SECRETS FOR GETTING THE MOST OUT OF YOUR ROUTER TABLE

+7 EASY ADD-ONS pg. 8

Vol. 17 Issue 97

ShopNotes®

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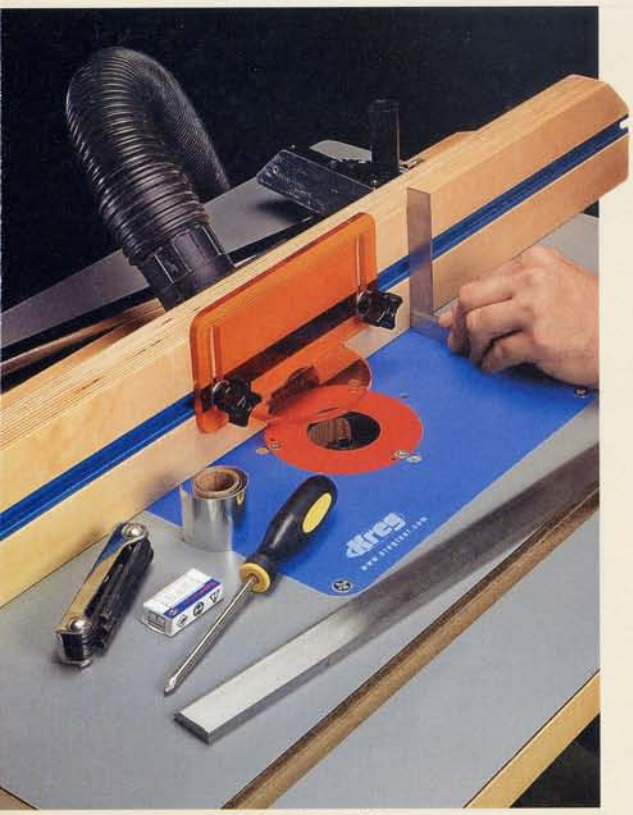

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About a year ago, we featured a one-wall workshop on the cover of *ShopNotes*. And judging from your reaction, it was a very popular project. It seems that almost everyone is looking for a way to make their shop a better place to work.

So in this issue, we've come up with a totally new way to transform your shop space. Last time, we used ready-to-assemble cabinets. But for the makeover shown on the cover, we started from scratch and made our own.

Now I'm not talking about building complicated or time-consuming cabinets. The idea here is to use basic, inexpensive materials (2x4s, MDF, and construction-grade plywood). Then you build the different components using a single, straightforward joinery technique.

Each component starts with four posts cut from 2x4s, then horizontal plywood platforms are bolted between them. Once the framework is complete, the MDF "skins" are simply screwed in place. Finally, to dress things up a bit, we painted some of the MDF panels.

It's really a simple, rock-solid solution for getting the most out of your shop space. And you can customize it to suit your shop. Be sure to check out the article that begins on page 16 for all the details.

Terry

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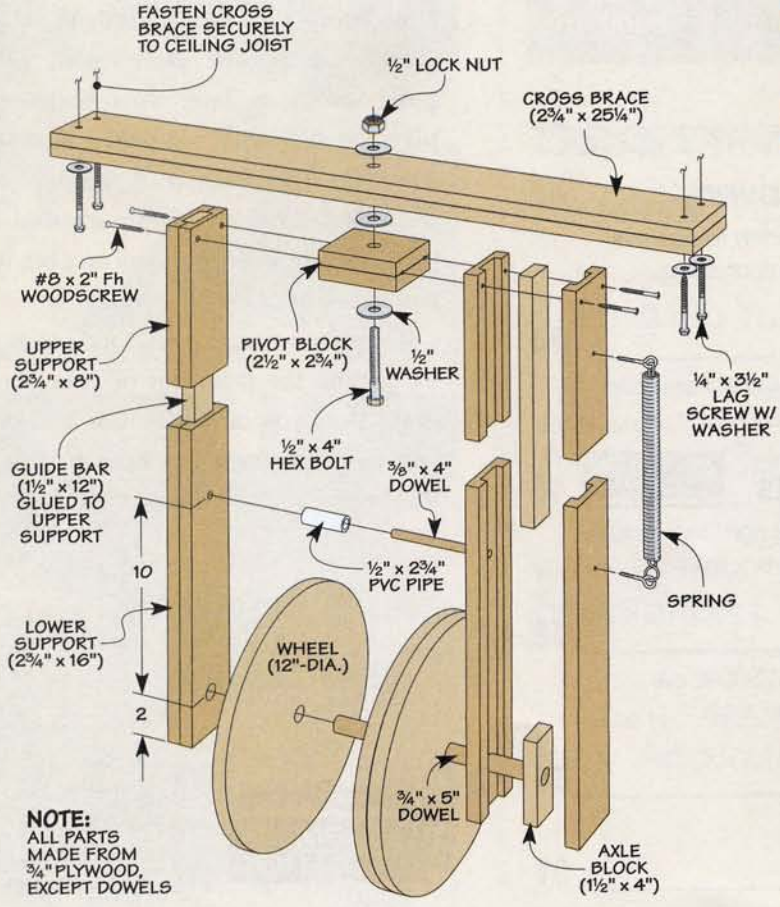
This symbol lets you know there's more information available online at www.ShopNotes.com

from our Readers

Tips for Your Shop



Hose Support

Keeping my dust collector hose and extension cord out of my way and tangle-free was a challenge in my shop. So I built the support you see in the photos and mounted it above my workbench.

The hose support is a simple device that allows a hose to roll forward, swivel left or right, and move up or down. There is a separate roller for the dust collector hose and the extension cord.

The supports have loose mortise and tenon joints that allow vertical motion. The springs keep the mortise and tenons together but are soft enough that a tug on the hose will allow some downward motion and absorb shock for smooth action.

The width of the wheel is just wide enough for the hose to roll freely. It's made from ¾" plywood. The swivel action for the whole assembly comes from a bolt, washers, and nut fastening the frame to the cross brace. (Just make sure the brace is securely attached to the ceiling joists above the workbench.)

Now the hoses stay out of the way above my work area yet they're still within easy reach when needed.

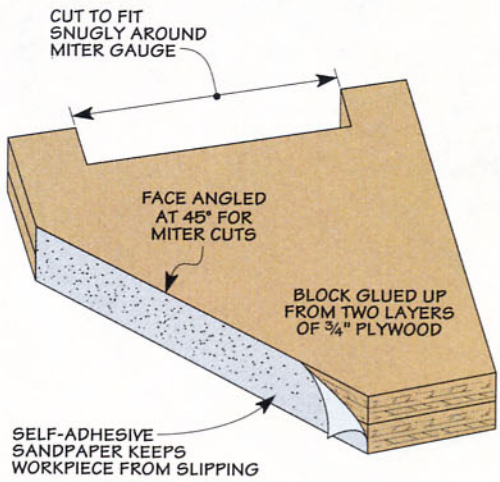
Ralph Okonieski
Stow, Ohio

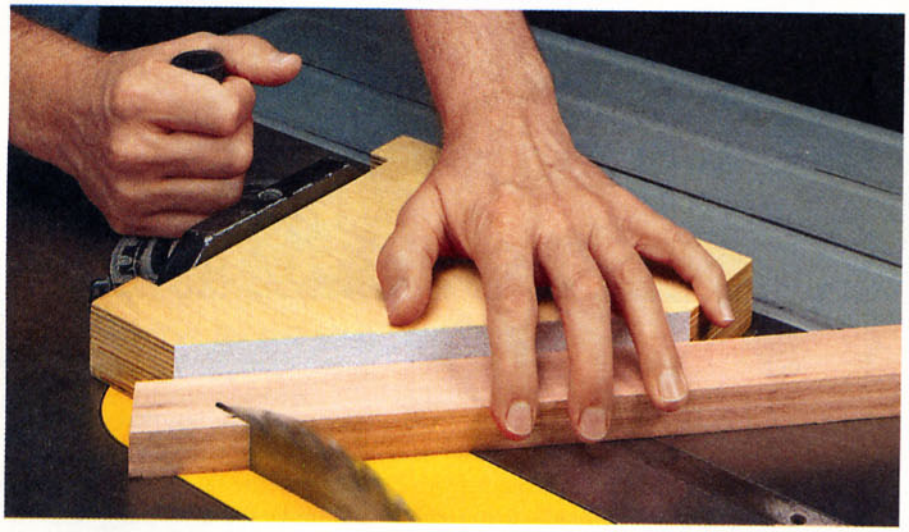
Angled Block for Miter Gauge

I made a simple add-on for cutting miters without having to adjust the miter gauge. An angled block, like you see in the drawing, fits tightly around the face of the miter gauge.

It's surprising how accurately the block helps cut 45° miters. And you can flip it over to make the cut on the end of the mating workpiece. If you need to fine-tune a cut, just slip some paper shims between the block and the face of your miter gauge for a perfect cut.

Donald Peck
Warren, New Jersey





Submit Your Tips

If you have an original shop tip, we would like to hear from you and consider publishing your tip in one or more of our publications. Just go online to our web site at *www.ShopNotes.com* and click on the link, "SUBMIT A TIP." Or you can mail your tip to: *ShopNotes* Tips for Your Shop, 2200 Grand Avenue, Des Moines, IA 50312. Please include your name, address, and daytime phone number (in case we have any questions). We will pay up to $200 if we publish your tip.

The Winner!

Congratulations to *Ralph Okonieski* of Stow, Ohio. His hose support mechanism for dust collection hose (shown on the opposite page) was selected as the winner of the *Porter-Cable* router, just like the one shown at right. Ralph's tip makes over-the-bench hose access easy.

To find out how you could win a *Porter-Cable* router, check out the information above. Your tip just might be a winner.

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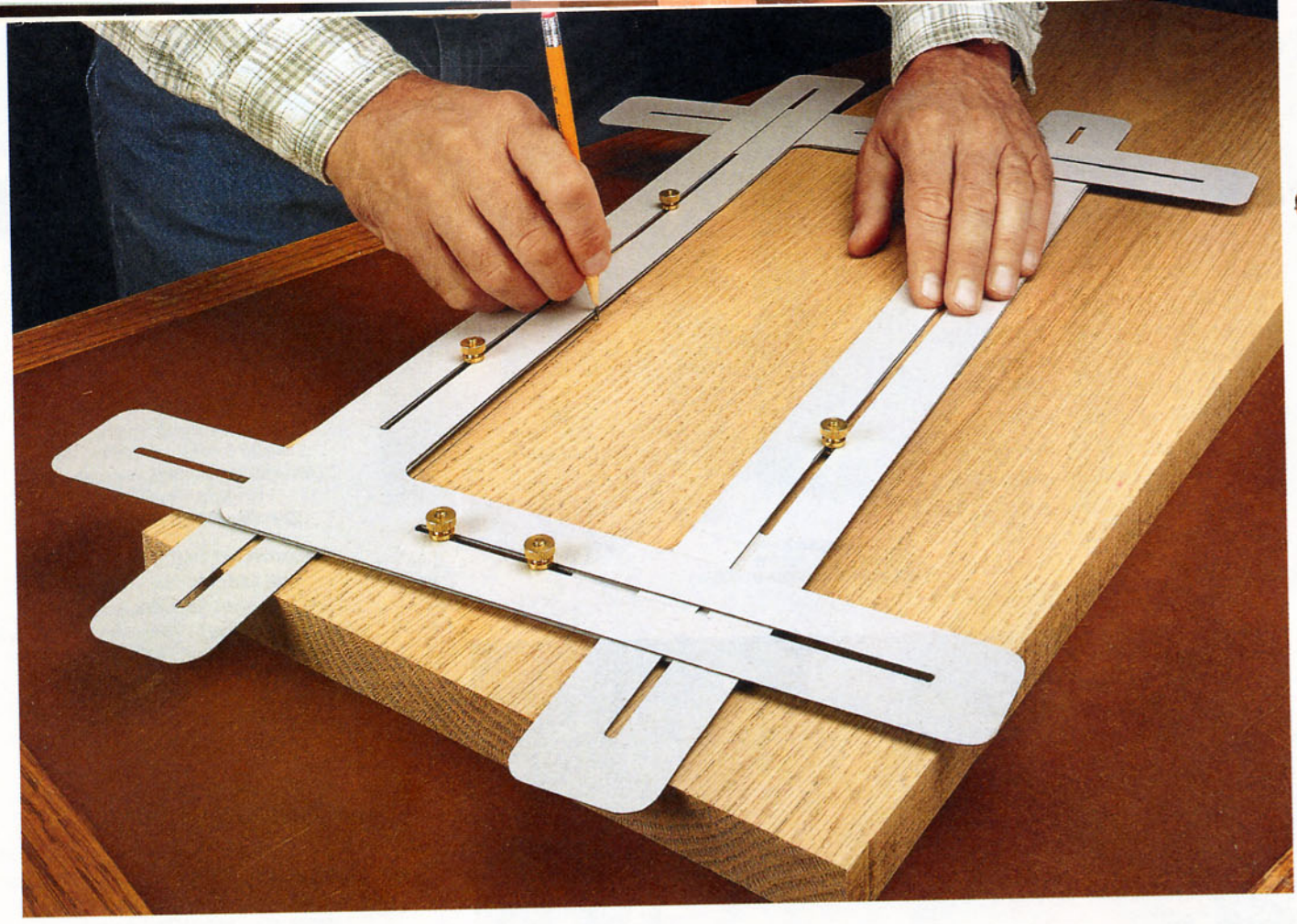


Layout Jig

When laying out workpieces for a project, I like to make sure all the pieces will have the best appearance. But it's sometimes hard to visualize what the grain of finished piece will look like. So I devised this simple jig you see in the photo above.

The jig helps you "frame" the workpiece for the best look before cutting it out. The jig is made from scrap plastic laminate that I cut into four L-shaped pieces (photo below). I routed a slot down the middle of each leg. Then the pieces are held together with screws, washers, and knurled nuts, as shown in the inset photo below.

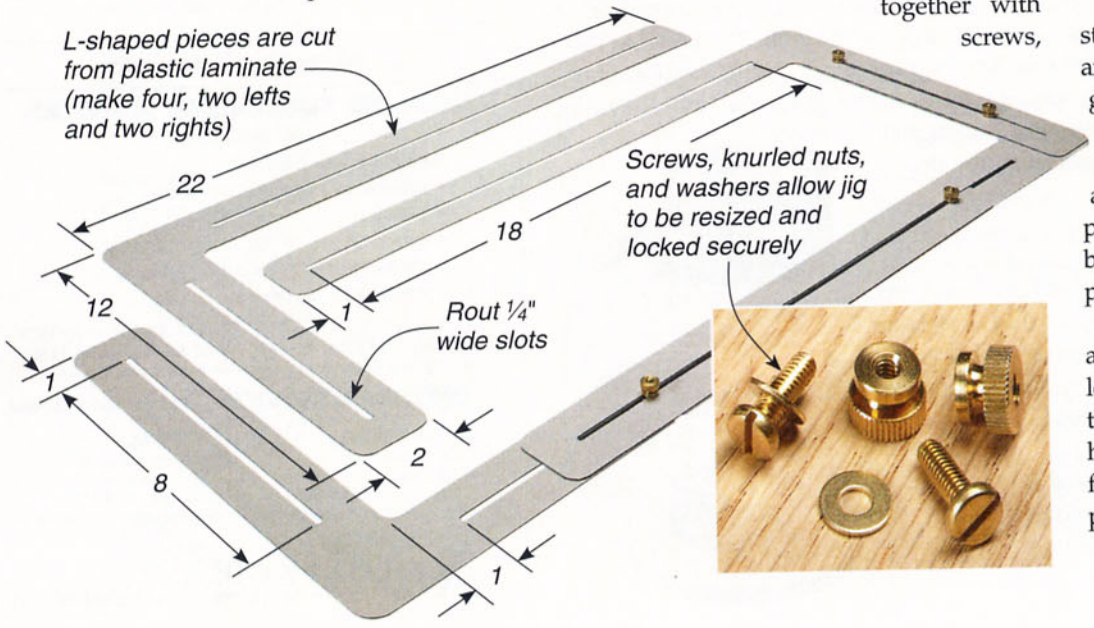
To use the jig, loosen the nuts and move the L-shaped pieces so that the inside dimensions match the finished dimensions of the workpiece. Then tighten the nuts to hold things together.

Now you can move over to your stock. Place the jig on the board and move it around until the best grain pattern for the workpiece appears in the "window."

You'll want to take your time and experiment with different positions before deciding on the best option. Then just use your pencil to trace out the piece.

This jig has proven so useful I also use it for selecting the best-looking panels for doors. Finally, the jig comes in handy when I use hardwood plywood or veneers for projects. I can home in on the perfect piece for my project.

Bryan Nelson
West Des Moines, Iowa



Fence Adapter for Sliding Hold-Down

The *Sliding Hold-Down* featured in *ShopNotes* No. 96 was designed for a T-square-style rip fence on a table saw. But it can easily be adapted for use with other styles of fences. All you need to do is build a "saddle" for your fence, like you see in the photo at right.

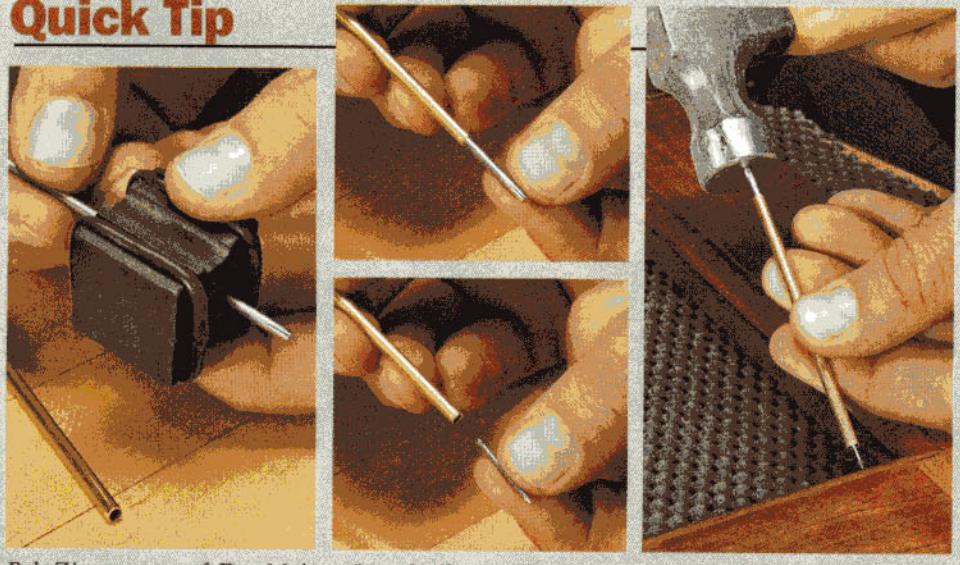
The key to building the fence adapter is getting a tight fit over the rip fence. It's important for the operation of the hold-down that it be secured to a solid base.

To meet this requirement, size the pieces of the fence adapter for a snug fit over your saw's rip fence. Then, to make sure it doesn't move while making a cut, install a couple of threaded inserts on the outside face for thumbscrews. The thumbscrews will hold the fence adapter securely in place but also allow it to be easily removed when it's not needed.

Now you can mount the sliding hold-down on top and put it to good use for ripping, cutting grooves, and cutting rabbets.

ShopNotes Staff

Quick Tip



Bob Zimmerman of *Des Moines, Iowa* built this magnetized brad driver from brass tube and music wire. You can find both of these items at most hardware or hobby stores. Just select the wire diameter for a sliding fit inside the brass tube.

To use it, magnetize the wire with a tool magnetizer and slide the wire in the tube. Now just insert a small brad or wire nail in one end. Position the nail where you need it and tap the other end of the wire using a small hammer to drive the nail home.

tuning up your Router Table

Follow these tips to maximize the potential of this shop workhorse.

Along with the table saw, the router table is one of the most useful tools in the shop. A flat and sturdy router table makes routing safer and more accurate. And you may not give it a lot of thought — until something goes wrong.

But you can give your router table a simple top-to-bottom checkup to find and correct any problems. The payoff will mean better-looking joints and edges.

Tabletop

My first router table was nothing more than a plywood table attached to a stand made from "two-by" material. After a while, I noticed that the depth of cut wasn't always consistent.

After a little investigating, I discovered there was a slight dip in the surface — most likely caused by the weight of the router. A flat table is a big factor in getting accurate cuts when routing.

You can easily check the flatness of the top with a straightedge. You'll want to check across the center of the table from side to side and front to back. You're looking for any dips in the table. (A slight crown is okay.)

The problem with even a slight dip is the workpiece can "bridge" the hollow spot without contacting the table. And that means a shallower cut in the middle of a long workpiece. Or it can result in joinery that doesn't quite fit right.

But there's a simple solution. You can add some bracing under the table to flatten it, like you see in the photo at left. I like to create a slight crown at the center of the brace. This applies extra pressure in the center of the tabletop and helps keep it flat.

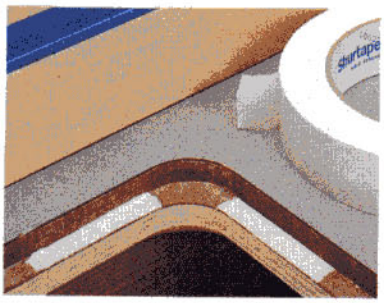
▼ ***Flatness.*** *A straightedge will show you if there's a dip or crown in the tabletop.*

▲ ***Bracing for Support.*** *Attach bracing to a sagging tabletop to keep it flat and rigid.*

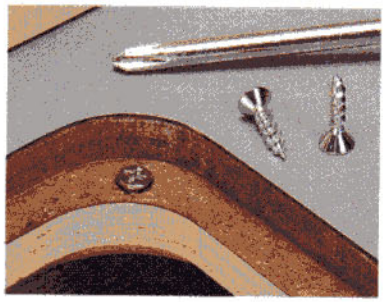
Router Insert Plate

Another area to look at is how the router is mounted. The router on my first router table was simply screwed to the underside of the top. It worked great, but I was limited in the diameter of bits I could use because of the fixed opening size in the tabletop. And the thickness of the top reduced the depth of cut I could make.

For most of us, an insert plate eliminates these problems. But there's more to it than just adding a plate. There are a few adjustments to make to help you get the accuracy and results you expect from your router table.



▲ ***Tape Shim.*** *A layer or two of tape may be all you need to tweak the height of the plate.*



◀ ***Leveling Screws.*** *A screw in each corner of the recess fine-tunes the height of the plate.*

Tight Fit. The first thing you need to do is make sure the plate fits properly in the opening. It shouldn't move from side to side or front to back. You need the insert plate to be a solid foundation for the router and bit for safer and more accurate routing.

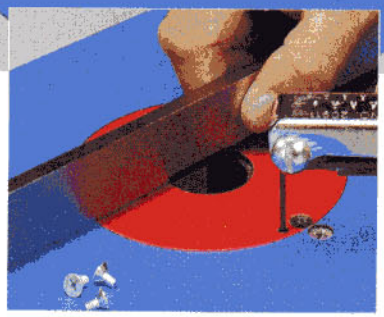
If you find that your insert plate moves at all, you can shim the sides of the plate or the recess with tape. I prefer clear packing tape since it allows the plate to slip in and out easily, but any tape you have handy will do. Your goal is to eliminate any "wiggle room" when the plate is installed in the table.

Flush. The next thing to check is that the plate is flush with the tabletop at all four corners. If it isn't, the workpiece will catch on the edge of the plate or recess.

There are some easy fixes for this. You can shim the plate with tape (upper photo at left). Or you can install "leveling screws" in the recess (lower photo at left). Adjust the height of each screw until the plate is flush all around.

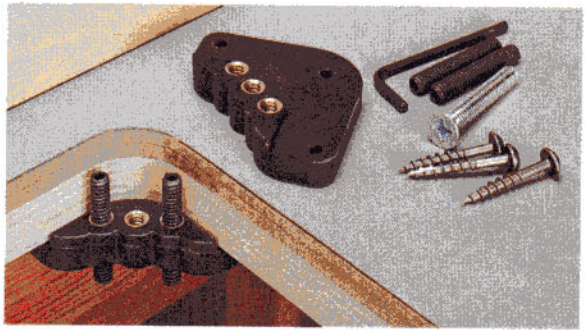
The ultimate option for leveling the router plate is to purchase a set of levelers like you see at right.

▲ ***Flush.*** *Use a straightedge to check that the plate and insert are flush with the top.*



They fasten to the underside of the table. Then long set screws are adjusted up or down to "dial in" the height of the plate.

Reducing Rings. Finally, if you have an insert plate with reducing rings to accommodate bits of varying diameters (inset photo above), check them with a straightedge and tweak them until they're flush with the top of the plate, as well.

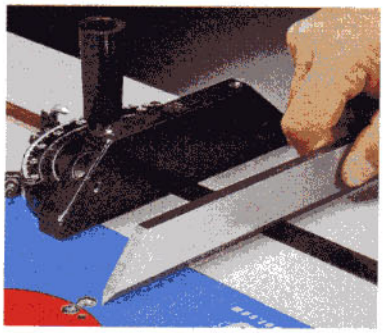


▼ ***Leveling.*** *Commercial levelers (like these from Kreg), make it easy to keep the plate flush with the top.*

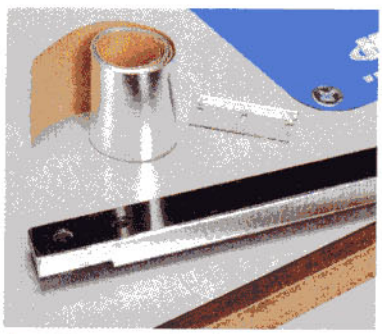
Miter Slot

A miter slot is a feature that lets you use featherboards and sleds, and make angled cuts with a miter gauge. If your table doesn't have a miter slot, it's easy to add one. It can be a simple groove cut into the table, as you see in the photo at right. Or you can add an aftermarket aluminum miter track for added durability.

Regardless of the type, when it comes time to use a miter gauge or a sled, you'll want to check for a good fit in the miter slot. Here, the goal is to have a smooth, sliding fit without any side-to-side play. If the miter bar is a little loose, you can shim it with aluminum tape from an auto parts store (far right photo). If it's too tight, simply file or sand it lightly until it fits.



▲ ***Proper Fit.*** *Check for side-to-side play and make sure the bar is flush with or below the top.*



▲ ***Shim to Fit.*** *Shim a loose-fitting bar with foil tape you can buy from an auto parts store.*

Fence

Even though I often use bearing-guided bits, having a fence can make routing safer and more accurate. And let's face it — all you really need is a board clamped to your router table. But even if you have a feature-packed fence, there are some things to consider.

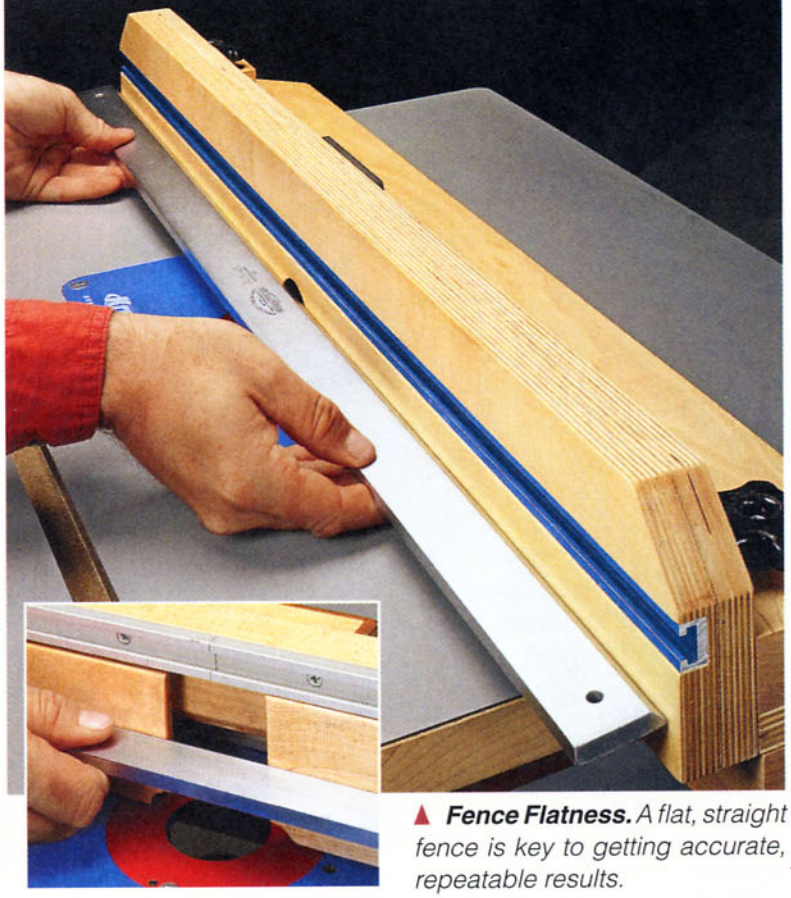
Flat & Straight. The first and most important thing is that the fence has to be straight. Again, I use a metal straightedge to check the fence, as you see at right.

For a single-face fence (main photo at right), it's an easy task to check for flatness. If I see any gaps, I'll use shims to flatten it, if I can. Otherwise, I'll replace the face.

