ASSEMBLY SECRETS Of The Pros p.26

STRONG JOINTS — Super Simple Setup p.8

ShopNotes®

ShopNotes.com

Vol. 23 Issue 135

Drill Press Upgrade

- Easily Adjustable
- Large Worksurface
- Versatile Fence

PLUS:

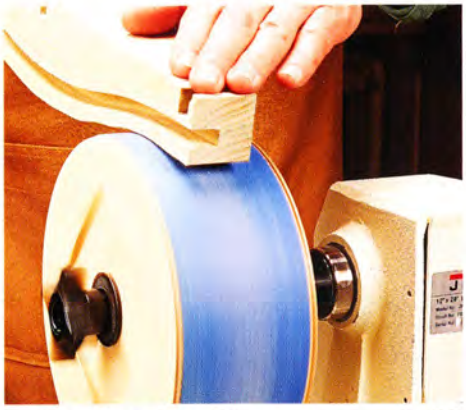
Simple Tools to Save Time Sanding p.42

Work Smarter, Not Harder: Table Saw Tips p.44

Tough Cuts Made Easy with Shop-Made Accessories p.46

Custom Details for Better-Looking Projects p.40

Tower Cart *page 14*



Lathe Sanding Drum *page 30*

Adding Custom Details *page 40*

Contents

Features

weekend workshop
Space-Saving 3-Tier Tower Cart ____ 14
This handy cart maximizes the space in any shop yet keeps tools at the ready.

storage solutions
Benchtop Table Saw Stand ____ GO ONLINE EXTRAS 18
Turn your benchtop saw into a big-time shop tool with this feature-packed stand.

hands-on technique
Gluing Thin Stock ____ 26
Learn the tips and tricks for gluing thin stock into flat, smooth panels.

best-built jigs & fixtures
Lathe Sanding Drum for Curved Parts ____ 30
Your lathe can serve double-duty as a sanding drum with this easy-to-build project.

best-built jigs & fixtures
Easy-Adjust Drill Press Table ____ 34
This unique design makes raising and lowering your table hassle-free. A large worksurface and easy-to-adjust fence make it an ideal upgrade.

Departments

Readers' Tips ____ 4

router workshop
Setting Up a Lock Miter Bit ____ 8
Set up a lock miter bit in your router table with ease using this handy aftermarket gauge.

jigs & accessories
Woodhaven Box Joint Jig ____ 10
Big box joints are a snap with this new jig. The jig is accurate and easy to use.

materials & hardware
Heavy-Duty Fasteners ____ 12
Here's what you need to know to choose stout and sturdy fasteners for your next big project.

Shop Short Cuts ____ 28
Check out our shop-tested tips and techniques for solving your woodworking problems.

hands-on technique
Custom Details: Chamfers & Bevels ____ 40
Simple hand tools and techniques allow you to add one-of-a-kind details to any project.

Benchtop Table Saw Stand *page 18*

in the shop
Sanding Blocks for Smooth Surfaces ____ 42
These sanding solutions help you create flat, smooth surfaces and crisp details in less time.

setting up shop
Locating Your Table Saw ____ 44
Get the most out of your table saw by locating it right using our time-tested tips.

mastering the table saw
Top-Notch Auxiliary Fences ____ 46
A set of shop-made auxiliary fences is the key to safer, more accurate cuts at the table saw.

great gear
Must-Have Shop Pencils ____ 48
Get better layouts and results by using the right shop pencil for any shop task.

Q&A ____ 50

Sources ____ 51

Cutoffs

There are times when we feature a project that leaves me wondering, "Why hasn't someone done this before?" In this issue, it happens to be the drill press table shown on the cover (the detailed plans start on page 34).

At first glance, it looks like a typical drill press table with a large worksurface, an adjustable fence, and a replaceable insert — all must-have features. But the amazing part is what's underneath the table. There you'll find a clever solution to the main problem of adding a large table to any drill press — the hassle of reaching around to the back to make adjustments. It can be difficult to loosen the table lock and crank the handle to adjust the table height up or down without banging your knuckles.

Fortunately, this isn't a problem with this drill press table. The miter gears and shafts we used allow you to make adjustments from the side and the front of the table. The result is easier access and no more pulled muscles or skinned knuckles. In fact, I "borrowed" the plans one weekend and built my own table for the drill press in my home shop. Major kudos to Chris Fitch, one of our designers, for coming up with this new take on a basic workshop necessity.

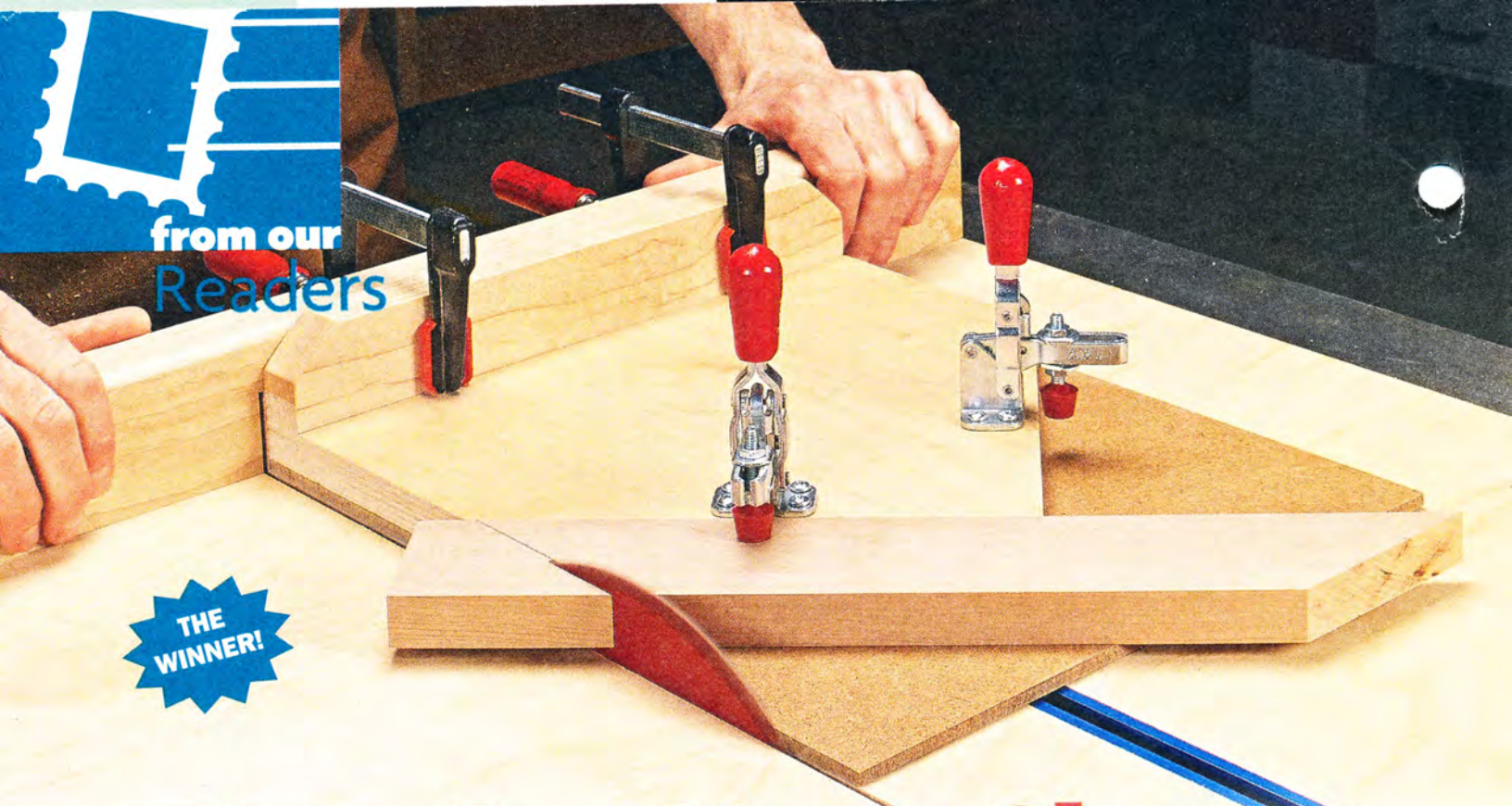
Along the lines of improving your shop, you'll find other great projects inside, like the three-tier tower cart (page 14) that makes more out of the space you have. Combined with the tips, tricks, and techniques throughout the rest of the issue, you'll be getting more from your tools and shop in no time.

Bryan

ShopNotes GO ONLINE EXTRAS

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

from our Readers

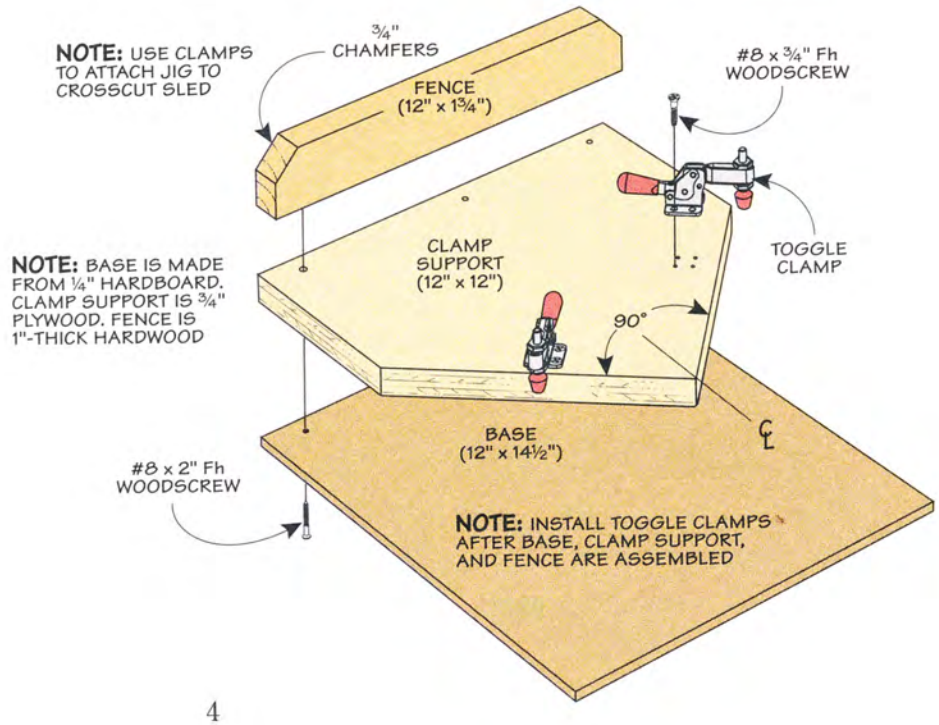


THE WINNER!

Tips for Your Shop

Versatile Miter Jig

Instead of a miter gauge, I prefer to use a sled for all of my crosscutting at the table saw. To avoid having to remove the sled to make mitered cuts, I came up with this simple jig. The miter jig clamps to the crosscut sled to make accurate 45° cuts. Then it's quick to remove to use the crosscut sled for straight cuts. This jig is also versatile enough to be used by itself by running it against the table saw rip fence to make mitered cuts.



To build the miter jig, start by cutting the hardboard base and the plywood clamp support to final size. Use a combination square to lay out the angles on the front edge. Taking extra care to lay out and cut these edges will ensure the accuracy of the jig. The base and clamp support are then held together with glue. The fence is cut from solid stock and is attached with screws through the bottom of the base and clamp support.

Making a miter cut using the jig is simple. Just clamp it to the back fence of the crosscut sled as shown above. Make sure the jig lines up with the kerf line of the sled. (The jig can be placed on either side of the saw kerf.) Set a workpiece against the clamp support and lock it in place using a toggle clamp. Now just push the crosscut sled forward to make the cut on your workpiece.

