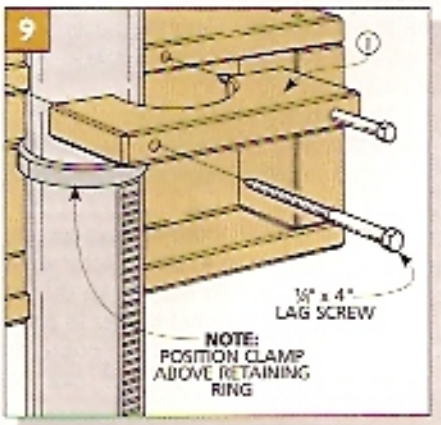




Note: If your drill press has a toothed rack along its column for raising and lowering the table, you will need to mount the clamp *above* the retaining ring *(Fig. 9)*.

Position the Drill Press Caddy at a comfortable and convenient height, tighten up the lag screws to hold it in place and keep it from sliding. ■





Revolving Parts Bin

Get thirty-two compartments in just over a square foot of bench space, with easy access to everything. A lazy Susan lets you spin the bin to get to the parts you need.

One of the things that fascinated me as a kid was the circular nail bin at the local hardware store. I couldn't resist spinning the metal shelves and watching the piles of nails go by like a merry-go-round.

That same basic idea is what's behind this Revolving Parts Bin. Four separate tiers (with eight compartments each) help organize small parts and pieces of hardware. Plus, there are three different sizes of compartments to hold hardware pieces of various sizes.

LAZY SUSAN. The bin rotates on a lazy Susan bearing. This is a great space saver, as it lets you put the bin close to the wall and still have access to everything in it. If you've never installed a lazy Susan before, don't worry. A few screws are all it takes to fasten it to the bin.

PLYWOOD. Although a bin with this many compartments might seem a bit complicated to build, that's really not the case. A sturdy frame made from ½" plywood (I used Baltic birch) serves as a "backbone" that runs all the way through the parts bin. Then hardboard bottom pieces are added to establish the individual compartments. And to keep the contents from spilling out, thin hardwood strips are attached to the fronts.

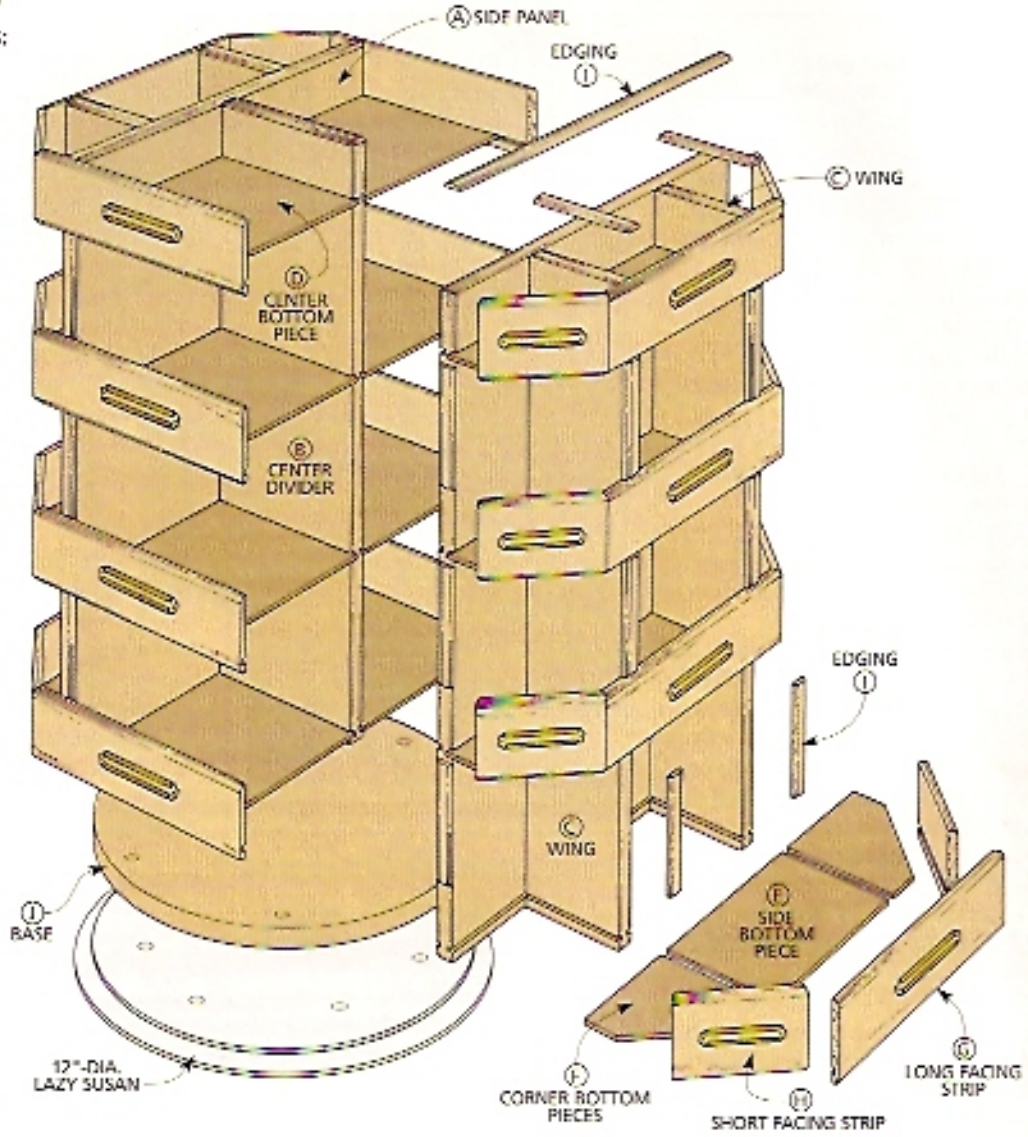
ANGLES. The triangular compartments on the corners introduce some additional angles. Cutting the angles accurately on the pieces that form the bottoms of the compartments is automatic with a simple jig.

Then when it's time to miter the facing strips that wrap around the bin, a few test cuts (and some patience) will pay off with a nice, tight fit.

LABELS. With all those storage spaces, it would be easy to forget exactly what is stored where. To help keep things straight, I added a label holder in front of each compartment. If the contents of a bin change, the label can be changed easily as well.

EXPLODED VIEW

OVERALL DIMENSIONS:
12½W x 13D x 17³⁄₁₆H



MATERIALS LIST

WOOD

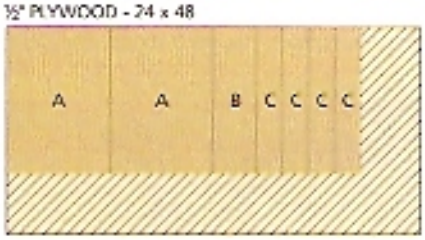
A	Side Panel (2)	¾ ply - 16⅞ x 12
B	Center Divider (1)	¾ ply - 16⅞ x 5
C	Wings (4)	¾ ply - 16⅞ x 3
D	Ctr. Btm. Pieces (8)	⅛ hdbd. - 5¼ x 6
E	Side Btm. Pieces (8)	⅛ hdbd. - 3¼ x 5¼
F	Cnr. Btm. Pcs. (16)	⅛ hdbd. - 3¼ x 3¼
G	Lg. Fcng. Strips (16)	¾ x 2 - 7⅞ rough
H	Sh. Fcng. Strips (16)	¾ x 2 - 3½ rough
I	Edging	⅜ x ⅝ - 9 ft. rough
J	Base (1)	½ ply - 11¼ dia.

HARDWARE SUPPLIES

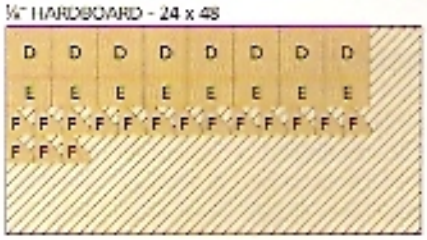
(4) No. 10 x ⅝" Rh sheet-metal screws
(8) No. 6 x 1" Fh woodscrews
(42) 1" wire brads
(1) 12"-dia. lazy Susan
(32) 2½"-long label holders w/ tacks

CUTTING DIAGRAM

½" PLYWOOD - 24 x 48

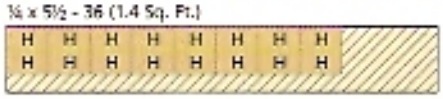


¼" HARDBOARD - 24 x 48



¾ x 5½ - 72 (2.75 Sq. Ft.)

¾ x 5½ - 36 (1.4 Sq. Ft.)



½ x 3½ - 36 (.9 Sq. Ft.)

FRAME

The core of the frame is an H-shaped assembly with two "wings" sticking out on each side *(Fig. 1b)*. This frame defines eight columns. To divide each of these columns into four compartments, grooves are cut in each side of the frame pieces to accept hardboard bottom pieces (refer to *Fig. 3*).

GROOVES. To get these grooves to align, it's best to cut them before cutting the individual frame pieces to size. Start with a piece of plywood the same width (height) as the frame (16⅞") *(Fig. 2)*. And to allow "extra" for the saw kerfs when cutting the frame pieces to size, I cut it to a rough length of 43".

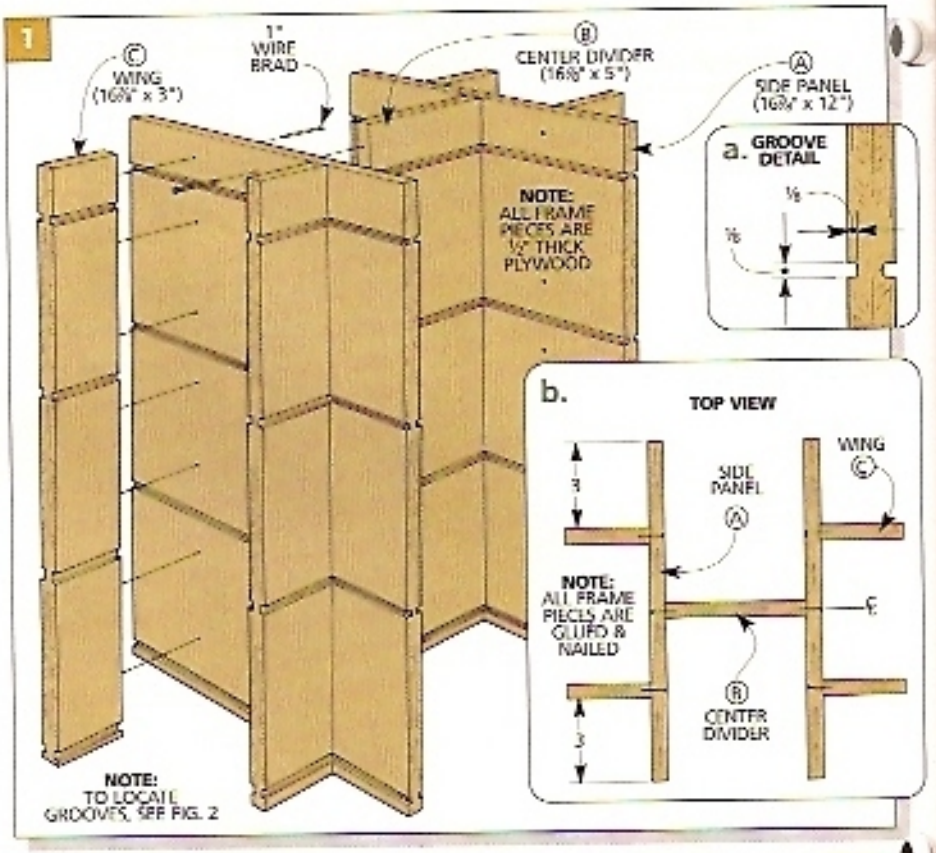
Now it's simply a matter of forming the grooves on both sides of the plywood *(Fig. 1a)*. The grooves are just shallow kerfs cut with the table saw.

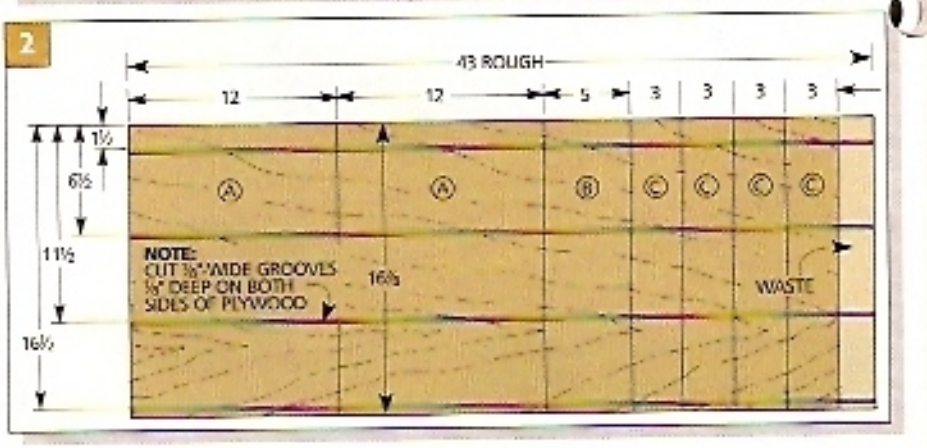
Note: In most cases, ⅛" hardboard will fit the width of a saw kerf. But before cutting the grooves in the plywood blank, make a cut in a scrap piece to test the fit.

To make sure the grooves line up on opposite faces, position the rip fence to cut the first groove. After making the cut on one face of the panel, flip the panel end-for-end and cut a matching groove on the opposite face. Then you can adjust the fence for the next groove and repeat the process.

CUT PIECES. Once the grooves are complete, cut the two side panels (A), a center divider (B), and the four wings (C) to final length *(Fig. 2)*.

Note: The length is the measurement running *with* the grain. So all the frame pieces are wider (16⅞") than they are long.





ASSEMBLY

At this point, the parts bin frame is ready to be assembled. To make it easy to fit wood fronts on the bin later, the idea is to make one side of the frame a mirror image of the other.

To do this, I started by gluing and nailing two wings to each side panel. And to make the job easier, I used a trick that will make sure the wings are positioned properly (see the Shop Tip at right). Another thing to consider, it's also important that the wings are square to the face of the side panels.

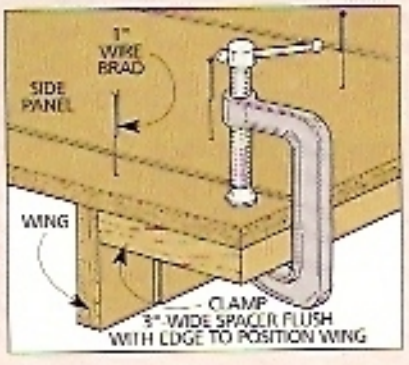
Once the wings are securely fastened to the side panels, glue and nail these two assemblies to the center divider.

SHOP TIP . . . . . Spacer Block

You could use a ruler to measure and mark the location of each wing, but that introduces several chances for errors.

Using a spacer solves that problem. Simply clamp it flush with the edge of the side panel, then press the wing against it.

A piece of scrap under the opposite end of the side panel will provide a stable and level surface while driving the nails.



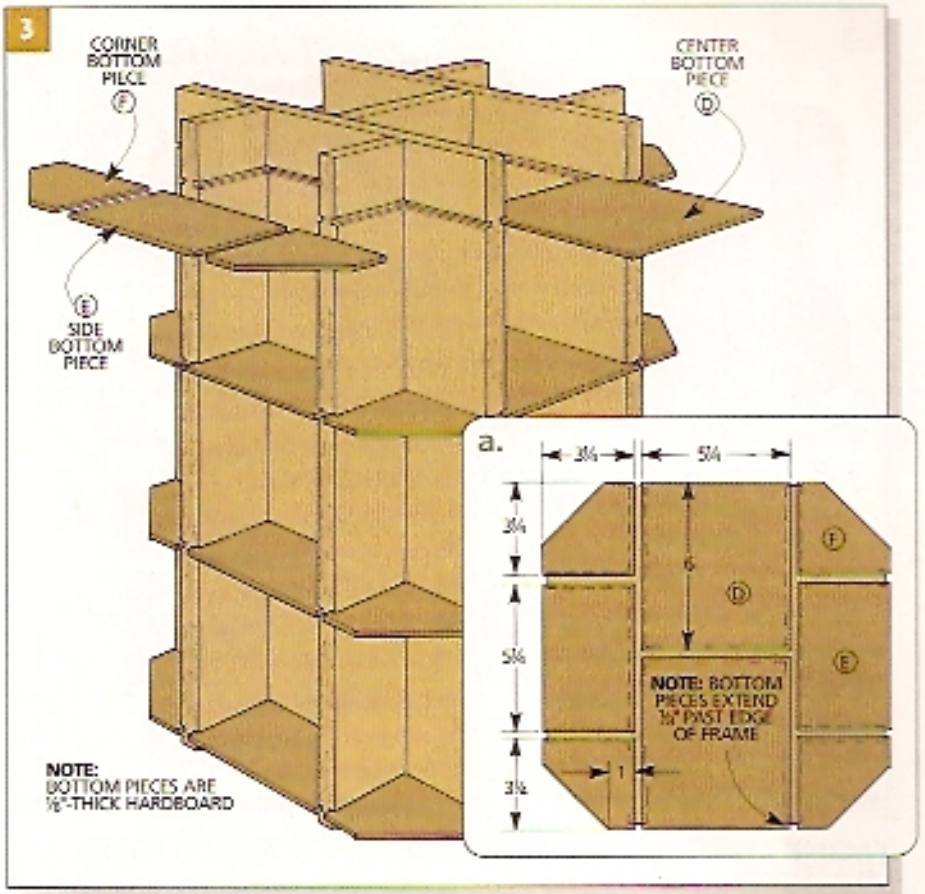
The center divider should be centered exactly along the lengths of the side panels *(Fig. 1b)*.

BOTTOM PIECES. With the parts bin frame complete, you're ready to add the bottom pieces *(Figs. 3 and 3a)*. Each tier has three different size bottoms, and each are made from 1/8" hardboard: two large center bottoms, two smaller side bottoms, and four corner bottom pieces *(Fig. 3)*.

Cutting the rectangular bottom pieces (D and E) is fairly straightforward *(Fig. 3a)*. They're cut to fit between the grooves and allow a 1/8" overhang at the front. (This overhang fits into a groove in the facing strips that are added later.)

ANGLED CUTS. But making the angled cuts on the small corner pieces (F) is a bit trickier. To do this safely, I used a simple sled that carries the pieces through the saw blade at a 45° angle (see the Shop Jig below).

After cutting all the bottom pieces, it's simply a matter of gluing them tightly into the grooves cut in the frame. I glued in all of the side and center pieces first, then finished up with the corner pieces.



SHOP JIG . . . . . Corner Sled

Cutting 16 identical corner pieces for the Revolving Parts Bin would be next to impossible without a jig to help you. This simple sled carries the piece past the blade, making it easy to form the 45° angle on one corner.

BASE. The base is just a 6"-wide piece of hardboard with two narrow strips attached to form a 90° corner. Start by cutting the base to size. Then rip a couple of 1"-wide hardboard strips that will be used to form the "cradle."

LAYOUT. Next, use a combination square to draw a layout line on the base at a 45° angle to one edge (see drawing). Glue one of the hardboard strips to the base, aligned with this mark. This is the first side of the cradle.

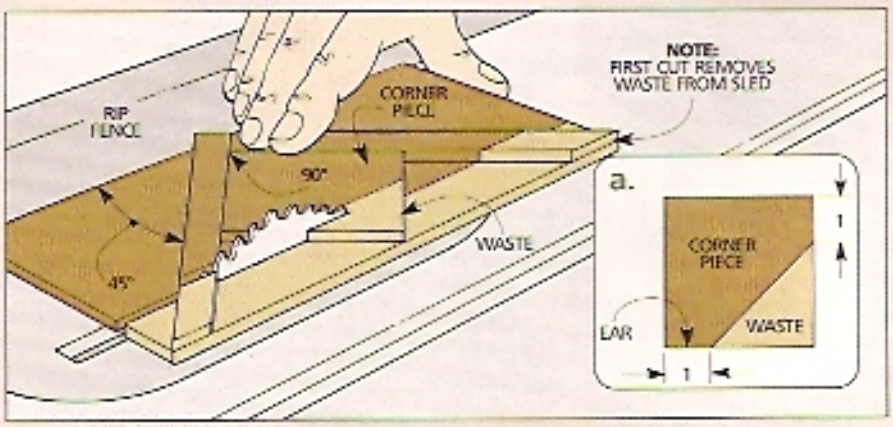
Once the glue is dry, use a square to position the second strip at a 90° angle to the first (see drawing).

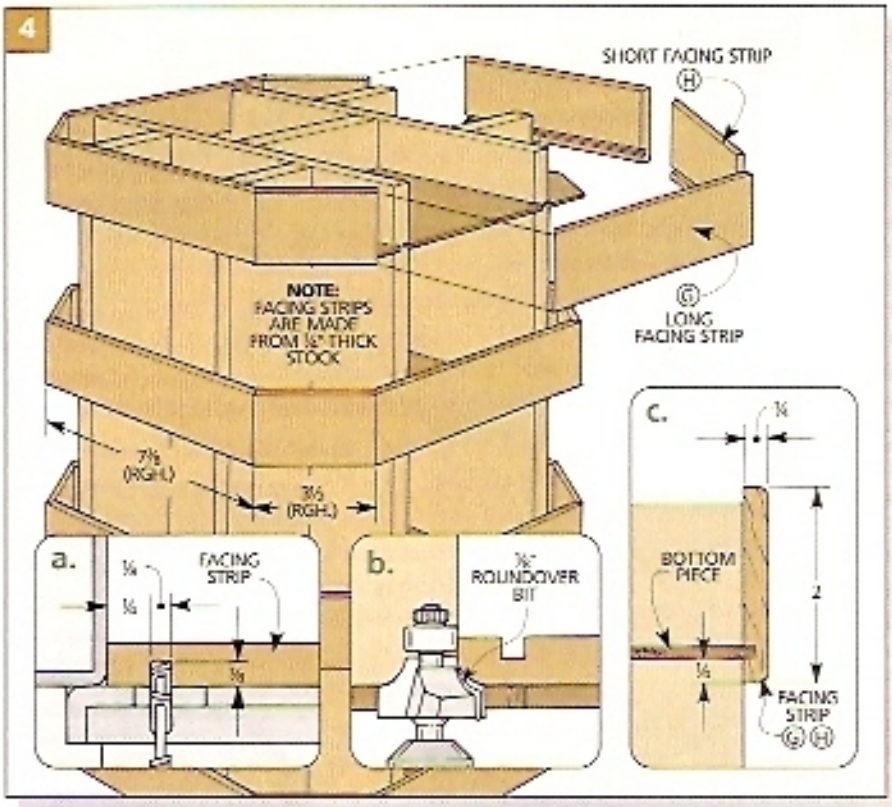
CUT BLANKS. To make the corner pieces, cut 16 square blanks (3¼" x 3¼"). You can check their size by dry-assembling the center and side bottom pieces (D, E) in the frame. The edges of the corner bottoms (F) should align with the edges of the side and center pieces (refer to *Fig. 3a* above).

CUT THE ANGLES. To use the jig, one side of the sled rides against the rip fence as the jig carries the corner piece past the saw blade (see drawing).

Setting the corner pieces in the sled automatically positions them so they're 45° to the saw blade. But you still need to adjust the rip fence to end up with two 1"-wide "ears" (see detail 'a').

What works well here is to start by taking an extra-wide cut. Then reposition the fence closer to the blade and sneak up on the final width of cut. (You'll be trimming the sled at the same time, but don't worry about this.) Once the fence is set, cut the corner pieces.





SHOP TIP

Hide Glue

There are a lot of facing strips to glue on to the parts bin. To provide more working time when positioning them, I used slow-setting liquid hide glue.

FACING STRIPS

At this point, the compartments have taken shape. To keep hardware from spilling out, each tier is "wrapped" with wood facing strips *(Fig. 4)*.

These strips are ¼" thick pieces of hard maple that are mitered on the ends where they come together. To fit over the bottom pieces, there's a groove on the inside face of each strip.

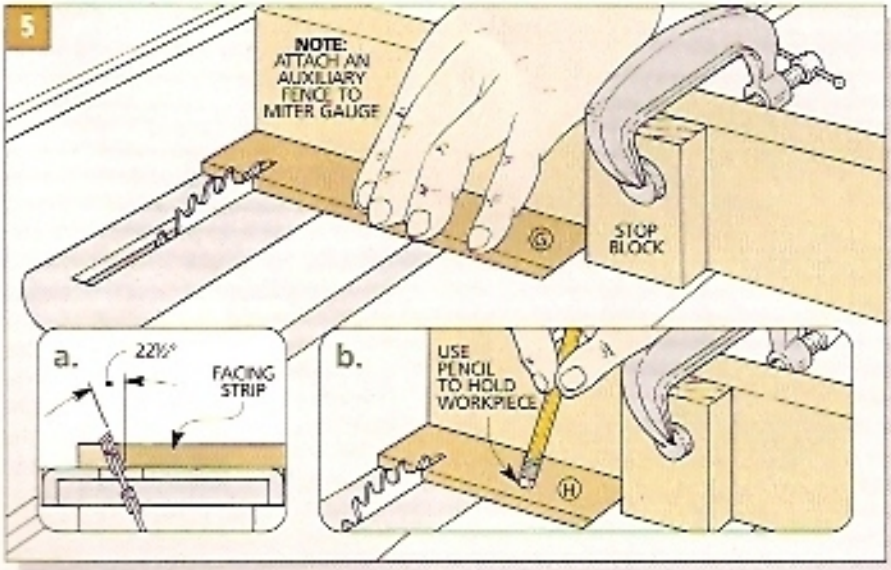
Here again, it's easiest to cut these grooves before making the individual strips. So start by ripping about 18 linear feet of ¼"-thick stock to width. This provides enough material for all the facing strips and a bit extra for making a couple of test pieces.

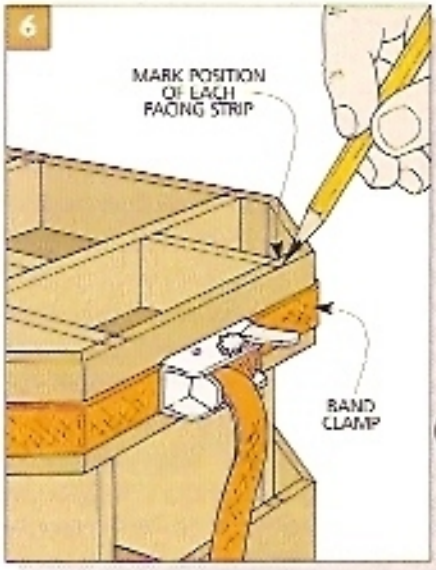
Now just cut the grooves to fit the bottoms *(Figs. 4a and 4c)*. Before cutting the facing strips to length, I softened the sharp corners on the outside by routing roundovers on the top and bottom edges *(Fig. 4b)*.

MITERS. At this point, you're ready to cut the miters on the ends of each of the facing strips. There are two things that affect the fit of these miters: the angle of the blade and the length of the strips.

ANGLE. Since there are eight strips on each tier, you'll need to tilt the saw blade to make a 22½° cut *(Fig. 5a)*. An easy way to check this angle is to cut miters on the ends of two test pieces. If they fit together tightly when held against the frame, you can concentrate on cutting the facing strips to length.

LENGTH. Each tier has four long facing strips (G) and four short strips (H) *(Fig. 4)*. Determining the length of these pieces to get a good fit all the way around each tier is a trial and error process. But it's easier than it sounds.





Rather than fitting them one by one, the idea here is to get all eight strips to fit together at the same time. To make this work, each long (or short) piece needs to be the exact same length.

To sneak up on the final length, I started by cutting all the strips $\frac{1}{8}$" longer than needed *(Fig. 4)*. Clamping a stop block to an auxiliary fence attached to the miter gauge ensures accuracy *(Fig. 5)*. And a pencil makes a handy hold-down *(Fig. 5b)*.

After test-fitting the strips (I used a band clamp to help hold them in place) you may need to trim off a bit. Just be sure you cut all the long (or short) pieces to the same length. Since you'll be trimming four pieces, make the adjustments very small.

Once you're satisfied with the fit, it's a good idea to mark the location of each strip *(Fig. 6)*. This makes it easy to reposition them during glue-up.

EDGING. With the facing strips in place, I covered the exposed plywood edges of the frame with thin strips of hardwood edging (maple) *(Fig. 7)*.

But cutting these small strips safely on the table saw can be a challenge. So I started by planing a wide workpiece to the same thickness as the plywood. Then after rounding over the edges *(Fig. 8a)*, I ripped a $\frac{1}{8}$"-wide strip so it falls to the waste side of the blade *(Figs. 8 and 8b)*. Then simply repeat the process until you have about ten linear feet of edging.

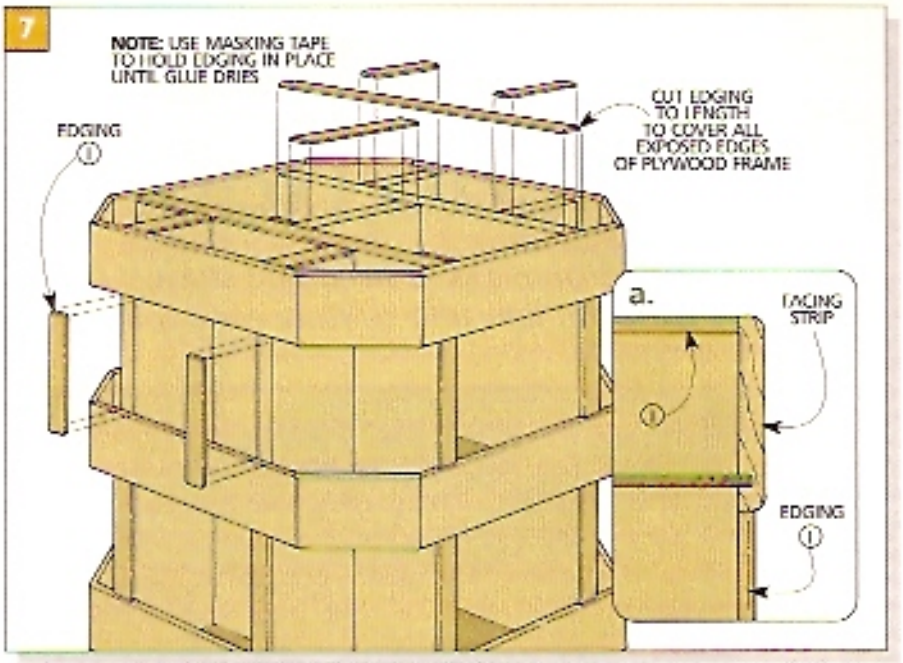
Now it's just a matter of cutting short pieces of edging (I) to fit and gluing them in place. Since it's difficult to clamp these pieces, I used masking tape to secure them while the glue dried.

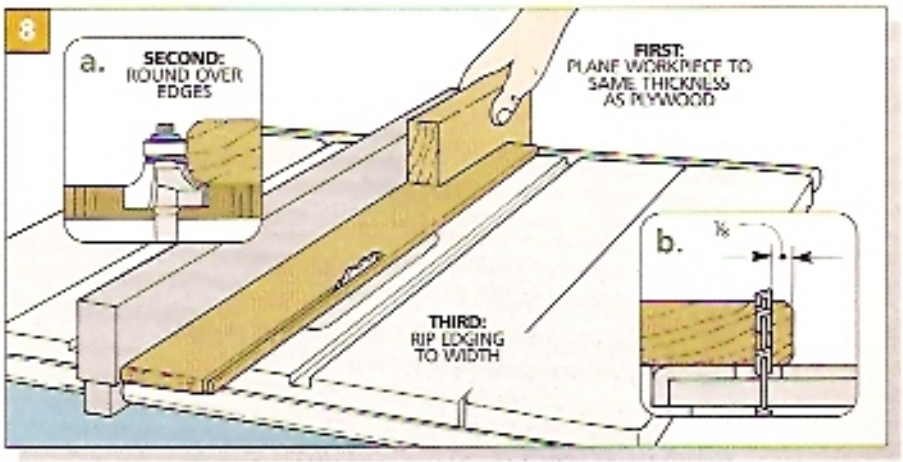
HARDWARE

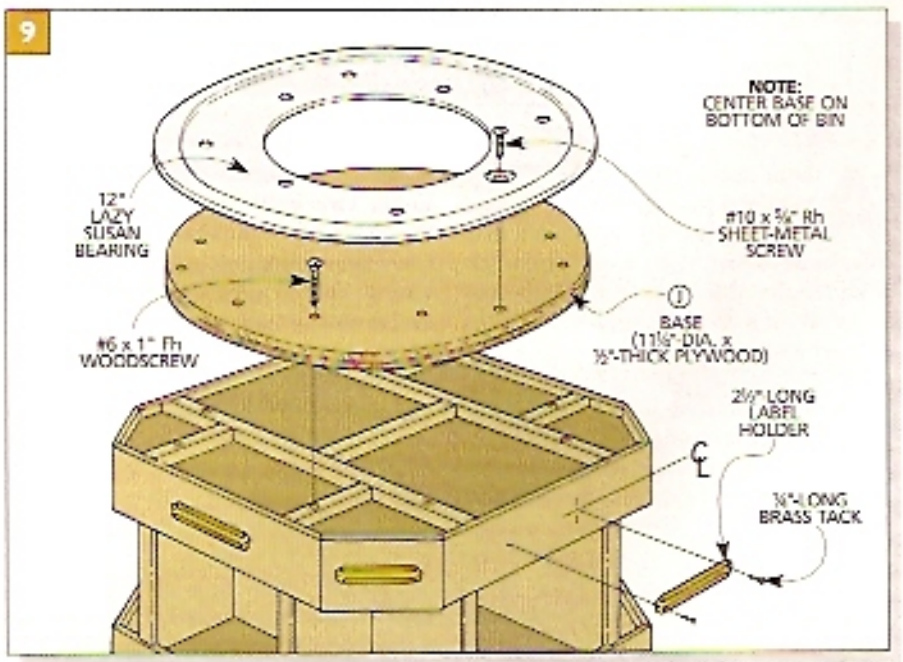
There are just two things left to do to complete the parts bin. Add a lazy Susan bearing so you can spin it around. And attach label holders to tell you what's inside each compartment.

LAZY SUSAN. To provide a mounting platform for the lazy Susan, an $11\frac{1}{4}$"-dia. plywood base (J) is screwed to the bottom of the frame *(Fig. 9)*. Then the bearing is screwed in place.

LABEL HOLDERS. Finally, brass label holders are tacked to the front of each compartment, centered on the compartment's width. But because you're going into hardwood, be sure to drill pilot holes first. ■







Overhead Racks

Turn unused space above your head into storage for your lumber supply. With t three easy racks, you'll be able to store even your longest stock out of the way.

About once a month or so, I have to take a full day to clean up and organize my workshop. It's usually the day after I've had trouble finding a particular tool (like my table saw) because it's buried under piles of lumber and cutoffs.

In a small shop, one of the reasons a mess starts to accumulate is because there is so little storage space — particularly for lumber. Most of my wall and floor space is already spoken for. As I mulled over the problem, I realized that just like a crowded city, sometimes the only way to go is up.

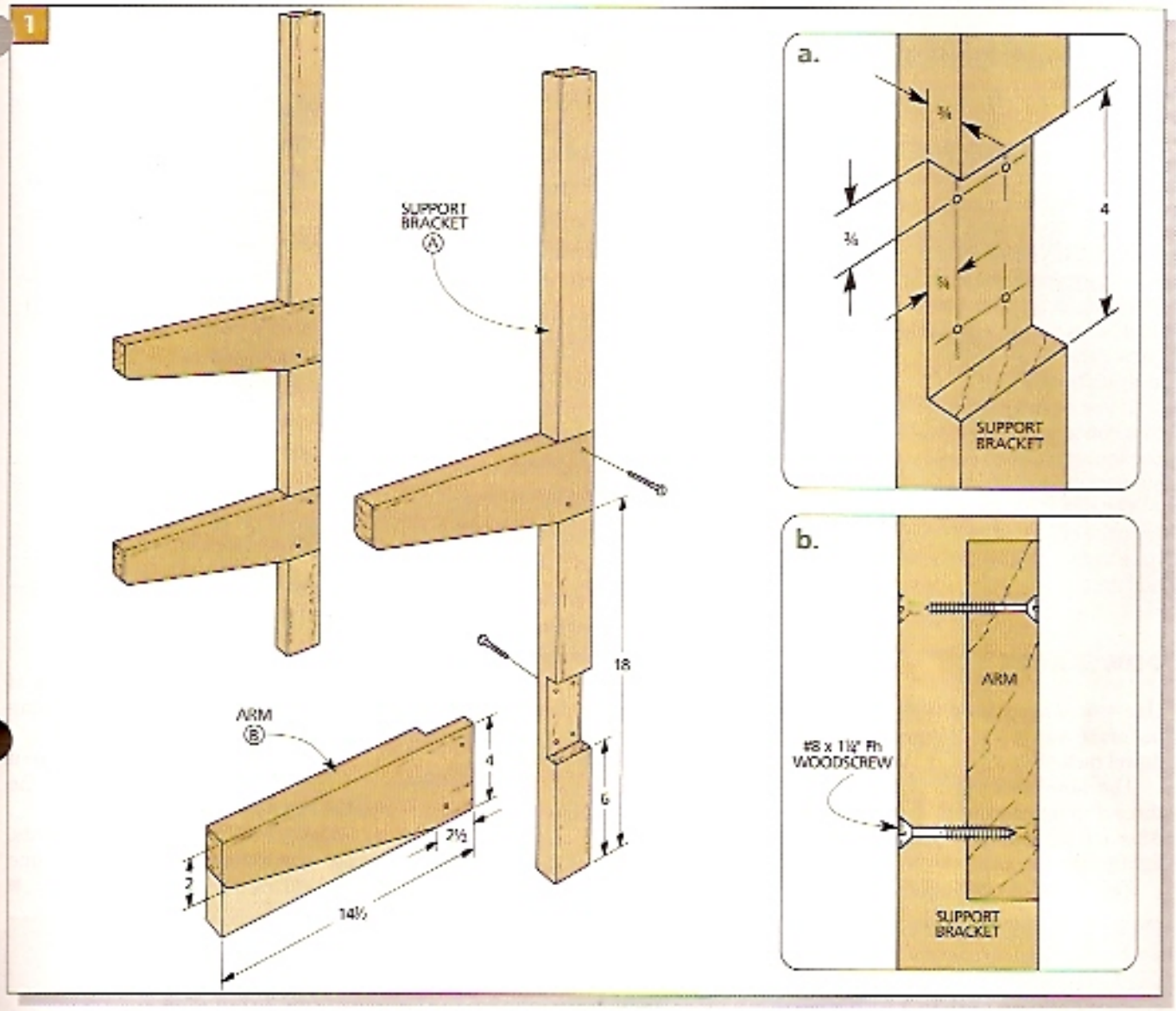
OVERHEAD RACKS. When you think about it, it's amazing how much storage space is available right above your head. This collection of simple racks is designed to hold your lumber in the space you aren't using above tools, your bench or anywhere else. And you can probably have all three built in an afternoon or evening.

LUMBER RACK. The first rack I built consisted of two pieces that looked like a couple of upside-down "Fs" (lower portion of photo). This rack is designed to hold longer lengths of lumber. (It's where I usually store my rough stock until I start a project.)

All the parts are cut from 2x6 lumber. The only hardware you'll need is a few screws, plus some lag screws or bolts to hang it. You'll need at le arms to start (as shown above). need to store longer stock, add a t even a fourth rack.

DOWEL RACK. The next storag I came up with was for my dowels (left in photo). It's just some sc of PVC pipe cut to length. You s be able to cut and mount this ra matter of minutes.

CUTOFF STORAGE. My last rack t the space between the exposed joi a place to keep my cutoffs and s lumber (top of photo). By spanni eral joists with a few cleats, I cre series of compartments, perfe sorting and storing cutoffs.



LUMBER RACK

The overhead lumber rack consists of three parts: a support bracket (A) and two identical arms (B) — all cut from "two-by" material *(Fig. 1)*.

The arms attach to the brackets with simple half-lap joints *(Fig. 1a)*. To cut this joint, I set up a ¾"-wide dado blade in my table saw. Set the height to exactly half of the thickness of the support bracket. Then, using the miter gauge to help guide the piece, make a pass to define the outside edge of each half lap. Finally, make several more passes to remove the waste.

Once all the half-laps are cut, the arms are cut to final shape and then glued and screwed in place *(Fig. 1)*.

Note: I drove in a pair of screws from each side *(Fig. 1b)*.

CUTTING DIAGRAM

1½ x 5½ - 48 (2.75 Bd. Ft.)

NOTE: CLEATS (C) USED FOR CUTOFF STORAGE RACK. SEE PAGE 28.

1½ x 5½ - 72 (4.1 Bd. Ft.)

MATERIALS LIST

WOOD

A	Support Brackets (2)	1½ x 2½ - 40
B	Arms (4)	1½ x 4 - 14½
C	Cleats (3)	¾ x 5½ - cut to fit

HARDWARE SUPPLIES

(6) No. 8 x 1" Rh woodscrews
(16) No. 8 x 1¼" Fh woodscrews
*(16) No. 8 x 1½" Fh woodscrews
*(4) ⅜" x 5½" lag screws
*(4 or 8) ⅜" washers
*(4) ⅜" x 4½" hex bolts
*(4) ⅜" nuts
(1) 6"-dia. PVC pipe, 12" long

*Actual quantity depends on mounting configuration. See page 28 for details.

DESIGNER'S NOTEBOOK

Secured to the wall or ceiling, the Lumber Rack keeps stock out from underfoot.

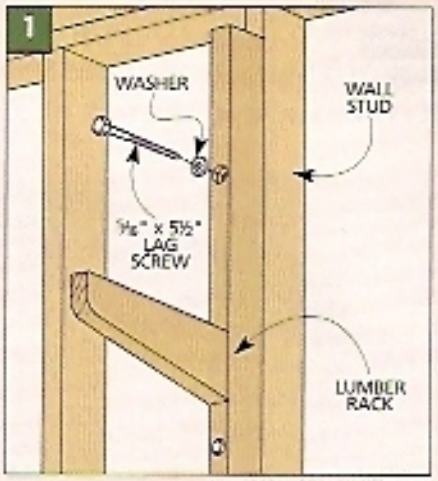
RACK MOUNTING OPTIONS

The lumber rack can be wall-mounted or fastened to exposed ceiling joists.

WALL. If you're mounting the rack to a finished wall, the first thing you need to do is locate the studs. Then drill pilot holes through the arms, and screw each rack to a stud with lag screws and washers *(Fig. 1)*.

If you're mounting the lumber rack to a concrete or block wall, be sure to use the appropriate anchors and bolts to support the weight.

CEILING. The rack can also be hung from the ceiling *(Fig. 2)*. For this, all you have to do is drill holes through the joists and the rack for bolts.



DOWEL RACK

One way to keep dowels organized and out of the way is with this joist-mounted dowel rack *(Fig. 2)*.

The dowel rack is nothing more than three 4"-long rings of 6"-dia. PVC pipe. After cutting the PVC with a hacksaw, lightly sand the sharp edges.

Finally, drill a couple of holes in each ring and then screw them in line to a ceiling joist *(Fig. 2a)*.

Note: To help me find the right size dowel, I use a marker to write the diameter on the end of the dowel.

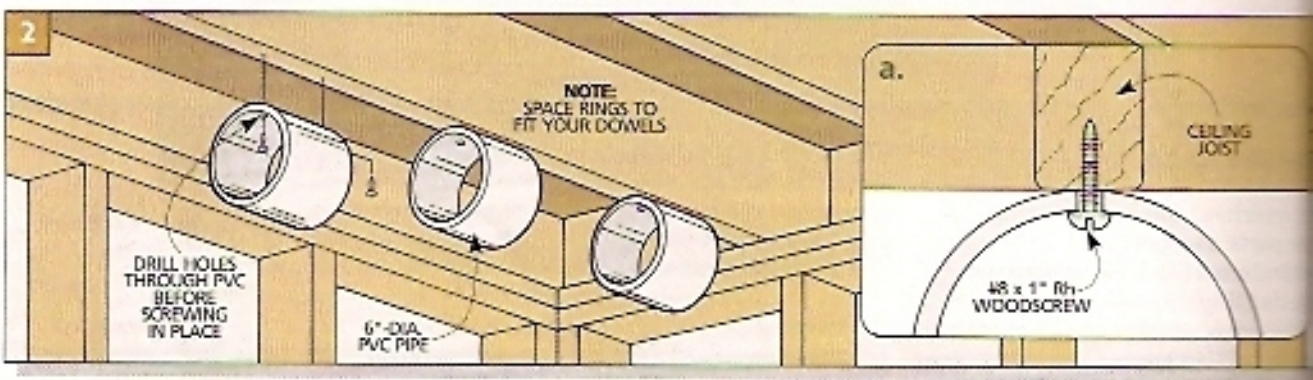
CUTOFF STORAGE

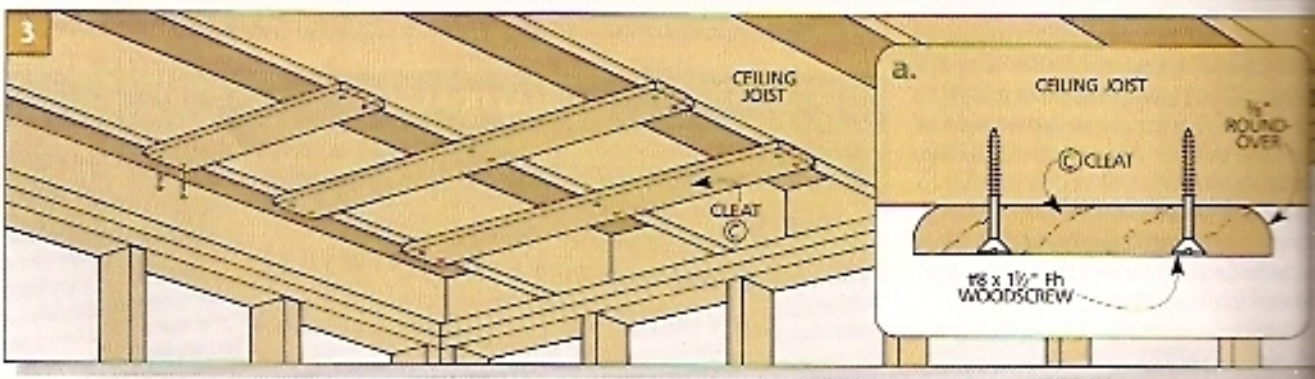
The third overhead rack takes advantage of the space between exposed joists to store and organize cutoffs.

The organizer is just several rows cleats screwed to the joists to form a tice *(Fig. 3)*. (I used 1x6s.)

To make it easy to slide pieces in, r ⅜" roundovers on the long edges of t cleats *(Fig. 3a)*.

When you're positioning the cle make sure to leave enough room at end to get the cutoffs in and out.





Wall-Mounted Bins

This shop storage system features removable bins so you can take them with you. Options include a handy tote to carry several bins at once, and a tape dispenser.

Storage that moves — that's the idea behind this system. Take a bin, hook it into strips mounted to the wall, or carry it right to your worksite. It couldn't be easier. But how do those bins stay in place?

RAILS. The hanging system may fool you at first glance. The bins don't actually hang from the wall. They sit on the rail below them. The rail above the bin simply traps the bin's back to keep it from falling forward. To remove a bin, just lift it slightly, then pivot the bottom out (see inset photo).

BINS. After seeing how many bins this system holds, your first question may be how to cut all those pieces. The secret is to set up an "assembly line" to cut all of the same-size parts one after another. To keep the total parts to a minimum, I limited myself to two bin sizes.

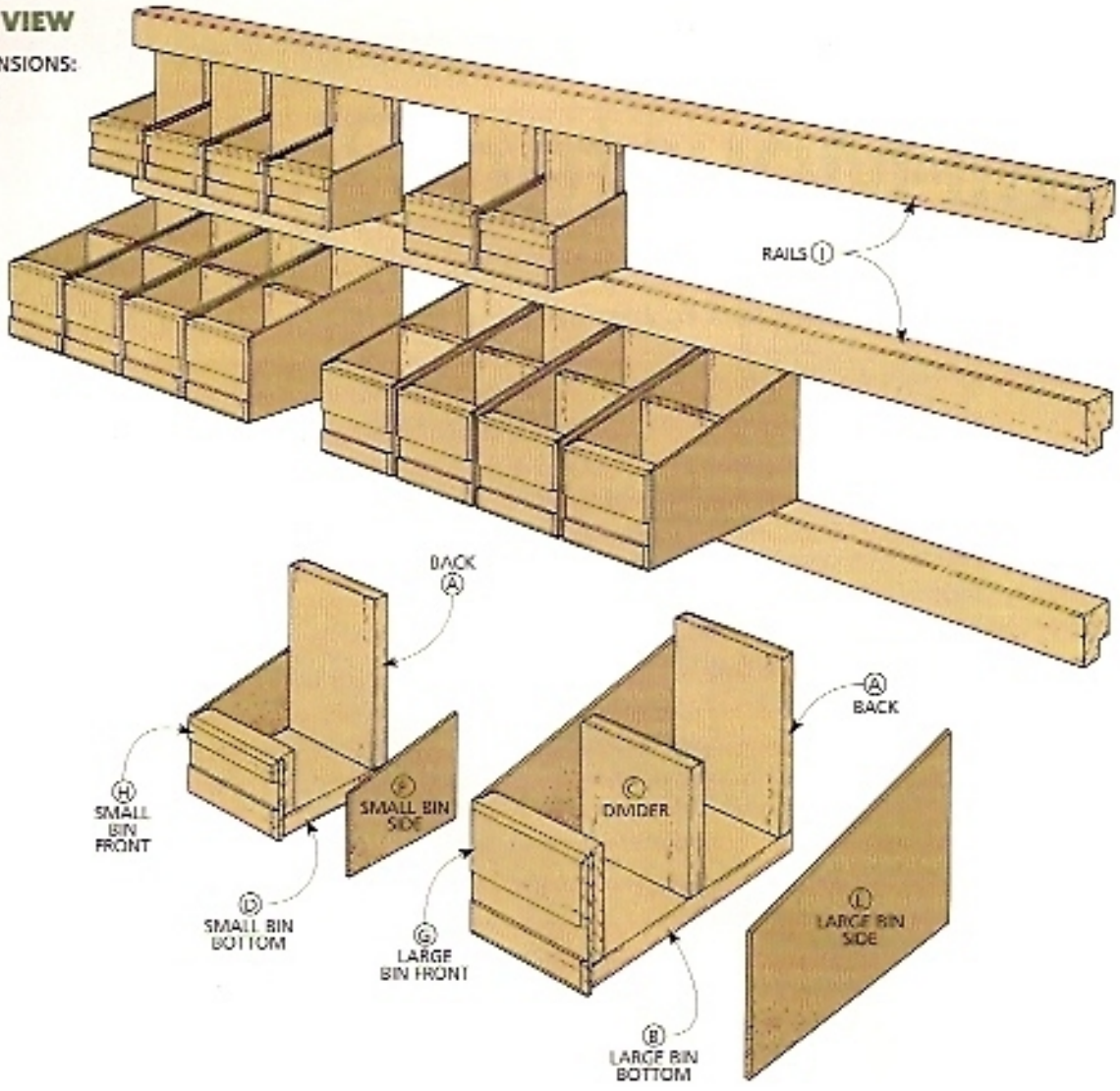
BUILD TO FIT. In addition to the organized storage, another benefit of the Wall-Mounted Bins is that you can size it to fit the space you have available.

ACCESSORIES. I designed this system so I could add accessories. The first one I built was a portable carrier to hold several bins. Then by modifying the design of one of the larger bins, I added a tool bin to the carrier. (These items are on the bottom row in the main photo above.)

Another option is to convert bins for specialized uses, such as holding rolls of tape. (My tape dispenser is on the left end of the second row in the main photo). The Designer's Notebook on pages 34 and 35 has more about building these accessories.

EXPLODED VIEW

OVERALL DIMENSIONS:
48W x 8D x 26H



MATERIALS LIST

WOOD

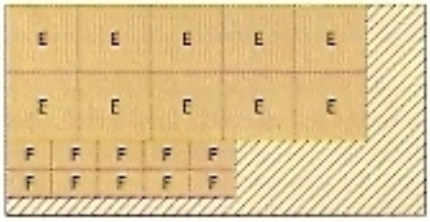
A	Backs (20)	½ ply - 3½ x 4⅛
B	Lg. Bin Bottoms (10)	½ ply - 3½ x 7¾
C	Dividers (10)	½ ply - 3½ x 3
D	Sm. Bin Btms. (10)	½ ply - 3½ x 3¾
E	Large Bin Sides (10)	⅛ hrdbd. - 4⁹⁄₁₆ x 7⅛
F	Small Bin Sides (10)	⅛ hrdbd. - 2⅝ x 3¾
G	Lg. Bin Fronts (10)	¾ x 3 - 3¾
H	Sm. Bin Fronts (10)	¾ x 2 - 3¾
I	Rails (3)	1½ x 1½ - cut to fit

HARDWARE SUPPLIES

(12) No. 8 x 3½" fh woodscrews
(440) ⅞"-long No. 18 brads

CUTTING DIAGRAM

⅛" HARDBOARD - 24 x 48



½" PLYWOOD - 24 x 48

¾ x 3½ - 48 (1.2 Bd. Ft.)

¾ x 3½ - 48 (1.2 Bd. Ft.)

1½ x 5½ - 48 (2.75 Bd. Ft.)

BOTTOMS & BACKS

Before making the bins, you have to determine how many of each size you want. To help you figure your needs, each bin takes about 4" of lineal wall space and each pair of rails is 7⅝" from top to bottom. Once you know how many bins you'll need, a plywood blank is cut for each bin.

PLYWOOD PIECES. For every large bin, it takes a strip of plywood about 16" long, and for every small bin a strip about 9" long (refer to the Cutting Diagram on the opposite page). Each strip is 3½" wide.

Here's your first chance to take advantage of a machine setup to cut a number of pieces. First, set up the table saw to rip the strips to finished width. Then cut them all to rough length.

Note: If you won't be using a divider in a long bin, the strip for that bin only needs to be about 13" long.

After cutting all the strips you need for the bins, each long strip is cut into a back (A), bottom (B), and the optional divider (C), while each short strip is cut into a back (A) and bottom (D) (see the Cutting Diagram on the opposite page). Here again, once I was set up to make a cut, I cut that piece for each bin. Then I set up for the next piece.

SIDES

Once all the plywood pieces were cut to size, I stacked them up and moved on to the sides (E, F). The sides are cut from blanks of ⅛"-thick hardboard *(Fig. 1)*.

BLANKS. First, cut enough blanks to size. (You'll need one blank for each bin.) Then the blanks are cut into two pieces to form the tapered sides.

The tricky part is cutting each side to exactly the same size while keeping your fingers away from the saw blade.

STOP BLOCK. To solve this problem, I made a combination stop block and hold-down (see the Shop Tip at right). The stop block/hold-down is clamped to an auxiliary fence that's screwed to the miter gauge *(Fig. 2)*.

CUT THE SIDES. To cut the tapered sides, first set the miter gauge to make a 10° cut. (The angle isn't critical. Just try to get it close.)

Then position the stop to cut the correct width (3" for the large bins, 2" for the small bins) at the short end of the side piece *(Figs. 2 and 2a)*. An easy way to do this is to make a cut through the auxiliary fence first. You can then measure from the kerf in the fence to the shoulder of the rabbet in the stop block.

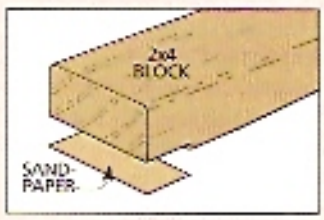
Now you can cut one side piece off the blank, then rotate the blank and cut the mating side piece *(Fig. 2b)*.

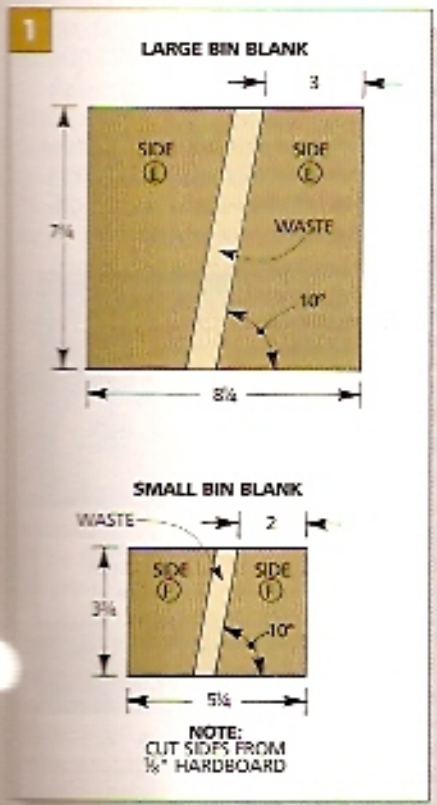
To help me orient each blank properly for the second cut, I marked an "X" in the opposite corner *(Fig. 2)*.

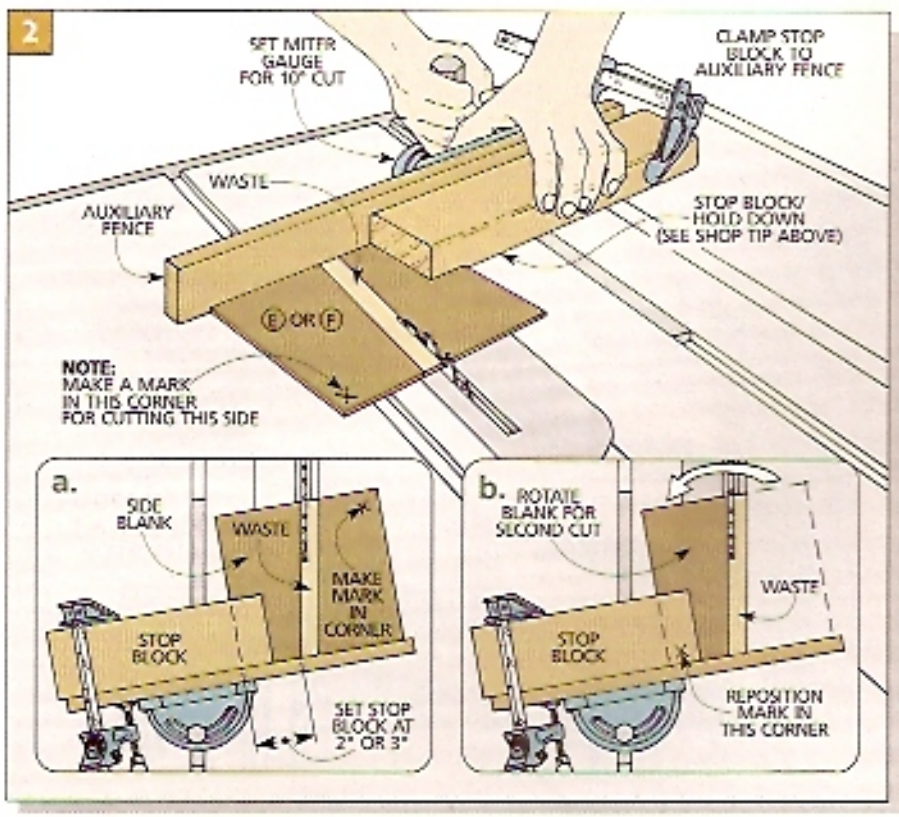
SHOP TIP
Stop Block

To make a combination stop block and hold-down, cut a shallow rabbet in a scrap of 2x4 (see drawing). So the block presses down firmly on the stock, the rabbet's depth should be just a hair less than the thickness of the hardboard you'll use for the bin sides.

Then, for an even better grip, glue a strip of medium grade (100 grit) sandpaper into the rabbet.







BIN FRONTS

The only other pieces needed for the bins are the fronts (G, H). (I used pine, but any ¾"-thick stock will do.)

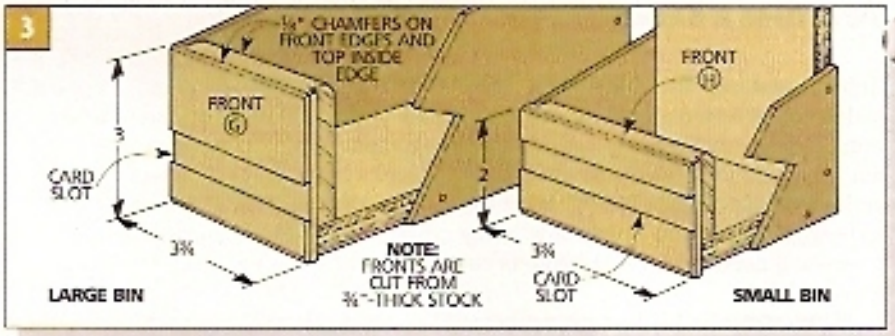
CUT STRIPS. The fronts are cut from strips that are 2" wide for the small bins or 3" wide for the large bins *(Fig. 3)*.

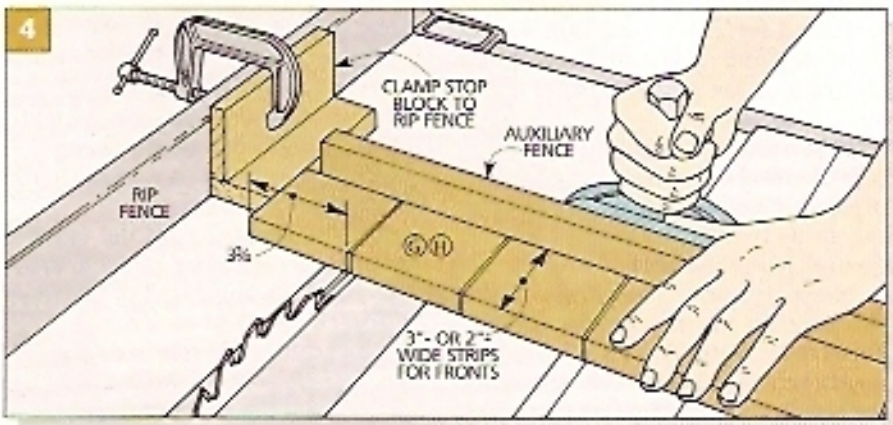
DETERMINE LENGTH. After the strips are ripped to width, cut the fronts to finished length. To determine the length of the fronts, measure the width of a bin bottom (3½"). Then add the combined thicknesses of both side pieces (¼"). (In my case, the fronts are 3¾" long.)

CUT TO LENGTH. To cut all the fronts to the same length, I clamped an L-shaped stop block to the table saw rip fence *(Fig. 4)*. This provides clearance so the cutoff won't bind between the rip fence and the saw blade.

RABBETING. After the fronts are cut to length, they're rabbeted to accept the sides and the bin bottom *(Fig. 3)*. To do this, attach an auxiliary fence to the table saw rip fence. Then set a dado blade to cut a rabbet ½" deep and wide enough to match the thickness of the sides (⅜") *(Fig. 5a)*.

Note: To support the workpieces while cutting the rabbets, I use a large push block *(Fig. 5)*.