If your fence has a split face, like the one shown in the inset photo, the two pieces need to be parallel and aligned with one another. This helps keep the workpiece from catching on the fence or changing position relative to the bit as you slide the workpiece through. And on a fence with sliding faces, you can shim the back side of the faces to make sure they're aligned and parallel.

Square. Another key requirement for a fence is that it has to be square to the tabletop. Like the top, the fence serves as a reference surface for the bit. Here again, if it's not square, it can affect the accuracy of the cut.

A small machinist's square is a great tool for this job (photo below).



▲ ***Fence Flatness.*** *A flat, straight fence is key to getting accurate, repeatable results.*

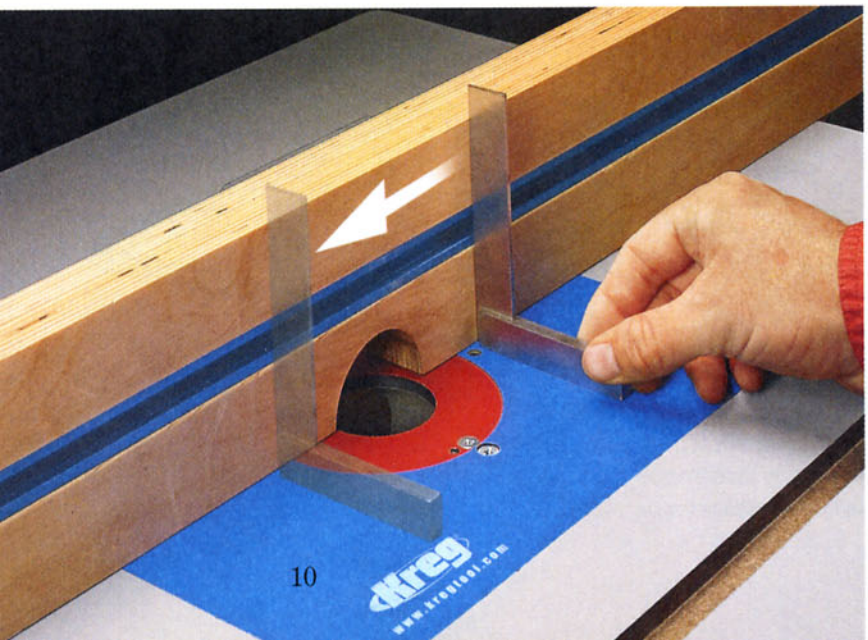
If you find the face of the fence isn't square, shimming it with a piece (or two) of tape on the underside may be all you need to bring it square (lower right photo).

Adjustability. The final thing to check is that the fence should be quick and easy to adjust. I make sure the fence slides easily across the tabletop. You may need to wax the top and remove any debris that might interfere with smooth positioning before clamping it down.

Accessories. What I've talked about so far will go a long way toward helping you get the accuracy you expect any time you're working at your router table. But there are some other things you can add that will make any routing task safer and more enjoyable. You can see some of these items in the photos on the opposite page. (For sources of these handy accessories, turn to page 51.)

As you can see, it doesn't take much effort to give your router table a tune-up. After spending just a little bit of time, the results will show in your projects.

▼ ***Square to the Table.*** *Check the fence for squareness at several locations along its length.*



▼ ***Squaring the Fence.*** *A few strategically placed pieces of foil tape are all you may need to bring your router fence square with the table.*

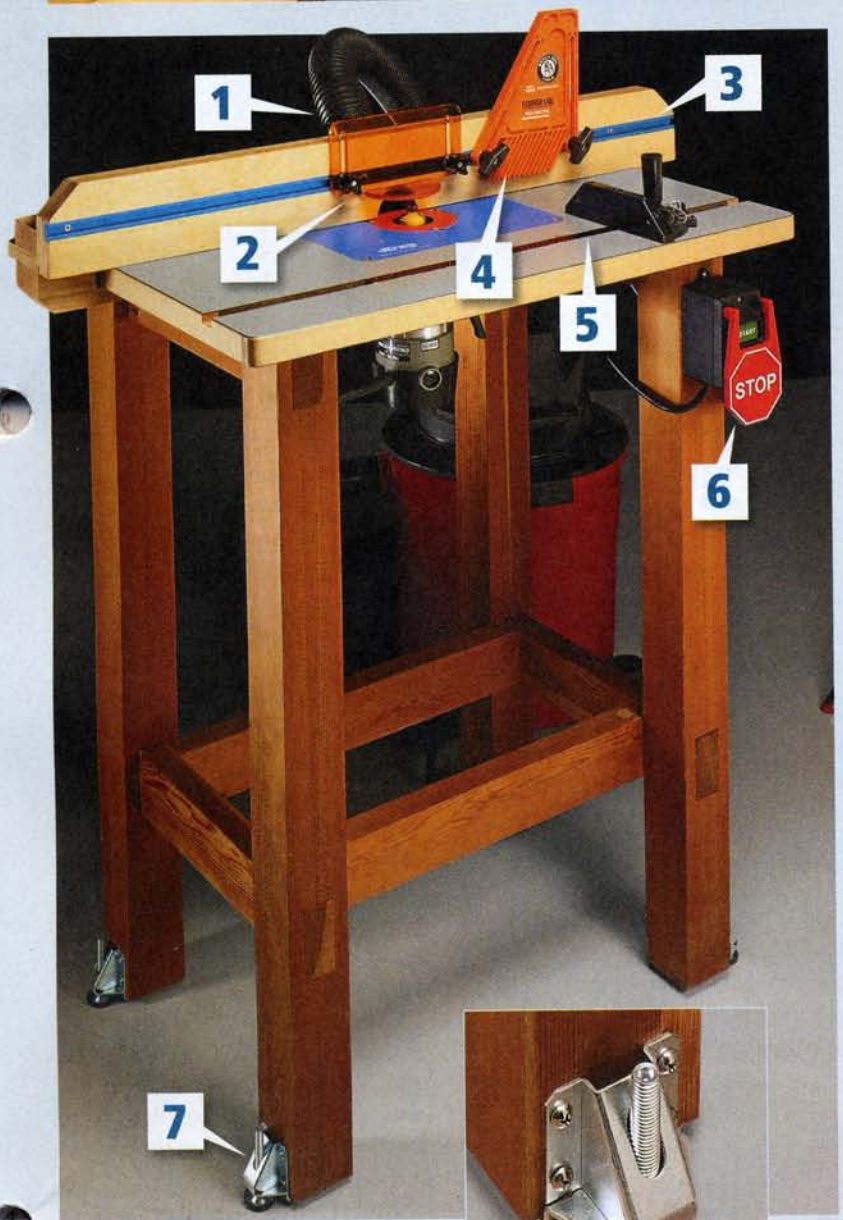
Simple and Inexpensive:

7 Great Add-Ons & Upgrades

1 *Dust Port.* *Adding dust collection to your fence means a cleaner shop.*

2&3 *T-Track & Bit Guard.* *A T-track is great for adding useful accessories like this simple guard. It keeps your fingers a safe distance away from the bit.*

4 *Featherboard.* *For a more consistent cut, a featherboard keeps downward pressure on the workpiece.*



5 *Miter Slot.* *You can use a miter gauge, a sled, or other accessories in a miter slot.*

6 *Switch.* *With this switch upgrade, a simple bump is all you need to turn off the power.*

7 *Sturdy Table.* *Make your table rock-solid by adding these heavy-duty levelers.*

great results with Circular Saw Blades

Using the right blade and a few simple techniques will make a big improvement in the quality of cut.

When it comes to cutting sheet goods down to size in the shop, using a circular saw sure beats trying to manhandle the sheet on your table saw. It all starts with the right blade and a few helpful hints. What you'll get is a clean, finished edge without a lot of hassle.

Choosing The Right Blade

Since most blades use the same tooth geometry (alternate top bevel, or ATB), it's the number of teeth that make the difference in the cut. A 16- or 24-tooth blade (left two blades below) is fine for rough carpentry.

But if you want better results in the shop, move up to a 30- or 40-tooth blade. It will give you good results when cutting sheet goods down to size. Reserve the 60-tooth blade for fine finish cuts.

BLADE CHOICE

Out on the job site, a circular saw is mainly used to cut framing lumber. For this task, the less-expensive, contractor-grade saw blades do a fine job. But in the shop, installing a better blade is worth it when cutting sheet goods.

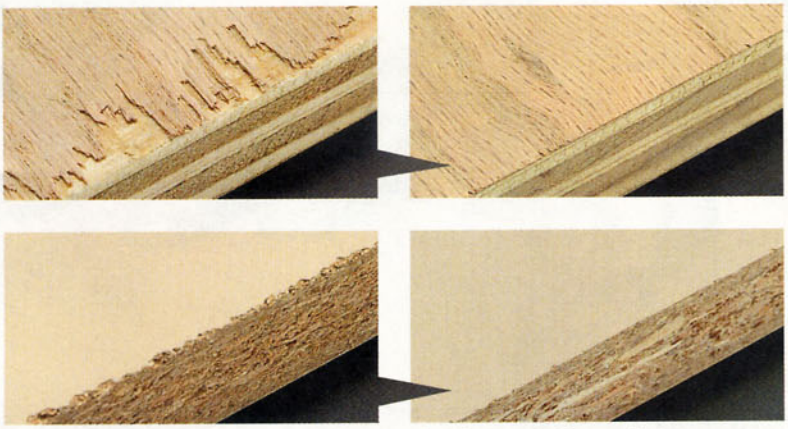
The goal when cutting sheet goods down to size is to get a smooth, finished edge with little tearout. To get the best results from your blade, there are some things you need to know.

Carbide. Let's talk about the blades first. You'll notice as you browse the tool aisle at your home center that most saw blades have carbide teeth. That's a big plus because carbide is tougher and stays sharp longer.

But there's something else you'll discover. Just like the blades for your table saw, there's a wide variety in the number of teeth, as you can see in the box at left.

Quality of Cut. So how many teeth are optimum? As a general rule, the more teeth on a blade, the smoother the cut edge. Plus, there will be less tearout. (See the photos at the top of the next page.)

While blades with 16 or 24 teeth work great for "two-by" stock, they aren't the best choice for sheet goods. And with blades with



▲ **Tearout.** *All blades, especially 16- or 24-tooth blades, can cause severe tearout and chipping on plywood and melamine.*

▲ **Clean Edge.** *You can get smoother edges and less chipout with a better blade and the techniques shown here.*

a high tooth count (60 or more) there's a tradeoff. More teeth means a cleaner cut but it cuts more slowly. And if you try to "push" it, you might get some burning. For my money, I've found that a 40-tooth blade is a good compromise between speed and quality of cut.

Plate Thickness. When shopping for saw blades, you'll find a difference in the thickness of the blades. Most contractor blades are pretty thin (box at lower right). I like a thicker blade for shop use because it makes a cleaner cut. But even the better blades can cause some tearout if you don't use some simple techniques to prevent it.

CLEAN CUTS

The first rule for cutting sheet goods is to use an edge guide. This way, your cuts will be smooth and straight. As I said before, the biggest challenge is tearout, especially when crosscutting.

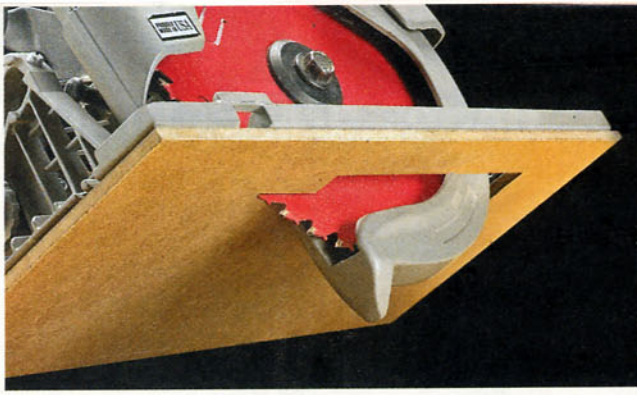
Good Side Down. The teeth on a circular saw blade enter the workpiece on the bottom. That means you can get a good, clean edge on the bottom side with almost any blade. That may be fine for some projects. The problem is you can get some serious tearout on the top side (photos above).

That's why it's important to remember to put the good face down when cutting sheet goods. If you want a good, crisp edge on *both* sides of the workpiece, you need to take some extra steps.

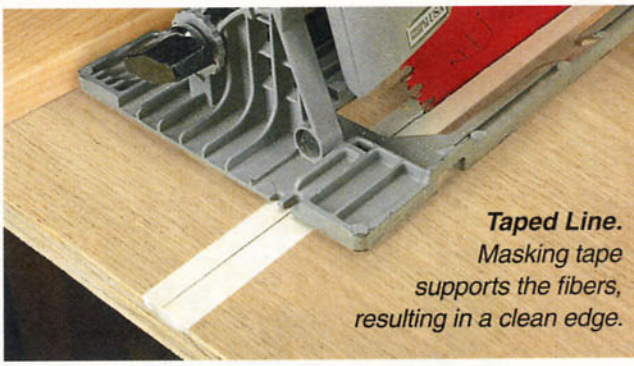
Zero-Clearance Base. Like a zero-clearance insert on a table saw, an auxiliary base added to your circular saw can help eliminate tearout (photo above right).

To make the base, just size a piece of hardboard to fit the dimensions of your saw's plate. (Make sure to cut an opening for the saw's blade guard.) Then with the blade raised all the way up, fasten the base in place with double-sided tape. With the saw on, carefully plunge the blade through the base, making sure the guard operates freely.

Masking Tape. Another trick I've used to eliminate tearout on the top side of sheet goods is masking tape, like you see above.



▲ **Zero-Clearance.** *Adding an auxiliary base to your saw helps eliminate tearout by supporting the wood fibers where the blade exits the cut at the front of the blade. Just make sure the guard operates properly.*



Taped Line. *Masking tape supports the fibers, resulting in a clean edge.*

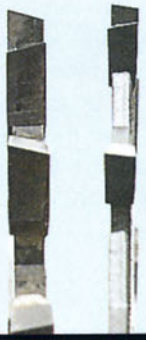
All you need to do is cover the cut line with the tape, pressing down firmly to make sure it adheres securely over the line.

Great Results. As you can see, with the right blade and a few simple techniques, you can get great results with your circular saw. The end result is better-looking projects.

A Step Up: Woodworker II

Forrest Manufacturing Company made a name for itself with its table saw blades. Their quality is legendary among woodworkers. The great thing is *Forrest* makes high-quality blades for portable circular saws as well, like this *Woodworker II*.

This 30-tooth, 7¼" blade is a heavyweight when compared to most other blades. As you can see in the left photo below, it's thicker (3/32") than most blades. And the carbide teeth are a lot beefier. That means you can have it sharpened more often. The blade retails for around $60, but it's an investment you'll appreciate every time you pick up your saw.



perfect curves with a Sanding Drum

Learn a few tips and techniques to get smooth, even curves with this low-cost drill press accessory.

Sanding straight edges smooth and square isn't very difficult. But throw in a few curves, and things start to get a little challenging.

The solution I turn to most often is a sanding drum mounted in my drill press. However, my first few attempts were less than satisfying. Instead of smooth, even curves, I had scalloped and burned edges along with loads of frustration.

What I've learned since then is all it really takes is a few setup tips and the right technique to get top-notch curves.

About the Drums. One of the things I like about sanding drums is how simple they are. They consist of an abrasive sleeve that slips over a rubber spindle. A nut on the threaded arbor compresses the rubber section to hold the sleeve in place. Sanding drums come in sizes ranging from $\frac{5}{8}$" dia. up to 3" (photo at left). You can find out where to get sanding drum sets by turning to Sources on page 51.

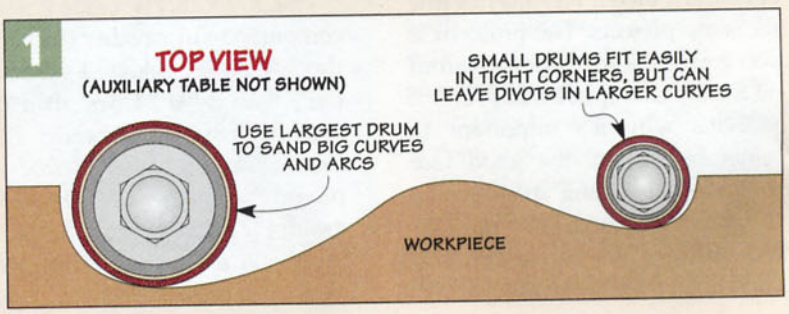
SETUP TIPS

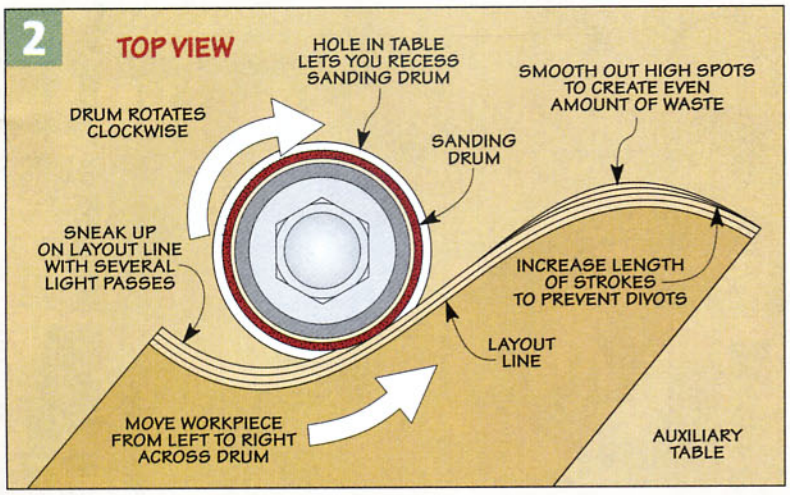
Once you have a sanding drum set, how do you get the most out of it? Here are a few things to consider.

The Right Size. The first thing is to select the right drum size. A good rule of thumb is to choose the largest drum that will fit in the curves of the workpiece. Most of the time this means I'll go right for the biggest drum I have, as shown in the drawing below. What you're looking for is a drum that matches the shape as closely as possible.

However, if the project has a lot of tight curves, it's a good idea to start with a small diameter drum to smooth the tight spots. Then switch to a larger drum to blend the contours together.

A Simple Table. Next, I've found it helpful to add a large, auxiliary table to the drill press.





This gives you a smooth worksurface and offers plenty of support for the workpiece. And a hole in the table lets you lower the drum to make better use of its entire length.

Speed Limit. The third item on the list is drum speed. A sanding drum works best when it's spinning at 1250-1500 RPM. Anything faster may cause burning.

Keep it Clean. Finally, one of the most important things to do is clean the drum regularly (inset photo, facing page). Built up dust and pitch can cause burning and shorten the life of the sleeve.

TECHNIQUE

Getting the setup right is only half the job. The other half is actually using the sanding drum. No matter what the shape of the workpiece, I use the same approach to get a smooth, even curve.

Starts with the Cut. The process for getting a smooth surface begins when you rough cut the curve. I cut as close to the layout line as possible in one smooth cut. This saves time by reducing the amount of material you have to sand away. And I try to maintain an even distance from the line.

Light Passes. Now, you're ready to start sanding. And because a sanding drum works so quickly, it's tempting to attack the high spots and grind down to the layout line.

What can happen though is that this creates large divots that are more difficult to even out. Plus, you'll clog up the drum in no time.

Instead, let the sanding drum do the work. The idea is to work up to the perfect edge with a series of light, skimming passes, as in Figure 2. Also, for the best control, move the workpiece against the rotation of the drum.

One common problem that leads to less than satisfactory results is heavy sanding. When applying too much pressure, the workpiece can catch on the sanding drum. This is what causes a wavy edge. And you can end up with burned edges on the workpiece, too.

You can apply this technique to just about any sanding task. But there are a few specific tasks that I'd like to highlight.

Removing High Spots. Sometimes, no matter how carefully I rough cut a workpiece, I can still end up with a high spot or two. You can see how to take care of this in Figure 2. Just be sure to "glide" into and away from the edge to avoid creating visible "landing" spots on the workpiece.

I've also found a couple of ways a sanding drum can come in handy when sanding straight edges. You'll find one example in the box below. For another idea, take a look at the video on the website (margin).

As you can see, there's no mystery to getting smooth, curved edges on a project. Best of all, you'll be able to master these techniques in short order. And the results can't be beat.

ShopNotes GO ONLINE EXTRAS

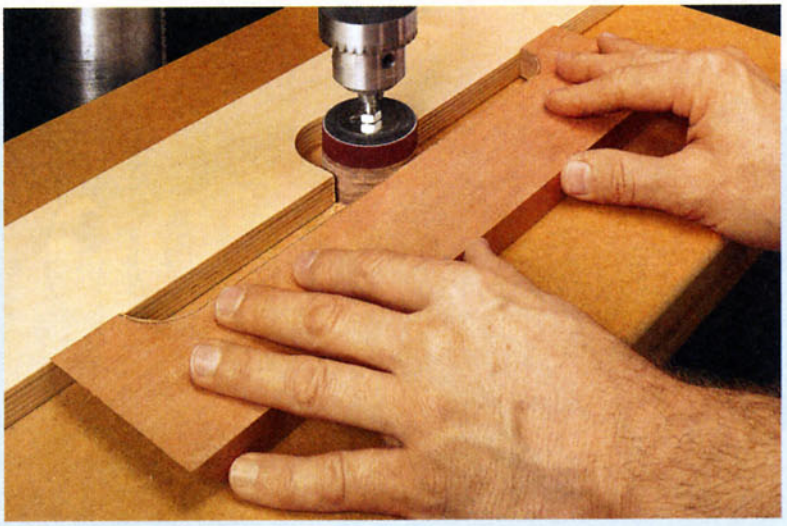
To see a video on using a fence to sand edges straight, go to ShopNotes.com

Straight Edges: Use a Fence

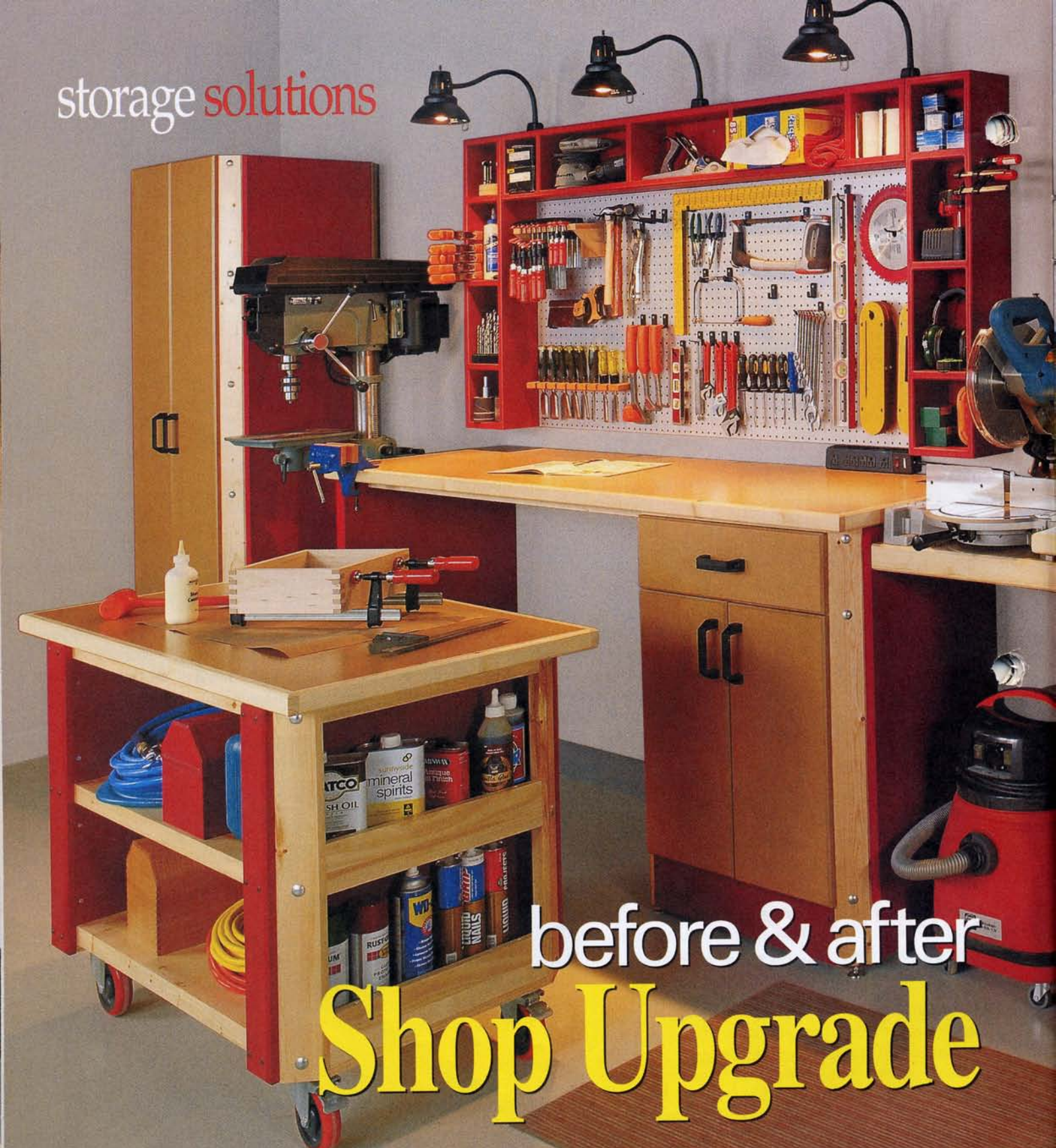
It's natural to think of using a sanding drum to smooth curves. But there are times when I turn to a sanding drum to smooth a straight edge.

In the photo at right, the task is to smooth the straight section of a cabinet base cutout. The solution is to attach a notched fence to the table to guide the workpiece. There's one thing I want to mention about the fence. It should be about twice as long as the workpiece. This way, the piece will be fully supported as you work from one end to the other.

Set the fence so the drum is exposed to the final depth of the cutout. Then take light passes until both ends touch the fence and the drum stops removing material.



▲ ***Sanding Edges Straight.*** *Clamp a long, notched fence to the drill press table to straighten and smooth long cutouts.*

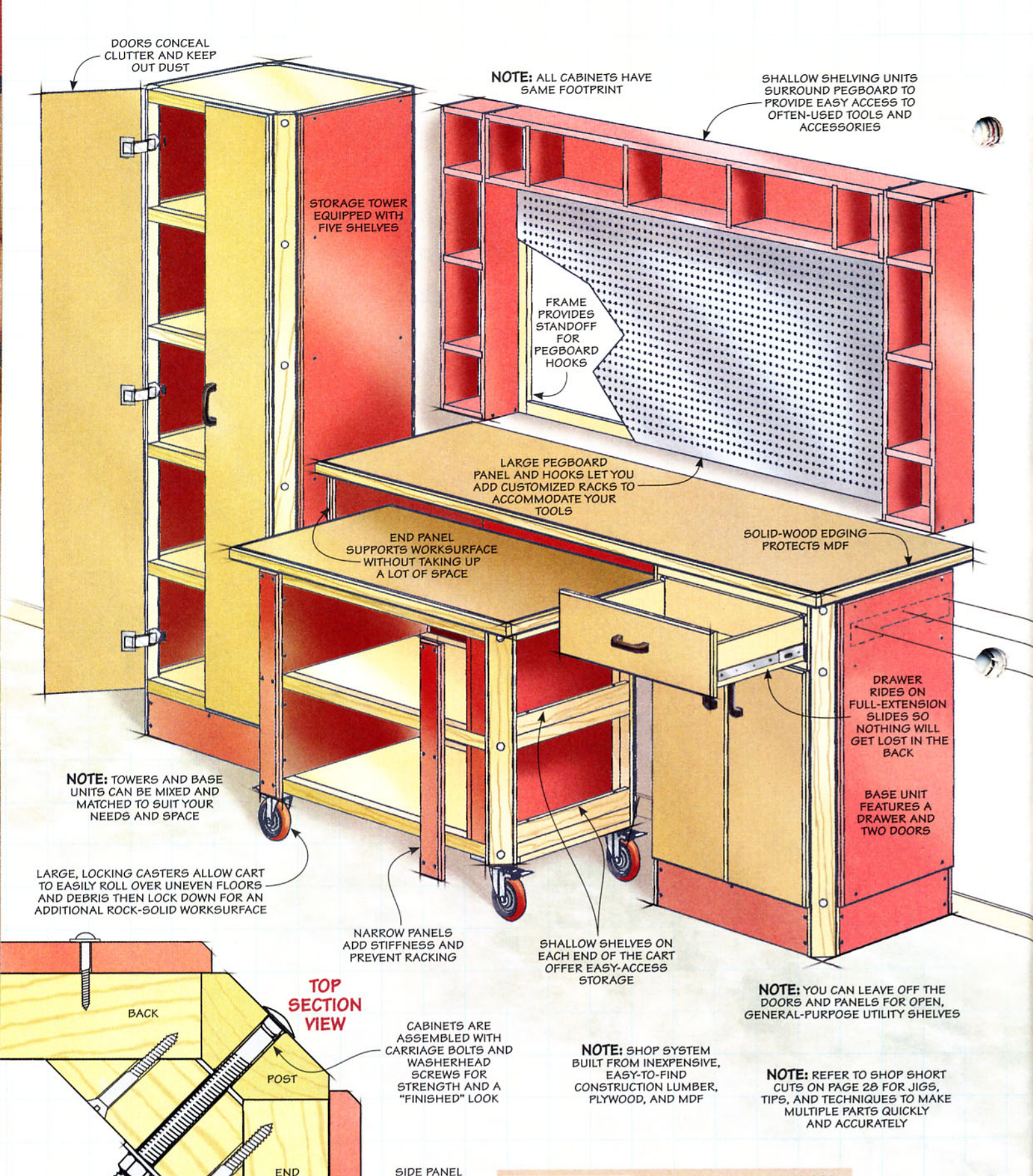


before & after
Shop Upgrade

Organization is the key to making any shop work well, no matter what the size. And if your shop looks anything like the photo at right, it could use some additional storage space. (I know mine could.)