Min-Hao Kuo
East Lansing, Michigan

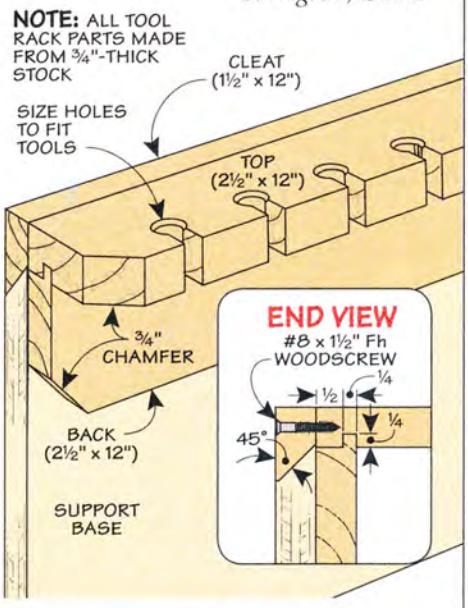
Portable Tool Rack

I often find myself walking back and forth from my tool cabinet to my workbench to fetch a tool. In order to save a few steps, I made a set of these portable tool racks. The racks allow me to bring several of my commonly used hand tools to my bench. They store conveniently out of the way when not being used.

The tool racks utilize a French cleat-style mounting system. The support base of the mounting system is simply a plywood board with a 45° angle cut on the top edge. It can be clamped to the end of my workbench when in use. I made my support base long enough to hold two individual tool racks at the same time.

The tool racks are made from ¾"-thick solid stock. Each rack is customized to fit whatever hand tools you need to keep close by. I have one rack for screwdrivers, one for chisels, and one for layout tools.

Jim Moorehead
Barrigada, Guam



Submit Your Tips!

If you have an original shop tip, we would like to consider it for publication. Go to:

ShopNotes.com
and click on the link
SUBMIT A TIP

There, you'll be able to describe your tip in detail and upload photos or drawings. Or you can mail your tip to the editorial address shown in the right margin. We will pay up to $200 if we publish your tip. And if your tip is selected as the top tip, you'll also receive a *Kreg K5 Jig*.

ShopNotes
Issue 135 May/June 2014

ShopNotes® (ISSN 1062-9696) is published bimonthly by August Home Publishing, 2200 Grand Ave., Des Moines, IA 50312.
ShopNotes® is a registered trademark of August Home Publishing

Single copy: $4.95 U.S. / $6.95 CDN
Canada Post Agreement Number 40038201.
Send change of address information and blocks of undeliverable copies to:
P.O. Box 881, Station Main
Markham, ON L3P 8M6
Canada BN 84597 5473 RT
Periodicals Postage Paid at Des Moines, IA and at additional mailing offices.
Postmaster: Send change of address to:
ShopNotes, P.O. Box 37106, Boone, IA 50037-0106

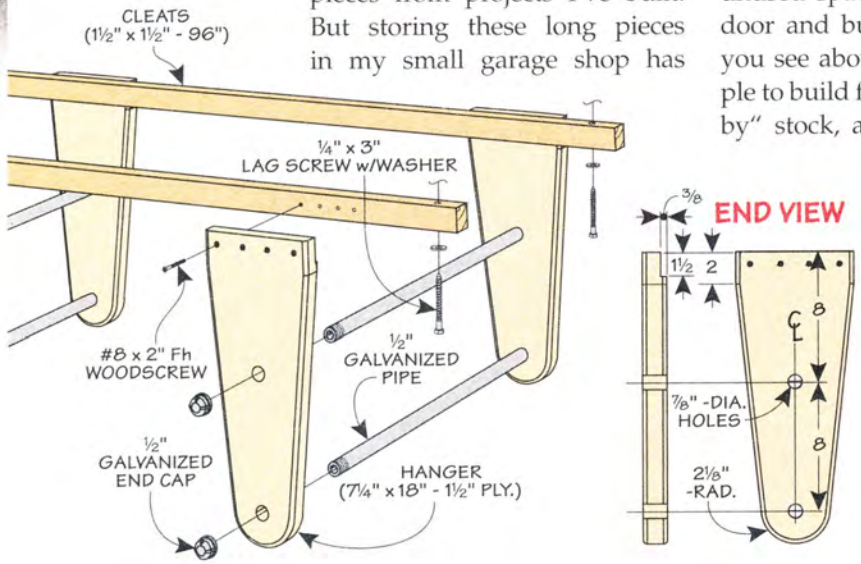
Overhead Storage Rack

I don't like to throw away left-over trim, pipes, and long cutoff pieces from projects I've built. But storing these long pieces in my small garage shop has always been cumbersome. So I decided to take advantage of the unused space above my garage door and built the storage rack you see above. This rack is simple to build from plywood, "two-by" stock, and galvanized pipe with end caps. I even made my rack with two levels for increased storage space and to help keep items neatly arranged.

If your garage ceiling is finished like mine, start by locating the joists and screwing the cleats to the ceiling using lag screws. Make sure the lag screws are long enough to penetrate the joists by 1½" or more. I used screws to secure the pipe hangers to the cleats. The hangers can be spaced closer together depending on the weight load. I designed my rack for light-duty use.

With an end cap fastened to one end, run each pipe through a hole in one hanger and into the adjacent hanger. Screw the cap on the other end of the pipe, and you're ready to start putting this storage rack to use.

Edward Stiles
Lawton, Oklahoma



Quick Tips

▲ *In order to sand tight grooves,* ***Leo Blaskowski*** *of Winona, Minnesota, files a chisel edge on a piece of rod that has the same diameter as the groove. It's easy to scrape the groove smooth this way.*

▲ ***Gerald Garrison*** *of Yellville, Arizona, uses horse stall mats, found in most farm stores, as anti-fatigue mats in his shop. These inexpensive, thick rubber mats are typically 4' x 6' but can easily be cut to smaller sizes with a circular saw.*

Add-On Power Strip

Last year, I built the shop vacuum dust collection cart that was featured in *ShopNotes* No. 109. This roll-around cart holds my shop vacuum and a cyclone dust collector and allows me to move the cart around my shop wherever it's needed. I really enjoy the convenience of this cart, but realized that it could benefit from an on-board electrical outlet. So I mounted a power strip (photo, right) to the side of my dust collection cart.

Having a power strip mounted directly on the dust collection cart allows me to plug in my shop vacuum, as well as whatever power tool is currently hooked up to the dust collector. This setup keeps the number of extension cords laying on my shop floor to a minimum.

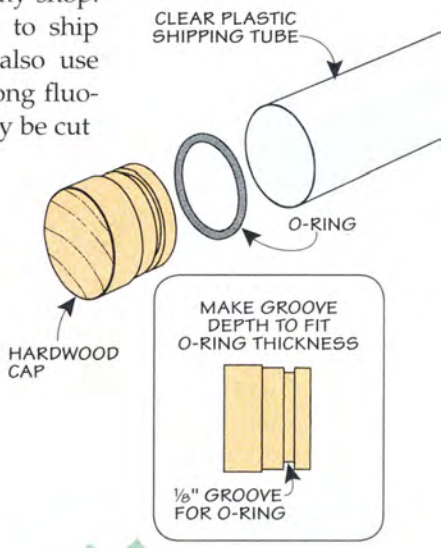
Allen Wildasin
Roseland, Nebraska

Small Parts Storage

I often need storage containers to hold small parts and hardware in my shop. I decided to make my own containers by using clear plastic shipping tubes that I had around my shop. Manufacturers often use these tubes to ship long items, like T-track. You could also use inexpensive safety sleeves made for long fluorescent light bulbs. The tubes can easily be cut to any size, up to four feet long.

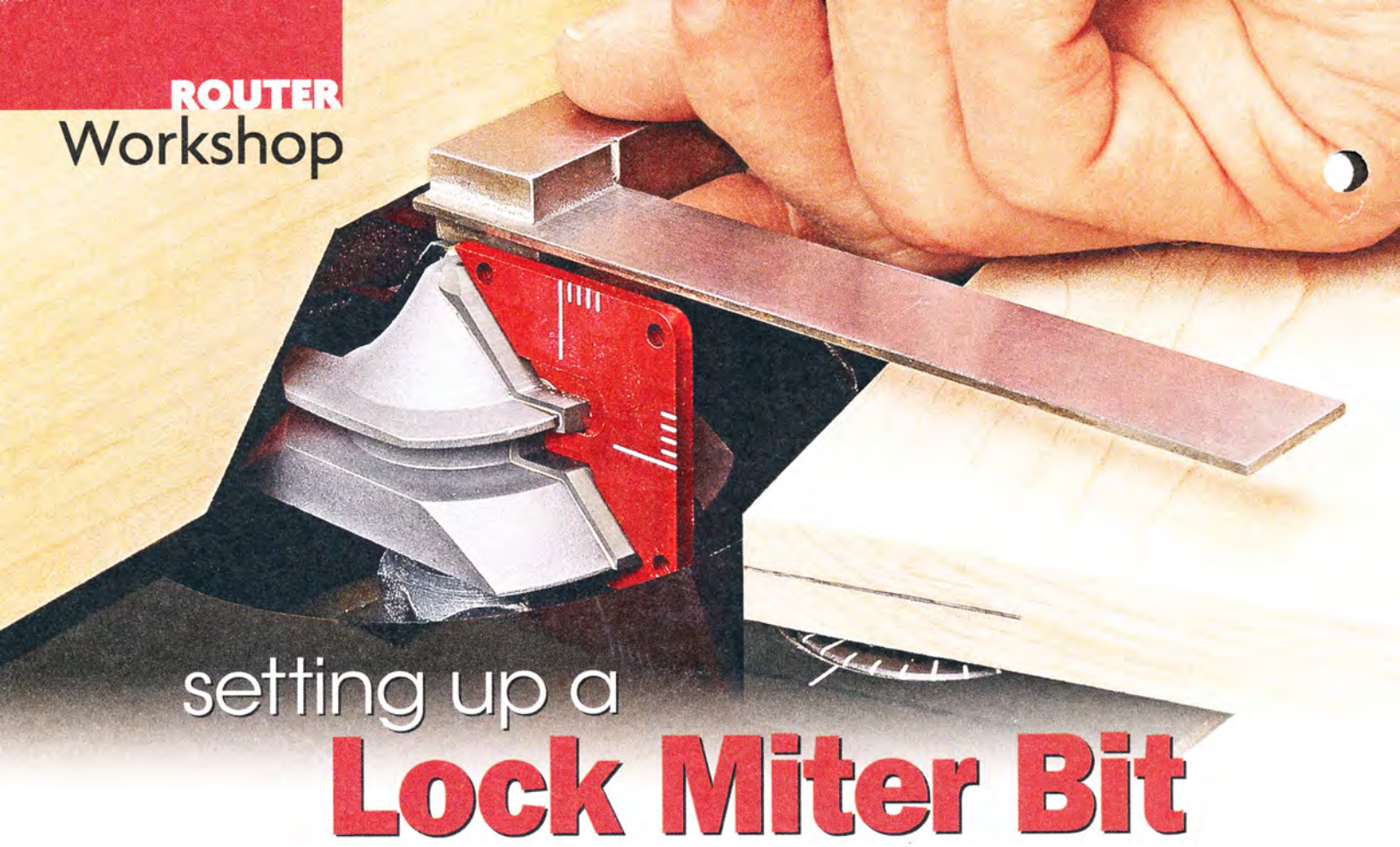
I make the caps for the containers at the lathe. An O-ring fits in a groove cut in the cap to provide a friction fit in the tube.