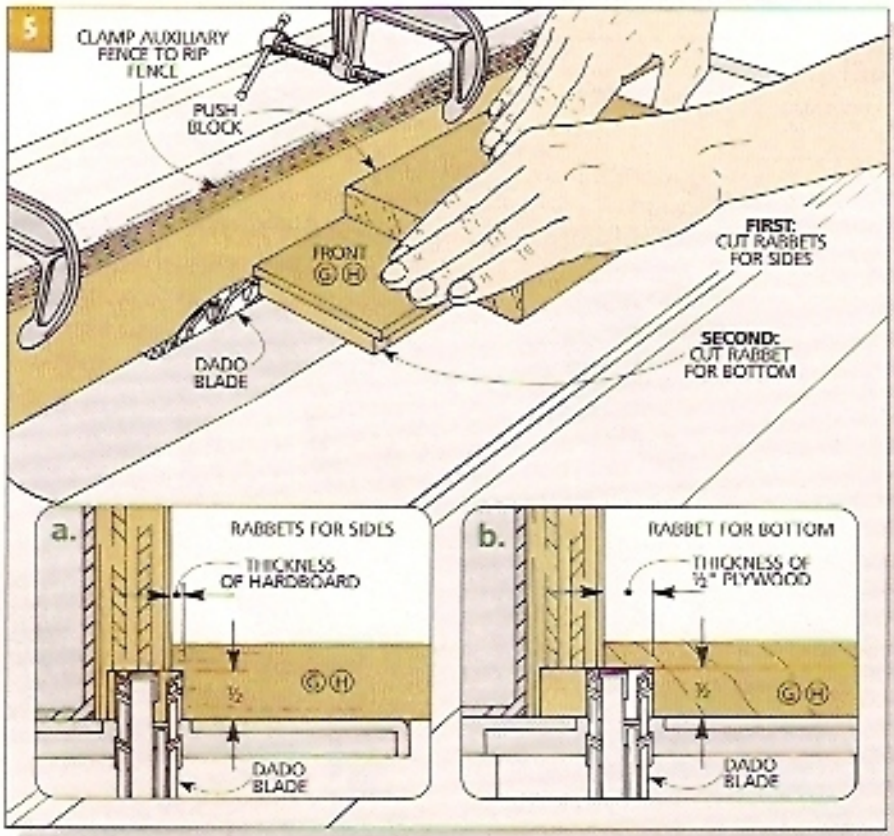




Next, reposition the fence and cut another rabbet wide enough to fit over the bottom *(Fig. 5b)*.

CHAMFERING. I cut small chamfers on the four outside edges of the bin fronts to soften all the sharp edges. I also chamfered the top inside edge *(Fig. 3)*.

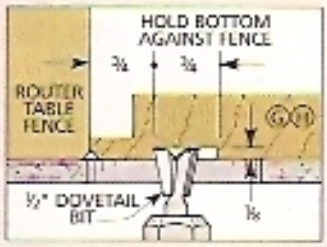
CARD HOLDER. Finally, I routed a slot across the front of the bin to hold a cardboard label (see the Shop Tip below).



SHOP TIP

Label Slots

The slanted sides of a slot cut with a dovetail bit will hold a label. The width isn't critical. Just cut your labels to fit.



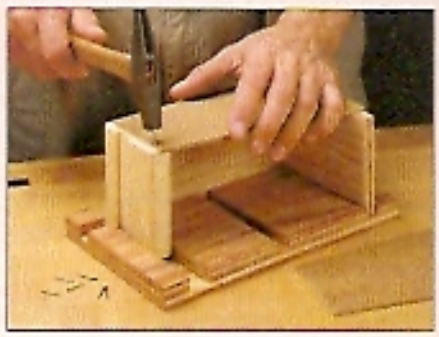
SHOP JIG . . . . . Assembly Jig

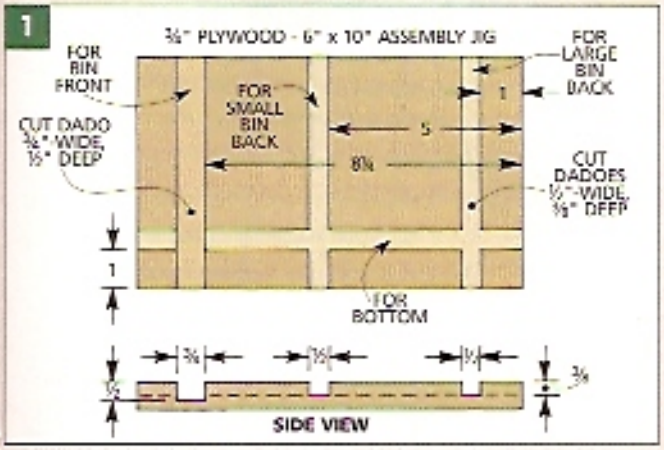
Assembling a large number of bins can be tedious work. It's easier and faster if you have a jig to hold the front, bottom, and back of the bin in place while you glue and nail on one of the sides (see photo).

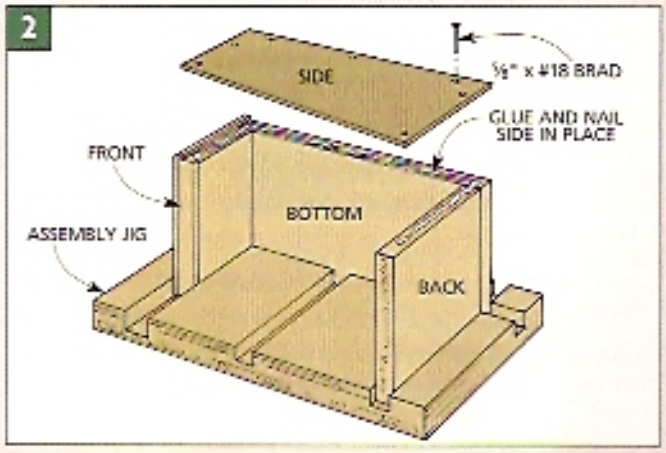
To make the jig, start by cutting a scrap piece of ¾"-thick plywood to size *(Fig. 1)*. Then, cut a ⅜"-deep groove to hold the bin's bottom. Next, cut two ⅜"-deep dadoes to position the backs of a large and small bin *(Fig. 1)*. Finally, cut a ½"-deep dado to hold the bin's front. (The extra depth accounts for the lip on the outside edge of the bin front.)

To use the jig, insert a front, back, and bottom. Then glue and nail on one of the sides so it's flush with the bottom of the bin *(Fig. 2)*.

To complete the bin, simply remove it from the jig, flip it over and glue and nail on the remaining side.







ASSEMBLY

Now that you've got dozens of parts stacked up in the shop, you're ready to assemble them to make the bins.

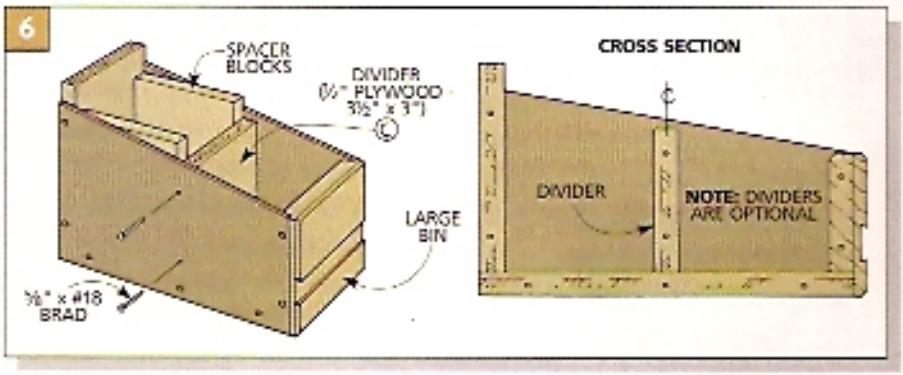
Assembly is really very easy — the pieces are just glued and nailed together. The only thing you might want to do is to make a couple of spacer blocks to help center the dividers in the large bins *(Fig. 6)*.

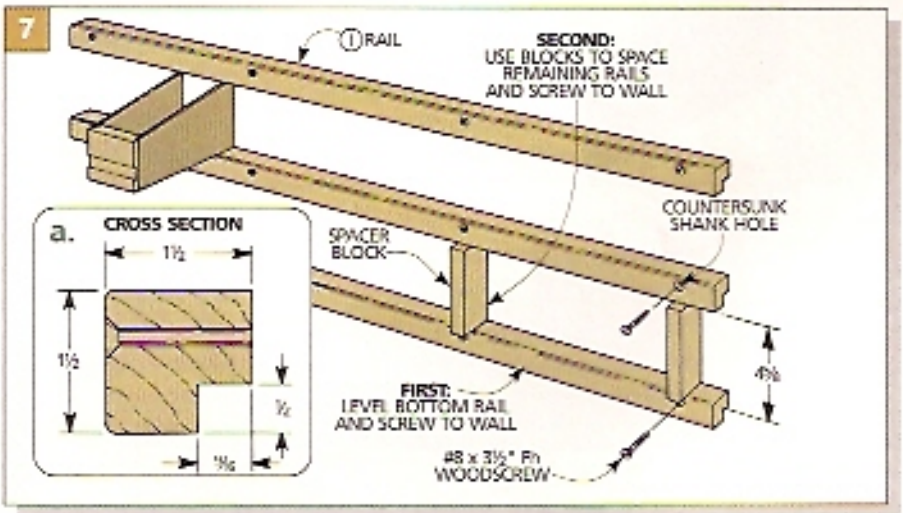
Note: If you're assembling quite a few bins, the assembly jig shown above is a real timesaver.

RAILS

The bins are mounted to rails made from lengths of 2x6 stock, ripped 1½" wide. The length of the rails is determined by the number of bins you want. (The rails shown in the photo on page 37 are 48" long.)

To form the retaining lip for the bins, cut a rabbet in the bottom back edge of each rail *(Fig. 7a)*. After the rabbets are cut, screw the rails to the wall, spacing them 4⅝" apart. It's important that the rails are parallel, so here again, a spacer block is handy *(Fig. 7)*. ■





DESIGNER'S NOTEBOOK

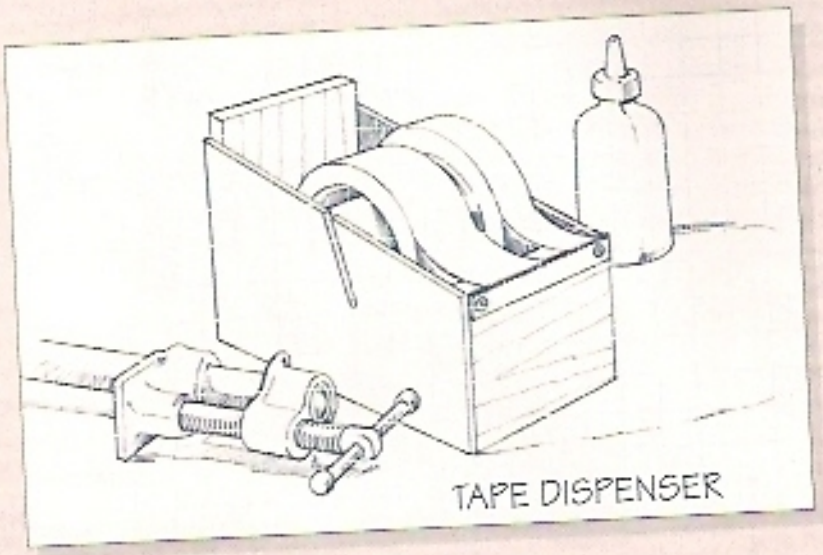
A few simple modifications turn a bin into a handy Tape Dispenser. Then build a Bin Carrier and Tool Bin to take hardware and even a few tools to your work.

TAPE DISPENSER

■ Start by cutting a plywood back piece (J), two hardboard side pieces (E), and the solid wood front (G) to size *(Fig. 1)*. (There is no bottom in the bin.)

■ When rabbeting the front piece, you only need rabbets for the sides.

■ Now cut a slot in each side for a dowel that holds the tape in place *(Fig. 1)*. Then glue and nail the bin together.



MATERIALS LIST

TAPE DISPENSER

J Dispenser Back ½ ply - 3½ x 4⅛
K Center Block 1½ x 2¼ - 2¼
Note: Also need two parts F, one part G.

HARDWARE SUPPLIES

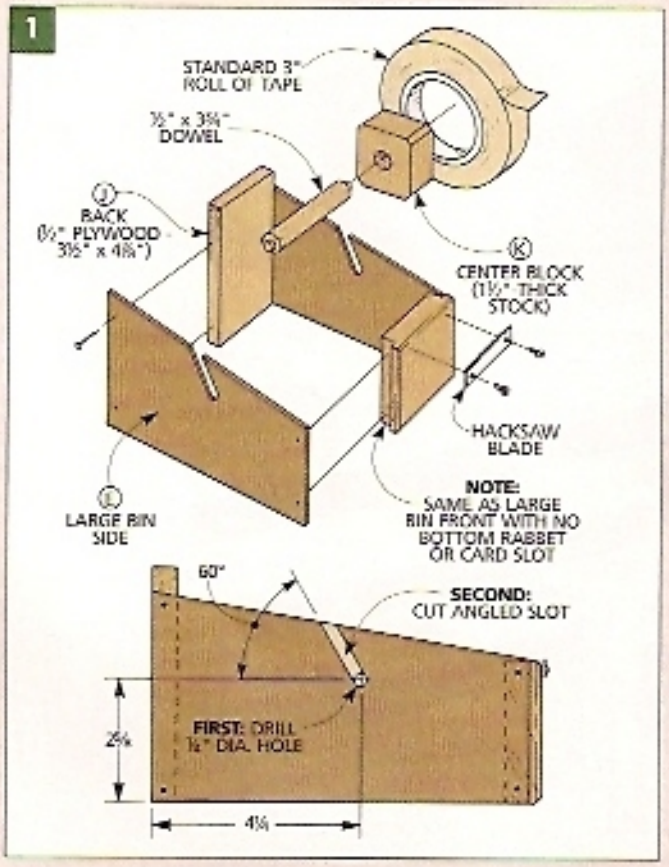
(2) No. 6 x ½" Rh woodscrews
(8) ⅝"-long No. 18 brads
(1) ½"-dia. dowel, 3¾" long
(1) Hacksaw blade

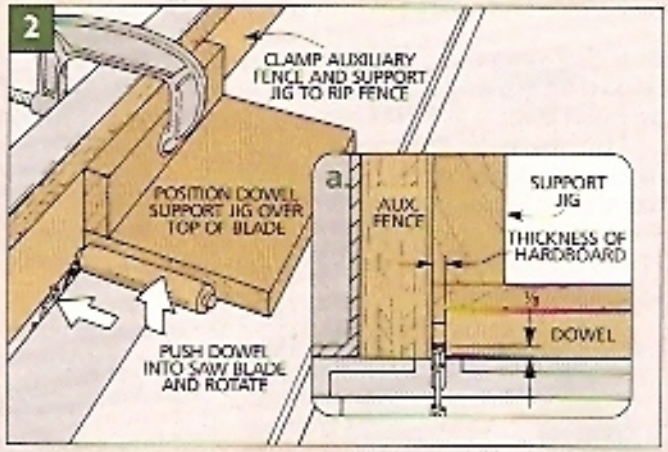
■ The dowel's length is the same as the outside width of the dispenser (3¾").

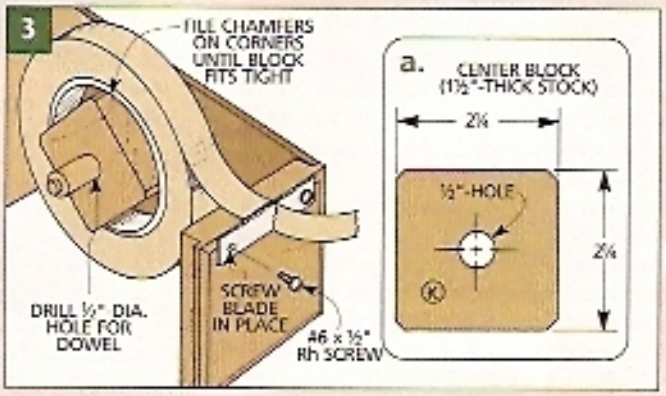
■ Cut a tenon on each end of the dowel that fits in the angled slots. To do this, clamp an auxiliary fence and a support jig to the table saw rip fence *(Fig. 2)*.

■ Next, cut a center block (K) from a square piece of stock *(Fig. 3)*. Chamfer the corners until it fits tight inside a roll of tape, then drill a hole for the dowel.

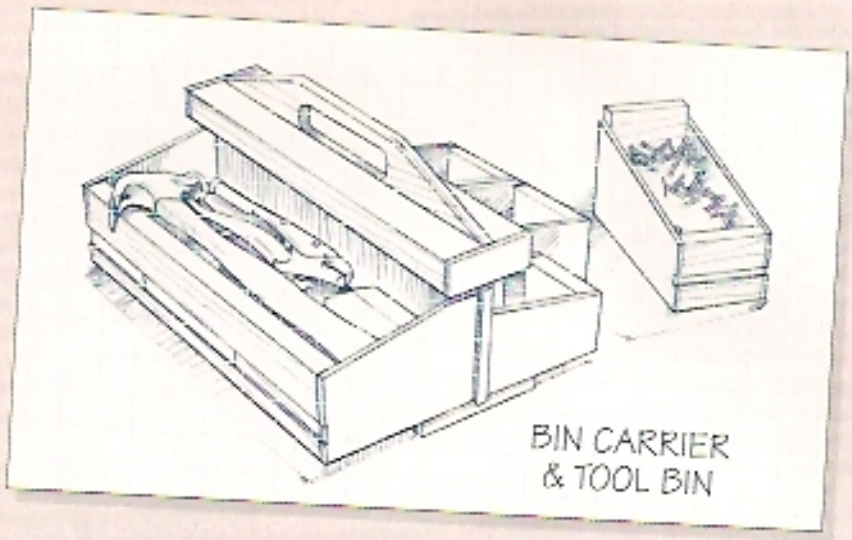
■ Finally, screw a short hacksaw blade to the front of the dispenser *(Fig. 3)*.







BIN CARRIER/TOOL BIN



■ This carrier provides a convenient way to hold up to eight bins at once. An extra-long tool bin fits on one side (see drawing at right).

■ The carrier consists of three main parts: a center divider (L), a base (M), and the rails (N) *(Fig. 4)*.

■ The first step is to make the divider (L) from ½" plywood. The length of the divider determines the number of bins you can carry. I made mine long enough to hold up to four bins on each side (15¾") *(Fig. 5)*.

■ After determining the length, cut the divider to shape *(Fig. 5)*.

■ Next, drill ⅜"-dia. holes in each corner of the handle and cut out the handle opening *(Fig. 5)*. Ease the sharp edges with a light sanding.

■ After the divider is complete, you can make the base (M). This is a piece of ½" plywood cut to the same length as the divider (15¾") *(Fig. 4)*. Then rip the base to a finished width of 4⅞".

■ After the base is cut to size, cut a ⅛"-deep groove down the center to hold the divider (L) *(Fig. 4)*.

■ Before assembling the carrier, a rail (N) is cut to fit on each side. These rails are identical to the rails for the Wall-Mounted Bins, except that their length matches the length of the divider. Rout a rabbet on the inside edge of each rail to hold the bins (refer to *Fig. 7a* on page 41). Then glue them in place on the divider *(Fig. 4)*.

■ Now, assemble the carrier, and glue and nail on a couple of end caps (O) made from ⅛" hardboard *(Fig. 4)*.

■ Another option is to make a long bin to hold hand tools. This bin is built to fit on one side of the carrier. (It can also hang on the wall strips.)

■ The tool bin is made just like a large storage bin, except it has a longer back (P), front (Q), and bottom (R) *(Fig. 6)*. Two large bin sides (E) are also used.

MATERIALS LIST

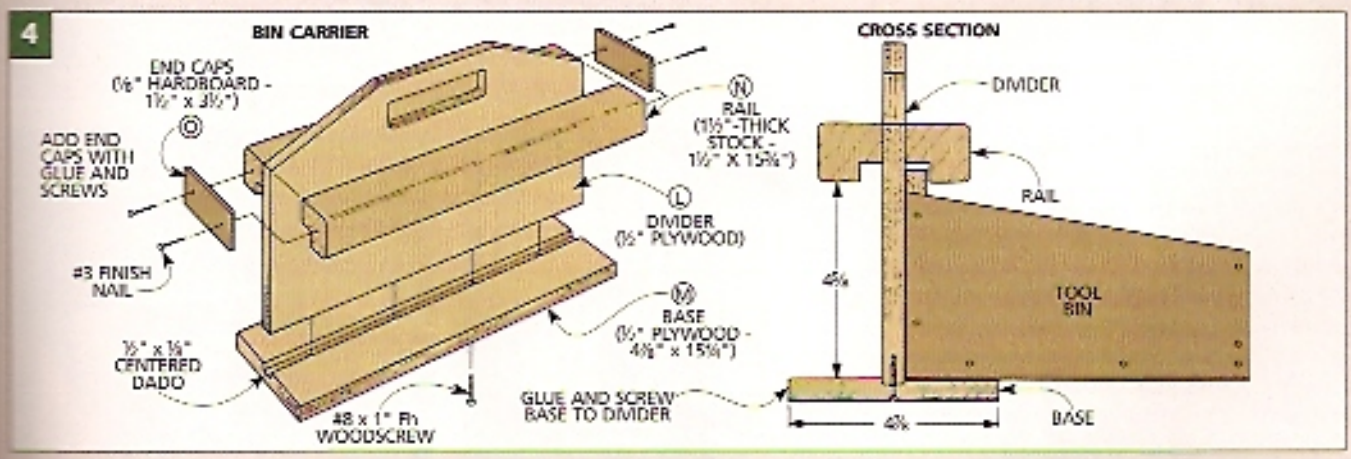
BIN CARRIER & TOOL BIN

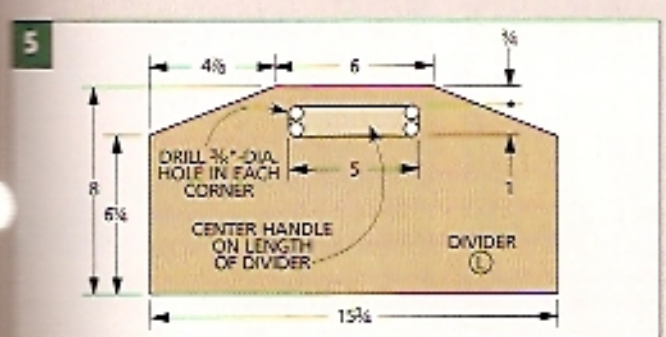
L	Divider (1)	½ ply - 8 x 15¾
M	Base (1)	½ ply - 4⅞ x 15¾
N	Rails (2)	1½ x 1½ - 15¾
O	End Caps (2)	⅛ hdbd. - 1½ x 3½
P	Tool Bin Back (1)	½ x 15½ - 4⅛
Q	Tool Bin Front (1)	¾ x 15¾ - 3
R	Tool Bin Btm. (1)	½ ply - 15½ x 7¾

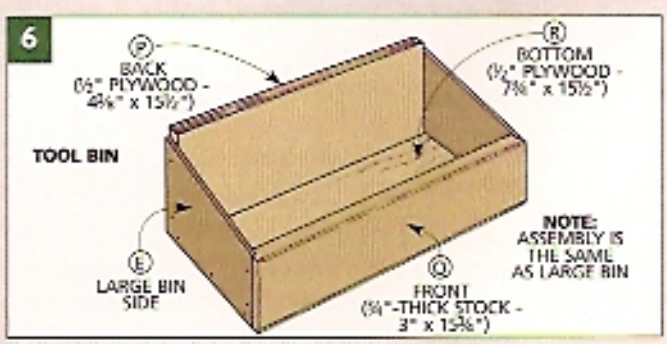
Note: Also need two parts E.

HARDWARE SUPPLIES

(4) No. 8 x 1" Fh woodscrews
(4) No. 3 finish nails
(14) ⅝"-long No. 18 brads







SHOP INFO ....Controlling Shop Dust

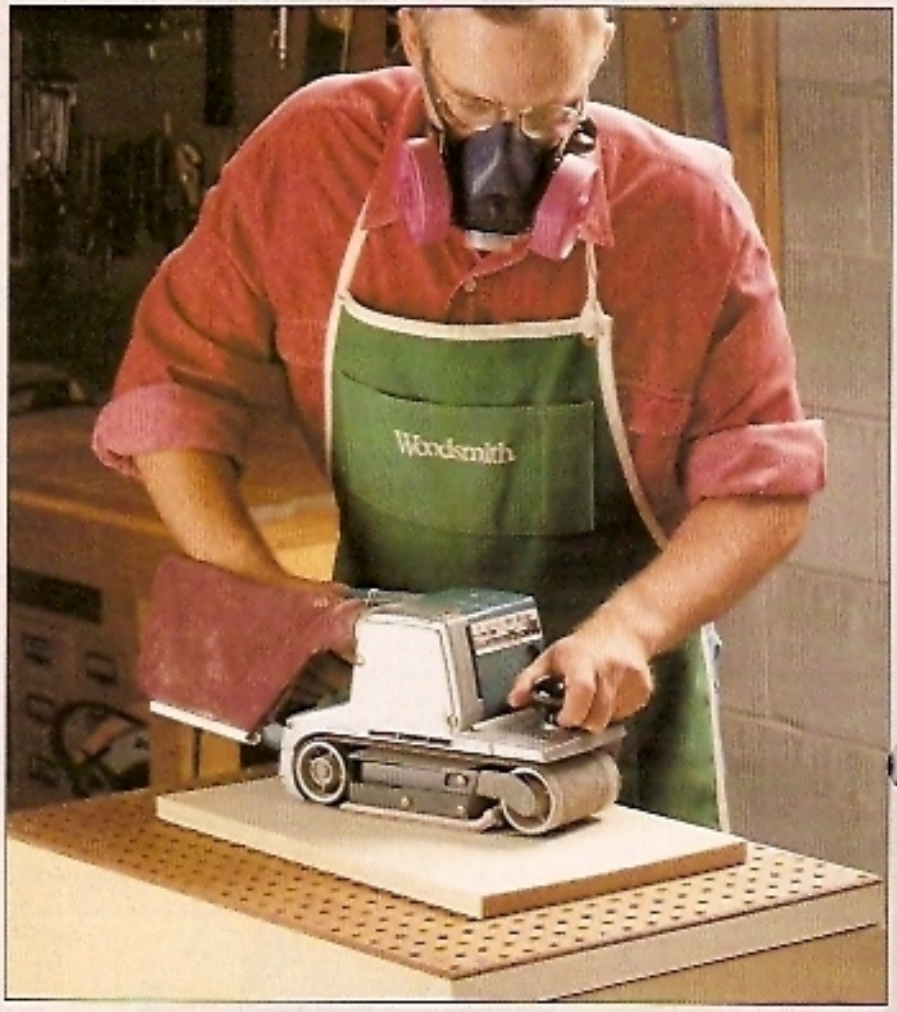
Every now and then, I receive a disheartening letter from an avid woodworker who had to hang up his or her tools because of a respiratory problem caused by sawdust.

Dealing with dust in the shop is one of the toughest problems facing a woodworker. And when the workshop is small, the problem is compounded. In just seconds, a power tool can kick up dust in the shop just like the snow that swirls around inside a glass paperweight. So protecting yourself and your tools is a constant problem that must be dealt with effectively and consistently.

TWO PROBLEMS. One thing that makes dealing with sawdust in workshops located in a small home such a challenge is that you're actually faced with two different problems.

First, you'll need to find a way to handle the mess that the tools create. From the large chips your jointer or planer produces to the dust a table saw or radial arm saw kicks up. And don't forget the fine dust generated by a power sander, which ultimately ends up coating everything in your shop.

Second, you'll need to develop a strategy for keeping harmful dust out of your lungs. Fortunately, there are a number of simple (and some surprisingly economical) ways to take care of both of these problems.



CONTAINING DUST

It's no surprise that the most common solution to containing dust is to use a small dust collection system. You can pick from a wide variety of quality single or two-stage collectors, like the one shown at right. With a little advance thought, it's often possible to pick a central location in the shop that can service the majority of your tools.

The disadvantage to these systems is that they take up a lot of valuable space. And they range in price from $300 to $800 or more (not including the hook-ups and pipe).

SHOP VACUUM. A more economical option is to purchase several small shop vacuums (approximately $50 to $100) and dedicate each one to a single machine (see far right photo). To make this setup even more convenient, you can purchase an automated switch from many

Dust Collector. *If you have room, a dust collector is one of the most effective ways to contain dust in a small shop.*

Shop Vacuum. *Another solution is to dedicate an inexpensive shop vacuum to each sawdust-producing machine.*

mail-order woodworking catalogs (see sources on page 112). This switch turns on the vacuum for you automatically whenever you power up the tool.

HOOK-UPS. Besides handling your stationary tools, there's another advantage to a shop vacuum or dust collector. You may be able to hook them up to one of the largest dust producers in the shop — power sanders.

Many sanders offer a vacuum hook-up (see photo at right). Or a dust bag (see top photo on opposite page). If your model doesn't have either, see if they're available separately. If not, you can upgrade to a sander with built-in vacuum assist (see photo at right). These sanders pull dust up through holes in the sandpaper. They're effective and highly portable.

FILTERING DUST

Even the best dust collection system won't filter out all the dust. And it's this fine dust that will coat both your shop and the inside of your lungs.

FAN AND FILTER. One of the simplest and most economical ways to capture airborne dust is to pull it into a fan with a pleated furnace filter strapped over the intake (see photo below). Just position the fan near the source of the dust.

Note: To further increase the efficiency of your dust filtering, try using two separate fans — one to blow the dust into the other.

FILTER UNIT. Another option is to purchase (or build) a filter unit to clean the air whenever you're working in the shop. Here again, one of the simplest methods is to use an inexpensive fan with a pleated filter.

The more sophisticated filter units can be moved around the shop where the dust is being produced. Or you can hang them from the ceiling over a particularly bothersome dust source (see photo below).

Note: You don't have to buy an expensive filter unit to contain shop dust. The article starting on page 38 explains how to build your own Shop Air Filter. It features three pleated furnace filters. Each filter traps more and more dust until clean air is exhausted back into the shop.

DUST MASKS. Whether or not you decide to live with a layer of sawdust in your shop, you can still protect your lungs by always using a good quality dust mask (see photo at bottom right and sources on page 112). When buying one of these, it's a good idea to pay a little more for a system that has replaceable canisters that can filter both sawdust and chemical fumes (around $50). These normally offer better protection than an average disposable mask.

DUST HELMET. A dust mask will keep the dust out of your lungs but not out of your eyes. For complete protection from dust, you may want to consider a dust helmet.

Recent advances in technology have allowed many manufacturers to produce lightweight self-contained units that are surprisingly comfortable (see photo at right). Although they cost considerably more than a dust mask (around $300), they do an excellent job of keeping airborne dust out of your face and lungs.

Safety Note: Although it's tempting, don't avoid the dust problem. Invest in your lungs now. You'll breathe easier, and your shop will be cleaner, too.

Power Sanders. *A built-in vacuum (left) or an attachment (right) are two ways to control sanding dust.*

Dust Helmet. *If you're really concerned about that fine sawdust and the health problems it can cause, don't be afraid to protect yourself. A good way to keep dust out of your lungs and face is to use a self-contained dust helmet.*

Fan Filter. *One way to reduce airborne dust in the shop is to attach a pleated filter to a household fan (or use two fans for even greater control). This is an ideal solution if you have a limited budget.*

Suspended Filter. *If floor or bench space is at a premium in your small shop, you might consider a simple filter unit that can be suspended overhead where it's out of the way.*

Dust Mask. *An economical and convenient way to keep dust out of your lungs is to use a dust mask with replaceable filters. This style tends to produce a tighter seal than disposable masks.*

Shop Air Filter

Whether ripping at the table saw or sanding, airborne dust is a nuisance for all woodworkers. Here's an inexpensive solution that clears the air in your shop.

You know, it doesn't take too much sawing or sanding to kick up a lot of dust. And a shop full of airborne dust is not a good place to work.

AIR FILTER. There is a way to get rid of airborne dust before it reaches your lungs. Professional shops often have a separate filter unit that will remove potentially harmful shop dust from the air. Unfortunately, these units are pretty expensive. So I designed a heavy-duty Shop Air Filter that uses three furnace filters to clean the air. There are two pre-filters at the intake end of the unit and one at the exhaust end.

By the time the air passes through the last filter, there's not much dust left to trap. The results are dusty furnace filters and cleaner air.

To make the unit even more efficient, I used pleated furnace filters instead of the standard fiberglass mesh furnace filters. These filters are commonly available and only cost a couple dollars more.

Note: There are actually two types of pleated filters to choose from. The most common are standard pleated furnace filters. They're inexpensive, disposable, and they trap large dust particles effectively (see the photo above).

Better yet are high-efficiency pleated furnace filters with an electrostatic charge. This filter is designed to capture the small particles that other filters miss.

Changing the filters is easy too. To get at them, the bottom of the case isn't permanently attached. I used tongue and groove joinery, so it slides open in either direction, and the filters simply drop down (see inset photo).

BLOWER. To circulate the air through the shop, I used a squirrel cage blower with an enclosed motor. This blower is easily the most expensive part of this project. But it's a workhorse that's worth every penny. It'll circulate the air in a 250 sq. ft. shop in about 5 minutes.

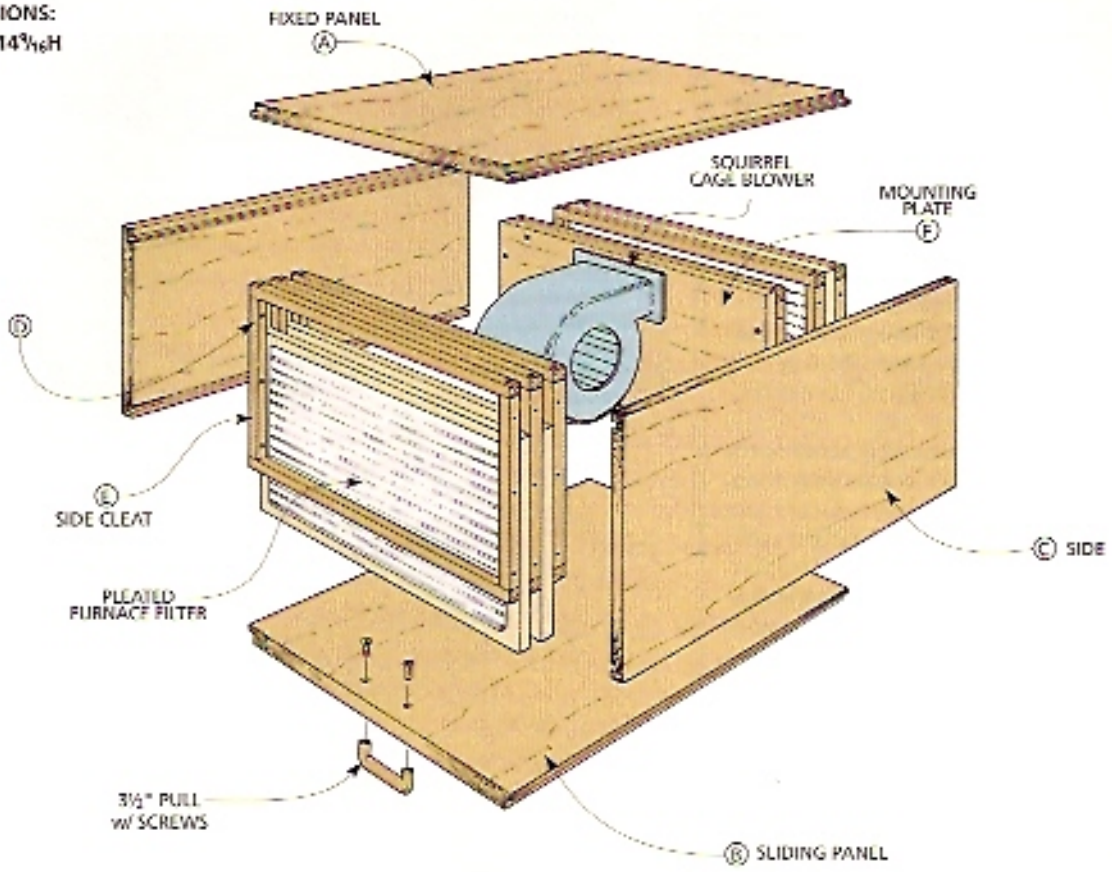
Note: You could possibly find a used blower from your local heating and air conditioning contractor that could be used as an inexpensive alternative.

CASE. The filters and the blower are housed in a simple, open-ended case.

For the wood, I used just three board feet of hardwood and a little over half a sheet of ¾" plywood.

EXPLODED VIEW

OVERALL DIMENSIONS:
25½W x 31¾D x 14⁹⁄₁₆H



MATERIALS LIST

WOOD

A	Fixed Panel (1)	¾ ply - 24¾ x 31¾
B	Sliding Panel (1)	¾ ply - 24 1⁄16 x 31¾
C	Sides (2)	¾ ply - 13½ x 31¾
D	Top/Btm. Cleats (12)	¾ x ¾ - 24
E	Side Cleats (12)	¾ x ¾ - 10½
F	Mounting Plate (1)	¾ ply - 12 x 24

HARDWARE SUPPLIES

- (1) Squirrel cage blower
- (3) 12" x 24" x 1" pleated furnace filters
- (62) No. 8 x 1¼" Fh woodscrews
- (12) No. 8 x 1¾" Fh woodscrews
- (10) No. 8 x 2½" Fh woodscrews
- (5) No. 10 x ⅜" Ph screws
- (5) No. 10 flat washers
- (2) 3½" pulls w/ screws

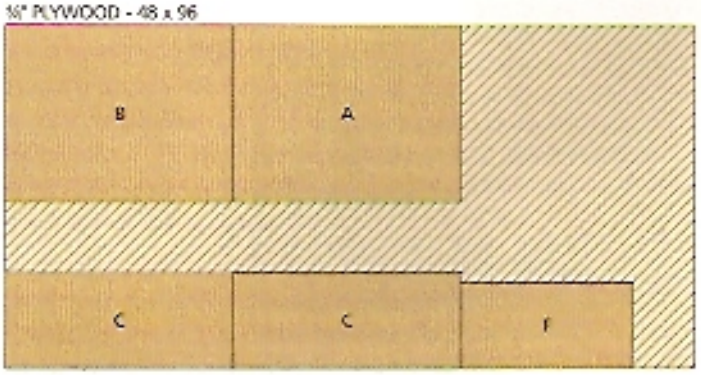
CUTTING DIAGRAM

¾ x 3½ - 36 (.9 Bd. Ft.)

¾ x 3½ - 36 (.9 Bd. Ft.)

¾ x 3½ - 36 (.9 Bd. Ft.)

¾" PLYWOOD - 48 x 96



CASE

To build the Shop Air Filter, I started with the case. The case is made up of four pieces: a fixed panel (A), a sliding panel (B), and two sides (C) *(Fig. 1)*. The size of the case really depends on the size of the furnace filters you use. I used 12" x 24" pleated furnace filters.

But I found that my furnace filters weren't exactly 12" x 24". They're a little smaller. So before cutting the case parts to size, measure the filters you intend to use. Then make the case opening 1/8" larger in width and height. This way the filters will fit well.

Also, to help the sliding panel open and close easily, it's 1/16" narrower than the fixed panel *(Fig. 1)*.

LOCKING RABBET. To hold the filter case together, I used a locking rabbet joint *(Fig. 2a)*. A locking rabbet provides an air-tight seal between the sides and the fixed panel. It also has another advantage — allowing the sliding panel to open and close without any special hardware.

ASSEMBLY. When both the tongues and the grooves have been cut in the case pieces, the filter case can be glued up *(Fig. 2)*. The easiest way to do this is to build it upside down. (You can set the sliding panel aside for now.)

FURNACE FILTERS & BLOWER

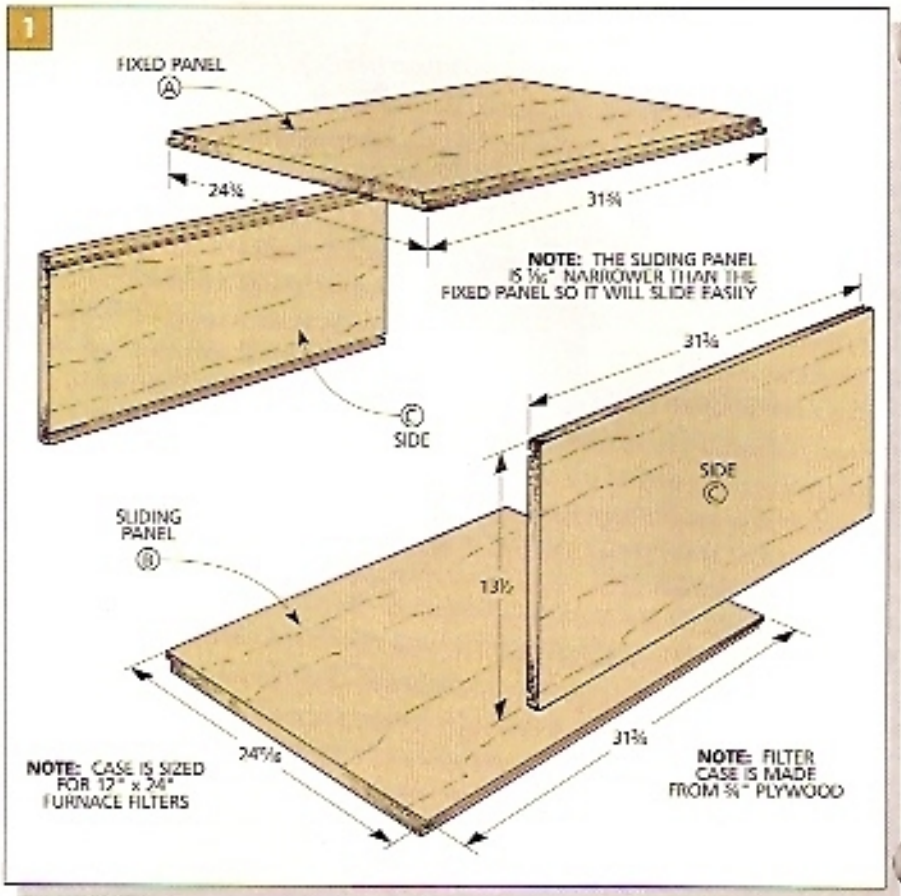
To position the furnace filters and blower inside, I added simple frame cleats (D, E) *(Fig. 3)*. These cleats are 3/4"-square strips of hardwood that are screwed to the inside of the case to form a frame.

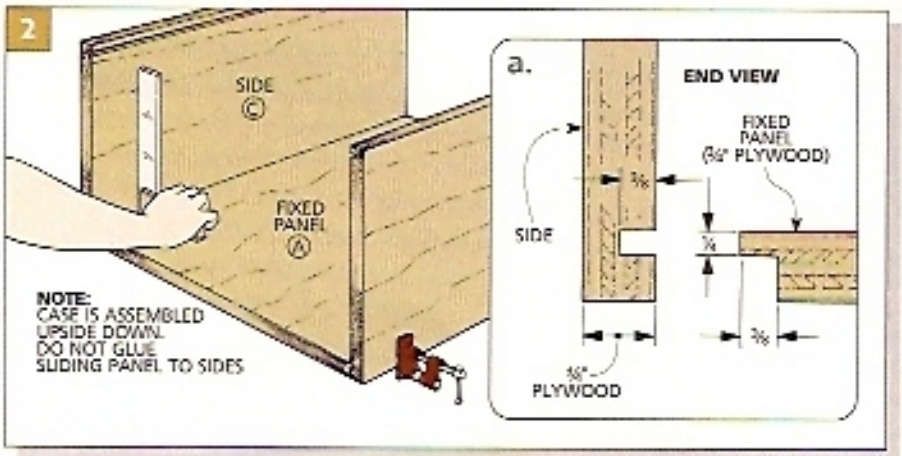
The cleats must end up flush with the grooves in the sides *(Fig. 3a)*. This ensures a tight seal between the cleats and the sliding panel. This is especially important since the sliding panel isn't glued in place.

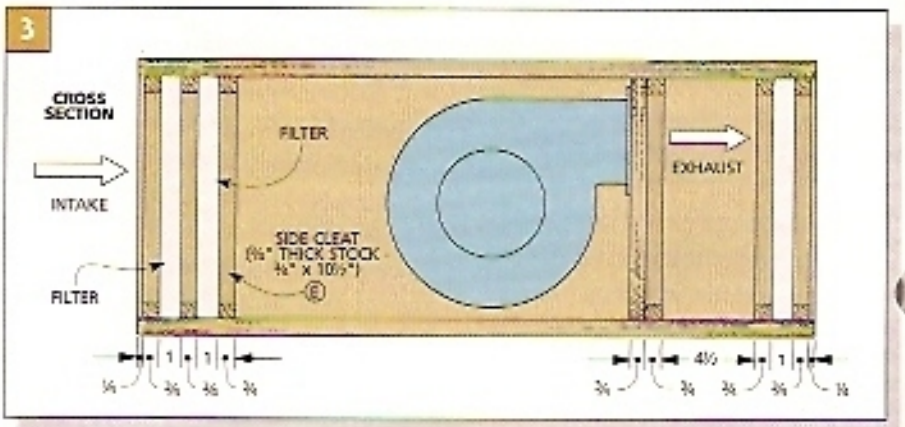
Note: Most of the cleats are screwed to the case with 1 1/4" woodscrews *(Fig. 4)*. But the last cleats are screwed into the end grain of the side cleats, so here I used 1 3/4" woodscrews for extra strength.

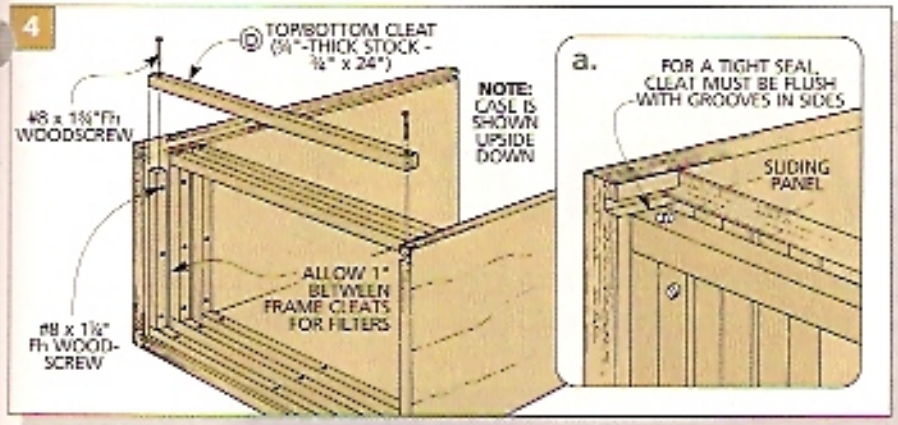
FILTER FRAMES. The air filter requires five sets of frame cleats to hold the filters *(Fig. 3)*. Three sets sandwich the two intake filters, and two sandwich the exhaust filter.

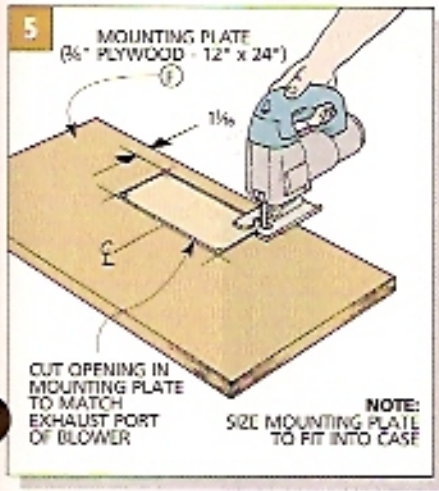
To allow for the filters, space the frame cleats 1" apart *(Fig. 3)*. Experiment with the spacing here. If the filters are too tight, they're hard to change because they tend to catch on the cleats.

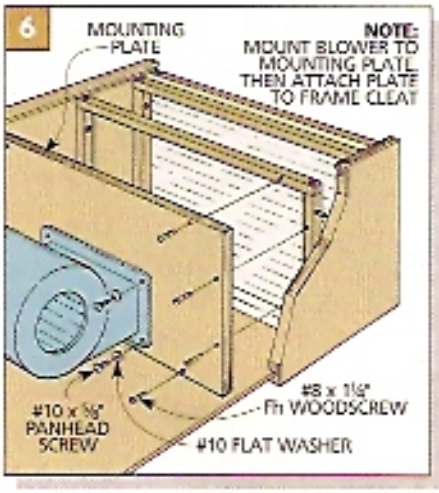


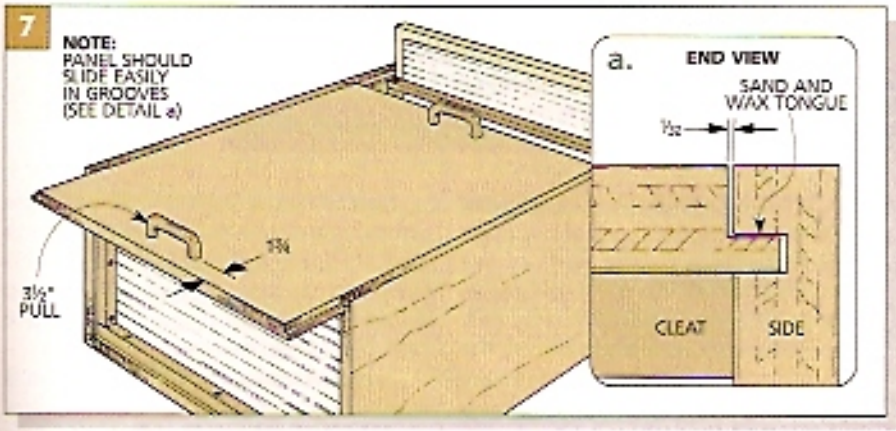


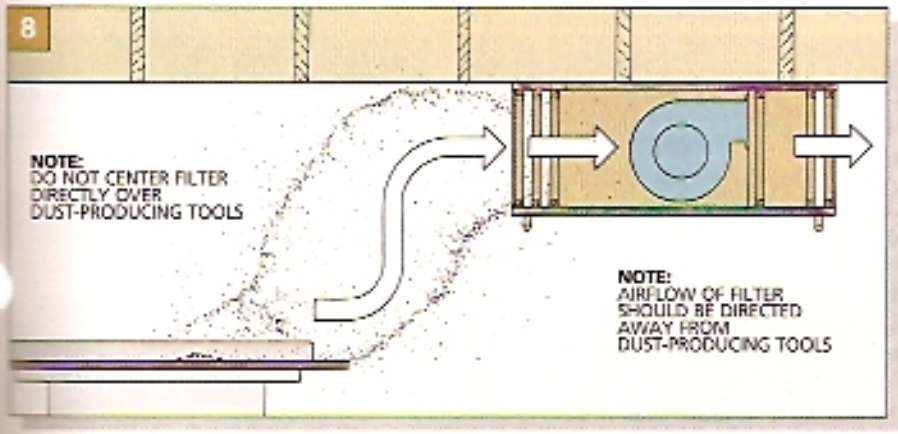












MOUNTING THE BLOWER. There's one last set of cleats that form a frame near the center of the case *(Fig. 3)*. This frame supports the blower. But I couldn't screw the blower directly to the frame. Instead, I made a mounting plate (F) out of plywood *(Fig. 5)*.

To make the mounting plate, first cut a piece of plywood to fit inside the case. Then cut an opening in the plate to match the exhaust port on the blower *(Fig. 5)*.

Screw the blower to the mounting plate first *(Fig. 6)*. Then screw the plate to the center cleats.

FITTING THE PANEL. The last step is to install the sliding panel *(Fig. 7)*. This panel already has tongues that fit the grooves in the case sides. If the fit is tight, sand the tongues until they slide smoothly *(Fig. 7a)*. A little wax will help.

Finally, I attached pulls near the ends of the sliding panel *(Fig. 7)*. They give you something to grab onto when sliding the panel open to change the filters.

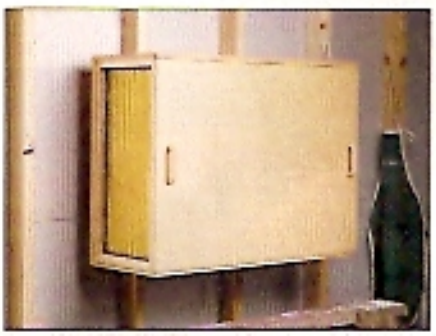
LOCATING THE UNIT

This filter unit should be located so all the dust is drawn into the intake filters *(Fig. 8)*. You don't want it centered directly over a dust-producing machine like a table saw or sanding table. The reason is simple. You don't want to blow dusty air around, just clean air.

CEILING-MOUNTED. To suspend it from the ceiling, all you will need to do is screw it to the ceiling joists.

But be careful. This filter unit isn't light. So before you attempt to mount it, locate and drill the mounting holes first. Then be sure to get plenty of help when lifting the filter into position.

And if your ceiling is low (as in a basement), consider mounting it on a wall, as shown in the photo below. ■



For the most versatility, the air filter can be mounted to the ceiling or to a wall (as shown in the photo above). Either way it's highly efficient.

Miter Saw Station

This portable saw station makes your miter saw work even harder. It combines extension wings for long stock with a stop system for accurate repeat cuts.

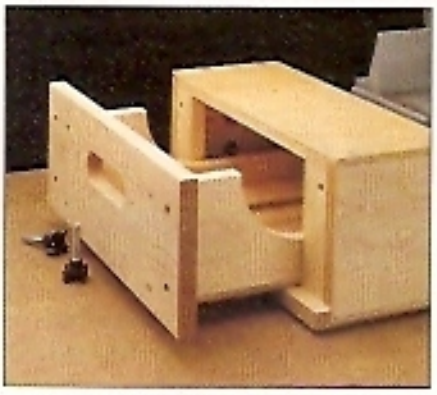
Every time I looked at my power miter saw, I'd think about building a work station for it—something to support long stock, with a system for making repeat cuts accurately.

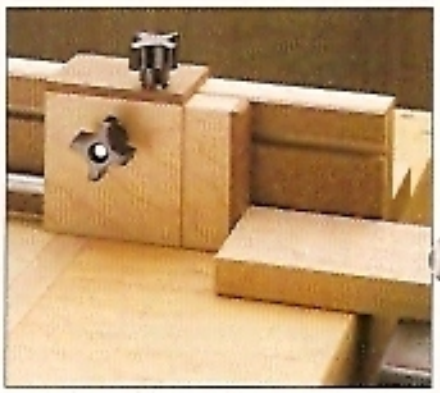
The challenge was to incorporate all those ideas without sacrificing portability. My answer was this Miter Saw Station (see photo above).

EXTENSION WINGS. To support long workpieces, I designed a pair of extension wings that attach to the ends of the station. For portability, these wings can be "tucked" away inside the case (see left photo below). And when stored, the wings provide built-in handles to make it easy to lift and move the miter saw (see photo below).

FENCE SYSTEM. Most miter saws fences are too short making it hard to position long workpieces. So I added a pair of rails to extend the fences. I also added a stop system that slides in slots cut in the fence rails (see photo below).

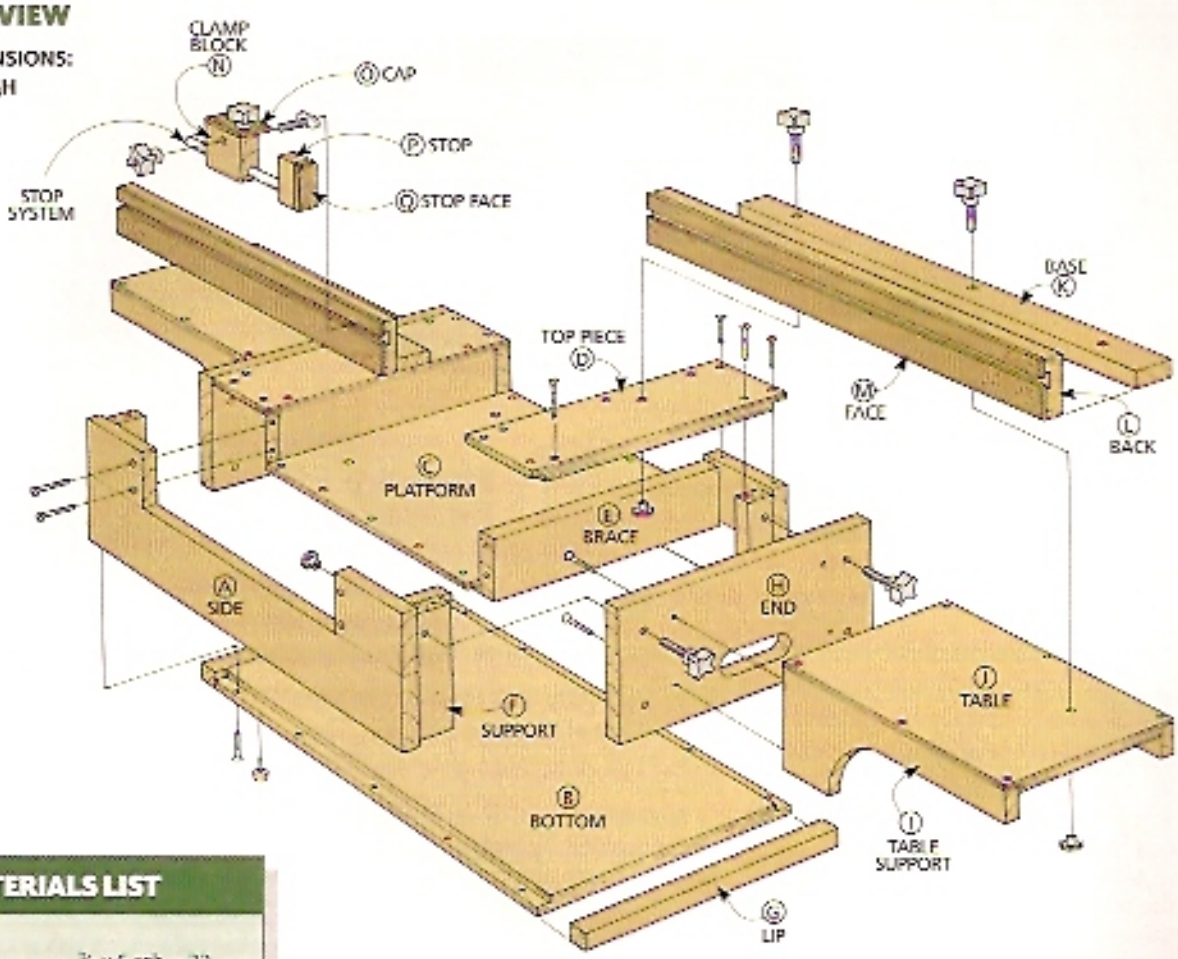
A hardware kit for the saw station is available from *Woodsmith Project Supplies*, see Sources on page 112.





EXPLODED VIEW

OVERALL DIMENSIONS:
84W x 16D x 6¾H



MATERIALS LIST

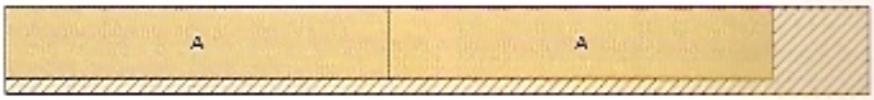
CASE		
A	Sides (2)	¾ x 6 rgh. - 32
B	Bottom (1)	¾ ply - 16 x 32
C	Platform (1)	¾ ply - 16 x 20
D	Top Pieces (2)	¾ ply - 6 x 16
E	Braces (2)	¾ x 3⅜ - 14½
F	Supports (4)	¾ x 1¾ - 5¼
G	Lips (2)	¾ x ¾ - 16
H	Ends (2)	¾ x 6 - 16
I	Table Supports (4)	¾ x 4½ - 15⅞
J	Tables (2)	¾ ply - 10⅞ x 15⅞
FENCE & STOP SYSTEM		
K	Bases (2)	¾ x 2 - 32
L	Backs (2)	¾ x 3 - 32
M	Faces (2)	¼ hdbd. - 3 x 32
N	Clamp Block (1)	¾ x 3 - 3
O	Cap (1)	¼ hdbd. - 1¾ x 3
P	Stop (1)	¾ x 1 - 3
Q	Stop Face (1)	¼ hdbd. - ¾ x 3

HARDWARE SUPPLIES

(1) 5/16" toilet bolt, 1¾" long
(1) 5/16" plastic knob
(12) 5/16" T-nuts
(8) 5/16" x 1½" threaded knobs
(1) 5/16" threaded insert
(1) 5/16" x 2½" threaded knob
(1) ⅜"-dia. x 36"-long steel rod
(4) Rubber feet 5/16" x ¾"
(4) Bolts and T-nuts to mount miter saw
(46) No. 8 x 1" Fh woodscrews
(24) No. 8 x 1¼" Fh woodscrews

CUTTING DIAGRAM

¾ x 7¼ - 72 (3.6 Bd. Ft.)



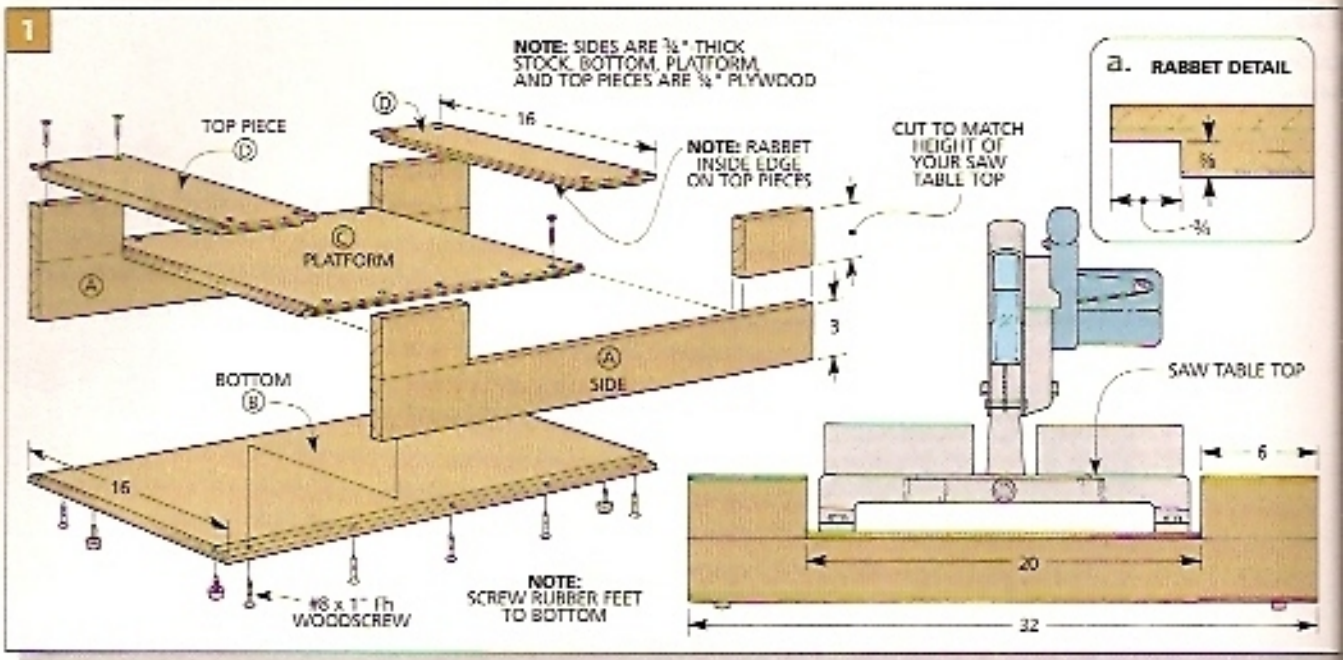
¾ x 7¼ - 72 (3.6 Bd. Ft.)

¾ x 5½ - 72 (2.75 Bd. Ft.)

¾ x 5½ - 72 (2.75 Bd. Ft.)

¼" HARDBOARD - 12 x 48

NOTE: ALSO NEED ONE 48 x 48 SHEET OF ¾" PLYWOOD



CASE

I started work on the Miter Saw Station by making the case and platform for the saw. The case is just a simple open-ended box with U-shaped sides *(Fig. 1)*.

SIDES. The U-shape forms a recess for the miter saw to sit in *(Fig. 1)*. At the same time, it creates a work support surface on either side of the saw.

To fit most 10" miter saws, the recess in each side (A) is 20" wide.

Note: For a sliding compound or large miter saw, you may need to adjust the case dimensions. Have your saw on hand before you cut any pieces.

The important thing is that the top of the case end up flush with the table of your saw. For this to happen, the height (width) of the short pieces that form the sides of the "U" must match the height of the saw table top *(Fig. 1)*.