That's where this shop system comes in. It's obvious there's a lot of storage space packed into this wall system. What's not so apparent is its easy-to-build design. Each unit is assembled from standardized components. And it's made from inexpensive, easy-to-find construction lumber, MDF, and plywood. This way, you can build what you want and add on down the road.

With basic materials and hardware, you can create a low-cost, custom shop storage system.

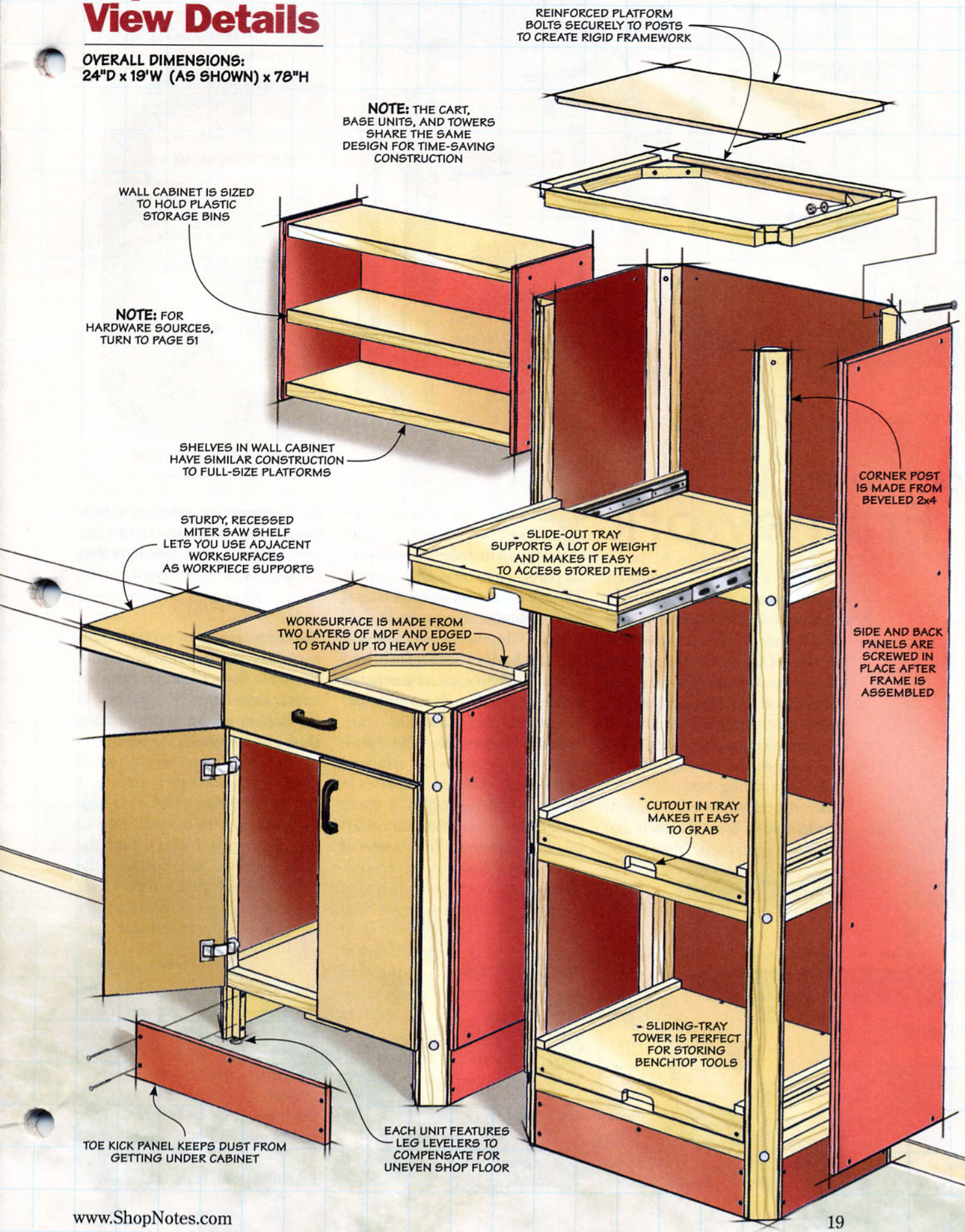


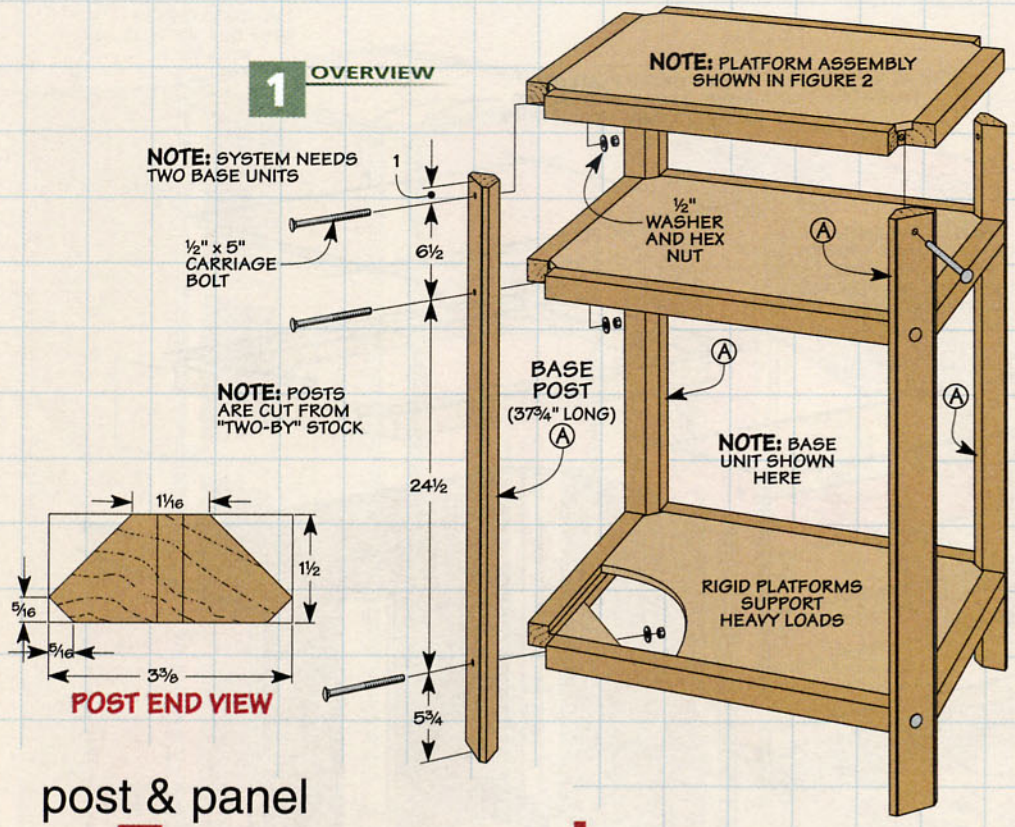
ShopNotes GO ONLINE EXTRAS

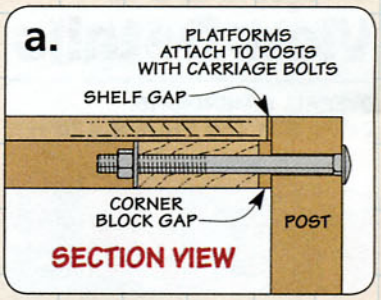
To view a video overview of this project and to download a free cutting diagram, go to:
www.ShopNotes.com

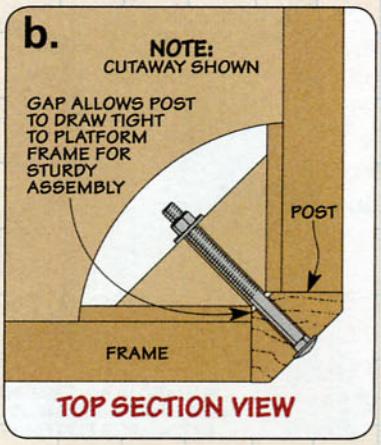
Exploded View Details

OVERALL DIMENSIONS:
24"D x 19"W (AS SHOWN) x 78"H









post & panel

Framework

Creating a large, customized storage system may seem like a daunting task. The key is to find ways to speed up and simplify the job. One of the easiest ways to do this is to use a common construction method that standardizes the parts. This way, you can mix and match the components into short base cabinets, tall storage towers, and even a rolling cart.

Before getting started, it's a good idea to make a list of the parts that you're going to need. (Take a look at the materials list on page 27 for guidance.) Then it's just a matter of setting up to make all the identical parts at one time. Don't worry, it's easy to add on sections later if you need more storage space.

Now, I'll give you an overview of the basic components and assembly. Then you can use that as a framework for the base units and towers you plan to build.

Basic Framework. The "skeleton" that provides the structure of the main cabinets is shown in Figure 1. In a nutshell, each frame is made up of four posts connected by rigid platforms. The corners of the platforms are notched to lock tight against the posts (Figure 1b). This creates a rigid assembly that can support a lot of weight.

POSTS

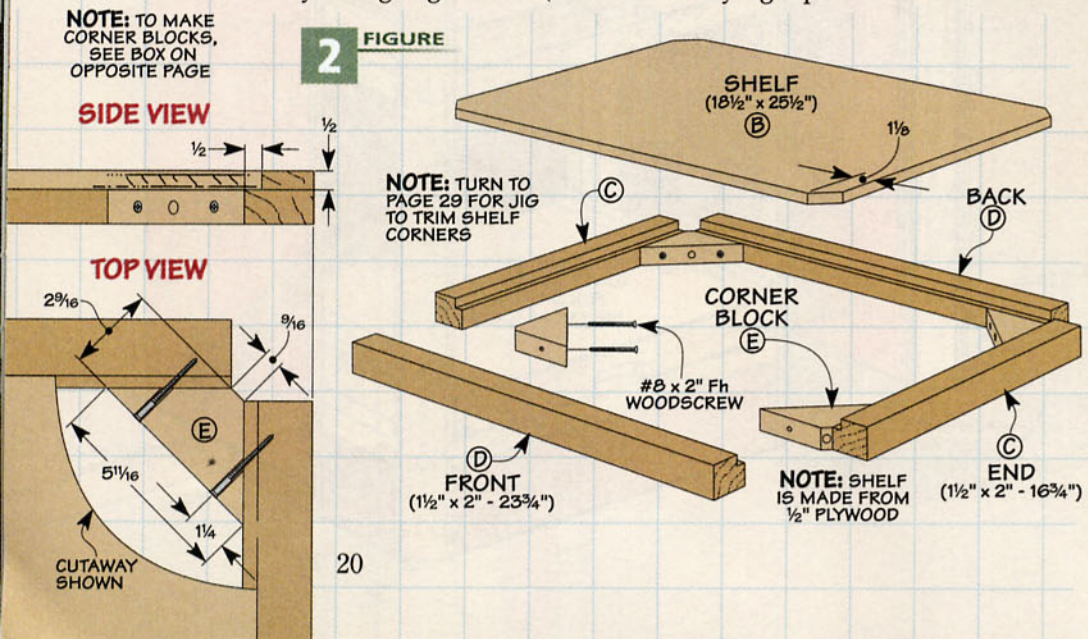
The corner posts are cut from ordinary 2x4s. The faces are beveled to allow the posts to fit into the platforms, as in Figure 1b. The box at the bottom of the opposite page shows how to make the posts.

The only other detail you'll need to take care of is drilling a few holes. These hold the carriage bolts that anchor the platforms to the corner posts. You'll find the hole locations for building the base units in Figure 1. Figure 3 on the next page gives the details for the two larger storage towers.

PLATFORMS

The second component of the framework is the platform. These assemblies act as the cabinet tops, bottoms, dividers, and shelves in the three cabinet types.

Shelf. You can see the platform structure in Figure 2. Each one starts with a plywood shelf. The shelf is then wrapped with a rabbeted front, back, and ends.



Now, there are a couple things I want to point out. First, the rabbeted pieces don't extend the full length and width of the shelf, as illustrated in the Top View of Figure 2. What this does is create a notch on each corner. This notch is where the posts fit and give the cabinets their rigidity.

Second, each corner of the shelf is clipped, as shown in Figure 2. I cut the corner back a bit to create a slight gap. The reason for the gap is to prevent the post from "bottoming out" in the notch and not drawing tight against the front, back, and end pieces.

The exact size of the cut isn't critical, I just wanted a way to trim the corners quickly. If you take a look at page 29, you'll find a pair of jigs that will let you do the job with a table saw or circular saw.

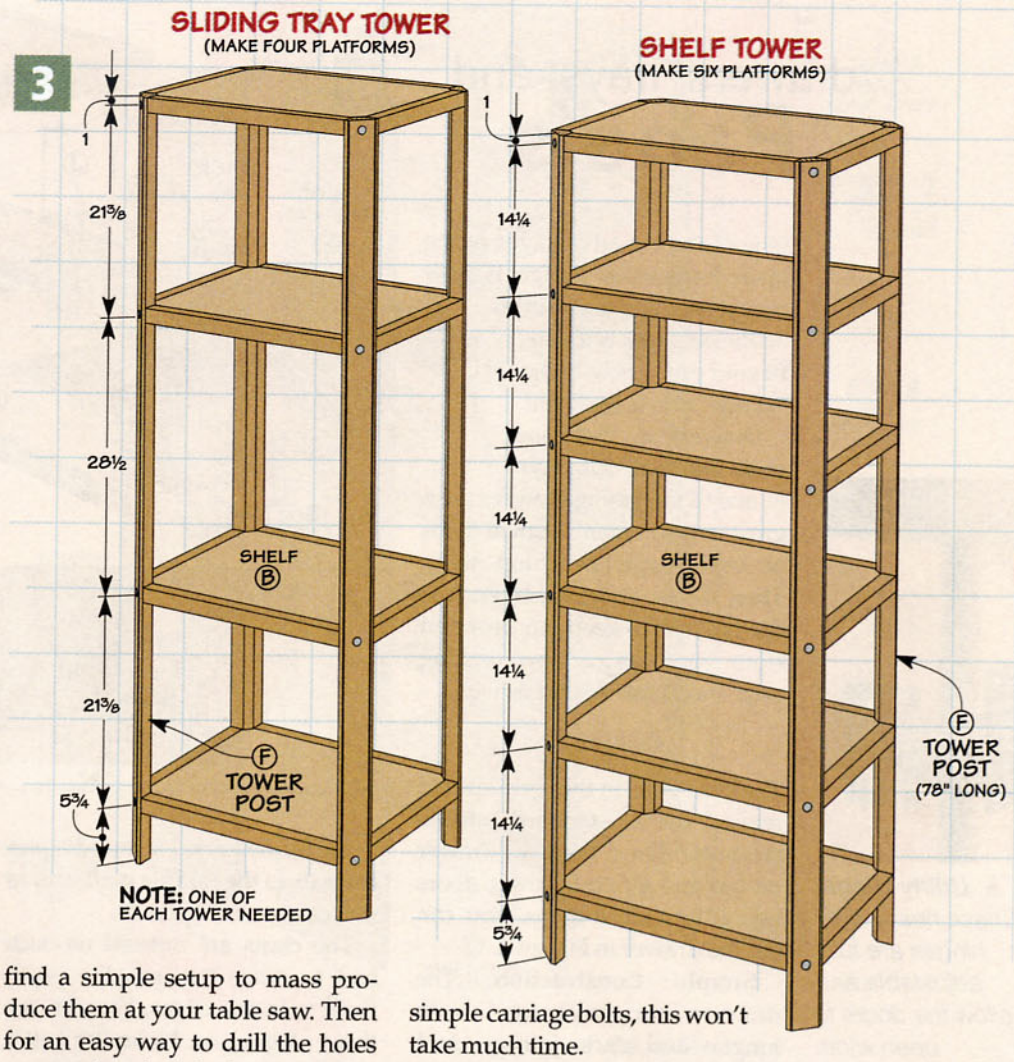
Corner Blocks. In order to join the posts to the platforms, you'll need to make and attach some corner blocks. They're glued and screwed to the rabbeted support pieces, as shown in Figure 2.

The corner blocks also provide a flat bearing surface to draw the post into the notch with a carriage bolt, washer, and nut (Figure 1b).

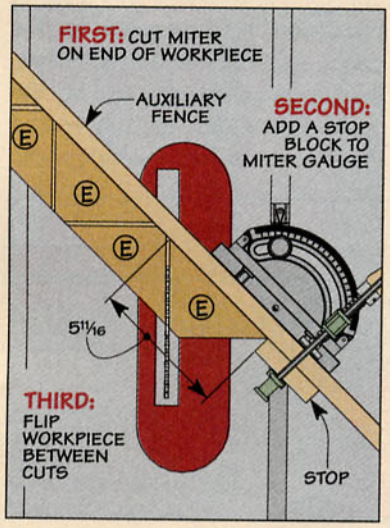
For a project this size, you're going to need quite a few corner blocks. So in the box below, you'll find a simple setup to mass produce them at your table saw. Then for an easy way to drill the holes accurately, take a look at page 28.

Assembly. After completing all the posts and platforms, you're ready to assemble each cabinet frame. And since you're using simple carriage bolts, this won't take much time.

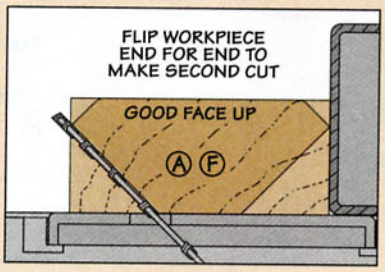
You could leave the assemblies as is and use them as basic ultility shelves. But you'll get more out of them if you add the other features you'll see on the next pages.

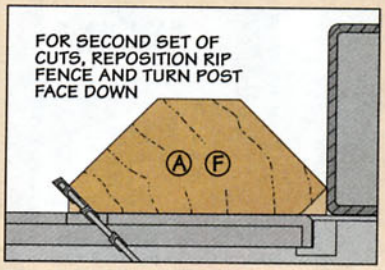


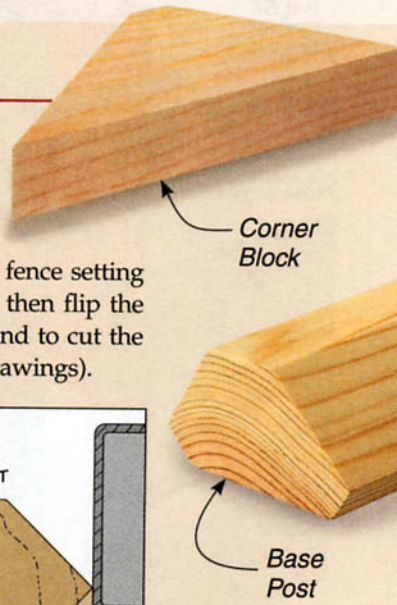
Two Ways to Make Angled Cuts



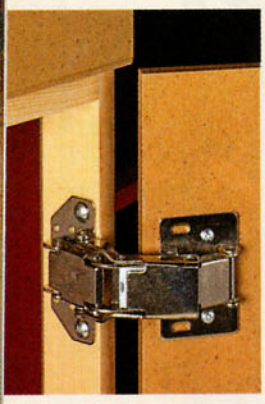
Accuracy and speed is the name of the game when making identical parts. And things can get tricky when you throw in angles. But really it's just a matter of having a good setup. The drawing at left is a good example of this for making the corner blocks. Then to bevel the posts, sneak up on the rip fence setting for the first cut and then flip the workpiece end for end to cut the other edge (lower drawings).







drawers, trays, and Panels



▲ ***Utility Hinge.*** *These heavy-duty hinges are fully adjustable and allow the doors to open wide.*

One of the big advantages of the open framework design is how easy it is to add accessories. So the next task is to outfit your cabinets with the "extras" you'll find here.

Drawers in the base units and pull-out trays in one of the storage towers are a great way to organize small items or even large, benchtop tools. Then doors and panels enclose the cabinets to keep out dust and store items out of view, making your shop look cleaner as well.

DRAWERS

The base units in the shop system remind me of standard kitchen cabinets. They have a drawer on top and a pair of lower doors below for larger items. You can see the drawer in Figure 4.

Simple Construction. The drawers are constructed with tongue and dado joinery. And they ride on full-extension, metal drawer slides. To attach the slides to the framework, I screwed a pair of cleats to the middle platform, as you can see in Figure 4b.

The cleats are mitered on each end to nestle between the posts, flush with the edges. You can see this in Figure 4a. Note: For better access when attaching the cleats, you can remove the top platform.

False Fronts. To conceal the metal slides and close off the opening, I attached a false front to the drawer. It's simply cut from MDF and is chamfered to soften the edges and keep them from chipping, as detailed in Figure 5.

DOORS AND PANELS

I mentioned earlier that you could use the cabinets as open shelves. But in a workshop, closing them in makes a lot of sense. And with this system, it's as easy as cutting and attaching MDF panels.

Doors. Let's stay with the base unit for the moment. In Figure 5, you'll find the dimensions for the doors. And like the drawer fronts, they're chamfered and overlay the opening between the drawer and lower platform. In the margin photo

FIGURE 4

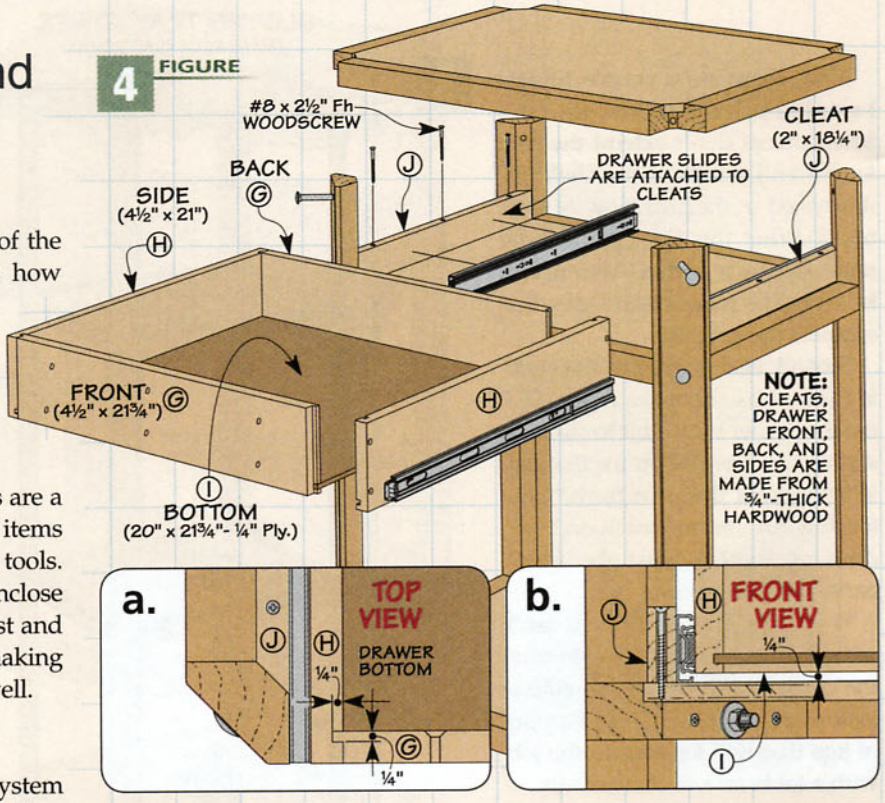
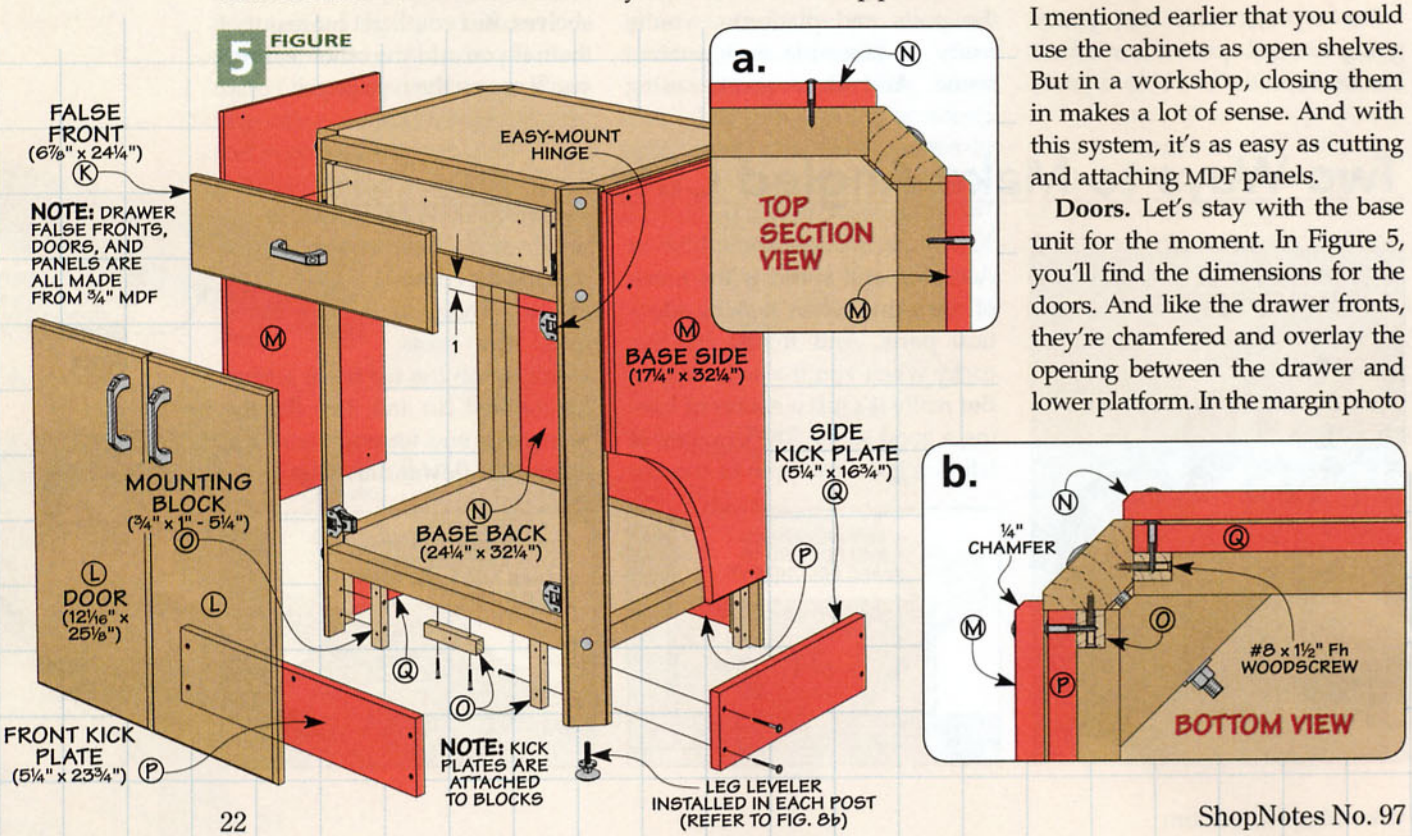


FIGURE 5



on the opposite page, you can see the heavy-duty hinges I used to mount them. They don't require mortises and are easily adjustable.

The doors for the storage tower are the same width as those for the base unit, just longer (Figure 6). Three hinges on each door are required to support these doors.