Gary Lee
Tacoma, Washington



▲ *To keep small parts from sticking to his bench while applying finish,* ***Peter Sherrill*** *of Forestville, Wisconsin, elevates the parts with a loop or two of masking tape.*

▲ ***Steve French*** *of Lakeland, Florida, uses an inexpensive tire tread depth gauge as a marking and measurement transfer tool in his shop.*



setting up a Lock Miter Bit

A handy gauge takes the hassle out of setting up this versatile bit in your router table.

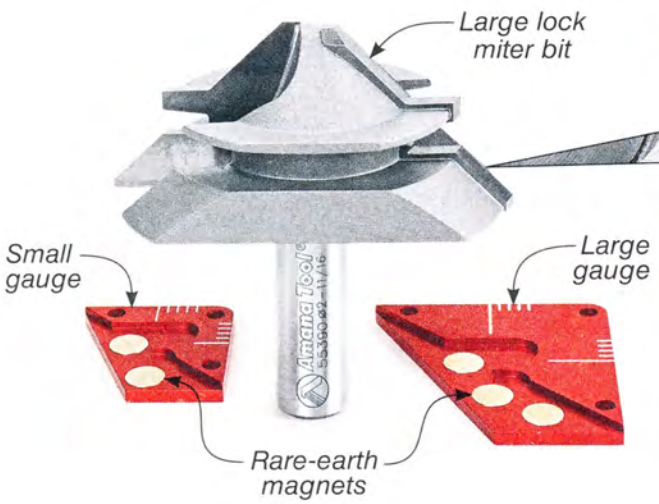
Several years ago, I bought a lock miter router bit, thinking it was an ideal solution to strong, perfect-fitting miter joints. The idea behind the bit is simple and ingenious. With a single setup, the bit allows you to rout both halves of a miter joint that incorporates a tongue and groove. This aligns the joint for assembly and creates an interlocking connection that increases its overall strength. It works great for everything from boxes and cabinets to table legs. (See the box on the facing page.)

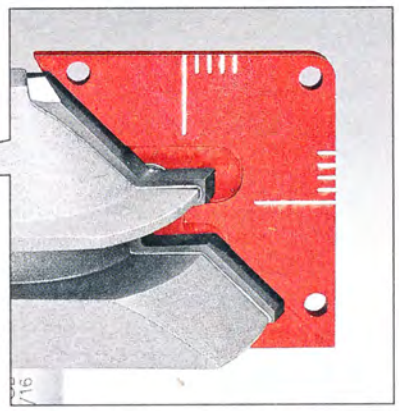
A Sticking Point. The bit certainly lived up to the hype. But there's a downside. The setup can be time-consuming. The reason is the bit height and fence setting work together and in turn, depend on the thickness of the parts being routed.

You could make a setup block once the bit is dialed in. But unless you're using parts that are *exactly* the same thickness, you'll still have some fine-tuning and test cuts to make.

So despite my initial enthusiasm, my lock miter bit has been sitting unused in my router bit drawer for some time.

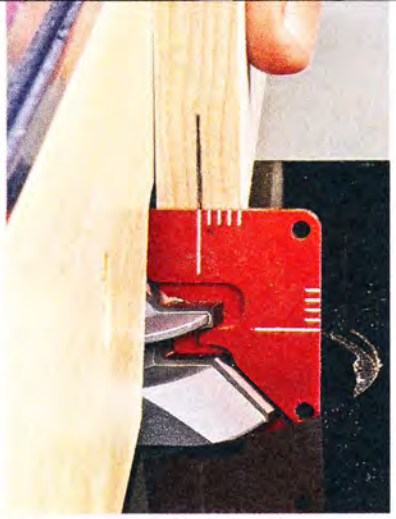
Setup Gauge. As it turns out, all a lock miter bit needs is a sidekick. *Infinity Cutting Tools* recently came out with a set of clever gauges, as shown in the far left photo. The gauges ($60) are sold as a pair to work with either small or large versions of any lock miter bit. They transform the setup from tedious to trouble-free.





▲ ***Registration.*** *The raised edge of the gauge should be tight against the cutting edge.*

▲ ***Bit Height.*** *Raise the bit so the line on the gauge aligns with the one on the workpiece.*



▲ ***Fence Setting.*** *With the part held vertically, move the fence until the centerlines meet.*

▲ ***Face Down.*** *Rout the first part of the joint with the inside face of the workpiece down on the router table. A backer board prevents tearout.*

Using the Gauge. Magnets in the gauge secure it to the bit. The lower right photo on the facing page shows how to align the gauge. Position the gauge so the recess in the face is against the angled cutting edge. The recess should also be tucked against the underside of the groove-cutting portion of the bit.

Router Table Setup. With the bit installed in the router table and the gauge in place, the setup goes pretty quickly. The first step is to mark a centerline on the thickness of one of your pieces. This line corresponds with the longer horizontal and vertical lines on the gauge. (The shorter lines are used for creating offset joints.)

The upper left photo shows how the bit height is determined. With the workpiece flat on the table, adjust the bit height so the centerline on the gauge and workpiece are aligned.

Setting the fence works about the same. The only difference is the workpiece is held vertically against the fence (middle photo). In order to get an accurate reading, you need to rotate the router bit so the cutting edge (and gauge) is square to the router table fence, as shown in the main photo on the opposite page.

Routing the Joint. From here, you're ready to rout a joint. The photos above right show each of the two types of cut. I like to use a backer board to prevent tearout as the router bit exits the cut.

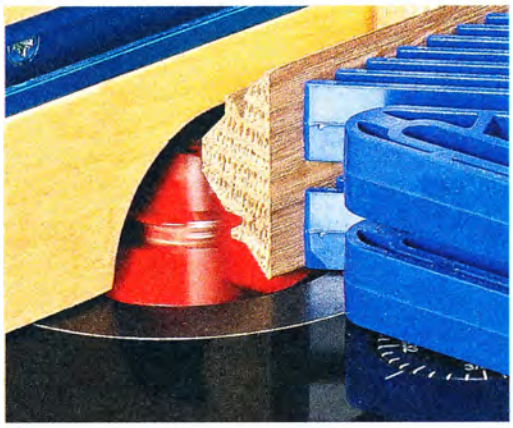
The real payoff comes when you assemble the joint. Right out of the gate, you get a tight-fitting, good-looking joint. The setup time you save means you're more likely to reach for your lock miter bit on future projects.

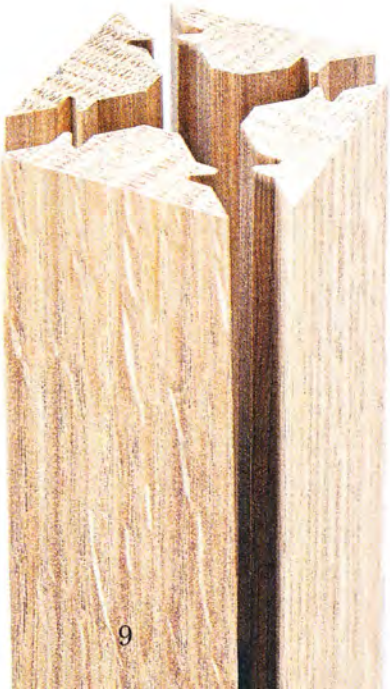
▲ ***On End.*** *The mating part of the joint is cut with the workpiece held vertically against the fence. The backer board helps keep it square.*

grain matching with One Bit Setup

The straight grain and ray flecks found in quartersawn white oak are one of the hallmarks of Craftsman-style furniture. But when furniture legs are made from a single, solid blank, you are typically left with quartersawn figure on only two faces of the leg.

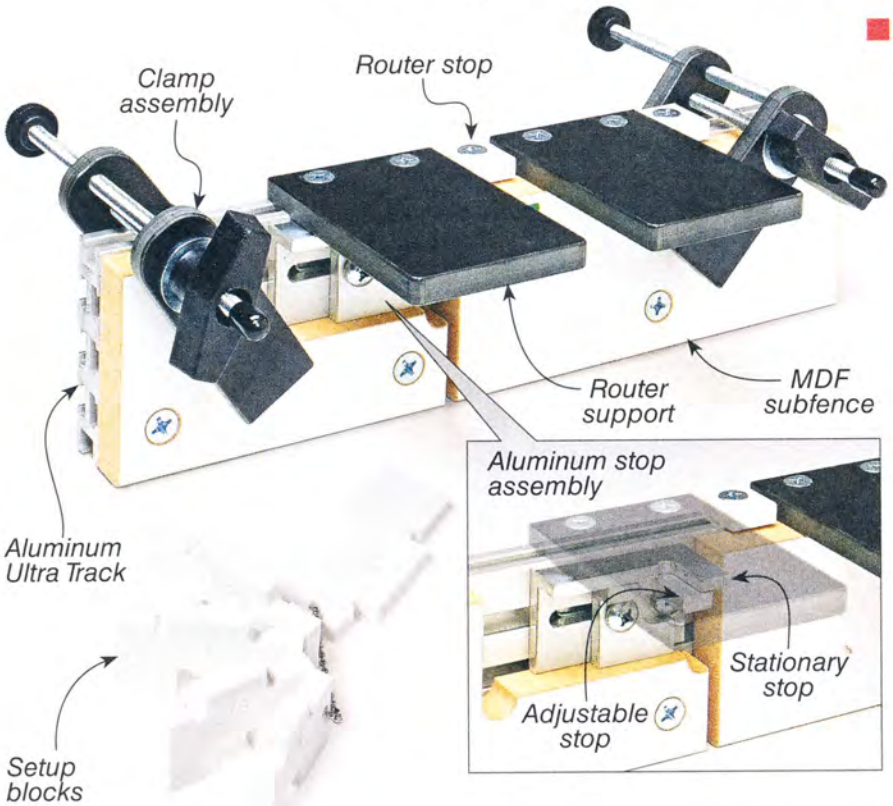
The solution is to create legs from four separate pieces. Each leg section has a profile that interlocks with the adjacent section. The *Infinity* gauge makes it easy to set up for these cuts, just as shown above. Be sure to alternate the profiles on each edge, as in the near right photo.





portable
Box Joint Jig

Take box joints to new dimensions with this router jig. It's designed to make wide joints on casework.



Box joints, with their interlocking fingers, have been a favorite of box builders for over 100 years. Factories use specialized machinery to mass-produce box joints. In the home shop, the table saw or router table does the job.

But there's a limitation in the size of the box and joinery you can create using these tools. For large casework like blanket chests, toy boxes, and tool chests, making box joints this way can be cumbersome, at best.

A better solution is the *Portable Box Joint Jig* from *Woodhaven*. It's unique in that the jig fastens to the workpiece and you use a hand-held router to cut the joinery. With this method, you're not limited by the size of the workpiece as you might be at the router table or table saw.

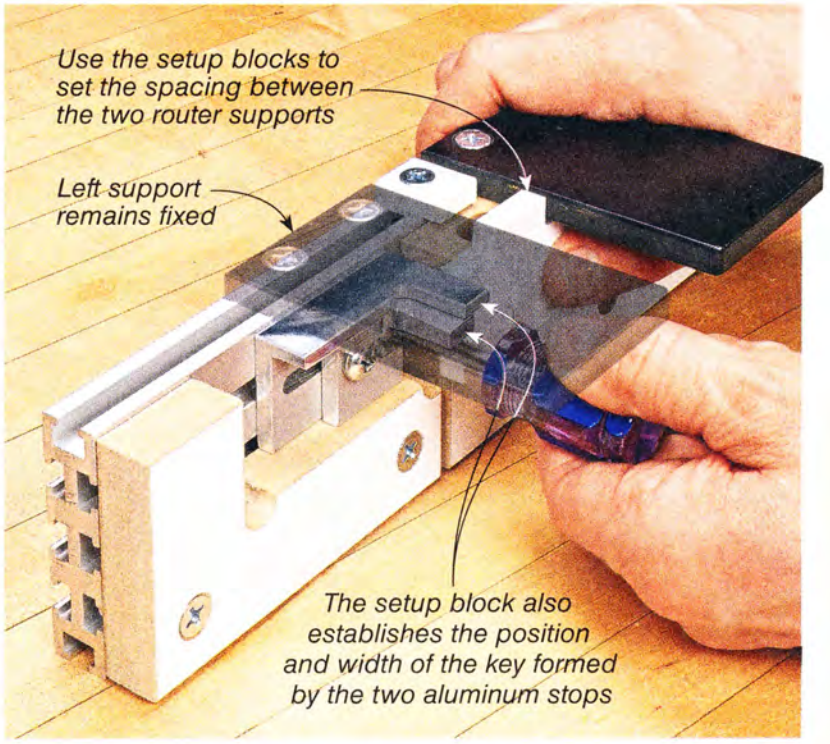
An Overview. As you can see on the left, the box joint jig is pretty compact. All of the parts are mounted to a section of extruded aluminum that incorporates T-tracks. The included instructions tell you everything you need to know to set it up. It took me about 30 minutes to assemble the jig before cutting joinery.