BOTTOM, PLATFORM, AND TOP. The bottom (B), platform (C), and top pieces (D) are all the same width (16"). But the lengths of these pieces vary *(Fig. 1)*. To keep the pieces aligned, I cut rabbets on the edges *(Fig. 1a)*. Then I glued and screwed the case together.

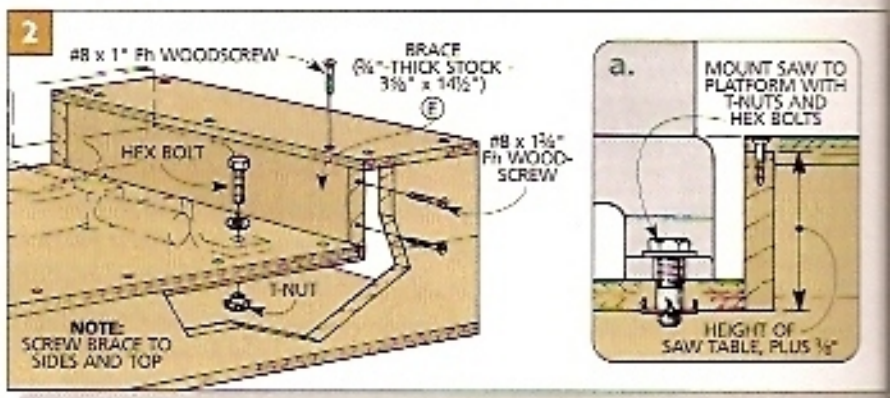
BRACES. Next, to strengthen the case and to help prevent it from racking during use, I added two ¾"-thick hardwood braces (E) *(Fig. 2)*. They fit between the sides and under the top pieces (D).

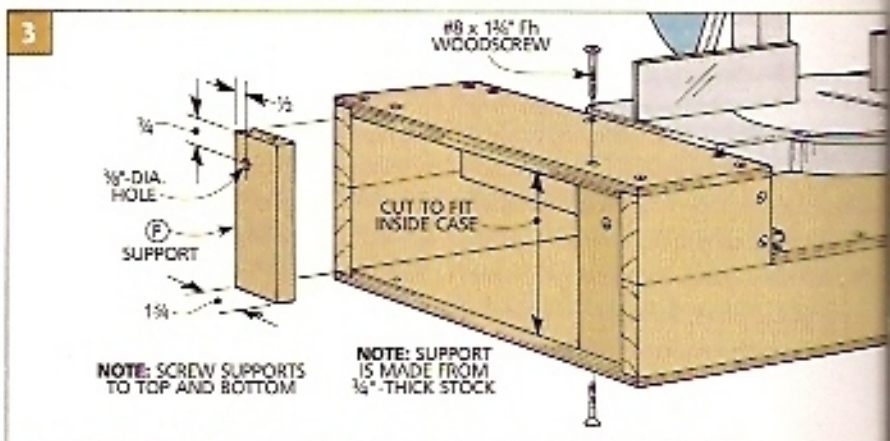
MOUNT SAW. At this point the saw can be attached to the case. To do this, center the saw on the platform between the sides. And slide it as close to the front edge of the platform as possible. Then drill holes and secure the saw with T-nuts and hex bolts *(Fig. 2a)*.

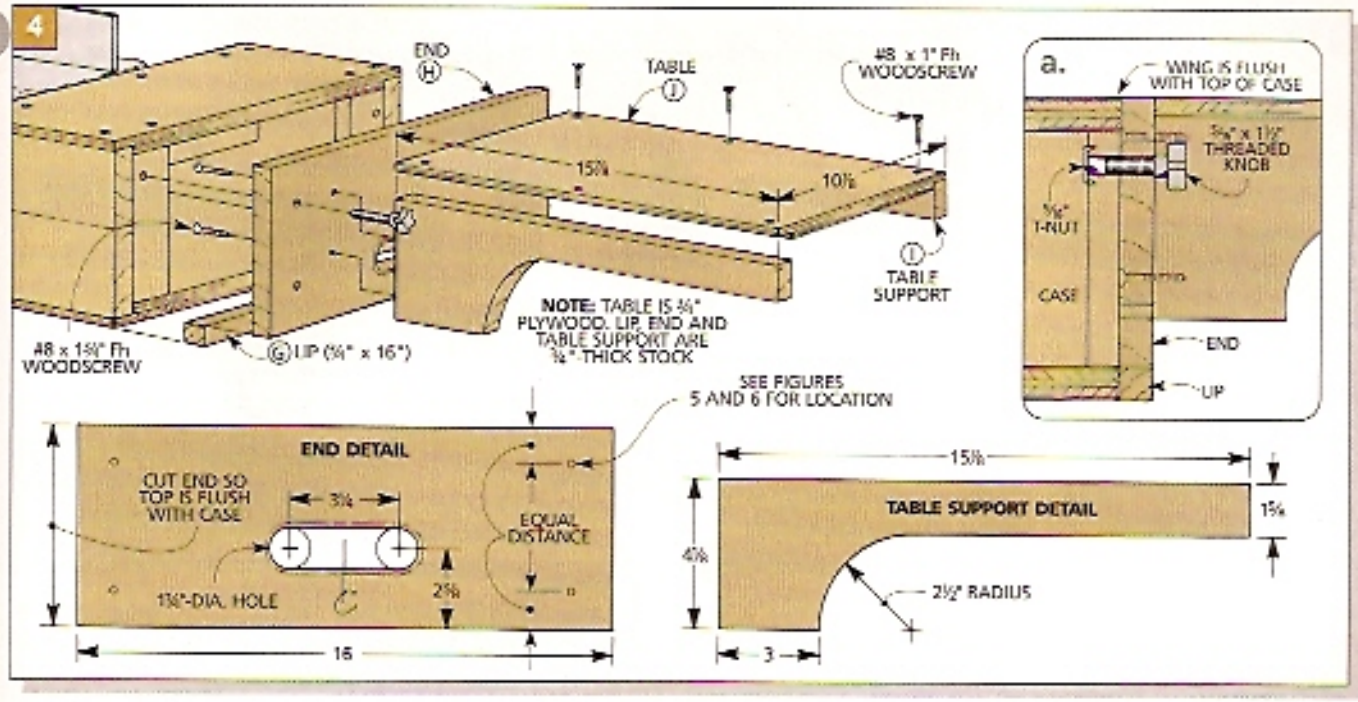
SUPPORTS. Next, two supports (F) are cut and glued in each end of the case *(Fig. 3)*. These supports are used later to mount the wings.

Note: I found it was easiest to drill holes in the supports (for the wings) before gluing and screwing them in place *(Fig. 3)*.

To complete the station's case, I screwed four rubber feet to the bottom (refer to *Fig. 1*). These keep the station from sliding around during use.







WINGS

After completing the case, I started on a pair of extension wings to support long workpieces *(Fig. 4)*.

LIP. But before work can begin on these wings, you'll need to glue a hardwood lip (G) across each end of the case *(Fig. 4)*. This lip covers the edge of the plywood bottom (B) and helps to support the wings.

WINGS. With the lips glued in place, you can make the wings. Each wing consists of an end (H), two supports (I), and a table (J) *(Fig. 4)*.

The first step is to make the ends. To prevent a workpiece from catching on the wings, it's important that the ends (H) be flush with the top of the case. The height of the ends (H) is the distance from the top of the lip to the top of the case (for me, this distance was 6").

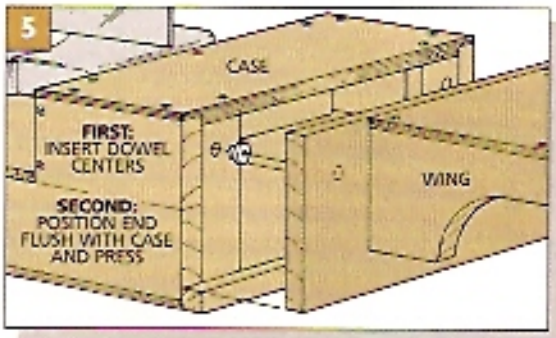
To complete the ends (H), I cut a handle hole in each to make it easy to move the saw *(Fig. 4)*.

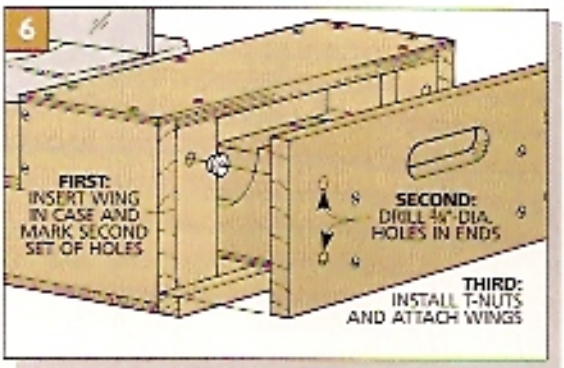
SUPPORTS AND TABLE. Attached to each end (H) are two table supports (I) and a table (J) *(Fig. 4)*. To size the table so the wings will fit inside the case, measure between the supports (F) and subtract ⅛" for clearance (10⅞"). Then rabbet the edges and glue and screw the wings together.

ATTACH THE WINGS. In order to knock down and set up the wings quickly, they're held in place with threaded knobs (or thumbscrews) and T-nuts. (For mail-order hardware sources, see page 112.) The threaded knobs pass through the holes you drilled earlier in the supports (F) and thread into T-nuts *(Fig. 4a)*.

Two sets of holes in each wing allow you to use the same knobs to secure the wing in either the open or stored position. The tricky part is aligning these holes with the ones you drilled in the supports (F). To do this, I used dowel centers *(Figs. 5 and 6)*.

Next install the T-nuts. Finally, position the wings and thread in the knobs.

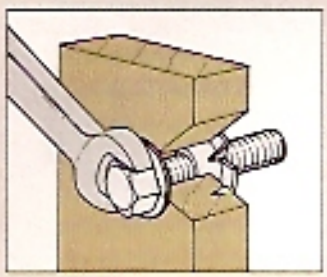


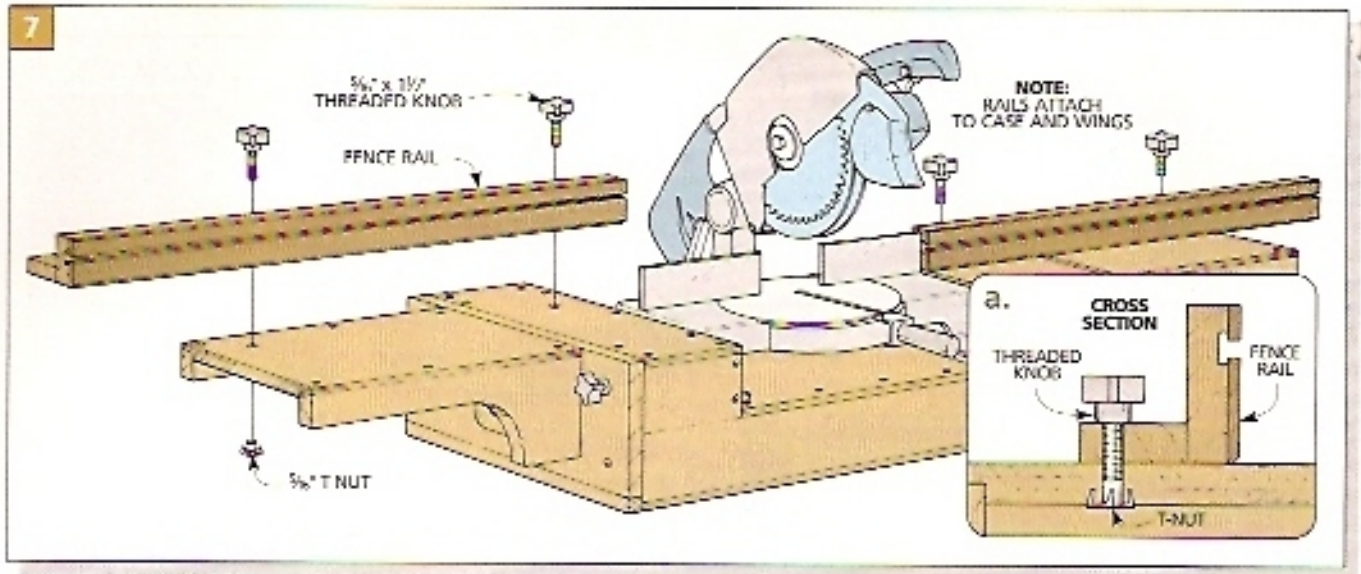


SHOP TIP

Installing T-Nuts

Installing T-nuts isn't as simple as it might seem. One easy way to "draw" a T-nut into hardwood (like the supports on the Miter Saw Station) is to use a wrench and a hex-head bolt (see drawing below).



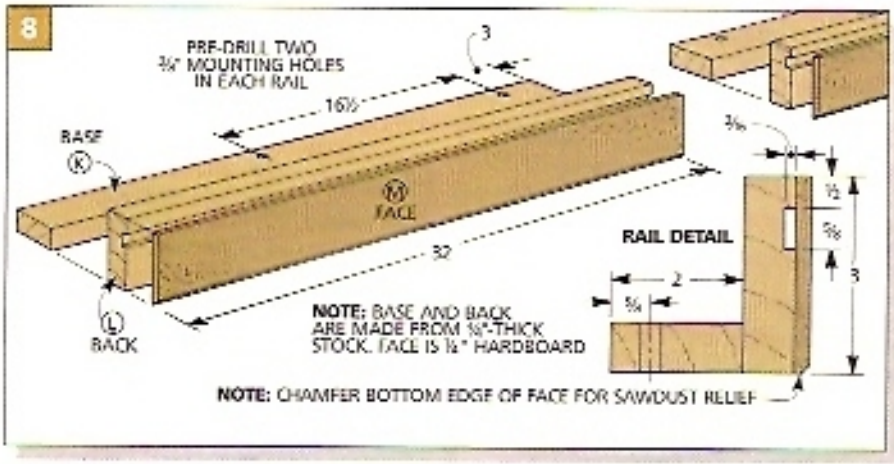


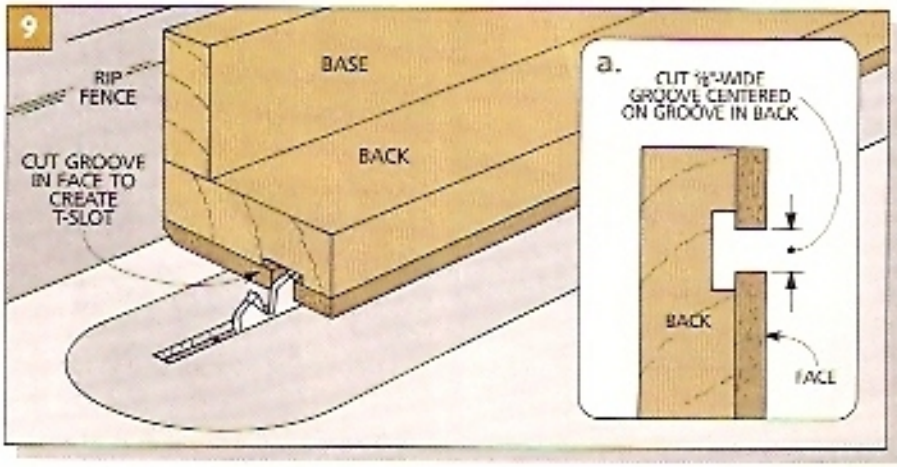
FENCE RAILS

Once the wings are complete, the Miter Saw Station is ready to use. But I've never been satisfied with the short fences on my miter saw. It's awkward to position and hold a long workpiece. And for repeat cuts, there's nothing to clamp a stop block to.

To solve both of these problems, I decided to add a pair of shop-built fence rails *(Fig. 7)*. They feature a built-in T-slot for a stop system added later (refer to page 48).

And just like the wings, the rails attach to the case with threaded knobs. This way they can be removed easily and stored *(Fig. 11* on the opposite page).





THREE PARTS. Each fence rail is made up of three parts: a base, back, and face *(Fig. 8)*. The base (K) provides a foundation for the back. And two mounting holes drilled in each base allow you to attach the rails to the case later *(Figs. 7 and 8)*.

Each back (L) supports the workpiece and is grooved for the stop system added later *(Fig. 8)*. After each groove is cut, a back is glued to a base to form an "L" *(Fig. 8)*.

For accurate cuts, it's important that the back is 90° to the base. So before you glue these pieces up, dry clamp them and check for square.

Note: Make sure to glue on each base (K) to create a right and a left fence rail. The end of each base with the mounting hole should face in toward the saw *(Figs. 7 and 8)*.

FACE. The next step is to add the face pieces. Each face (M) is cut from ¼"-thick hardboard and is glued on top of the groove in each back *(Fig. 8)*.

Note: After gluing on the faces, sand or rout a chamfer on the bottom front edge for sawdust relief *(Fig. 8)*.

T-SLOT. Finally, to create the "T" (and provide a rock-solid way to lock the stop system in place), a slot is cut in each face *(Figs. 9 and 9a)*.

MOUNTING THE RAILS

After the fence rails have been completed, they can be attached to the station's case. Just like the wings you made earlier (refer to page 45), the rails will be held in place with threaded knobs and T-nuts *(Fig. 10)*.

The tricky part is mounting the rails so they're in line with the miter saw fence. To do this, I use a long straightedge (in my case, a four foot level) to position the rails *(Fig. 10)*.

MOUNTING HOLES. To locate the holes for the T-nuts, clamp the straightedge to the saw fence, and the fence rail to the wing *(Fig. 10)*.

Holding the other end of the rail in place, drill through the holes in the base and into the case and wings *(Fig. 10a)*.

Note: Making the rails removable means more convenience and versatility for you, but it could make for more problems if you have to follow the same procedure to position them every time. To make it easy to realign the rails whenever they're removed, see the Shop Tip below right.

T-NUTS. All that's left is to add T-nuts and threaded knobs, then screw the rails in place *(Fig. 7a)*.

STORING THE FENCE RAILS

I wanted the Miter Saw Station to be not only useful, but also portable.

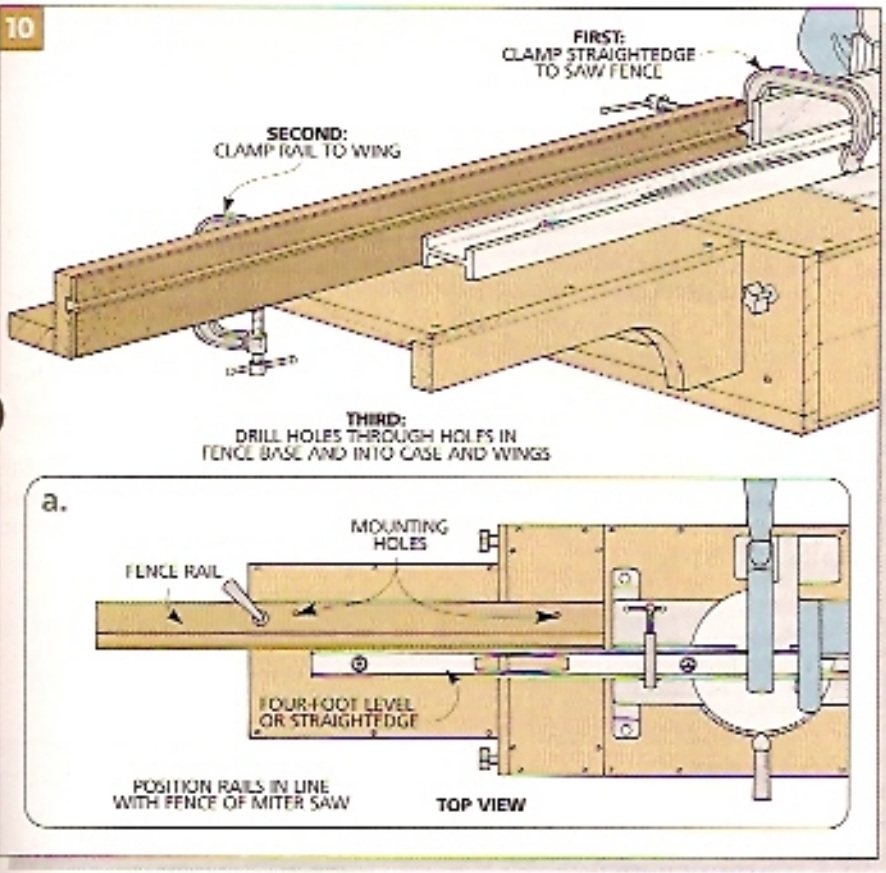
To make it as convenient as possible to lift and move the station, the fence rails can be mounted out of the way on the rear of the case *(Fig. 11)*. They're held in place there with the same plastic knobs used to mount them on top of the case *(Fig. 11)*.

THIRD HOLE. To bolt both rail ends to the case, you'll need to drill a third $\frac{3}{8}$"-dia. mounting hole 3" in from the end of each fence rail *(Fig. 11)*.

Then, to locate the matching holes in the case for the T-nuts, just hold each rail up against the case. And drill through the hole in each end of the rail and into the side *(Figs. 11 and 11a)*.

MOUNT RAILS. Finally, to secure the fence rails, insert the T-nuts and screw the rails to the case with the threaded knobs *(Fig. 11)*.

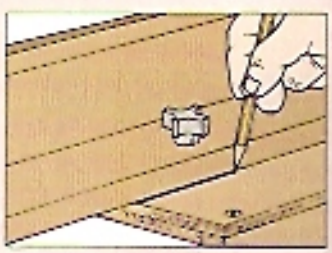
10



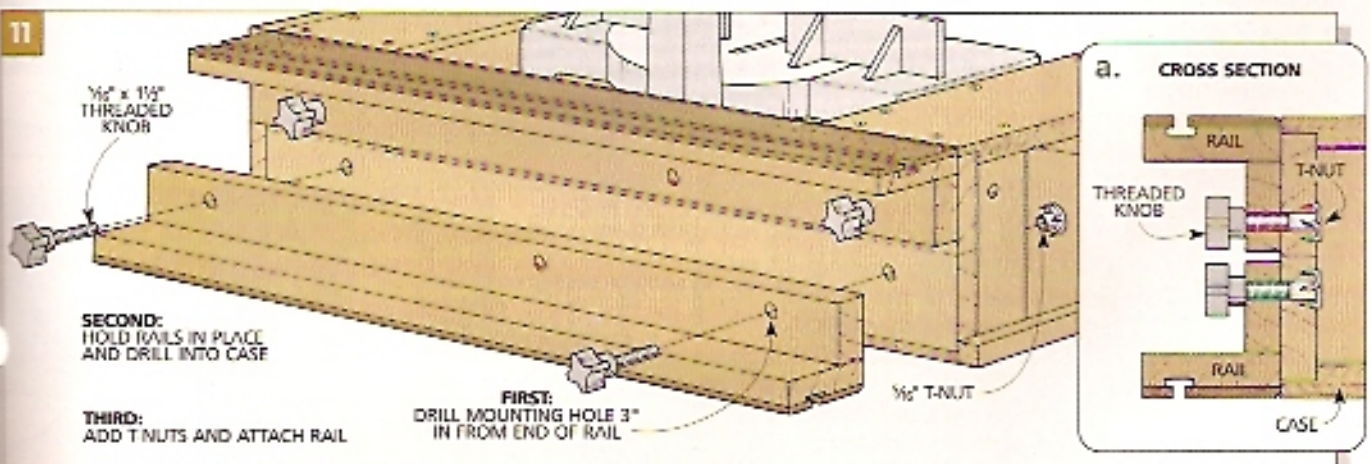
SHOP TIP

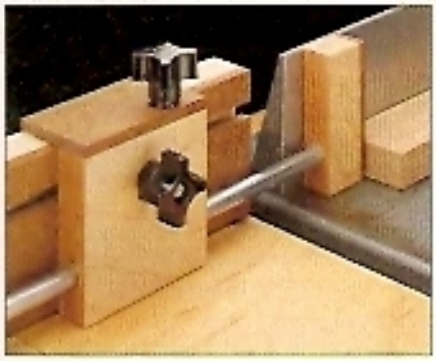
Reference Marks

To make it easy to reposition the rails whenever they've been removed, just mark a reference line on the Miter Saw Station's table.



11





STOP SYSTEM

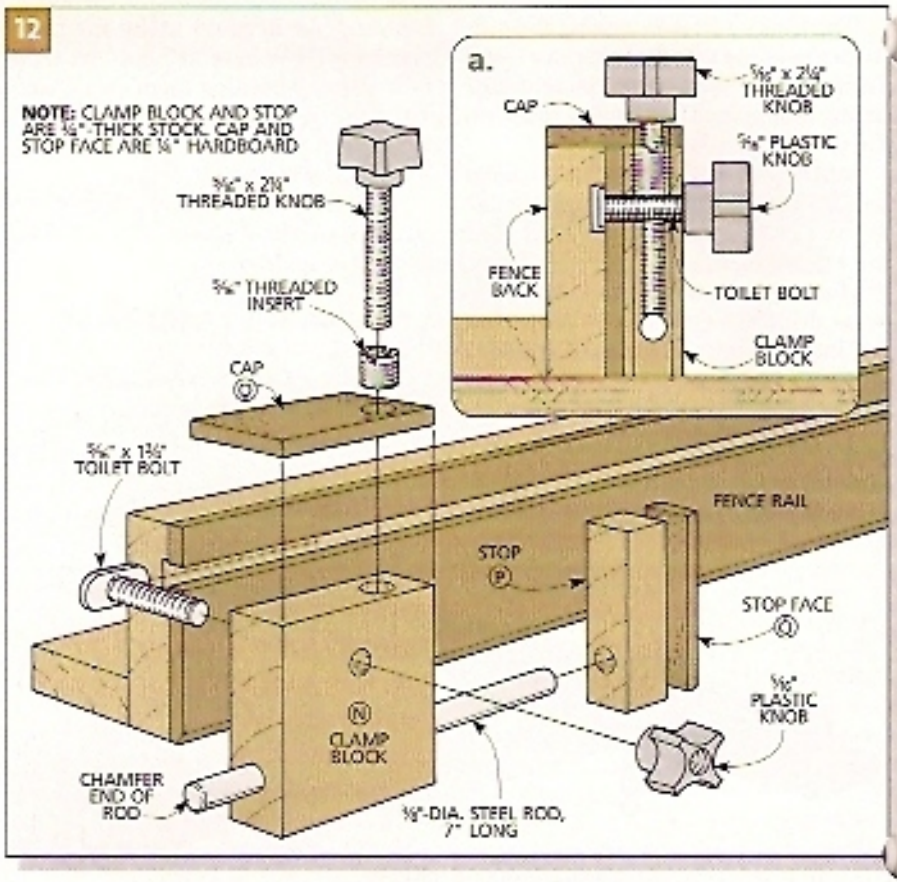
With the fence rails mounted, work can begin on the stop system. To help you make quick and accurate repeat cuts, the easily adjustable stop system slides in the T-slot in the fence rails *(Fig. 12)*.

THREE PARTS. The only problem is there isn't a T-slot in the miter saw fence. In order to use the stop close to the saw blade, the stop is made up of three parts: a clamp block, a length of steel rod, and a sliding stop. This way you can extend the stop out over the table of the miter saw (see photo above).

CLAMP BLOCK. I started work by making the clamp block (N) *(Fig. 13)*. The clamping action is provided by a toilet bolt (available at most hardware stores and home centers). It passes through the block and fits in the T-slot in the fence rail *(Fig. 12a)*. Tightening a plastic knob (or wing nut) on the end of the bolt pinches the bolt in the slot and locks the stop in place.

Next, a hole is drilled through the length of the block to accept a steel rod *(Figs. 12 and 13* and the Shop Tip on the opposite page).

12

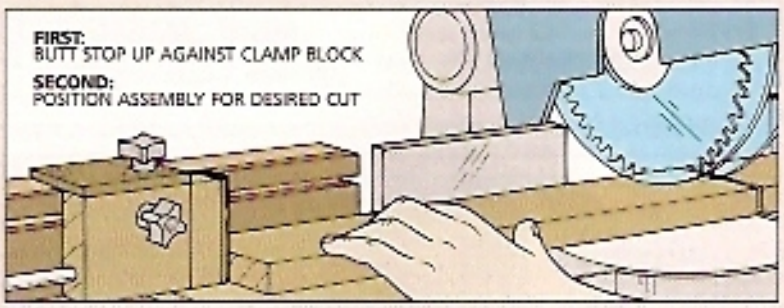


TECHNIQUE ..... *Using the Stop*

CLOSED

For the majority of cuts I make, I butt the stop (P) up against the clamp block (N) and lock it in place (see drawing at right).

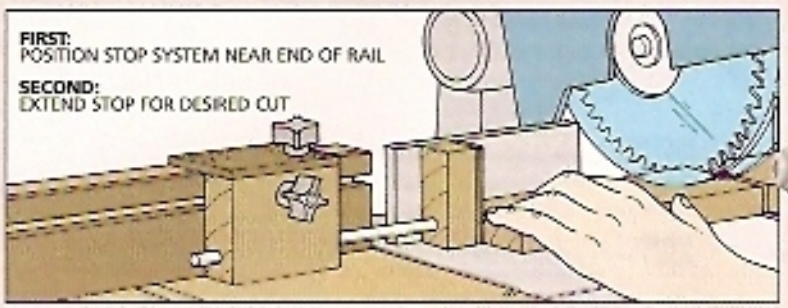
To set up the stop for making accurate repeat cuts, start by loosening the plastic knob that secures the clamp block to the fence. Then position the entire stop block assembly for the desired cut and lock it in place.



EXTENDED

To cut shorter workpieces, slide the stop assembly near the end of the rail and lock it in place (see drawing at right). Then loosen the threaded knob on top of the clamp block and extend the stop (P) out for the desired cut.

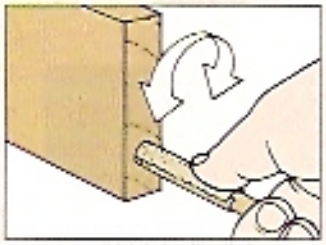
Safety Note: To allow room for you to hold the workpiece, the stop should always be at least 6" away from the blade.



SHOP TIP

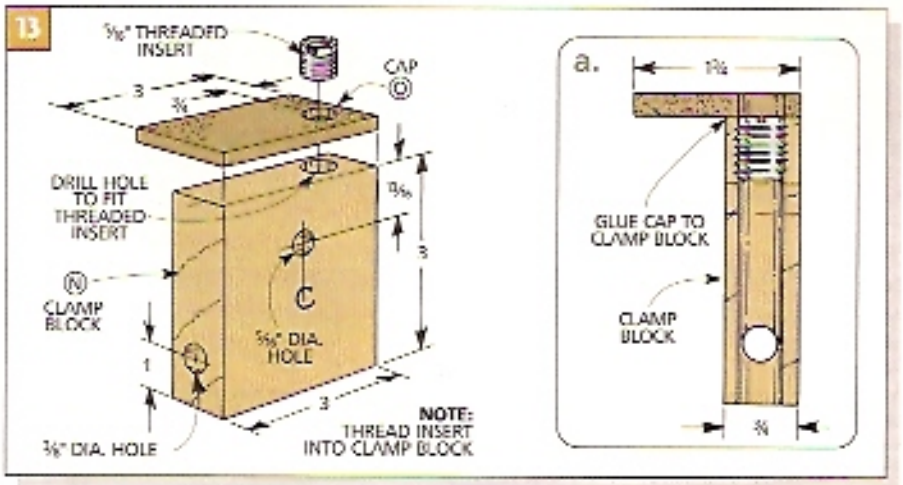
Enlarge Hole

To prevent the steel rod from binding in the clamp block, just use a dowel wrapped with sandpaper to enlarge the hole first.



To help prevent the clamp block from twisting and binding as it slides back and forth, I glued a $^1/_4$" hardboard cap (O) to the top of the clamp block to keep it square and flat *(Fig. 13)*.

THREADED INSERT. In use, the steel rod used in the stop is locked in place with a threaded knob (or a thumbscrew). It runs through a $^5/_{16}$" threaded insert in the clamp body to pinch the rod in the hole *(Figs. 13 and 13a)*.

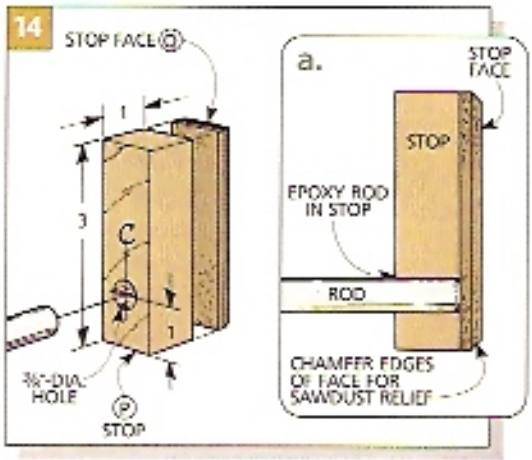


STOP. Next, I added a stop (P) to the end of the rod *(Fig. 14)*.

To strengthen the stop, I cut and glued a hardboard face (Q) to one end *(Fig. 14)*. And for sawdust relief, I sanded a chamfer on all edges of the face.

Finally, epoxy the steel rod in the stop. When it's dry, slide it into the clamp body and attach the stop system to the fence rail.

Safety Note: So that you don't place your hand too close to the blade, the stop extends only to within 6" of it. ■



DESIGNER'S NOTEBOOK

Make repeat cuts on pieces that are longer than the wings with this optional stop.

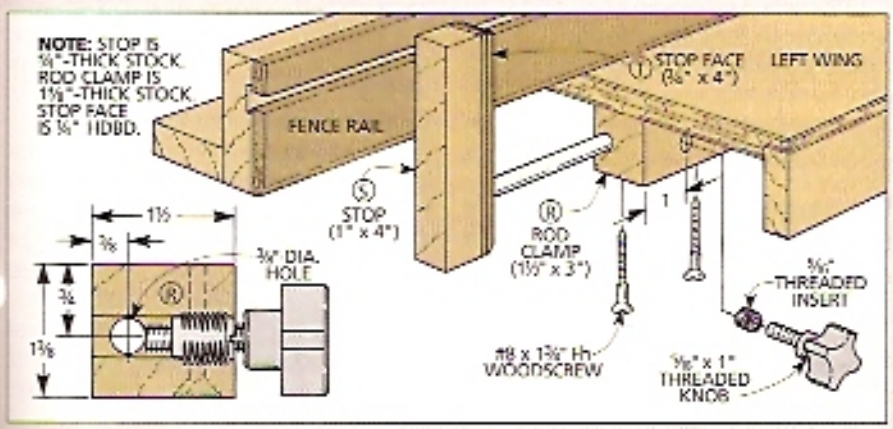
STOP FOR LONG STOCK

■ To make repeat cuts on stock longer than the fence rails, I added an optional stop (see photo). It's similar to the station's fence system, except that it fits *under* the left wing.

■ The optional stop consists of a rod clamp (R) and a two-piece stop (S, T) (see drawing). These two parts are connected with a $^3/_8$"-diameter steel rod.

Note: I wanted to be able to store the stop in the case and still get the maximum extension. So I cut the steel rod to a length of 22".

■ To mount the stop, position it under the wing so it butts up against the face of the fence rail. Then glue and screw the clamp block to the wing table (J).



Weekend Workbench

Construction lumber and a weekend's work are all it takes to build this workbench. This one features a base made of 2x4s and a solid-core door for a top.

All I wanted was a simple, heavy-duty workbench. It had to be sturdy, have a large work surface, and I didn't want it to cost a lot. *And* I wanted to build it in a weekend.

So one Saturday morning I went to the local lumberyard and by Sunday night my basic bench was complete. The base of the bench is made out of Douglas fir 2x4s. The top is a solid core door. Lumberyards and building centers often have slightly damaged doors at a discount. Or, you could make the top out of two pieces of ¾" plywood.

DRAWERS AND TRAY STORAGE. The basic bench worked great, but by the next weekend I began thinking some drawers sure would be handy. So I added three large drawers that are joined together with half-blind dovetails that I cut with a router and a dovetail jig. I also added a small sliding tray in one drawer to keep things organized. The drawers and tray provide plenty of extra storage.

EXTRA STORAGE. Even if you build the drawers, you'll need a plywood shelf underneath for extra storage. Then I added a woodworking vise at one end of the workbench as a final touch. (For sources of woodworking vises, see page 112.) The point is this project can be as simple or as involved as you want. The basic bench can be put together in a weekend. Or you can add storage and a vise for a more versatile bench.

JOINERY. The end frames of the bench are assembled with half-lap joints. But, instead of cutting lap joints in the traditional way, I built them up by laminating 2x4s together. The uprights are stacked (laminated) in a way to create "notches" for the crosspieces (braces).

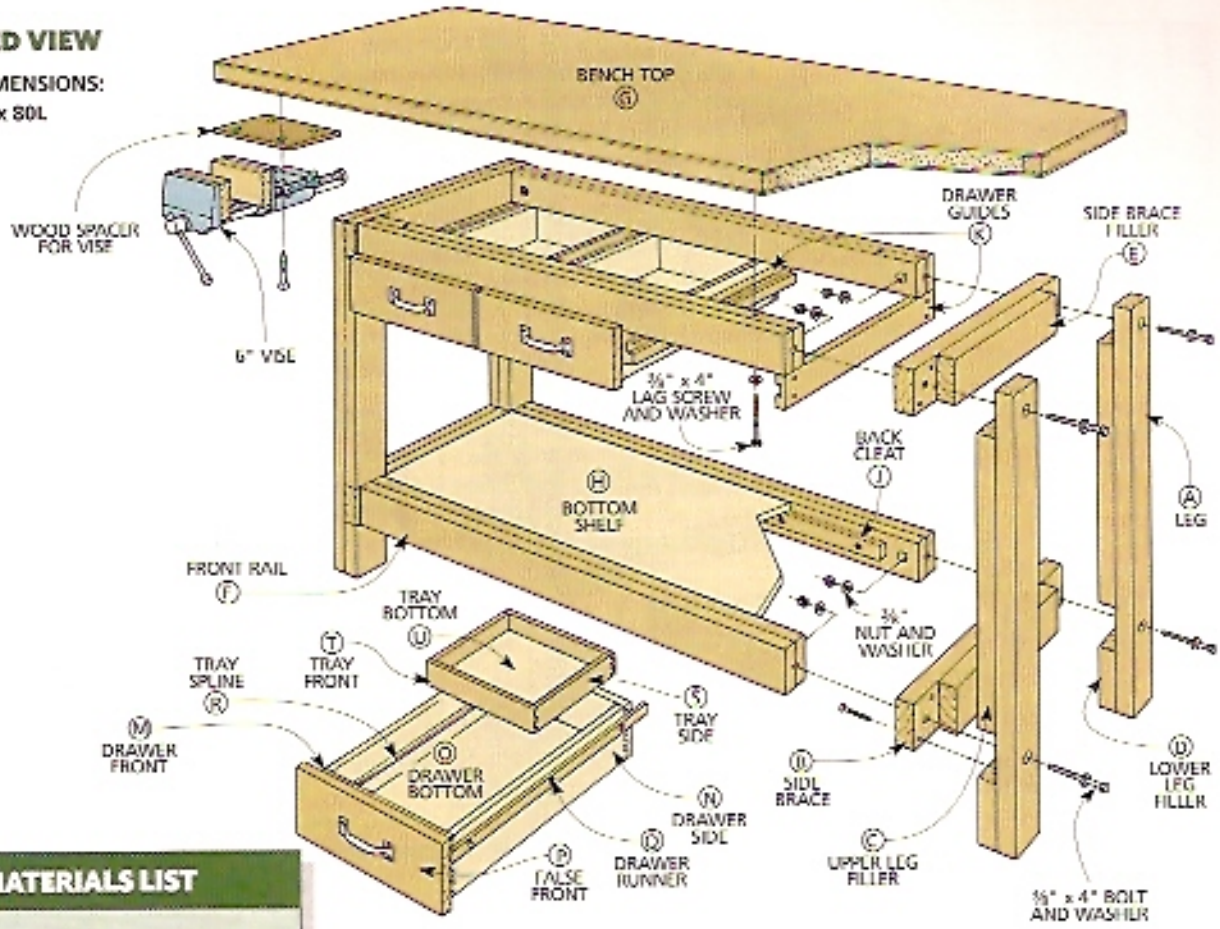
This brought up the question of the best way to laminate the 2x4 stock together. If you have enough clamps, you can glue and clamp them to each other. Or, you can glue, and then nail them together. (Here I'd use finish nails.) Or, simply glue and screw them.

There was another question about how to join the rails (horizontal pieces) to the legs. After a lot of thought, I chose a draw bolt system that allows you to knock down the bench if you ever need to move it in the future.

FINISH. To protect the workbench and keep glue from sticking to it, I finished the bench with two coats of an oil/urethane blend finish.

EXPLODED VIEW

OVERALL DIMENSIONS:
34⅛H x 30D x 80L



MATERIALS LIST

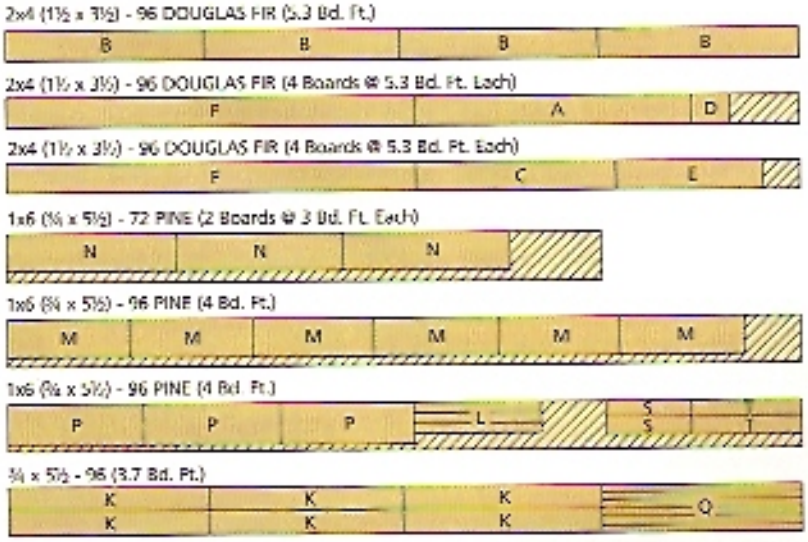
WOOD

A	Legs (4)	1½ x 3½ - 32½
B	Side Braces (4)	1½ x 3½ - 23
C	Upper Leg Fillers (4)	1½ x 3½ - 21
D	Lower Leg Fillers (4)	1½ x 3½ - 4½
E	Side Brace Fillers (4)	1½ x 3½ - 16
F	Ft./Back Rails (8)	1½ x 3½ - 43⅜
G	Bench Top (1)	1¾ x 30 - 80
H	Bottom Shelf (1)	¾ ply - 16⅜ x 48
I	Side Cleats (2)	¾ ply - 1½ x 16
J	Ft./Back Cleats (2)	¾ ply - 1½ x 42
K	Drawer Guides (6)	¾ x 2⅜16 - 22½
L	Drawer Stops (3)	¾ x 1 - 14½
M	Drawer Ft./Bk. (6)	¾ x 4⅛ - 14½
N	Drawer Sides (6)	¾ x 4⅛ - 20¼
O	Drawer Bottoms (3)	⅛ ply - 13½ x 20⅛
P	False Fronts (3)	¾ x 4⅛ - 16
Q	Drawer Runners (6)	½ x ¾ - 22½
R	Tray Splines (2)	¼ x ½ - 19½
S	Tray Sides (2)	½ x 1¾ - 9¾
T	Tray Ft./Back (2)	½ x 1¾ - 12⅞
U	Tray Bottom (1)	¼ ply - 9⅞ x 12⅞

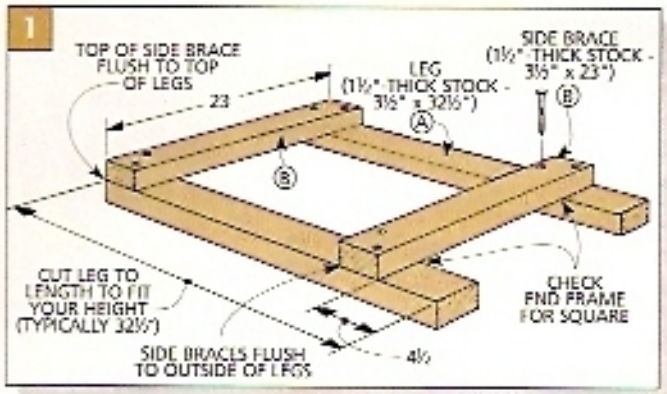
HARDWARE SUPPLIES

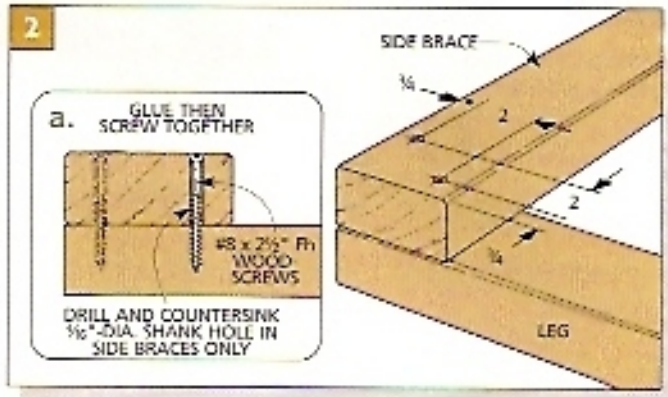
(18) No. 8 x 1" Fh woodscrews
(36) No. 8 x 1¼" Fh woodscrews
(100) No. 8 x 2½" Fh woodscrews
(8) No. 12 x 4" Fh woodscrews
(8) ⅜" x 4" hex bolts
(20) ⅜" washers
(8) ⅜" nuts
(4) ⅜" x 4" lag bolts
(3) Drawer handles w/ screws
(1) 1¾" x 30" - 80" solid-core door
(1) 6" woodworking vise

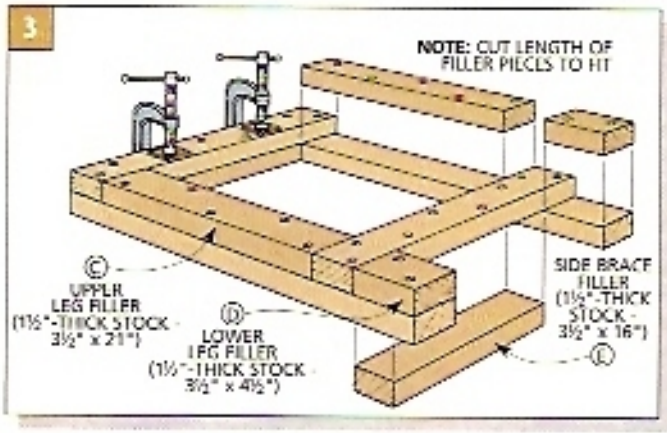
CUTTING DIAGRAM

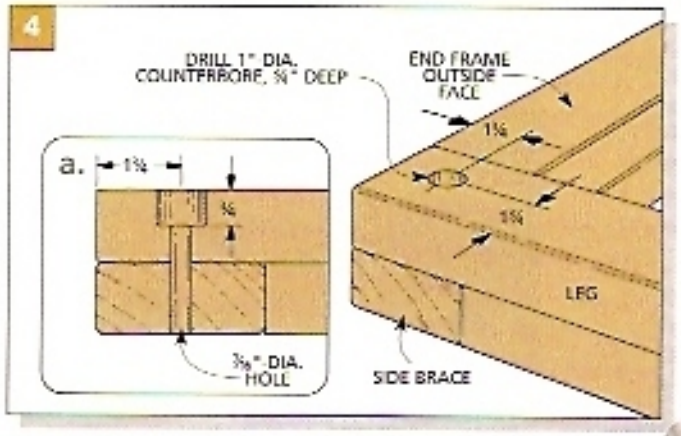


NOTE: ALSO NEED ONE 24" x 48" PIECE OF ¾" PLYWOOD FOR PARTS H, I AND J, ONE 24" x 24" PIECE OF ¼" PLYWOOD FOR PARTS O AND U, AND ONE ONE SOLID-CORE DOOR FOR PART G









END FRAMES

To build the bench, start by building the two end frames. Begin by cutting two legs (A) to length. The length of the legs can be modified to suit your height.

Note: I made my bench about 34¼" tall, which is a typical overall height once the top has been added.

BUILDING THE FRAMES. With the workbench legs cut to length, go ahead and cut the two side braces (B) *(Fig. 1)*. Lay two legs side-by-side and position one side brace (B) 4½" up from the bottom ends. Then place the other brace flush to the top of the legs *(Fig. 1)*.

Once the pieces are in place, lay out the screw locations *(Fig. 2)*. Then drill and countersink 3/16" shank holes in the side braces *(Fig. 2a)*. Now glue and screw the side braces to the legs.

ATTACH THE FILLER PIECES. To strengthen the end frames I added upper (C) and lower leg fillers (D), and two side brace fillers (E) *(Fig. 3)*.

After I trimmed the filler pieces to fit, I clamped the pieces in position while I glued and screwed them in place *(Fig. 3)*.

BOLT HOLES. All that's left to complete the end frames is to drill and counterbore the holes for the bolts that connect the rails (refer to *Fig. 7* on the next page). These holes are 1¾" down from the top edge of the side braces, and centered on the width of the legs *(Fig. 4)*.

Once the hole locations have been marked, drill the counterbore (1"-dia., ¾" deep) on the outside face of the end frames. Then drill shank holes centered in the counterbores *(Fig. 4a)*.

RAILS

After the end frames are built, I made the four rails (F) that run across the front and back of the bench. Each rail is made from two 2x4s laminated together.

BUILD THE RAILS. To make each rail, start by cutting the two 2x4s to rough length. Then glue the pieces together to form a 3" x 3½" rail blank *(Fig. 5)*.

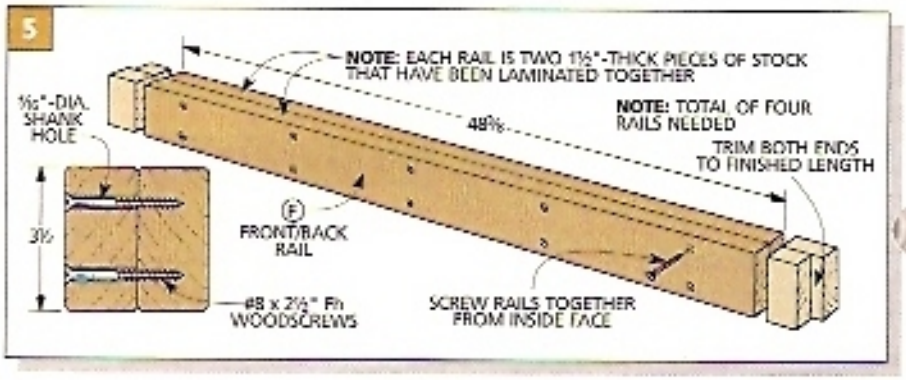
Note: Rather than using clamps and then waiting for the glue to dry, I screwed the rails together with 2½"-long screws. Be sure to drill shank holes and countersink the holes before screwing the pieces together *(Fig. 5)*.

After gluing together all four rails, I trimmed them to length *(Fig. 5)*.

Note: My rails are 48⅜" long. This way if I decide to add a cabinet to the base, I'll have plenty of room for one that's a full 48" long.

RAIL CONNECTORS

The rails are connected to the end frames with a draw-bolt system. This system not only allows the joint to be tightened if it becomes loose, it's also



easy to make. Plus it allows you to take the bench apart if you ever need to move it around your shop.

POCKET HOLES. The first step is to mark the location of the pocket holes on the rails. The holes are centered on the face of the rails and located 1¾" in from each end *(Fig. 6a)*. Now, drill a 1"-dia. hole, 2" deep at the marked location. Then, to provide a flat surface for the washer and nut to draw against, square up the edge of the hole nearest the end of the rail *(Fig. 6)*.

END HOLES. Once all of the pocket holes had been squared up, I drilled 7/16"-dia. holes centered on the ends of the rails *(Fig. 6a)*. These holes allow the draw bolt to exten into the pocket hole.

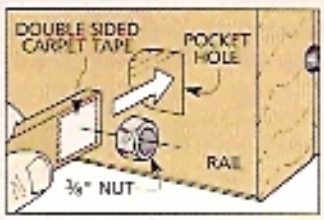
BOLT TOGETHER. Now the rails can be bolted to the end frames. Just insert a hex-head machine bolt with a washer. Push the bolt through the countersunk hole in the end frame and into the hole in the end of the rail *(Fig. 7)*.

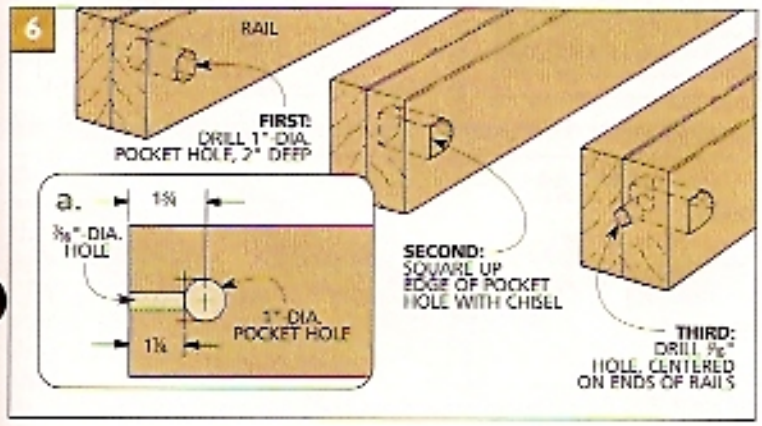
Then slip a washer and nut in the pocket hole and tighten the bolt holding the nut with an open end wrench. (See the Shop Tip at right for a trick I used to start the nuts.) If the rails won't draw up tight against the end frames, you may want to try undercutting. (Refer to the Technique below for more on how to do this).

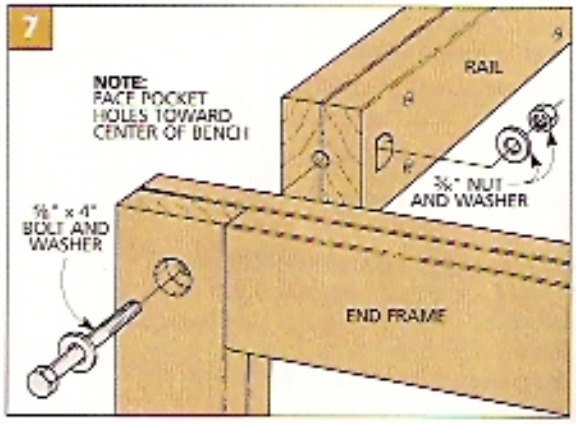
Note: To keep the pocket holes from showing, I positioned the rails so these holes faced toward the center of the bench (*Fig. 7* and Exploded View on page 51).

SHOP TIP
Nut Holder

To help start a nut (in the pocket hole), I attached the nut to a small scrap of wood with a piece of carpet tape.







TECHNIQUE ..... Undercutting

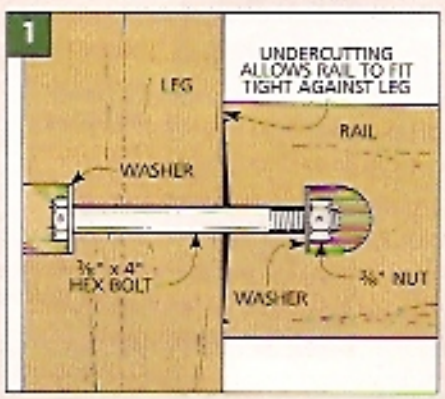
Sometimes it's difficult to get a tight joint line when you butt one piece into another. (Like attaching the rails to the legs on the workbench.) The problem is both surfaces need to be perfectly flat for the joint to pull completely together.

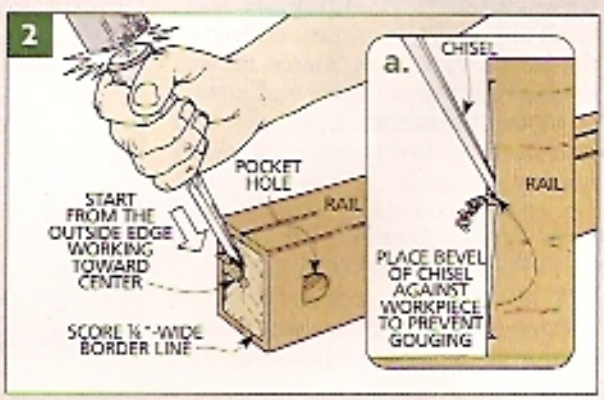
To avoid problems, I use a technique called undercutting. This is simply cutting out a recess on the end of the rails until a small shoulder remains around the perimeter. Since only the shoulder touches the adjoining piece, it's much easier to pull the joint tight *(Fig. 1)*.

UNDERCUTTING THE ENDS. To undercut the rails, I laid out a ¼"-wide border around the perimeter of the ends of the rails *(Fig. 2)*. Then I chopped straight down on this border line with a chisel to score the line 1/16"-deep.

CHOP OUT WASTE. Once the line is defined, just chisel the waste away. To do this, hold the chisel with the bevel facing against the end of the rail, to keep the chisel from digging too deeply *(Fig. 2)*.

To keep the shoulder from breaking off, start the chisel at the border line, paring away the end grain as you work toward the center of the recess *(Fig. 2a)*. After the end of the rail has been undercut, attach the rail to the leg. As you tighten the hex bolt, the joint should pull together without gaps.





TOP & SHELF

With the base bolted together, all that's left is to attach the top (G) and bottom shelves. I used a 1¾"-thick solid-core door as a top. But you could laminate two pieces of ¾" plywood together instead.

ATTACH TOP. To attach the top, turn the top and the base upside down and center the base on the top. Then mark and drill the mounting holes on the bottom side of the top rails *(Fig. 8)*. Now attach the top with lag screws and washers.

INSTALL SHELF. Finally, cut a plywood bottom shelf (H) to fit between the rails. (I used a 48"-long piece to fit between the end frames which are 48⅜" apart.) Use some leftover plywood to make the shelf cleats (I, J). Then attach the shelf cleats to the top inside edge of the bottom rails and side braces *(Fig. 9a)*.

Note: Don't cover the pocket holes when attaching the cleats so you can get to the draw bolts.

DRAWER GUIDES

After the basic bench was built, I added a set of drawers. The first step here is to build and install the drawer guides (K). For durability, I used hard maple to make the guides, but you could make them out of pine (same as the drawers).

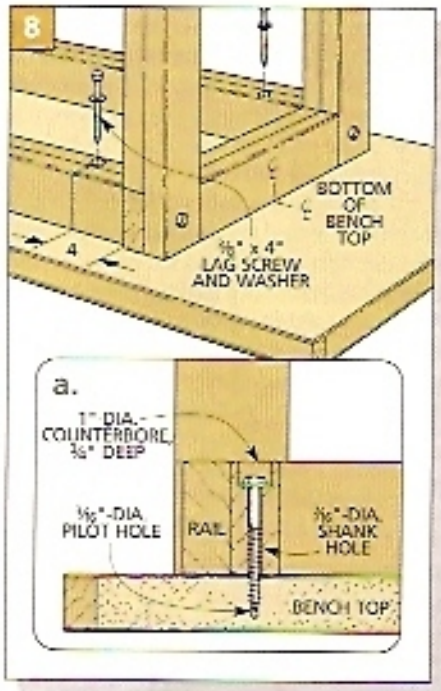
CUT GUIDES TO SIZE. There are a total of six drawer guides made from ¾"-thick stock. However, the two center guides are laminated together *(Fig. 10)*. To make things easier, I glued up the two center guides to a rough width of 2¾". Then I trimmed the center guides along with the two side guides to a finished width of 2⁹⁄₁₆" and cut them to length *(Fig. 10)*.

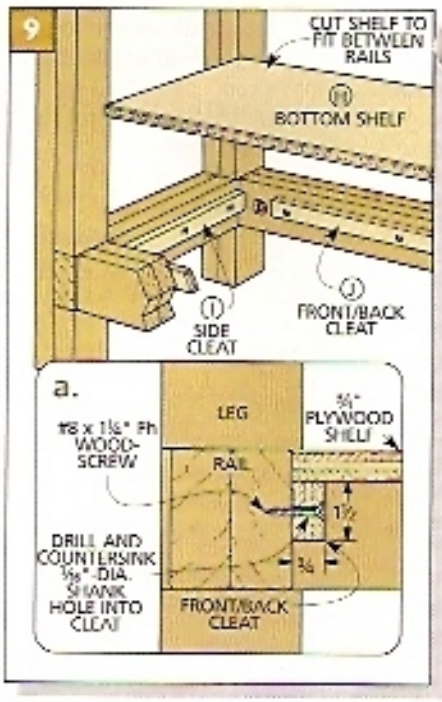
CUT THE GROOVES. Once the guides are cut to size, grooves are cut to accept the drawer runners *(Fig. 10)*. I cut these ½"-deep grooves with a ¾" dado blade.

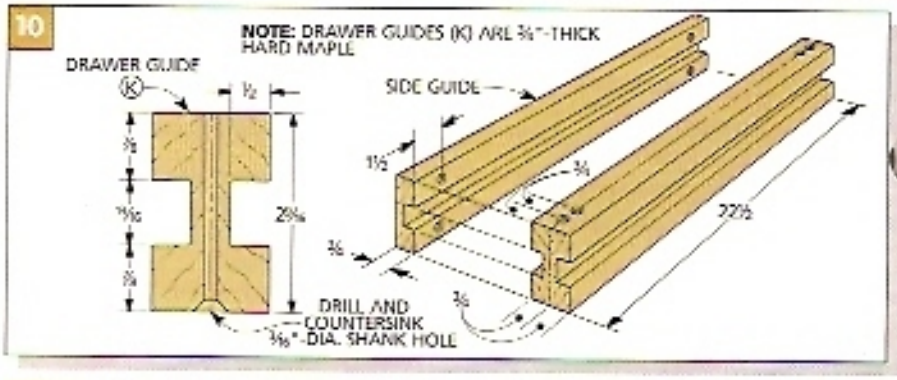
To cut the grooves, first position the table saw fence ⅞" from the blade. Then, to get the ¹³⁄₁₆"-wide groove centered on the guides, I made two passes, turning the pieces end-for-end after each pass.

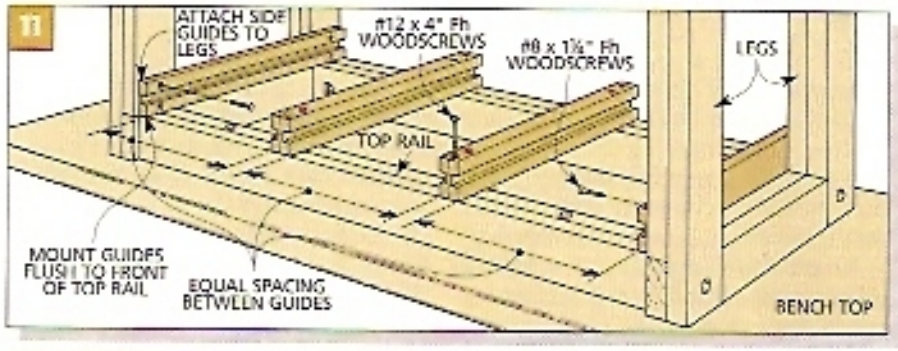
MOUNT THE GUIDES. After the grooves have been cut, drill countersunk shank holes at the locations shown *(Fig. 10)*. Then position the side guides so they're flush with the front of the top rail and screw them to the legs *(Fig. 11)*.

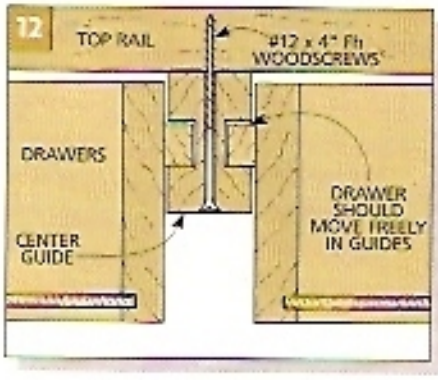
With the side guides in place, position the center guides so the three drawer openings are equal *(Fig. 11)*.