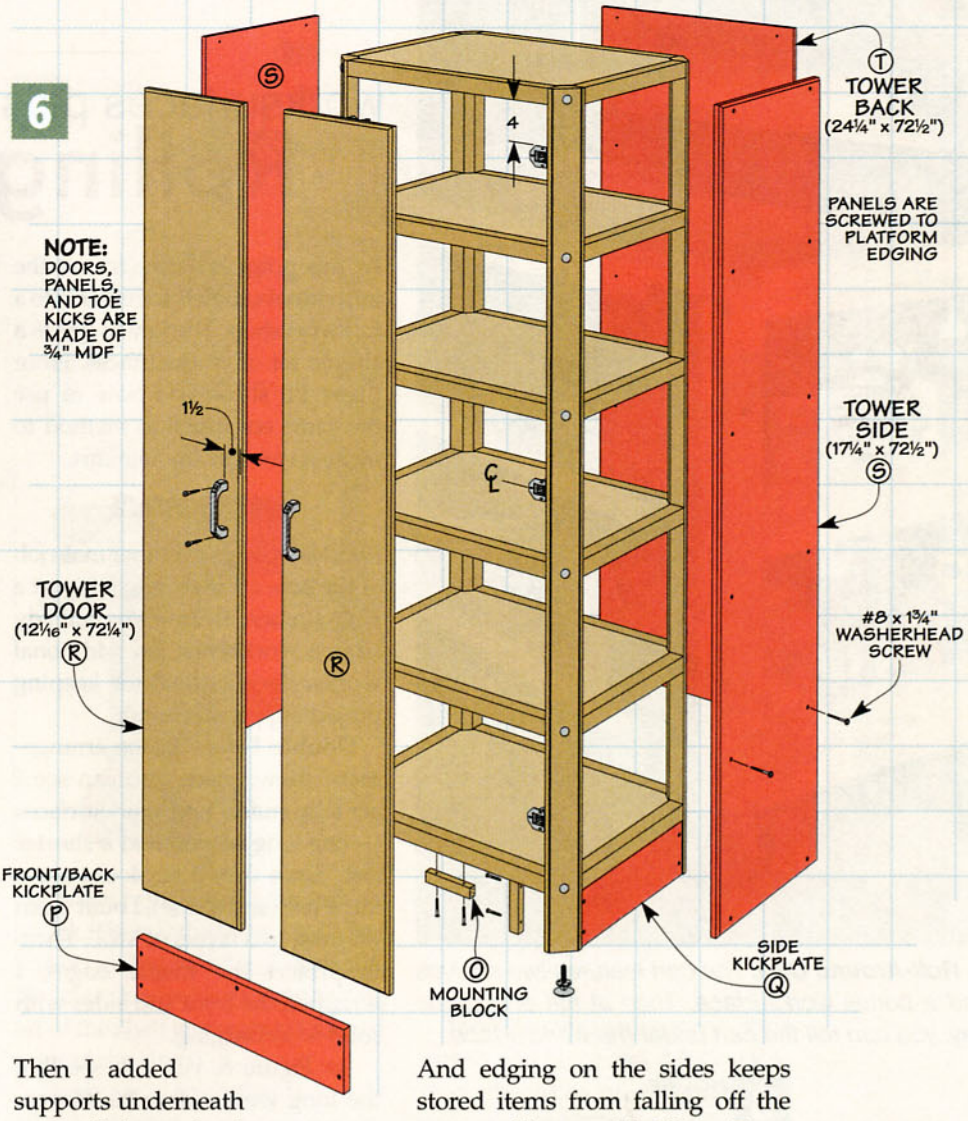
Panels. The panels that enclose the sides and back of the cabinet are made the same way as the doors (Figures 5 and 6). They're attached with washerhead screws that are driven into the edges of the platforms. These screws provide a wide bearing surface and won't split or deform the MDF.

Toe Kick Plate. To close off the bottom of the cabinets and give them a clean, finished look, I added kick plates all around, as in Figure 6. They're set flush with the posts. To attach them, I first made a set of mounting blocks for the posts and lower platform. Then you can install the kickplates.

TRAYS

In one of the storage towers, I left off the doors and made a set of trays to hold larger tools and supplies. This way, it's much easier to store and remove bulky benchtop tools or access items at the back.

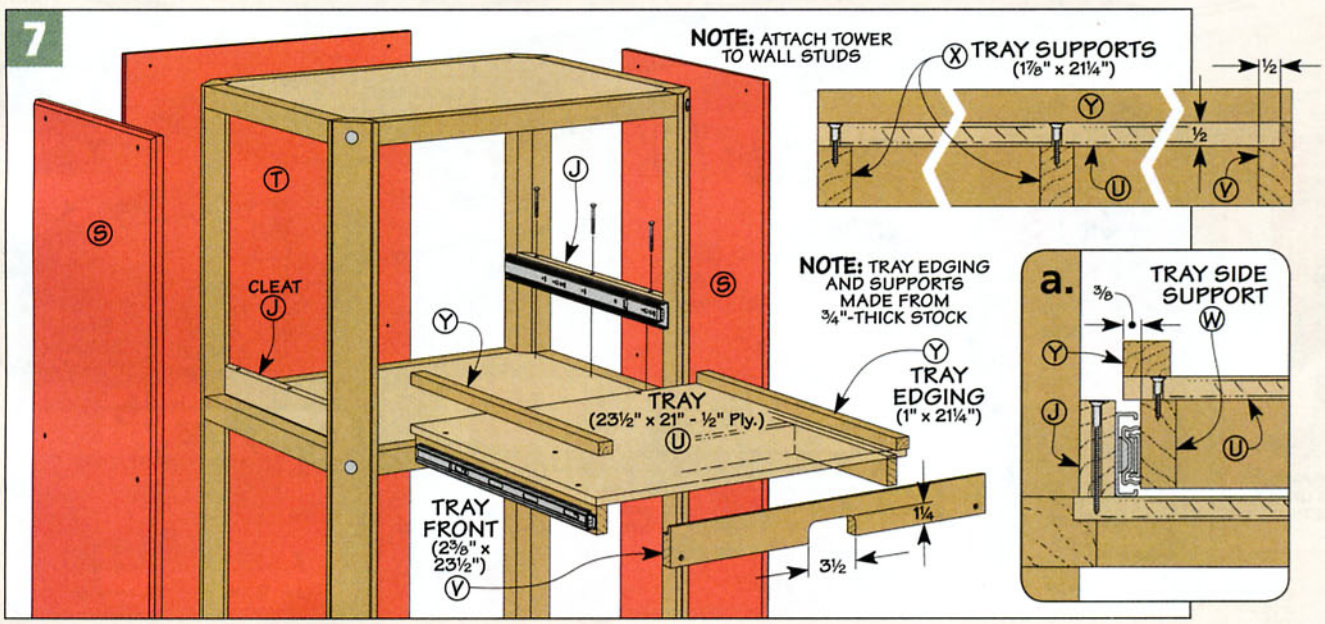
Reinforced Construction. The trays are basic plywood panels.



Then I added supports underneath to handle heavy loads, as you can see in Figure 7. The front support is rabbeted to conceal the plywood edge and has a cutout on the bottom edge to serve as a pull.

And edging on the sides keeps stored items from falling off the trays, as illustrated in Figure 7a.

The trays are supported by heavy-duty drawer slides and are added to the tower using the same cleat system as the drawers.



▲ ***Roll-Around Cart.*** *The cart features two shelves and a bonus worksurface. Then at the end of the day, you can roll the cart under the worksurface.*

worksurfaces plus a
Rolling Cart

At this point, it's time to put the individual cabinets together into a full workshop. The key to this is a simple set of worksurfaces. From there, I'll show you how to use the same construction method to make a versatile, mobile cart.

WORKSURFACE

Besides storage, the other main job of the base cabinets is to support a worksurface. Even if you already have a workbench, an additional worksurface is ideal for keeping project supplies at hand.

Double Layer. In the arrangement shown here, you can see I actually made two worksurfaces — one long section and a shorter one. Since they'll no doubt see a lot of use (and abuse), I built them up from two layers of MDF. Then, to protect the fragile edges, I wrapped the front and sides with solid-wood edging.

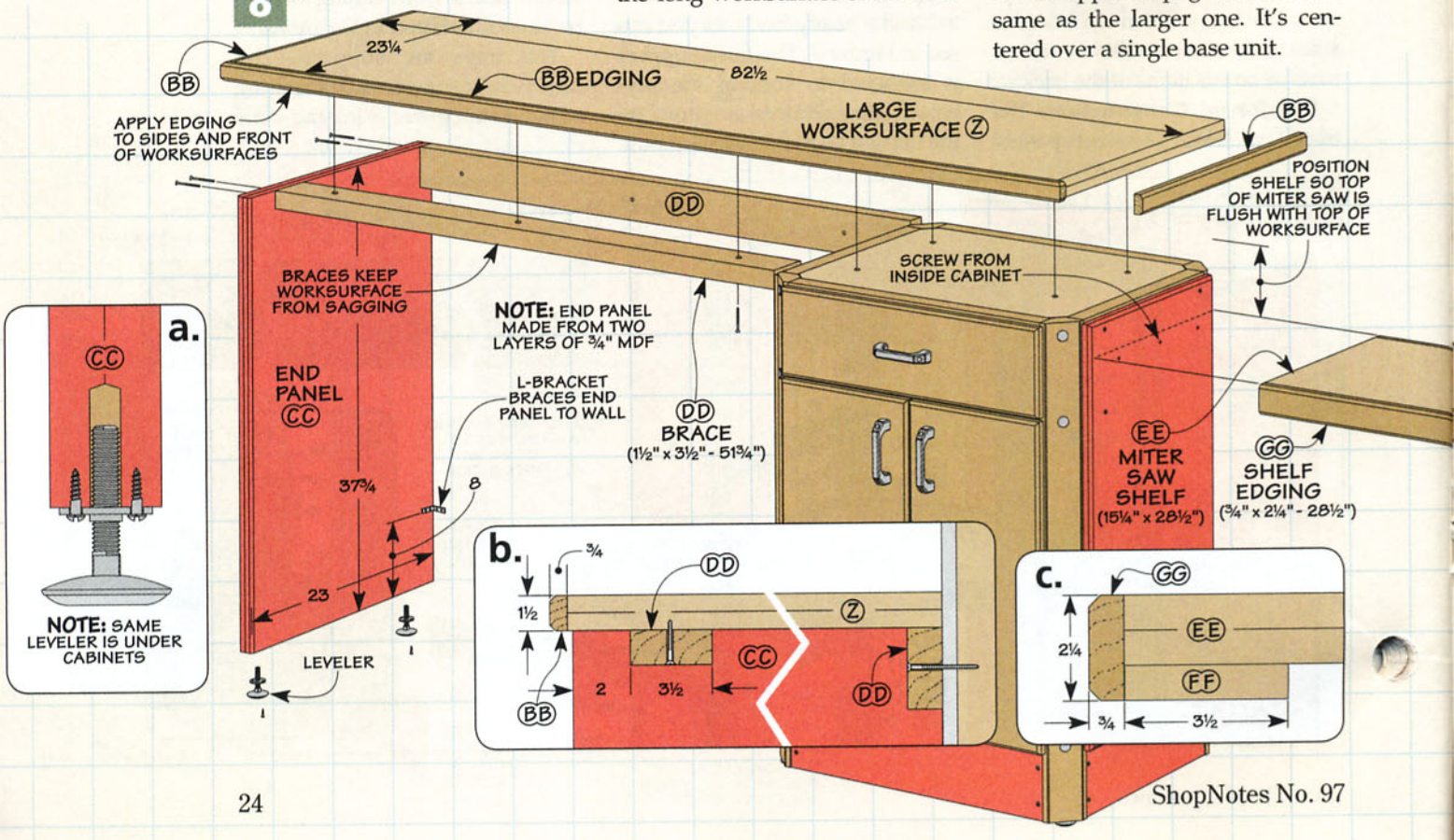
In Figure 8, you can see that the long worksurface starts over one base unit and stretches across to a narrow end panel. The space between the cabinet and end panel allows you to tuck a cart or other tools under the worksurface. This is very handy if you plan to put this shop system in a garage.

Braces. To keep the suspended worksurface from sagging over time, I cut and fit a pair of braces from some "two-by" lumber. If you look at Figure 8b, you'll see the braces aren't mounted the same way. The front brace is attached "on the flat" to the worksurface while the rear brace is on edge.

There are a couple of reasons for this. First, the lower profile of the front brace provides clearance for the cart. And mounting the rear brace on edge lets you attach it to the wall for even more support. Just be sure to drive the screws into wall studs for the most strength.

Small Worksurface. The smaller worksurface shown on the bottom of the opposite page is built the same as the larger one. It's centered over a single base unit.

FIGURE 8



Miter Saw Shelf. There's one other detail in Figure 8 that's easy to overlook. And that's the miter saw shelf that separates the two base units. It's positioned so that the saw table is flush with the worksurfaces on either side. This way, you can use them for added workpiece support.

The construction of this shelf has one main difference from the larger worksurfaces. I added a set of supports to the front and back edge. This provides additional stiffness to resist sagging under the weight of a miter saw, as illustrated in Figure 8c.

ROLL-AROUND CART

Completing the worksurfaces wraps up the work on the fixed parts of the shop system. There's just one other large piece to make — and that's the cart.

Familiar Construction. As you can see in Figure 9, the cart shares the same basic construction as the cabinet pieces. The only change is that the cart platforms are a little longer. After fastening the three platforms to the posts, you can then add a couple of plates for mounting the casters, as shown in Figures 9a and 9b.

Shelves. On each end of the cart I created a pair of shallow shelves, as shown in Figure 10. The shelves are made from a pair of sides and a back. Then at the front, I installed a cleat, as illustrated in Figure 10a. The cleat keeps items from falling off of the shelf as the cart is moved around the shop.

There are a few other pieces to add. I attached narrow cart sides to each post. These provide additional rigidity to the cabinet, just like the side and back panels in the other cabinet pieces.

Top. The final component of the cart to add is the top. Making this piece should be pretty familiar by now. It's just like the worksurfaces you made earlier. Since the cart is meant to be used all around the shop, I wrapped the entire top with solid-wood edging.

FIGURE 9

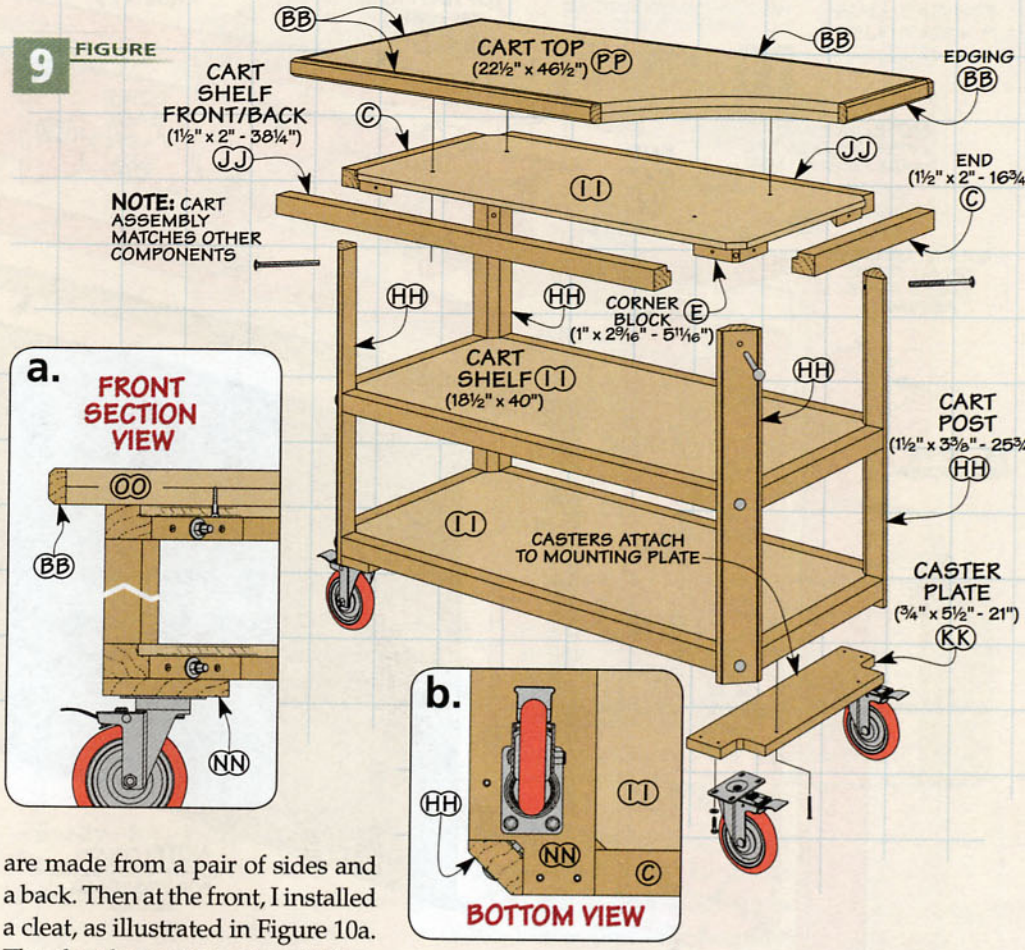
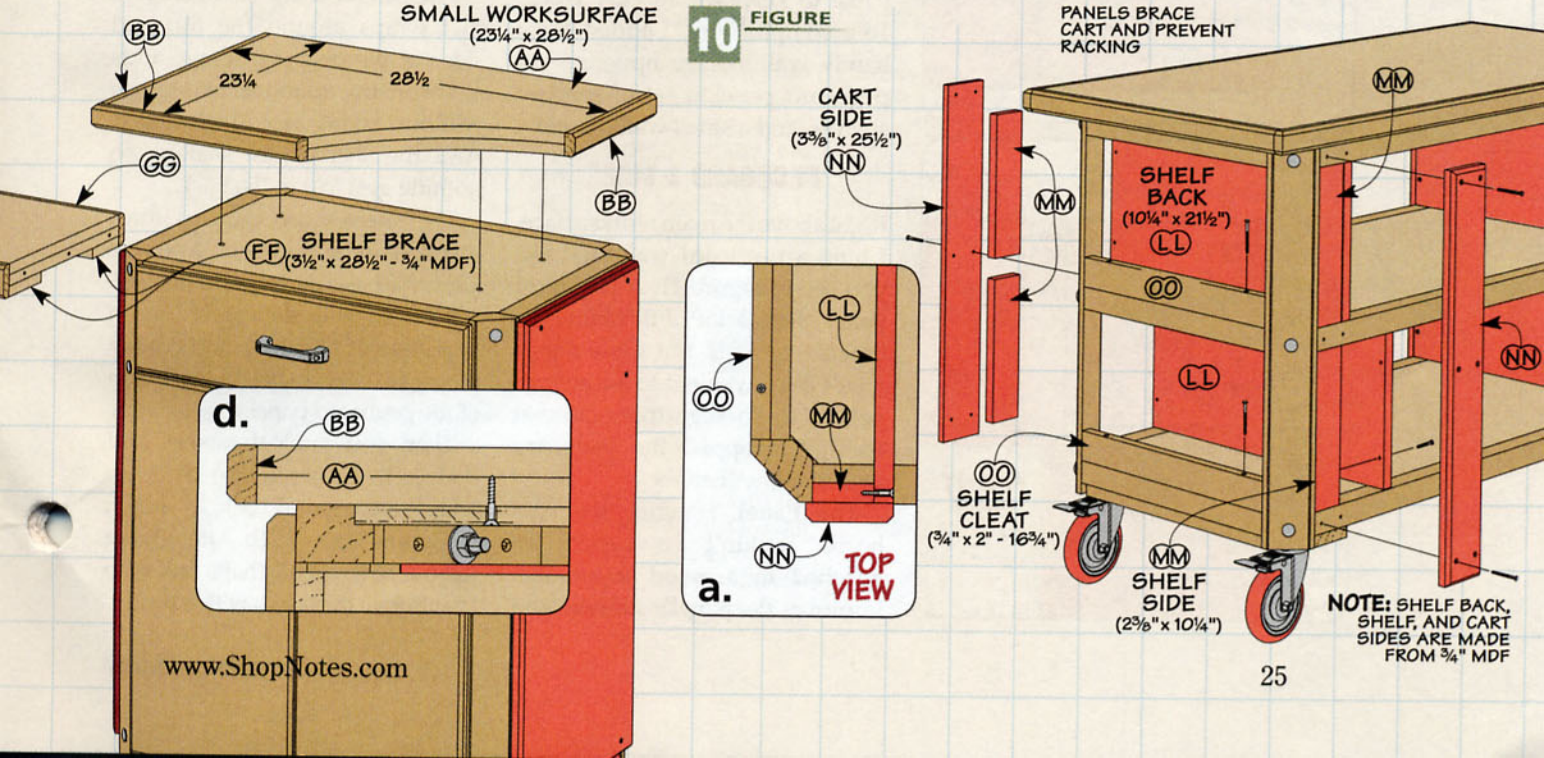
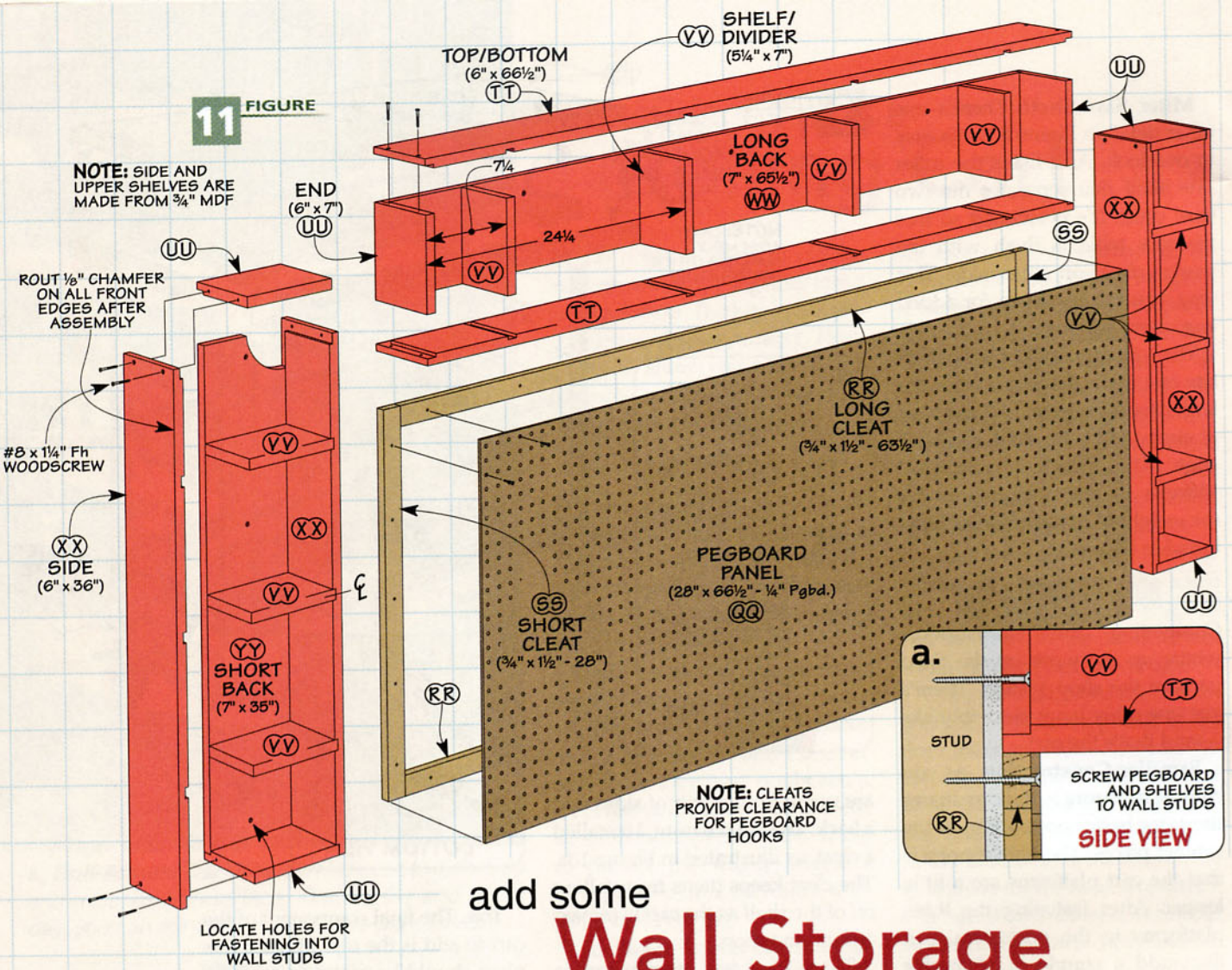


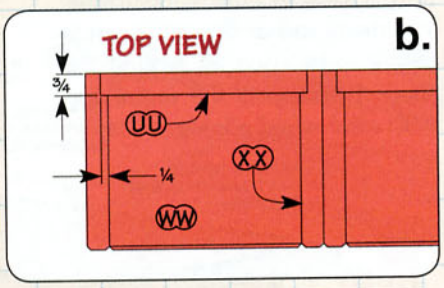
FIGURE 10

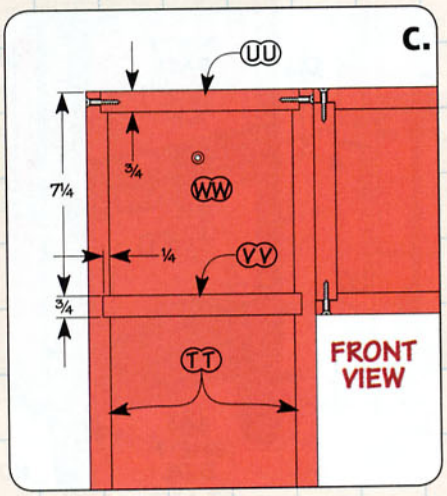




add some

Wall Storage





There's no doubt that the main components of this shop can hold a lot of tools and equipment. But there are some smaller tools that I like to keep within easy reach. To accomplish this, I added some handy wall storage options — a pegboard panel, a set of shallow shelves, and a small wall cabinet.

PEGBOARD & MORE

Right above the main worksurface, I built a pegboard wall rack like you see in Figure 11. A pegboard panel offers a lot of flexibility for organizing tools. But some things aren't as convenient to hang from pegboard. To keep these close at hand, I wrapped the pegboard with shallow shelves.

The Panel. Hanging the pegboard couldn't be easier. It's attached to a wood frame that improves the panel's stiffness and provides clearance for adding hooks, as shown in Figure 11a. Just be sure to anchor the panel to several wall studs for a secure hold.

The Shelves. The set of shelves that wraps around the top and sides of the pegboard panel adds a surprising amount of storage without taking up much space. And the shelves are shallow so nothing gets lost in the back.

The shelves are built in three easy-to-handle sections. And the joinery is basic dadoes and rabbets.

I started with the upper section of shelves. It's long top and bottom pieces are sized to match the length of the pegboard panel.

Then you can cut rabbets and dadoes in each piece to hold the ends, dividers, and back, as shown in Figures 11a and 11b. After gluing up the shelves, all that's left is to chamfer all the edges with a router.

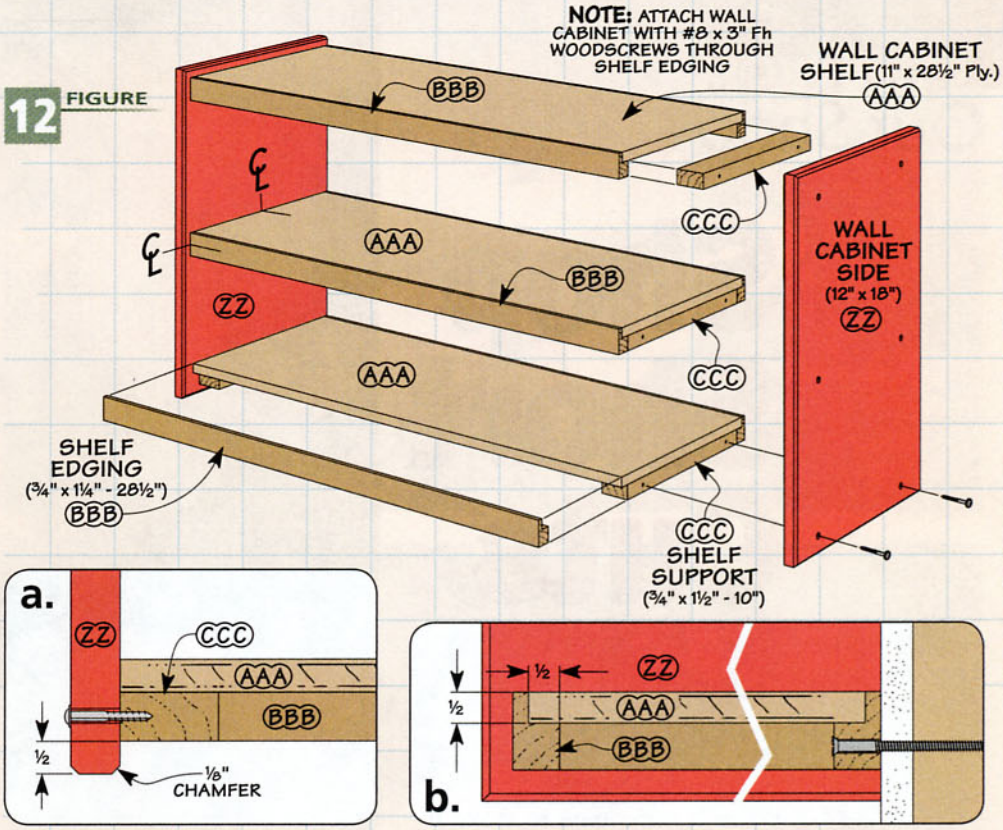
Construction on the side shelves goes just the same. The only difference is that the side pieces are cut to match the combined height of the pegboard and upper shelf.

WALL CABINET

The other wall storage unit, and the final section of this workshop system, is the small wall cabinet you see in Figure 12. I use it as my personal hardware store since the shelves are just right for holding those inexpensive, plastic hardware storage bins.

Although this piece is small compared to the others, I wanted the design to match. The MDF sides are really just smaller versions of the side panels on the base and tower units you made earlier.

Shelves. You can see how the shelves are built in Figures 12 and 12b. They're somewhat similar to the platforms — without the posts. Solid-wood edging and end supports are added to a plywood panel. Because the cabinet is small, the shelves are simply screwed to the sides, as shown in Figure 12a.