To rout box joints, you'll need a ¾"-dia. guide bushing and a ½" straight bit. (A spiral upcut bit is recommended because it cuts cleanly.) Two phenolic router supports provide a stable base for the router and set the spacing between the fingers of the joint. The bushing rides between the supports. The white stops prevent the bit from cutting into the aluminum track.

Two aluminum stops under the left router support act as a "key," similar to the key on traditional box joint jigs you'd use at the router table or table saw.

The jig includes a variety of plastic setup blocks for cutting box joints from ½" wide up to 1 9/16" wide. You can cut these joints in workpieces from ½" to 2" thick. The setup blocks help establish the distance between the router supports plus the width and distance of the two stops, as you can see above.

Integrated clamps secure the jig to the workpiece. However, when cutting the first and last few slots on a workpiece, one of the clamps won't reach. So you'll need an additional clamp, as shown in the main photo on the opposite page.

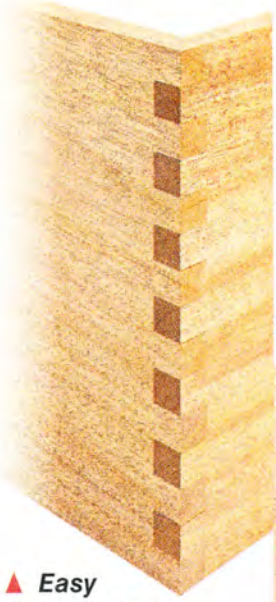


Using the jig is a simple process. Place the router on the supports with the bit between them. Turn on the router and then rout in a clockwise direction with the bushing against the supports. Turn off the router and pull it straight out to avoid damaging the router supports.

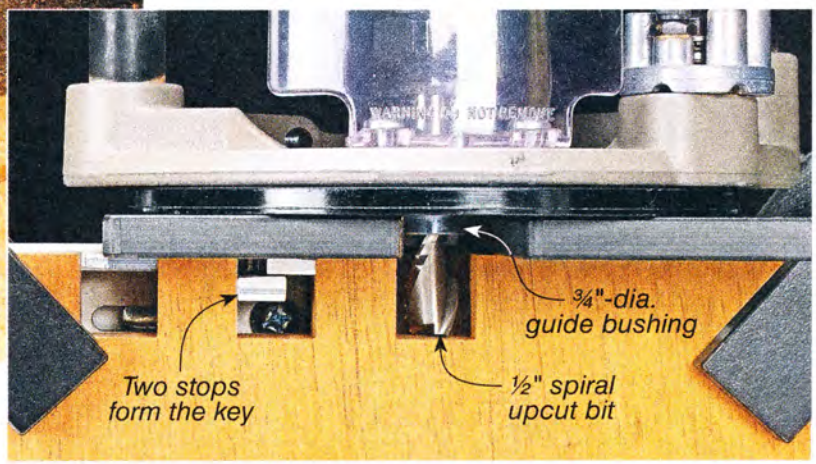
Hopscotch. To rout the next notch, you need to move the jig over, slipping the two aluminum stops into the notch you just routed (photos below). It's a much slower process than other methods, but the results speak for themselves, as you can see in the margin photo at right.

The MDF sub-fences prevent tearout on the back side of the cut. And the spiral bit does a great job of removing chips and leaving a clean joint.

Overall, I found the jig easy to set up and use. It does take a little time to rout all of the joints, but you develop a rhythm after awhile. For creating box joints on larger projects, I can't think of a better solution. For large boxes, the $120 jig is well-designed and worth the investment.



▲ ***Easy Joinery.*** *With a little patience, you can create tight-fitting box joints in large workpieces.*



▲ ***Three-Step Process.*** *To rout the box joints, clamp the jig with the key engaged in the previous slot, rout, and then move the jig over one notch.*

heavy-duty Fasteners

When you need extra holding power, choose one of these hardworking options.

Woodscrews are my fasteners of choice for most tasks. But every once in a while, a project comes up in my shop where I need something stronger. The tower cart on page 14, which is built to hold heavy tools and equipment, is a good example.

In these situations, I'll turn to heavy-duty fasteners like lag screws, carriage bolts, and lock nuts. All three of these choices offer a step up from standard screws and nuts in terms of strength and holding power. Here's what you need to know to choose the right one for your project.

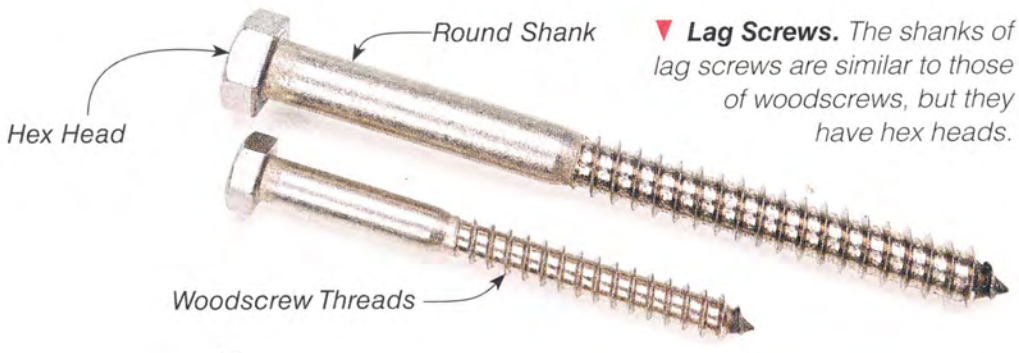
LAG SCREWS

With a pointed end and a tapered, threaded shank that pulls the fastener into wood, lag screws share similarities with woodscrews. One big difference, of course, is that lags are larger in diameter. This means you'll definitely want to drill a pilot hole for the threads and a larger hole for the shank before installing them. They're also available in greater lengths than woodscrews. These features give lags big-time load capacity.

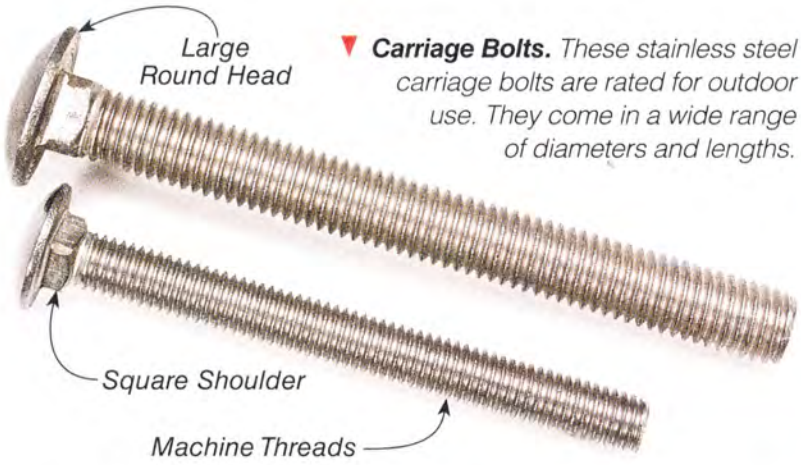
Another advantage of lags is their hex head, which allows you to drive them with a socket or wrench. By pairing them with washers, you can get even more holding power (photo above). The washer also prevents the head from embedding in the wood.

At the hardware store or home center, you'll find lag screws in diameters ranging from ¼" to ½", with lengths from 1" to over 12". Zinc-plated are the least expensive and suitable for indoor use. For outdoor fixtures, you'll want galvanized or stainless steel lags.

Lag screws, as well as the carriage bolts I'll discuss next, are available in stronger "grades" from specialty suppliers. But the options at home centers and hardware stores should be plenty strong for general shop use.



▼ ***Lag Screws.*** *The shanks of lag screws are similar to those of woodscrews, but they have hex heads.*



▼ **Carriage Bolts.** *These stainless steel carriage bolts are rated for outdoor use. They come in a wide range of diameters and lengths.*

When I need a sturdy wood-to-wood connection that I'm probably not going to take apart, that's when I'll use lag screws. Shelves that hold heavy loads or wall-mounted workstations are just two of many possible uses for these hardworking fasteners.

CARRIAGE BOLTS

Carriage bolts come in the same finishes, diameters, and lengths as lag screws. But I tend to use them for different purposes. The distinguishing feature of a carriage bolt is its round head with a square shoulder underneath. By tapping the square shoulder into the workpiece (inset photo at right), you can thread a nut or knob on the other end without the bolt spinning (upper right).

This strength and versatility make carriage bolts a perfect choice for jigs and fixtures around my shop, like the drill press fence shown above. The sturdy shank and square head ensure that the fastener stays put once it's tightened down. But the bolt can also be released easily if adjustments are needed.

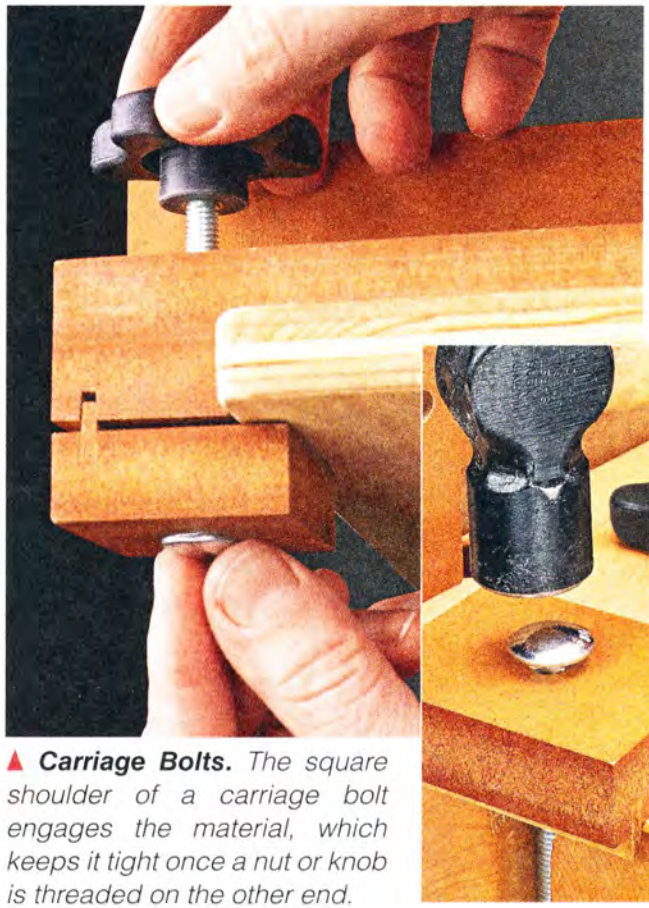
LOCK NUTS

Of course, the strongest bolt in the world won't do you much good if the nut on the other end comes loose. And there are some jigs and fixtures in my shop where this is a legitimate concern. Mobile tool bases and sliding, adjustable jigs are just a couple of possibilities that come to mind.