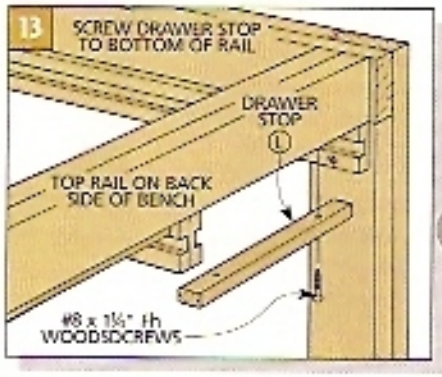












Once they're in place, screw the center guides to the top rails *(Fig. 12)*.

DRAWER STOPS. Finally, I cut drawer stops (L) to keep them from being pushed in too far *(Fig. 13)*. Later, you'll screw the stops in position so the backs of the drawers hit them before the false front hits the end of the drawer guides.

DRAWERS

Next, build the drawers to size to fit between the guides. Since these drawers will be subjected to a lot of weight, I built them with dovetail joints, using a router and a dovetail jig.

Start by cutting the fronts and backs (M) to length (⅛" less than the distance between the drawer guides) and width *(Fig. 14)*. Then cut the sides (N) to the same width and 20¼" long.

After the pieces have been cut to size, rout all the dovetail joints.

BOTTOM GROOVE. Before assembling the drawer, cut the groove for the plywood bottom (O) *(Fig. 15)*. The width of the groove is determined by the thickness of the plywood. (In this case, ¼".)

TRAY GROOVE. To provide additional storage, I added a tray to one of the drawers *(Fig. 17)*. To make a ledge for the tray to slide on, I cut another groove in the drawer sides *(Fig. 15)*.

Now, assemble the drawers and cut the tray splines (R) to fit in the grooves and glue them in place *(Fig. 14)*.

FALSE FRONTS. The next step is to cut and attach the false fronts (P). Once the fronts are cut, drill and countersink four mounting holes *(Fig. 15)*. Then position the fronts flush to the bottom of the drawer and centered on the width, and screw them to the drawers *(Fig. 16)*.

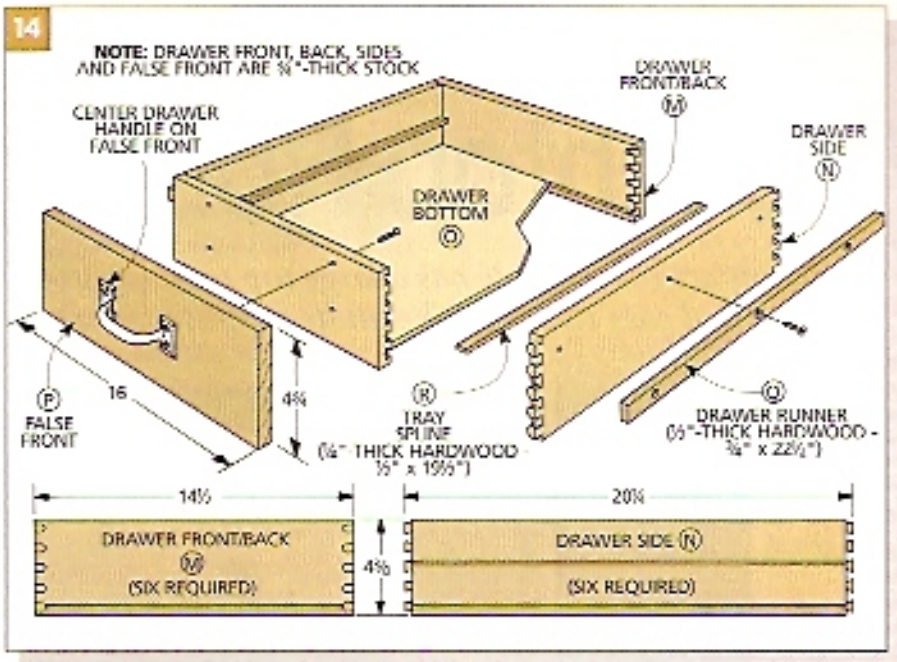
RUNNERS. All that's left to complete the drawers is to cut the hardwood drawer runners (Q) and mount them so they slide in the drawer guides *(Fig. 16)*.

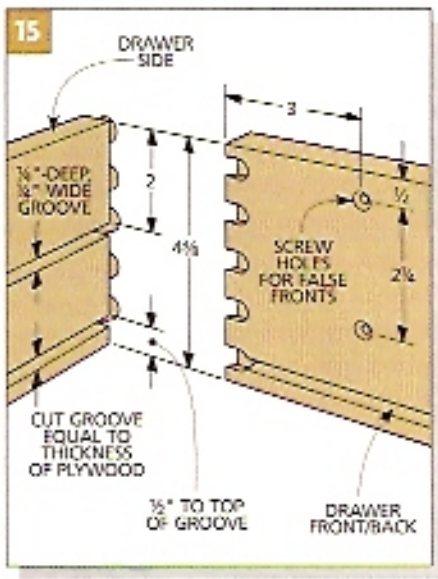
TRAY

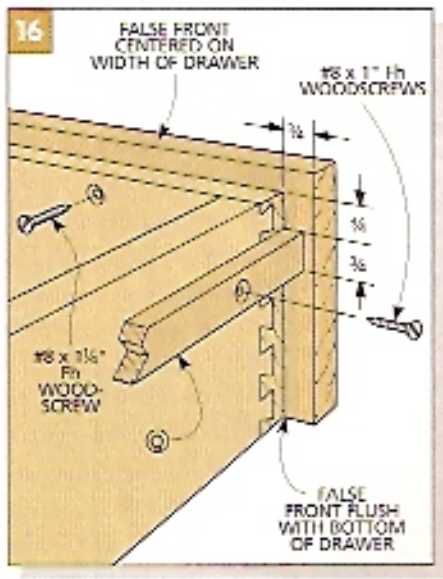
To keep small tools from getting lost in the bottom of the drawer, I built a shallow sliding tray for one of the large drawers.

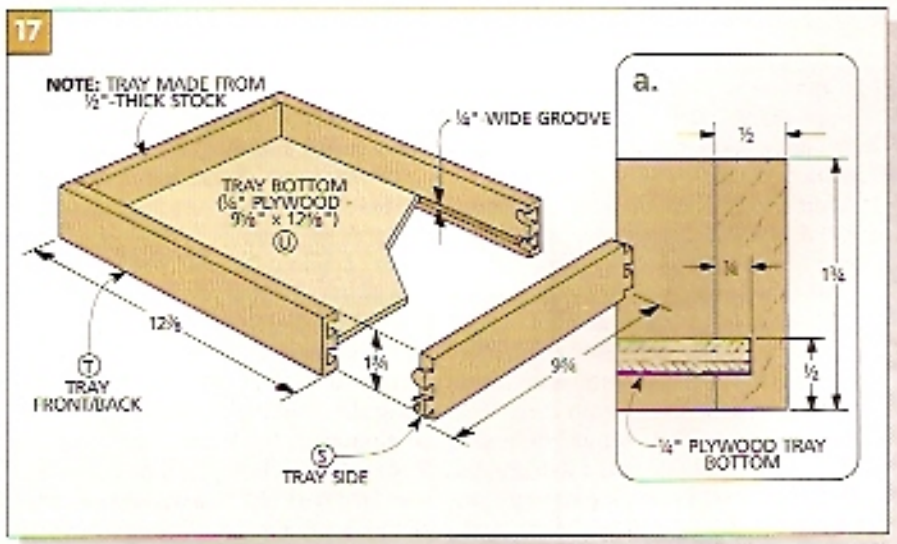
THE SIDES. To do this, start by cutting tray sides (S) to length *(Fig. 17)*. The front and back (T) pieces are ⅛" smaller than the inside of the drawer *(Fig. 17)*.

Once the tray pieces are cut to length, the ends can be dovetailed together. Also cut grooves for the plywood bottom (U) *(Fig. 17a)* and assemble the tray. ■



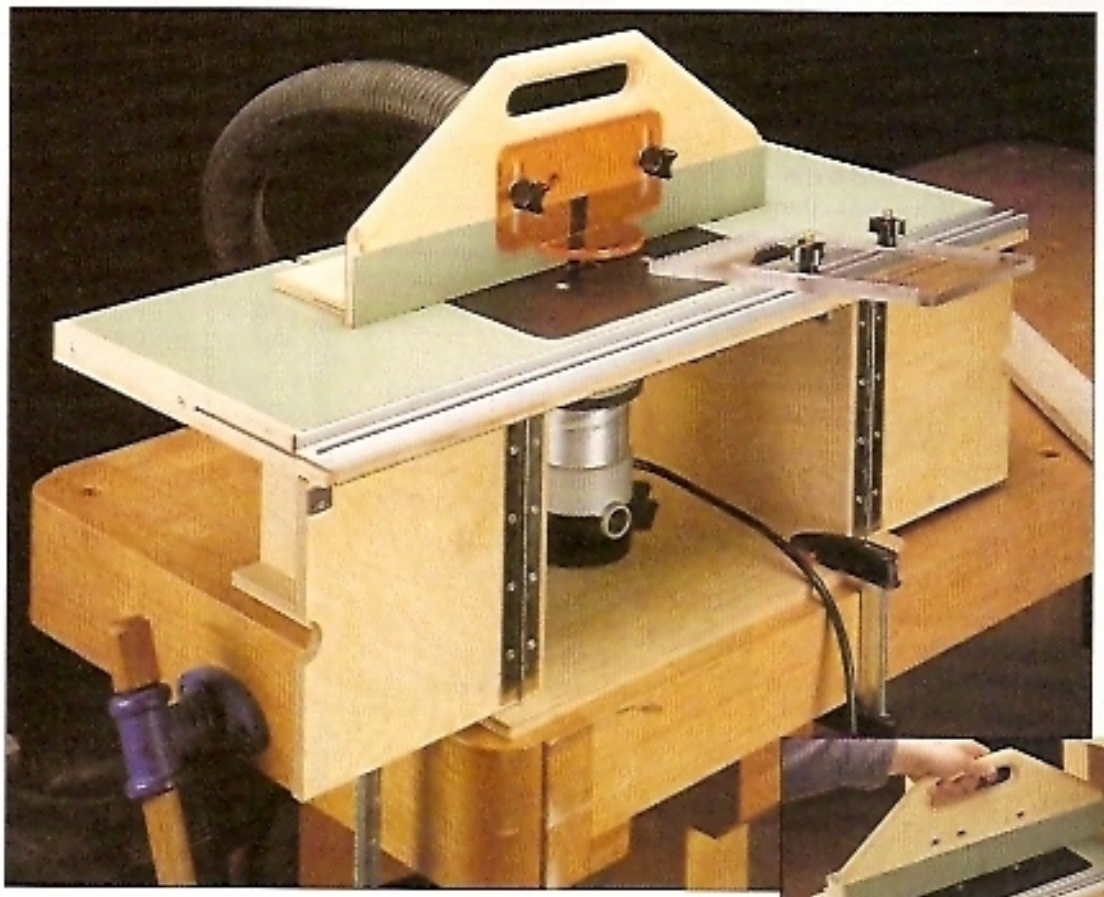






Benchtop Router Table

This compact router table has a large top with wings that fold away, making it compact and easy to store. The multi-purpose fence doubles as a sturdy handle.



Let's face it. Not every shop has room for a large, stationary router table. That's the reason I like this Benchtop Router Table.

Instead of taking up valuable floor space, the router table simply clamps to a bench. And once a job is completed, it folds up into a compact box that's stored neatly out of the way (see inset photo).

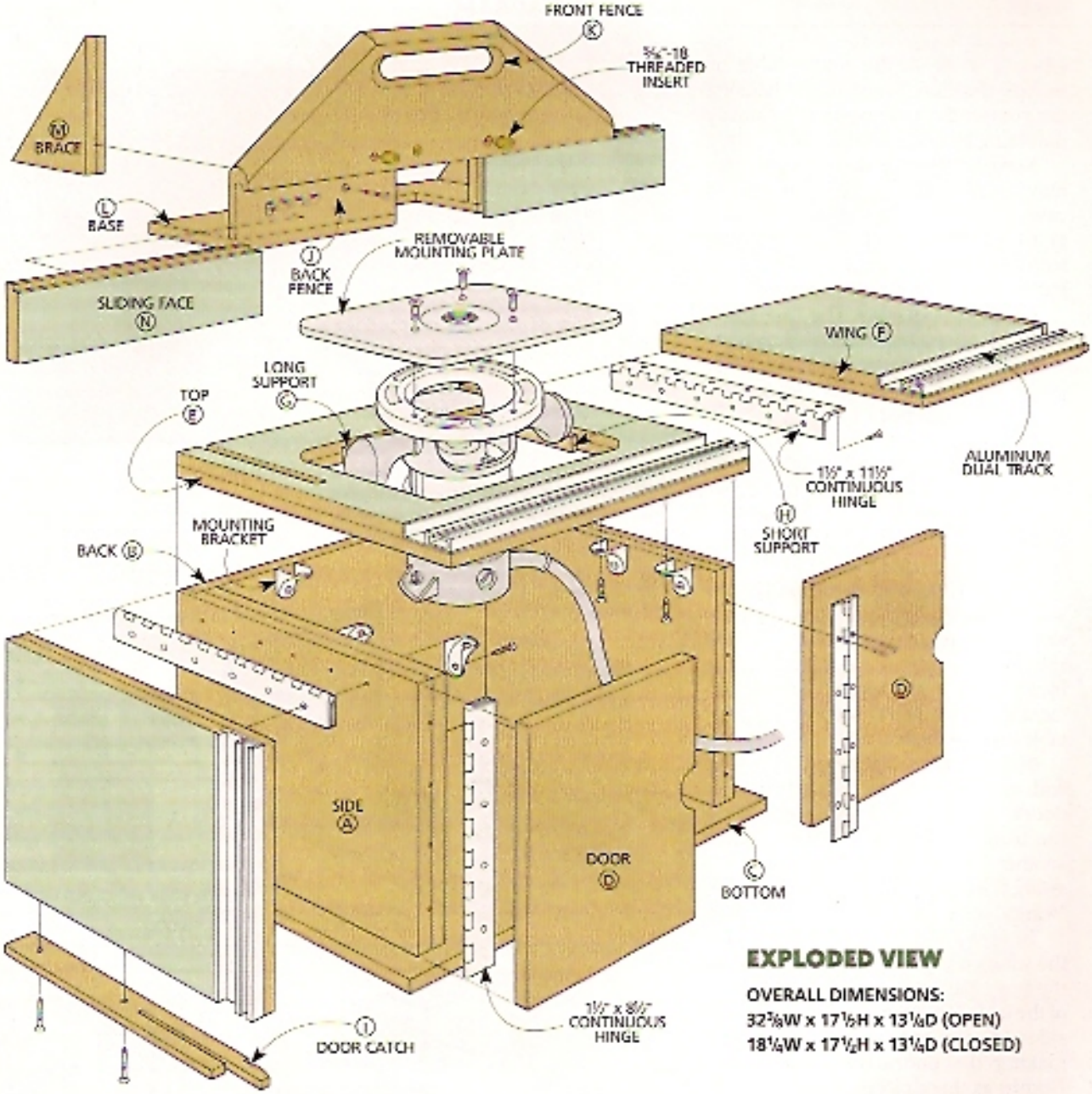
With the router table folded up, it's only about as big as a picnic basket. But don't let its small size fool you.

LARGE TABLE. The "wings" on each side of the router table fold out to create a large, flat table. To provide support for the wings, just open the doors and swing them underneath. The doors "click" into a shop-made catch with a reassuring sound.

FENCE. As much as I like the table, it's the fence that impresses me the most. It adjusts easily and locks down tight. And a pair of sliding faces let you change the size of the opening around the bit. The fence even doubles as a handle to make it easy to carry the router table.

ALUMINUM TRACK. Another handy thing about this router table is that it has an aluminum track that runs along the front edge. Actually, it's *two* tracks in one. One part acts as a smooth, accurate slot for a miter gauge. The other lets you attach a featherboard.

ANOTHER VERSION. If you want a less expensive version of this router table, take a look at the Designer's Notebook on page 59. It uses the same basic design as the deluxe version, but I left out the aluminum track system and a few other options to keep the cost down.



EXPLODED VIEW

OVERALL DIMENSIONS:
32⅞W x 17⅛H x 13¼D (OPEN)
18¼W x 17½H x 13¼D (CLOSED)

MATERIALS LIST

CASE		
A	Sides (2)	1 ply - 8¾ x 12½
B	Back (1)	½ ply - 8¾ x 15½
C	Bottom (1)	½ ply - 13¼ x 18½
D	Doors (2)	½ ply - 8¾ x 7 15/16
E	Top (1)	1 ply - 13¼ x 16
F	Wings (2)	1 ply - 13¼ x 7⅞
G	Long Supports (2)	¼ x 1 1/16 - 9
H	Short Supports (2)	¼ x 1 1/16 - 6
I	Door Catches (2)	5/16 x 1⅛ - 13¼
FENCE		
J	Back Fence (1)	½ ply - 6¾ x 18¼
K	Front Fence (1)	½ ply - 5 x 18⅛
L	Base (1)	½ ply - 4 x 18⅛
M	Braces (2)	1 ply - 3½ x 5
N	Sliding Faces (2)	½ ply - 2½ x 9⅛

Note: All 1"-thick plywood is made by face-gluing two pieces of ½" plywood.

HARDWARE SUPPLIES

(1) Router mounting plate
(1 pc.) 48" x 48" plastic laminate
(50) No. 4 x ½" Fh woodscrews
(16) No. 6 x ¾" Fh woodscrews
(16) No. 6 x 1½" Fh woodscrews
(4) 1" wire brads (18 gauge)
(6) Mounting brackets
(1) Magnetic catch
(2) 1½" x 8½" cont. hinges w/ screws
(2) 1½" x 11½" cont. hinges w/ screws
(2) ¼"-20 threaded rods (1⅛" long)
(2) 5/16"-18 x 1¾" toilet bolts
(2) 5/16" flat washers
(2) ¼" flat washers
(2) ¼"-20 star knob (through-hole)
(2) 5/16"-18 star knob (through-hole)
(3) 5/16"-18 threaded inserts (⅝" long)
(1) 32"-long aluminum dual track

CASE

I began work on the router table by making the case. In addition to housing the router, the case provides a sturdy mounting platform for the table.

Note: Depending on your router, you may need to modify the height of the case. Just be sure it's tall enough that you can adjust the height of the bit without having the router contact the bottom of the case.

U-SHAPED ASSEMBLY. The case starts out as a U-shaped assembly that consists of two sides and a back *(Fig. 1)*. Each side is glued up from two oversize pieces of ½" plywood. (I used Baltic birch.)

After trimming the sides (A) to final size, you'll need to rabbet the back, inside edge of each one to accept the back (B) *(Fig. 1a)*. The back is a piece of ½" plywood that's glued and screwed to the sides.

BOTTOM. The next step is to add a plywood bottom (C) *(Fig. 1)*. The bottom is sized to extend an equal amount past the sides and front of the case. (It's flush at the back.) This provides several clamping surfaces that allow you to secure the router table to a workbench.

DOORS. After attaching the bottom with glue and screws, I added a pair of doors (D) *(Fig. 2)*. Besides enclosing the front of the case, the doors have another (more important) job. When you swing the doors open, they hold up the "wings" of the router table.

To create a continuous, flat surface, the wings work best when supported at the exact same height as the center part of the table. This center part rests on the sides (A) and back (B) of the case. So making the doors the same height (width) as these pieces will prevent the wings from sagging.

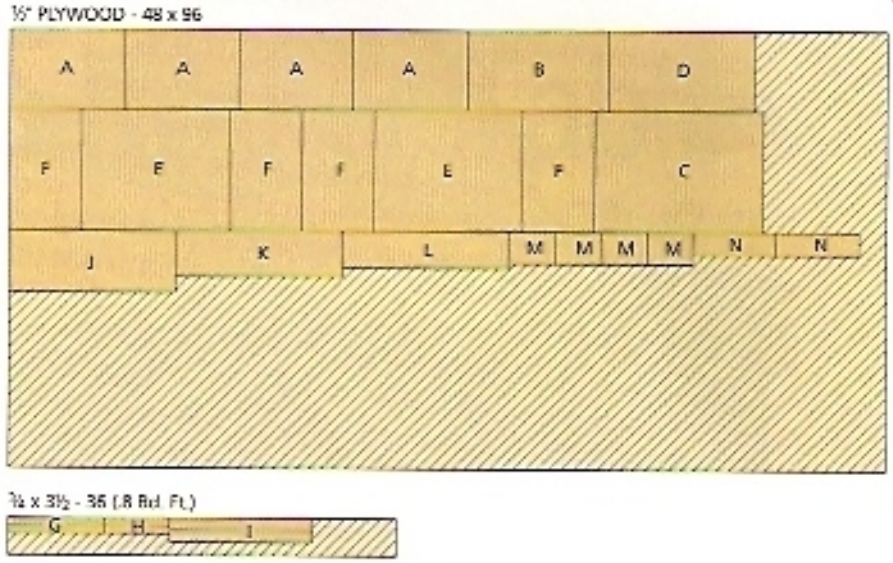
Of course, this means that the doors will fit quite tightly in the opening when the top is added later. But that's okay. In fact, the goal is to size the doors so they'll just barely scrape against the top and bottom.

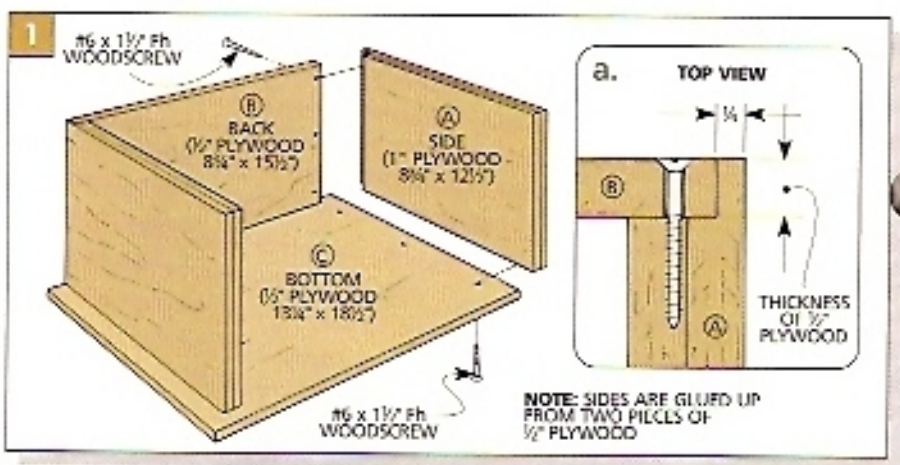
To do this, I made both doors from a single blank of ½" plywood *(Fig. 2)*. As I mentioned, the plywood is ripped to width to match the height of the sides. And it's cut to length to match the distance of the case from one outside face to the other.

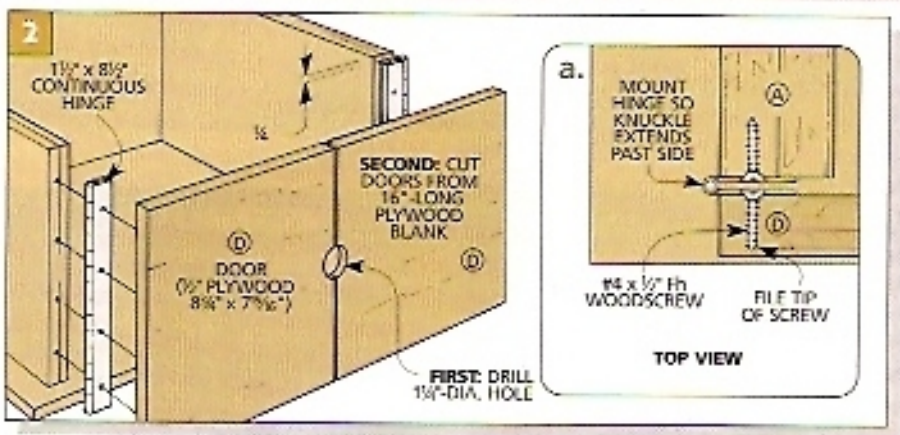
FINGER RECESSES. Before crosscutting the blank into two equal pieces to make the doors, it's best to drill a hole for the finger recesses. This is just a matter of drilling a centered hole in the plywood blank before making the crosscut (the kerf from this cut leaves a ⅛" gap between the doors).

INSTALL DOORS. All that's left to complete the case is to install the doors. They're held in place with a pair of continuous (piano) hinges *(Fig. 2a)*. One thing to be aware of here is that the hinges are located ¼" *below* the top of the door and side. This provides clearance that keeps the wings from binding against the hinge.

CUTTING DIAGRAM







TABLE

Once the hinges are screwed in place, you can turn your attention to the table. Basically it consists of three parts: a top (E) and two wings (F) *(Fig. 4)*.

GLUE UP BLANK. Here again, it's easiest to make all three parts from one blank. I wanted to create a thick, sturdy table. To do this, I simply glued up two pieces of ½" plywood *(Fig. 3)*.

PLASTIC LAMINATE. Regardless of its thickness, the surface of the table will still get worn from sliding workpieces across it. So to produce a durable surface, it's a good idea to glue a piece of plastic laminate to the top of the blank. And add another piece to the bottom of the blank. Laminating both sides helps keep the table from warping.

TRACK SYSTEM. After trimming the laminate flush, I added an aluminum track system. This system consists of two parts: a wide, L-shaped piece, and on top of it, a narrow mounting strip with a T-shaped slot *(Fig. 3)*.

Together, these parts form a slot for the miter gauge. And the mounting strip makes it easy to attach a featherboard. Just slip the head of a toilet bolt into the T-slot and secure the featherboard with a knob.

Note: This track system is available exclusively from *Woodsmith Project Supplies*. Refer to Sources on page 112.

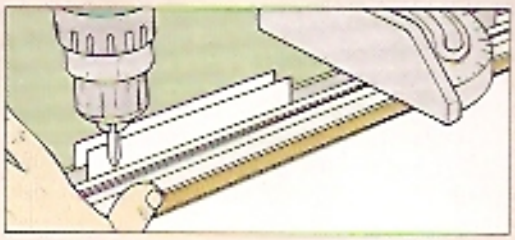
Of course, you can build the router table without using the track at all. In that case, you may want to rout a slot in the blank for a miter gauge. Or just plan on using a squared-up block to push the workpiece past the bit.

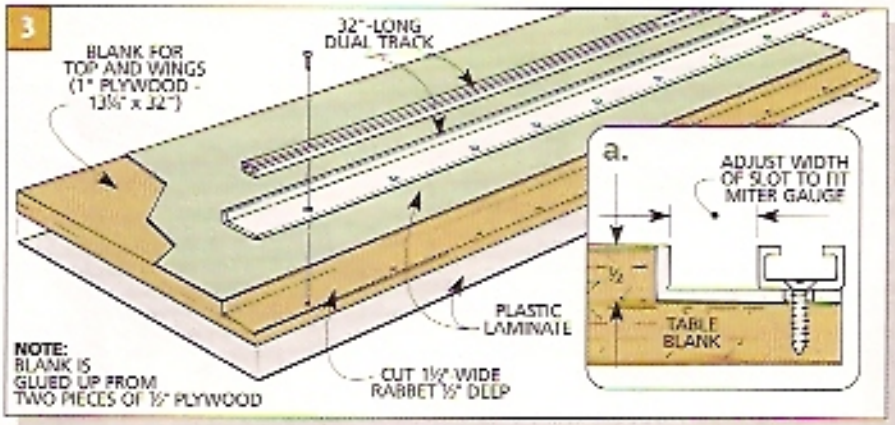
INSTALL TRACK. There's nothing complicated about installing the track. The L-shaped piece fits in a rabbet that's cut in the edge of the blank *(Fig. 3a)*. Then, to position the narrow mounting strip, I used the bar on the miter gauge and a single layer of paper as a spacer. (See the Shop Tip above for the best way to do this.)

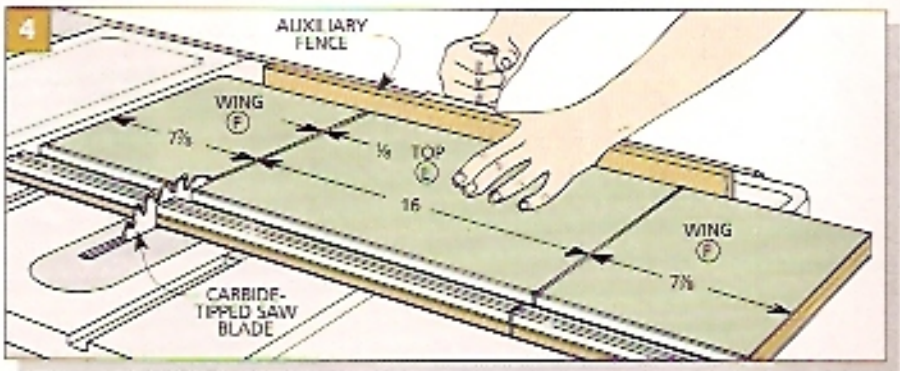
CROSSCUT BLANK. After attaching the narrow strip with screws, it's time to crosscut the blank to form the three table pieces *(Fig. 4)*. A table saw and a miter gauge with an auxiliary fence make quick work of the job of cutting the blank. And as long as you use a carbide-tipped saw blade, there's no need to worry about cutting through the aluminum track. Aluminum is quite soft, and it cuts easily.

SHOP TIP . . . . . Track System

Wrap a single layer of paper around the miter gauge bar to ensure a smooth, sliding fit for the miter gauge when installing the aluminum track system to the table top.







DESIGNER'S NOTEBOOK

BASIC ROUTER TABLE

■ This router table uses the same basic design as the deluxe version. But in order to simplify construction and reduce the cost, there are a few minor changes.

First of all, the table and the sliding faces on the fence aren't covered with laminate.

■ The table also features a removable mounting plate. It's just a ¼"-thick phenolic plate, pre-drilled for the router bit and finger holes.

■ Finally, the aluminum track system was eliminated. The featherboard is attached with knobs into threaded inserts installed in the table.

TECHNIQUE ..... Mounting Plate

Thanks to a mounting plate that fits into an opening in the router table, changing bits is a snap (see photo). For sources of mounting plates, see page 112.

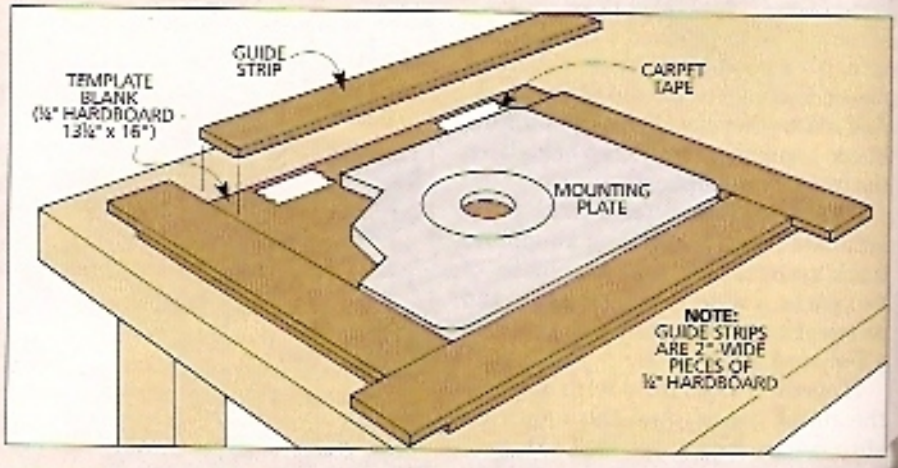
To provide easy access to the router, just lift the mounting plate out of the opening. Then change the bit and drop the mounting plate back in.

TEMPLATE. The challenge is cutting an opening that allows the mounting plate to fit nice and snug. To do this, I made a hardboard template *(Steps 1 through 3)*.

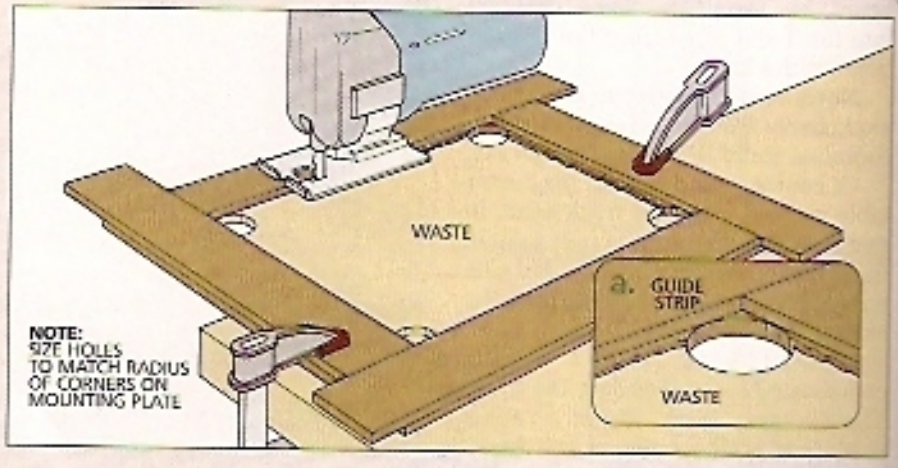
CUT OPENING. By using the template as a guide, you can cut an identical opening in the top (E) of the router table *(Steps 4 and 5)*.

SUPPORT STRIPS. Next add several hardwood strips to support the mounting plate *(Step 6)*. Then simply attach the router to the mounting plate *(Step 7)*.

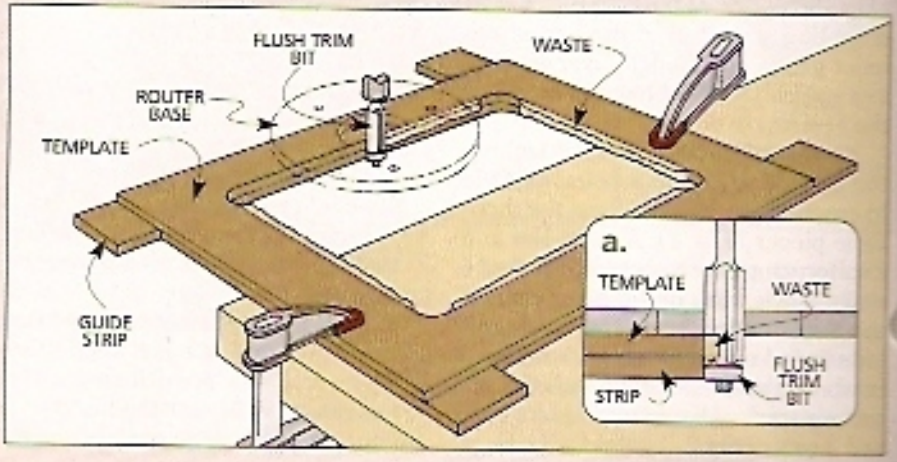
1 To make the template, start by cutting a ¼" hardboard blank to the same size as the top of the table. Then center the mounting plate on the blank and surround it with hardboard guide strips. The strips are simply butted against the plate and secured with carpet tape.



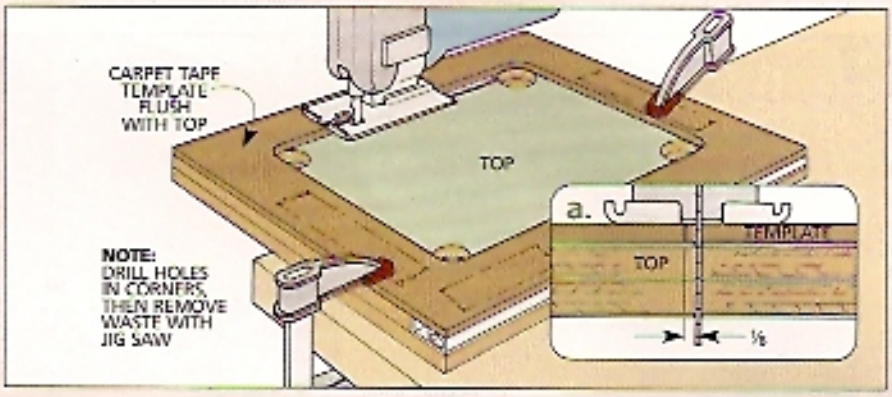
2 After removing the mounting plate, the next step is to cut a rough opening in the template. To do this, drill a hole in each corner that just grazes the edges of the guide strips (see detail 'a'). Then remove the bulk of the waste with a jig saw by cutting inside the strips.



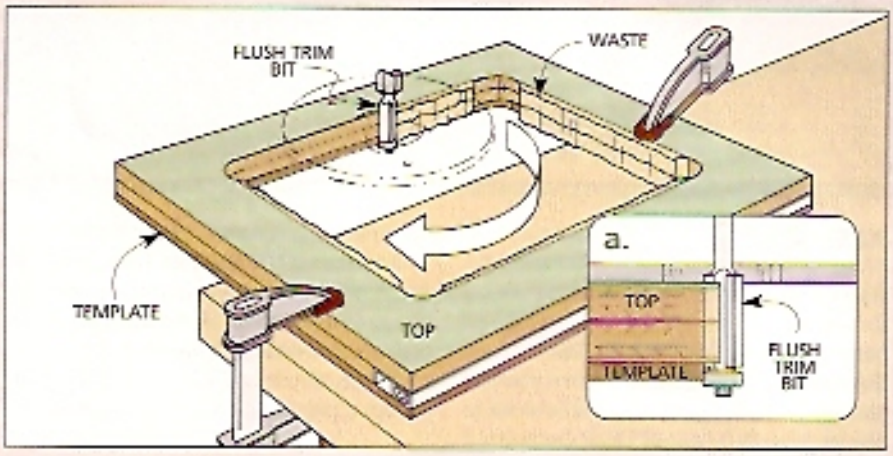
3 Now flip the template over so the guide strips are on the bottom and clean up the rest of the waste with a hand-held router and flush-trim bit. To avoid changing the radius of the corners, stop routing just short of the corner holes. This leaves a ridge that's easily sanded smooth.



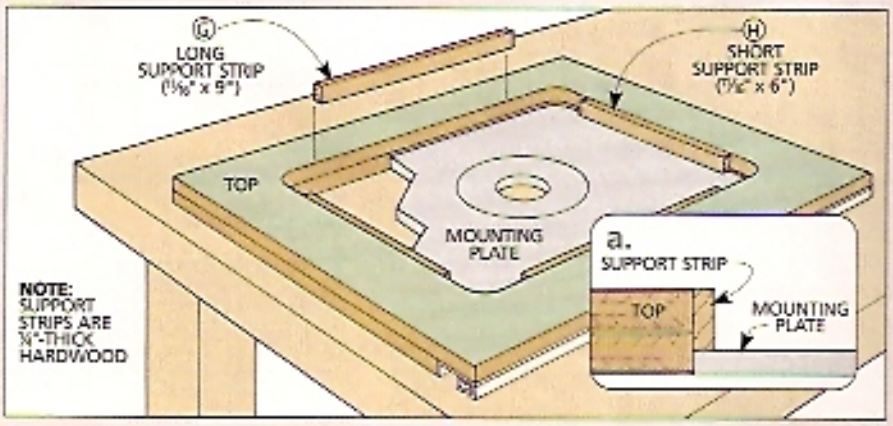
4 *Now you can use the template as a guide to cut the opening in the table top. After carpet-taping the template flush with the top, drill holes in the corners as before. Then cut the opening to rough size, staying about '⅛" to the inside edge of the template (see detail 'a').*



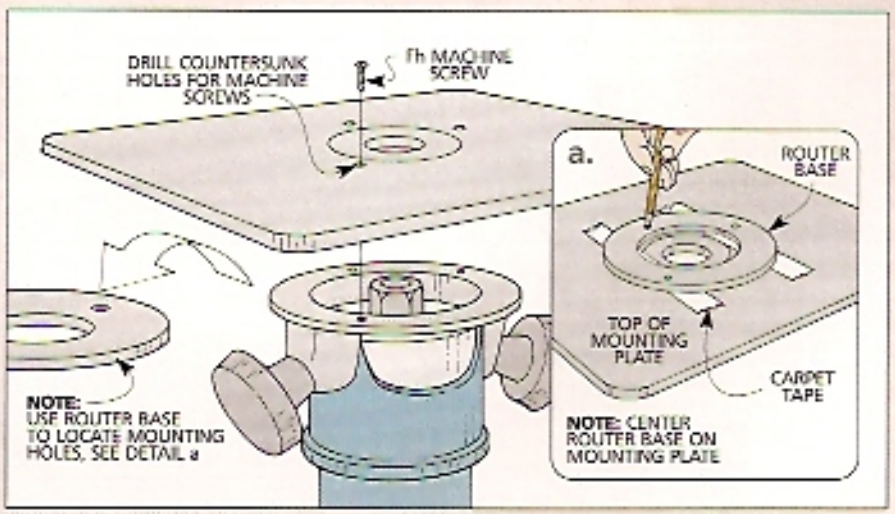
5 *At this point, it's just a matter of trimming the edges of the opening flush with the template. Here again, a hand-held router and flush-trim bit make quick work of this. Just flip the top so the template is on the bottom. Then clean up the waste by routing in the direction shown.*

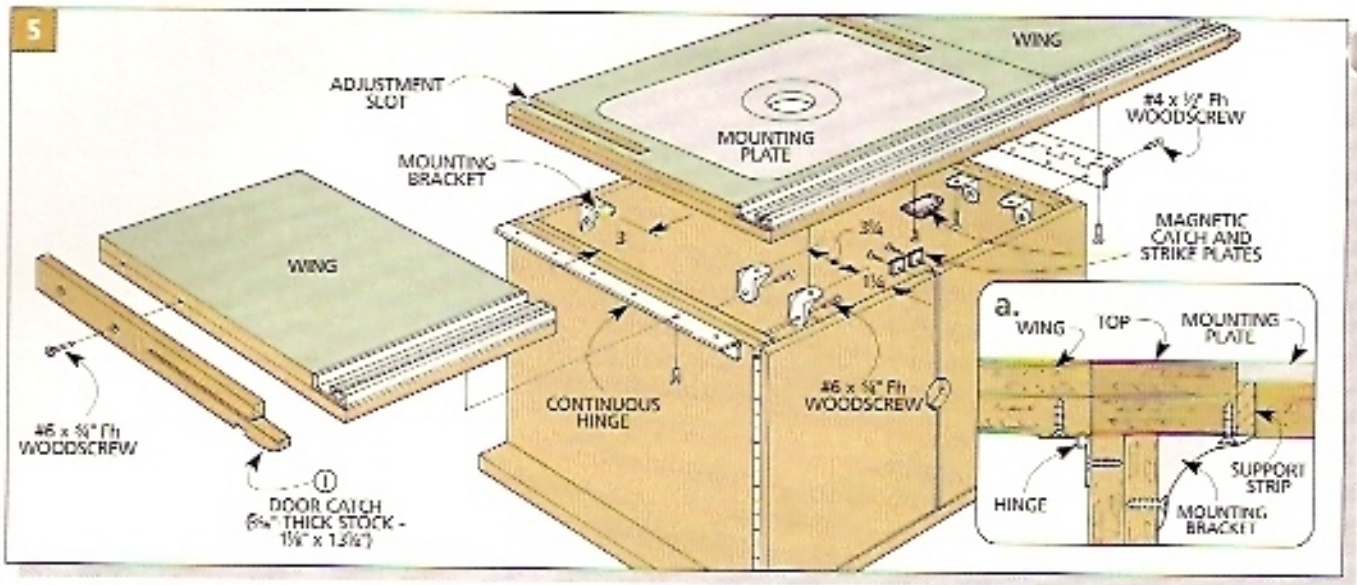


6 *Once the opening is complete, you'll need to add thin, hardwood strips to provide support for the mounting plate. To ensure that the mounting plate is flush with the top, start by placing both parts face down on a flat surface. Then butt the strips against the plate and glue them to the top.*



7 *All that's left to do is to attach the router to the mounting plate. This requires drilling holes for the machine screws that hold it in place. An easy way to locate the holes for the screws is to use the existing base on your router. (I used two-sided carpet tape to keep the base from shifting.)*





ASSEMBLY

Assembling the table is a fairly straightforward process. But getting all three parts to form a continuous, flat surface does require some care. Before you get started though, there's still some work to do on the top (center) of the table.

ADJUSTMENT SLOTS. To make the fence adjustable from front to back, cut two slots that extend about halfway across the top of the table *(Fig. 5)*.

Later, these adjustment slots will accept a pair of toilet bolts. So each one is shaped like an upside-down "T". The narrow part of each slot accepts the shank of the bolt. And the head of the bolt fits in a wide, shallow recess.

To cut the narrow part of each slot in a single pass, I mounted a ⅜"-wide dado blade in the table saw *(Fig. 6a)*.

Note: This cut will leave an arc at the end of the slot. But that's okay, as long as it's on the bottom of the table. It won't show once the table is assembled.

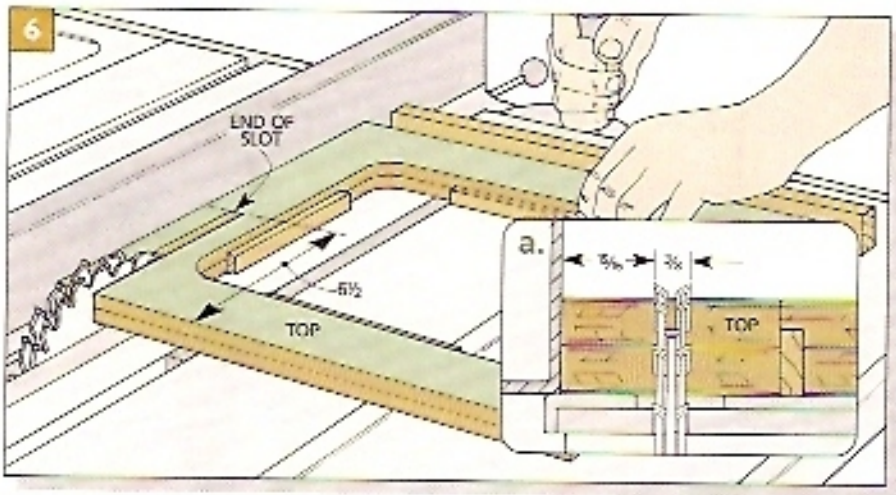
This means you'll need to mark the end of the slot on the top of the workpiece and then cut up to the line *(Fig. 6)*. To reduce the chance of kickback, turn off the saw and let the blade stop spinning before sliding the top back across the saw table.

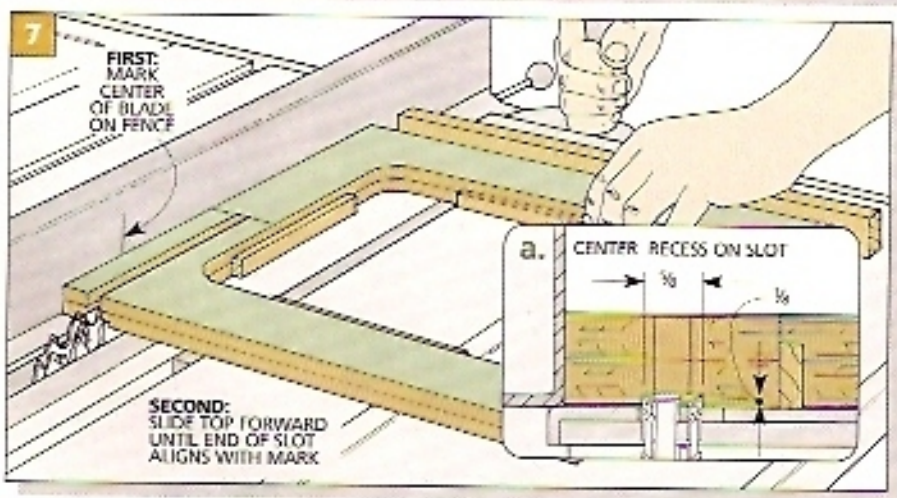
To cut the narrow part of the slot in the opposite end, you could flip the workpiece over and use the same setup. But then the arc would be cut in the top surface of the table. So I moved the fence to the opposite side of the blade to cut this slot.

RECESS. Now you're ready to cut the shallow recess for the head of the bolt. The procedure is the same, only here I used a ⅝"-wide dado blade and set it for an ⅛"-deep cut *(Fig. 7a)*.

Since the blade won't extend all the way through the top, it won't be visible. So add a reference mark to establish the end of the recess. A pencil mark on the rip fence that indicates the top (center) of the blade will work fine *(Fig. 7)*.

Now just turn on the saw and push the workpiece forward until the end of the slot aligns with the mark. As before, move the fence to the *opposite* side of the blade to cut the other recess.





MOUNT TOP. Once the adjustment slots are completed, you can mount the top. It's attached with six metal brackets to the case *(Fig. 5a)*.

After positioning the top flush with the sides and back, the brackets are just screwed in place. I also added a magnetic catch and two strike plates to keep the doors closed.

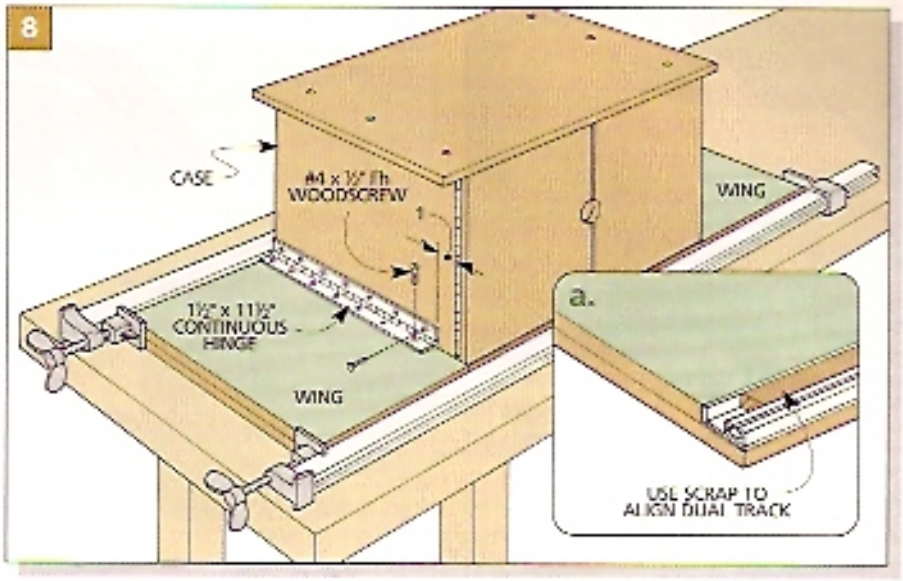
ATTACH WINGS. The next step is to attach the wings. As with the doors, they're hinged to the case. But first, you'll want to make sure the aluminum track in the wings aligns with the aluminum track in the top. Also, it's important that the top surface of all three pieces is perfectly flush.

The best way I found to accomplish both things is to cut a scrap to fit snugly in the track *(Fig. 8a)*. The scrap should be long enough to span all three pieces of the router table top. Then turn the case and wings upside down on a *flat* surface and clamp all three pieces together *(Fig. 8)*.

Now it's just a matter of marking the location of the pilot holes for the mounting screws. To provide clearance for the doors as they are swung open, the hinges are set back 1" from the front edge of the sides.

Note: I used carpet tape to keep the continuous hinges from shifting.

After carefully marking the center-points of the mounting holes, you can unclamp the wings and drill the pilot holes. Then just screw the hinges to the wings and sides.

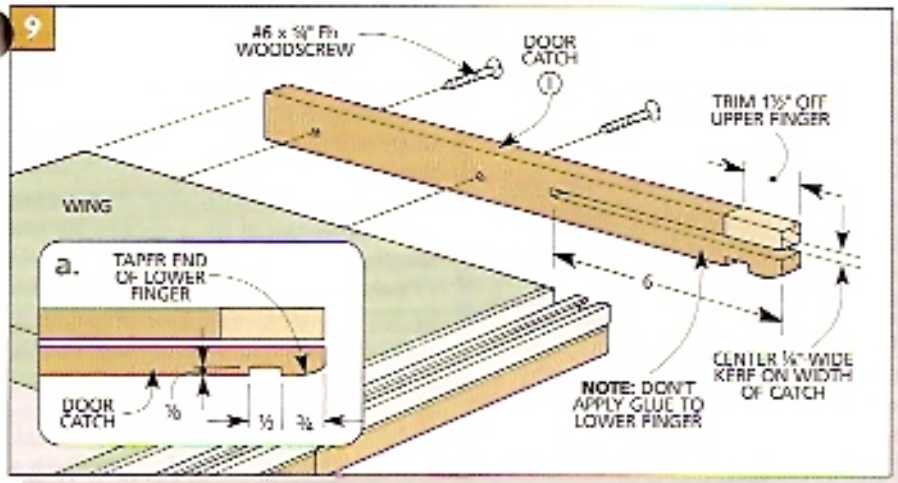


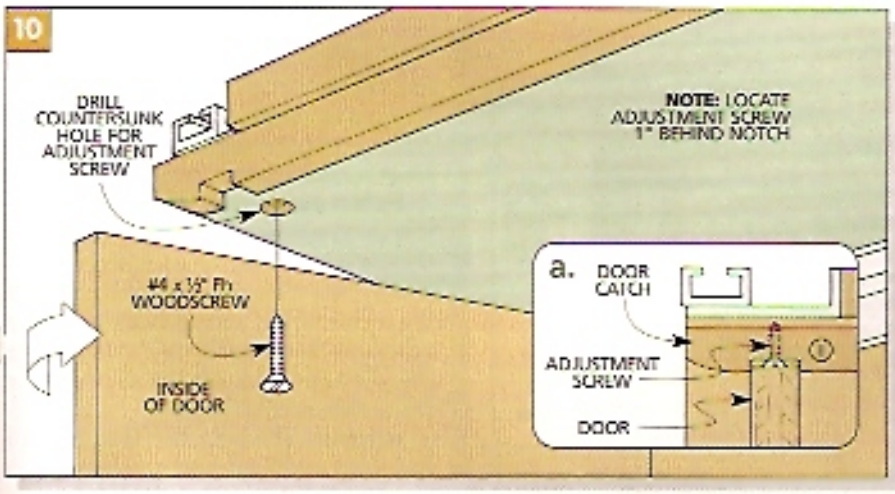
CATCHES. To complete the table, I added a wood catch (I) to each wing *(Fig. 9)*. The catch is just a thin strip of hardwood that "locks" the door in the open position. This prevents the door from swinging out from under the wing if it accidentally becomes dislodged after being bumped.

FINGERS. To make this work, a kerf in each catch forms two "fingers" that flex like an old-fashioned clothespin. The lower edge of the finger tapers toward the end, and it has a small notch in the bottom edge *(Fig. 9a)*. This way, as you swing the door open, it contacts the tapered end of the catch and lifts up the lower finger. To secure the door, just open it a bit further. The lower finger of the catch drops down, and the notch will securely "capture" the door.

Before attaching the catches, you'll need to trim the end of the *upper* finger. This allows the miter gauge to slide in and out of the track. Now glue and screw the catches to the wings. Just make sure you don't apply glue to the lower finger.

ADJUSTMENT SCREWS. At this point it's a good idea to flip up the wings, open the doors, and check the table to make sure it's flat and level. If necessary, you can install an adjustment screw in the bottom of each wing *(Fig. 10)*. Pre-drill a countersunk hole for the screw. The adjustment screw allows you to "tweak" the wings to create a flat, level work surface *(Fig. 10a)*.



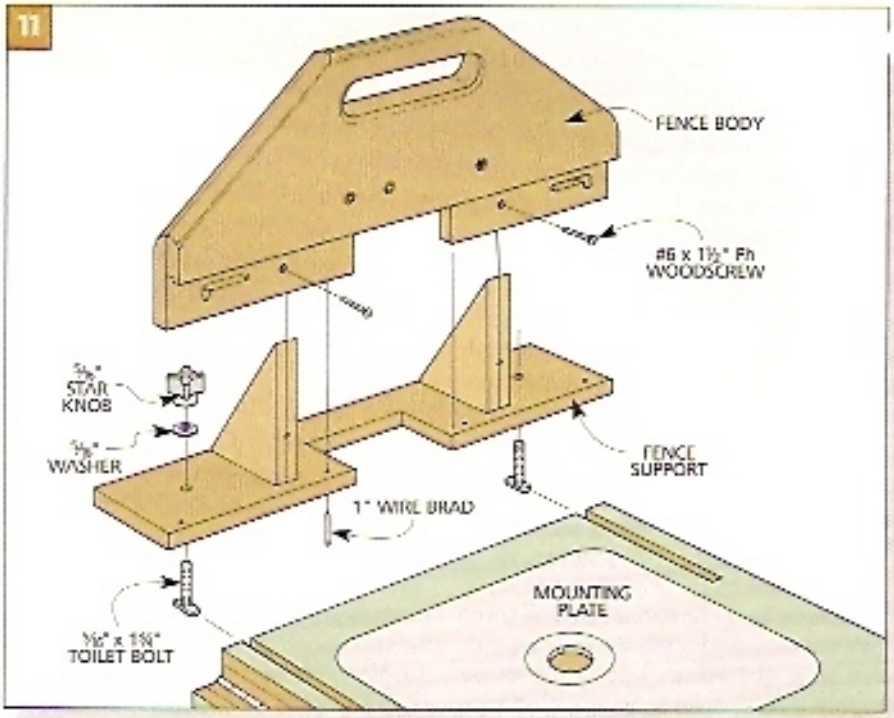


ADJUSTMENT SLOTS. *Two convenient adjustment slots make it easy for you to slide the fence on and off the router table top.*

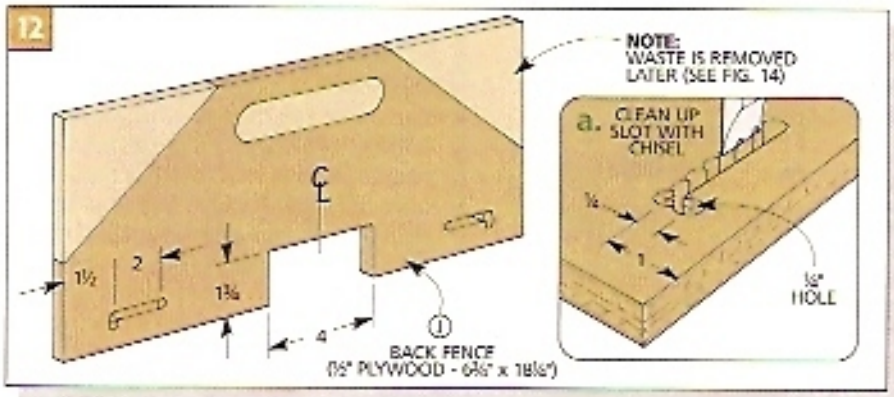
FENCE

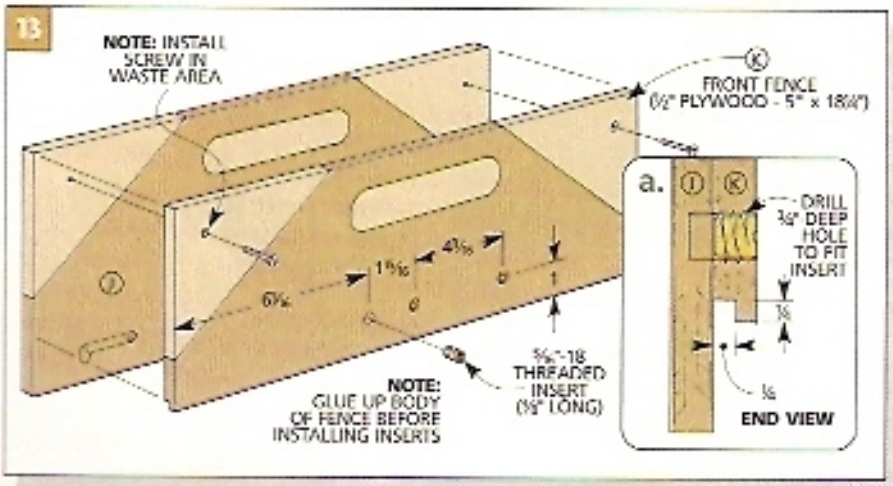
The most unique thing about this router table is that the fence doubles as a handle. The top of the fence body has a long, wide slot for a handhold. And the inside edges of the slot are rounded for comfort. But there's more to it than that.

A simple clamping system is used to lock the fence in place quickly and accurately. There's also an adjustable opening in the fence to accommodate different sized router bits.



The fence consists of three main parts: a tall body with angled corners, a fence support for rigidity *(Fig. 11)*, and two sliding faces to adjust the size of the bit opening (refer to *Fig. 17*).





BODY

Besides acting as the handle, the body of the fence houses the sliding faces. To support the weight of the router table *and* the router, the body needs to be sturdy and strong. So it's made up of two pieces of ½"-thick plywood. But I didn't glue these pieces together right away. Instead, I worked on one at a time. This made it easier to "build in" a recess for the two sliding faces.

BACK FENCE. I began by cutting the back fence (J) to final size *(Fig. 12)*. A wide notch in the bottom edge of this piece forms an opening that prevents the bit from chewing up the fence.

In addition to the notch, you also need to cut a pair of L-shaped slots *(Fig. 12a)*. The long part of each slot lets you adjust the sliding face. And later, the "leg" makes it possible to attach the sliding faces to the fence.

A quick way to cut these slots is to first drill a series of overlapping holes. Then just clean up the ridges with a chisel.

FRONT FENCE. Now you're ready to start on the front fence (K) *(Fig. 13)*. It's the same length as the back, but it's narrower. The difference in widths forms the recess for the sliding faces. Cutting a rabbet in the bottom edge of this piece creates a lip that holds the sliding faces in the recess *(Fig. 13a)*.

GLUE-UP. The next step is to glue up the front and back fence pieces. This

presents a bit of a problem. If the pieces slip out of alignment, the sliding faces will bind in the recess. To prevent this, I used a simple trick.

Start by first screwing the pieces together (no glue) so the top edges and ends are flush *(Fig. 13)*.

Note: Install the screws in the waste areas of the two upper corners.

Now separate the pieces, apply glue, and reinstall the screws. This keeps the pieces from shifting around as you clamp up the assembly.

INSERTS. All that's left to complete the body is to install three threaded inserts, for attaching accessories like a bit guard or featherboard *(Fig. 13a)*.

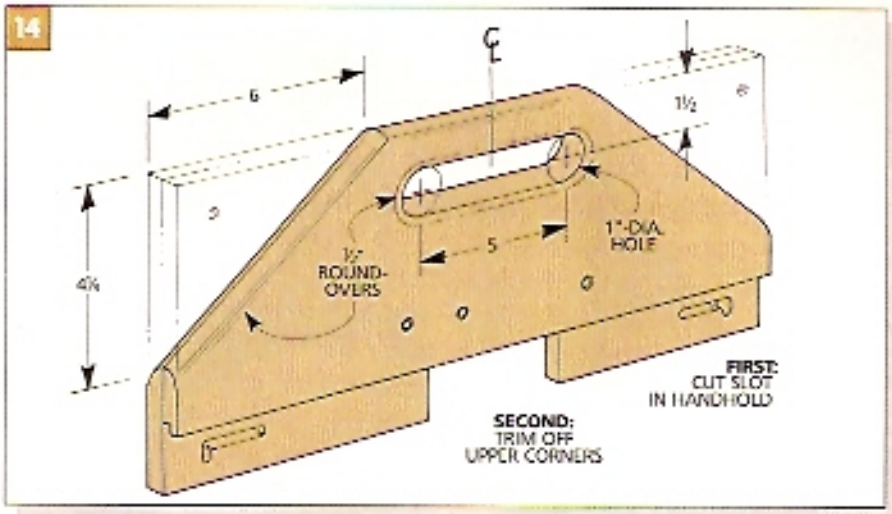
HANDHOLD. Now you can turn your attention to the handhold. It's a long, wide slot at the top of the body *(Fig. 14)*. The ends of the handhold are established by drilling two large holes, and a jig saw makes quick work of removing the rest of the waste. After smoothing the rough spots with a file, I routed roundovers on all the edges to provide a comfortable grip.