Ready for Work. When all the components are completed and installed, you can start finding new homes for all your stuff. And even though it's a big project, you'll find it makes it easier to enjoy the time in your shop when you know everything is in its place. You might find other spots in your home (like the laundry room or basement) that could use some organization, too.

Materials & Hardware

POST & PANEL COMPONENTS		
A	Base Posts (8)	1½ x 3⅜ - 37¾
B	Shelves (16)	18½ x 25½ - ½ Ply.
C	Ends (38)	1½ x 2 - 16¾
D	Fronts/Backs (32)	1½ x 2 - 23¾
E	Corner Blocks (76)	2⁹⁄₁₆ x 5¹¹⁄₁₆ - 1
F	Tower Posts (8)	1½ x 3⅜ - 78
ACCESSORIES		
G	Drawer Fronts/Backs (4)	¾ x 4½ - 21¾
H	Drawer Sides (4)	¾ x 4½ - 21
I	Drawer Bottoms (2)	20 x 21¾ - ¼ Ply.
J	Cleats (14)	¾ x 2 - 18¼
K	Drawer False Frts. (2)	6⅞ x 24¼ - ¾ MDF
L	Base Doors (4)	12⅛ x 25⅛ - ¾ MDF
M	Base Sides (4)	17¼ x 32¼ - ¾ MDF
N	Base Backs (2)	24¼ x 32¼ - ¾ MDF
O	Mounting Blocks (40)	¾ x 1 - 5¼
P	Frt./Bk. Kick Plates (8)	5¼ x 23¾ - ¾ MDF
Q	Side Kick Plates (8)	5¼ x 16¾ - ¾ MDF
R	Tower Doors (2)	12⅛ x 72¼ - ¾ MDF
S	Tower Sides (4)	17¼ x 72½ - ¾ MDF
T	Tower Backs (2)	24¼ x 72½ - ¾ MDF
U	Trays (3)	23½ x 21 - ½ Ply.
V	Tray Fronts (3)	¾ x 2⅜ - 23½
W	Tray Side Supports (6)	¾ x 1⅞ - 20½
X	Tray Mid./Bk. Supports (6)	¾ x 1⅞ - 21¼
Y	Tray Edging (6)	¾ x 1 - 21¼

ADD-ONS		
Z	Lg. Worksurface (1)	23¼ x 82½ - 1½ MDF
AA	Sm. Worksurface (1)	23¼ x 28½ - 1½ MDF
BB	Edging (1)	¾ x 1½ - 350 rgh.
CC	End Panel (1)	23 x 37¾ - 1½ MDF
DD	Braces (2)	1½ x 3½ - 51¾
EE	Miter Saw Shelf (1)	15¼ x 28½ - 1½ MDF
FF	Shelf Braces (2)	3½ - 28½ - ¾ MDF
GG	Shelf Edging (1)	¾ x 2¼ - 57 rgh.
ROLLING CART		
HH	Cart Posts (4)	1½ x 3⅜ - 25¾
II	Shelves (3)	18½ x 40 -½ Ply.
JJ	Front/Back (6)	1½ x 2 - 38¼
KK	Caster Plates (2)	5½ x 21 - ¾ MDF
LL	Shelf Back (4)	10¼ x 21½- ¾ MDF
MM	Shelf Sides (8)	2⅜ x 10¼ - ¾ MDF
NN	Cart Sides (4)	3⅜ x 25½ - ¾ MDF
OO	Shelf Cleat (4)	¾ x 2 - 16¾
PP	Top (1)	22½ x 46½ - 1½ MDF
WALL STORAGE		
QQ	Pegboard Panel (1)	28 x 66½ - ¼ Pgbd.
RR	Long Cleats (2)	¾ x 1½ - 63½
SS	Short Cleats (2)	¾ x 1½ - 28
TT	Top/Bottom (2)	6 x 66½ - ¾ MDF
UU	Ends (6)	6 x 7 - ¾ MDF
VV	Shelves/Dividers (10)	5¼ x 7 - ¾ MDF
WW	Long Back (1)	7 x 65½ - ¾ MDF

XX	Sides (4)	6 x 36 - ¾ MD
YY	Short Backs (2)	7 x 35 - ¾ MD
ZZ	Wall Cabinet Sides (2)	12 x 18 - ¾ MD
AAA	Wall Cabinet Shelves (3)	11 x 28½ - ½ Pl
BBB	Shelf Edging (6)	¾ x 1¼ - 28½
CCC	Shelf Supports (6)	¾ x 1½ - 1

- (76) ½" x 5" Carriage Bolts
- (76) ½" Flat Washers
- (76) ½" Hex Nuts
- (204) #8 x 1¾" Washerhead Screws
- (152) #8 x 2" Fh Woodscrews
- (166) #8 x 1½" Fh Woodscrews
- (36) #8 x 2½" Fh Woodscrews
- (2) #8 x 3" Fh Woodscrews
- (5 pr.) 20" Full-Extension Drawer Slides
- (8) 5¼" Handles w/Screws
- (14) Easy-Mount Hinges w/Screws
- (32) #8 x 1¼" Fh Woodscrews
- (18) Leg Levelers
- (18) ⅜" T-Nuts
- (6) #8 x 2½" Fh Woodscrews
- (4) 5" Locking Swivel Casters
- (16) #14 x ¾" Sheet Metal Screws

Shop Short Cuts

Solid Support. *This simple jig holds a corner block in precise position for drilling.*

3-in-1 Drilling Jig

When it came time to make the corner blocks for the workshop shelves on page 16, I needed a way to drill all of the blocks quickly and without a lot of setup. Let's face it, this is one of those tasks that takes a lot of time, so the goal is getting this done as quickly as possible.

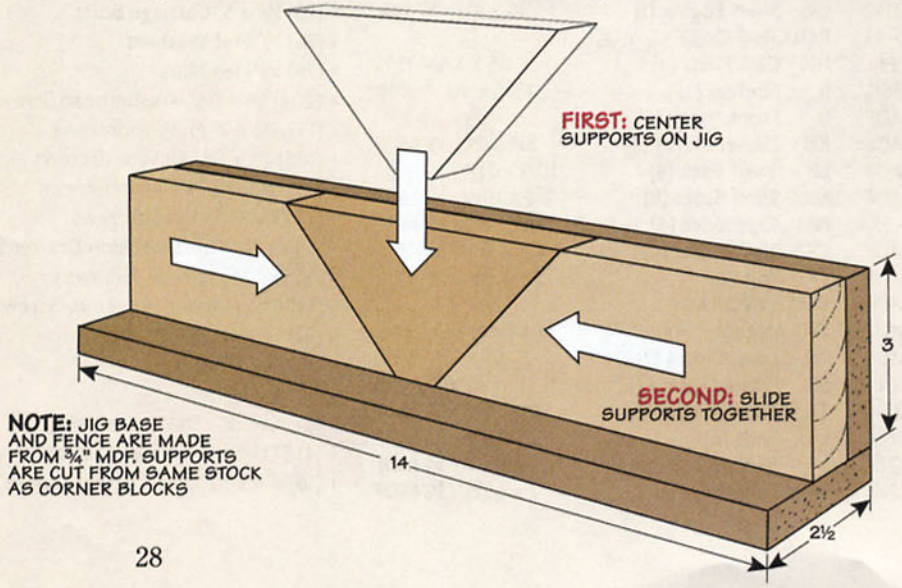
The challenge is keeping the triangular blocks upright while drilling the holes used to attach the blocks and assemble the cabinets.

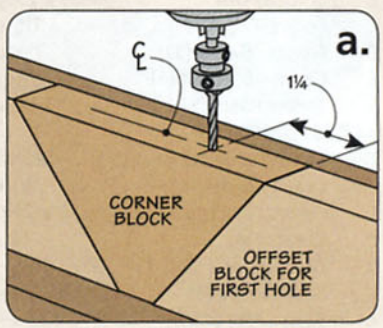
The Jig. The answer is the simple jig you see here. It's basically an L-shaped fence with a pair of angled supports to hold the block in place. I made the fence from two scraps of MDF. To position the supports, I just centered a corner block on the fence and glued a pair of angled support pieces on either side of the block, as shown in the drawing below.

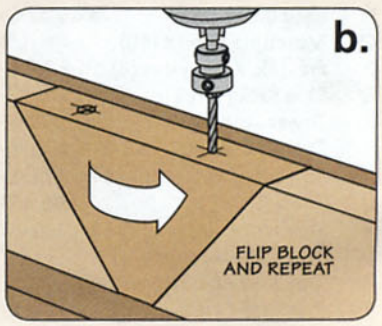
Using the Jig. Using the jig is a snap. All you need to do is clamp the fence to the drill press so you can drill a pilot hole on one end of the corner block (detail 'a'). Then just flip the block end for end and drill the second hole (detail 'b').

After you've completed all the pilot holes for the mounting screws, simply reposition the jig so the block is centered under the bit (main photo). Then drill a centered through hole in each block for the carriage bolt, using a ½"-dia. drill bit.

With this handy jig, I think you'll find you can make short work of a tedious job.







Two Ways to Trim Corners

There are just as many corners to cut on the shelves for the cabinets on page 16 as there are corner blocks to drill. So again, I needed a quick way to trim the corners identically for all of the plywood shelves.

Table Saw Sled. To do this at my table saw, I built a sled. It's just a plywood base with two fences that cradles the shelf at the correct angle and position. Since some of the plywood shelves were larger than the top of my table saw, I made the base extra wide to keep each shelf from tipping as I cut it.

You'll need to position the runner on the bottom of the plywood and then trim the plywood.

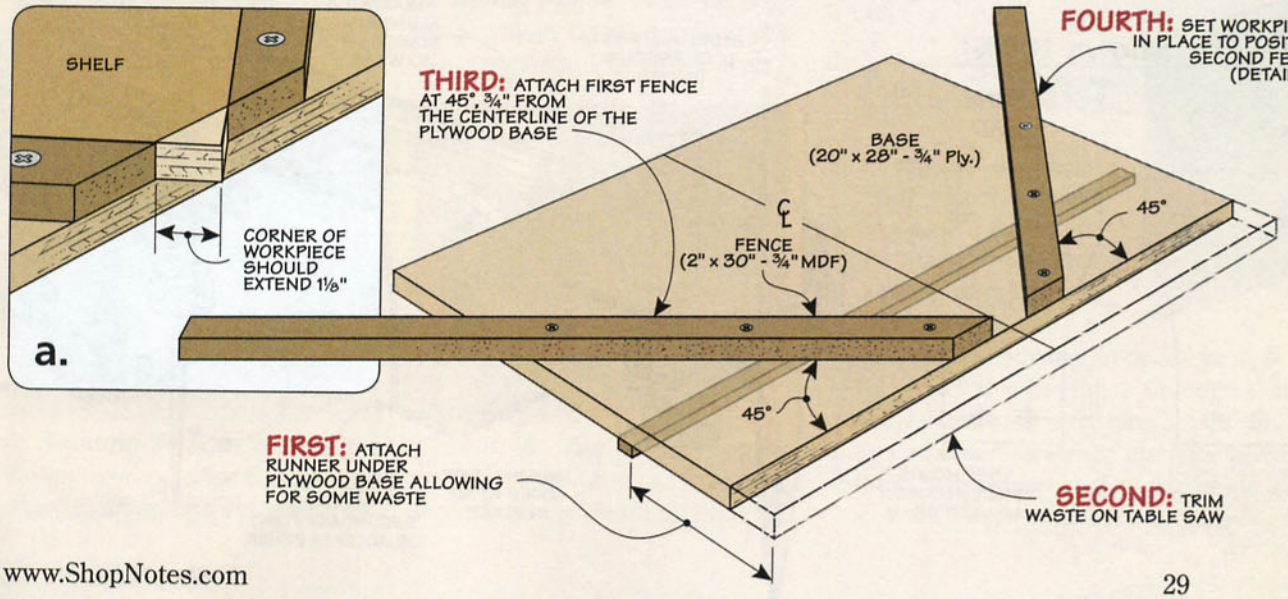
Fences. To position the shelf correctly, you'll need to attach a strip of MDF on the top of the sled, as shown in the drawing below. To locate the second fence, lay one of the shelves against the first fence with the corner extending (detail 'a'). Finally, fasten the second fence along the edge of the workpiece to hold the shelf in position.

With the sled complete, trimming the corner is just a matter of setting the shelf in the sled and passing it through the saw blade.

Circular Saw. Using a circular saw to trim the shelf corners is just as easy with a similar jig. It's an upside down version of the table saw sled. Instead of a runner on the bottom, a fence is attached to the top of the jig to guide the saw (lower photo above). Then the two fences are attached to the bottom of the jig using the same process as the table saw sled. To use this jig, you place it over the shelf to make each cut. Just be sure to clamp the shelf securely to a bench or sawhorse.

Table Saw Sled. *The sled aligns the corner of each shelf for identical cuts.*

Circular Saw Jig. *The jig for the circular saw is similar to the table saw sled. But with a guide on top and fences on the bottom.*



shop-made Beam Compass

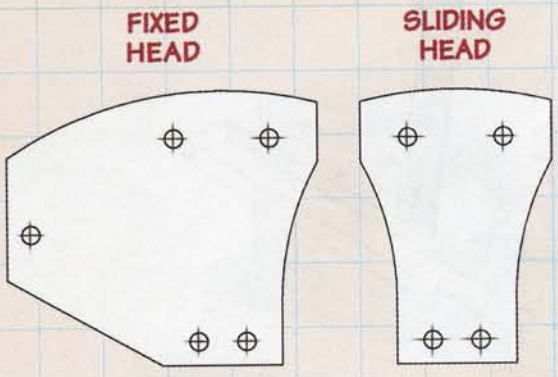
Aluminum and figured wood come together in this practical layout tool you can build in a weekend.

When it comes to laying out large arcs and circles for a project, nothing beats a beam compass. The beauty of this tool is you're not limited by the distance between points as you would be with a standard compass. For larger circles, you just use a longer beam.

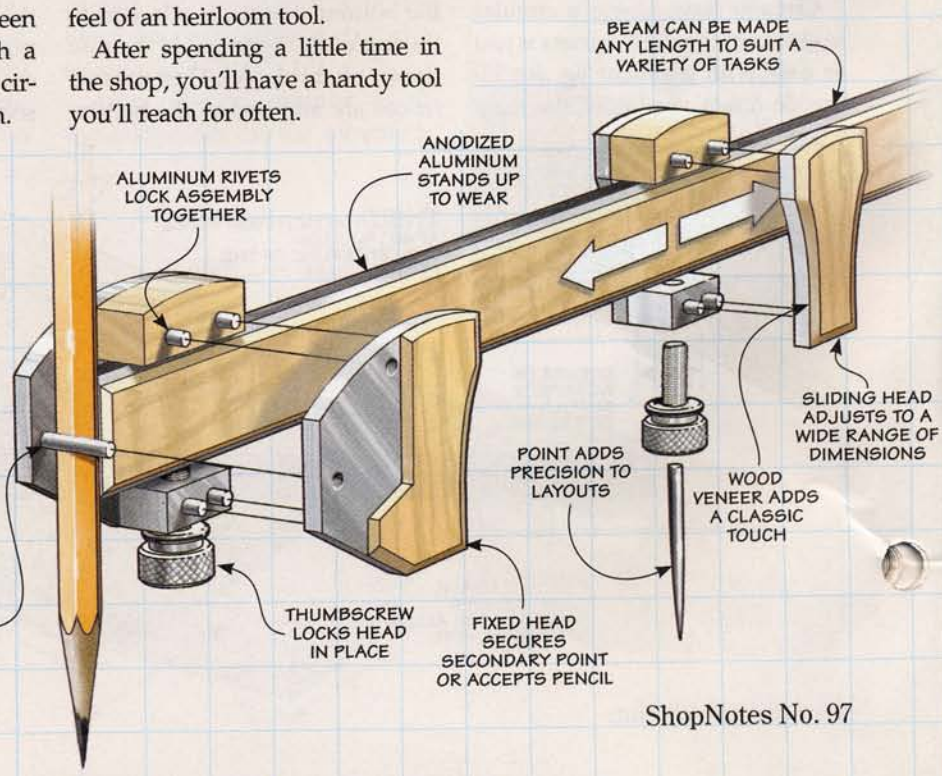
For the beam compass shown here, anodized aluminum gives it a unique look and durability. And wood veneer adds the look and feel of an heirloom tool.

After spending a little time in the shop, you'll have a handy tool you'll reach for often.

Patterns (shown 100%)



Exploded View Details

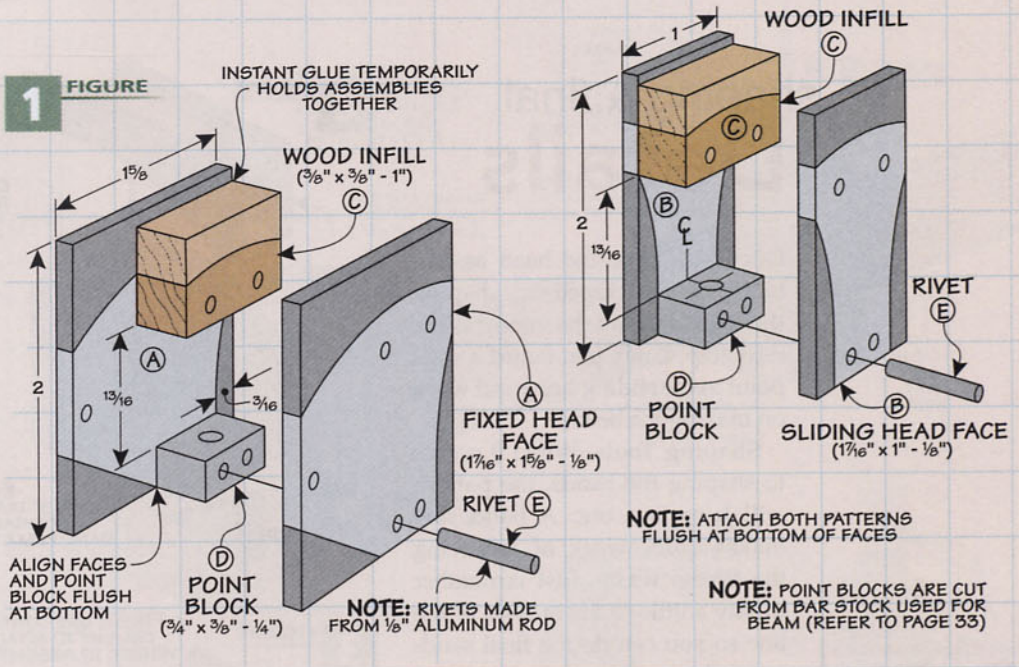


One look at the Exploded View will tell you that there's not much to building the beam compass. The two heads are just wood infill and aluminum "sandwiches" riveted together with a solid wood face on each side. And the beam is nothing more than an aluminum bar with wood veneer faces.

Anodized. I used anodized aluminum for this project. Not only does it add some color, but the anodizing makes the surface of the aluminum tougher (box below).

Making a Sandwich. Since most of the detail work will be spent building the two heads, that's the place to start. Figure 1 and the photos below will step you through the process. The full-size patterns on the opposite page are a big help when it comes time for shaping and drilling later on.

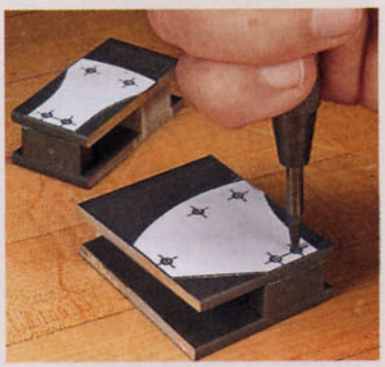
I started by cutting the face blanks to rough size. After attaching the patterns to one face with spray adhesive, you can start putting all the pieces together.



Instant Glue. These small parts, especially the wood infill and point block, are hard to clamp and hold in place while drilling for the rivets. So I used instant glue to hold everything together temporarily. Then, after using the pattern as a guide for drilling, you can add the rivets to secure the assembly.

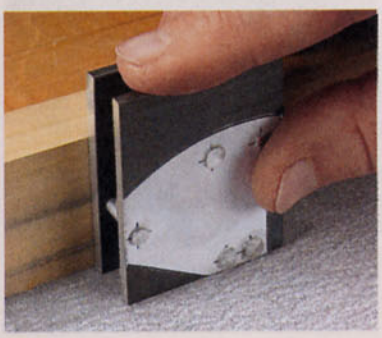
Drill & Tap. Before drilling the holes for the knurled screws in the point blocks, go ahead and sand the rivets flush on the side without the pattern. This creates a flat reference surface you'll use to sand the assemblies to shape. Finally, after sanding the bottom edge flush, drill and tap the holes.

▲ ***Glue.*** *Use a spacer and instant glue to locate and attach parts to the face blank.*

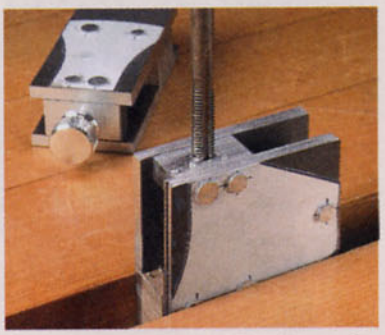


▲ ***Center Punch.*** *A punch is an easy way to locate points to drill and countersink holes for rivets.*

◀ ***Drill & Rivet.*** *Peening the aluminum rivets is an easy task and locks the assembly together.*

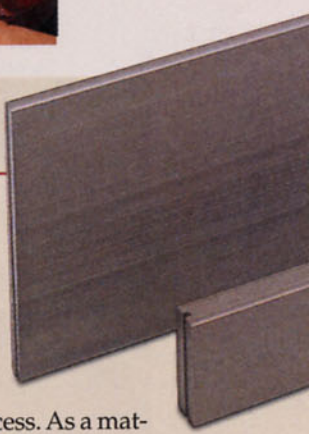


▲ ***Sanding Smooth.*** *Smooth the bottom square after sanding the rivets flush on one side.*



▲ ***Drill & Tap.*** *Finally, after drilling, use a hand tap to cut the threads for the thumbscrew.*

Anodizing



Aluminum is a relatively soft metal. But anodized aluminum has a hard, protective coating of aluminum oxide that is created during the anodizing process. As a matter of fact, this coating is so tough that I had a hard time scratching it with my awl. The anodized surface stands up to the pressure of the thumbscrews and makes the heads slide more smoothly. Refer to Sources on page 51.

shaping & final Details

Once you have the head assemblies riveted together, shaping them and adding the veneer is the next step. Later, you'll add a steel point to the sliding head and work on making the beam.

Shaping Tools. When it comes to shaping the heads, the pattern will help you out. A band saw makes quick work of removing the excess waste. Just remember to stay a little to the outside of the line so you can do the final sanding and smoothing up to the line.

A coping saw with a standard 15-TPI blade works fine, too (left photo below). It just takes some effort and a little extra time.

Sanding. For the inside curves on the heads, a 3"-dia. sanding drum works perfectly to smooth the edges to their final shape. It works great on the outside curves, too. Just be sure to keep the blank moving to avoid flat spots.

Once you're satisfied with the overall shape, go ahead and remove the pattern and sand the remaining rivets flush.

Veneer Faces. Gluing the veneer to the outside faces is easy. Simply cut the veneer a bit oversize and use contact cement to attach it.

Because the veneer is so thin, it won't take much work to sand it to shape with the sanding drum. You just need to sand it flush with the aluminum. To add a little detail, I created a small chamfer around the edges using sandpaper wrapped around a block and a dowel.

ShopNotes GO ONLINE EXTRAS

To watch a video on how to use a beam compass in your shop, go to our website **ShopNotes.com**

FIGURE 2

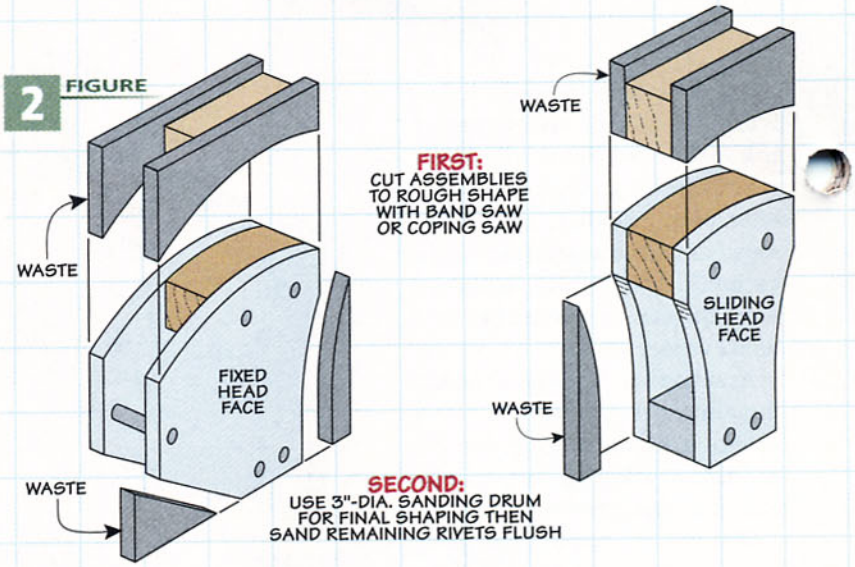
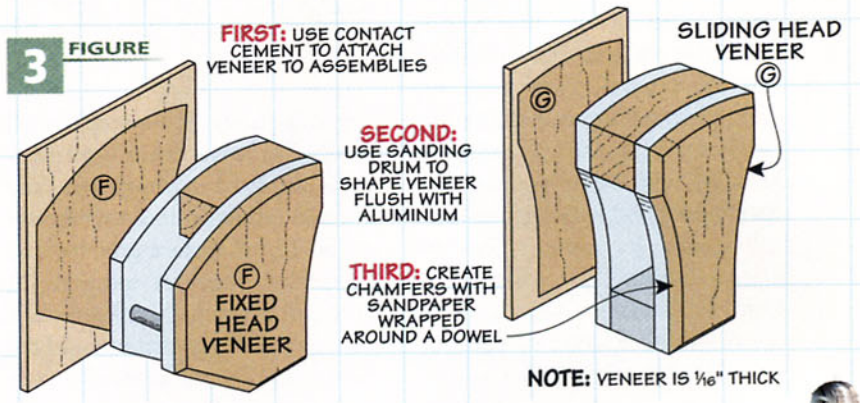


FIGURE 3

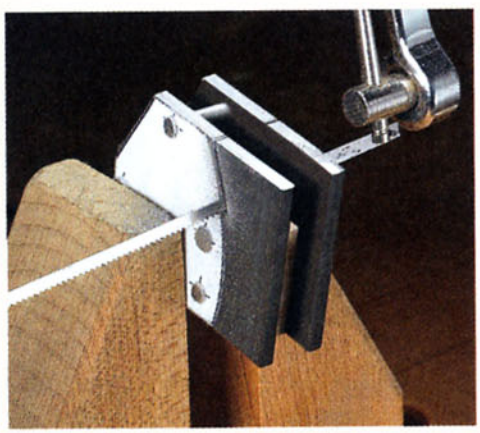


ADDING A POINT

With the head assemblies complete, the next thing to do is add a steel point to the sliding head.

For the point, you'll be drilling a hole in the head of the knurled thumbscrew and filing a nail to a sharp point. I found that a 6d finish nail was just the right size and soft enough to file easily. But you could also use an old drill bit to file down for the point.

Drilling the Thumbscrew. The important thing here is to make sure the hole in the head of the



▲ ***Shaping.*** *A coping saw can be used to rough out the shape of the head assemblies.*

▲ ***Smoothing.*** *Use a 3"-dia. sanding drum to do the final shaping and smoothing.*

▲ ***Shaping the Veneer.*** *After gluing on the veneer, the sanding drum quickly trims it flush.*

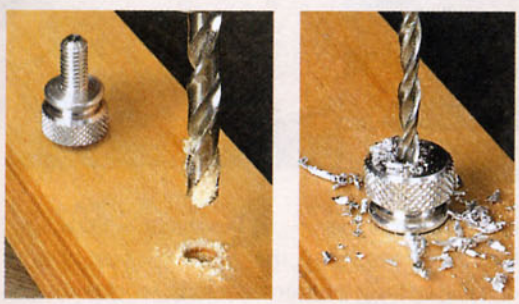
thumbscrew is perfectly centered. But there's really a simple trick I used to do this (photos below).

First, I clamped a piece of plywood to the drill press table. Then it's just a matter of drilling a hole the same diameter as the threads on the thumbscrew. Without moving the plywood block, insert the threaded portion of the thumbscrew into the hole.

Next, drill a hole in the head of the thumbscrew for the nail. You'll want the diameter of the drill bit to match the diameter of the nail. If you find the thumbscrew starts spinning as you're drilling, use pliers to safely hold it in place.

File and Polish. When it comes to shaping the nail to a sharp point, you can use the drill press and a metal file. All you need to do is chuck the nail in the drill press and file it while it's spinning, as shown in the lower left photo below.