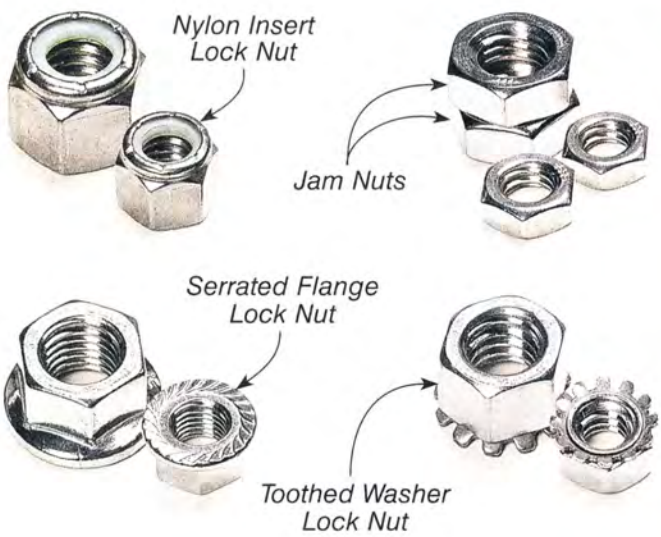
In these situations, lock nuts are a great choice. As you can see below, they come in several different varieties. But each one has a specific feature that prevents the nut from working itself loose once in place.

Nylon insert lock nuts are probably the most common. When tightened, the compression of the nylon ring against the bolt prevents loosening. The toothed washer and serrated flange nuts work similarly to one another. They rotate freely like a regular nut, but then they'll lock once tightened up against a surface.

Jam nuts are probably the simplest "lock nuts" of all. These are nothing more than two thin nuts of the same diameter. When you tighten one nut against the other using a pair of wrenches, the jam nuts stay locked in place.



▲ **Carriage Bolts.** *The square shoulder of a carriage bolt engages the material, which keeps it tight once a nut or knob is threaded on the other end.*



◄ **Lock Nuts.** *Lock nuts use a variety of methods that prevent them from working loose. This makes them great for adjustable jigs or mobile tool bases.*

weekend workshop

3-tier Tower Cart

Go vertical with this handy cart to free up valuable floor space in your shop.

In my small shop, it's a constant struggle to keep clutter at bay. It seems that every flat surface is a magnet for everything from tools to project parts to hardware.

In an effort to free up the already crowded floor space, I built the tower cart you see here. The three sturdy shelves allow you to store several tools and accessories vertically.

The wide base provides stability when rolling the cart on its locking casters. You can position the middle shelf to serve as an auxiliary worksurface. And each shelf includes a drawer that's accessible from either side of the cart. All in all, this practical, easy-to-build cart is a must-have in any woodworking shop.

start with the
Ends

The great thing about this cart is that you can build it in a weekend. I built it from maple but you could easily construct it with "two-by" lumber to save a few dollars on the material.

Posts. The construction starts out with a pair of identical end assemblies (Figure 1). These feature a pair of posts tied together at the top with a short rail. Half-lap joinery ensures a strong rail-to-post connection.

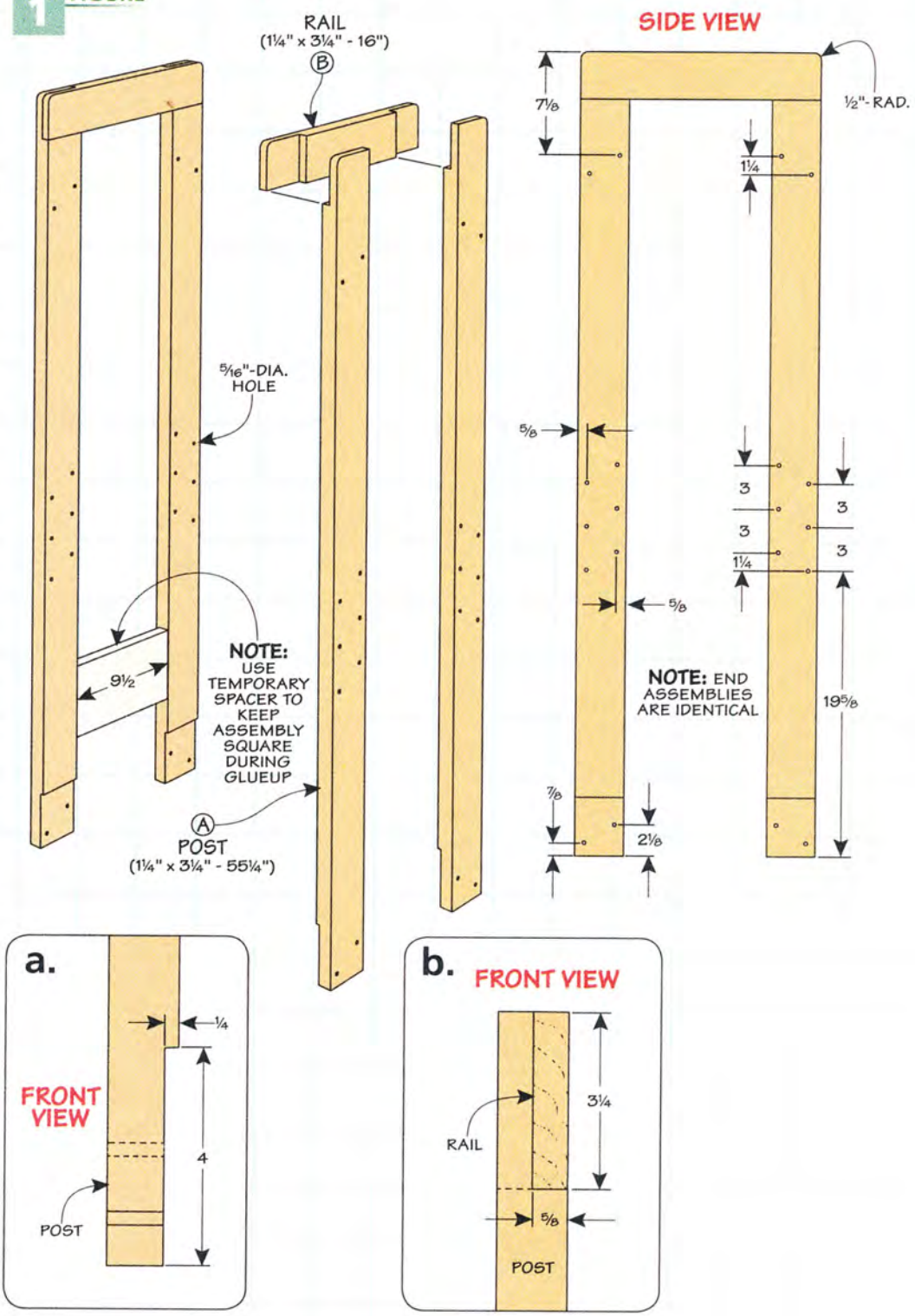
The posts are cut to size before forming the joinery at each end. A shallow rabbet at the bottom of the post wraps around the base of the cart, as in Figure 1a. I used a dado blade in the table saw to cut the rabbets and half laps.

Drilling. The base and shelves will be secured to the post assemblies with lag screws. So I took the time here to drill all of the shank holes in the posts. There are three sets of holes for the middle shelf to allow for adjustment in the position if needed.

Short Rails. The rails are easy to make. Simply cut them to size, then cut the half laps on the ends to mate with those at the top of each pair of posts (Figure 1b).

Glueup. Before gluing the rails to the posts, it's a good idea to cut a spacer to fit between the posts. This way, the assembly will stay square as you tighten the clamps. After the glue is dry, you can round off the top corners of the end assemblies.

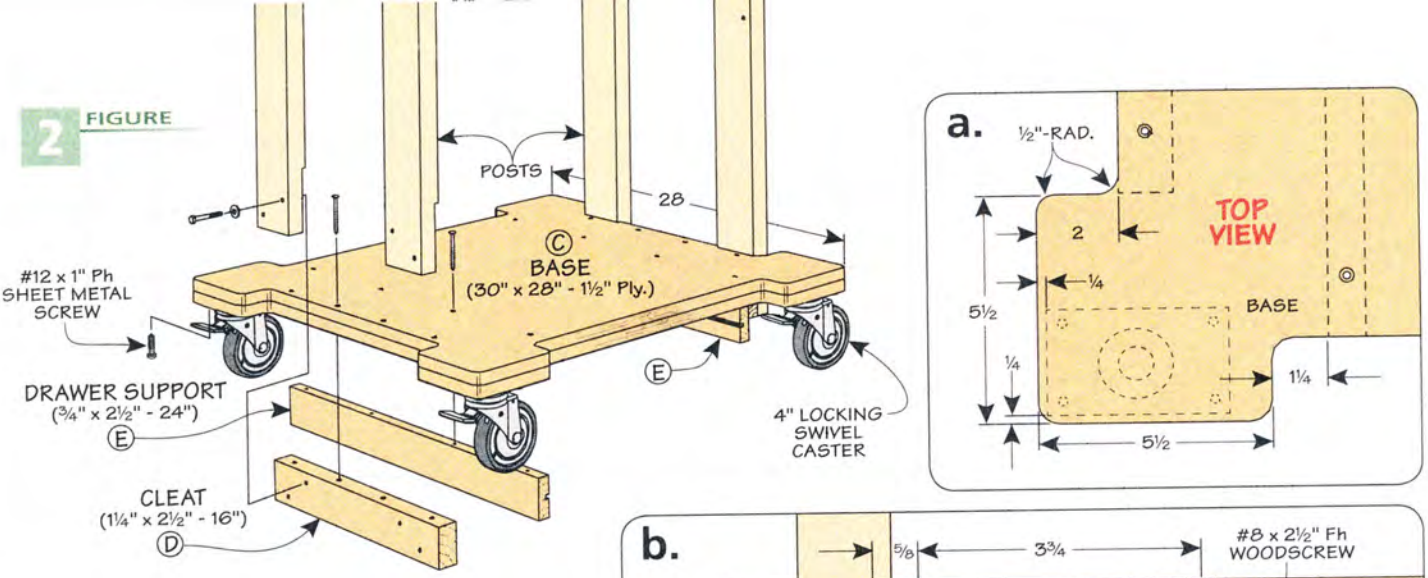
FIGURE 1



Materials & Hardware

A	Posts (4)	1¼ x 3¼ - 55¼
B	Rails (2)	1¼ x 3¼ - 16
C	Base (1)	30 x 28 - 1½ Ply.
D	Cleats (2)	1¼ x 2½ - 16
E	Drawer Supports (2)	¾ x 2½ - 24
F	Shelves (2)	26 x 24 - ¾ Ply.
G	Shelf Sides (4)	1¼ x 2½ - 24
H	Runners (6)	½ x 24 - ¼ Hdbd.
I	Drawer Sides (6)	¾ x 2 7/16 - 23¾
J	Lower Drawer Fronts (2)	¾ x 2 7/16 - 14 7/8
K	Lower Drawer Divider (1)	¾ x 1 15/16 - 13 7/8
L	Lower Drawer Bot. (1)	13 7/8 x 23 - ¼ Hdbd.
M	Drawer Fronts (4)	¾ x 2 7/16 - 23 3/8
N	Drawer Dividers (2)	¾ x 1 15/16 - 22 3/8
O	Drawer Bottoms (2)	22 3/8 x 23 - ¼ Hdbd.