To "slim down" the profile of the fence (and reduce its overall weight), it's also a good idea to cut the upper corners of the body at an angle. Here again, sand the rough surfaces smooth and round over the edges.

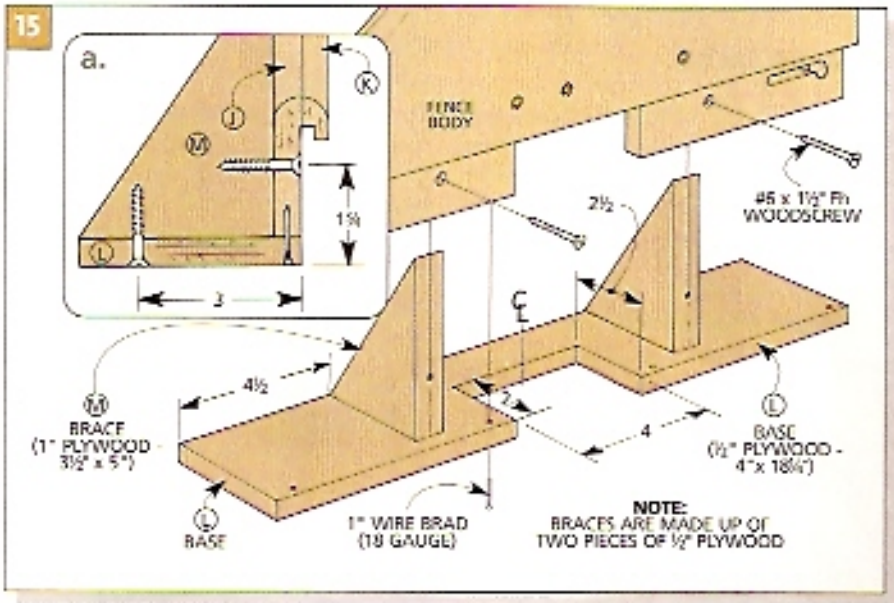
FENCE SUPPORT

To provide accurate results, the fence needs to be square to the table. And since this fence is used to carry the router table around, I wanted to make sure it stayed square. So I added a sturdy fence support as a foundation. It's just a wide base and two triangular braces.

14



15



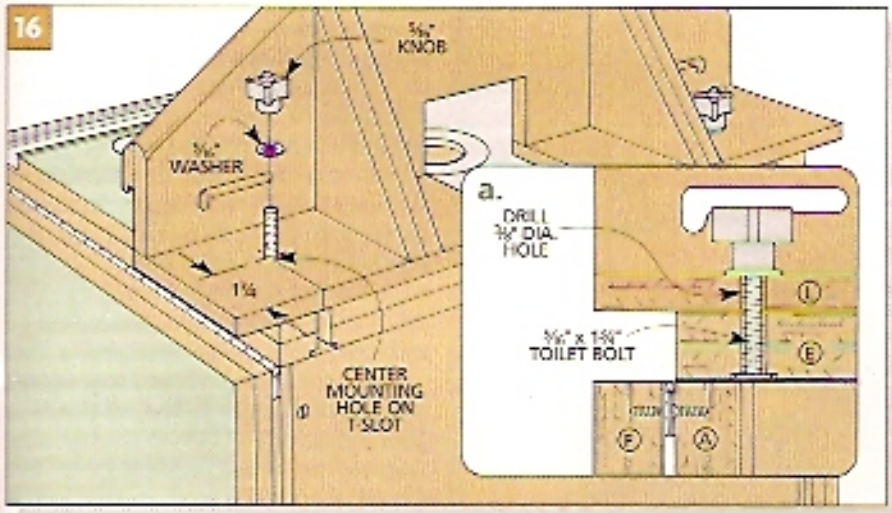
BASE. The base is cut from ¾" plywood (L) *(Fig. 15)*. As with the back fence, cutting a large notch in the base provides clearance for the router bit.

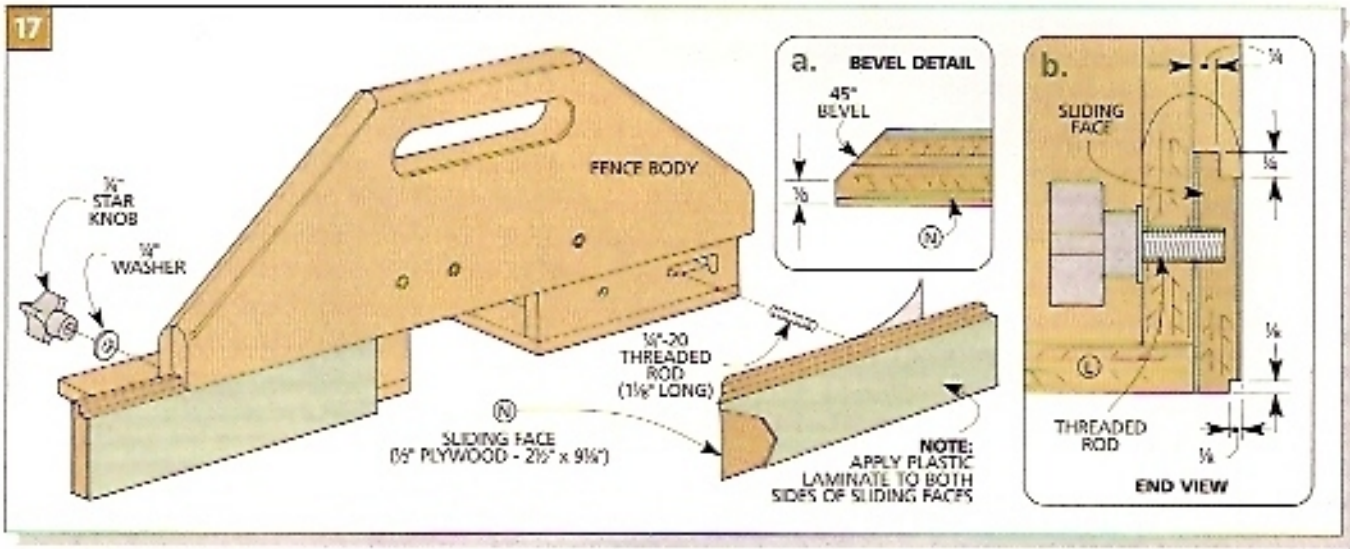
BRACES. Next, to hold the fence square to the base, I added two triangular braces (M). Each brace is made by gluing up two pieces of ¾" plywood. The braces are held in place with glue and screws. But to simplify the assembly, I first glued and nailed the back fence (J) flush with the front edge of the base *(Fig. 15a)*.

MOUNTING HOLES. There's one more thing to do and that's to drill two mounting holes for the toilet bolts that are used to secure the fence to the table *(Figs. 16 and 16a)*.

To locate these holes, position the fence flush with the back edge of the table. Then, after checking that there's an equal overhang on each side, center the holes on the T-slots in the table. Now it's just a matter of drilling the holes for the toilet bolts and installing the bolts and lock knobs.

16

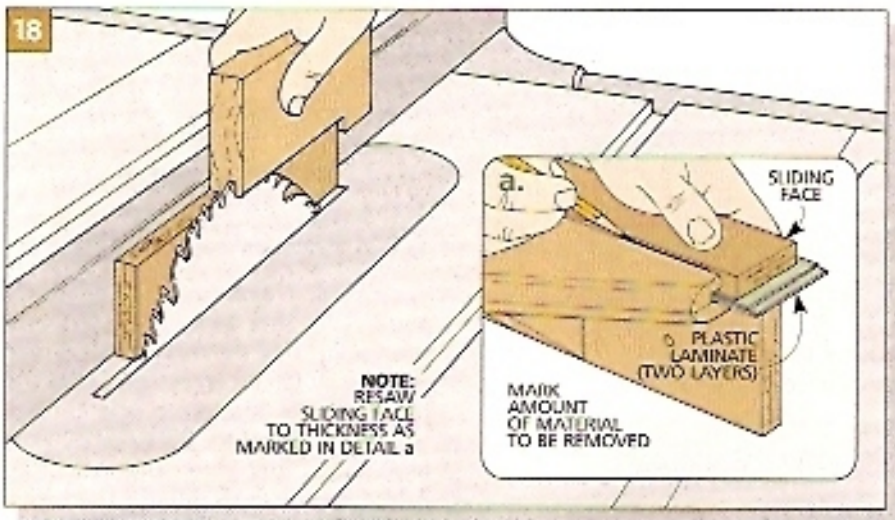


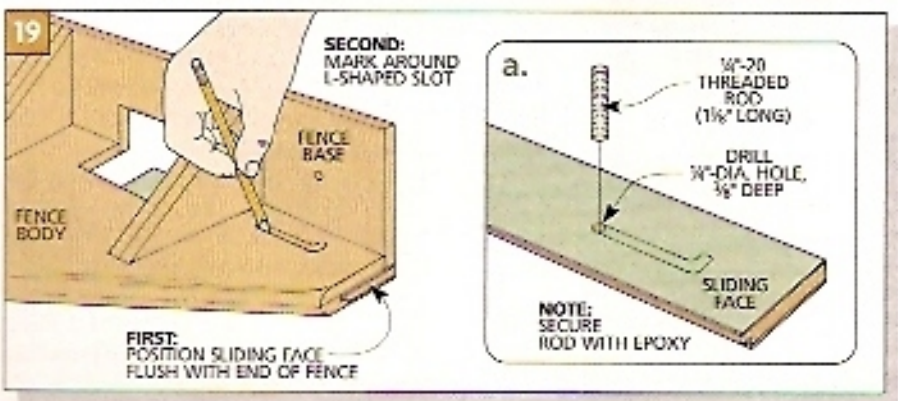


SLIDING FACES

All that's left to complete the fence is to add two sliding faces. Including these makes it possible to quickly adjust the fence opening for different sized bits. The sliding faces can easily be moved in or out along the fence as needed. A threaded rod and knob hold the faces in place once they're properly adjusted.

Each of the sliding faces (N) starts out as a piece of ½" plywood *(Fig. 17)*. To create a durable surface on the faces, both sides are covered with plastic laminate. But don't apply the laminate yet. This would make the sliding faces thicker than the front fence piece. As a result there would be a slight "step" between the faces and body of the fence.





The solution, in this case, is simple. Just use two layers of laminate as a "gauge" and mark the amount of material to remove *(Fig. 18a)*. Then slice off the extra thickness from the plywood on the table saw *(Fig. 18)*.

BEVEL ENDS. After applying the laminate, you can cut a bevel on the *inside* end of each face *(Fig. 17a)*. The bevels provide clearance for large bits, so that the size of the fence opening can be reduced even more.

CUT RABBET. In addition to the bevels, you'll also need to rabbet the top edge of each sliding face *(Fig. 17b)*. This forms a lip that fits under the lip in the front fence (K). Together, they form an interlocking (sliding) joint that keeps the sliding faces nice and flat against the fence.

DUST RELIEF. The bottom edge of each sliding face is also rabbeted *(Fig. 17b)*. It's just a small rabbet that provides some dust relief at the bottom of the fence.

THREADED ROD. Now all that's left is to add a short, threaded rod to each sliding face. These rods pass through the L-shaped slots in the fence. Tightening a knob on the end of each rod locks the face in place.

It's easy to lay out the location of the rods. Just slide each face into the fence so the ends are flush *(Fig. 19)*. (It should also be snug along the top edge.) After marking around the slot, drill a hole in the end and glue in the rod with epoxy *(Fig. 19a)*.

To install the sliding face, insert the rod in the short "leg" of the slot. Then lift *up* on the face so the top edge engages the fence, slide it *over*, and thread on a knob. ■

ACCESSORIES . . . . . Fence Add-Ons

After completing the router table, one of the first improvements I made was to build three simple accessories for the router table and fence.

The featherboard, the router bit guard, and the vacuum attachment can all be made easily in a couple of hours (*Figs. 1, 2, and 3* and photos below).

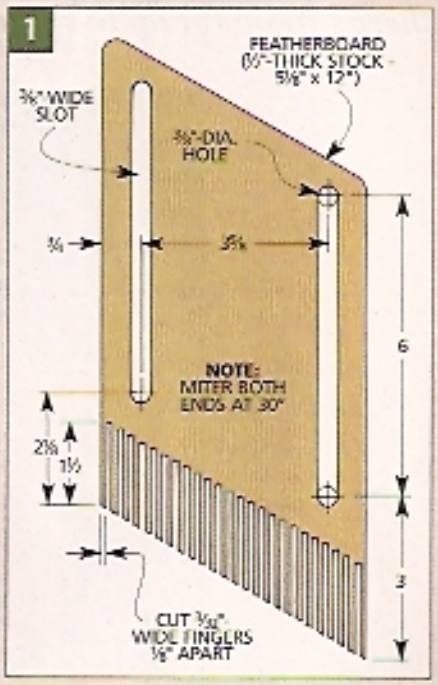
Otherwise, durable plastic versions (see photo on page 56) are available from a variety of mail order suppliers of hardware and accessories (see page 112).

FEATHERBOARD

One nice thing about the featherboard shown here is that it can be attached either to the router table fence or to the aluminum track. That gives you the kind of convenience and versatility that always comes in so handy in a small home workshop.

To keep a workpiece flat on the Benchtop Router Table, all you need to do is mount the featherboard to the fence with knobs that thread into the inserts. Or, if you prefer, secure the featherboard to the track with toilet bolts and knobs to hold the workpiece against the fence.

The featherboard is a piece of 1/2"-thick hardwood. It has mitered ends and a pair of adjustment slots cut parallel to its sides (*Fig. 1*). To cut the slots that form the fingers, I tilted the blade on the table saw and clamped the featherboard to an auxiliary fence on the miter gauge.

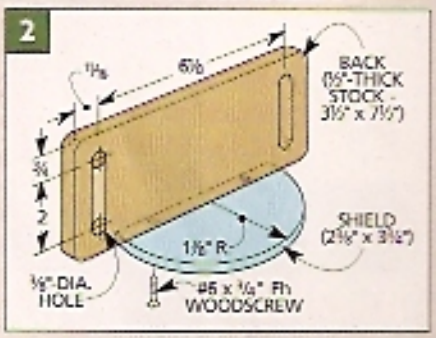


ROUTER BIT GUARD

For safety, you should include a bit guard on the router table. This guard attaches to the fence with knobs that thread into the two outer inserts.

Note: The middle insert is for the featherboard (see photo above).

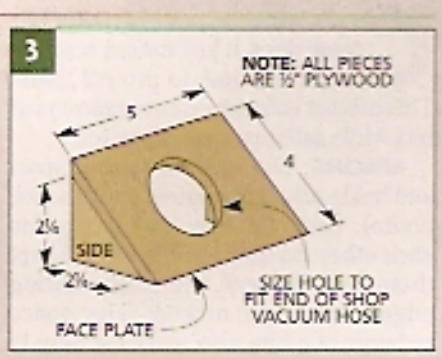
The guard consists of a hardwood back and a shield made from 1/4" polycarbonate plastic (*Fig. 2*). After cutting two adjustment slots in the back, the shield is screwed in place.



VACUUM ATTACHMENT

Finally, I decided to add a simple dust collection system that attaches to the back of the router table fence and connects to a shop vacuum.

It's made up of two triangular sides and a faceplate with a hole cut to fit the vacuum hose (*Fig. 3*). After beveling the faceplate to fit against the fence and table, it's simply glued to the sides. Gluing the attachment to the fence holds it securely in place.



Router Bit Cabinet

Box joints at the corners of this cabinet let you show off your craftsmanship. Inside there's room for up to twenty router bits, plus a handy drawer to hold accessories.

Considering the price of router bits these days, it just makes sense to invest the time to protect them. This cabinet is designed to organize your bits while safeguarding them, too.

SPACING. The bits are spaced apart and held upright in a pair of shelves (see photo). Since the bits can't bump into each other (as they used to when I kept them in a drawer), the sharp cutting edges don't get nicked. The space between the bits also makes it easy to grab hold of the one you need. There's even a unique approach to holding the bits in the shelf. It prevents the bits from binding as the shelf expands or contracts with changes in humidity.

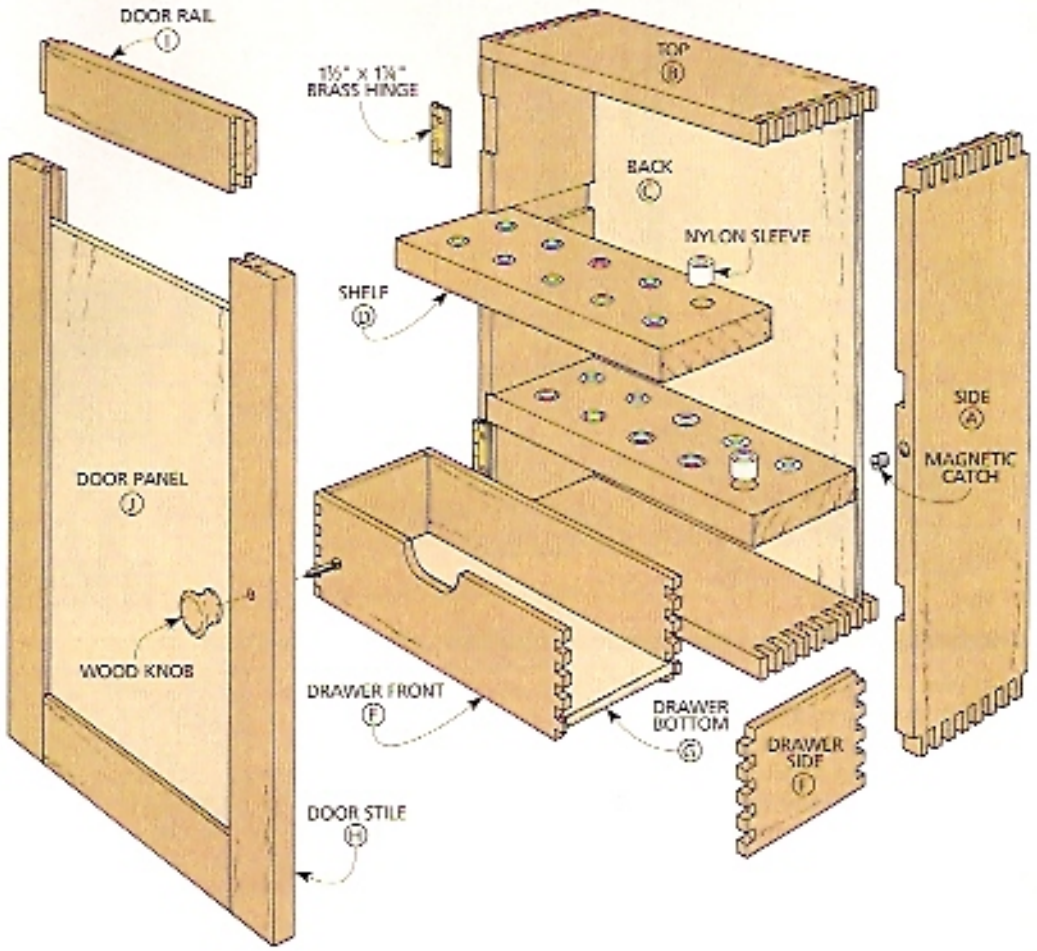
DOOR. This cabinet also has a door to keep the bits clean and free from dust and dirt. And I added a pullout drawer inside the cabinet to store and protect wrenches and other accessories.

WALL MOUNT. A simple two piece mounting system makes it easy to hang the cabinet in a convenient spot near your router table. And if you take your router out of the shop to do some work, the cabinet lifts off the hanger so you can take the bits with you, too.

JOINERY. I chose to make the cabinet case and the drawer with box joints. They're strong and also decorative. But if you don't have a box joint jig, a different version of the cabinet using simpler joinery is shown in the Designer's Notebook on page 73.

EXPLODED VIEW

OVERALL DIMENSIONS:
10W x 4 13/16D x 13H



MATERIALS LIST

WOOD

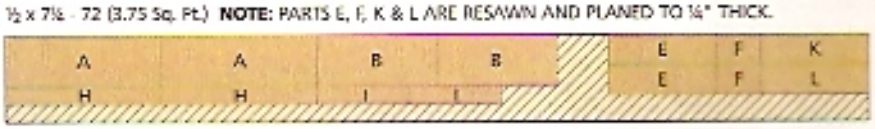
A	Sides (2)	½ x 4¼ - 13
B	Top/Bottom (2)	½ x 4¼ - 10
C	Back (1)	¼ ply - 9½ x 12½
D	Shelves (2)	¾ x 3¾ - 9½
E	Drawer Fr./Bk. (2)	¼ x 2½ - 8 9/16
F	Drawer Sides (2)	¼ x 2½ - 3¾
G	Drawer Bottom (1)	¼ ply - 3½ x 8 11/16
H	Door Stiles (2)	½ x 1½ - 13
I	Door Rails (2)	½ x 1½ - 7⅛
J	Door Panel (1)	¼ ply - 7⅛ x 10¾
K	Cabinet Cleat (1)	¼ x 2½ - 9
L	Wall Cleat (1)	¼ x 2½ - 8 15/16

HARDWARE SUPPLIES

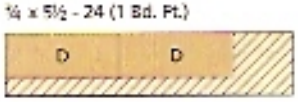
(1) No. 4 x ⅜" Fh woodscrew
(1) ¾"-dia. wood knob w/ screw
(1) 5/16"-dia. magnetic catch
(2) 1½" x 1¼" brass hinges w/ screws
(*) ¼"-I.D., ½"-long nylon sleeves
(*) ½"-I.D., ½"-long nylon sleeves
* Quantity will vary depending on your collection of bits

CUTTING DIAGRAM

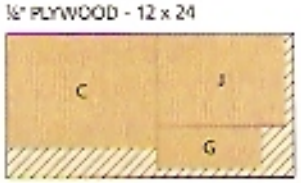
½ x 7⅛ - 72 (3.75 Sq. Pt.) **NOTE:** PARTS E, F, K & L ARE RESAWN AND PLANED TO ¼" THICK.

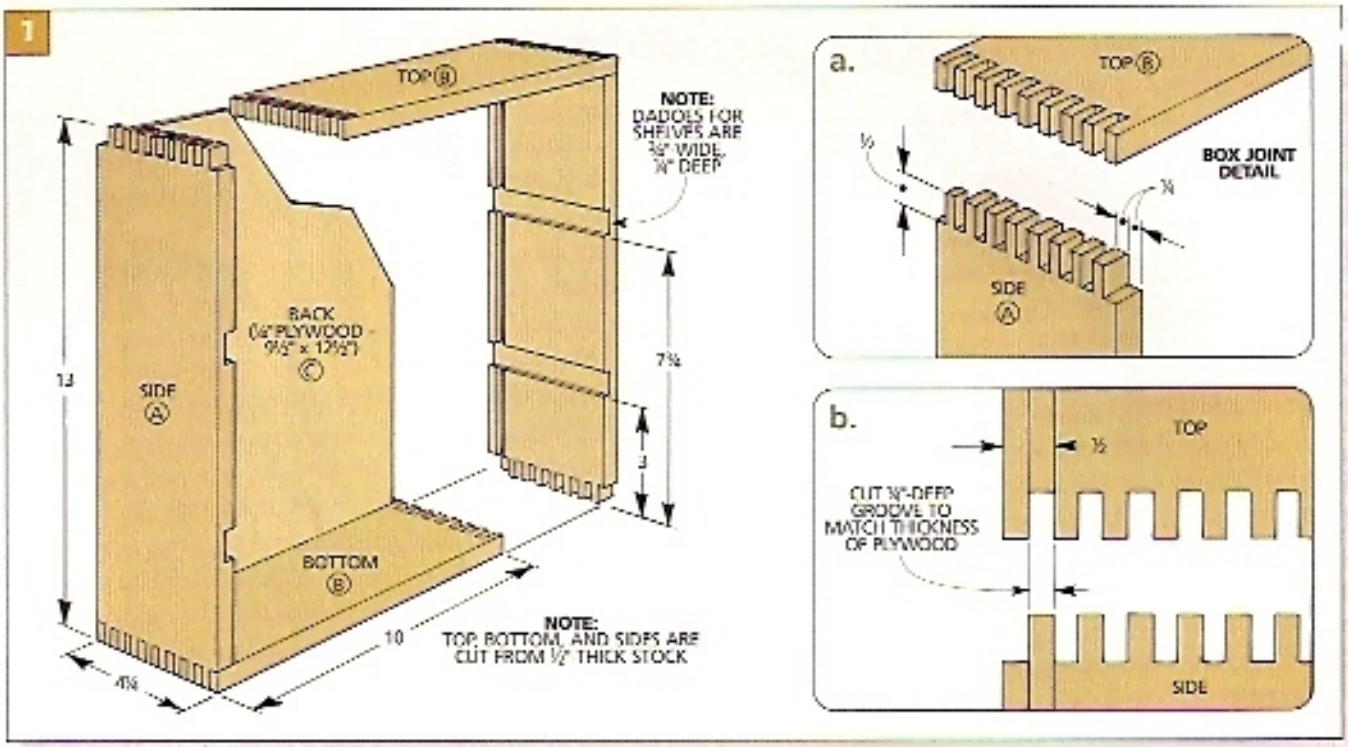


¼ x 5½ - 24 (1 Bd. Pt.)



¾" PLYWOOD - 12 x 24





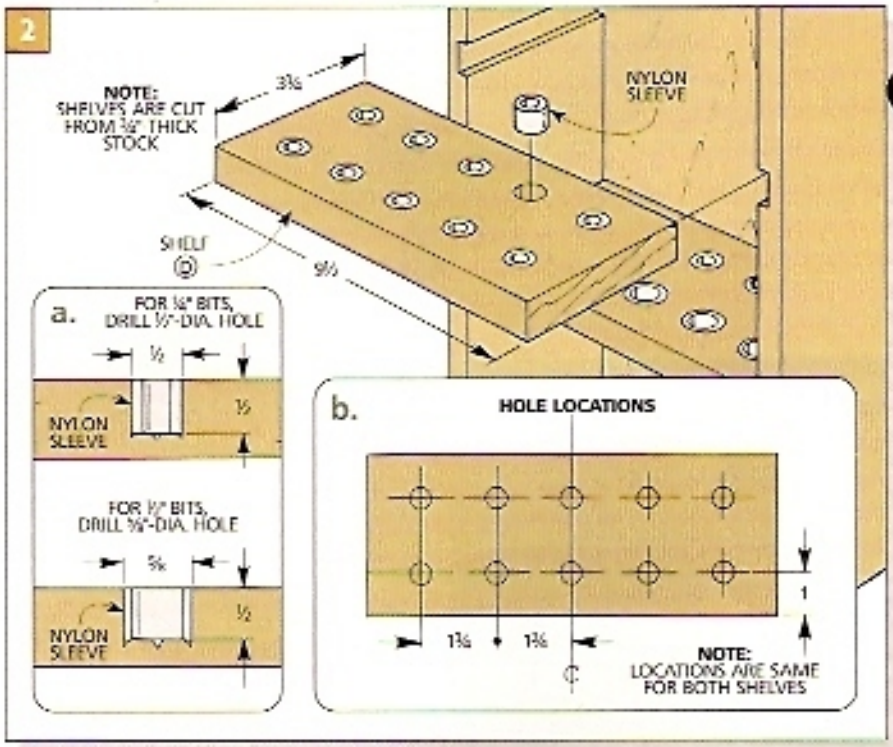
CASE

I started work on the cabinet by making the case. It's just a shallow box consisting of two sides (A), a top (B), and a bottom (B) *(Fig. 1)*. I cut these pieces from ½"-thick stock and used box joints to hold them together *(Figs. 1 and 1a)*.

SHELF DADOES. Once the box joints are cut, dadoes are cut in the sides for the shelves that hold the bits *(Fig. 1)*.

BACK. Next, to seal up the rear of the cabinet, I added a back (C) *(Fig. 1)*. It's just a piece of ¼"-thick plywood that fits into ¼" x ¼" grooves cut in the sides and top and bottom pieces *(Fig. 1b)*.

ASSEMBLY. Now the case can be glued together. When the glue dries, you'll need to plug the holes in the cabinet top and bottom that are left from cutting the grooves in the sides. (See the Shop Tip at the bottom of page 71.)



SHELVES

After the case is assembled, the next step is to make the shelves that hold the router bits. The shelves fit in the dadoes cut in the case sides earlier.

The shelves (D) are cut to length to fit between the sides. As for the width, trim them so they end up flush with the front edge *(Fig. 2)*.

BIT HOLES. After cutting the shelves to size, the holes for the router bits can be laid out *(Fig. 2b)*. But I didn't drill them to fit the shanks of my router bits. Instead, they're slightly larger.

SLEEVES. The reason is the nylon sleeves I used to line the holes *(Fig. 2a* and the Shop Tip at the top of page 71). They make it easy to get bits in and out.

Note: Before you start drilling, it's a good idea to buy the nylon sleeves first. And the quantity of sleeves you'll need will depend on your collection of bits with ¼" or ½" shanks.

ASSEMBLY. Once the holes are drilled, the next step is to glue in the nylon sleeves. To do this, I squirt "instant" glue in each hole and insert a sleeve. Then to complete the case, glue the shelves flush with the front edge.

SHOP TIP
Nylon Sleeves

To make it easy to slip bits in and out, nylon sleeves fit into holes drilled in each shelf. When the humidity changes, the wood can't swell and "lock" the bits in place.

DRAWER

After completing the case, I added a small drawer that slides into the bottom opening of the case *(Fig. 3)*. This makes a handy place to store larger bits, wrenches, and other accessories.

BOX JOINTS. The drawer is made up of a front and back (E) and two sides (F) with box joints at each corner *(Fig. 3)*. But since the drawer pieces are cut from ¼"-thick stock, the box joints will be ¼" x ¼" *(Fig. 3a)*.

DRAWER PIECES. To find the height (width) of all the drawer pieces, measure the height of the opening (2½"). Normally, at this point I would subtract 1/16" for clearance. But this would mess up the ¼" spacing for the box joints. So instead, I cut the pieces to full height (2½") and then sanded the drawer to fit the opening after it was assembled.

The length of the front and back (E) pieces equals the width of the drawer opening, less 1/16" for clearance (8 15/16") *(Fig. 3)*. And since I wanted the drawer to be flush with the case front, the sides (F) are cut to match the depth of the opening (3¾").

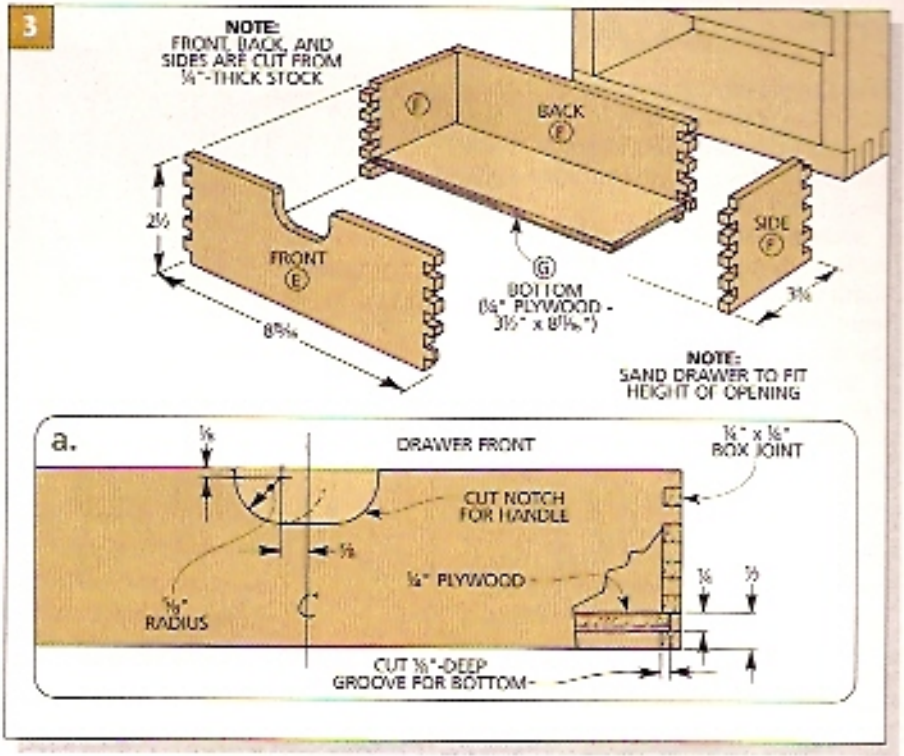
NOTCH. To make a simple "handle" for the drawer, I cut a centered notch in the top edge of the drawer front *(Figs. 3 and 3a)*. I did this by roughing out the opening with a jig saw, then sanding up to the line with a drum sander.

Once this notch is cut out, box joints can be cut to join the drawer pieces together *(Fig. 3a)*.

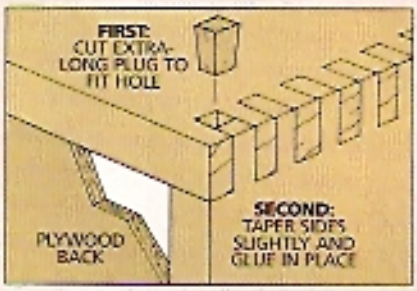
BOTTOM. The next step is to cut a groove in each drawer piece for a ¼"-thick bottom (G) *(Figs. 3 and 3a)*. Here again, you'll need to plug holes after you've glued up the drawer.

TEST FIT. After filling the holes, test the fit of the drawer in the case. If necessary, sand the top or bottom edges of the drawer to achieve a fit that's snug but still slides in and out easily.

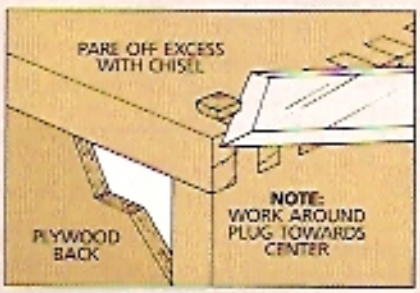
3



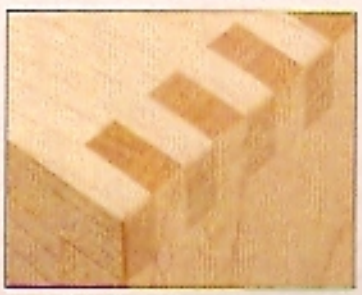
SHOP TIP ..... *Hiding Grooves*



Plug the hole. *Start by cutting an extra-long square plug to fit the hole. Then taper the sides slightly to get a snug fit and glue the plug in place.*



Trim the plug. *After the glue has dried, use a chisel to pare off excess by working around the plug towards the center. Then sand it smooth.*



Invisible fix. *The end-grain plug matches the end grain of the "finger" almost perfectly. The patch will be practically invisible.*

DOOR

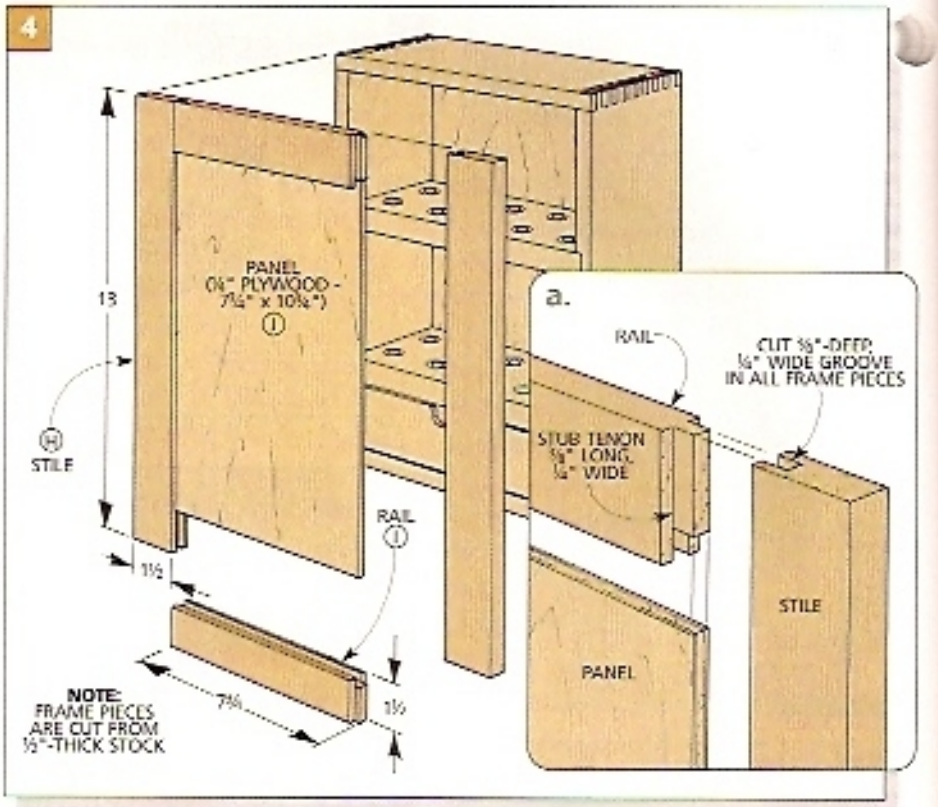
With the drawer complete, the next thing is to add a door to keep your router bits free from dust and dirt. The door is just a hardwood frame that fits around a plywood panel *(Fig. 4)*.

FRAME PIECES. All the frame pieces are cut from ½"-thick stock and are the same width (1½"). The only difference is their length. The stiles (H) are 13" long, and the rails (I) are 7¾" long.

STUB TENON AND GROOVE. The frame (and panel) is held together with a simple joint — a stub tenon and groove. The first step when making this joint is to cut a ⅜"-deep groove centered in each piece *(Fig. 4a)*. This groove accepts a ¼" plywood panel (J). It also serves as the mortise for the short (stub) tenons cut on the ends of the rails *(Figs. 4 and 4a)*. When cutting the tenons, flip the rail between passes so you make cuts on opposite faces and sneak up on the tenon's final thickness. This automatically centers the tenon on the rail's thickness.

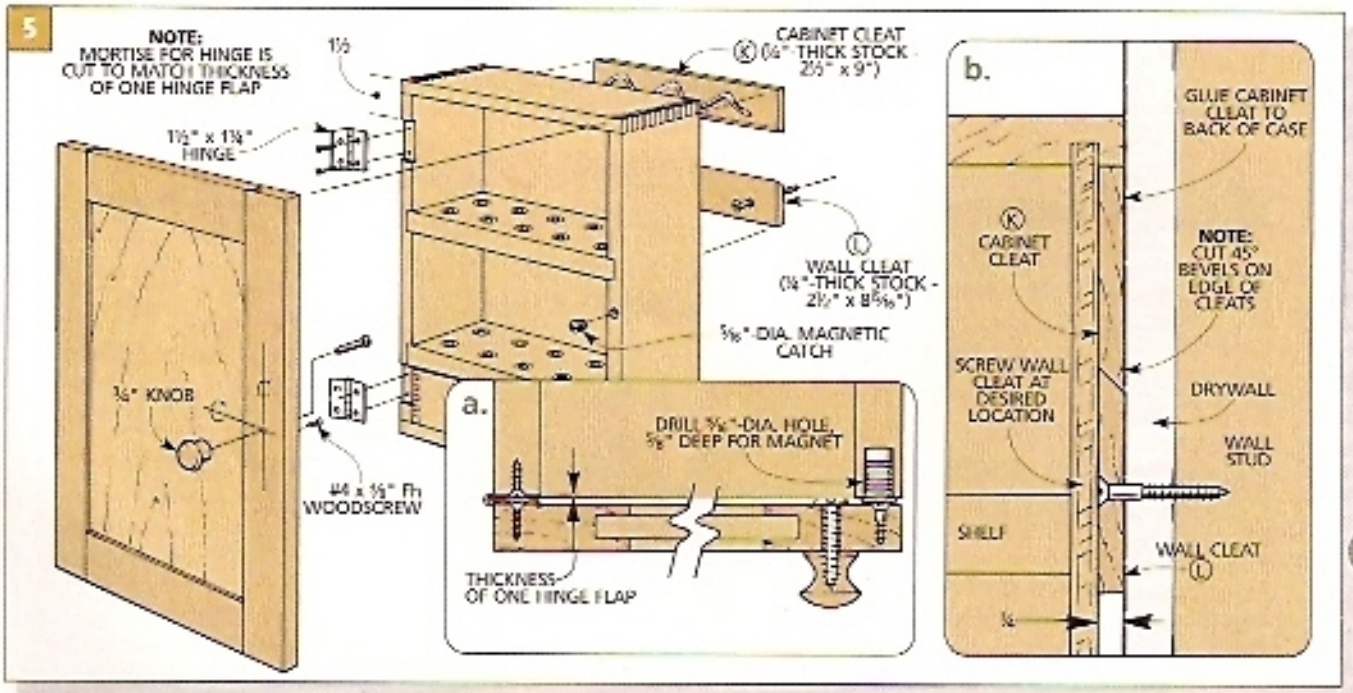
ASSEMBLY. After the stub tenons are cut, the door can be glued and clamped up. When the glue is dry, you can mount the door on the case. It attaches to one side with a pair of hinges *(Fig. 5)*.

Note: The hinge mortises are cut in the case to match the thickness of one hinge flap. This leaves about 1/16" clearance between the door and the case for a magnetic catch that's added next.



CATCH. With the door in place, the next step is to add a knob and a magnetic catch *(Fig. 5a)*. To keep the gap between the door and case to a minimum, I used a No. 4 x ⅜" flathead woodscrew instead of the thick strike plate that came with the catch *(Fig. 5a)*. It still provides plenty of "pull" and can be adjusted in or out easily.

HANGING SYSTEM. Finally, to mount the case to a wall, I used a unique two-piece system *(Fig. 5b)*. A cabinet cleat (K) is glued to the back of the case. And a wall cleat (L) is screwed to the wall. The mating edges are beveled at 45°. The advantage of this system is it allows you to lift off the cabinet and take it wherever you need it in the shop. ■

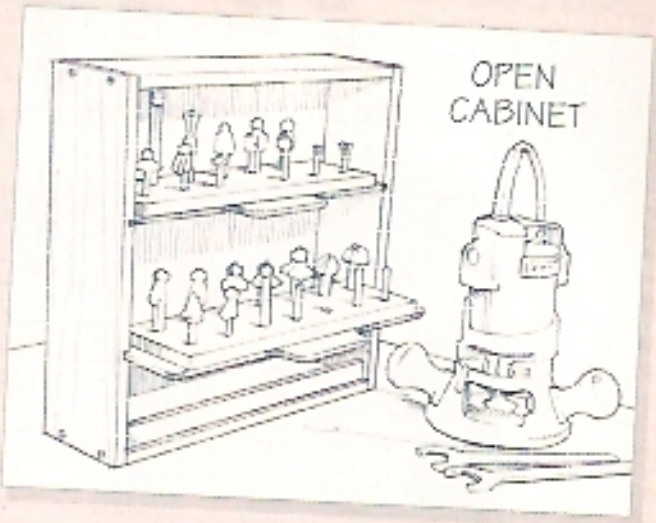


DESIGNER'S NOTEBOOK

This version of the Router Cabinet features simple joinery, an open front, slide-out shelves, and easy-to-access storage. And it can sit on a bench or be wall mounted.

CONSTRUCTION NOTES:

- Start by cutting the sides (A), top (B), and bottom (B) to size *(Fig. 1)*.
- To accept the top and bottom, rout rabbets on the sides (A) *(Fig. 1)*.
- Next, cut grooves in the sides, top, and bottom to hold the back (C) *(Fig. 1)*.
- Also cut a groove near the front edge of the bottom (B) for a lip added later.
- Before assembling the case, cut two dadoes in each side to hold the shelf bases (M) *(Fig. 1)*.
- Now you can dry-assemble the case and cut a back (C) to fit between the grooves. Then glue and screw the case together.
- Cut a tray lip (N) to fit between the case sides and glue it in place *(Fig. 1)*.
- To make the shelves, start by cutting two shelf bases (M) to shape *(Fig. 2)*.
- A bit holder (O) is glued to each shelf base. Cut these from ½" MDF, then drill holes to hold your bits *(Fig. 2)*. (Nylon inserts aren't used, since MDF won't swell or shrink like solid wood.)
- Finally, add a hardboard filler strip (P) to the back so the cabinet can be hung on a wall *(Fig. 1)*.



MATERIALS LIST

CHANGED PARTS

A	Sides (2)	½ MDF - 4½ x 14
B	Top/Bottom (2)	½ MDF - 4½ x 14
C	Back (1)	¼ hdbd. - 13½ x 14

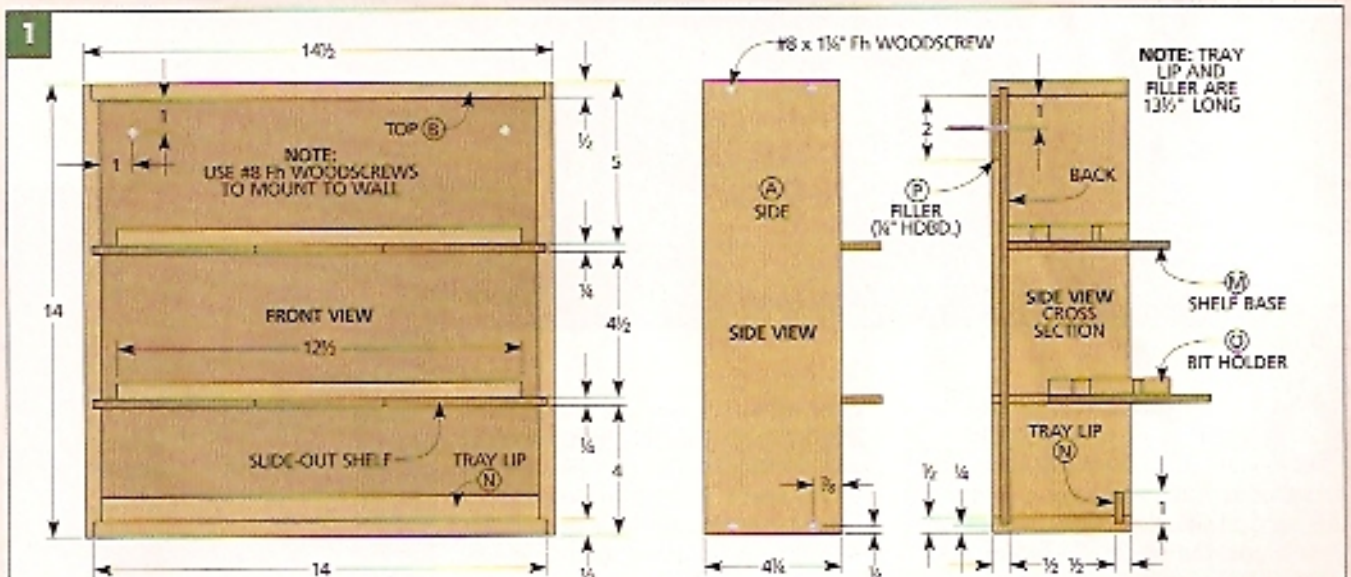
NEW PARTS

M	Shelf Bases (2)	¼ hdbd. - 5 x 14
N	Tray Lip (1)	¼ hdbd. - 1 x 13½
O	Bit Holders (2)	½ MDF - 3⅜ x 12½
P	Filler (1)	¼ hdbd. - 2 x 13½

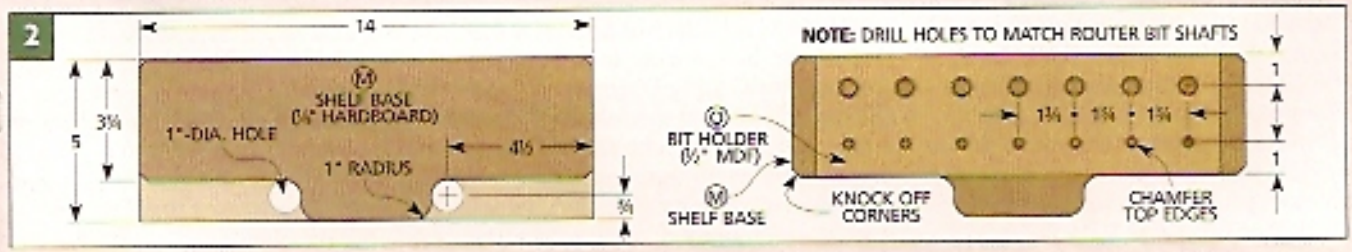
HARDWARE SUPPLIES

(2) No. 8 x 1½" Fh woodscrews
(8) No. 8 x 1¼" Fh woodscrews
Note: Don't need parts D, E, F, G, H, I, J, K, L.

1

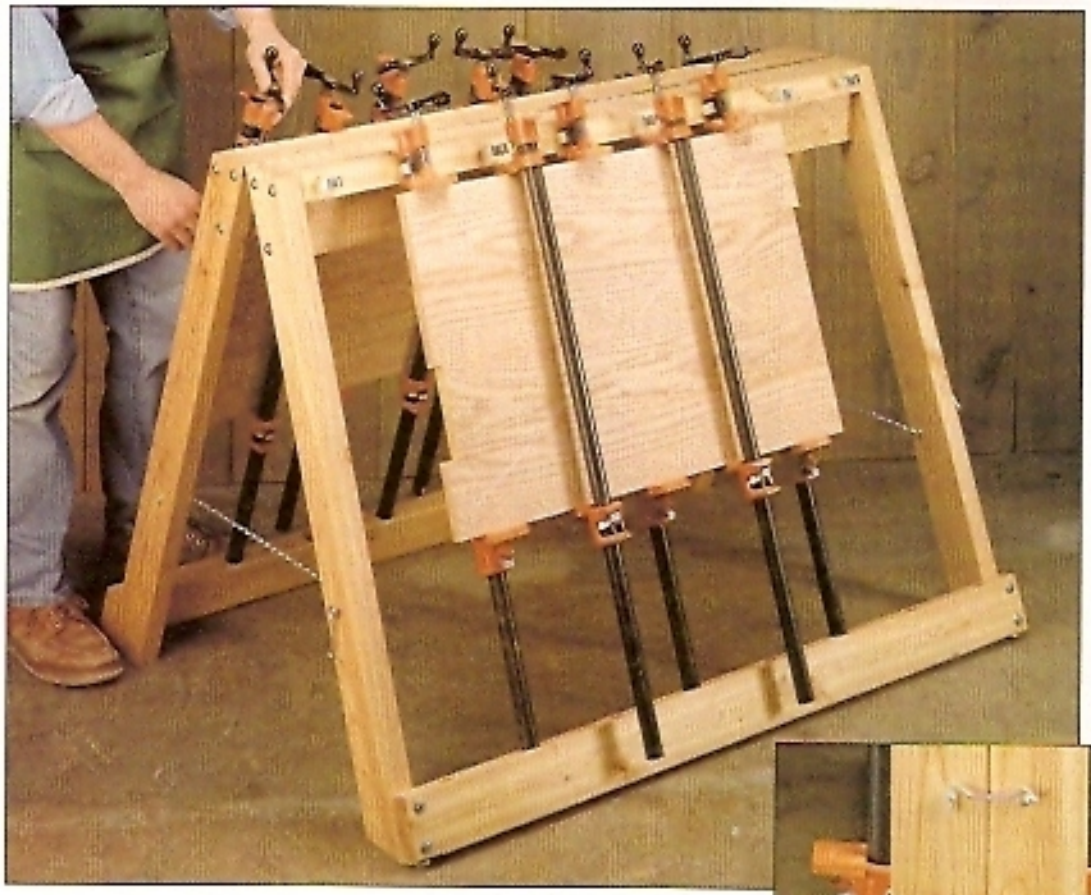


2



Glue-Up Station

This vertical work station makes gluing up solid wood panels easier. It also doubles as a clamp storage rack and when not in use, folds together for compact storage.



Okay, I'll admit it. Gluing up a solid wood panel with pipe clamps standing on end looks a bit unorthodox. But it works great. And with this vertical Glue-Up Station to support the clamps, the whole glue-up process is simplified considerably.

CLAMP STORAGE. For example, you'll never have to drag heavy pipe clamps around the shop again. That's because the Glue-Up Station also doubles as a clamp storage rack.

WORK SURFACES. With a row of clamps on each side of the station, there are two flat work surfaces for gluing up panels. So in addition to the fact that you don't have to clear off a work surface somewhere else in the shop, you can glue up several panels at a time.

SAVES SPACE. Finally, to save space, the Glue-Up Station hinges in the middle. When the glue dries, just remove the panels and fold the station for storage (see inset photo).

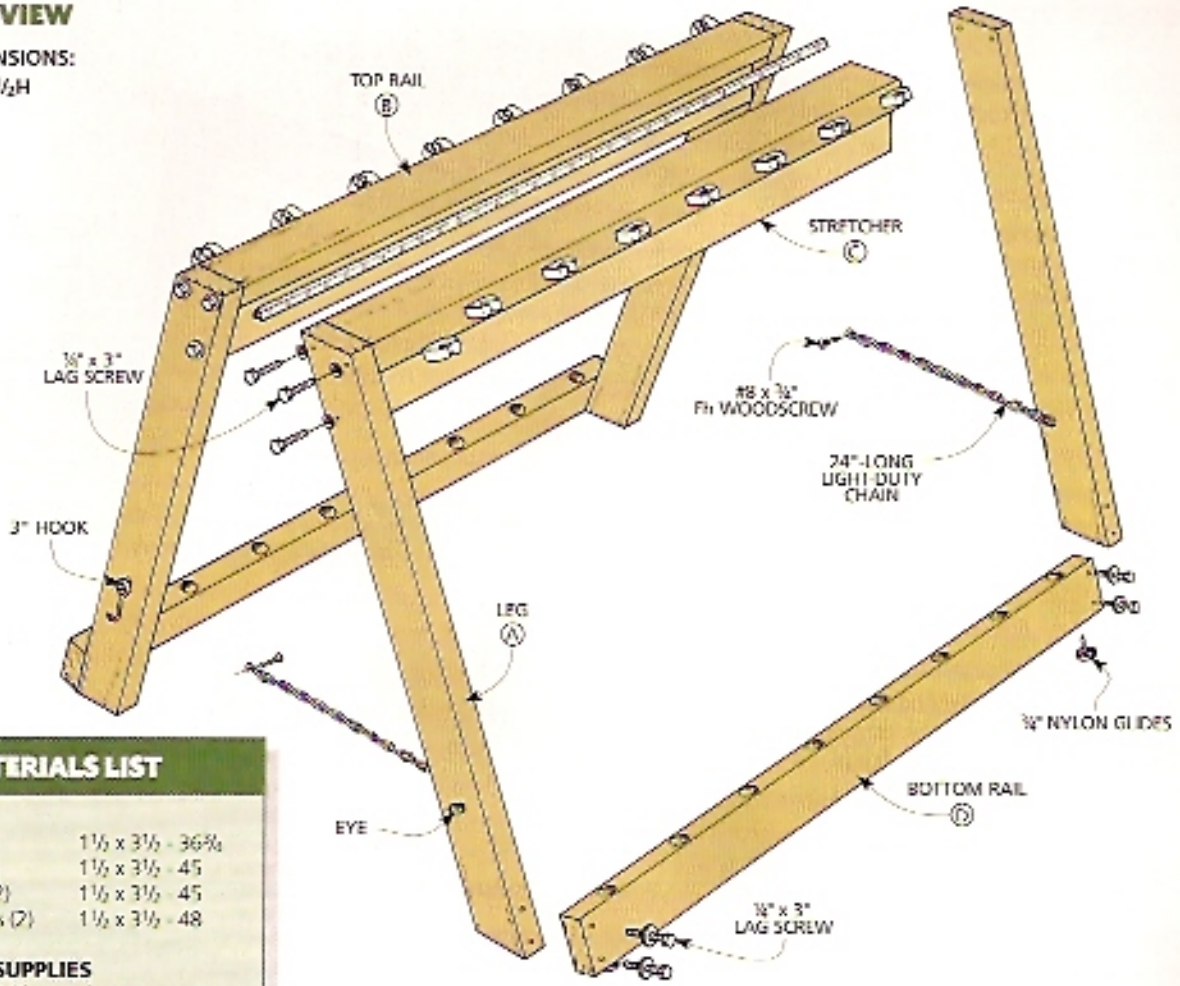
MATERIALS. All the wood parts for this project can be cut from four 2x4s and one 2x6 (see Cutting Diagram on opposite page). The only special hardware is a pair of light-duty chains and some broom clips for storing clamps.

Note: If floor space is limited, there's even a wall-mounted version. See the Designer's Notebook on page 77 for more on this option.

PIPE CLAMP TIPS. There are a couple of minor problems that seem to get in my way when I work with pipe clamps. For some simple solutions that I've discovered, see the Shop Tip on page 79.

EXPLODED VIEW

OVERALL DIMENSIONS:
48W x 35D x 33½H



MATERIALS LIST

WOOD

A	Legs (4)	1½ x 3½ - 36¾
B	Top Rails (2)	1½ x 3½ - 45
C	Stretchers (2)	1½ x 3½ - 45
D	Bottom Rails (2)	1½ x 3½ - 48

HARDWARE SUPPLIES

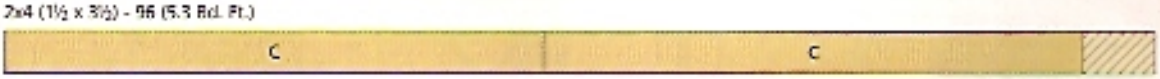
(20) No. 8 x ¾" Rh woodscrews
(6) No. 8 x 3" Fh woodscrews
(20) ¼" x 3" lag screws
(20) ¼" washers
(1) 1½" x 48" piano hinge w/ screws
(2) 3" hooks w/ eyes
(16) Broom clips
(2) 24" light-duty chains
(4) ¾" nylon furniture glides

CUTTING DIAGRAM

2x4 (1½ x 3½) - 96 (5.3 Bd. Ft.)

2x4 (1½ x 3½) - 96 (5.3 Bd. Ft.)

2x4 (1½ x 3½) - 96 (5.3 Bd. Ft.)



2x4 (1½ x 3½) - 96 (5.3 Bd. Ft.)

2x6 (1½ x 5½) - 96 (8 Bd. Ft.)

CONSTRUCTION

The Glue-Up Station consists of two identical wood frames that are hinged together at the top. (I used "two-by" Douglas fir for all of the wood parts.)

Note: These frames are designed to hold 36"-long pipe clamps. If you prefer, you can alter some of the dimensions to hold other sizes.

LEGS. Each frame starts off with a simple pair of legs (A) *(Fig. 1)*. To tilt each frame at an angle so a workpiece is able to sit flat against the pipe clamps, a 20° miter is cut on each end of each leg *(Fig. 1a)*. Make sure all four legs end up the same length.

TOP RAIL. The legs are held together with a top rail (B) that's ripped to width to match the legs and at a 20° angle on each edge (see End View in *Fig. 1*).

The front edges are angled so when you attach broom clips (later) they'll be able to grab the pipe clamps. And the same angle on the back edges keeps the top rails on each frame from binding when you fold up the station for out-of-the-way storage.

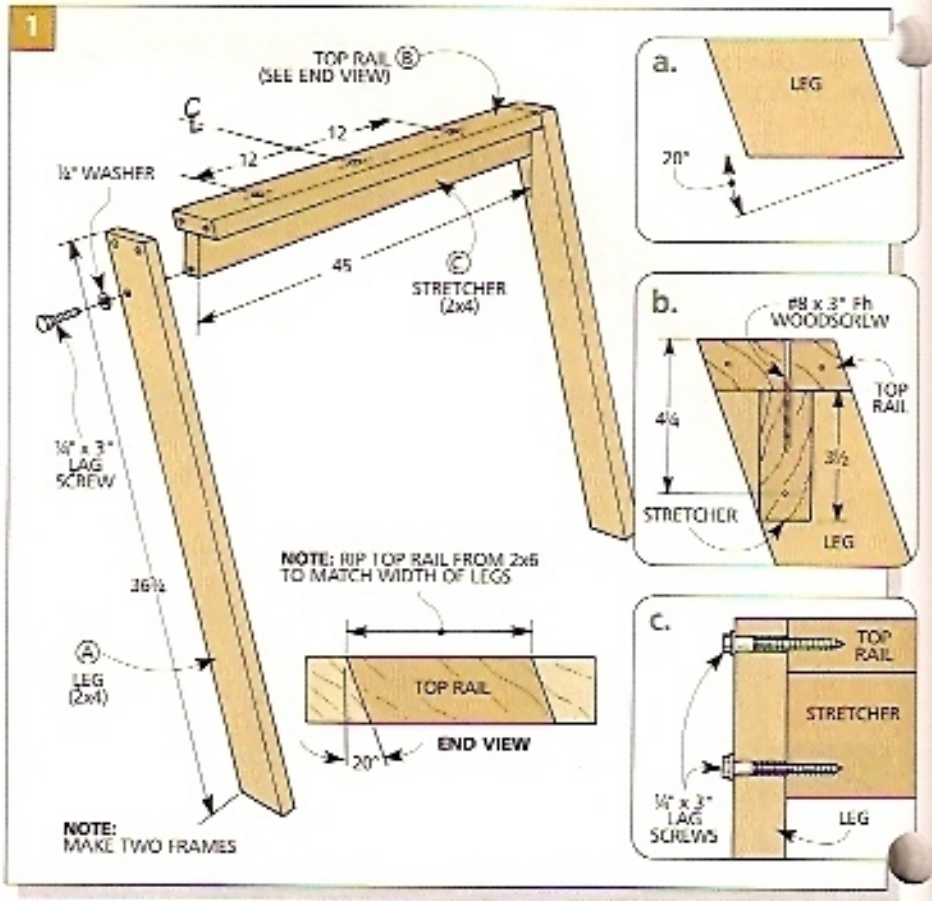
STRETCHER. After attaching the top rail of each frame to the legs with lag screws, I added a stretcher (C) to prevent the frame from racking. This stretcher is cut to fit between the legs and is screwed to the top rail of each frame *(Fig. 1b)*. Here again, I used a lag screw at each end to fasten the stretcher to the legs *(Fig. 1c)*.

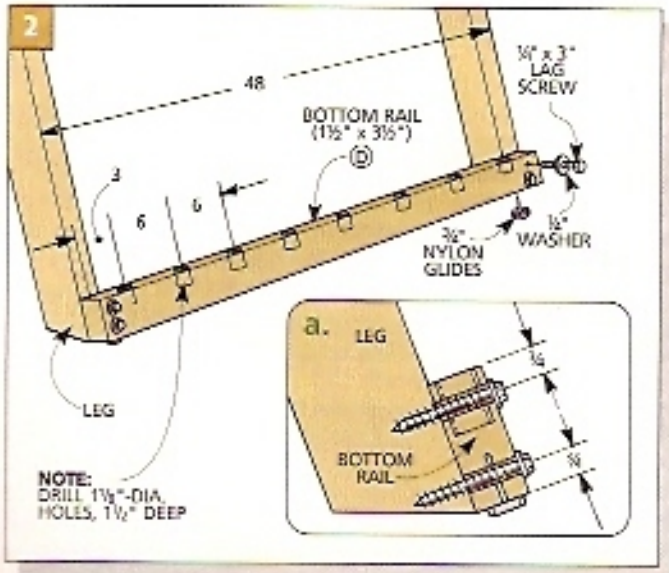
BOTTOM RAIL. All that's left to complete each of the basic frames is to add a bottom rail (D) to the legs *(Fig. 2)*. Holes drilled in the top edge of this rail act as a "pocket" for the bottom end of each pipe clamp.

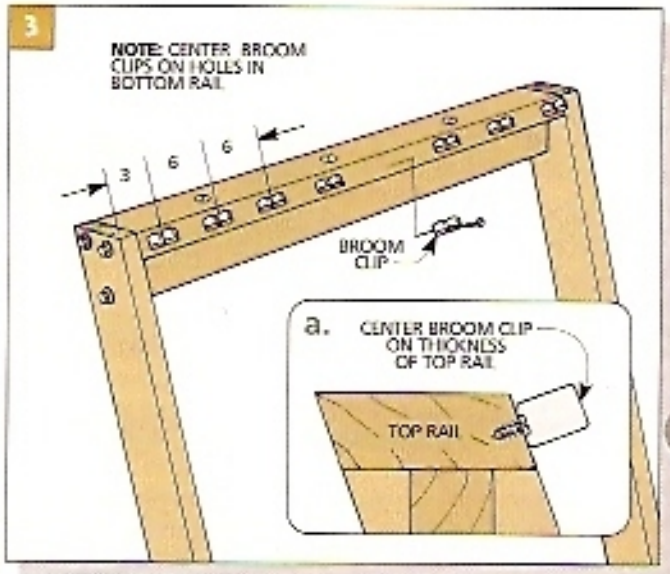
To make it easy to remove the clamps and set them back in place, these holes are slightly larger than the outside diameter of the black clamp pipe. (I drilled $1\frac{1}{8}$"-dia. holes to accommodate $\frac{3}{4}$" black pipe.)