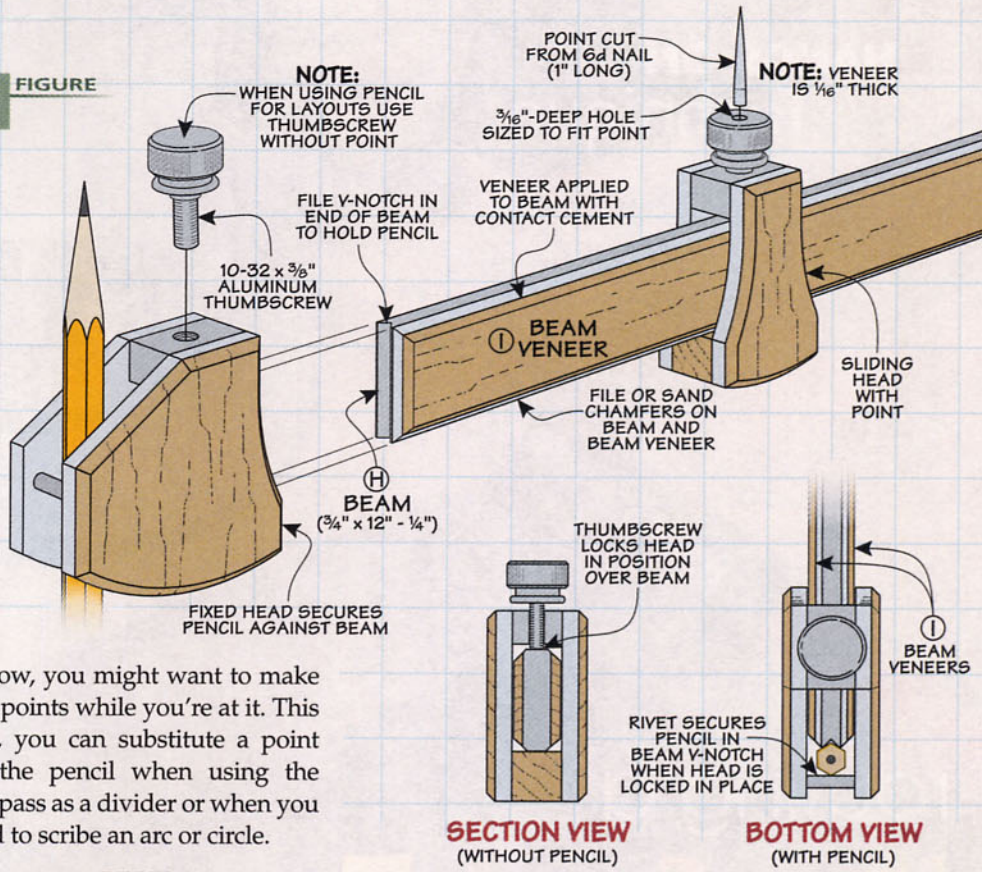
Once I had a sharp point, I used progressively finer grits of wet/dry sandpaper to polish it smooth. Finally, use a dab of epoxy to set the nail in the thumbscrew.



▲ ***A Centered Hole.*** *Drill a hole in a scrap to fit the threads of the thumbscrew. Then drill a 3/16"-deep hole sized to fit the point.*

▲ ***Making a Point.*** *Cut a nail to length and chuck it in the drill press. With the drill press on, file it to a point and polish it with sandpaper. Then use epoxy to glue the point into the hole in the thumbscrew.*

FIGURE 4



Now, you might want to make two points while you're at it. This way, you can substitute a point for the pencil when using the compass as a divider or when you need to scribe an arc or circle.

BEAM

The beam of the compass is made from the same bar stock used for the point blocks. I started with a 3'-long piece, so I made two beams: one 12" long and another (about 2') from the leftover.

You can make the beam any length you wish, depending on the layout task at hand. For an extra-long beam, you can simply use a length of 3/4"-thick hardwood ripped and sanded to fit inside the heads.

To make the beam, start by gluing the veneers to the aluminum bar. Then it's just a matter of sanding them for a smooth sliding fit in the head assemblies. A light chamfer eases the edges. Finally, file a shallow V-notch in one end to help hold a pencil in place, like you see illustrated in Figure 4.

After spending just a few hours in the shop, you have a classic tool that grabs attention. And the best thing is, it comes in handy for a lot of layout tasks. For some practical ways to use your beam compass, you can view an online video by going to *ShopNotes.com*.

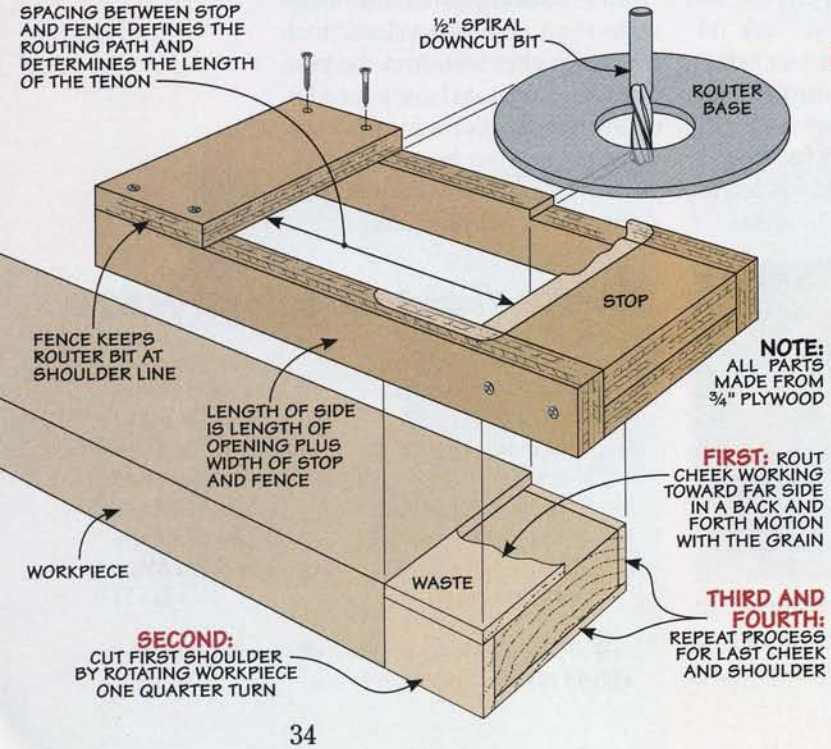
Materials & Hardware

A	Fixed Head Faces (2)	1 7/16 x 1 5/8 - 1/8 Alum.
B	Sliding Head Faces (2)	1 7/16 x 1 - 1/8 Alum.
C	Wood Infill (2)	3/8 x 3/8 - 1
D	Point Blocks (2)	3/4 x 3/8 - 1/4 Alum.
E	Rivets (9)	1/8 x 11/16 rgh. Alum. Rod
F	Fixed Head Veneers (2)	1/16 x 2 - 1 1/2 rgh.
G	Sliding Head Veneers (2)	1/16 x 1 1/2 - 1 1/2 rgh.
H	Beam (1)	3/4 x 12 - 1/4 Alum.
I	Beam Veneers (2)	1/16 x 3/4 - 12

- (3) 10-32 x 3/8" Aluminum Knurled Thumbscrews
- (2) 6d Finish Nails (cut to 1" long)

routing a Perfect Tenon

A handy, shop-made jig makes it easy to cut a smooth, clean tenon with a hand-held router.



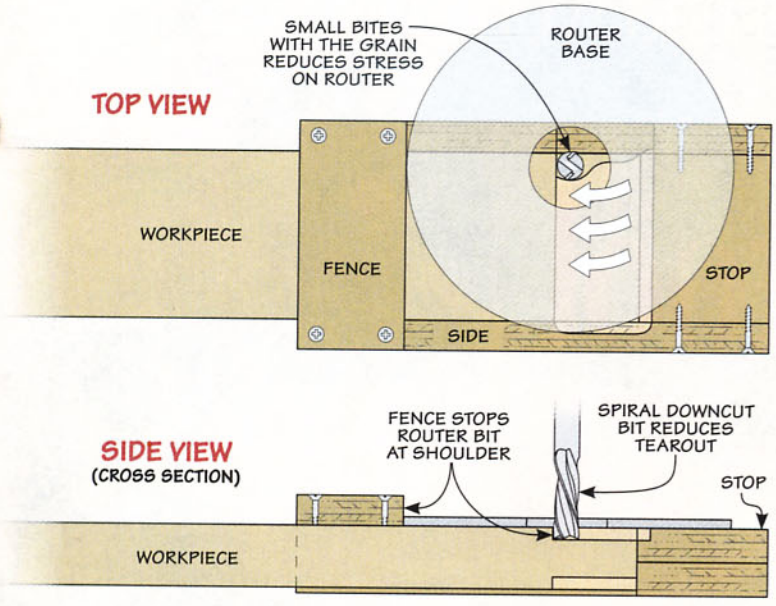
For most projects, I like to cut tenons on a table saw. But there are times when that's not the best option. For example, cutting a tenon on a long workpiece can be difficult on a table saw. That's because balancing a long piece off the side of the saw can cause it to tip and the tenon ends up being inaccurate.

So, when I need to cut a tenon on a long workpiece, I turn to a hand-held router and a simple jig, like you see above. This method works great for table aprons, bed rails, or any long workpiece.

Benefits. Using this technique has several advantages. Clamping the workpiece to a workbench keeps it stable. And moving a small router across the workpiece is much easier than trying to balance and move a large workpiece on a small saw table. Plus, the router forms smooth cheeks and sharp shoulders (inset photo).

MAKING THE JIG

To keep things simple, I build the jig to suit the project at hand. If you look at the drawing at left, you'll



see it's just a fence, stop, and two sides made from ¾" plywood. The jig is assembled to fit snug around the workpiece to make routing the tenon more accurate.

Sizing the Jig. There are several things to keep in mind as you size the jig. Of course, the length of the tenon is key. But the size of the baseplate on your router and the size of the router bit you're using are also factors. And speaking of the bit, I use a ½" spiral downcut bit. It cuts clean shoulders on the tenon without tearout.

Fence. To locate the fence, measure the distance from the outside edge of the router bit to the edge of the baseplate. Then add that measurement to the length of the tenon. This will be the distance between the fence and stop.

Sides. With this measurement in mind, you can add that to the width of the fence and stop to determine the length of the sides.

Stop. The stop is attached to the end of the jig so it registers against the end of the workpiece. So after gluing up the two layers, you can attach it to the sides. Finally, you can fasten the fence in place.

USING THE JIG

Once the jig is built, cutting the tenon is easy. The box at right helps you through the process. But before you start, clamp the workpiece securely to the bench. Then clamp the jig to the face of the workpiece, as shown in the top photo at right. Set your router against the fence of the jig and verify the inside edge of the bit lines up with the shoulder mark of the tenon before you start routing.

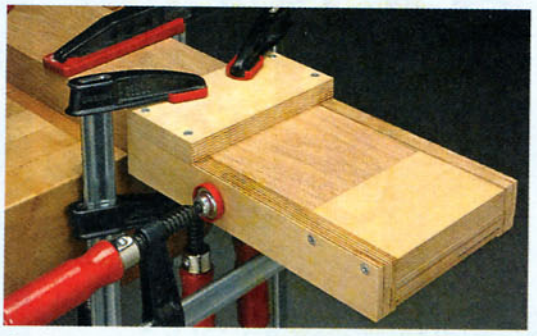
First Cheek. You'll start by routing one cheek of the tenon. For the best results, you'll want to rout in several shallow passes. Each cut should be about ¼" deep. If you're using a fixed-base router, you'll rout all four sides of the tenon before adjusting the depth. This makes it easy to sneak up on the final size of the tenon.

Shoulder Cut. With one tenon cheek routed, turn the workpiece a quarter turn to work on the shoulder. You'll need to clamp the jig in place once again, but there's one thing to note. In order to support the cut to minimize tearout, clamp the jig so the router bit cuts into the side of the jig at the back of the cut. You can see what I mean in the bottom photo at right.

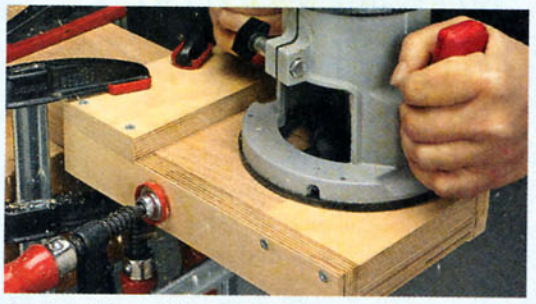
Opposite Cheek. Now you can rotate the workpiece another quarter turn to rout the opposite cheek. Finally, you can rotate the workpiece once more and cut the last shoulder to complete the tenon.

This technique is surprisingly simple, and the jig is easy to build. I think you'll find it will save time when you're working with large workpieces in the shop.

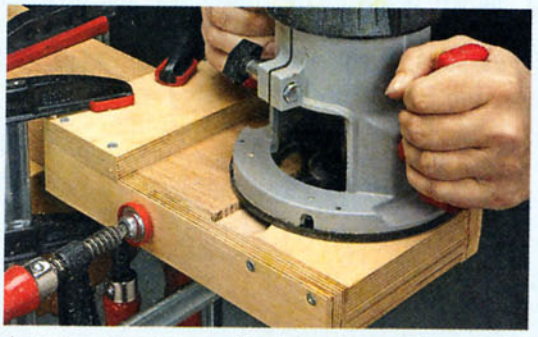
A Perfect Tenon: Step-by-Step



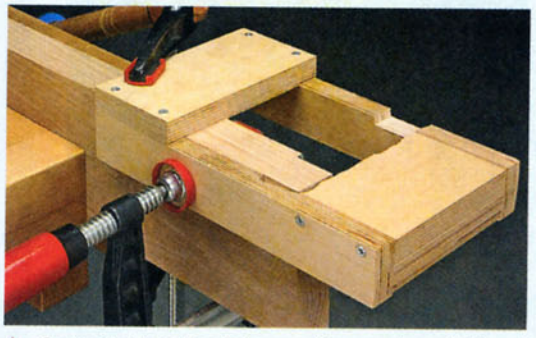
▲ ***Secure Clamping.*** *After clamping the workpiece to the workbench, securely clamp the jig to the workpiece to keep it in position.*



▲ ***Rout With the Grain.*** *To start the cut, route down one side of the tenon. Then continue removing the waste, routing with the grain.*



▲ ***Shoulder Pass.*** *Rout back and forth with the grain until you reach the fence. Then make a final pass along the fence.*



▲ ***Completing the Tenon.*** *For each additional edge, rotate the workpiece and clamp the jig in place to prevent tearout at the end of the cut.*

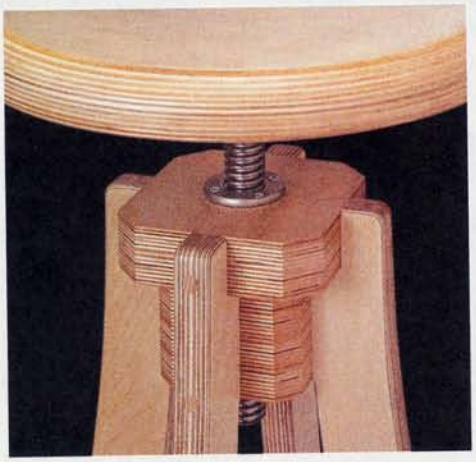
adjustable Shop Stool

Sure-footed and easy to adjust, this stool lifts comfort to new heights.

A good shop stool is a great asset for any shop. The challenge is how to design a comfortable stool that you can easily adjust in height. This adjustable stool answers the challenge.

It's made from solid hardwood. (An example made from Baltic birch is shown below.) The shop-made metal straps provide stability and strength for the stool, and also serve as footrests.

But what really sets this stool apart is how easily it adjusts. It raises and lowers by simply spinning the seat like an old-fashioned piano stool. (The seat adjusts from 27" to 33".) That capability allows you to work comfortably no matter where you park yourself in the shop.



▲ ***Plywood Option.*** *Baltic birch provides a good alternative to using hardwood, and it gives the stool a unique look.*

Exploded View Details

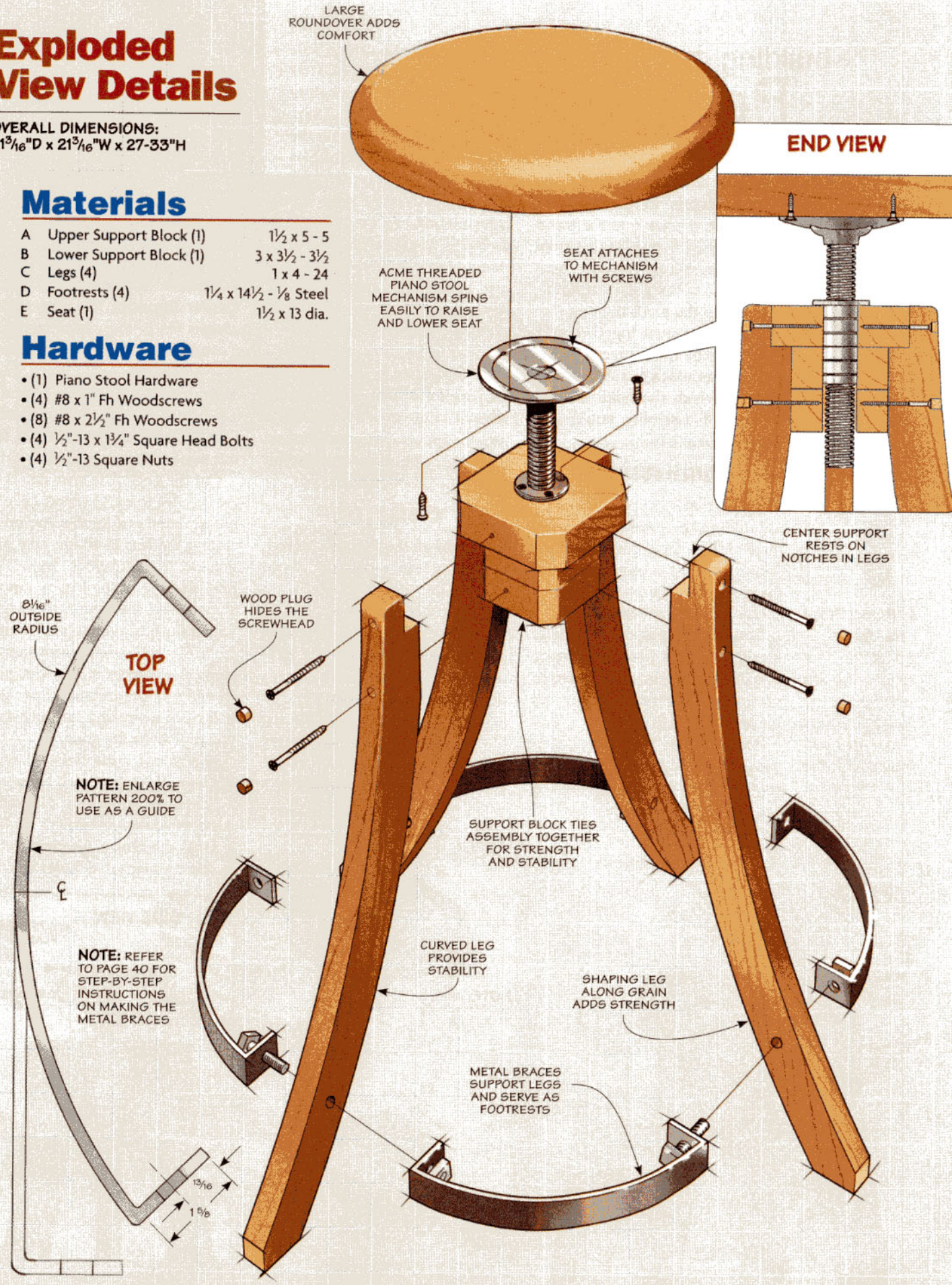
OVERALL DIMENSIONS:
21 3/16"D x 21 3/16"W x 27-33"H

Materials

A	Upper Support Block (1)	1½ x 5 - 5
B	Lower Support Block (1)	3 x 3½ - 3½
C	Legs (4)	1 x 4 - 24
D	Footrests (4)	1¼ x 14½ - ⅛ Steel
E	Seat (1)	1½ x 13 dia.

Hardware

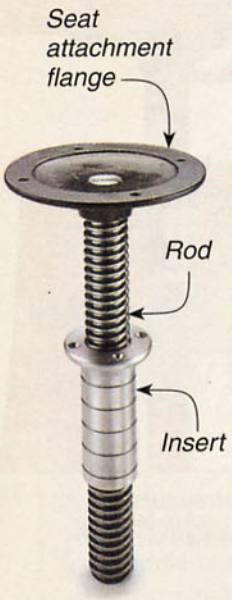
- (1) Piano Stool Hardware
- (4) #8 x 1" Fh Woodscrews
- (8) #8 x 2½" Fh Woodscrews
- (4) ½"-13 x 1¾" Square Head Bolts
- (4) ½"-13 Square Nuts



building the Pedestal

The key to a great shop stool is a steady base. That means the pedestal needs to be wider at the bottom than it is at the top. I accomplished that with this stool by creating a gentle outward curve from top to bottom on each leg.

To make the stool more stable, the legs are joined together near the bottom by metal braces. At the top, the legs attach to a stout center support, which also holds the seat adjustment assembly you'll add later (photo at left).



▲ ***Piano Stool Hardware.*** *To adjust the seat height, the rod attached to the flange threads into an insert mounted in the pedestal.*

CENTER SUPPORT

Since the center support is the key to building the pedestal, I started there. It's a three-part assembly with a hole in the center to accept the piano stool hardware. Figure 1 shows how it goes together.

The Blocks. I glued up the lower block from two identical blanks. The upper block is simply a larger version of the lower assembly, but it's only 1½" thick.

Because the glued-up center support would be difficult to drill completely through, I found it easier to drill the center hole in each individual block after cutting them to size but before gluing them together. Then, all you need to do is glue the blocks together will the holes lined up with each other.

Align Holes. To keep the holes aligned, I inserted a wood dowel through the holes and clamped the blocks together. Just be sure to remove the dowel before the glue sets to prevent gluing it in the holes.

You'll also need to make sure the edges of the blocks are parallel as well. This will help when it's time to fit the legs to the center support. Now, you can set the center support aside while you turn your attention to the legs.

▲ ***Center Support.*** *The piano stool hardware fits in the center support that secures the tops of the legs.*

CURVED LEGS

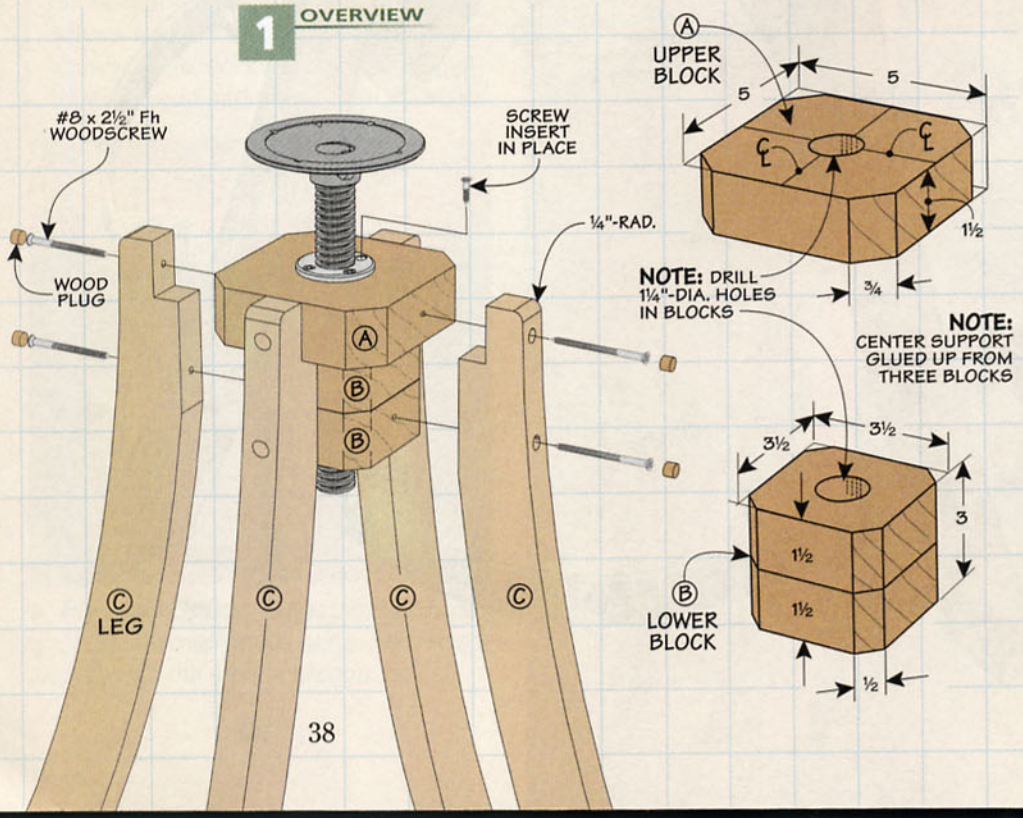
Even though the legs are curved, there's nothing delicate about them. The trick, though, is to make them all the same.

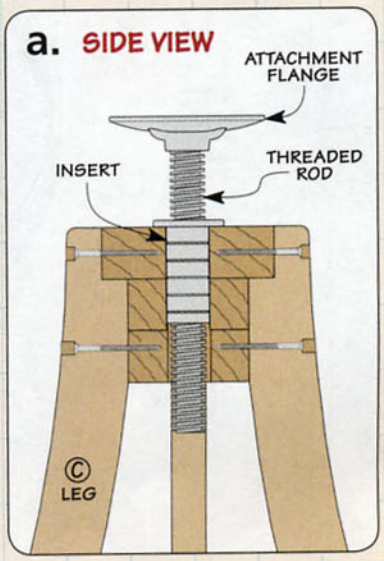
Make a Template. The best way to do this is to make a template. This way, you only have to do the layout once, then you can just trace the outline on the leg blanks. Because of the long curve in each leg, I was able to reduce waste by laying out two legs on a 1"-thick oversized blank. Figure 2 gives the dimensions of the blanks and the template, and how to lay out two legs on each blank.

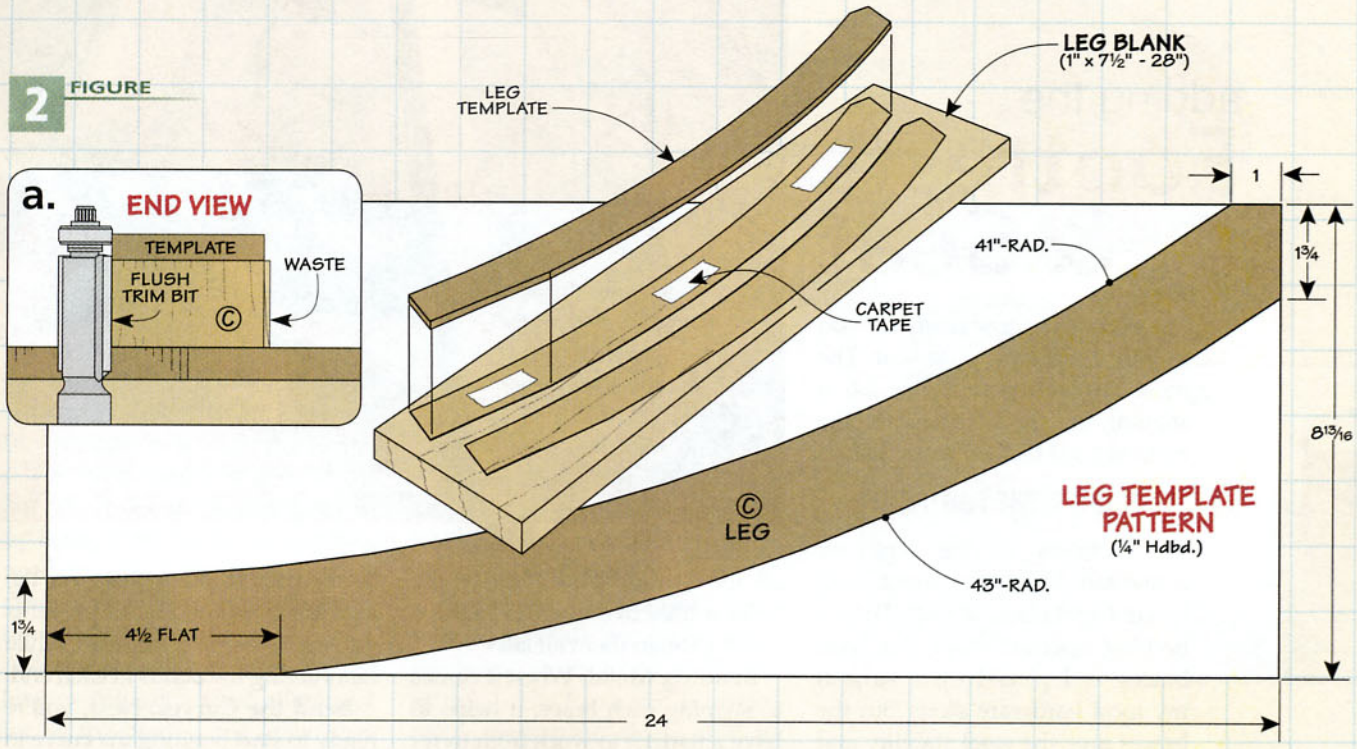
Cut the Legs. The next step is to cut each leg to rough shape. I like to use my band saw for this. As you're cutting the legs to shape, stay just outside of the layout lines. The final shaping of the legs is simply a matter of smoothing the edges with a flush trim bit in your router table (Figure 2a). To prevent tearout along the corners of the legs, you should rout the endgrain first. This will clean away any tearout when you rout along the grain.