- (24) 5/16" x 2" Lag Screws w/Washers
- (6) Drawer Pulls
- (4) 4" Locking Swivel Casters
- (16) #8 x 1¼" Fh Woodscrews
- (16) #8 x 2½" Fh Woodscrews
- (16) #8 x 1" Rh Woodscrews
- (16) #12 x 1" Ph Sheet Metal Screws



build the Shelves

You'll start on the three shelves that connect the post assemblies next. The base of the cart forms the lower shelf. Each shelf incorporates a drawer that opens from either side of the cart. You'll build the wide base first.

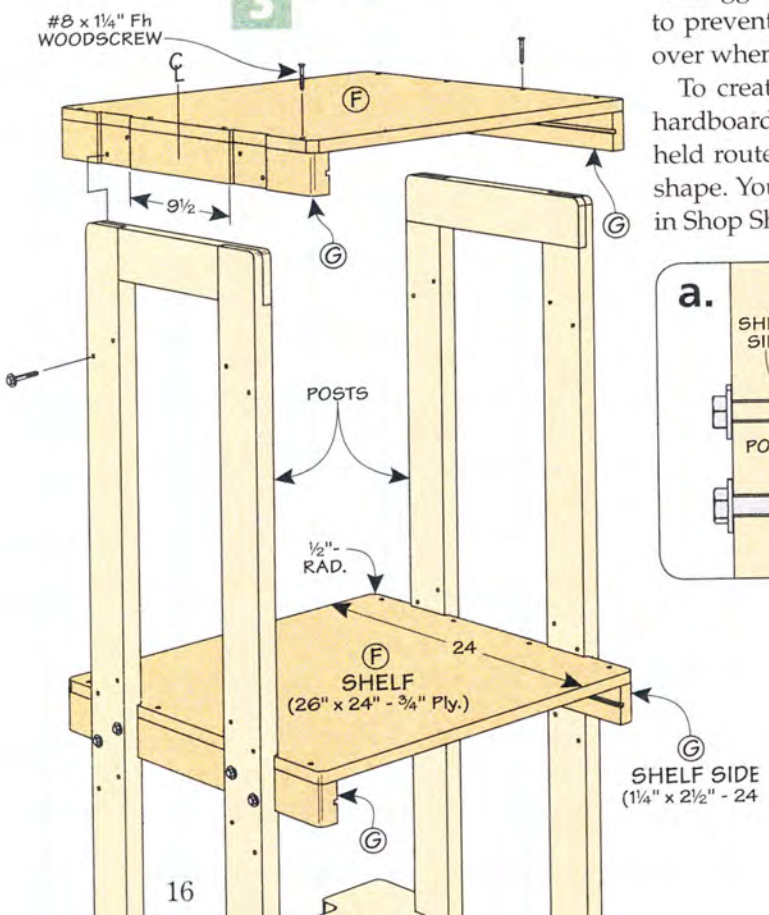
Stable Base. To create a strong and stable base, I glued up two layers of ¾" plywood. In Figure 2, you'll see that the base has a unique shape. The four corners extend beyond the posts. This serves two purposes. First, it provides a platform for mounting locking swivel casters. Plus, these "outriggers" add extra stability to prevent the cart from tipping over when moved.

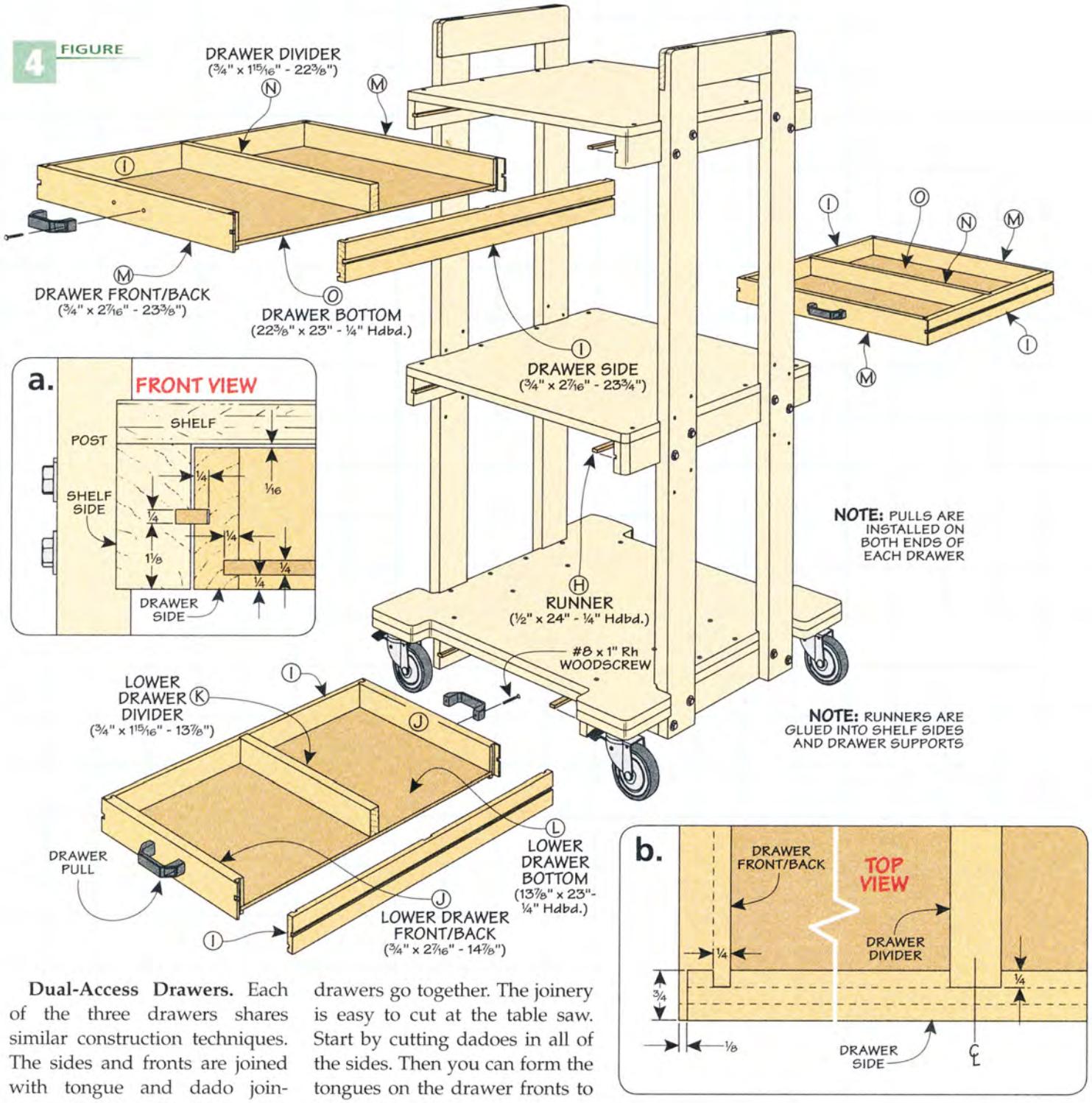
To create the profile, I used a hardboard template and handheld router to trim it to the final shape. You can see how it works in Shop Short Cuts on page 28.

Two cleats provide an attachment point for the posts. They're glued and screwed in place. And a pair of drawer supports can be cut to size. I cut a centered groove down the length to hold drawer runners that will be added later. These supports are also attached with glue and screws.

The locking, swivel casters complete the base. They're installed with panhead screws.

Upper Shelves. Figure 3 shows you how to make the two identical upper shelves. The sides are grooved for runners as before. I found it easier to attach the sides to the shelf before rounding the corners and cutting the dadoes. I used a tall auxiliary fence on the miter gauge to cut the dadoes (Figure 3b). Fasten the base and shelves between the posts with lag screws and washers.





Dual-Access Drawers. Each of the three drawers shares similar construction techniques. The sides and fronts are joined with tongue and dado joinery. A divider splits the storage space into two areas that can be accessed from either side. The drawers ride on hardboard runners. Figure 4 shows what I mean. The only thing to note is that the lower drawer is narrower than the other two.

Before starting on the drawers, it's a good idea to install the drawer runners in the shelf sides. I cut these to size and used spring clamps to hold them in place.

The main drawing and details above show you how the drawers go together. The joinery is easy to cut at the table saw. Start by cutting dadoes in all of the sides. Then you can form the tongues on the drawer fronts to fit into the dadoes.

There's a centered dado on the inside face of each drawer side to hold a divider (Figure '4b'). After the joinery is complete, cut a groove in each piece to hold the hardboard drawer bottom.

I assembled the drawers and then cut the dividers to fit. The grooves for the runners can be cut after assembly. Size the groove for a smooth, sliding fit over the runners. I applied a little wax to the runners to make the drawers slide easier. Adding the drawer pulls is simply a matter of attaching them with roundhead screws from the front of the pull.

Final Note. There's one thing I want to mention before you put the cart to use. While the cart has a stable base, it's still a good idea to load the cart with the heavier items on the bottom. This makes the cart even more stable as you move it around the shop.

With the cart loaded up, you'll be amazed at how much shop space you suddenly have.

benchtop Table Saw Stand

This handy cart helps your small table saw work large and also adds much-needed storage.

Benchtop table saws pack a lot of function into a compact footprint. But the small size of the saw table can make cutting long boards or large plywood panels tricky, at best. Throw in the fact that many benchtop saws don't come with a stand (or have a lightweight, "job site" stand), and you can see the need for some upgrades.

This stand solves both of those problems. For starters, it's a solid, yet mobile, platform for the table saw. So you can still tuck it out of the way when necessary.

Built-in supports on the left and outfeed sides of the cart effectively increase the size of the saw table. That makes cuts safer and more accurate.

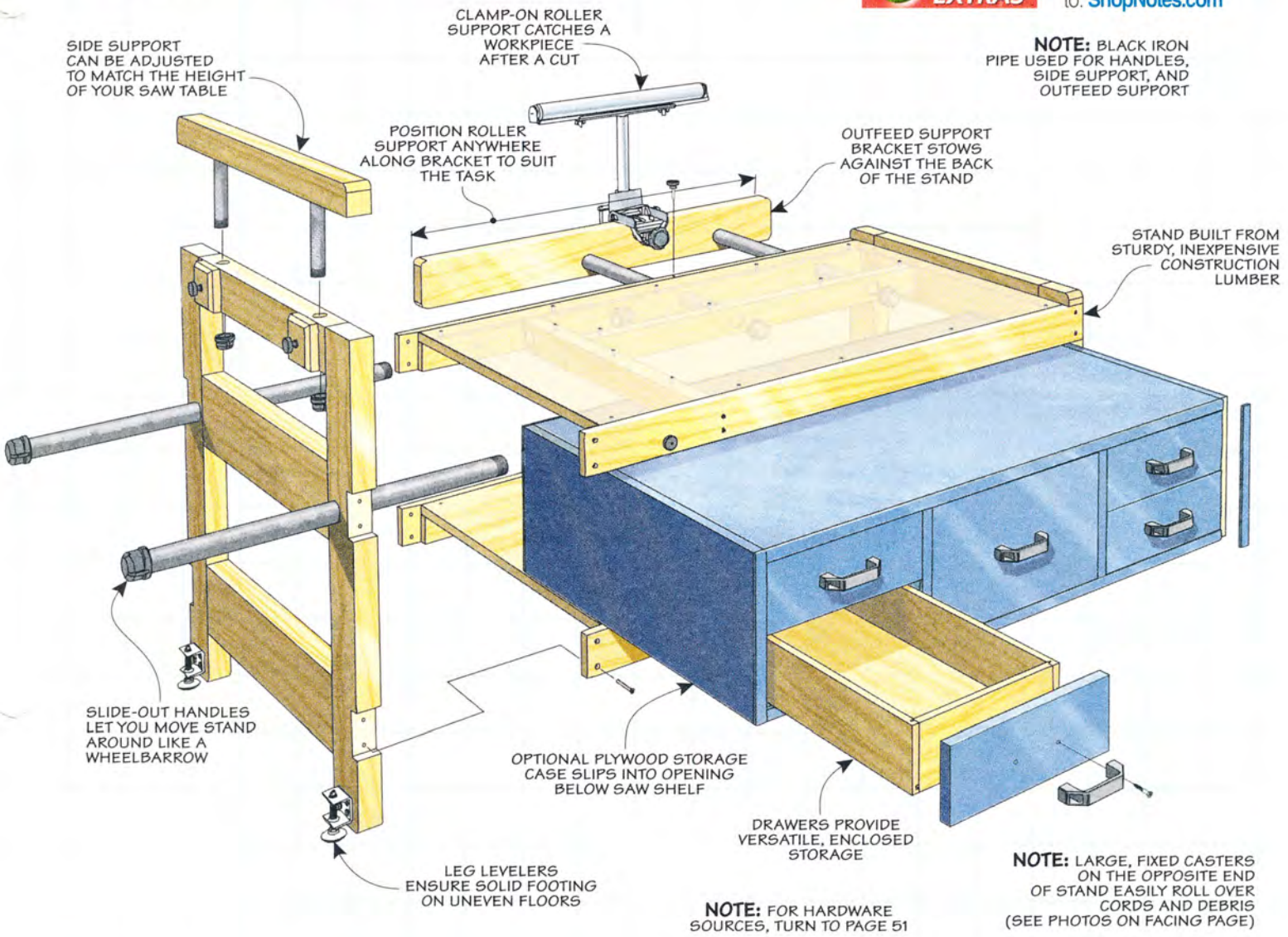
Finally, a bank of drawers below the saw gives you some extra storage for your shop. And who couldn't use that?