BROOM CLIPS. Now that the holes are drilled for the clamps, it's just a matter of screwing metal broom clips to the top rail. To keep the pipe clamps aligned, the clips are centered over the holes in the bottom rail *(Figs. 2 and 3)*.

Finally, tacking a pair of nylon glides to each bottom corner makes it easy to open and close the Glue-Up Station *(Fig. 2)*. For sources of hardware, including broom clips and nylon glides, see page 112.





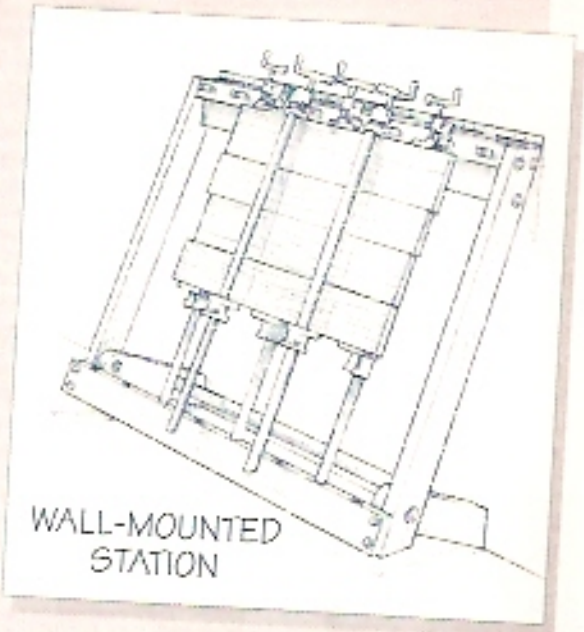


DESIGNER'S NOTEBOOK

If floor space is limited, build this wall-mounted version of the station. Simply build one half of the original design, and then add a support at the bottom.

CONSTRUCTION NOTES:

- First cut two arms (E), each with a curve at one end to keep the support from binding *(Fig. 1b)*. The other end is mitered so it fits tightly against the wall.
- Add the support bar (F) between the arms *(Fig. 1)*. This 1½"-dia. dowel fits into holes drilled in the arms.
- Attach the support to the frame with hex bolts *(Figs. 1a and 2)*.
- Tack nylon glides to the bottom and mount the station to the wall. Use a piano hinge with one leaf screwed to the top and the other screwed to the wall *(Fig. 2a)*.



MATERIALS LIST

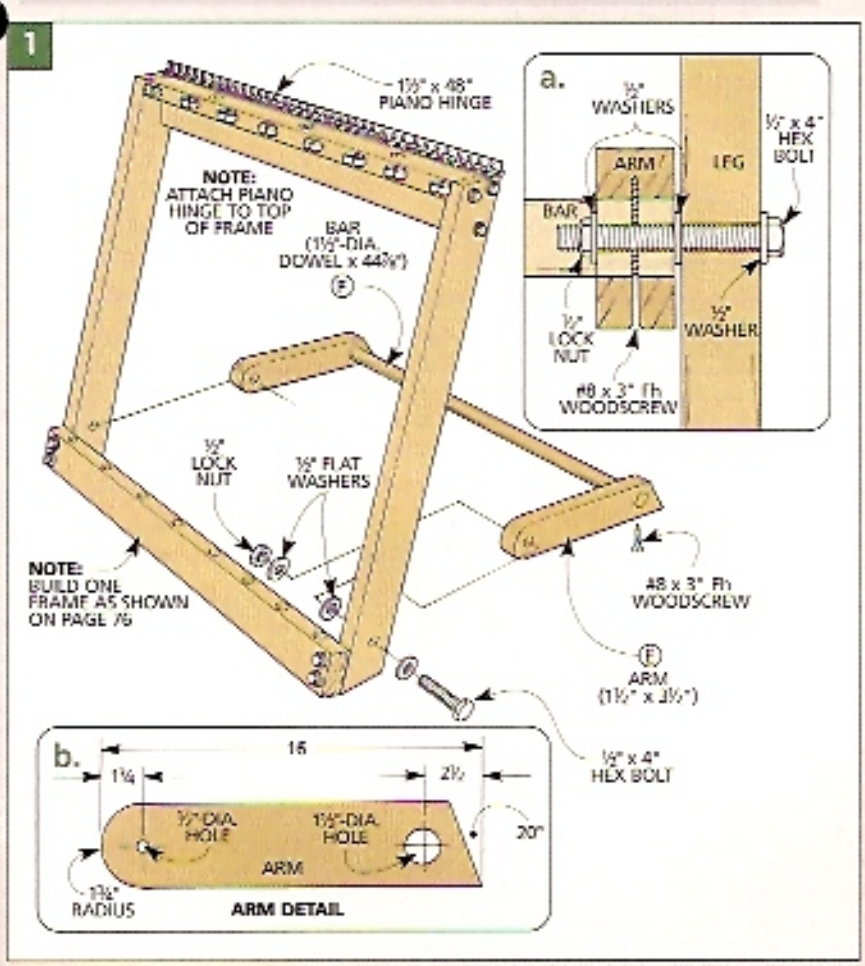
NEW PARTS

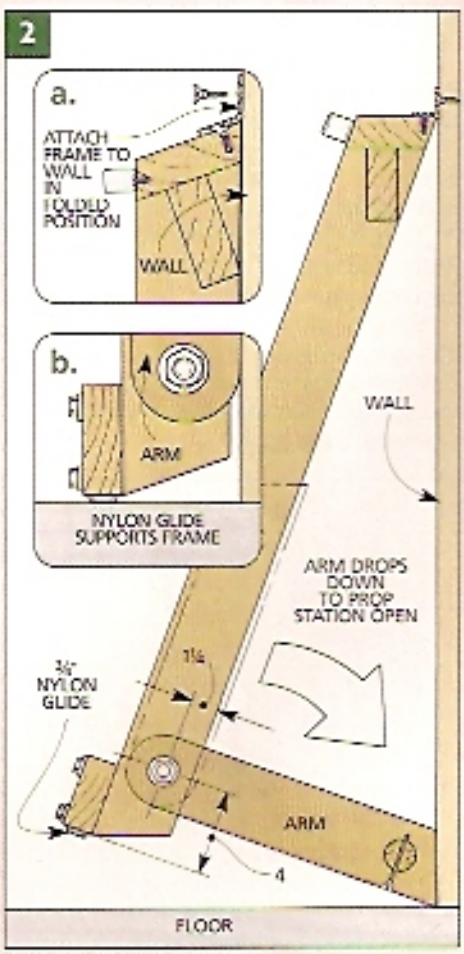
E	Arms (2)	1½ x 3½ - 16
F	Support Bar (1)	1½ dowel x 44⅞

HARDWARE SUPPLIES

(8) No. 8 x ¾" Rh woodscrews
(5) No. 8 x 3" Fh woodscrews
(10) ¼" x 3" lag screws
(10) ¼" washers
(1) 1½" x 48" piano hinge w/ screws
(8) Broom clips
(2) ½" x 4" hex bolts
(6) ½" flat washers
(2) ½" lock nuts
(2) ⅞" nylon furniture glides

Note: Only need 2 of part A and 1 each of parts B, C, and D.





ASSEMBLY

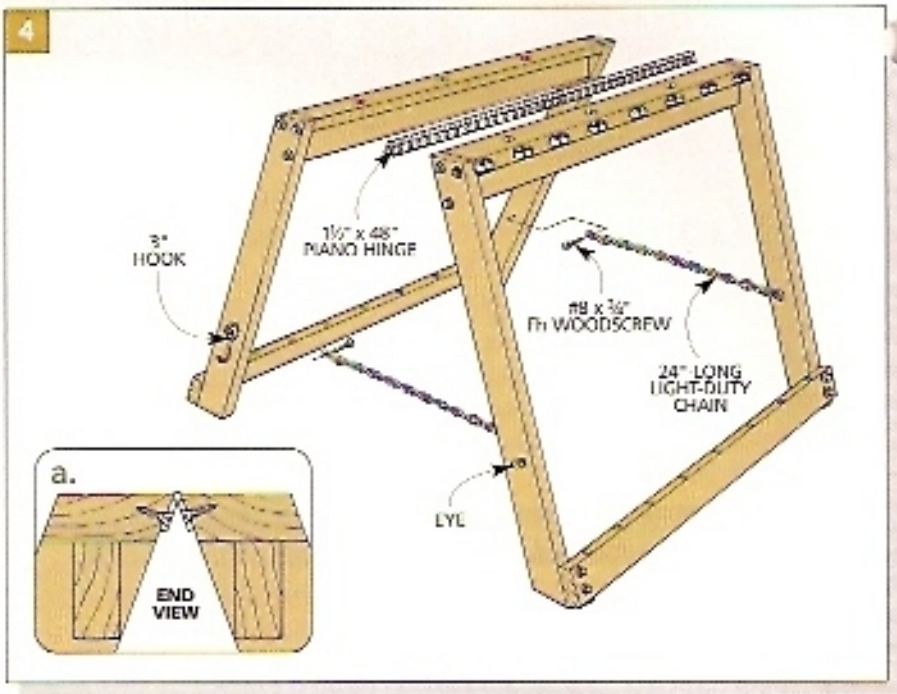
With the two separate frames completed, they're ready to be assembled.

Note: The directions here are for a double frame (as shown in the photo and Exploded View on pages 74-75). However, if you only built one frame for mounting against a wall, refer back to the Designer's Notebook on page 77 for instructions on mounting it with different hardware.

HINGE. I wanted to make it easy to fold the Glue-Up Station so it would take up a minimal amount of storage space.

To accomplish this, the frames are held together with a piano hinge that's screwed to the inside edge of each top rail (B) *(Figs. 4 and 4a)*.

Note: Mounting this piano hinge flush with both the top rails creates a flat surface that is ideal for holding glue and supplies.



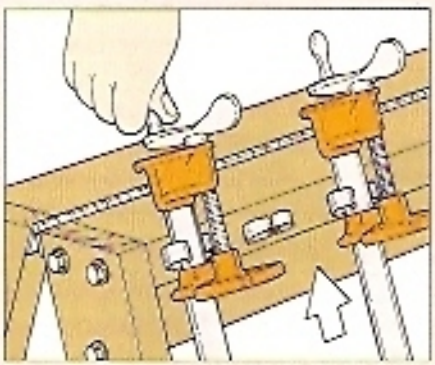
TECHNIQUE . . . . . Using the Glue-Up Station

When using this Glue-Up Station to put together a solid wood panel, it's easiest to adjust each clamp first for the width of the panel *(Steps 1 and 2)*.

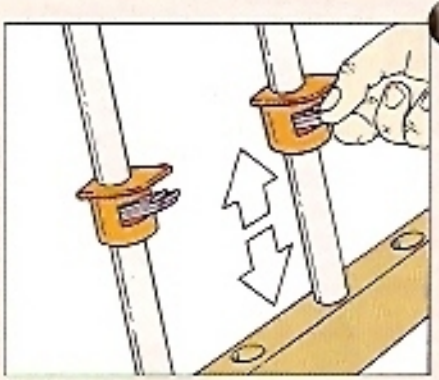
Note: I like to position the clamp heads ½" farther apart than the width of the panel.

Then it's just a matter of stacking the individual pieces on the station and applying glue *(Step 3)*.

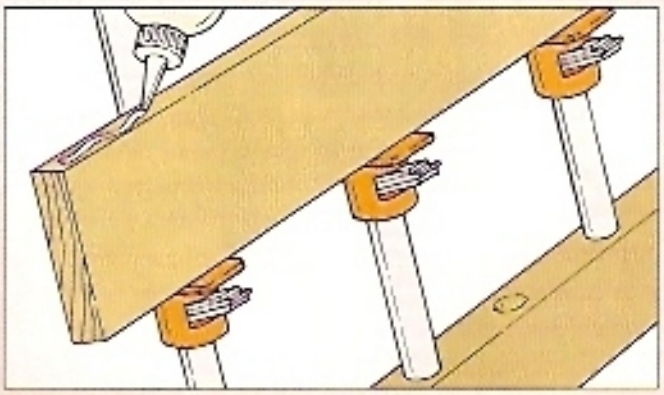
Finally, after tightening the back clamps, position additional clamps on the *front* of the panel. This will help ensure that you apply even clamping pressure *(Step 4)*.



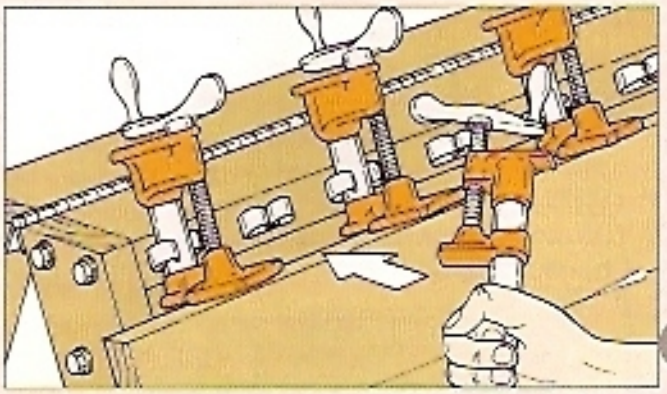
1 *Start by backing off the top clamp heads until they hit the bottoms of the broom clips.*



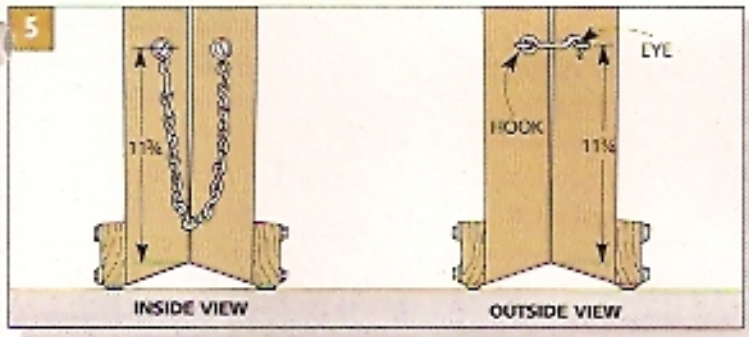
2 *Next, adjust the bottom clamp heads to allow for the width of the panel you'll be gluing up.*



3 *Now you can lay the individual workpieces on the pipe clamps, and apply glue to each one as you work your way toward the top of the panel.*



4 *After the last workpiece is positioned, tighten the pipe clamps along the back, then add another row of clamps across the front of the panel.*



ADDITIONAL HARDWARE. There are a couple more pieces of hardware to add to the station. First, to prevent the frames from spreading too far apart and damaging the piano hinge, I installed a light-duty chain on the inside face of each leg (see Inside View in *Fig. 5*).

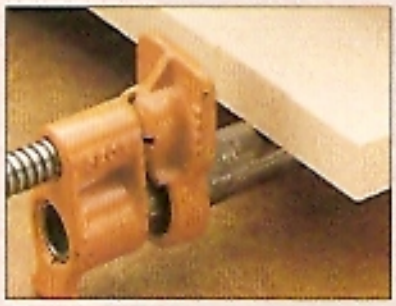
Finally, attaching a hook and eye to the outside of each pair of legs lets you lock the Glue-Up Station together when it's folded for storage (see Outside View in *Fig. 5*). ■

TWO WORK SURFACES. *Each side of the Glue-Up Station is designed to hold pipe clamps. So to save time, you can glue up several panels at once.*

SHOP TIP . . . . . Protecting Wood From Clamps

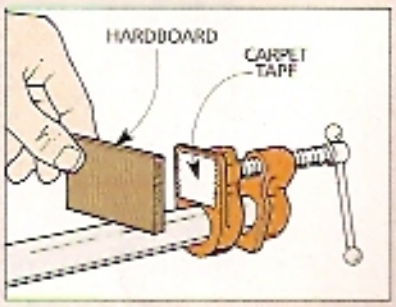
Sometimes the most frustrating tasks I face are the ones that seem the smallest and simplest. Take working with pipe clamps, for example. They're great for gluing up solid wood panels (made even easier with the Glue-Up Station). However, they present some special considerations that may seem insignificant but that can damage the project you're working on.

Below are two such problems having to do with the clamps themselves leaving their marks. Whether you want to avoid a crushed workpiece from the clamp heads or stains from the iron pipe, these simple tricks will help you.

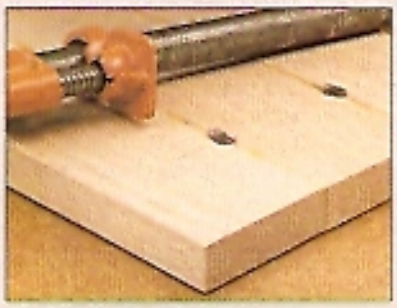


Clamp Marks. *A common problem with pipe clamps is that it's all too easy to apply too much pressure and crush the workpiece.*

Plastic Padding. *One way to pad the jaws of a pipe clamp is to dip them in liquid plastic (available at most hardware stores).*

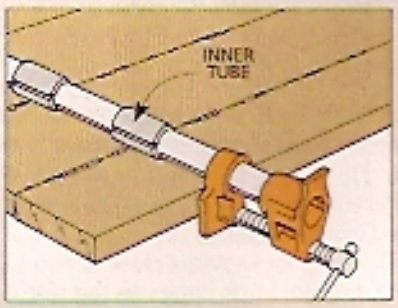


Wood Padding. *Another simple way to pad the jaws is to attach a small piece of hardboard (or scrap wood) with carpet tape.*



Stained Wood. *Pipe clamps can discolor a glued-up panel when the iron in the pipe comes in contact with the wet glue.*

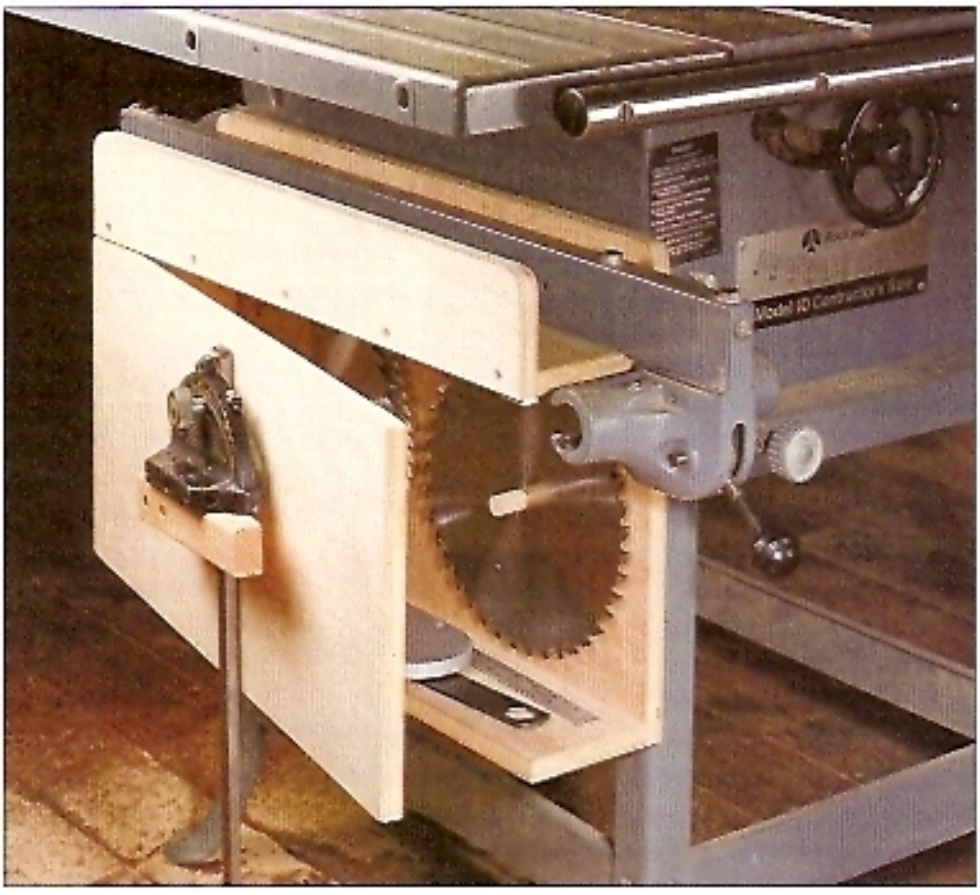
Masking Tape. *The quickest and easiest way to prevent discoloration is to isolate the pipe from the wood with masking tape.*



Inner Tubes. *A more permanent solution to preventing stains is to slide lengths of a bicycle tire inner tube over the pipe.*

Saw Cabinet

Table saw accessories should be stored out of the way, yet close at hand while you work. This cabinet provides just the place within arm's reach, under the saw's wing.



It's no secret that the table saw is the workhorse of most shops. Whether cutting pieces to size or forming joinery, I'd be lost without my table saw. But to do all that work, the table saw requires a number of accessories, from the rip fence and miter gauge to different types of blades and the wrench used to change them.

To keep these items close at hand, I built a cabinet that hangs on the side of my table saw, taking advantage of the space below the table extension.

RIP FENCE STORAGE. When I need to switch from the rip fence to the miter gauge, there's convenient storage for the fence right nearby. On top of the cabinet, there's a channel. It's open at both ends so the head can hang below the top and the rest of the fence can extend out the back. And there's usually some space left beside the fence to store my push sticks.

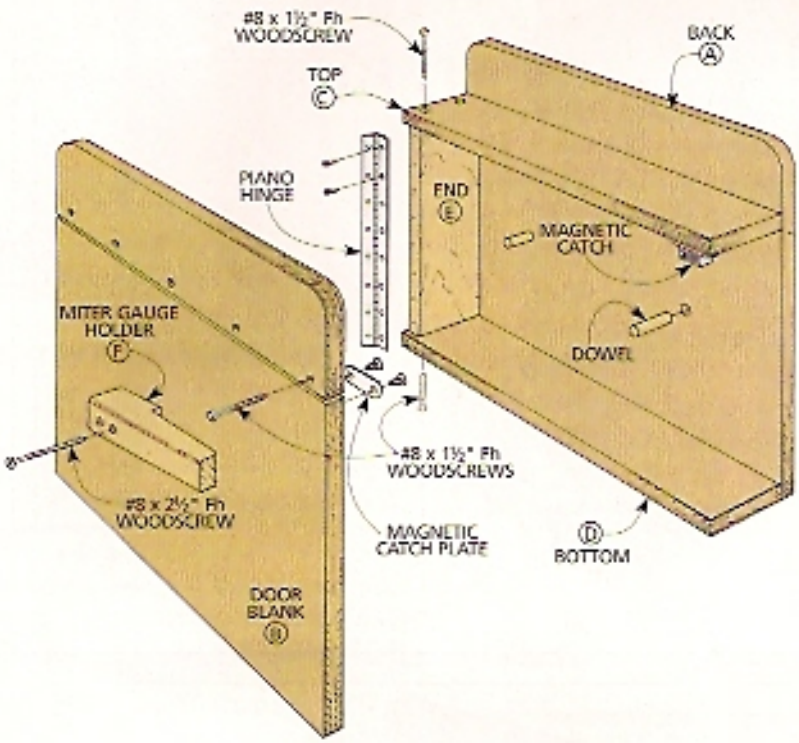
DOOR. The cabinet has a door which effectively doubles the storage space — allowing you to store the arbor wrench, saw blades, and other accessories inside. The miter gauge hangs in a quick-access holder on the outside of the door. It's designed so you can easily store the miter gauge, even if you have a long auxiliary fence fastened to it. (The Accessory box on the opposite page has details on making an auxiliary fence.)

BLADE HOLDERS. Inside the cabinet are two pegs to hold saw blades. This keeps them out of the way so the teeth don't get chipped. The pegs are long enough that they will hold several blades each or even a full dado blade set with chippers.

OPTIONAL TRAY. I've noticed that other items tend to pile up around the saw as I work. So I designed an optional add-on tray to hold things like push sticks, safety glasses, and rulers. Details for building this tray are in the Designer's Notebook on page 83.

EXPLODED VIEW

OVERALL DIMENSIONS:
6W x 23D x 15½H



MATERIALS LIST

WOOD

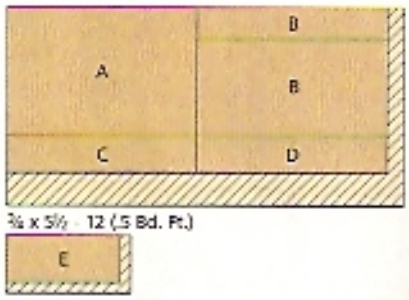
A	Back (1)	¾ ply - 15½ x 23
B	Door Blank (1)	¾ ply - 15½ x 23
C	Top (1)	¾ ply - 23 x 4½
D	Bottom (1)	¾ ply - 23 x 4½
E	End (1)	¾ x 4⅞ - 11
F	Miter Ga. Holder (1)	1½ x 2 - 8
G	Spacer Blocks (2)	1½ x 1½ - 5

HARDWARE SUPPLIES

(2) No. 8 x 2½" Fh woodscrews
(21) No. 8 x 1½" Fh woodscrews
(4) ⅜" x 2½" carriage bolts
(4) ⅜" washers
(4) ⅜" nuts
(1) Piano hinge, 11" long
(1) Magnetic catch w/strike plate, screws
(1) ½"-dia. dowel, 6" long

CUTTING DIAGRAM

¾" PLYWOOD - 24 x 48



¾ x 5½ - 12 (.5 Bd. Ft.)

ACCESSORY . . . . . Adjustable Miter Fence

One of the best accessories I have for my table saw is an adjustable fence for my miter gauge *(Fig. 1)*. (I designed a holder on the Saw Cabinet to hold the miter gauge with a fence.)

The fence is made of two interlocking parts — a short rabbeted top piece that's screwed to the miter gauge. And a long, rabbeted bottom piece with a tall face glued to its front. When the machine screws are tightened, the long piece is pinched against the miter gauge.

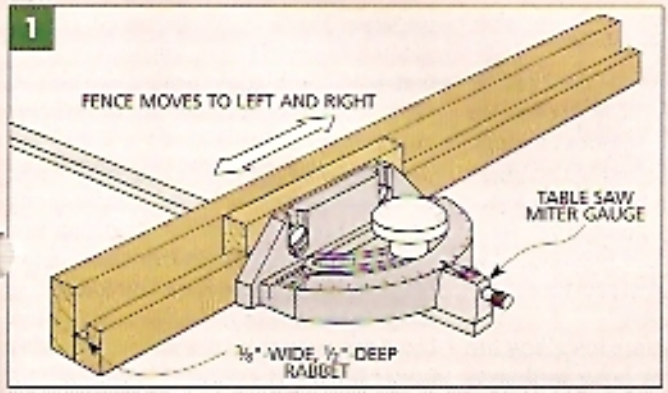
To make the fence, start by ripping a piece of ¾"-thick stock 1¼" wide. Then cut a ½" rabbet in one edge exactly half the thickness of the piece (⅜") *(Fig. 1)*.

Now cut a 6"-long piece from one end. This is the top piece that will be screwed to the miter gauge. The long piece will form the bottom of the fence. To create the pinching action, sand or plane 1/32" off the rabbeted face of the top piece *(Fig. 2a)*.

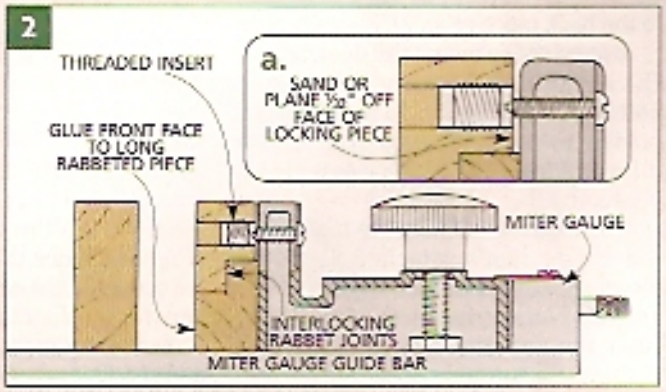
Next, install threaded inserts in the top piece so they align with the holes in the miter gauge face *(Fig. 2)*.

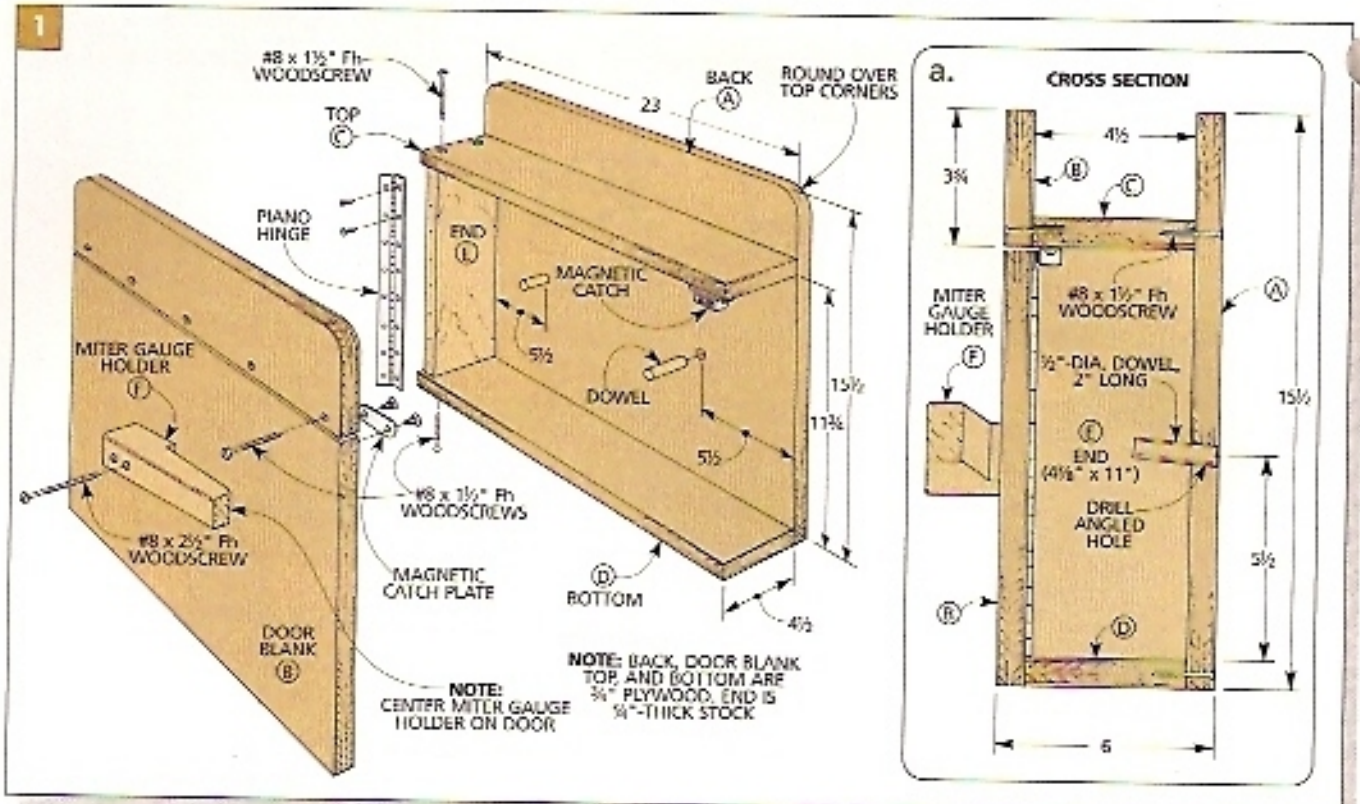
Now, to form a U-shaped channel, glue a 2"-wide front face to the front edge of the long rabbeted piece (but not to the short piece) *(Fig. 2)*.

1



2





CONSTRUCTION

To build the Saw Cabinet, I started by cutting the back (A) and the door blank (B) from ¾" plywood *(Fig. 1)*. I cut both pieces 15½" wide by 23" long (large enough to store 10"-dia. saw blades side by side).

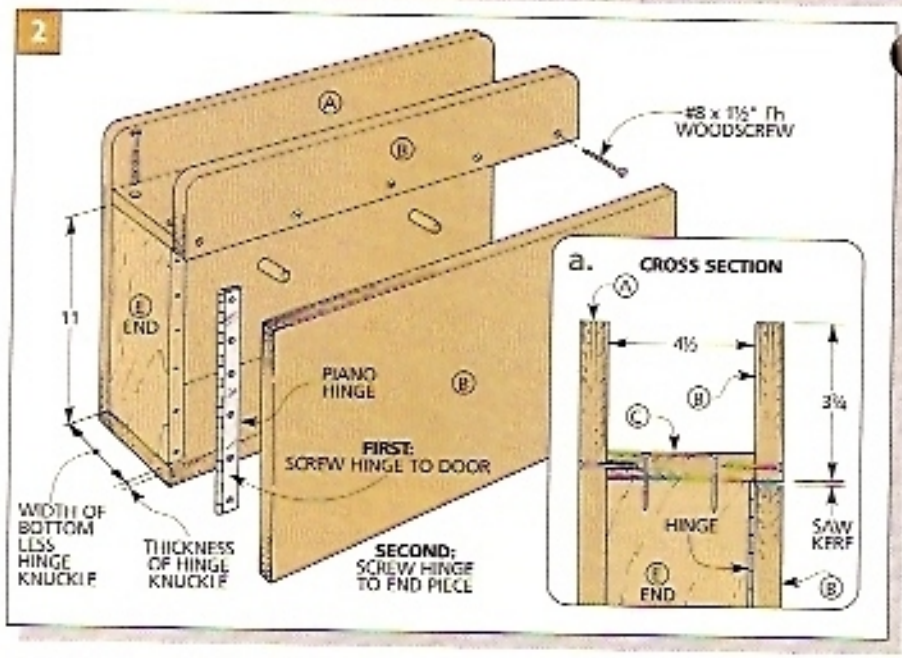
TOP AND BOTTOM. The door and the back are joined together with the top and bottom (C, D). Cut both of these pieces to the same length as the back and 4½" wide *(Fig. 1)*.

Note: The 4½" width will accommodate most saw fences, but you can change the width to fit your fence.

After the top and bottom are cut to size, drill shank holes through the back piece and pilot holes into the top and bottom. Then screw the top and bottom to the back piece *(Fig. 1)*.

END PIECE. To mount the door, an end (E) is cut to fit between the top and bottom pieces *(Fig. 2)*. To provide more holding power for the hinge screws, I cut this piece from ¾"-thick hardwood (not plywood).

The width of this piece has to allow for the hinge that's attached later. So measure the width of the bottom (4½") and subtract the thickness of the hinge. After the end is cut to size, screw it between the top and bottom.



DOOR BLANK. Before the door can be mounted, the door blank is ripped into two pieces. One piece becomes the door. The other piece is screwed to the top to complete the channel for the rip fence *(Fig. 2)*. Rip the top piece 3¾" wide *(Fig. 2a)*. When the door is mounted to the case later, the saw kerf provides clearance for the door to open.

BLADE HOLDERS. Before installing the door, I drilled two ½"-dia. holes for dowels that hold the blades inside the cabinet *(Fig. 1a)*. These holes are angled to keep blades from falling off.

MOUNT DOOR. When you're ready to mount the door to the cabinet, cut a piano hinge the same length as the door. Then screw the hinge to the door *(Fig. 2)*. Next, screw the other flap of the hinge to the end (E). Finally, to help keep the door closed, add a magnetic catch under the top (C) *(Fig. 1)*.

MITER GAUGE HOLDER

One of the most awkward things to store is a miter gauge — especially when it has a long auxiliary fence attached to it. Storing it becomes even more of a problem if you want easy and quick access when you need it.

One solution is this simple quick-access miter gauge holder (F) that mounts to the front of the cabinet door. It's just a bracket with a tapered notch.

I cut mine from a scrap piece of "2 by" stock that was 8" long *(Fig. 3)*. Then, I ripped it to a width of 2".

Next, lay out the tapered notch and cut it out with a jig saw or on a band saw. Also, drill two countersunk shank holes through the thickest portion of the holder. Before mounting the holder, ease the sharp edges with sandpaper.

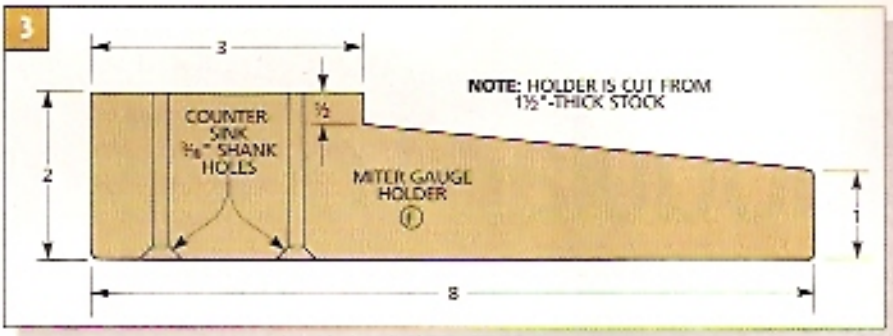
When mounting the holder to the door, center it on the door's length so an auxiliary fence won't stick past the front of the cabinet. Also, tilt it at a slight angle to keep the miter gauge from sliding off the front (open) end.

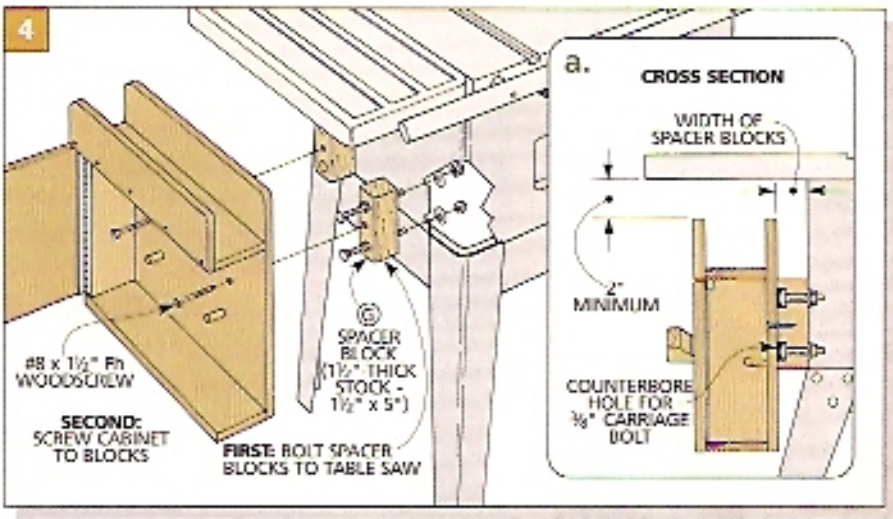
MOUNTING

With the cabinet complete, all that's left is to mount it to the saw.

As you position the cabinet, make sure you leave enough room below the wing to allow you to place the rip fence in the channel *(Fig. 4a)*.

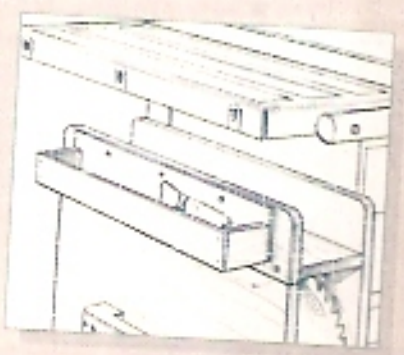
If the angle of the legs on your table saw interferes with mounting the cabinet, add a couple of spacer blocks (G) between the cabinet and the saw. Counterbore holes in the blocks, and use carriage bolts to fasten them to the side of the saw *(Fig. 5)*. Now just screw the cabinet to the blocks and start organizing your accessories. ■





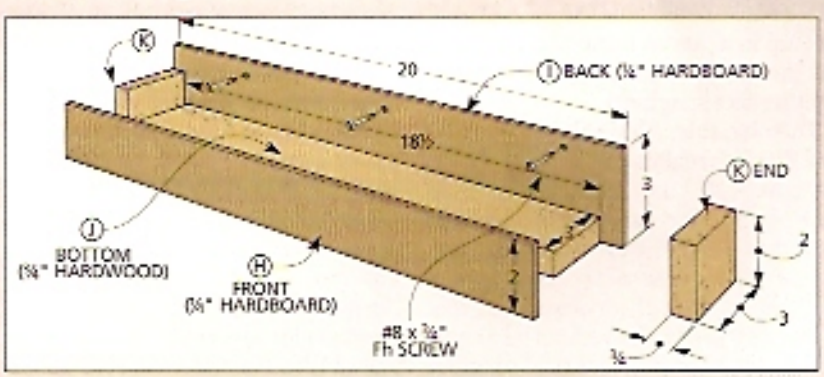
DESIGNER'S NOTEBOOK

ACCESSORY TRAY



■ This optional accessory tray provides a place to put smaller accessories. It consists of a hardboad front (H) and back (I), and a ¾" hardwood bottom (J) that are glued to two tray ends (K) cut from ¾"-thick hardwood (see drawing).

■ The back is taller than the front to allow you to screw the tray flush with the top edge of the Saw Cabinet (see drawings).



Modular Tool Bins

These Tool Bins have adjustable shelves for compartments that fit your needs. Make two and set them side by side or stack them up to fit the space in your shop.

Storing portable power tools is always a problem. They usually end up in a pile on a shelf somewhere. And the power cords unwind and weave together like spaghetti.

To solve this, I built these Modular Tool Bins. It's really a tool storage system that you can customize easily to fit your needs. The cabinets are open in the front to keep the tools right at hand. A set of shelves creates a series of bins—each bin a "home" for a specific tool or accessory. The shelves can be moved up or down to make each opening a custom fit. And since it's easy to access the shelves, I find I'm more likely to put a tool back where it belongs instead of just setting it down.

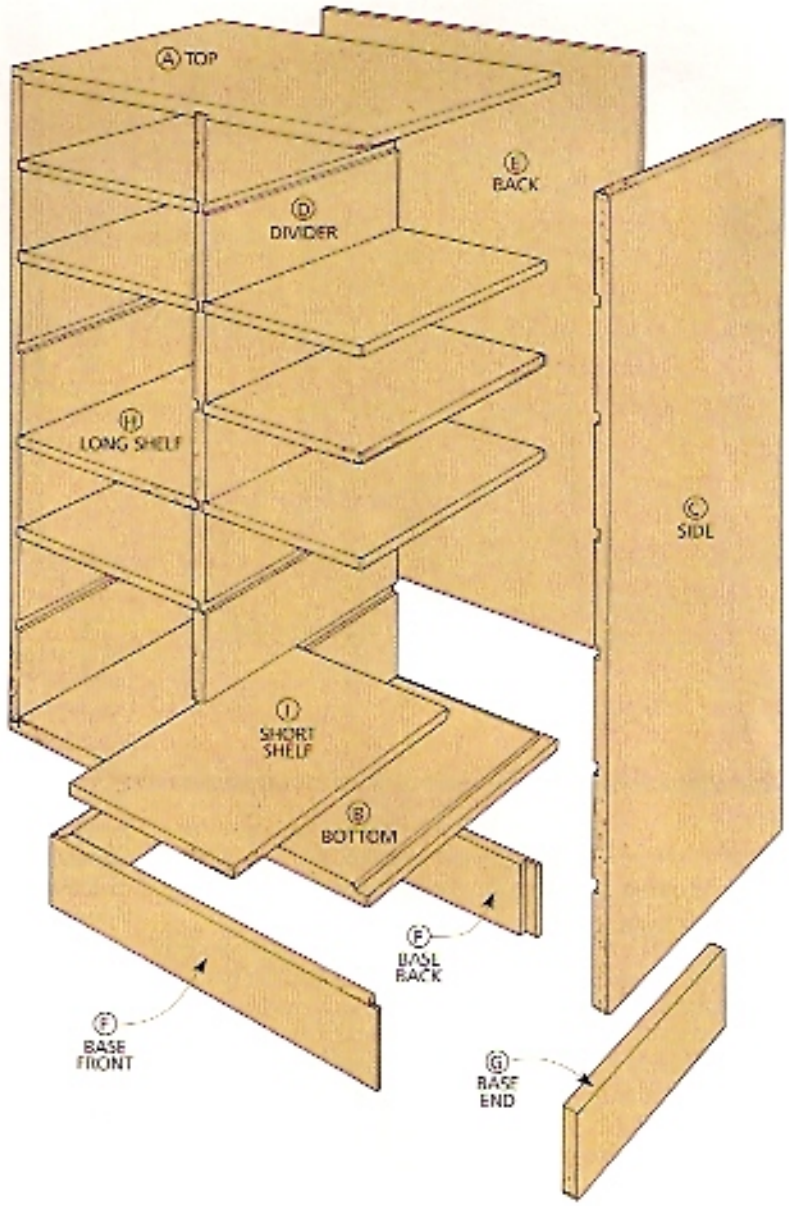
ADAPTABLE. I also wanted a system that could be adapted to fit a variety of shop layouts. So I built two smaller cases instead of one large cabinet. This way I could stack the bins (see left photo), place them side by side (see right photo), or use them as stand alone units in separate areas. By adding a work surface between them, they can even be used as the base for a workbench. There's more about this option in the Designer's Notebook on page 89.

SHELVES. To store the widest possible variety of power tools, the shelves are two different widths. And in keeping with the simple design, there's no hardware needed to hold the shelves. Instead they fit in a set of dadoes in the sides. This makes it easy to rearrange the shelves to accommodate different tools and accessories. I even customized several of the shelves to hold specific tools. (For more on this, see the Designer's Notebook on page 88.)

Even though there are 24 dadoes for the shelves, I'll show you a trick for cutting them quickly.

EXPLODED VIEW

OVERALL DIMENSIONS:
23¼W x 15¼D x 36H



MATERIALS LIST

WOOD

A	Tops (2)	¾ ply - 15¾ x 23¾
B	Bottoms (2)	¾ ply - 15¾ x 23¾
C	Sides (4)	¾ ply - 15¾ x 31½
D	Dividers (2)	¾ ply - 15¼ x 31½
E	Backs (2)	½ ply - 22¾ x 31½
F	Base Ft./Bk. (2)	¾ x 3½ - 21¾*
G	Base Ends (2)	¾ x 3½ - 13¾
H	Long Shelves (8)	½ ply - 15¼ x 12¾
I	Short Shelves (8)	½ ply - 15¼ x 9¾

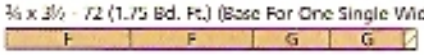
* Length for single base

HARDWARE SUPPLIES

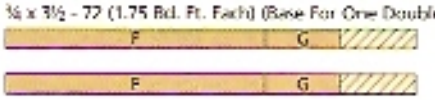
(22) No. 8 x 2" Fh woodscrews
(16) No. 4 (1½") finish nails
(8) No. 6 (2") finish nails
Note: Materials and hardware are for one single-wide case only.

CUTTING DIAGRAM

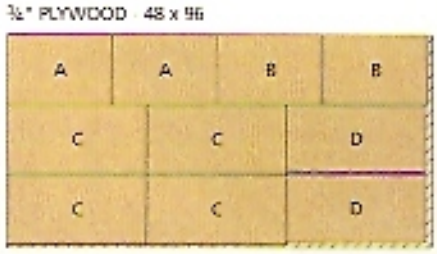
¾ x 3½ - 72 (1.75 Bd. Ft.) (Base For One Single Wide Case)



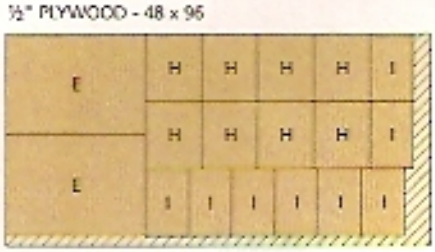
¾ x 3½ - 72 (1.75 Bd. Ft. Each) (Base For One Double-Wide Case)

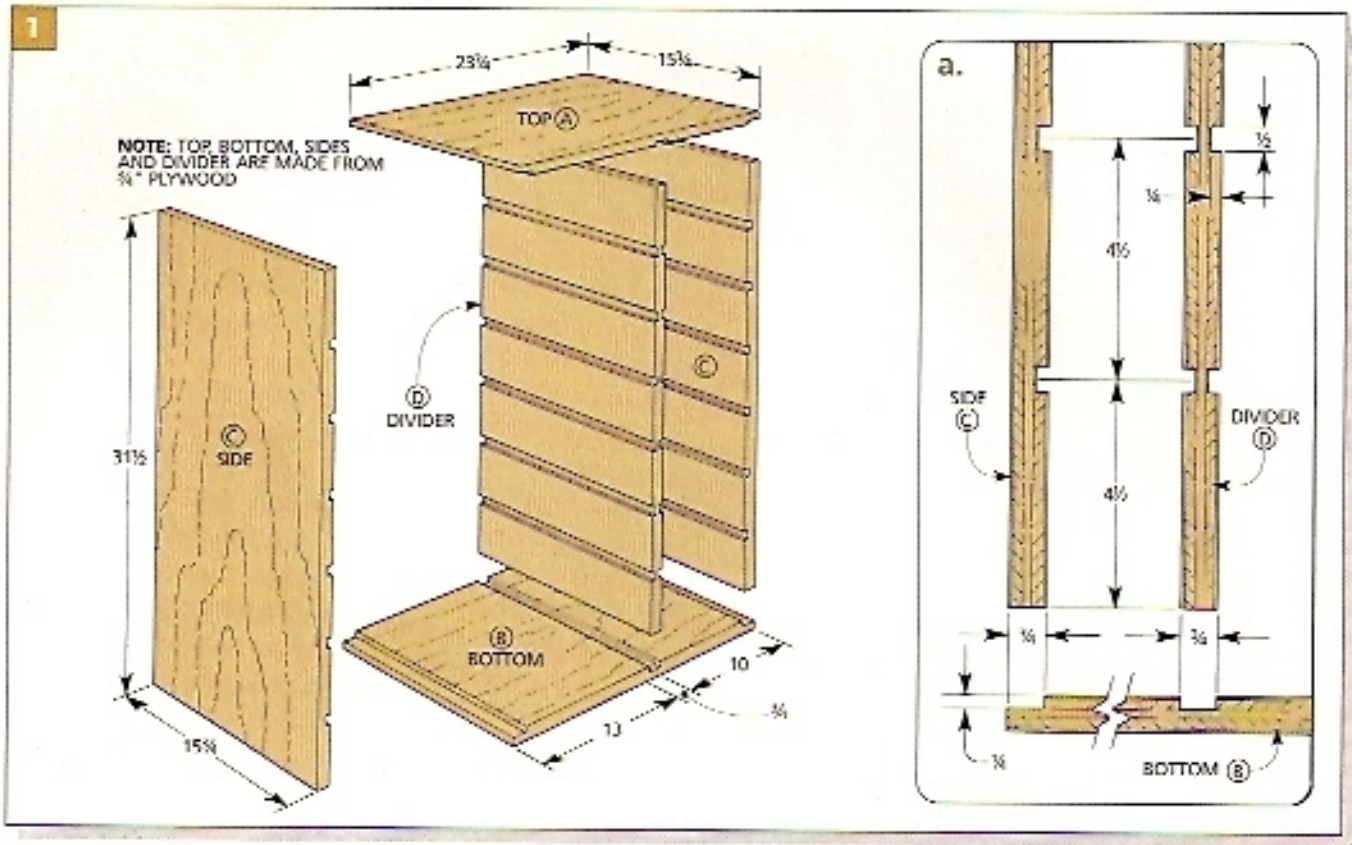


¾" PLYWOOD - 48 x 96



½" PLYWOOD - 48 x 96





CASE

The modular tool bins consist of two identical cases. Each case is just a plywood box with a divider *(Fig. 1)*.

All of the ¾"-thick plywood pieces for both cases are cut from a single sheet (refer to the Cutting Diagram on page 85). Since these pieces are all the same width (15¾"), I started by ripping the sheet into three 15¾"-wide strips.

TOP AND BOTTOM. Once the case pieces are cut to width, the top (A) and bottom (B) pieces can be cut to their finished length (23¾") *(Fig. 1)*.

Then the ends are rabbeted to accept the side pieces *(Fig. 1a)*. And a dado is cut in each piece for a divider added later. Note that this dado is offset on the length of the top and bottom *(Fig. 1)*.

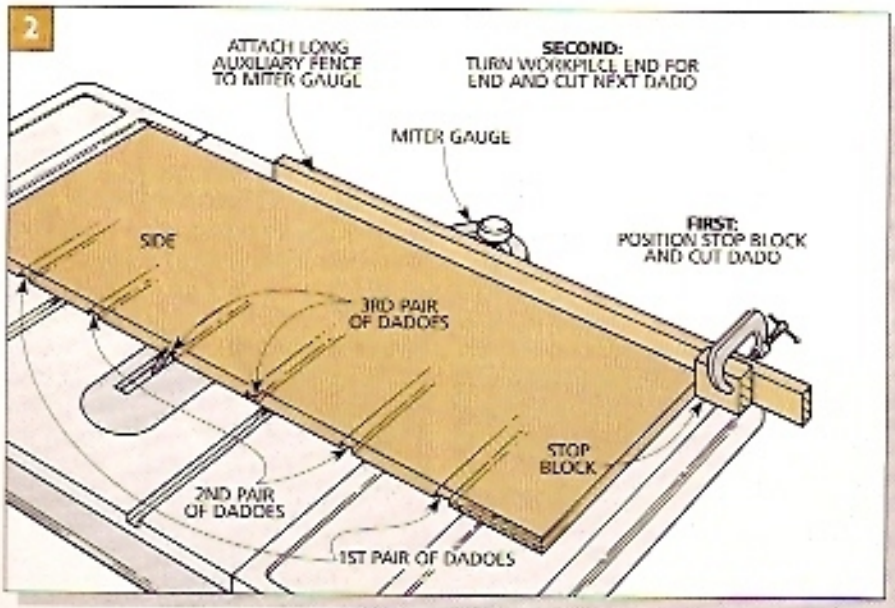
SIDES AND DIVIDERS. The next step is to cut the sides (C) and dividers (D) to length (31½") *(Fig. 1)*. To accept the adjustable shelves (added later), ½"-wide dadoes are cut in the inside faces of the sides (C), and both faces of the dividers (D) *(Fig. 1a)*.

CUT IN PAIRS. That's a lot of dadoes to cut (24 per case). To cut these quickly, I use a special technique. I cut the dadoes in pairs starting near the ends and working towards the center *(Fig. 2)*. This cuts your set up time in half and ensures the dadoes will align.

Start by attaching a long auxiliary fence to your miter gauge *(Fig. 2)*. Then clamp a stop to the fence and cut the first dado. Now turn the workpiece end for end and cut a second dado *(Fig. 2)*.

Once you've cut matching pairs of dadoes in all four sides and both dividers, then reset the stop and cut the next set of dadoes.

Note: For each divider (E), flip the piece over and repeat the cuts on the other side.



BACK

To strengthen the case and prevent it from racking, I added a back (E) made from ½" plywood.

RABBET. To hold the back in place, I cut rabbets on the inside edges

of the top, bottom, and side pieces (A, B, C) *(Figs. 3 and 3b)*.

TRIM DIVIDER. But before you can assemble the case, you'll need to trim ½" off the width of the divider (D). This way it won't interfere with the back when it's installed later *(Fig. 3)*.

ASSEMBLE CASES. Now you're ready to assemble the cases. To do this, apply glue, then screw the top and bottom to the sides and divider *(Figs. 3 and 3a)*.

Note: Make sure that the case is square, and the front of the divider (D) is flush with the front of the case.

ADD THE BACK. Finally, cut a back (E) to fit in the rabbets in each case. Then glue and nail the back in place *(Fig. 3b)*.

BASE

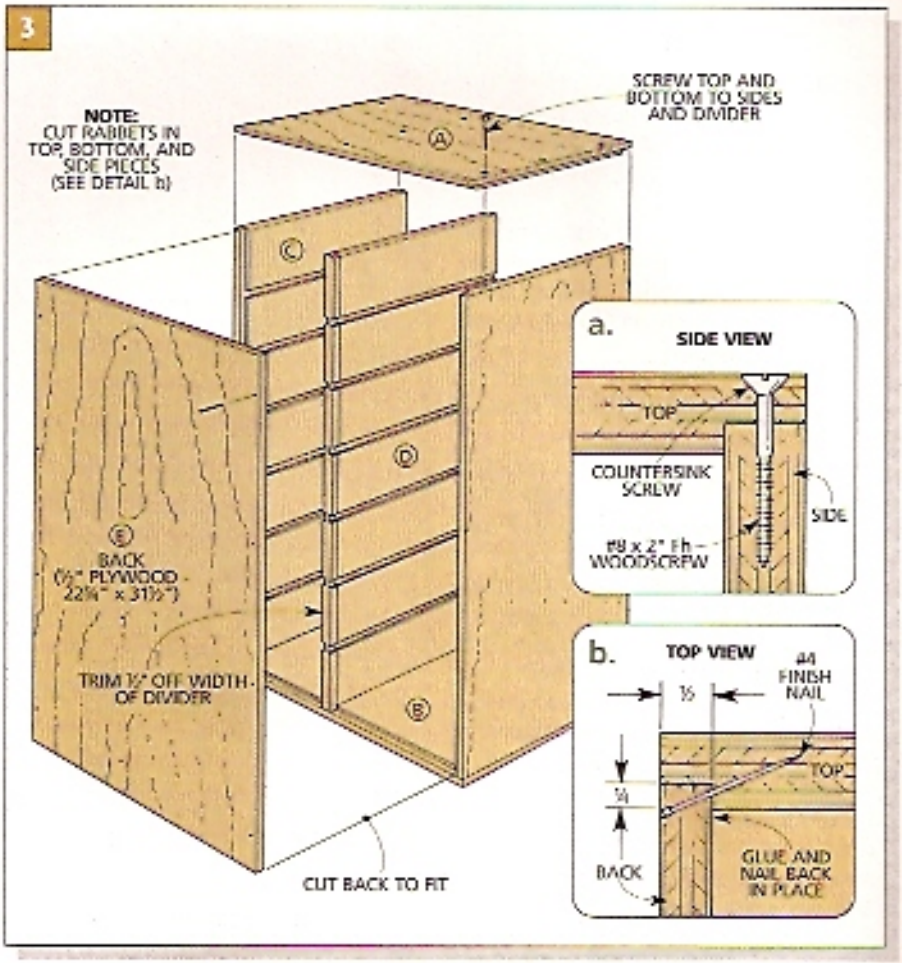
To make the bottom bin more accessible and keep the case up off a damp floor, I added a base *(Fig. 4)*.

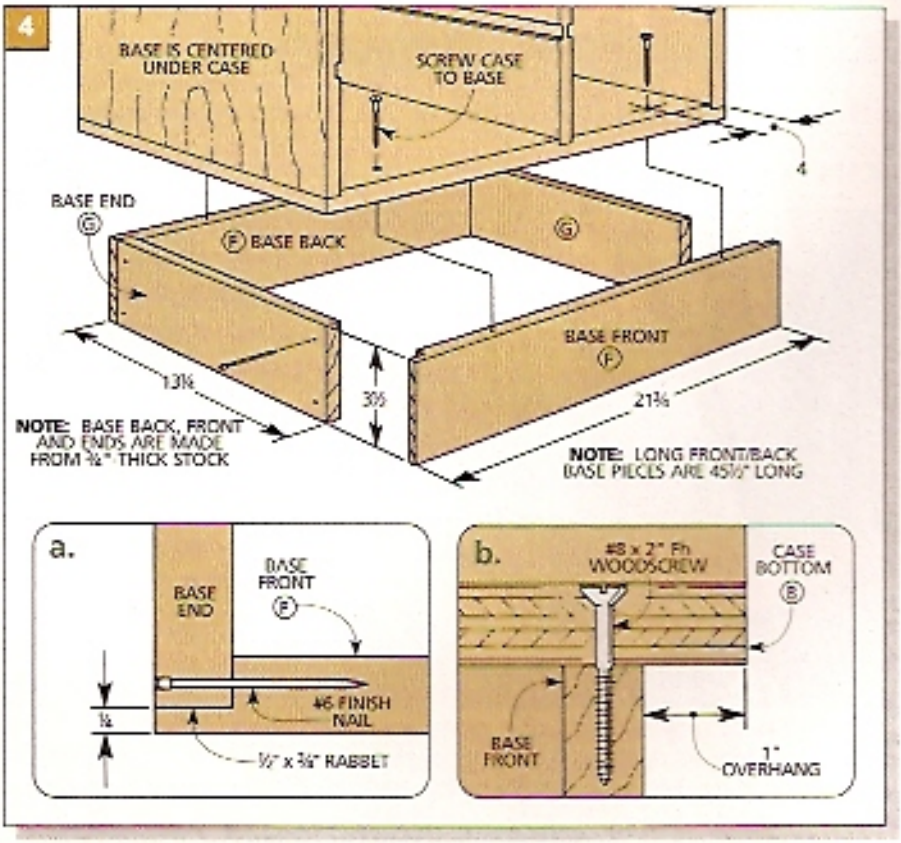
The base consists of four pieces of 1x4 stock: a front and back (F), and two ends (G). The front and back pieces are rabbeted to accept the ends *(Fig. 4a)*.

CUT PIECES. The length of the ends is the same (13¼"). But the length of the front and back depends on how you arrange the cases. If the base is for a single case (or you're going to stack them), the front and back pieces are 21¾" long. If the cases are side by side, they're 45½" long.

ASSEMBLY. The base is assembled with glue and a couple of nails at each corner *(Fig. 4a)*. Then it's centered under the case (this allows a 1" overhang) and screwed in place *(Fig. 4b)*.

ADJUSTABLE SHELVES. *A series of dadoes allows the shelves to be adjusted or removed to hold tools of various sizes.*





SHELVES

The only thing left to complete the tool bins is to add the adjustable shelves *(Fig. 5)*. These ½" plywood shelves are cut to fit in between the dadoes in the sides and divider.

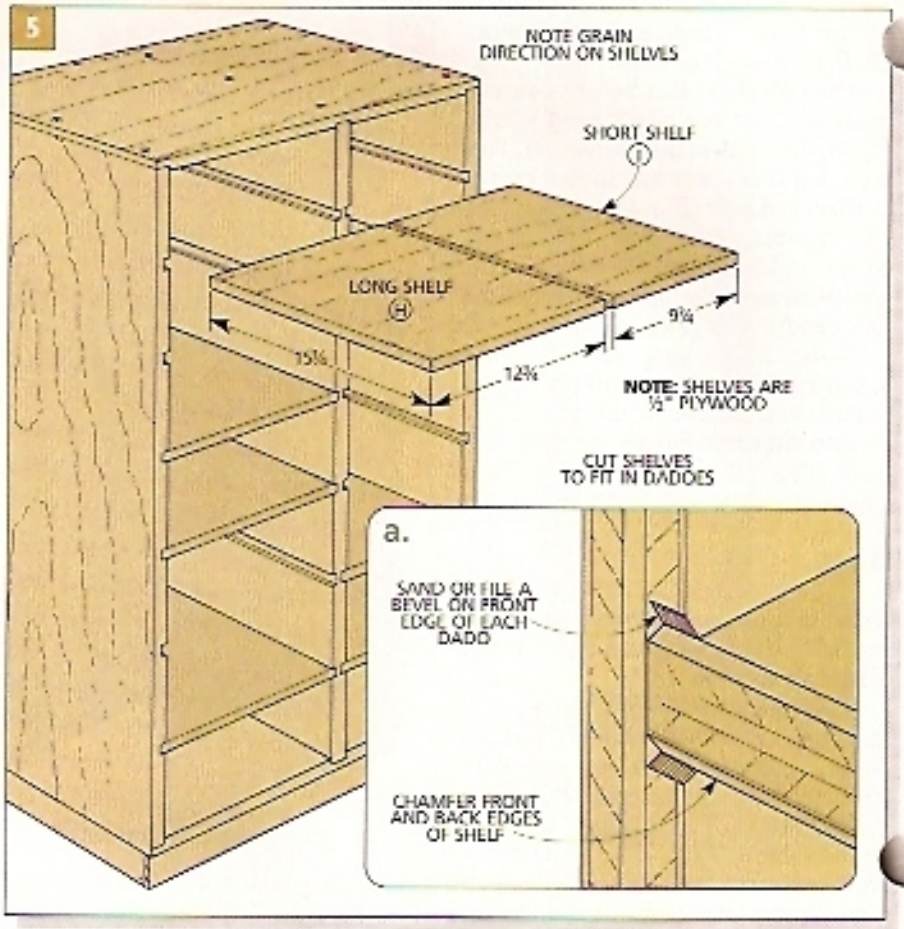
TWO SIZES. The depth of the shelves (distance from front to back) is the same (15¼"). But the lengths (distance from side to side) are different *(Fig. 5)*. (Note the grain direction.)