You're not quite finished with the legs. The top of each leg needs a little more work to fit the center support you made earlier.

Drill the Holes. The first detail is the counterbored holes for the







screws that will attach the legs to the block (Figure 3a). I drilled the holes at my drill press, making sure the flat area at the top of each leg was tight against the table.

These holes will be plugged later to hide the screwheads. Whenever I use wood plugs, I start by drilling the counterbored hole for the plug first. This makes it easier to center the pilot hole for the woodscrew.

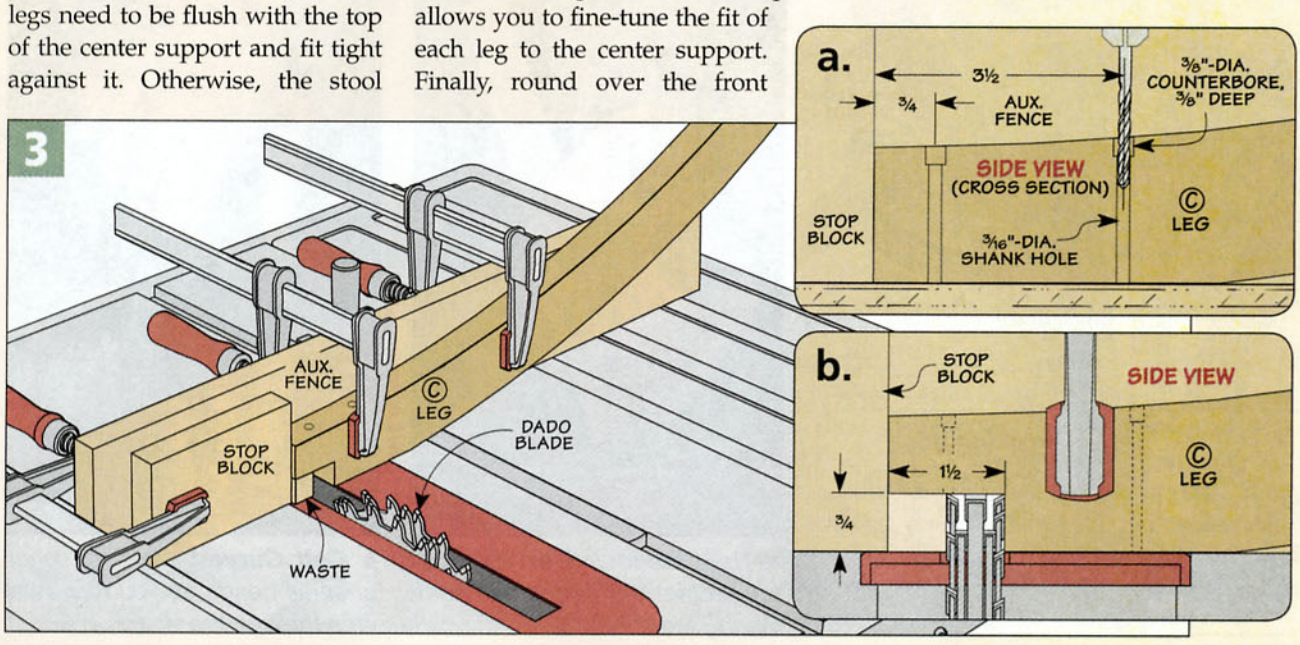
Top Notch. The second detail involves cutting the notches that hold the center support. What's critical here is that the tops of the legs need to be flush with the top of the center support and fit tight against it. Otherwise, the stool could end up a bit wobbly. Cutting the notches can be a little tricky, but Figure 3 shows a table saw method that's safe and accurate.

Make sure when you clamp each leg to the auxiliary fence that the flat section is tight against the table. You'll also want to set up a stop block to establish the shoulder of each notch (Figure 3b).

After the initial pass, I loosened the fence clamps (not the stop block) and cut away the rest of the waste to form the complete notch. Then, simply repeat the process for the other legs. Note: This setup allows you to fine-tune the fit of each leg to the center support. Finally, round over the front edges of the tops of the legs to soften the sharp corners, as you can see in Figure 1.

With the legs cut to final shape, you can attach them to the center support. Again, make sure the notches are tight against the center support and the legs are square. Then, you can glue and screw the legs in place. Finally, glue the wood plugs in the counterbores and sand them flush.

The basic groundwork of the pedestal is complete. At this point, you're ready to add the metal footrests and the seat.



adding the Footrests & Seat

The pedestal is now ready for you to add the footrest and seat. The most involved part of this job is shaping the metal braces for the footrests, so I tackled them first.

Footrests. *While primarily supporting the base of the stool, the metal braces also serve as footrests.*

SHAPING THE FOOTRESTS

The bottoms of the legs are connected by four curved steel braces (right photo above). There's nothing special about the steel braces — I picked up a strip at my local hardware store. But the braces give the stool stability and provide convenient footrests all the way around the stool. And working with steel isn't difficult.

Drill the Holes. After trimming the metal strips to length with a hack saw, the next step is to drill the mounting holes in each end. These holes allow you to bolt the braces to the legs, and it would be difficult to drill them after shaping all the braces. And I made the holes a little oversized to make it easier to align them all later.

Bending Metal. When it comes to shaping each brace, it helps to have a pattern to work from (refer to page 37). After enlarging the pattern to full size, compare it to the brace to check your progress.

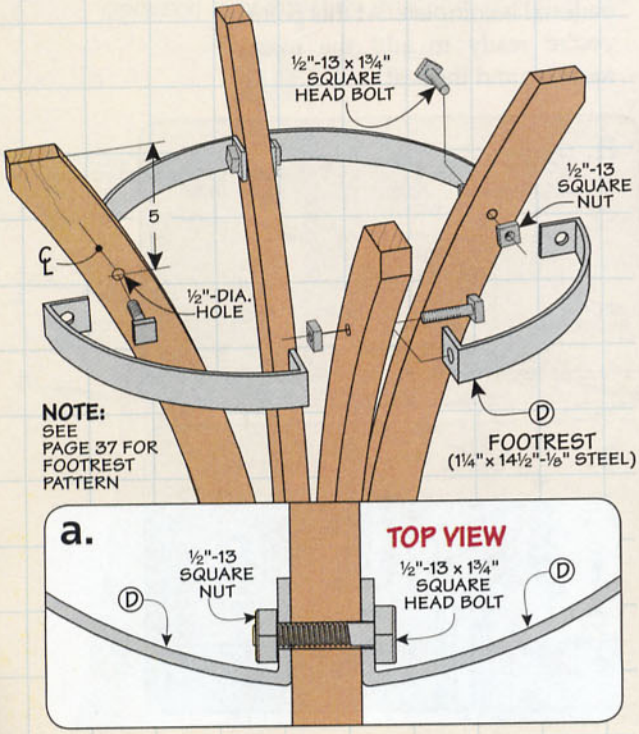
The photos here show the steps I used to bend the braces into shape. But there are a couple of details I'd like to point out.

Square the Ends. Make sure the angles in the ends of the braces are square. If they're not, it will be difficult to align them on the legs. Using a wood block prevents damage to the brace while hammering the bends at each end.

Bend the Curves. Next, you're ready to start bending the curve in the braces. But don't try to bend

► ***Clamp It Square.*** *Ensure the metal strip is square in your vise before bending the end.*

FIGURE 4



▲ ***Hard Bends.*** *A scrap block will protect the strip when hammering the sharp bend.*

▲ ***Soft Curves.*** *Make a series of small bends as you move the strip through the vise.*

the entire curve all at once. Instead, use a bench vise to slowly create the curve, making a series of small bends while working your way along the length of the brace. This allows you to fine-tune the curve to match the pattern.

Locate the Holes. Once the braces are curved, you can use them to locate the holes in the legs (Figure 4). This is really a custom fit. The goal is to have the braces at the same height all around the bottom of the stool. (Mine ended up being 5" off the floor.) You may need to adjust the braces up or down, depending on the shape of the curves you made.

And that really doesn't matter, as long as you get a good alignment for all the braces. Just make sure the holes are drilled along the centerline of the legs. Finally, you can bolt the braces to the legs.

BUILDING THE SEAT

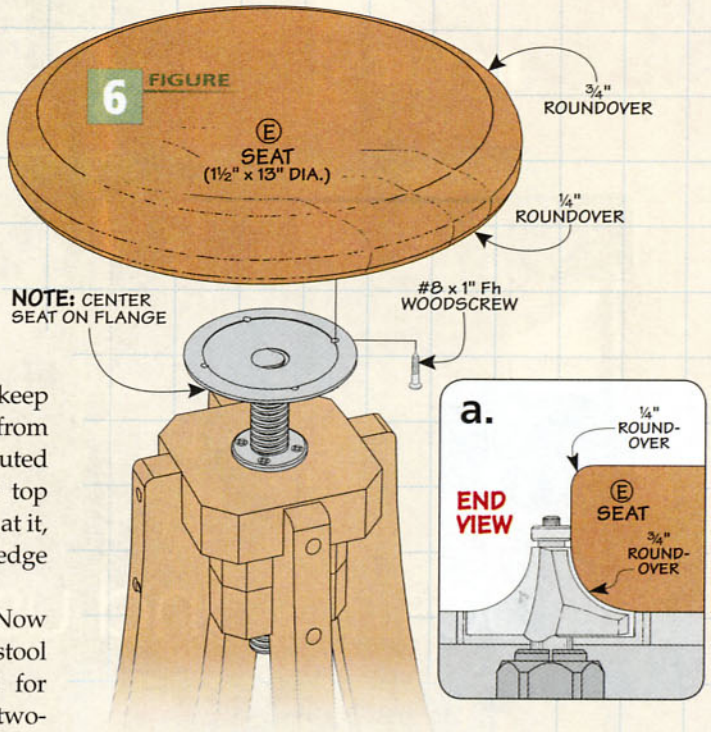
The pedestal is now complete, and it's time to add the seat. To make the seat sturdy, I started with a 1½"-thick hardwood blank.

Shape the Seat. The next step is to cut the seat to shape. After laying out the diameter, I used my band saw and the circle-cutting jig to cut the seat (box below). Since the edges were a little rough, I sanded them smooth.

Round the Edges. To keep the sharp edges of the seat from digging into my legs, I routed a ¾" roundover around the top edge (Figure 6a). While I was at it, I softened the seat's bottom edge with a ¼" roundover.

Hardware Installation. Now you can install the piano stool hardware (turn to page 51 for sources). The hardware is a two-piece mechanism that's easy to install. First, separate the two parts of the mechanism. Then, just flip the seat over and attach the flange on the bottom.

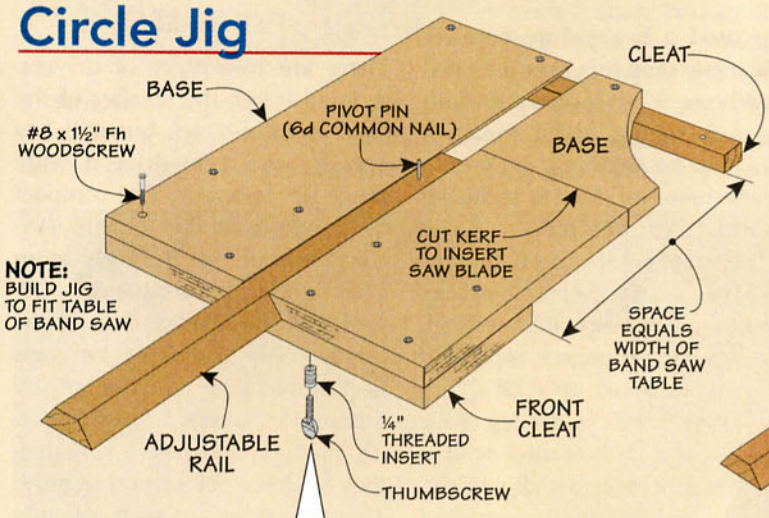
Next, you can drop the insert into the center support. If it's snug, a few taps with a rubber mallet should do the trick. Then, all you have to do is fasten it with screws.

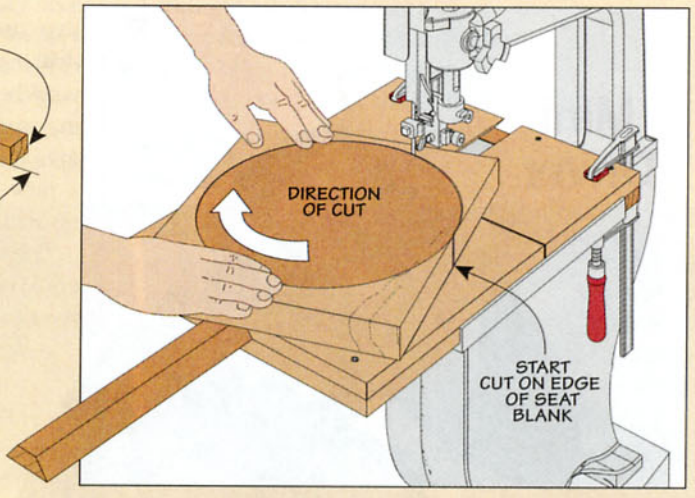


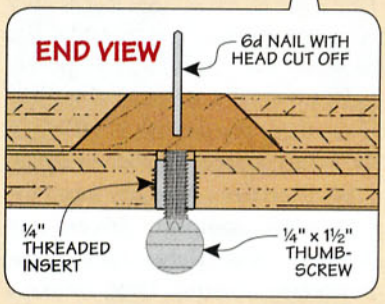
And finally, you can attach the seat to the base by simply spinning it into the insert.

After using this stool for a while, I'm sure you'll find that it's a great asset in your shop. And anything that can provide added comfort in the shop is a welcome addition.

Circle Jig







One of the easiest ways to cut a perfect circle is on a band saw. All it takes is a pin to spin the workpiece on. The jig you see here allows you to quickly set up for an exact cut.

As shown in the drawings, there are two main parts: a "split" base and an adjustable rail. The base serves as a support for the workpiece, while cleats at the front and back of the base hold the jig in place.

The split base is sized to position the adjustable rail (and pivot pin) on the center of the band saw blade, as shown above.

A thumbscrew threads into an insert at the front of the rail to pinch it against the base, locking the rail in place. All you have to do then is adjust the rail for the size of circle you want to cut, using one edge of your blank as the starting point.

choosing and using Compact Drivers

These small drivers are lightweight, recharge quickly, and have the power to handle a wide range of tasks.

I've used a heavy-duty cordless drill in my shop for years. It's a real workhorse when it comes to drilling and driving, and I wouldn't give it up for anything. But there's a new breed of drivers available now that's worth a look.

These new compact or mini drivers have a lot of power for their size. And they work especially well for assembling a project, especially when teamed up with a full-sized drill. Just keep your main drill loaded with a drill bit and a slip a driving bit in the compact unit for quick assembly.

Compact drivers are small and lightweight, so they're great for tight, confined spaces (left photo on the opposite page). Plus, they're great take-along tools for assembly or installation of projects away from the shop.

TWO CLASSES

There are two types of drivers. A mini-driver, the smaller of the two, is palm-sized, but still has enough power to drive a wide range of fasteners. The compact drivers look similar to a full-size cordless drill, but fit nicely in an apron pocket or your hand.

Lithum Ion Power. Part of the reason these drivers are so compact is that they are powered by lithium ion batteries. These batteries maintain a charge even when they're stored for several months. That's a real advantage if you only get to your shop on weekends. The batteries also provide full power right up until they need charging. Even then, recharging is quick on the smart charger (shown at right).

Similarities. It's obvious the mini and compact drivers are different, but they share some important features. First, unlike a

typical drill, these drivers accept hex-shaped bits. Some of the collets are magnetized and others are locking. While the magnetic collets are strong, I prefer knowing a bit is locked in. Second, like a typical cordless drill, the drivers are variable speed, so you can start slow to set a screw and then power up to drive it in. Finally, both types are are best used for simple driving tasks, but in a pinch they'll drill (lower center photo).

Mini Drivers. Mini drivers, like the one pictured on the opposite page, run at about 200 RPM. Unlike my cordless drill, they don't have clutches to prevent stripping out a screw. But with its slower speed, it's not critical to the tool's performance.

I used the *Dremel* driver to drive a number of screws in a project recently, and it kept up with the work load, driving 3" screws to assemble some cabinets. I also like the charging cradle that holds the tool when it's not in use. It keeps the built-in battery fully charged and ready to go.

▲ ***Smart Charger.*** *Lithium ion smart chargers indicate when the battery is too hot or cold, charged, or damaged.*

Compact Drivers. The *Milwaukee* and the *Bosch* that you see in the main photo and at right are examples of the compact-driver class. These drivers are lightweight, but at 400 to 500 RPM, they work a little faster than the smaller mini drivers.

Compact drivers have a couple advantages over mini drivers. They come with a spare battery that lets you keep one battery charged while the other is working. Plus they have an adjustable clutch so you can drive screws securely without stripping out (lower right photo).

While I wouldn't rely on a pocket driver as my only drill, it's a great second choice for handling most assembly tasks. I think you'll find a compact driver is one tool you keep with you all the time.

Compact Driver

▲ ***Tight Quarters.*** *A mini driver works well in small spaces, and it keeps up no matter the work load. Plus they recharge continuously, so they're always ready.*

▲ ***Drilling.*** *A larger compact driver has the power to drill as well as drive. And swapping bits is hassle-free with the quick-change, locking collet.*

▲ ***Assembly.*** *Project assembly is a snap with a compact driver. Variable speed and an adjustable clutch allow for installing fasteners with precision.*

10 handy Drill Bits

Here's what you need to know to select the top drill bits for your shop.

Drill bits are an essential accessory in every shop. The problem is that choosing the right bits for the task at hand can be a challenge. And it doesn't help that some drill bits can be used to accomplish some of the same drilling operations.

What you'll see here are the best bits to start with and also what to add to your collection over time. Finally, there are specialty bits that you'll want to pick up just for those one-of-a-kind tasks.

Must-Have Bits

TWIST BIT. The first set of drill bits I owned was a set of twist bits. You'll find they're a jack-of-all-trades bit good for drilling through wood, metal, or plastic. This makes them useful for just about any project.

These versatile bits are designed to bring the waste material up and out through the flutes while drilling. And this design also allows the bit to drill deep holes quickly.

A set of these essential bits will get you through just about any task. You'll probably find yourself reaching for one every time you're in the shop, whether you're building furniture or making a shop jig.

BRAD POINT BIT. When you need a bit that will make a precision hole in wood, a brad point bit is the one to reach for. The bit has a small point at the tip to locate it precisely and keep the bit from wandering. And sharp cutting spurs on the edge create a clean entry.

I think you'll find that a set of these bits (in sizes from ⅛" to ½") will handle most of your needs in the shop.

COUNTERSINK BIT. When it comes to installing a screw flush with the finished surface of a project, a good countersink bit is a must.

This bit clears the way for recessed screws in wood, metal, or plastic and is available in several sizes to match the size of the screw. I like the single-flute design of the *Weldon* bit shown above. It provides a smooth, chatter-free cut so the screwhead seats perfectly.

FORSTNER BIT. There are times when I need to drill a smooth-sided, flat-bottom hole. That's when I turn to a Forstner bit. They're also great for creating mortises and pocket holes.

Forstner bits remove large amounts of material quickly while producing clean sides. And they have a center guide point, which allows for precise positioning. Plus, you can easily drill overlapping holes.

SELF-CENTERING BIT. Mounting a hinge requires perfectly centered pilot holes for the screws. To do this easily, I turn to a self-centering bit.

The beveled tip of the bit fits the hinge hole. As you press down, the sleeve retracts, allowing the spinning bit to drill a centered hole. A set of three bits (#3, #5, and #9) will handle a wide range of screw sizes.

COMBINATION BIT. If you want to drill a pilot hole for a screw at the same time you drill the countersink and counterbore, check out the bit shown above.

A combination bit usually has a tapered shaft to more closely fit a standard woodscrew. But you can also use the stop collar assembly with any twist bit. An Allen wrench is all it takes to adjust the position of the stop.

Handy Add-Ons

SPADE BIT. Drilling a hole for a project doesn't always require an expensive, precision bit. That's where a spade bit can come in handy.

A spade bit can make a rough cut. So I like to use the ones with a cutting spur on the outside edge. They make cleaner holes and work great for counterbores in furniture frames or other hidden areas of a project.

Specialty Cutters

PLUG CUTTER. Many of the furniture projects I build require covering the screws with wood plugs. If you have a project that calls for plugs, then you'll want to pick up a set of plug cutters.

The cutters are usually sold in a set of three to handle the most common plug sizes. But I use the ⅜" cutter most of the time.

Just remember that a plug cutter is designed to be used only in a drill press.

CIRCLE CUTTER. When I need to cut a round opening in a workpiece for a custom-fit, I turn to my circle cutter. It's great for cutting holes for clock movements.

Most circle cutters cut smooth-edged circles up to 6". And you can produce smooth disks for wheels just by flipping the cutter in the assembly.

HOLE SAW. One final type of "bit" to consider adding to your collection is a plumber's hole saw. They're available in a wide range of sizes (up to 6"-dia.). And the center guide bit allows for quick and accurate positioning.

The saw-tooth edge cuts through plastic, as well as wood. Plus, they're relatively inexpensive. For this reason, hole saws are versatile and valuable tools to have in the shop.

getting the Perfect Crosscut

A smooth, clean crosscut is guaranteed with the right setup and these tips and techniques.

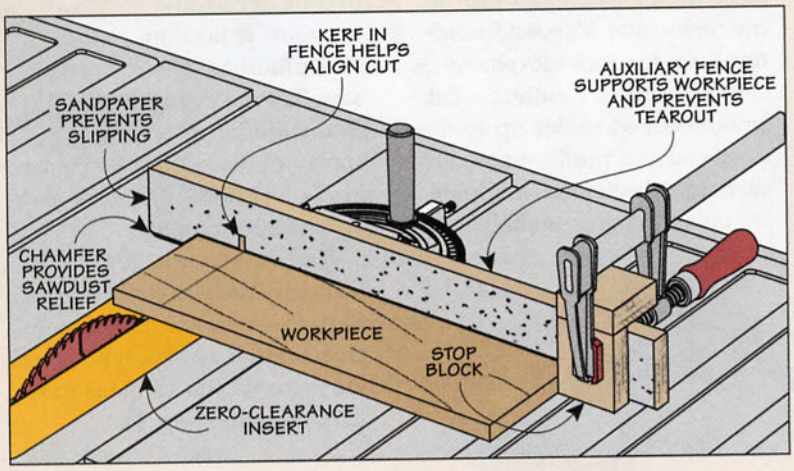
There's nothing more basic in woodworking than a crosscut on a table saw. But even with a perfectly tuned-up saw, you may still end up with splintering, tearout, burning, or saw marks marring your cut. By using the following tips and techniques, you can get smooth, tearout-free crosscuts on your table saw every time.

ShopNotes GO ONLINE EXTRAS

To see a video on making a zero-clearance insert, go to ShopNotes.com

TABLE SAW SETUP

Even though it sounds simple, getting an accurate crosscut can be a challenge. The first step to meeting the challenge is setting up your table saw. And that's where I turn to a couple of helpful accessories, like the auxiliary miter gauge fence and zero-clearance insert you see in the drawing below.



Auxiliary Fence. The auxiliary fence I use is just a strip of plywood that extends beyond the blade, like you see above. This way, the workpiece is fully supported on both sides of the blade, minimizing any chance of tearout. Plus, the cutoff is pushed safely past the blade.

Another benefit is that it provides an easy way to clamp a stop block in place (more on this later). Finally, adding some self-adhesive sandpaper to the fence keeps the workpiece from shifting during the cut.

Zero-Clearance Insert. While an auxiliary fence prevents tearout along the back edge of a workpiece, it doesn't help along the bottom face. As the blade exits the bottom of the workpiece, the teeth can cause tearout — especially with the wide opening in most table saw inserts. So it's always best to make any crosscut with the good face of the workpiece up.

But what if you need a clean cut along both faces? The solution to this is a zero-clearance insert. It supports the workpiece right up next to the cut. As an added bonus, the insert prevents any cutoff from getting wedged in the blade opening and kicking back.

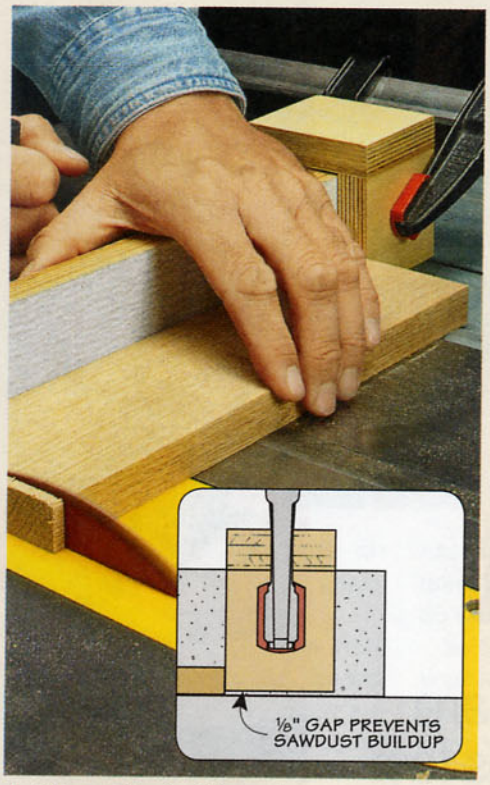
TIPS & TECHNIQUES

Using an auxiliary fence and zero-clearance insert will give you a good start to better crosscuts. And adding a dedicated crosscut blade can help (box below). But there are still a few techniques that will further improve every crosscut you make with your table saw.

Smooth & Steady. As you feed the workpiece through, keep it moving steadily. Burning is a sure sign you're moving too slow, while blade marks and a lot of tearout mean you're going too fast.

Complete the Cut. Be sure to push the workpiece all the way past the blade, then slide it away. Pulling the workpiece back across the blade can spoil the cut edge.

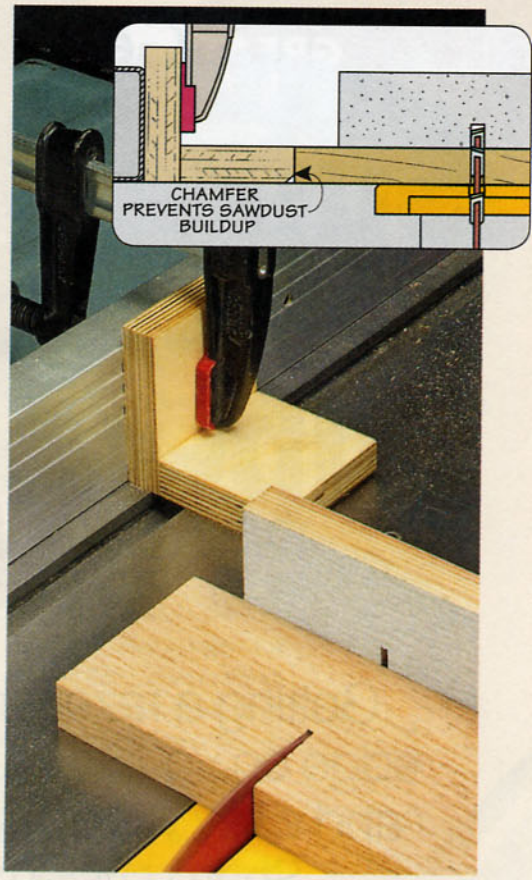
Repetitive Cuts. These techniques will produce a clean cut, but sometimes I need to make several identical parts. And measuring each part takes time and doesn't provide consistent results. Instead, I use a stop block that's L-shaped, sits square, and is easy to adjust, as in the photos above.



▲ ***Stop Block.*** *Clamping a stop block to the auxiliary fence allows you to cut several parts to the same exact length.*

To make repetitive cuts, clamp your stop block in place. Then, all you have to do is butt each workpiece against the block, and you'll get consistent pieces quickly.

Short Pieces. When I need to cut a number of short pieces, this method puts my fingers too close to the blade. To make the cuts more safely, I simply flip the stop block over and clamp it to the rip fence (right photo).



▲ ***Offset Block.*** *Clamp the block to the rip fence a few inches in front of the saw blade when crosscutting short pieces.*

By clamping the block in front of the blade, you can still position each workpiece identically. As you make the cut, a gap opens up between the workpiece and the fence. This provides clearance so the cutoff isn't trapped.

As you can see, making a crosscut doesn't have to be a hassle. After using these handy tips and techniques, you'll be on the right track to great crosscuts.

Saw Upgrade: Crosscut Blade

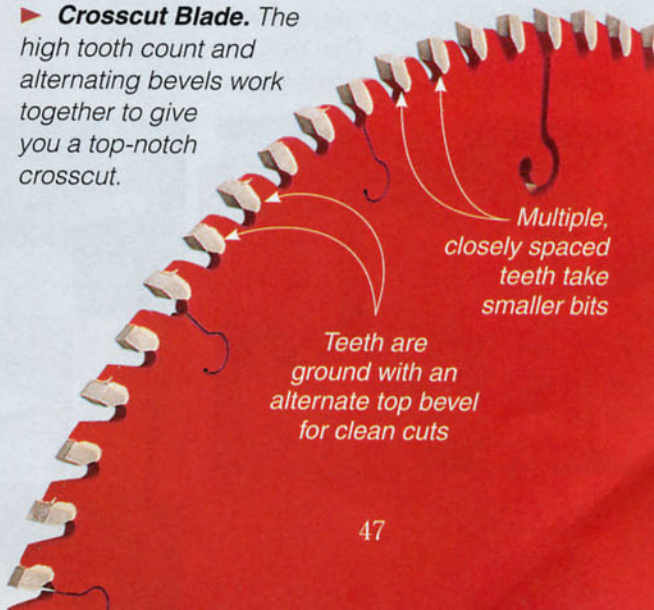
Setup and technique go a long way toward getting a good crosscut on a workpiece. Another way to improve your crosscuts is to use a saw blade specifically designed for the task, like the crosscut blade you see at right.