Mobile Stand. *Slide out the handles to easily roll the stand.*

Exploded View Details

OVERALL DIMENSIONS: 46"W x 34"H x 35"D

ShopNotes GO ONLINE EXTRAS To download a free cutting diagram for the Table Saw Stand, go to: ShopNotes.com



Materials & Hardware

A	Left Stiles (2)	1½ x 3½ - 31
B	Right Stiles (2)	1½ x 3½ - 18¾
C	Rails (4)	1½ x 5 - 24
D	Upper Rail (1)	1½ x 3 - 24
E	Stretchers (4)	1½ x 3 - 45
F	Caster Plate (1)	1½ x 5½ - 25
G	Handle Rail (1)	1½ x 2¼ - 25
H	Outfeed Support Rail (1)	1½ x 2¼ - 32
I	Outfeed Bracket (1)	1½ x 4 - 36
J	Side Support Arm (1)	1½ x 2 - 28
K	Insert Blocks (2)	¾ x 3 - 3
L	Shelves (2)	26½ x 42 - ¾ Ply.
M	Case Sides (2)	27½ x 10 11/16 - ¾ Ply.
N	Case Top & Bottom (2)	27½ x 40⅞ - ¾ Ply.
O	Dividers (2)	27½ x 9 11/16 - ¾ Ply.
P	Case Back (1)	10 11/16 x 41⅞ - ¼ Ply.
Q	Edging (1)	¼ x ¾ - 125 rgh.
R	Large Drawer Sides (2)	½ x 8½ - 26
S	Lg. Drawer Front/Back (2)	½ x 8½ - 13⅜
T	Lg. Drawer Bottom (1)	13⅜ x 25½ - ¼ Ply.
U	Lg. False Front (1)	¾ x 9 1/16 - 14¾
V	Small Drawer Sides (8)	½ x 4 - 26
W	Sm. Drawer Fronts/Backs (8)	½ x 4 - 10½
X	Sm. Drawer Bottoms (4)	10½ x 25½ - ¼ Ply.
Y	Sm. False Fronts (4)	¾ x 4½ - 11⅞

- (16) #8 x 1¾" Fh Woodscrews
- (12) #8 x 3" Fh Woodscrews
- (5) 5/16"-18 Threaded Inserts
- (2) 1½"-dia. Rose Knobs
- (2) 5/16"-18 x 2" Cap Screws
- (2) Leg Levelers w/Screws
- (2) 4" Fixed Casters
- (8) #12 x 1" Ph Woodscrews
- (8) #12 Flat Washers
- (3) 1"-dia. Knurled Knobs
- (3) 5/16"-18 x 1½" Cap Screws
- (4) 1"-dia. x 24" Black Iron Pipes
- (6) 1"-dia. Pipe Caps
- (2) ½"-dia. x 6" Black Iron Pipes
- (2) ½"-dia. Pipe Caps
- (4) 5/16"-18 T-Nuts
- (4) 5/16"-18 x 3" Hex Bolts
- (4) 5/16" Flat Washers
- (1) Clamp-On Roller Support
- (16) #8 x 1¼" Fh Woodscrews
- (20) #8 x 1" Fh Woodscrews
- (5) 4" Drawer Pulls
- (10) #8 x 1" Rh Woodscrews
- (12) #6 x ¾" Fh Woodscrews

start with the
Frames

The main structure of the table saw stand is a framework made from standard "two-by" construction material. Combined with solid, traditional joinery, the result is a rigid assembly that will stand up to years of heavy use.

End Frames. The starting point for making the table saw stand is building a pair of end frames. But as you can see in Figure 1, the end frames aren't identical. The left frame is taller. It forms part of an adjustable side support for crosscutting long stock or large sheets of plywood.

Regardless of the size difference, the frames share a similar construction: Vertical stiles are joined to horizontal rails with mortise and tenon joinery.

My usual order for making this joint is to create the mortises first. Then fit the mating tenon to each mortise. Take note that the left frame has three rails and the right frame has just two.

Some Details. Tackling a few other details before you grab the glue bottle will make some tasks easier. First, you need to cut a pair of notches along the outside edge of each stile. These notches accept stretchers that join the frames. To end up with a square stand, it's important that the distance between the notches in each set of stiles is consistent, as shown in Figure 1b. In Figure 2, you can see the table saw setup I used to cut the notches with a dado blade.

I also want to point out that the upper rail on the left frame has a pair of holes drilled through it vertically (Figure 1a). These house lengths of black pipe for the adjustable side support. Doing this before assembly allows you to drill the holes at the drill press, ensuring they're square to the rail.

One last item to take care of before assembly is to round the ends of the stiles. (Leave the upper ends of the left stiles square.)

Gluing up the end frames is pretty straightforward. Once the

FIGURE 1

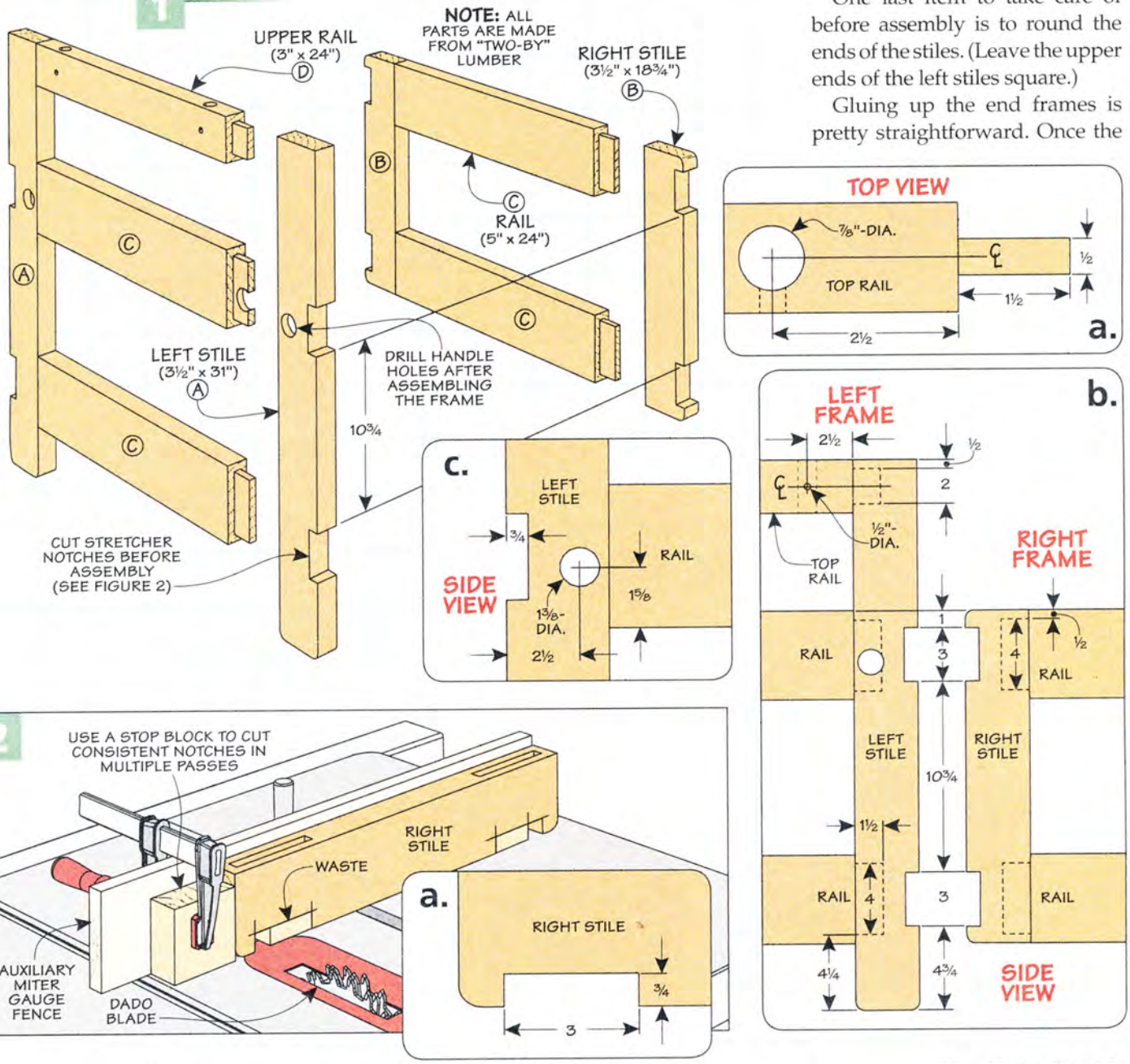
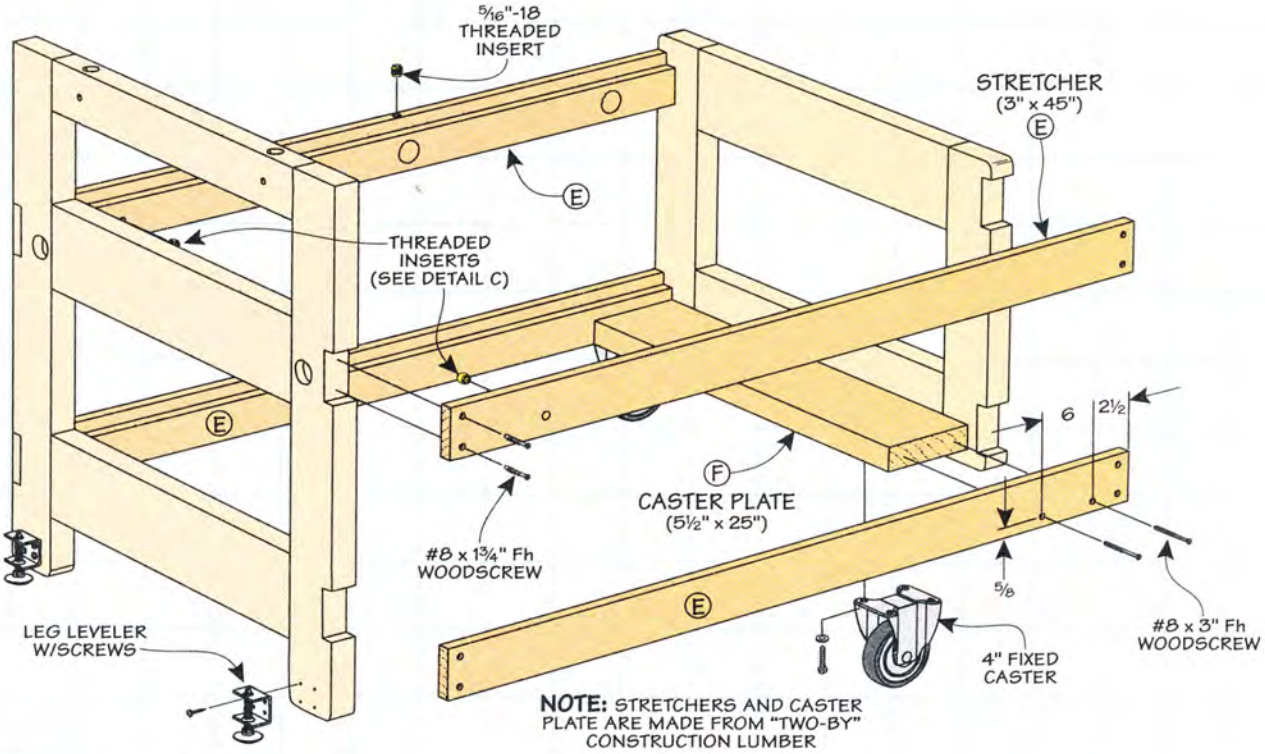
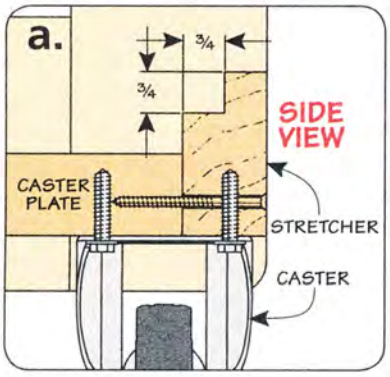
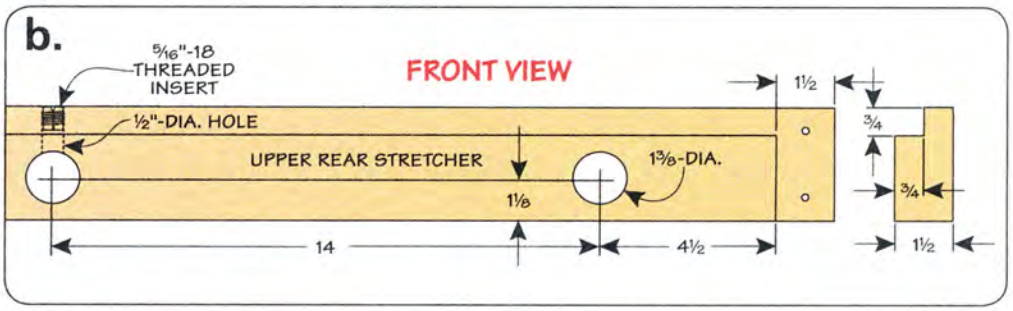