In my case, the long shelves (H) are 12¾" long, and the short shelves (I) are 9¾" long.

Note: The ½" plywood that remains from cutting the backs (E) will allow for eight shelves of each size. Make as many shelves as you need.

CHAMFER AND BEVEL. To prevent chipping and to make it easier to slide the shelves in and out, I took them to the router table and chamfered their front and back edges *(Fig. 5a)*. Then I beveled the front edge of each dado in the cabinets *(Fig. 5a)*. This can be done with a chisel, a file, or with sandpaper.

CUSTOMIZE. Finally, I took the time to customize some of the shelves to hold specific tools, as shown in the Designer's Notebook below. ■



DESIGNER'S NOTEBOOK

These simple modifications to the shelves give each tool a custom-fit home.

CUSTOMIZING SHELVES

Circular Saw. *To keep the saw from tilting when it's set on a shelf, I cut a long rectangular slot wide enough to fit the blade guard. This allows the saw to sit flat. An easy way to lay out this slot is to trace the opening in the saw's baseplate.*

Drills. *To make it easy to reach in and grab an electric (or cordless) drill, notch the front end of one of the shelves. Each notch is cut to fit the handle and holds the drill upright. The cord for the electric drill can be coiled up on the shelf below.*

DESIGNER'S NOTEBOOK

An easy-to-make work surface placed across two of the bins serves as a workbench. The hardboard top can easily be removed for quick replacement when needed.

CONSTRUCTION NOTES:

■ Start by cutting a base (J) from ¾" plywood to a width of 18". This allows for a 1⅛" overhang on the front and back (see detail 'a' in drawing). To provide some "knee room" between the bins, I cut my base to a length of 72". You can make yours longer or shorter to fit your space.

■ A hardboard cover (K) is cut to the same size as the base (J) (see drawing).

■ Hardwood edging is added to each side of the base to hide the edges of the plywood. The edging also extends above the top of the base to form a "lip" to hold the hardboard in place (see detail 'a' in drawing).

■ The edging (L, M) is ¾"-thick stock ripped to a width of 1½". I cut each piece about 1" over finished length to allow me to sneak up on the final length as I mitered the ends.

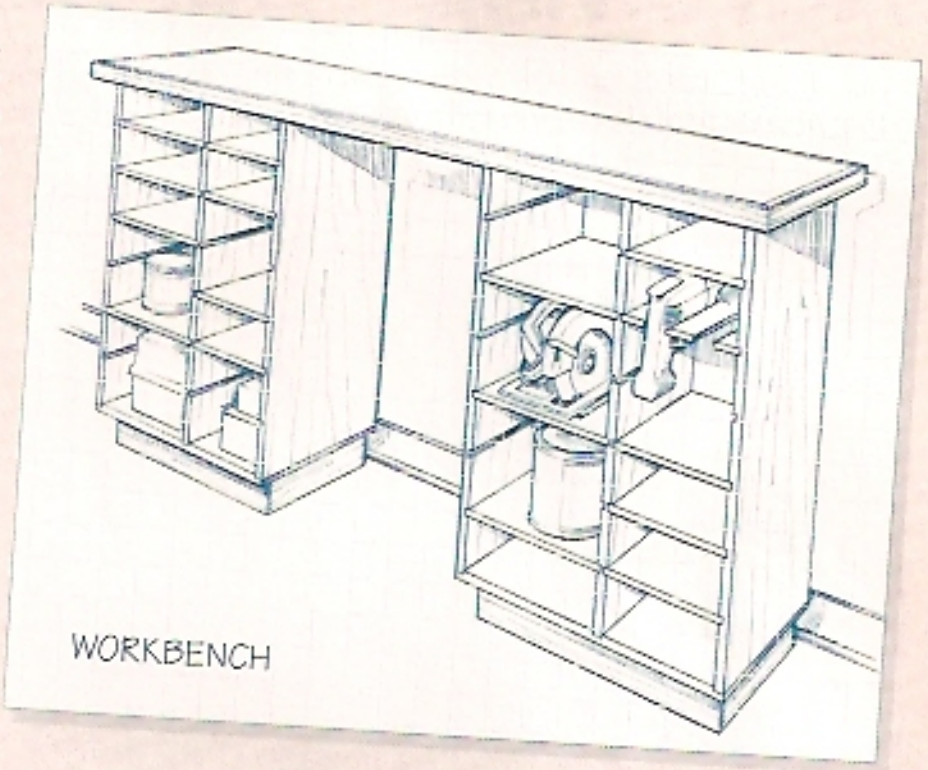
■ When "wrapping" a workpiece with mitered trim on all four sides, I like to start with the front piece, then cut the side pieces (M) to length. I cut and attach the back piece last. This way, any slight gap in the miters will be at the rear where it's less noticeable. Of course, I cut a number of test joints first to get the best fit possible before starting to miter the trim.

■ When the trim is mitered to length, it can be fastened to the base. Before doing this, I set the base on top of the Tool Bins to provide clearance since the trim extends below the bottom edge (see detail 'a' in drawing).

■ I used a scrap of ¼" hardboard as a gauge to help position the trim above the top edge of the base. A couple of finish nails in each piece help hold it in position as you clamp it (see detail 'a').

■ Before setting the cover (K) in place, drill a finger hole through the base (J) centered on its length (see drawing). This lets you lift the cover so you can replace it if it becomes worn.

■ Secure the work surface to the Tool Bins by driving screws through the top of the bins up into the base.



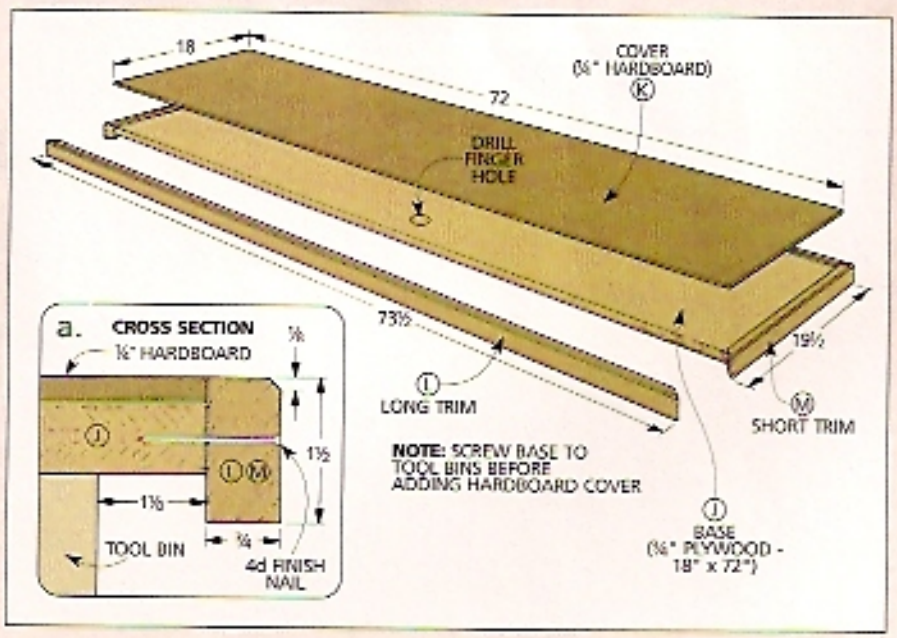
MATERIALS LIST

NEW PARTS

J	Base (1)	¾ ply - 18 x 72
K	Cover (1)	¼ hdbd. - 18 x 72
L	Long Trim (2)	¾ x 1½ - 73½
M	Short Trim (2)	¾ x 1½ - 19½

HARDWARE SUPPLIES

(8) No. 8 x 1¼" Fh woodscrews
(8) 4d (1½") finish nails



Revolving Tool Station

A spinning "carousel" on top and a rotating turntable below provide easy access to all your power tools. Spacious drawers provide convenient storage for accessories.

I've never met a home woodworker yet who had too much space in the workshop. Maybe that explains why they're always looking for ways to use the space that is available as efficiently as possible.

One of the most useful, space-saving ideas I've come up with is this Revolving Tool Station. Basically, it's a rotating tool stand that provides easy access to a number of benchtop tools in a small amount of space.

TOOL STATION. This station has a "footprint" that only takes up about eleven square feet of space. (I like to tuck mine in a corner of the shop.) Even so, it combines a work center and a convenient storage area that would normally take up much more room.

WORK CENTER. The heart of the work center is a large circular platform that spins around like a carousel. Mounting your benchtop tools to this platform provides quick access to each tool while keeping the others close at hand.

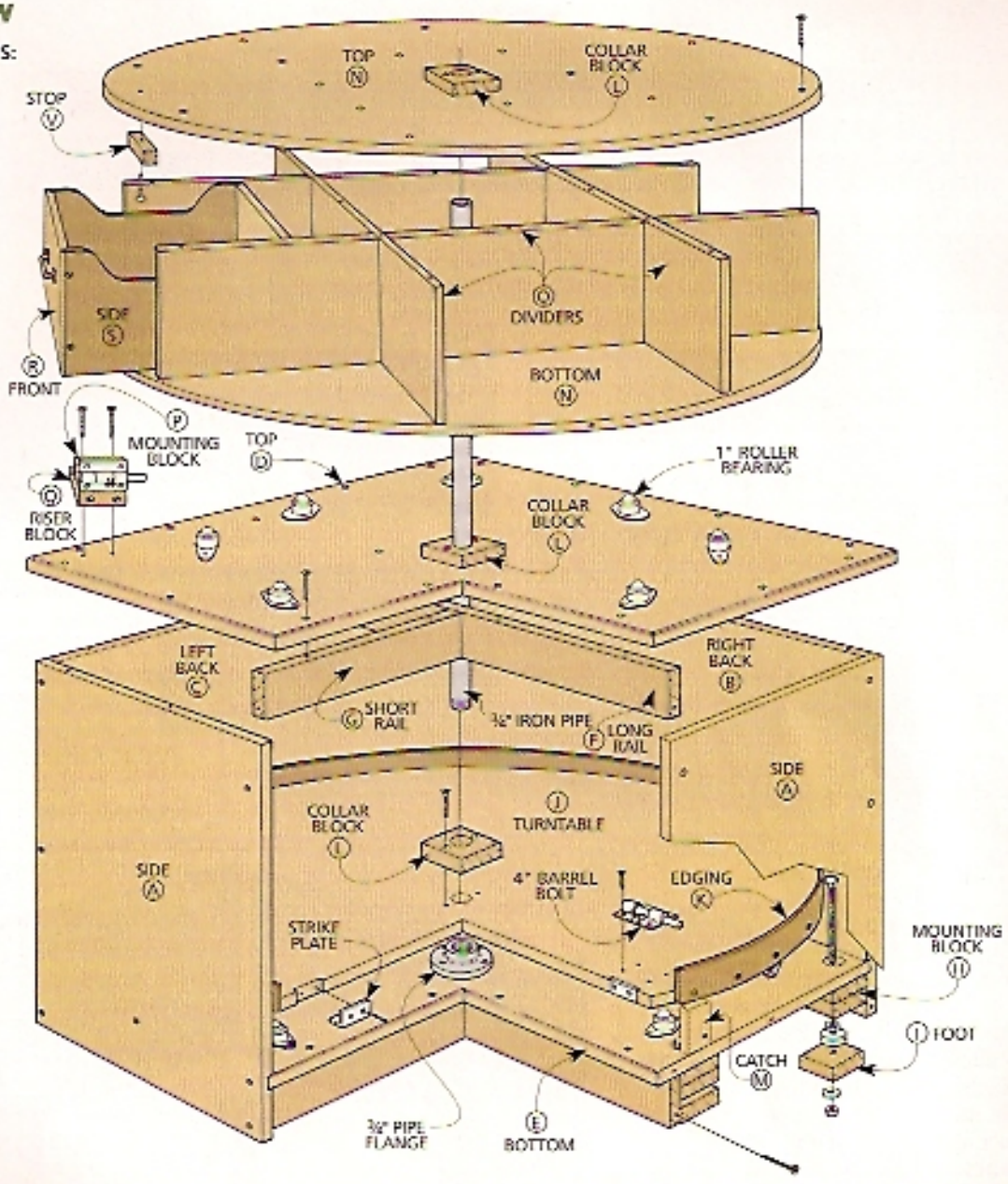
STORAGE AREAS. The carousel also features plenty of room for storage. Directly underneath each tool is a drawer that's perfect for storing accessories. Between the drawers are open shelves. And a large rotating turntable in the base provides storage for a number of your portable power tools.

MATERIALS. I decided to use $^3/_4$" MDF (medium-density fiberboard) for the large parts of this station, not only because it's easy to work with, but also because its density will help damp the vibration of the tools mounted to it. If you prefer, you could also use plywood.

HARDWARE. There isn't much special hardware needed for this project. You will need an iron pipe with a flange, a couple of small pieces of aluminum angle, and several 1"-roller bearings. These bearings let the turntable and carousel spin smoothly. For mail-order sources of hardware, see page 112.

EXPLODED VIEW

OVERALL DIMENSIONS:
40W x 40D x 32¾H



MATERIALS LIST

BASE

A	Sides (2)	¾ MDF - 22 x 19⅞
B	Right Back (1)	¾ MDF - 22 x 33⅝
C	Left Back (1)	¾ MDF - 22 x 33
D	Top (1)	¾ MDF - 36 x 36
E	Bottom (1)	¾ MDF - 33⅝ x 33¼
F	Long Rails (2)	¾ x 3 - 33
G	Short Rails (2)	¾ x 3 - 15
H	Mounting Blks. (10)	¾ x 3 - 3
I	Feet (5)	¾ x 3 - 3

TURNTABLE

J	Turntable (1)	¾ MDF - 30 x 30
K	Edging (1)	⅛ hdbd. - 1⅝ x 72⅛
L	Collar Blocks (3)	4/4 x 3 - 3
M	Catch (1)	4/4 x 1 - 3

CAROUSEL

N	Top/Bottom (2)	¾ MDF - 40 x 40
O	Dividers (4)	¾ MDF - 6 x 36½
P	Mounting Block (1)	¾ x 1 - 3
Q	Riser Block (1)	¾ x 2½ - 3

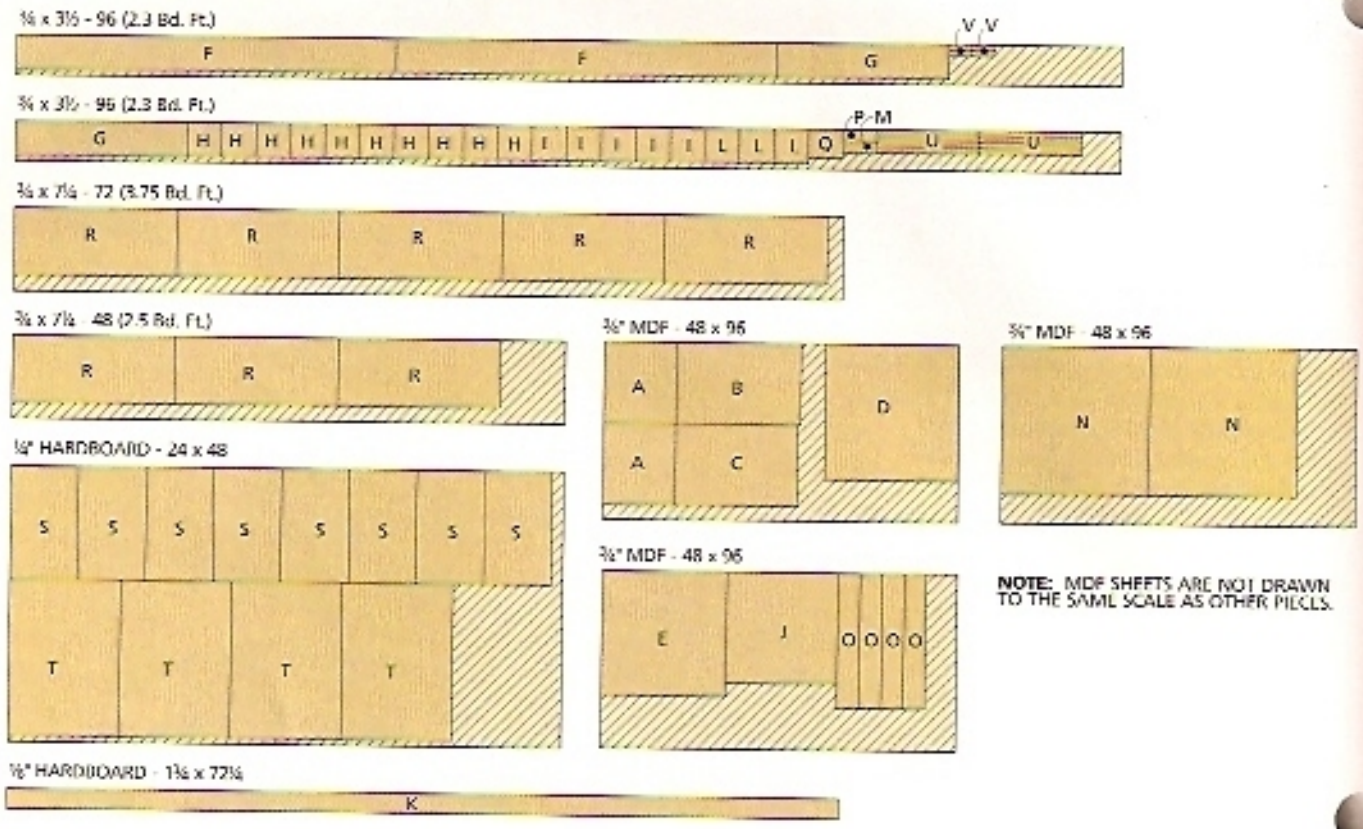
DRAWERS

R	Fronts/Backs (8)	½ x 5⅞ - 14⅛
S	Sides (8)	¼ hdbd. - 5⅞ x 9⅞
T	Bottoms (4)	¼ hdbd. - 13⅜ x 9⅜
U	Cleats (8)	½ x ½ - 8⅛
V	Stops (4)	¾ x ½ - 2

HARDWARE SUPPLIES

(28) No. 8 x ⅜" Fh screws
(24) No. 6 x ½" Fh sheet-metal screws
(19) No. 6 x ¾" Fh sheet-metal screws
(36) No. 6 x 1¼" Fh sheet-metal screws
(15) No. 8 x 1¼" Fh sheet-metal screws
(91) No. 8 x 1½" Fh sheet-metal screws
(10) No. 8 x 2" Fh sheet-metal screws
(2) 4" barrel bolts w/ screws
(5) ⅜" x 4" full thread hex bolts
(5) ⅜" 16 T nuts
(10) ⅜" lock nuts
(10) ⅜" x 1½" fender washers
(5) ⅜" flat washers
(14) 1" roller bearings
(2) ¾" x ¾" aluminum angle, 2" long
(1) ¾" pipe flange w/ screws
(1) ¾" iron pipe, 28" long
(4) 4" sash handles

CUTTING DIAGRAM



BASE

I began work on the Revolving Tool Station by making an open, L shaped base cabinet *(Fig. 1)*. The shape of the base will provide easy access to the turntable that's added later. And it will allow plenty of leg room when working at the tools on the carousel — while still fitting conveniently into a corner of your workshop.

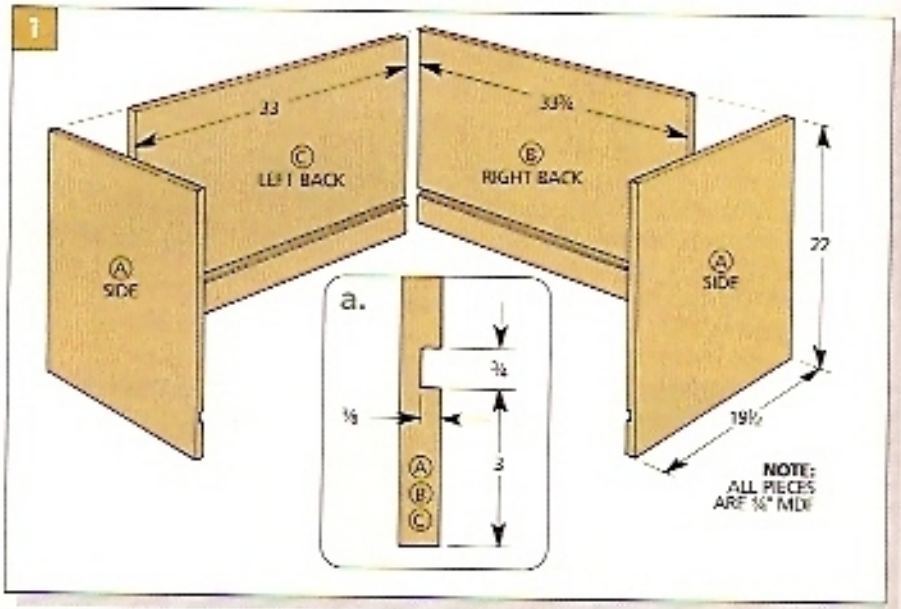
SIDES AND BACKS. The base cabinet starts out as two sides (A) and a right (B) and left back (C) piece *(Fig. 1)*.

Note: For these pieces, I used ¾" MDF (medium-density fiberboard), but plywood would work just as well.

These four pieces are held together with simple butt joints. So to allow for the joinery in the back corner, the *right* back is a little wider (33¾") than the *left* back (33").

After cutting all the side and back pieces to size, there's one more thing to do before moving on to the top and bottom pieces. That's to cut a long dado in each piece for the bottom of the base cabinet *(Fig. 1a)*. This dado is ⅜" deep and cut to width to match the thickness of the ¾" MDF.

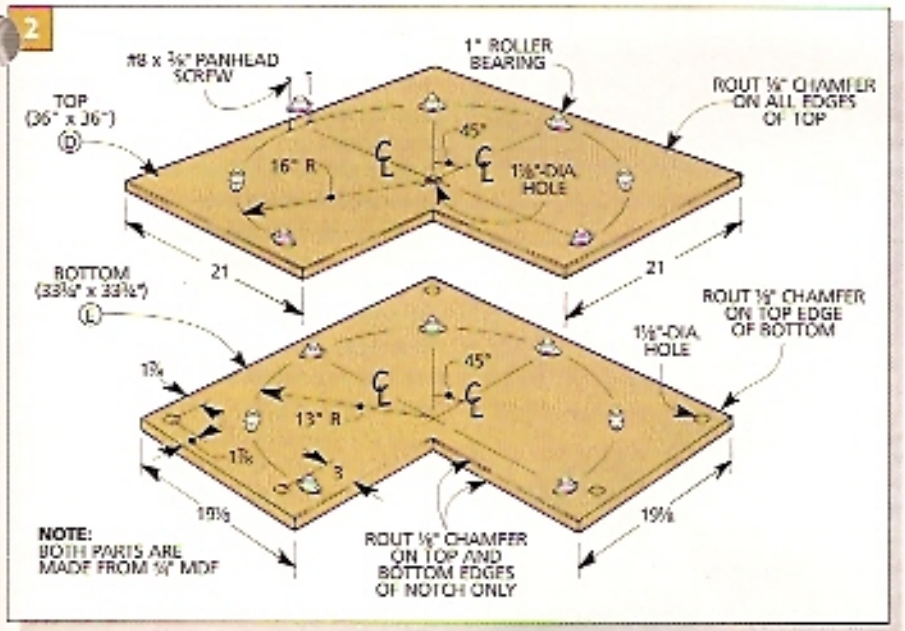
1



TOP AND BOTTOM. Besides holding the case together, the top and bottom provide a surface for mounting a number of roller bearings (see the photo on the opposite page). The roller bearings on the bottom make it easy to spin the turntable around, while those on the top allow you to rotate the carousel smoothly.

Both the top (D) and bottom (E) start out as square pieces of ¾" MDF *(Fig. 2)*. But to create an overhang, the top is larger than the bottom.

NOTCH. With the pieces cut to size, the next step is to cut a large notch in each one so they don't extend into the opening in front of the base. While you're at it, rout small (⅛") chamfers on



ROLLER BEARINGS. *Mounting a number of roller bearings to the top and bottom of the tool station in a circular pattern will allow both the carousel above and the turntable below to spin smoothly and easily. For sources of roller bearings like the one shown in the photo above,* *see page 112.*

the top and bottom edges of the top and the top edge of the bottom *(Fig. 2)*.

ATTACH ROLLERS. Now you're ready to attach the rollers to the top and bottom. After spacing the rollers evenly around the perimeter of a large circle, they're screwed in place *(Fig. 2)*.

Note: To provide plenty of support near the edge of the carousel, the circle on top has a larger radius (16") than the one on the bottom (13").

Before assembling the base, it's best to drill several large holes. There's a hole in the top for an iron pipe that serves as a pivot point for the turntable and carousel *(Fig. 2)*. Also, five holes in the bottom will be used when levelers are added later.

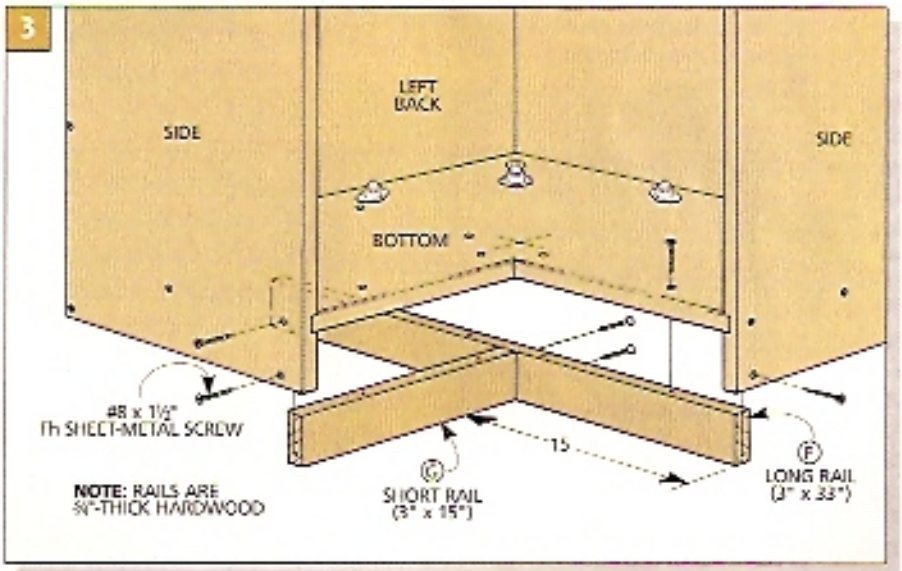
ASSEMBLY. At this point, you can begin putting together the base cabinet. I started by gluing up a U-shaped assembly consisting of one side and the two back pieces.

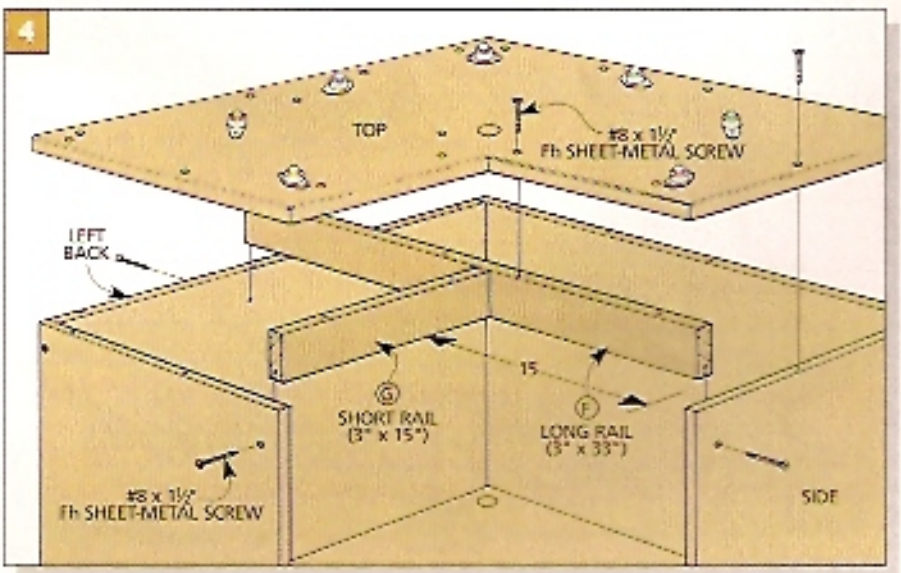
Then I slipped the bottom in place and added the other side.

Note: Reinforcing each joint with screws during assembly will help strengthen the base.

RAILS. To add even more rigidity, I installed two hardwood rails under the top and bottom *(Figs. 3 and 4)*. A long rail (F) spans from one side to the left back. And a short rail (G) connects the long rail to the opposite side.

ATTACH TOP. All that's left to complete the base of the station is to attach the top. It's simply positioned, then glued and screwed to the rails, backs, and sides *(Fig. 4)*.



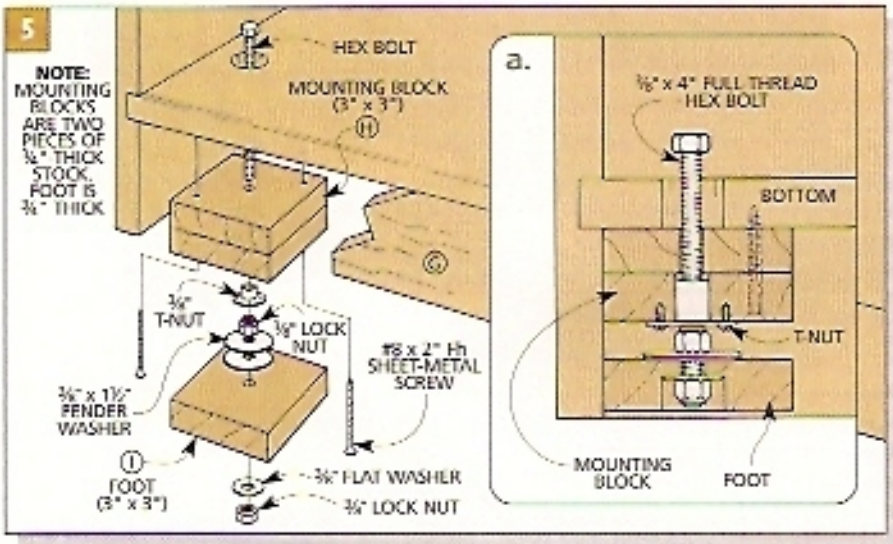


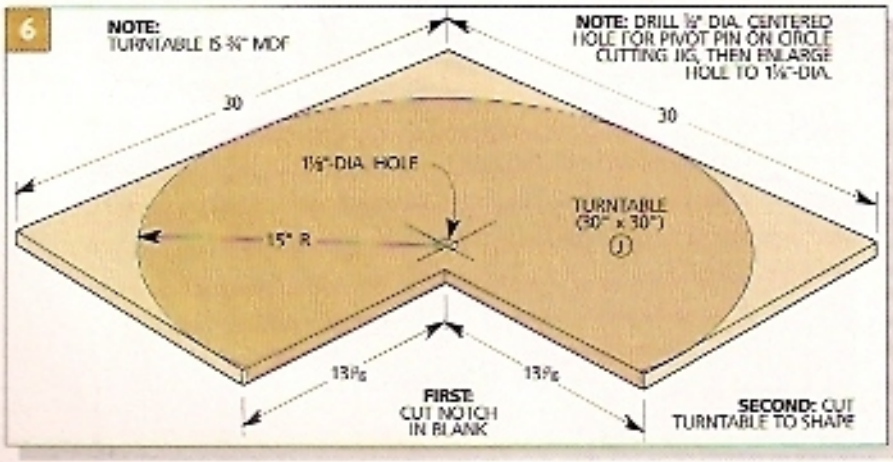
SHOP TIP . . . . . Uses for Levelers

The shop-made leveling system I used for the Revolving Tool Station can easily be adapted to other projects and fixtures.

For example, if your bench rocks on an uneven floor, you can add a leveler to one leg to compensate.

Bookcases that sit on a carpeted floor next to a wall tend to lean forward because of the tack bar under the carpet. If this is a problem for a cabinet in your house, levelers at the front of the case will keep the unit from tipping forward.





LEVELERS

To compensate for an uneven floor, I added five levelers to the base. But these aren't just any levelers. Their unique design allows each outside corner of the base to be leveled independently.

Each leveler consists of two parts: a thick mounting block that attaches to the bottom of the base and an adjustable foot *(Fig. 5)*. By turning a bolt that passes through the center of each part, you can raise or lower the foot (see Shop Tip at left).

MOUNTING BLOCK. The weight of the MDF combined with a load of tools, means the completed project will be rather heavy. To provide plenty of strength for lifting this weight, each mounting block (11) is made by gluing up two pieces of ¾"-thick hardwood *(Fig. 5)*. (I used maple.)

Before gluing and screwing the mounting block to the bottom of the base, you'll need to drill a counterbored shank hole for a T-nut that accepts the adjustment bolt *(Fig. 5a)*. The T-nut is simply screwed in place.

FOOT. Once the block is in place, you can add the foot (1). It's a piece of ¾" thick hardwood that's captured on the end of the bolt by a pair of lock nuts.

One nut rests in a counterbored shank hole drilled in the bottom of the foot. The other tightens against the top of the foot to lock it in place.

Note: When threading the bolt into the foot, make sure it doesn't extend past the bottom face of the foot.

TURNTABLE

The base of the tool carousel provides plenty of storage for portable power tools. To make it easy to remove a tool (or put one back) without having to reach deep inside the base, I added a turntable *(Fig. 6)*. This lets you bring to the front whatever you need.

The turntable is nothing more than a circular shelf that spins around on the roller bearings. An iron pipe acts as an axle that keeps the turntable centered in the base (refer to *Fig. 10* on page 97).

BLANK. As with the base sides, top, and bottom, the turntable starts out as a large, square blank of ¾" MDF *(Fig. 6)*. Using a square blank provides straight reference edges for laying out and cutting a notch that matches the shape of the opening in the base. To cut this notch, I

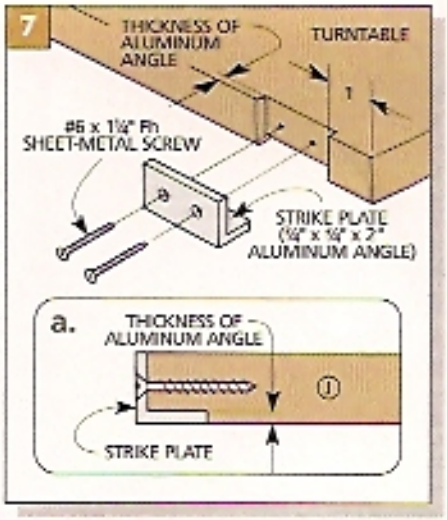
used a straightedge to guide my circular saw. Stop the cut just short of the inside corner, then finish up with a hand saw.

CUT TO SHAPE. Once the notch is done, you're ready to cut the turntable (J) to its final shape. An easy way to do this is to mount a router with a straight bit to a simple circle-cutting jig. (For details about making this jig, refer to the box below.)

To use the jig, you'll need to drill a small, centered hole in the turntable for a bolt that acts as a pivot pin. This hole needs to be enlarged so the iron pipe can stick through. But trying to center a bit in a hole can be difficult. So I plugged a short piece of dowel in the hole to give the bit something to "bite" into. I drilled this final hole slightly larger than the outside diameter of the pipe to prevent wear on the turntable.

STRIKE PLATES. Another place that could wear is along the edge of the notch in the turntable where it rides up on the roller bearings. To prevent this from excessive wear, I added a metal strike plate to each notch.

These strike plates are simple — just short pieces of aluminum angle. They fit in shallow mortises cut in both the front edge and bottom of the turntable *(Fig. 7)*. After laying out the location of the mortises, just remove the waste material with a chisel.



TURNTABLE. *A spin of the turntable in the base of the Revolving Tool Station provides quick and easy access to your portable power tools.*

SHOP JIG ..... Circle-Cutting Jig

An easy way to cut the large circular workpieces on the Revolving Tool Station is to use a router that's mounted to a simple jig (see drawing).

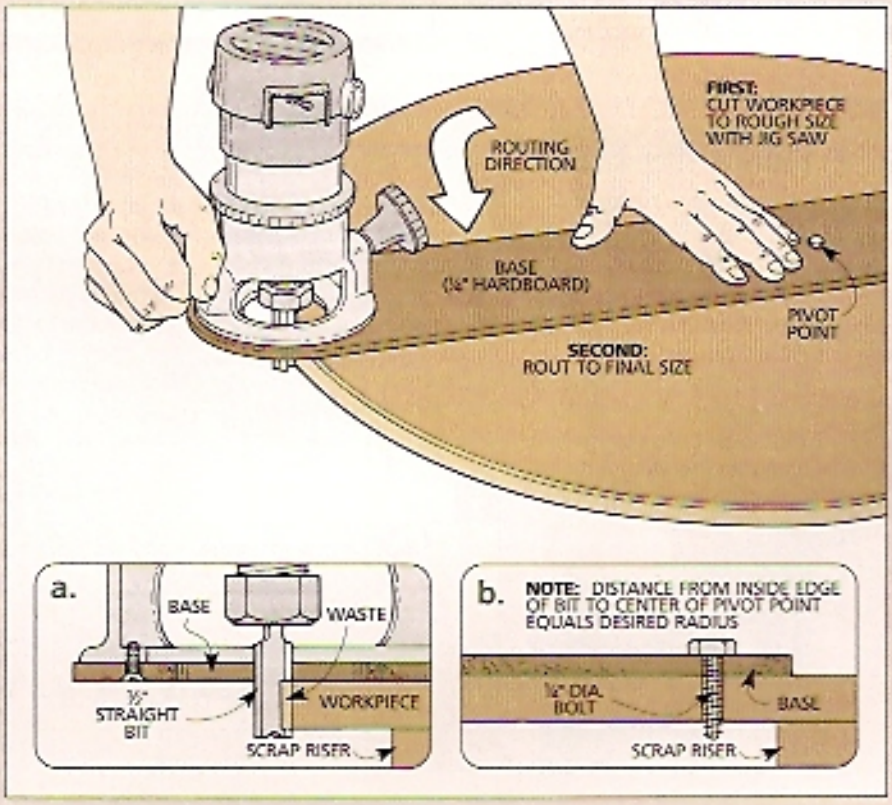
BASE. The jig is just a hardboard base that pivots on a bolt. The length of the base isn't critical, but it needs to be long enough to hold your router and measure at least 20" from the bit to the pivot bolt. (The turntable has a 15" radius, but the carousel added later on top of the tool station has a radius of 20". Refer to *Fig. 12* on page 98.)

PIVOT BOLT. A bolt passes through the base and into a centered hole drilled in the workpiece. To determine the location of the hole in the base, you'll need to know the radius of the workpiece. The hole is drilled that same distance away from the *inside* edge of a straight bit (see details 'a' and 'b'). To cut a different size circle, just drill a new hole in the base.

SET UP. Before routing the circle, it's a good idea to cut the workpiece to rough size first. I used a jig saw and tried to stay within 1/16" of the line. This way, there's not as much material to remove as you rout it to final size.

Then set the blank on a couple of pieces of scrap to raise it off the work surface. This will provide clearance for the pivot bolt and the router bit (see details 'a' and 'b').

ROUT. As you rout, move the jig counter-clockwise around the workpiece. Keep one hand firmly on the router. The other hand helps move the jig smoothly and keeps it pressed against the workpiece (see drawing).



EDGING. Once the strike plates are screwed in place, the next step is to wrap a thin (1/8") strip of hardboard edging (K) around the curved part of the turntable.

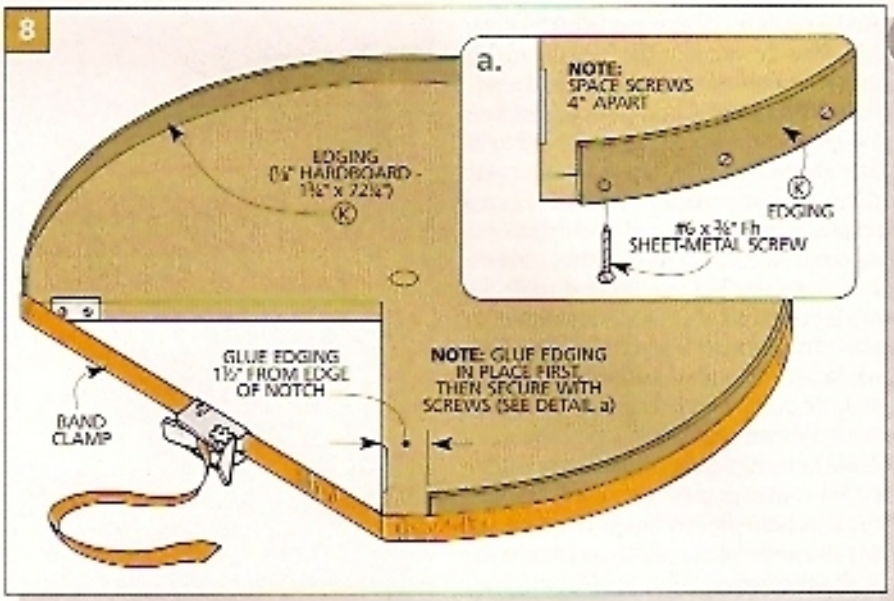
This edging is a little taller (wider) than the thickness of the turntable. This way, it forms a lip that will keep tools and materials from falling off the turntable's edge.

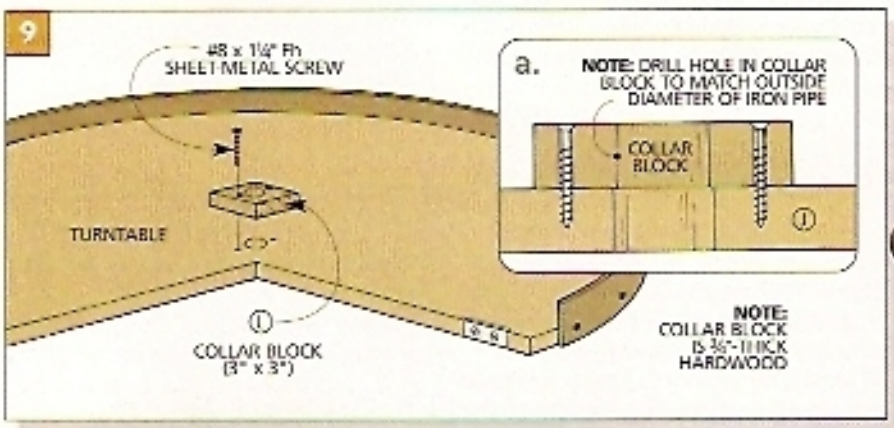
One thing to notice about the edging is that it's actually cut 1 1/2" shorter than the distance around the curved part of the turntable *(Figs. 8 and 8a)*. This is done to provide enough clearance for a barrel bolt that's installed later. This barrel bolt will be used to lock the turntable in place so it won't spin around when you don't want it to (refer to *Figs. 10 and 11* on opposite page).

All it takes to attach the edging is to apply a little glue and hold the edging in place securely using a band clamp *(Fig. 8)*. After the glue dries and you have removed the band clamp, it's a good idea to secure the hardboard edging with screws *(Fig. 8a)*.

COLLAR BLOCK. At this point, you're almost ready to install the turntable. But first, to prevent it from rubbing against the pipe, I added a simple collar block *(Fig. 9)*.

The collar block (L) is a 3/4"-thick piece of hardwood with a centered hole that's sized to fit the iron pipe.





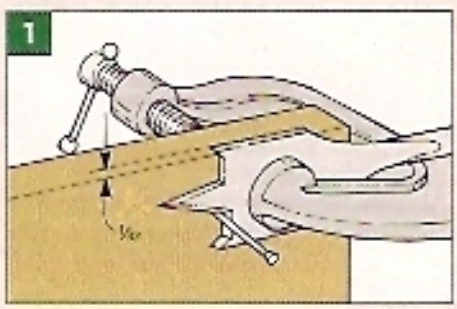
SHOP TIP . . . . . Modifying a Spade Bit

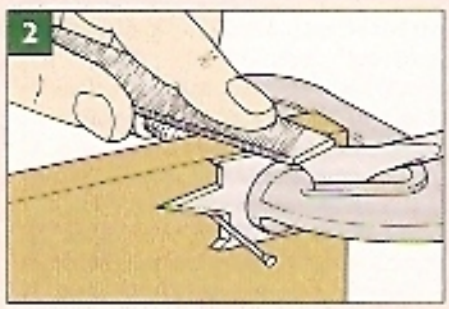
The turntable (J), top (N), and bottom (N) each have a 1 1/8"-dia. hole in them to make it easy to slide the pipe through these pieces. However, I wanted the wood collar blocks (L) to fit closely around the pipe. But I ran into a snag when it came time to drill the holes in the collars. There wasn't a spade bit available that matched the 1 1/16" outside diameter of the pipe. So I modified a larger (1 1/8"-dia.) spade bit by filing the sides until it was the correct size.

To ensure that the bit is balanced and cuts evenly, it's important to remove the same amount of material from each side. A handy way to do this is to use a nail and a scrap block. Just clamp the spade bit to the scrap so that the edge of the bit extends 1/32" above the scrap's edge *(Fig. 1)*. Then drive a nail below the point of the bit to keep it from slipping down. (I marked the location of the nail, then removed the bit to drive the nail.)

Now file one side until it's even with the top of the scrap block *(Fig. 2)*. (Don't file into the scrap.) Then flip the bit over and repeat the process on the other side.

Test the size of the modified bit on some scrap before boring holes in the collar blocks.





PIPE FLANGE. *A pre-threaded flange secured to the bottom of the Revolving Tool Station provides a solid foundation for the pipe that serves as a pivot for the turntable and carousel.*

Note: To drill this hole so the collar block fits snugly around the pipe, refer to the Shop Tip on the opposite page.

PIPE. After screwing the collar block in place, you can turn your attention to the pipe that serves as a pivot point for the turntable *(Fig. 10)*. (I used a piece of $^{3}/_{4}$" iron pipe.) The pipe fits into a flange screwed to the bottom of the base (*Fig. 10a* and photo above).

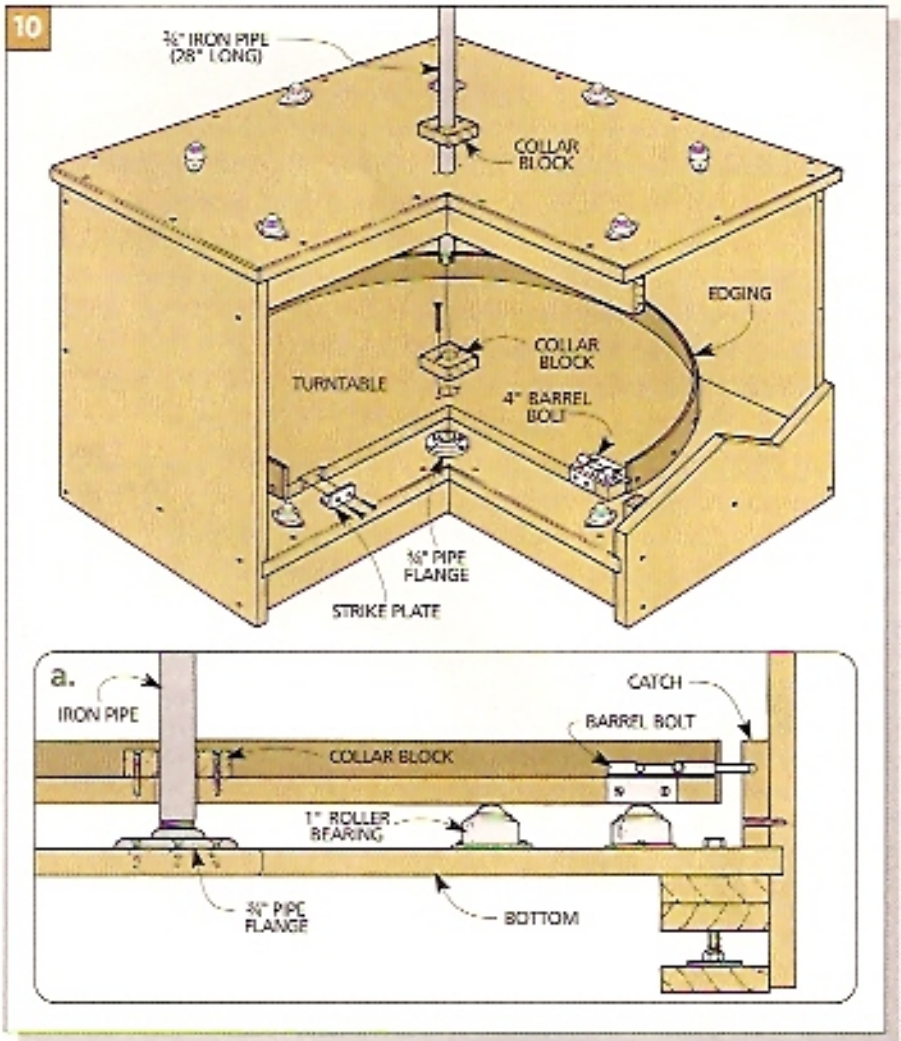
Note: The pipe is extra long so it can double as a pivot point for the carousel that's added later.

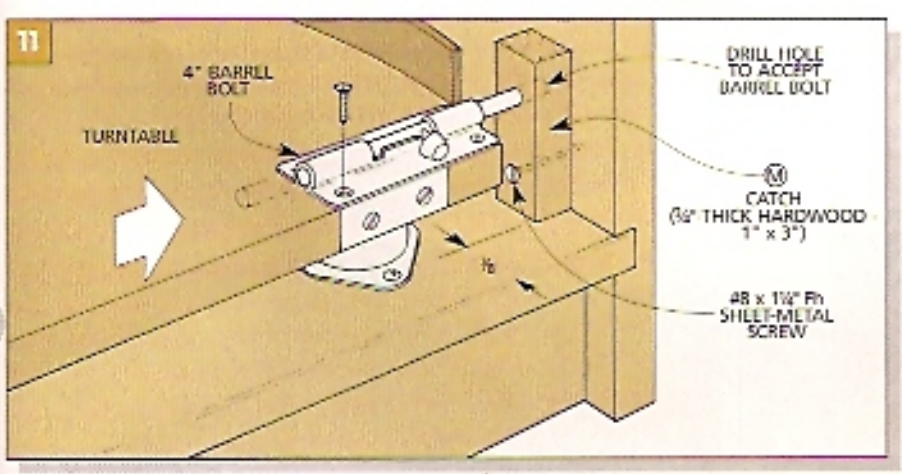
Before installing the pipe, you'll need to set the turntable in place. Then slip the pipe through the top of the base and turntable and thread the end into the pipe flange.

Here again, to keep the pipe from rubbing, I screwed a second collar block (L) to the top of the base *(Fig. 10)*.

BARREL BOLT. Finally, to lock the turntable in place, I added a barrel bolt *(Fig. 11)*. The bolt slides into a $^{3}/_{4}$"-thick hardwood catch (M) that's attached to the side of the base.

After gluing and screwing the catch in place, I located and drilled a hole in the catch to accept the end of the barrel bolt. For more on how to do this, see the Shop Tip at right.

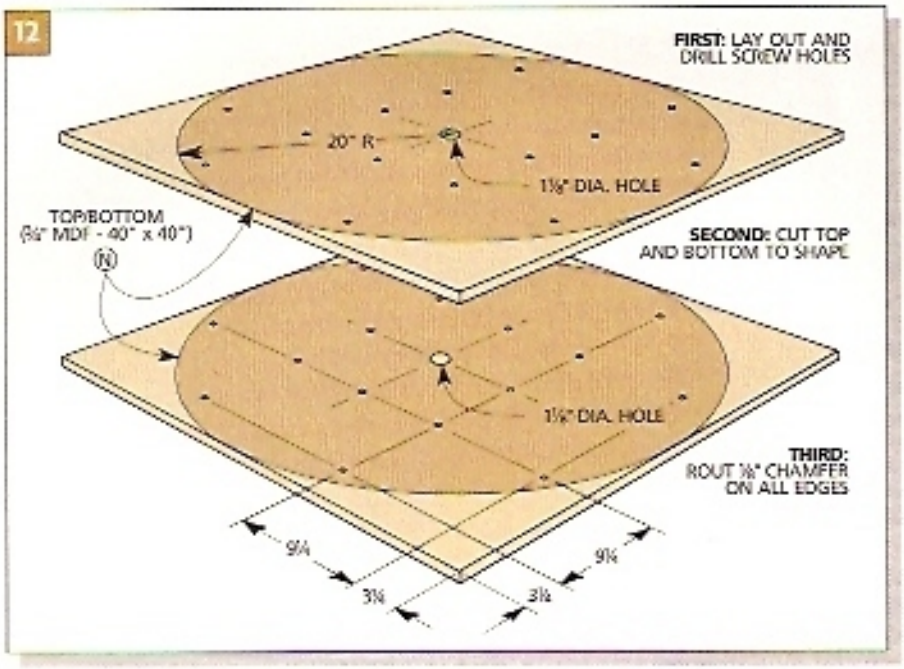




SHOP TIP

Barrel Bolt Hole

To locate the hole for the barrel bolt, slip a dowel center over the end of the bolt and press it against the catch. You may have to tap the back of the bolt with a hammer to leave a mark.



CAROUSEL. *Just spin the carousel until the tool you need is directly in front of you, then lock it in place.*

CAROUSEL

One of the handiest things about this tool station is a large revolving carousel that supports your benchtop tools. Spinning the carousel around provides quick access to the tool you need.

The carousel consists of a grid that's sandwiched between a circular top and bottom *(Fig. 12)*. The grid creates an opening under each tool for a drawer as well as small storage areas on the sides.

TOP AND BOTTOM. The top and bottom (N) of the carousel each start out as large square pieces of ¾" MDF *(Fig. 12)*. After laying out the locations of the screws used to fasten the top and bottom to the grid, they can be cut to shape. Here again, a router and a circle jig make quick work of this (see the Shop Jig on page 95).

As with the turntable, you'll need to enlarge the pivot hole in each piece to provide clearance for the iron pipe. Also, it's a good idea to drill the pilot holes in the bottom face of the top now for the drawer stops that are added later (refer to *Figs. 17 and 17a* on the opposite page).

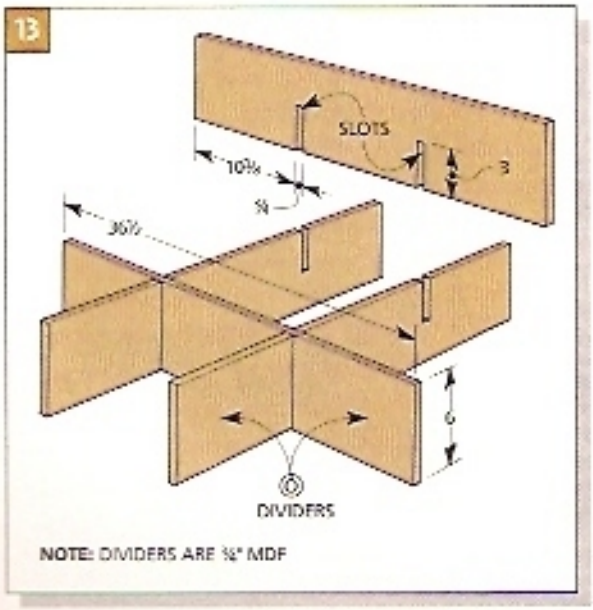
GRID. Now you can turn your attention to the grid that divides the carousel into separate compartments. The grid consists of four dividers (O) with interlocking slots in each one *(Fig. 13)*.

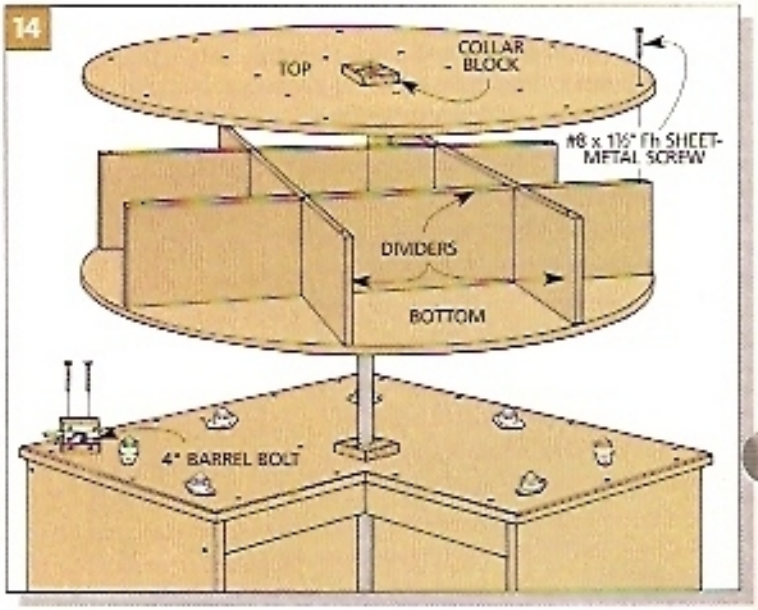
ASSEMBLY. Once the slots are cut, you can assemble the grid and attach the top and bottom with screws *(Fig. 14)*. After screwing one last collar block (L) in place on the top, just get a friend to help you lift the carousel onto the base.

BARREL BOLT. To lock the carousel in place when using a tool, another barrel bolt is attached to the base *(Fig. 15)*. This bolt slides into holes drilled in the bottom edge of the carousel.

To raise the barrel bolt off the base so it aligns with the carousel, I added an L-shaped mounting assembly *(Fig. 15)*. It's made up of two small pieces of ¾"-thick hardwood: a mounting block (P) that's screwed to the base and a riser block (Q) that positions the barrel bolt in line with the bottom edge of the carousel *(Fig. 15a)*.

MOUNT TOOLS. Before drilling the holes in the carousel's edge, you'll want to mount your individual power tools.





(I used lag screws to mount them.) This way, you can rotate the carousel to the most comfortable working position for each specific tool. Then just drill each of the holes at the correct locations.

DRAWERS

With the carousel complete, I added a set of four drawers. These drawers fit into the openings directly below each tool to keep accessories right at hand where you need them.

FRONT AND BACK. To build the drawers, start by cutting a front and back (R) for each one. These are 3/4"-thick pieces of hardwood that are sized to allow 1/8" gaps along the sides and top of the opening.

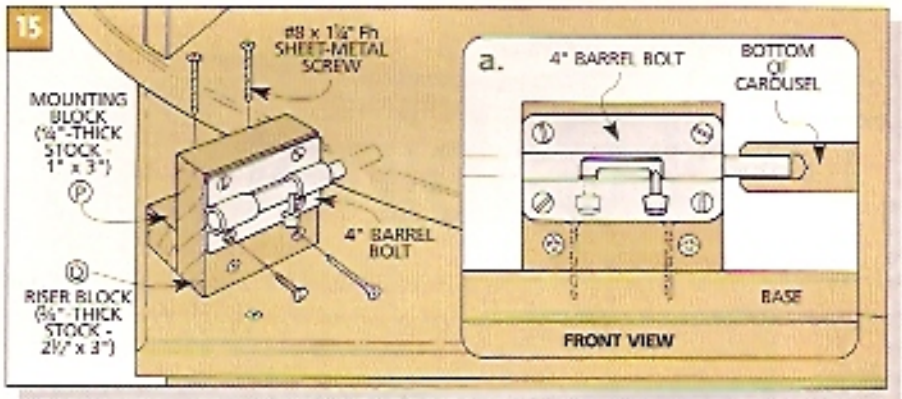
Shallow rabbets in the ends of the front and back accept the sides of the drawer *(Figs. 16 and 16c)*. And there's a groove in each piece for the drawer bottom *(Fig. 16b)*.

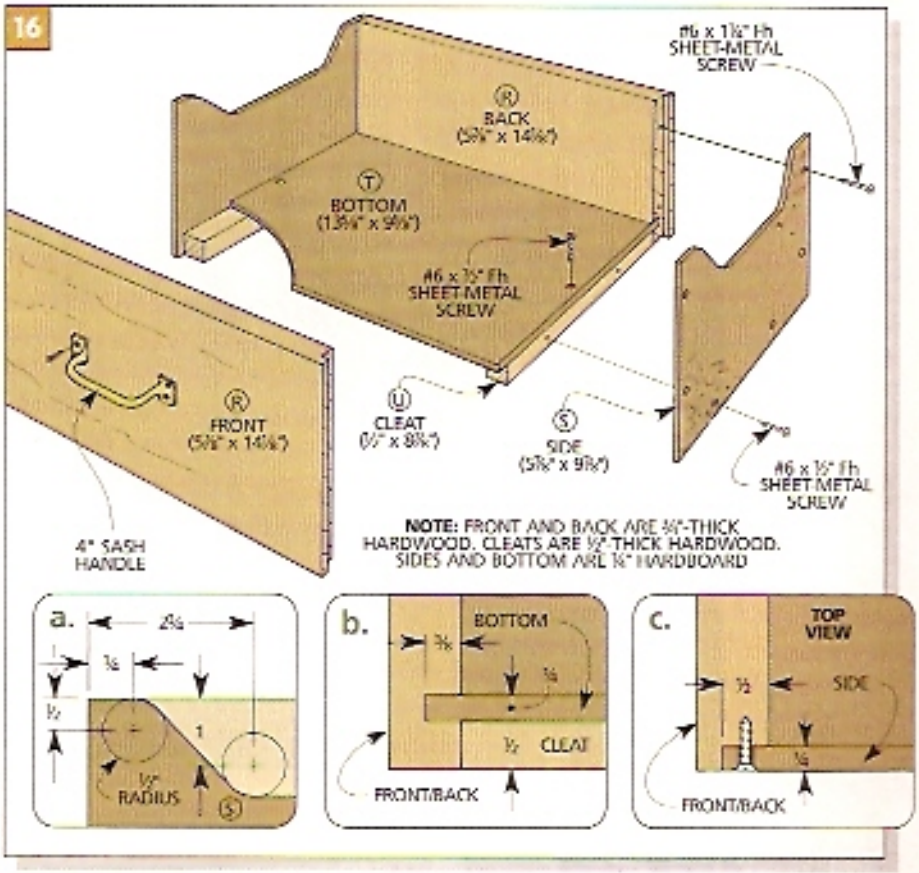
SIDES. After completing the front and back, you can add the sides (S). These are pieces of 1/4" hardboard with a notch at the top *(Fig. 16a)*. When the drawer stops are added later, this notch makes it possible to remove a drawer and put it back in.