While a typical saw blade may have 40 or 50 teeth, a dedicated crosscut blade may have 80 or more. Plus, the teeth are ground with alternating top bevels.

So what does all this mean? Well, the extra teeth mean each one is taking less of a bite. So it's not so aggressively tearing away at the fibers. And the alternating top bevel grind means a smooth shearing cut through the fibers.

The end result is less splintering and clean crisp edges on both sides of the cut. For the ultimate super-smooth cut, a dedicated crosscut blade is your best choice.

► ***Crosscut Blade.*** *The high tooth count and alternating bevels work together to give you a top-notch crosscut.*



Super Sharp, Super Fast

Getting a razor-sharp edge on your tools is fast and easy with the Work Sharp system.

When I'm in the middle of a project, the last thing I want to do is spend a lot of time sharpening a tool. So when I got a chance to see the new *Work Sharp WS3000* sharpening system, I knew I had to try it out in my shop.

Full-Featured & Light Weight. Traditional bench grinders and motorized sharpening systems can be heavy beasts. So I was really surprised by the light weight of the *Work Sharp*. But I soon found out that it's really heavy where it counts — features.

The *Work Sharp's* light weight makes it easy to move around and reposition for a variety of sharpening tasks. (I mounted mine to a plywood base for easy clamping to my workbench, as shown above.)

Easy to Use. There are a lot of features I like about the *Work Sharp*. The first is that it's a dry system. I don't have the mess and cleanup to worry about that I would have with a wet sharpening system.

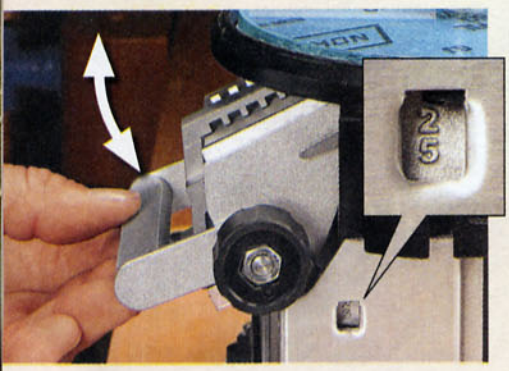
But what really impresses me is how easy it is to use. To sharpen a chisel, you begin by setting the bevel angle of the sharpening port (lower left photo). Unlike most conventional sharpening systems, you sharpen the tool with the bevel-side up, as you can see in the lower right photo below.

Once the fence is adjusted to square the chisel in the port, simply turn on the machine and gently move the blade in and out.

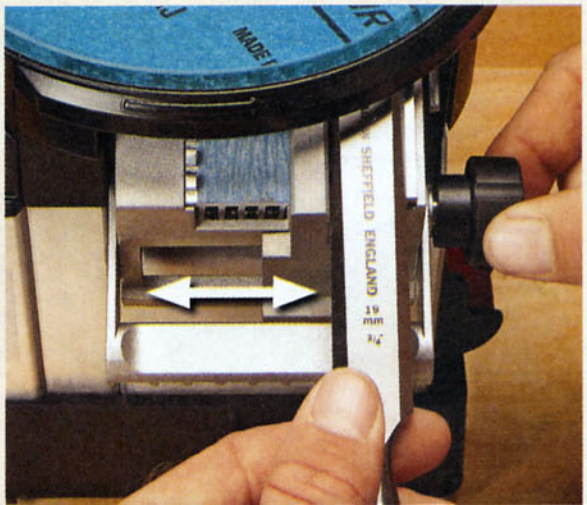
And the *Work Sharp* keeps the tool's edge cool, something that's a challenge at a grinder. The whole system is designed for maximum air flow. Even the aluminum sharpening port acts as a heat sink. And the wheel spins at a slow 580 RPM (much slower than most grinders). All this helps keep the edge of the tool cool while you're sharpening.

Spinning Wheel. The system comes with two tempered glass wheels. You can use the included 6"-dia. self-adhesive abrasive disks, but any 6" disk will work.

What's great about this is you can have a different grit on each side of the wheel. So, with the two glass wheels, that means four



▼ ***Bevel Angle.*** *Setting the bevel angle of the sharpening port from 20° to 35° (in 5° increments) is quick and easy.*



◄ ***Adjustable.*** *The sharpening port will accept chisels and plane irons up to 2" wide.*

◀ **See-Through Disk.** *Using the Edge-Vision wheel and slotted abrasive, you can watch your progress on a curved edge tool.*

different grits. This setup makes it easy to quickly work your way from coarse to fine grits as you sharpen and hone a tool. (The top disk is removed in the photos on the opposite page to show the tempered glass wheel.)

Top Side. There's another benefit to the glass wheels. Besides the sharpening port that works from the bottom of the wheel, you can make use of the top of the wheel, too (photo below).

One benefit to this "top side" sharpening is that it's easy to lap the back of chisels or plane irons. You'll quickly and easily get a flat surface before working the bevel. And for a tool that won't fit the sharpening port, you can use the tool rest for freehand sharpening.

There's something I need to mention: Some chisels taper in width from the cutting edge back to the handle. That means that you can't really use the guides on the sharpening port to get a square edge. So you might be tempted to sharpen freehand on the top of the wheel. But with a little practice, you can use the bed of the sharpening port to guide the chisel, maintain the bevel angle, and still get a square edge.

See-Through Disk. The *Work Sharp* has a solution for carving tools and gouges, too. There's a unique, slotted *Edge-Vision* wheel included in the package. And there are matching abrasive disks with slots, as shown above.

Why the slots? If you take a look at the main photo above, you can see how the edge of the tool you're sharpening is still visible as the wheel spins. This makes it easy to see the progress you're making on the edge of the tool.

Honing. The abrasives included in the kit range from P120 to P400 grits for sharpening and P1000 to *Micro Mesh* 3600 for honing. But if you prefer a traditional leather hone, you can purchase a honing wheel (box below). The *Work Sharp* has become my new honing station because it's so fast and easy to do without a lot of fuss.

So is the *Work Sharp* right for you? At around $200, it won't bust the budget and keeps your tools sharp without a lot of downtime or mess. For my money, that means more time spent on woodworking. To find out where to buy the *Work Sharp* and accessories, turn to Sources on page 51.

◀ **Freehand.** *Use the tool rest to sharpen tools on the top side for freehand sharpening.*

Power Strop: Honing

◀ **Super Sharp.** *A leather disk charged with honing compound makes quick work of honing an edge.*

While the *Work Sharp* system includes ultra-fine *Micro-Mesh* abrasives for honing, you may prefer to use the traditional leather and honing compound combination. Fortunately, one of the accessories available for the *Work Sharp* is a honing wheel. It's like a "power strop" for your edge tools.

The honing wheel is a leather disk that's bonded to a tempered glass wheel. It comes with the green honing compound you see in the photo above.

I gave it a workout on some dull carving tools I had in the shop. In just a few seconds, I was able to get a razor-sharp edge on each tool without a lot of fuss.

Q&A

questions from
Our Readers

versatile Shop Solvents

Recently, I needed to thin some oil-based finish for a project, and the selection was overwhelming. Which solvent is the best choice?

David Nall
St. Louis, Missouri

If facing a shelf full of solvents in the paint store makes you feel like you're back in chemistry class, don't worry. Since all the products do basically the same job (thinning finishes and cleanup), it can be a challenge to figure out just what solvent you need. I've found that three solvents take care of most of the tasks in my shop — mineral spirits, lacquer thinner, and denatured alcohol. (Be sure to follow the safety instructions on the can.)

▲ ***Mineral Spirits.*** *To see what an oil finish will look like, wipe on some mineral spirits. As an added benefit, you'll be able to spot any missed glue smudges.*

Mineral Spirits. If there's one multipurpose solvent I turn to most often, it's mineral spirits.

Of course, this is the solvent of choice for oil-based finishes and stains. Thinning out a thick finish makes it perfect for wiping on a smooth, final coat. And you can use mineral spirits to lighten up blotches in oil stains.

But the thing I use mineral spirits for most often is to "test drive" the look of an oil finish (photo at left). The mineral spirits also reveals any hidden glue smudges that need to be removed.

One more thing: Look for products with 100% mineral spirits. (It usually says so on the can.) Some solvents labeled as "paint thinners" and "brush cleaners" often contain other chemicals that can leave a residue on your project or interfere with a finish.

Lacquer Thinner. Next on the list is lacquer thinner. This blend of solvents is my "ultimate cleaner." As the name implies, it's great to have on hand for stripping old finish or thinning lacquer for brushing or spraying.

I also use lacquer thinner when refinishing a project. I start by wiping down the surfaces to remove built-up grease, wax, or other gunk. It also serves to "etch" the old finish so that the new coat adheres better.

Denatured Alcohol. The third solvent is denatured alcohol. There are two ways that I use it. The first is to thin shellac. I like to use dewaxed shellac as a sealer under stain or between the stain and finish coats. And by varying the amount of alcohol, you can get a thin, fast drying sealer coat or thicker, built-up finish.

The second use is for cleanup. I've found it works great for removing epoxy. You can wipe off the squeezeout while the epoxy is still soft. It's much easier than scraping or sanding it away after it has dried. Finally, denatured alcohol works as a "liquid eraser" to quickly remove pencil lines.

You'll find there's more to using solvents than just thinning finishes. They'll help you get better results with your projects.

Sources

You'll find most of the materials and supplies you need for the projects at a hardware store or home center. For specific products or hard-to-find items, take a look at the sources listed below. You'll find the part number listed by the company name. See the right margin for contact information.

ROUTER TABLE TUNE-UP *(p.8)*

- **Router Insert Plate**
  Kreg Tool . . . . . PRS 3030
  Woodsmith Store 618062
- **Router Insert Plate Levelers**
  Kreg Tool . . . . . PRS 3040
  Woodsmith Store 618063
- **Bit Safety Guard**
  Rockler 67157
- **Dust Collection Port**
  Rockler 35317
- **Safety Power Tool Switch**
  Rockler 20915
  Woodsmith Store 456549
- **Heavy-Duty Lifting Levelers**
  Rockler 81239
  Woodsmith Store 454430

CIRCULAR SAW BLADES *(p.13)*

- **Woodworker II 7¼" Saw Blade**
  Forrest WW07Q307100
  Woodsmith Store 222404

DRUM SANDING *(p.15)*

- **Drum Sanding Kit**
  Rockler 20859

CUSTOM SHOP *(p.16)*

- **#8 x 1¾" Washerhead Screws**
  McFeely's 0816-WAL-C
  Woodworker's Supply 146-030
- **Plastic Handles**
  Reid Supply KHO-10
- **20" Full-Extension Drawer Slides (*Accuride*)**
  Rockler 32508
  Woodsmith Store 455560
  Woodcraft 27D16
- **5" Swivel Casters**
  Rockler 31845
  Woodsmith Store 454398
- **Easy-Mount Hinges**
  Woodworker's Hardware . LAXX1
  Rockler 32407

BEAM COMPASS *(p.30)*

- **¼"-thick Anodized Aluminum Bar Stock for Beam**
  McMaster-Carr 6023K14
- **⅛"-thick Anodized Aluminum Bar Stock for Heads**
  McMaster-Carr 6023K27
- **10-32 x ⅜" Aluminum Knurled Thumbscrews**
  McMaster-Carr 94567A390

ROUTING TENONS *(p.34)*

- **½" Spiral Downcut Bit**
  Woodsmith Store 271526
  Woodcraft 822963

SHOP STOOL *(p.36)*

- **Piano Stool Hardware**
  Lee Valley 01K71.01
- **½"-13 x 1¾" Squarehead Bolts**
  McMaster-Carr 91465A164
- **½"-13 Square Nuts**
  McMaster-Carr 90043A055

DRILL BITS *(p.44)*

- **Weldon Countersink Bits**
  DK Hardware DB18
  Woodcraft 145636
- **Self-Centering Bits**
  Woodcraft 16140
  Rockler 69053
- **Plug Cutters**
  Woodcraft 146723
  Lee Valley 05J05.10
- **Circle Cutter**
  General Tools 06
  Lee Valley 99K09.01

WORK SHARP *(p.48)*

- **Work Sharp WS3000**
  Woodsmith Store 206018
  Amazon B000PVHIMW

MAIL ORDER SOURCES

Woodsmith Store
800-444-7527

Rockler
800-279-4441
rockler.com

Lee Valley
800-871-8158
leevalley.com

McFeely's
800-443-7937
mcfeelys.com

McMaster-Carr
630-833-0300
mcmaster.com

Woodworker's Hardware
800-383-0130
wwhardware.com

Woodcraft
800-225-1153
woodcraft.com

DK Hardware
305-851-2811
dkhardware.com

Amazon
amazon.com

General Tools
212-431-6100
generaltoolsandinstruments.com

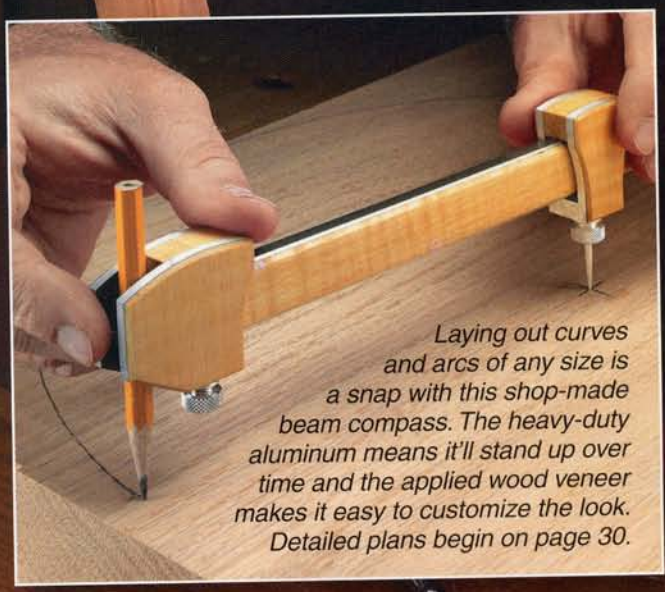
Woodworker's Supply
800-645-9292
woodworker.com

Reid Supply
800-253-0421
reidsupply.com

Forrest Manufacturing
800-733-7111
forrestblades.com

Scenes from the Shop

Stylish and practical, the shop stool shown below adjusts through a wide range of heights to suit any task. You'll find detailed, step-by-step plans on building your own shop stool starting on page 36.



Laying out curves and arcs of any size is a snap with this shop-made beam compass. The heavy-duty aluminum means it'll stand up over time and the applied wood veneer makes it easy to customize the look. Detailed plans begin on page 30.

A razor-sharp edge on any shop tool is only minutes away with the sharpening system from Work Sharp (shown above). Turn to page 48 to learn more about all the capabilities of this sharpening system and how it works.

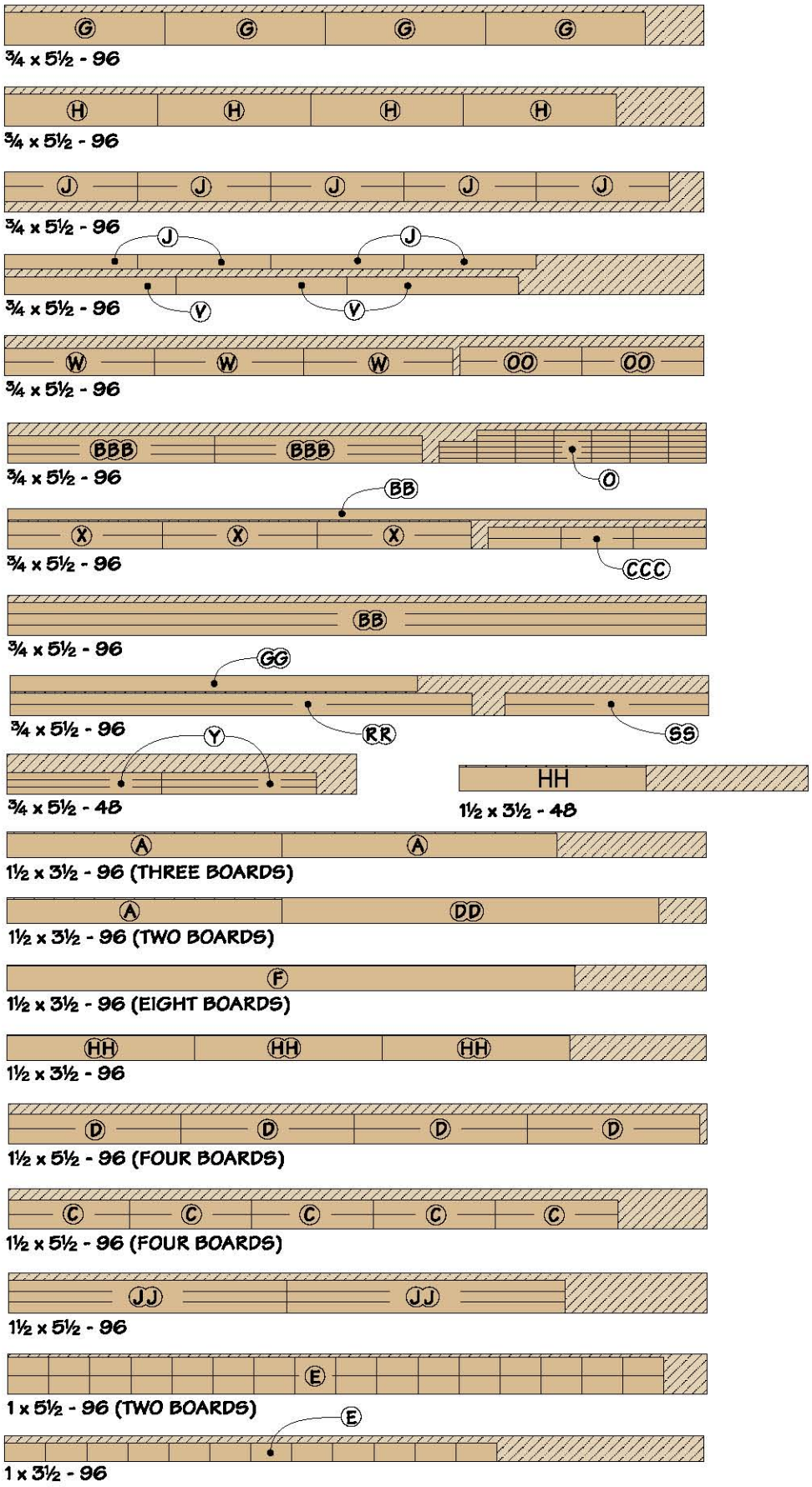
Shop Upgrade

Materials & Hardware

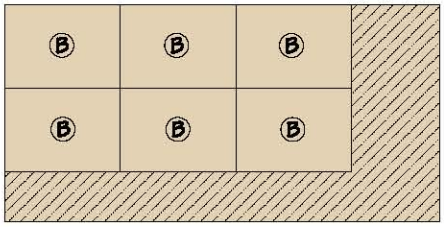
POST & PANEL COMPONENTS		
A	Base Posts (8)	1½ x 3⅜ - 37¾
B	Shelves (16)	18½ x 25½ - ½ Ply.
C	Ends (38)	1½ x 2 - 16¾
D	Fronts/Backs (32)	1½ x 2 - 23¾
E	Corner Blocks (76)	2 9/16 x 5 11/16 - 1
F	Tower Posts (8)	1½ x 3⅜ - 78
ACCESSORIES		
G	Drawer Fronts/Backs (4)	¾ x 4½ - 21¾
H	Drawer Sides (4)	¾ x 4½ - 21
I	Drawer Bottoms (2)	20 x 21¾ - ¼ Ply.
J	Cleats (14)	¾ x 2 - 18¼
K	Drawer False Frts. (2)	6⅞ x 24¼ - ¾ MDF
L	Base Doors (4)	12 1/16 x 25⅛ - ¾ MDF
M	Base Sides (4)	17¼ x 32¼ - ¾ MDF
N	Base Backs (2)	24¼ x 32¼ - ¾ MDF
O	Mounting Blocks (40)	¾ x 1 - 5¼
P	Frt./Bk. Kick Plates (8)	5¼ x 23¾ - ¾ MDF
Q	Side Kick Plates (8)	5¼ x 16¾ - ¾ MDF
R	Tower Doors (2)	12 1/16 x 72¼ - ¾ MDF
S	Tower Sides (4)	17¼ x 72½ - ¾ MDF
T	Tower Backs (2)	24¼ x 72½ - ¾ MDF
U	Trays (3)	23½ x 21 - ½ Ply.
V	Tray Fronts (3)	¾ x 2⅜ - 23½
W	Tray Side Supports (6)	¾ x 1⅞ - 20½
X	Tray Mid./Bk. Supports (6)	¾ x 1⅞ - 21¼
Y	Tray Edging (6)	¾ x 1 - 21¼
ADD-ONS		
Z	Lg. Worksurface (1)	23¼ x 82½ - 1½ MDF
AA	Sm. Worksurface (1)	23¼ x 28½ - 1½ MDF
BB	Edging (1)	¾ x 1½ - 350 rgh.
CC	End Panel (1)	23 x 37¾ - 1½ MDF
DD	Braces (2)	1½ x 3½ - 51¾
EE	Miter Saw Shelf (1)	15¼ x 28½ - 1½ MDF
FF	Shelf Braces (2)	3½ - 28½ - ¾ MDF
GG	Shelf Edging (1)	¾ x 2¼ - 57 rgh.
ROLLING CART		
HH	Cart Posts (4)	1½ x 3⅜ - 25¾
II	Shelves (3)	18½ x 40 - ½ Ply.
JJ	Front/Back (6)	1½ x 2 - 38¼
KK	Caster Plates (2)	5½ x 21 - ¾ MDF
LL	Shelf Back (4)	10¼ x 21½ - ¾ MDF
MM	Shelf Sides (8)	2⅜ x 10¼ - ¾ MDF
NN	Cart Sides (4)	3⅜ x 25½ - ¾ MDF
OO	Shelf Cleat (4)	¾ x 2 - 16¾
PP	Top (1)	22½ x 46½ - 1½ MDF
WALL STORAGE		
QQ	Pegboard Panel (1)	28 x 66½ - ¼ Pgbd.
RR	Long Cleats (2)	¾ x 1½ - 63½
SS	Short Cleats (2)	¾ x 1½ - 28
TT	Top/Bottom (2)	6 x 66½ - ¾ MDF
UU	Ends (6)	6 x 7 - ¾ MDF
VV	Shelves/Dividers (10)	5¼ x 7 - ¾ MDF
WW	Long Back (1)	7 x 65½ - ¾ MDF
XX	Sides (4)	6 x 36 - ¾ MDF
YY	Short Backs (2)	7 x 35 - ¾ MDF
ZZ	Wall Cabinet Sides (2)	12 x 18 - ¾ MDF
AAA	Wall Cabinet Shelves (3)	11 x 28½ - ½ Ply.
BBB	Shelf Edging (6)	¾ x 1¼ - 28½
CCC	Shelf Supports (6)	¾ x 1½ - 10

- (76) ½" x 5" Carriage Bolts
- (76) ½" Flat Washers
- (76) ½" Hex Nuts
- (204) #8 x 1¾" Washerhead Screws
- (152) #8 x 2" Fh Woodscrews
- (166) #8 x 1½" Fh Woodscrews
- (36) #8 x 2½" Fh Woodscrews
- (2) #8 x 3" Fh Woodscrews
- (5 pr.) 20" Full-Extension Drawer Slides
- (8) 5¼" Handles w/Screws
- (14) Easy-Mount Hinges w/Screws
- (32) #8 x 1¼" Fh Woodscrews
- (18) Leg Levelers
- (18) ⅜" T-Nuts
- (6) #8 x 2½" Fh Woodscrews
- (4) 5" Locking Swivel Casters
- (16) #14 x ¾" Sheet Metal Screws

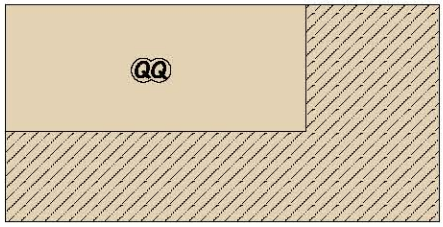
Cutting Diagram (lumber)



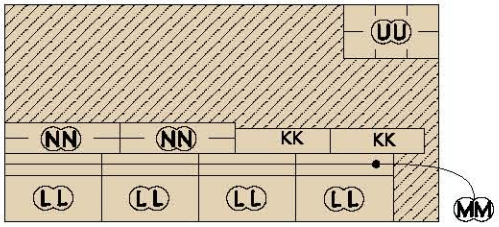
Cutting Diagram (sheet stock)



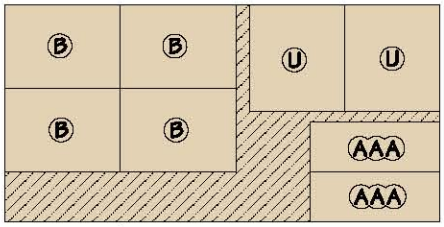
48 x 96 - ½ PLY (TWO SHEETS)



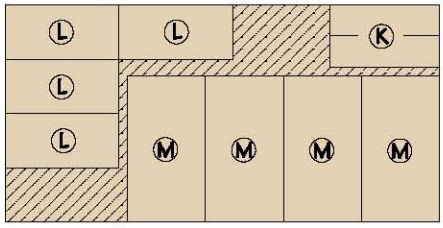
48 X 96 - ¼ PEGBOARD



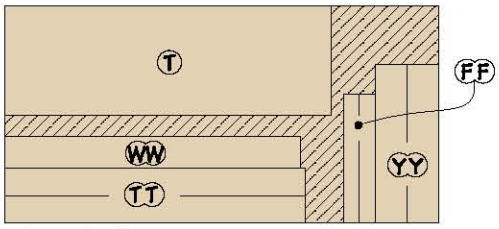
48 X 96 - ¾ MDF



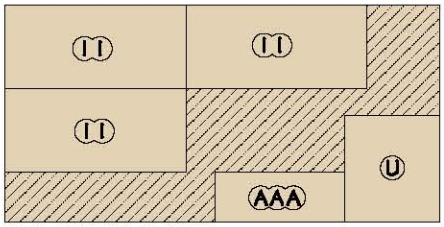
48 x 96 - ½ PLY



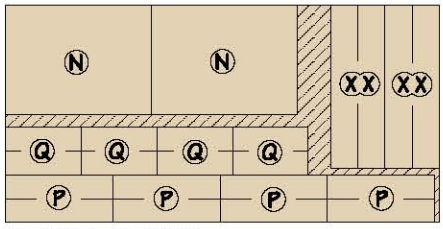
48 X 96 - ¾ MDF



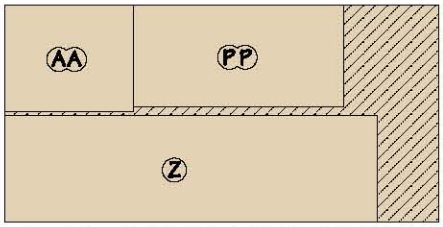
48 X 96 - ¾ MDF



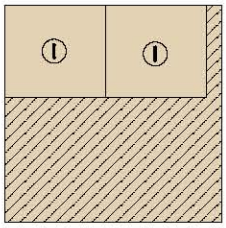
48 x 96 - ½ PLY



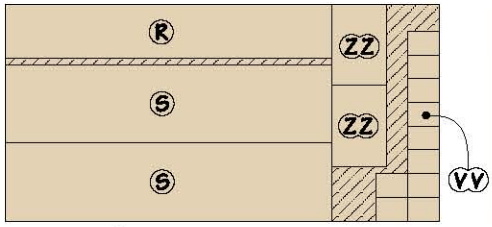
48 X 96 - ¾ MDF



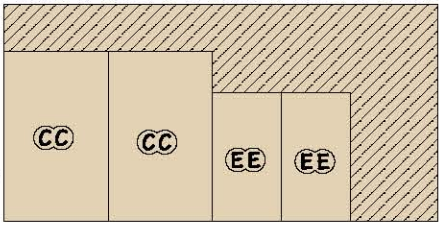
48 x 96 - ¾ MDF (TWO SHEETS)



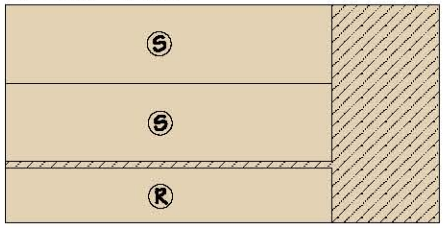
48 x 48 - ¼ PLY



48 X 96 - ¾ MDF



48 x 48 - ¾ MDF



48 X 96 - ¾ MDF