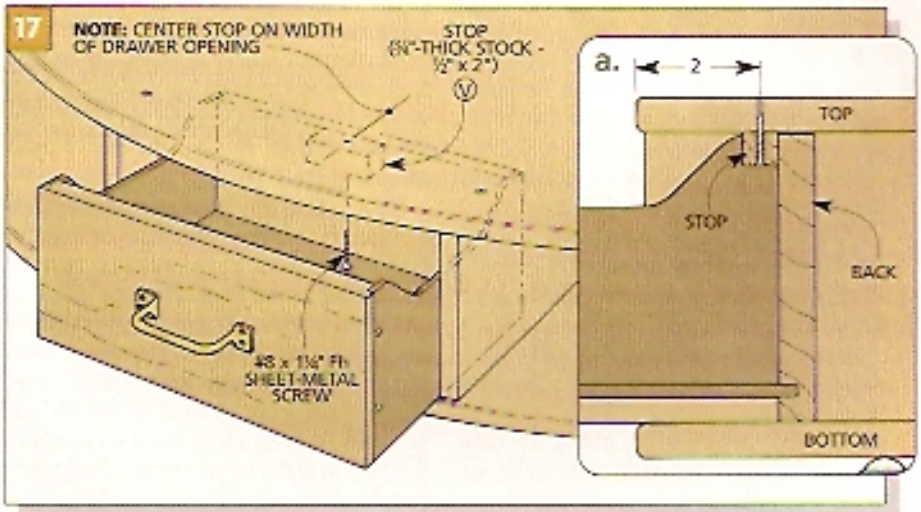
BOTTOM AND CLEATS. There are just two things left to do to complete each drawer. A hardboard bottom (T) is cut to fit so the drawer can be glued and screwed together. Then two hardwood cleats (U) are glued to the bottom and sides to provide extra support.

STOP. Before installing the drawers, I attached four stops (V) under the top of the carousel *(Fig. 17)*. They keep the drawer from being pulled out too far and spilling what's inside. ■

DRAWERS. *With a drawer below each tool, there's plenty of storage for accessories and other items.*







Tool Cabinet

If your old tool cabinet is busting at the seams, here's one to consider that offers plenty of storage space. It has room for both hand tools and portable power tools.

Like the belt around my waist, my existing tool cabinet seems to keep shrinking in size. So recently, I decided to build a bigger, better cabinet for my shop. And this one had to be large enough to hold some smaller power tools as well as hand tools.

I designed this Tool Cabinet to have lots of storage potential. For example:

- The case is deep enough to hold most portable power tools.
- There's an inner door that doubles the storage space for hanging tools. It's mounted on a piano hinge that allows it to swing out of the way, as shown in the inset photo below.
- Two sets of shelves inside the cabinet (one shallow set, and the other deep) are totally adjustable.
- The base includes a drawer that pulls all the way out on ball-bearing, full-extension drawer slides.

MATERIALS. I used $\frac{3}{4}$"-thick hard maple to build this cabinet. To make the legs sturdy, I laminated several pieces of solid maple together. And for the case I used maple plywood.

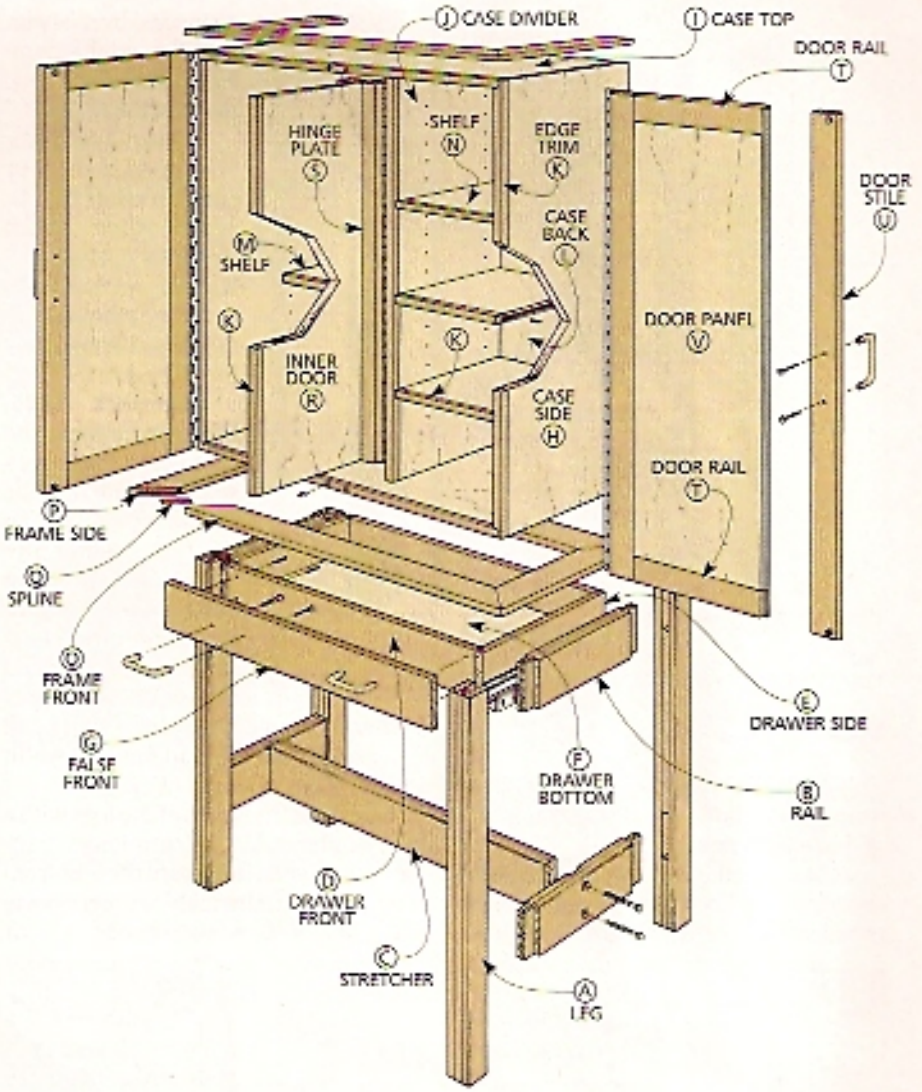
Note: Maple plywood may be hard to find, but birch plywood is a good substitute. It's almost identical in appearance to maple and it should cost a little less.

I even decided to use $\frac{3}{4}$" plywood for the back and door panels. This way, I could screw the optional customized tool hangers securely to each of the panels. To learn more about these tool hangers and how to make them, see the Designer's Notebook on page 107.

With just about every square inch inside being used for storage, this Tool Cabinet should last me a while. (Now all I need is a larger belt.)

EXPLODED VIEW

OVERALL DIMENSIONS:
37½W x 17½D x 67⅛H



MATERIALS LIST

WOOD

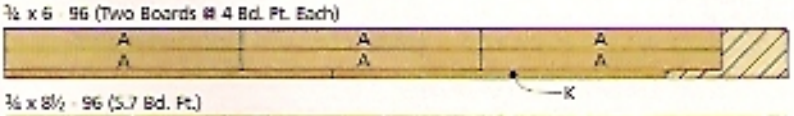
A	Legs (4)	2⅛ x 2⅛ - 29¼
B	Rails (4)	1½ x 4 - 15½
C	Stretcher (1)	1½ x 4 - 33½
D	Drwr. Ft./Back (2)	¾ x 3⅞ - 30
E	Drwr. Sides (2)	¾ x 3⅞ - 16
F	Drwr. Bottom (1)	⅛ hdbd. - 14⁹⁄₁₆ x 29¹⁵⁄₁₆
G	False Front (1)	¾ x 3¹⁵⁄₁₆ - 31⅞
H	Case Sides (2)	¾ ply - 15⁵⁄₁₆ x 36
I	Case Top/Btm. (2)	¾ ply - 15⁵⁄₁₆ x 36
J	Case Divider (1)	¾ ply - 11¼ x 34½
K	Edge Trim	¾ x ¾ - 30 In. ft.
L	Case Back (1)	¼ ply - 36 x 35½
M	Narrow Shelves (4)	¾ ply - 6¾ x 20⁹⁄₁₆
N	Wide Shelves (3)	¾ ply - 11⅛ x 13⁹⁄₁₆
O	Frame Fr./Back (3)	¾ x 3 - 37½
P	Frame Sides (4)	¾ x 3 - 17½
Q	Splines (4)	⅛ hdbd. - ½ x 2
R	Inner Door (1)	¾ ply - 17⅜ x 33
S	Hinge Plate (1)	⅜ x 4 - 33
T	Door Rails (4)	¾ x 2¼ - 14⅝
U	Door Stiles (4)	¾ x 2¼ - 36
V	Door Panels (2)	¾ ply - 14½ x 32¼

HARDWARE SUPPLIES

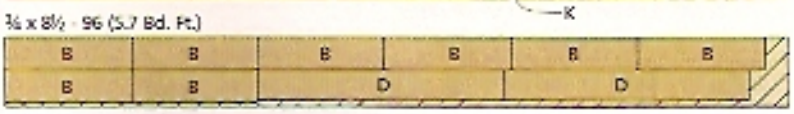
(17) No. 8 x 1¼" Fh woodscrews
(25) No. 8 x 1¼" Fh woodscrews
(28) 4d finish nails
(4) ¼" x 3½" lag screws
(4) ¼" flat washers
(1 pr.) 16" full-extension drawer slides
(4) ¾" D-handle wire drawer pulls
(1) ¼"-dia. dowel (28" long)
(1) 1½" x 33" piano hinge w/ screws
(1) 1½" x 35⅛" piano hinge w/ screws
(5) Magnetic barrel catches w/ plates

CUTTING DIAGRAM

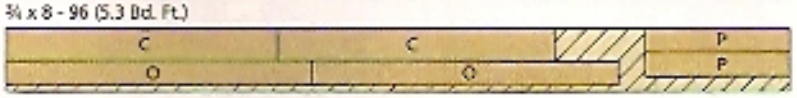
¾ x 6 - 96 (Two Boards @ 4 Bd. Ft. Each)



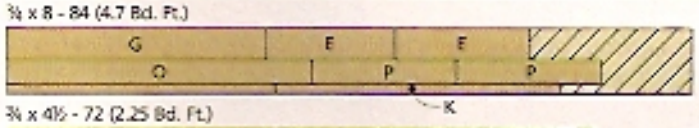
¾ x 8½ - 96 (5.7 Bd. Ft.)



¾ x 8 - 96 (5.3 Bd. Ft.)

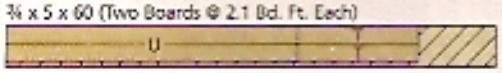


¾ x 8 - 84 (4.7 Bd. Ft.)

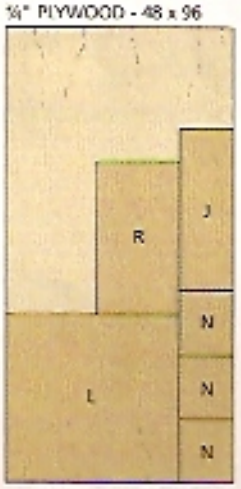


¾ x 4½ - 72 (2.25 Bd. Ft.)

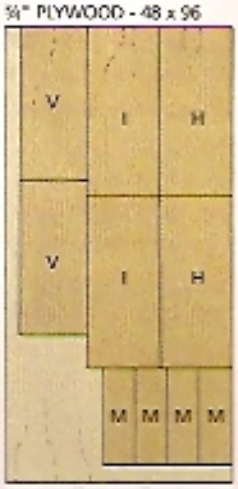
¾ x 5 x 60 (Two Boards @ 2.1 Bd. Ft. Each)



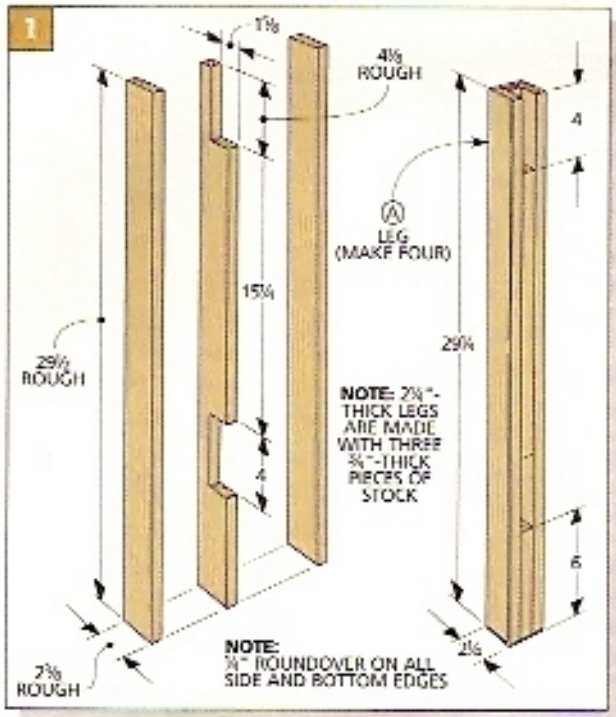
¼" PLYWOOD - 48 x 96



¼" PLYWOOD - 48 x 96



ALSO NEED: 24" x 48" SHEET OF ¼" HARDBOARD FOR DRAWER BOTTOM (F) AND SPLINES (Q)



BASE

This cabinet has an open base that raises it up off the floor — so your tools are within easy reach.

LEGS. To build the base, I started with the legs (A). They're made up of three oversize pieces of ¾"-thick maple *(Fig. 1)*.

Each pair of legs is connected by rails with mortise and tenon joints. But I didn't chop any mortises.

Instead, I cut a pair of notches in the four center pieces *(Fig. 1)*. Then when these center pieces are sandwiched between the outside pieces, the notches automatically form the mortises.

LAMINATE LEGS. When laminating the legs, keep the edges with the mortises as flush as possible. To do this, clamp the edges face down on your bench before clamping the legs together. (I used waxed paper to protect my bench from excess glue.) When the legs are dry, rip them to finished width and cut them to length *(Fig. 1)*.

Now, rout the edges of the legs with a ¼" roundover bit. I also rounded over the bottom ends to prevent the legs from splintering if the cabinet ever gets dragged across the shop floor.

RAILS AND STRETCHER. Once the legs are complete, each pair of legs is connected with rails. Then these end units are joined with one long stretcher.

Like the legs, the four rails (B) and the stretcher (C) are cut oversize, then laminated together but this time from two pieces, not three *(Fig. 2)*.

When the rails are laminated, cut them to length and clean up one edge. (I waited until later to rip the pieces to width. This let me clean up any chipout.)

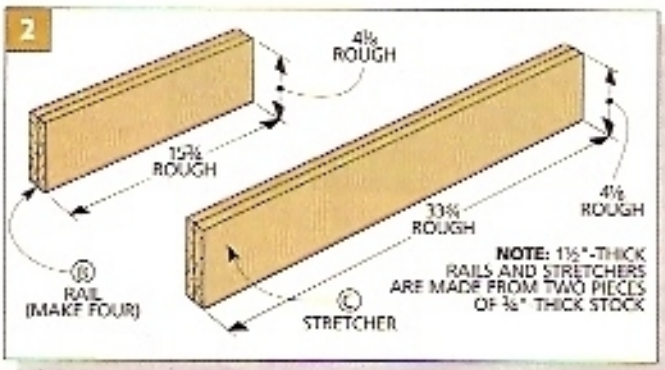
JOINERY. Next, cut tenons on each rail *(Fig. 3)*. Use a test piece to sneak up on the thickness of the tenon until it just slides into the mortise.

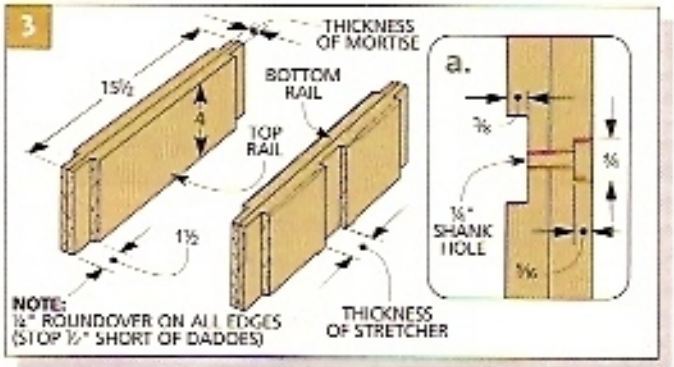
Note: There's no shoulder on the top and bottom edges of these tenons. So until the rail is cut to width, only a corner will actually fit into the mortises.

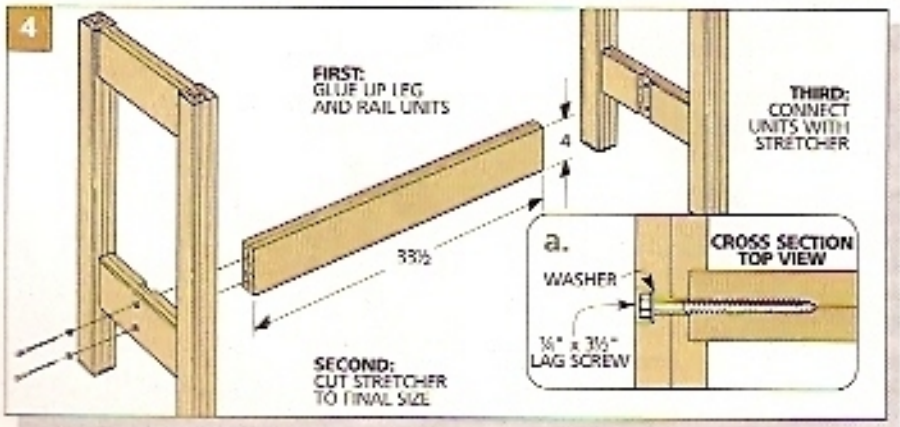
Now set aside two pieces for the top rails. Then, on the other two rails I cut a dado centered on the length to hold the stretcher *(Fig. 3)*. Each dado is cut wide enough to hold the stretcher. And to the same depth as the cheeks of the tenons (so the blade setting stays the same).

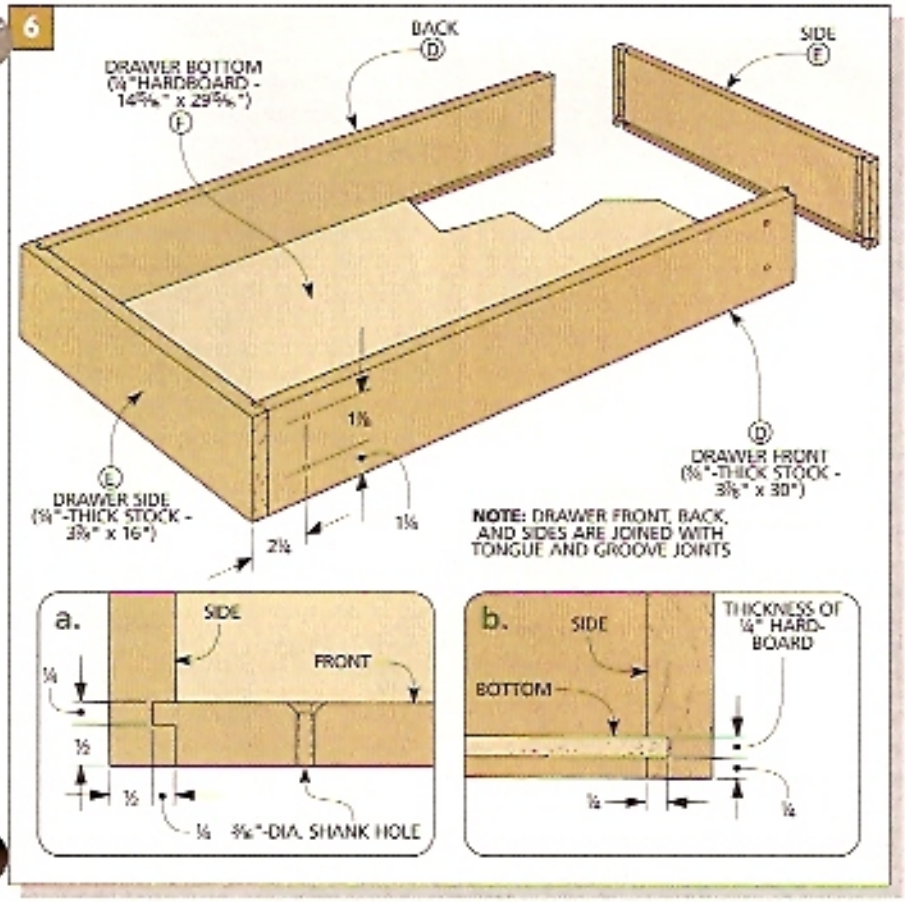
RIP TO SIZE. After cutting a dado on each bottom rail, rip all the rails to width, sneaking up on the final cut until the tenons just fit the mortises in the legs.

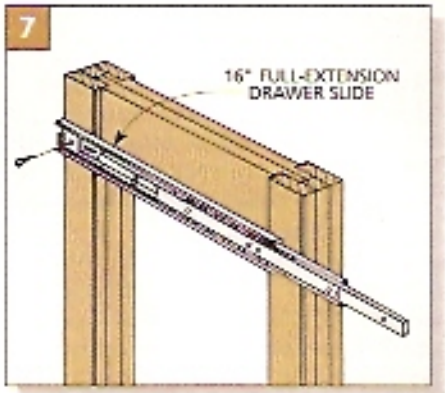
Now, round over the edges of the rails. But stop short of the dadoes on the

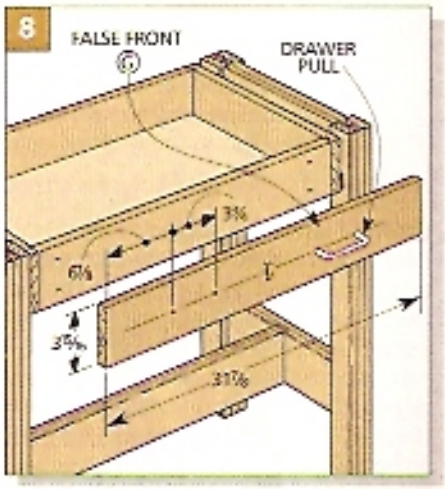












bottom rails *(Fig. 3)*. (They'll be completed after the base is assembled.)

Before gluing up the legs and rails, drill counterbored shank holes through the dadoes in the bottom rails *(Fig. 3a)*.

ASSEMBLY

When assembling the base, it's easiest to work in stages. First, glue two legs and two rails together as a unit *(Fig. 4)*.

While both end units were drying, I cut the stretcher to final length and width. Then I drilled pilot holes and glued and screwed the stretcher between the end units using ¼" lag screws *(Fig. 4a)*.

Now, using a hand-held router, complete the roundovers on the rails and rout the edges of the stretcher *(Fig. 5)*.

DRAWER

For more storage space, I added a single, wide drawer between the legs of the base. And to provide full access to what's inside, I mounted it with full-extension drawer slides. (For sources, see page 112.)

CUT TO SIZE. Begin by determining the size of the drawer. For the width, measure between the legs (level with the stretcher) and subtract the thickness of the two drawer slides. For the depth, measure from front to back and subtract 1". (The drawer is inset ¼" and has a ¾"-thick false front.)

Now, cut a front (D), back (D), and two sides (E) to size *(Fig. 6)*. Then cut the bottom (F) from ¼"-thick hardboard.

CUT LOCKED RABBET. I used a locked rabbet joint to hold the parts of the drawer together securely. To make this joint, first cut tongues on the ends of the drawer front and back *(Fig. 6a)*. Then cut mating dadoes in the drawer sides.

Next, to hold the bottom (F), I cut a groove ¼" from the bottom edge of each of the drawer pieces *(Fig. 6b)*.

Before gluing up the drawer, drill countersunk holes in the front for a false front that's added later *(Figs. 6 and 6a)*.

INSTALL DRAWER. After the drawer is assembled, mount the drawer slides and install the drawer *(Fig. 7)*. (It's easier to do this before adding the false front.)

Note: When mounted, the top of the drawer should be about ⅛" below the top of the legs.

ADD FALSE FRONT. After the drawer is installed, cut the false front (G) to final size *(Fig. 8)*. To cover the drawer, the false front is 1/16" taller, and it fits between the legs with a 1/16" gap at each side.

Before adding the false front, drill countersunk pilot holes and add the two drawer pulls. And to align the drawer front, see the Shop Tip below.

SHOP TIP
False Front

To align a false drawer front, I use double-sided carpet tape. A straightedge set across the legs helps position the false front so there's a uniform gap when the frame is added to the top later.

CASE

With the base of the cabinet complete, it's time to build the case. The case is simply a square plywood box joined with rabbets. The main requirement was that it be big enough for hand-held power tools — especially a circular saw.

To build the case, begin by cutting the case sides (H) and top and bottom (I) to finished length and width *(Fig. 9)*. (I made it easy on myself — they're all the same size.) Then rip a divider (J) to width. I left this piece a bit long; it will be cut to fit the case after assembly.

ADD EDGING. To hide the edges of the plywood, rip five pieces of edge trim (K) to match the thickness of the plywood. Then glue the trim to the front of each piece of plywood *(Fig. 9a)*.

CUT RABBETS. The case is held together with rabbet joints. To hold the back (L), I cut rabbets in the back edges of all the case pieces except the divider *(Fig. 9b)*. To hold the top and bottom, I cut rabbets in the sides (H) *(Fig. 9c)*.

DRILL HOLES. I wanted to add adjustable shelves on both sides of the divider. So before assembly, I laid out and drilled holes for shelf pins in each side of the divider and the inside face of each side *(Fig. 10)*.

Note: The shelves on the left side are narrower (shallower) than those on the right. Also, the holes on each side of the divider are offset so they won't run into each other.

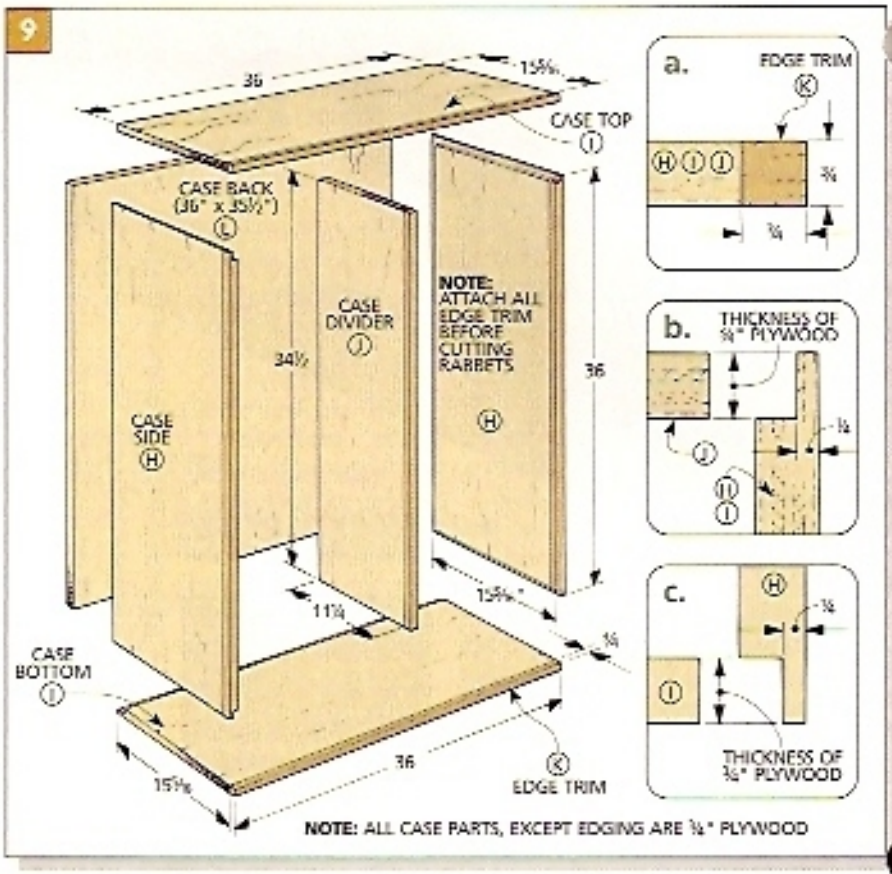
ASSEMBLE CASE. Now it's time to assemble the case. First, glue and nail the sides to the top and bottom *(Fig. 11)*. Then cut a back (L) to fit into the rabbets.

Note: I used ¾" plywood for the case back. This adds support to the case and holds it square. It's also heavy enough that it lets me securely mount tool hangers to the back of the case.

When the back of the case has been glued and nailed in place, the divider can be cut to fit between the top and bottom.

Note: I simply screwed the divider to the top, bottom, and back. It could be set in dadoes. But the divider isn't as wide (deep) as the case, so any dadoes would have to be stopped short of the front edges.

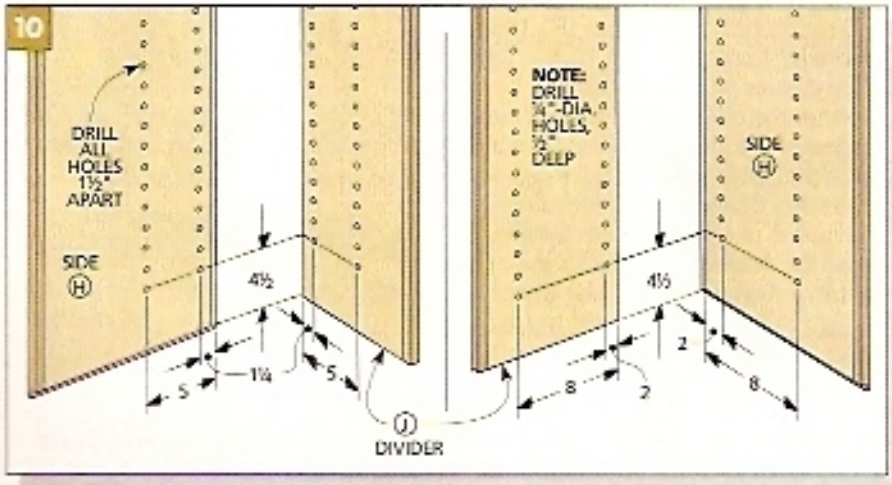
To position the divider in the case, I used a little trick. First, tip the case on its side *(Fig. 11)*. Then cut four spacers to hold the divider parallel to the sides while you glue and screw it to the top, bottom, and back of the case.



SHELVES

The shelves are a little different than you'd find in most cabinets. They don't just rest on shelf pins. Instead, the shelves have a groove cut in each side, so they slide around the pins *(Fig. 12b)*.

The shelves are still adjustable, but the grooves hold them in place better than if they were just sitting on pins.



But even though I wanted adjustable shelves, I didn't want them to look adjustable. So I cut the grooves before adding the edge trim to the shelves. This way, the trim covers the plywood and also hides the grooves.

CUT TO SIZE. To begin, cut the shelves (M, N) to fit inside the case with a 1/32" gap at each side *(Fig. 12)*. Next, cut a 1/4" groove along both edges of each shelf to match the 1/4"-dia. dowel shelf pins.

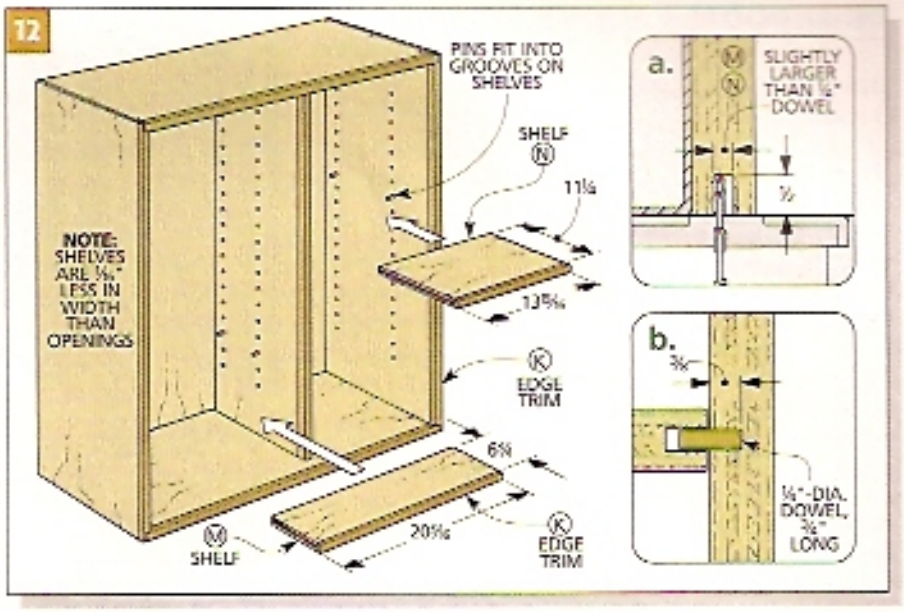
To do this, I adjusted the fence so the blade was slightly off-center on the edge of the piece *(Fig. 12a)*. Then, after the first pass, I flipped the board around and made a second pass. If the fit over a 1/4" dowel is still a bit tight, adjust the fence and make two more passes.

When the grooves were cut, I added some edge trim (K) to the fronts of the shelves *(Fig. 12)*. Then to position the shelves, I inserted 3/4"-long dowels into the holes and slid the shelves in place.

ASSEMBLY

Before adding the doors, I attached the case to the base. The link between these units is a mitered frame. And for a decorative touch, I added a similar frame to the top of the case.

CUT FRAMES. To make the frames, rip three front and back pieces (O) and four sides (P) to width *(Fig. 13)*. (There's no back to the frame at the top of the case.)



Now miter the frame pieces to length. The front and back pieces are 1" longer than the width of the base. And the sides are 1/2" longer than the depth of the base. (They're flush with the back of the base.)

SPLINED MITERS. I added the base frame first *(Fig. 13)*. Here, I wanted to make sure the miters were plenty strong, so I used splines (Q) to add strength.

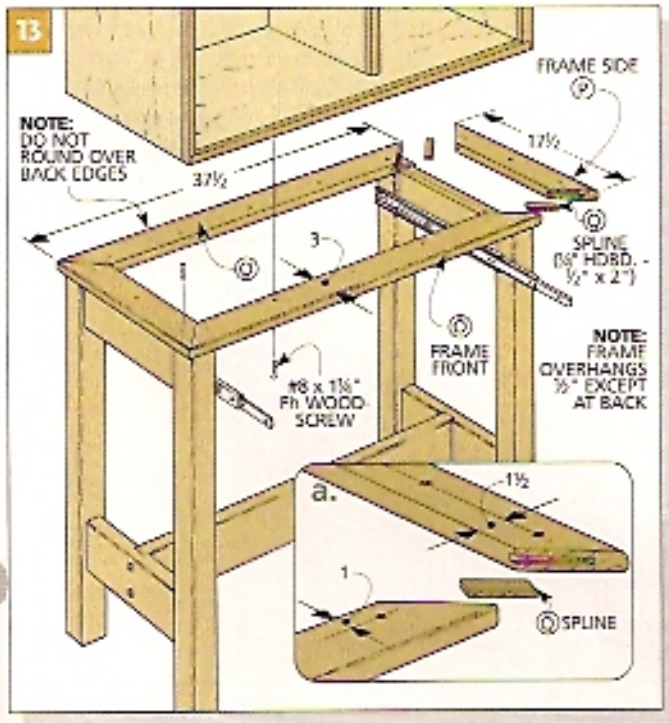
Now, the base frame can be glued together. When it's dry, soften the front and side edges with a 1/8" roundover bit.

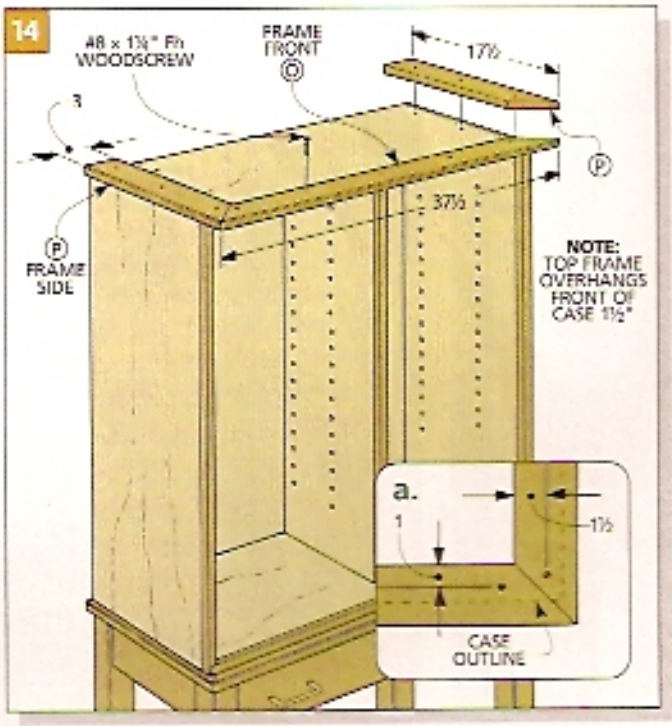
ADD BASE FRAME. The frame is held down to the base and up to the case with countersunk screws *(Fig. 13)*.

When all the shank holes are drilled, set the frame in place so the back edge is flush with the base and centered side to side *(Fig. 13)*. Now mark and drill pilot holes and screw the frame to the base.

Then you can do the same to screw the case to the frame. (Screw the case only to the front and back pieces of the frame.)

ADD CASE FRAME. The frame on top of the case is a bit different from the base frame. First, it doesn't have a back, just a front and two sides *(Fig. 14)*. Also, these miters didn't have to be as strong, so I didn't use splines. I simply glued and screwed the top frame to the case.





INNER DOORS

Before making the outer doors, I added a smaller inner door to the left side of the case. This door isn't for covering anything. Instead, it swings out to provide additional space for hanging hand tools.

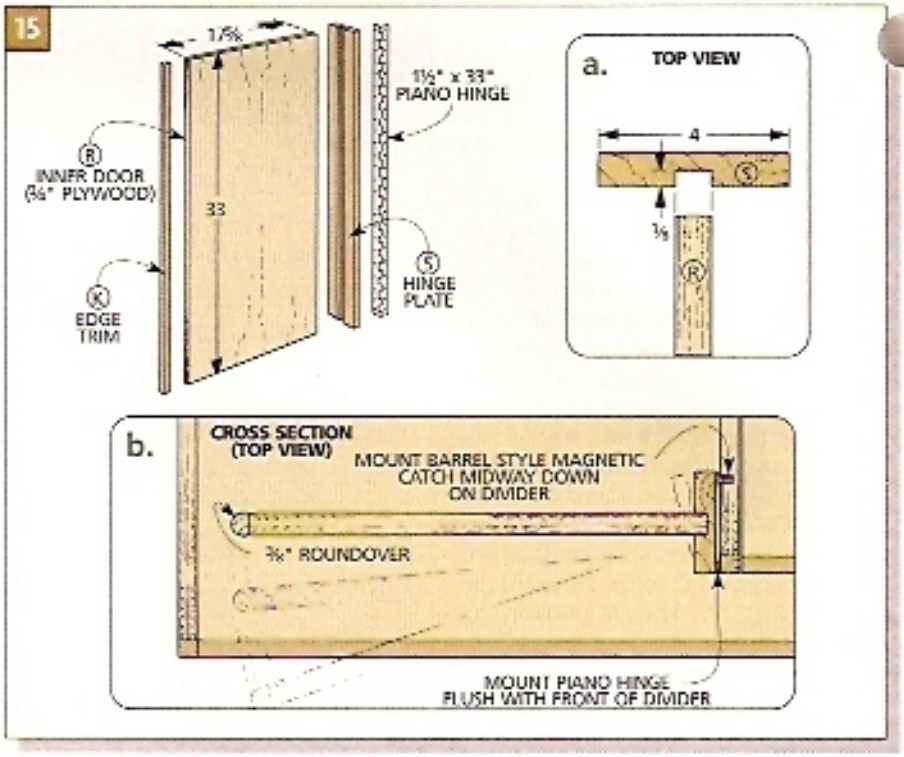
CUT TO SIZE. Start by cutting the inner door (Q) to size *(Fig. 15)*.

Note: It's smaller than the case opening, so there's plenty of room to reach in and pull it open.

Next, glue a strip of edge trim (K) to the outside edge of the inner door *(Fig. 15)*. Then to soften the edges of the trim, I rounded them over with a $\frac{3}{8}$" roundover bit *(Fig. 15b)*.

ADD HINGE PLATE. The door swings on a piano hinge. But the hinge isn't screwed directly to the door. Instead, I made a 4" wide hinge plate (S) and glued the door into a groove centered on this plate *(Figs. 15 and 15a)*. This way, the door can be held closed with a barrel-style magnetic catch without interfering with the piano hinge.

MOUNT DOOR. With the hinge plate glued in place, hang the door with the piano hinge *(Fig. 15b)*. Next, drill a pilot hole in the divider and add the magnetic catch. Then screw the strike plate to the hinge plate.



OUTER DOORS

The outer doors are all that's left. These are frame and panel doors built with stub tenon and groove joints.

CUT RAILS AND STILES. The first step is to cut the door rails (T) and stiles (U) to size *(Fig. 16)*. (Allow for a $\frac{1}{16}$" gap at the top and bottom of the case and also between the doors.)

Next, cut a $\frac{7}{16}$"-deep groove centered on the inside edge of each piece of the door frame *(Fig. 16a)*. Then, cut mating tongues on both ends of each rail.

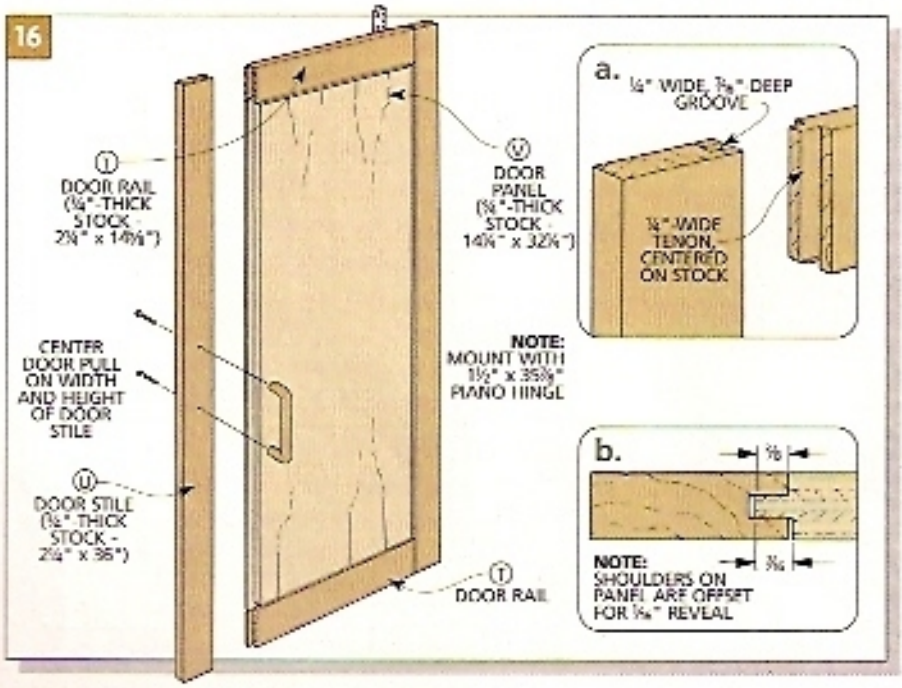
ADD PANEL. At this point, you can measure for the panel. So dry-assemble each frame and cut a plywood panel (V) to fit *(Fig. 16)*. (Add $\frac{3}{8}$" to all sides of the panel for tongues that will fit the grooves.)

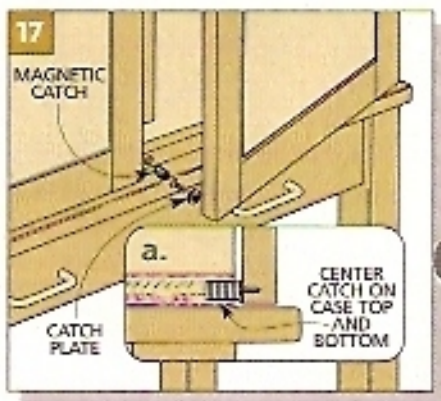
CUT TONGUES. The tongues on the door panels are a bit odd. I wanted to add a decorative groove to the front of the door. To do this, the rabbets in front are wider than those in back. I did this in two steps.

First, I cut $\frac{3}{8}$" rabbets on both faces of each panel *(Fig. 16b)*. Then I trimmed an extra $\frac{1}{16}$" from the front face only. (Doing it this way reduces the tendency for chipout on the front face.)

Now, the doors can be assembled, and the pulls added *(Fig. 16)*.

MOUNT DOORS. Mount the doors with piano hinges. Then, finally, to hold the doors closed, I added a pair of barrel-style magnetic catches to the top and bottom of the case behind each door *(Fig. 17)*.





DESIGNER'S NOTEBOOK

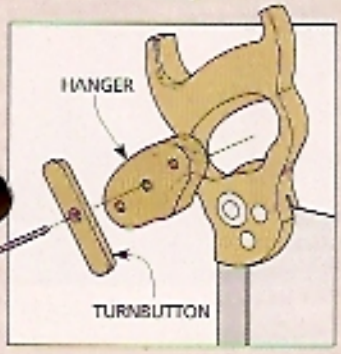
With a little ingenuity, a few pieces of scrap from the wood bin can become handy tool hangers. Here are some ideas that will work in any cabinet or on a wall.

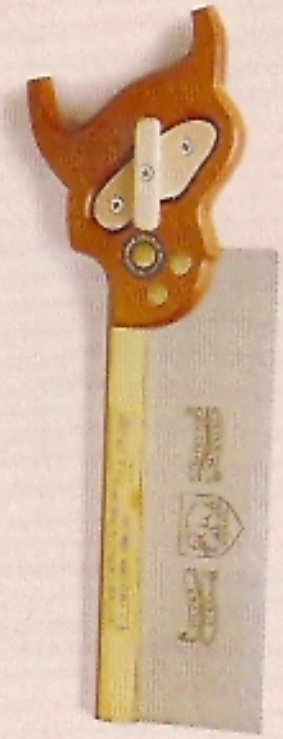
HAND SAW HANGER

■ To avoid damaging the teeth on a hand saw, hang it by its handle. The hanger matches the inside of the handle.

To make the hanger, trace the inside of the handle on a piece of scrap that's the same thickness as the handle. Then cut it to shape and sand it smooth.

■ To keep the saw in place, screw a small wooden turn-button to the hanger.

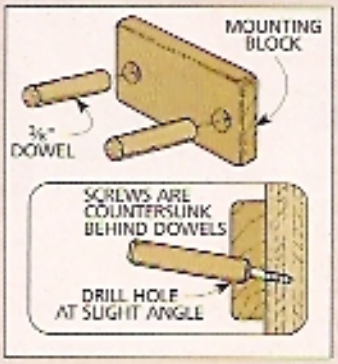




HAMMER HANGER

■ The most convenient way to hang a hammer is to rest the head on two dowels. But rather than mount these dowels directly to the door, I mounted them to a small block of wood that's screwed to the door.

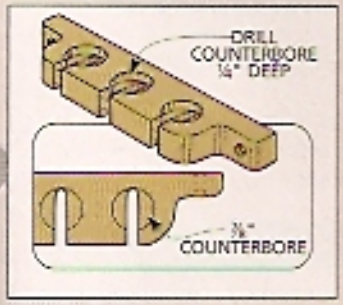
■ This is an extra step, but here's the reason for it — it's easier to locate and drill angled holes in a large plywood door.

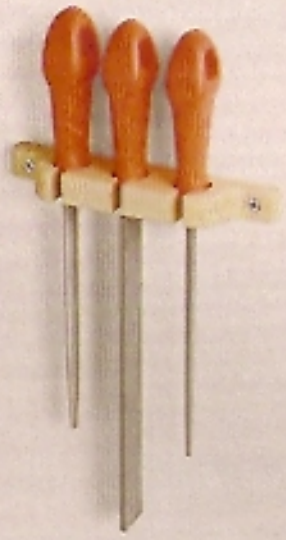


FILES HANGER

■ Make this simple rack to store files. The nice thing is the files can't fall out. You have to lift them before they will slide out.

■ When building the file rack, drill the large holes only ¼" deep. (This way, oval-shaped handles won't wedge themselves in place.) The slots are started by drilling small through holes. Then remove the waste with a band saw.



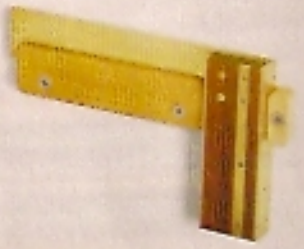


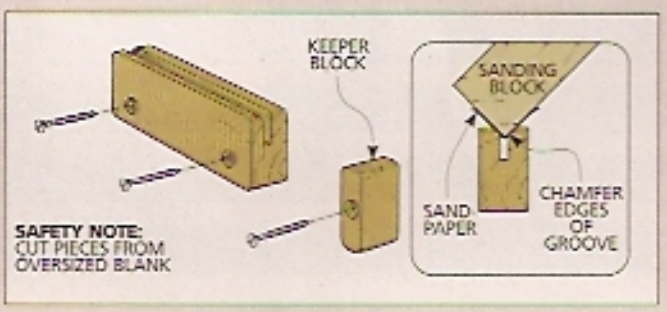
TRY SQUARE HANGER

■ To make a hanger for a try square, I started with a long piece of scrap. (It's easier and safer to work with.)

■ First, rip a kerf centered on one edge to hold the blade of the square. Then cut the piece to fit the length of the blade. Now, screw it to the cabinet.

■ To keep the try square from sliding off, I also added a small keeper block behind the handle.





SHOP INFO . . . . . Reducing Tool Noise

Noise is a fact of life in most shops. And let's face it, even though you can insulate yourself with a pair of hearing protectors, the high-pitched whine of a router or table saw still carries throughout the house (and sometimes even to the neighbor's).

To avoid disturbing the people around me (and being forced to close down shop early in the evening), I've been experimenting with different ways to put a damper on the tools that generate the most noise.

METER. As a starting point, I wanted to get an idea of just how noisy my tools were to begin with. So I bought a "noise meter" from a local electronics store (see photo at right).

This meter measures the intensity of the sound in decibels (dB). And since this intensity usually increases as you make a cut, all of the readings were taken with the tool in operation (see the chart below).

BENCHMARK. Although this gave me an initial noise level that served as a "benchmark," I was surprised by one thing. There wasn't as much of a range as I'd expected between the decibel readings of a relatively quiet tool (a drill press for example) and those of an "ear-buster" (like a table saw).

SCALE. To find out why, I called a local hearing specialist. He said that the scale used to measure decibels was logarithmic. What this means is that a slight increase (or decrease) in the decibel reading has a much more significant effect than you'd think.

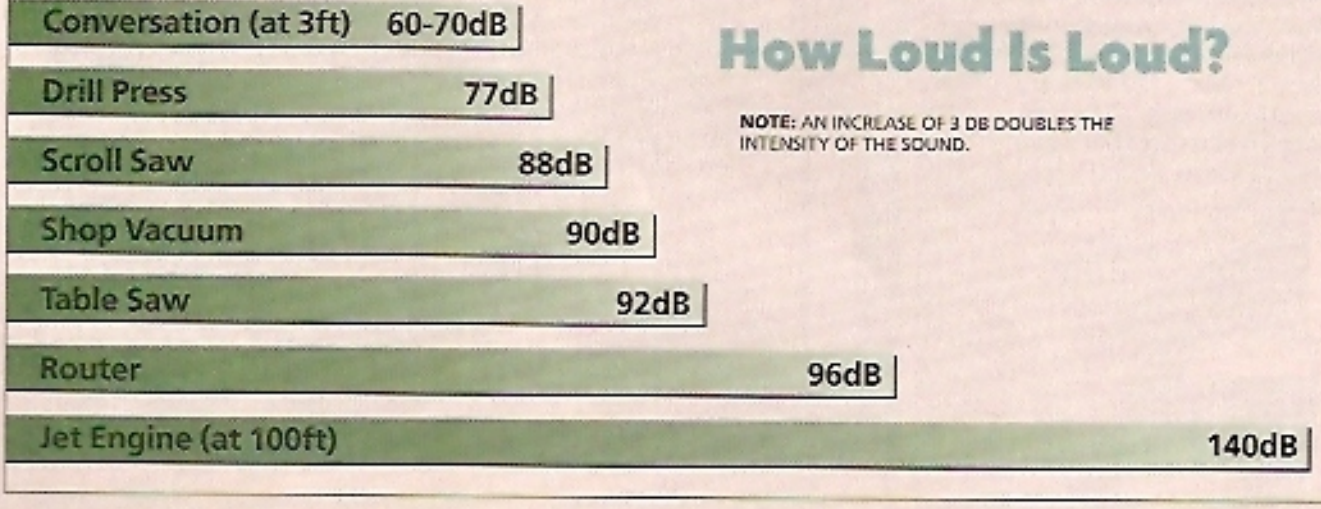
For example, for every 3 dB increase in the reading, the intensity of the sound actually doubles. So, for example, if one shop vacuum spikes 90 dB, two shop vacuums would top out at 93 dB on the meter.

Understanding how the scale works is one thing. But when it comes to dampening tool noise, the real test is to use the scale as a measuring stick to see (or hear) what works and what doesn't.

MULTIPLE SOLUTIONS. What I've found is that there's no single solution that's going to dramatically reduce the noise level of the tools in your shop. But there are combinations of little things you can do that soon add up to produce a quieter shop.

How Loud Is Loud?

NOTE: AN INCREASE OF 3 DB DOUBLES THE INTENSITY OF THE SOUND.



TOOL SELECTION

If you're planning to buy a new tool, one of the simplest things you can do to reduce your shop's noise level is to select a quiet tool. This may sound like a simple task, but it might require a bit of detective work.

While some manufacturers include decibel readings along with other information about the tool, that seems to be the exception — not the rule.

Be sure to ask the salesperson about noise while you're examining the tool, in case the information isn't posted where it's easily accessible.

NOISE TEST. So what I do is fire up the tool in the store. After all, if it's too loud in a wide open space (like a tool or home improvement warehouse), you know it's going to be too loud at home.

Don't give a tool the benefit of the doubt when it comes to noise. That sound will actually feel a lot louder when you bring the tool into your home workshop, so be realistic.

Note: Unfortunately, this "test it in the store" method isn't exactly foolproof. Until you can actually run a scrap piece of wood through the blade of the tool, you won't know exactly how loud it will get in use.

FEATURES. Another thing that's worth considering before buying a tool is the features it has that can contribute to quieter operation. Some of them are designed specifically with noise reduction in mind, while others have unrelated uses (a lower level of noise is just a pleasant bonus).

There are several features to consider, but some important ones to be aware of are the motor, drive system, and the speed of operation (see below).

MOTOR

One thing that affects the noise produced by a tool is the type of motor. Because it runs at a higher speed, a universal (brush-type) motor is louder than an induction (brushless) motor.

Note: To tell them apart, simply check for the "caps" that hold the brushes in place.

Although most hand-held power tools use a universal motor, you'll often have a choice when buying a stationary power tool (see photos at right).

Universal Motor. *Because it operates at high speed, a tool with a universal motor runs louder.*

Induction Motor. *A heavy motor housing and slower speed contribute to a quieter running tool.*

DRIVE SYSTEM

The drive system of a tool also makes a difference in the noise it generates. As a rule of thumb, a gear-driven tool runs louder than one that's belt-driven (see photos at right).

The reason is simple. In a gear-driven tool, there's a certain amount of "transmission" noise caused by the gears meshing together.

But if you transfer power from the motor to the blade through a belt, it eliminates this noise.

Gear-Driven. *A tool that transfers power through a system of gears tends to run louder.*

Belt-Driven. *A belt-driven tool offers a quieter method of getting power from the motor to the blade.*

VARIABLE SPEED

Although it's not designed specifically to reduce noise, a tool with a variable speed control can be set to run slower (and therefore significantly quieter) than a single speed tool.

For example, the decibel reading of the variable speed router in the left photo drops from 100 dB at high speed to 78 dB at the slowest speed.

If you already have a fixed speed router, you can use a control like the one in the far right photo.

Variable Speed. *A router with a built-in variable speed control can be set to run slower and quieter.*

Speed Control. *To reduce the RPM (and noise) of a fixed speed router, use a speed control unit.*

MOTOR VIBRATION

One of the main sources of tool noise is the vibration that's set up by the tool's own motor. Reducing this vibration will go a long way toward a quieter tool and a quieter workshop.

The best way to damp the excessive vibration (and noise) is to absorb the vibration *before* it's transferred to other parts of the tool or stand.

ANTI-VIBRATION PADS. One way to do this is to insulate the base of the tool from the stand. To do this, you can use a rubber-like pad that's specially designed to absorb vibration (see left photo). They generally come oversized so they are large enough to fit most tools.

This pad can be cut to match the "footprint" of your tool. Or you can cut strips to fit between the frame of a motor and the mounting plate.

Note: See page 112 for mail-order sources of anti-vibration pads.

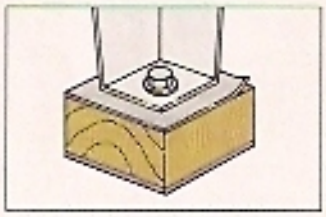
ISOLATION MOUNTS. But after a lot of searching and testing, the best thing I've found for soaking up motor vibration is a special product called an "isolation mount." Basically, an isolation mount is a hard rubber cylinder with a threaded hole at each end for a mounting bolt (see right photo).

What makes these mounts work is that the holes (and the mounting bolts that thread into them) don't go all the way through. Instead, they're separated by a rubber "cushion" that helps dissipate the vibration.

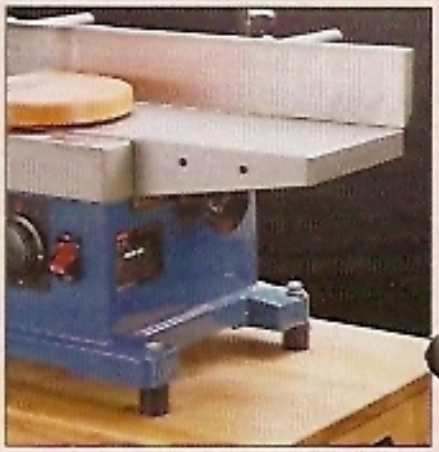
Note: Be sure to select a bolt that's short enough so it won't "bottom out" before it tightens up. See page 112 for sources of isolation mounts, hardware, and other supplies.

SHOP TIP
Isolation Pad

Controlling vibration at floor level helps reduce noise. Here, a block sandwiched between rubber strips keeps vibration (and noise) from transferring to the floor.



Anti-Vibration Pad. *This rubber-like pad absorbs vibration instead of transferring it to the tool stand.*



Isolation Mounts. *Hard rubber cylinders "isolate" the vibration set up by the motor on a tool.*

TOOL STANDS

Sometimes even the stand that a tool is mounted on can add to the noise level in your workshop.

TIGHTEN BOLTS. Because a stand can loosen up with use and start to rattle, it's a good idea to tighten down the bolts that hold it together. And to keep them from vibrating loose again, replace any flat washers with lock washers.

But noise can still be a problem if the stand flexes when the tool is running. To keep the metal parts from rubbing against each other, you'll need to "insulate" the tool stand.

INSULATE. One way to do this is to disassemble the stand and apply construction adhesive between parts that touch. Or, just add weight or ballast to the stand. (Concrete blocks or sand work well.) To insulate the stand from the floor of the shop, see the Shop Tip above.

SHOP-BUILT STANDS. But perhaps the best way I've found to damp the noise of a metal stand is to replace it with a shop-built one. To absorb as much vibration as possible, incorporate heavy, dense materials like particleboard or MDF.

To further reduce noise, enclose the tool inside the stand (see photos). Just be sure to provide plenty of ventilation to prevent heat build-up.

Router Cabinet. *An enclosed cabinet decreases the noise level of this router from 100dB to 90 dB.*

Shop Vacuum. *Here, an enclosed cabinet is used to muffle the shrill pitch of a shop vacuum.*

BELTS & PULLEYS

Although it's easy to overlook them, the drive belt and the pulleys on a motor also contribute to how much noise a tool makes.

BELT. With use, a lump can form on the belt where it's fused together. As this lump passes across the pulleys, it can sound like a washing machine that's out of balance.

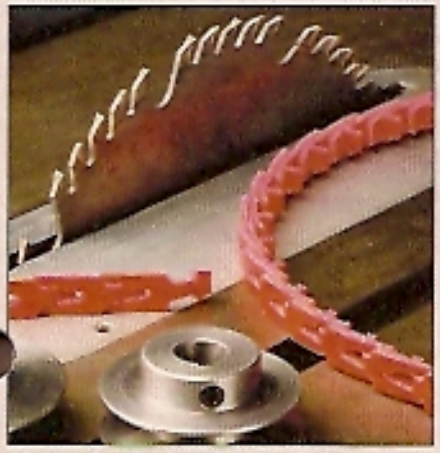
You can replace the old belt with a standard V-belt. But a belt like the one in the left photo is specially designed to reduce noise (see Sources on page 112).

TENSION. No matter which one you use, a belt that's too tight runs louder. So on tools with a fixed (not hinged) motor, I back off the tension just enough so the belt doesn't slip (see the Shop Tip at right).

PULLEYS. Noise can also be traced back to the pulleys on a tool. Typically, many tools have pulleys that are *cast* from a soft metal. Since these pulleys aren't always perfectly balanced, they have a tendency to wobble and make noise.

My solution to this problem is to replace the old pulleys with ones that are *turned* from solid pieces of steel (see right photo).

ALIGNMENT. Regardless of the pulleys, they won't run quiet unless they line up. To check this, I use a straightedge. When held against the pulleys, it should touch the outside edges of both pulleys.



Link Belt. *The interlocking links create a flexible belt which makes a tool run smooth and quiet.*

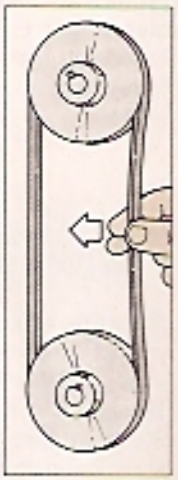
Turned Pulley. *Balanced to run true, this turned steel pulley reduces noise caused by vibration.*

SHOP TIP

Belt Tension

Adding a bit of slack to a tool's belt can reduce the noise the tool makes. Just make sure you don't loosen it *too* much.

A good rule of thumb is to loosen the belt tension just enough so that you can push the belt in about an inch (see drawing at right).



SAW BLADES

When it comes to noise, one of the worst culprits in my shop is the blade on my table saw. Luckily, there are some easy remedies to reduce its shrill sound.

SHARP AND CLEAN. First, it makes sense that cutting with a sharp, clean blade produces less noise than a worn blade (about 3 dB difference).

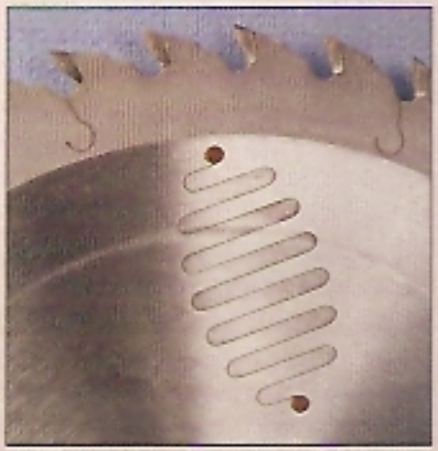
I also make it a habit to raise the saw blade so it's only slightly higher than the thickness of the workpiece I'm cutting. This can make a difference of 2 dB compared to when the blade is set to maximum height.

STABILIZER. Another thing you can use to reduce the noise of a blade is a stabilizer (see left photo). A stabilizer is designed primarily to help stiffen a blade when cutting thick stock. But I've found that it also helps damp the blade's noise by as much as 2 dB.

QUIET BLADES. Finally, you can look into "quiet" blades. These are designed to reduce the high-pitched ringing you typically get when you make a cut.

The secret is a series of slots in the body of the blade (see right photo). While they don't eliminate vibration, they do direct it to a "plug" at each end. These act as shock absorbers to damp the sound. (For sources, see page 112.)

Stabilizer. *By adding side support, a stabilizer damps noise produced by a wobbly blade.*



Quiet Blade. *Slots and sound-absorbing plugs reduce the noise level of this blade from 92 dB to 88 dB.*

The Complete SMALL SHOP

Wall space equals storage. Lift a bin off to take the contents to a project.

The Revolving Tool Station has lots of room for all kinds of power tools.

Do more by gluing up panels vertically. This fold-up rack handles two at once!

This Miter Saw Station offers plenty of support for long stock, then stores in half the space when you're done.

Fold-out wings on this portable Benchtop Router Table give you more work surface than many full-size router tables.

#8010286