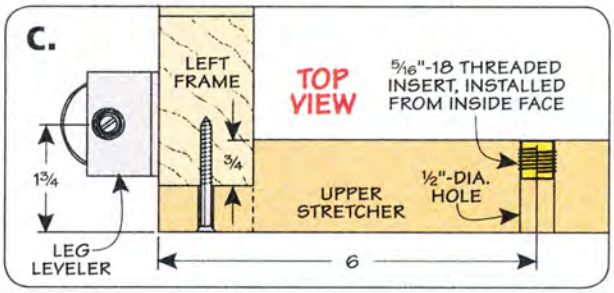
FIGURE 2

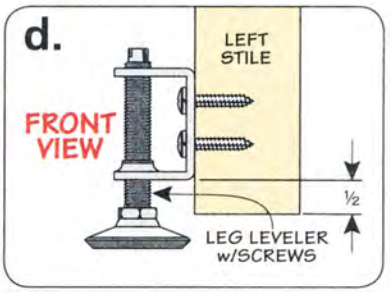
FIGURE 3











clamps are in place, I like to measure across the corners to make sure the assembly is square. Then I'll use a straightedge to ensure the frame is flat.

Handle Holes. You aren't done with the frames yet. After removing the clamps, you can drill holes in the left frame to allow the pipe handles to pass through, as shown in Figure 1c. Once again, the drill press is the tool of choice to make the holes.

Stretchers. Connecting the end frames are a set of four, nearly identical stretchers, as in Figure 3. They're joined to the frames with lap joints. Rabbets cut on each end of the stretchers form a mating tongue to fit the notches you cut along the stiles earlier. This is shown in Figure 3b.

The other detail all the stretchers share is another rabbet cut along the upper edge (Figure 3a). These accept plywood panels for the top and lower shelf of the stand.

However, there are some details that set a few of the stretchers apart. The two lower stretchers are the simplest. All you need to do here is drill and countersink a few holes for attaching the caster plate later on.

The upper rear stretcher has a pair of large holes for more black pipe that accepts the outfeed support assembly. A cross hole is counterbored to take a threaded insert to lock the outfeed support in place, as in Figure 3b.

On the opposite end, another threaded insert here lets you secure the handles in the extended or retracted position, as you can see in Figure 3c. Note that the threaded insert is installed from the inside face.

The upper front stretcher only has a threaded insert, as shown in Figure 3c. All the stretchers are glued and screwed into the notches in the end frames.

The caster plate provides a mounting surface for the casters. On the left frame, you can attach a pair of leg levelers to account for uneven shop floors (Figure 3d).

handles, outfeed, & side Supports

▲ ***Solid Support.*** *Raise the side support flush with the saw table and extend the outfeed support to effectively increase the working size of a benchtop table saw. The result is safer and more accurate cuts.*

Completing the main framework of the stand means you can move on to adding some of the more interesting features. This involves the retractable handles, the outfeed support system, and the side support assembly.

Support Rails. However, you need to take care of a little prep work inside the stand first. For this, you install a pair of rails. These provide additional bracing for the black pipe sections that form the handles and allow the outfeed support to slide in and out, as shown in Figure 4.

The handle rail goes in first. There are two important points to pay attention to. The holes in the rail need to be perfectly aligned with the holes in the left end frame (Figure 4c). To do this, position the handle rail right behind the holes in the left frame and mark the centerpoint using the same Forstner bit that you'll drill the holes with.

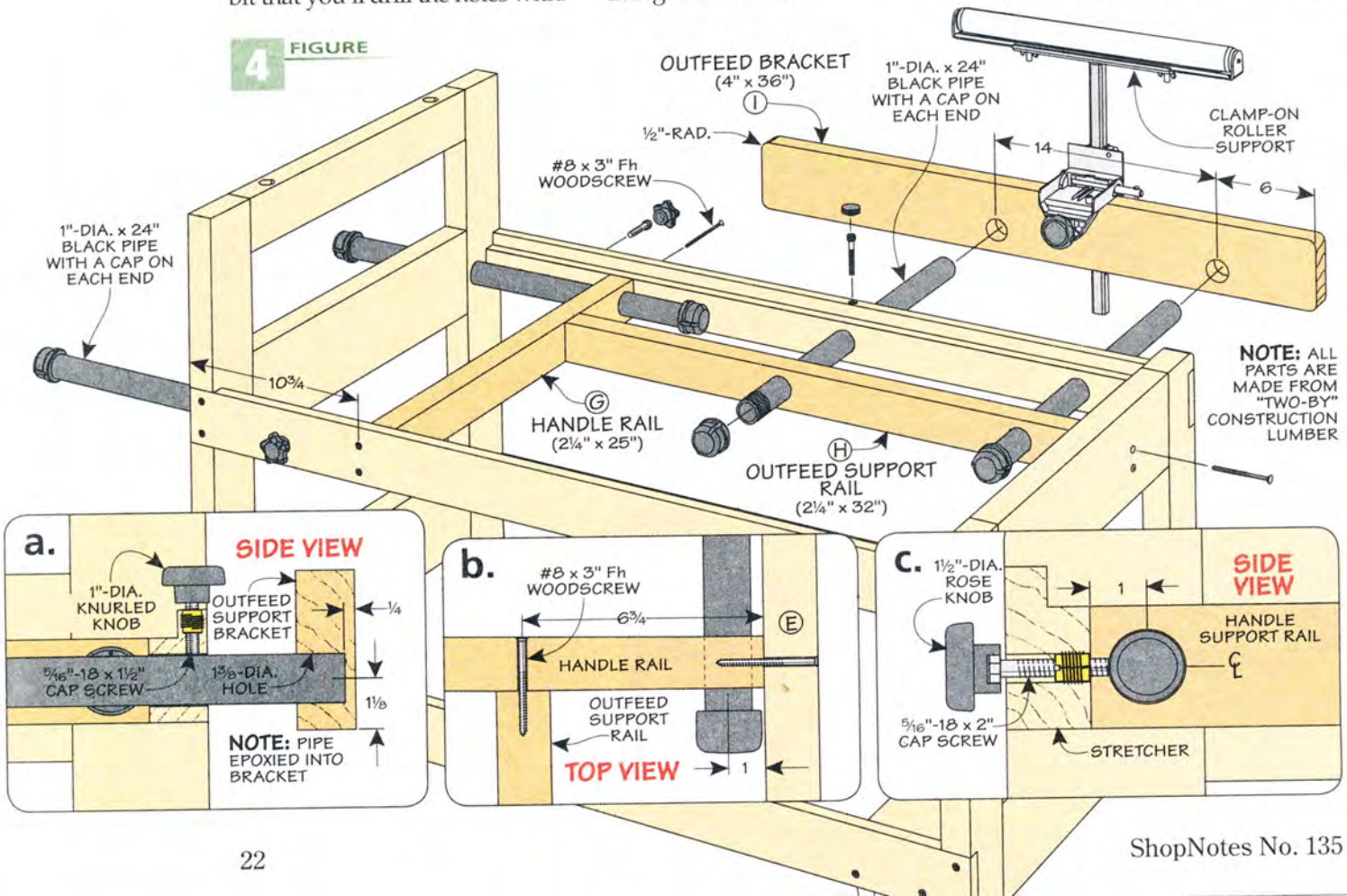
The other detail is where you attach the rail. The top edge of the rail should be flush with the rabbet in the stretchers. This way, the support rails help stiffen the top to support the table saw, as in Figure 4c. The rail is secured with glue and screws.

Outfeed Support. The other rail that gets installed is the outfeed support rail. Like the previous rail, it has holes drilled to match the holes in the upper rear stretcher. The outfeed rail is glued and screwed to the handle rail and the right end frame, as shown in Figures 4 and 4b.

As I mentioned earlier, the stand uses a clamp-on adjustable roller support to catch long workpieces as they come off the back of the saw. The support clamps to a long bracket, as you can see in Figure 4. The length of the bracket allows you to adjust the position of the roller support to match the width of the workpiece you're cutting.

A pair of holes on the inside face of the bracket accept the pipes that allow the bracket to slide, as shown in Figure 4a. By now you know that it's important for these shallow holes to

FIGURE 4



match the spacing of the holes in the upper rear stretcher.

Black Pipe. I chose black pipe because it's rigid and inexpensive. But I want to mention some details about the different pieces of pipe. For the outfeed and side support pieces, you can simply cut the pipe to length, leaving one end threaded. The threaded end is for a cap. This prevents the pipe from being pulled out of the stand.

The pipe sections for the handles are a different story. You want to make sure to have both ends threaded. This way, you can also install a cap on the outer end of the handles, which is a lot more comfortable to hold.

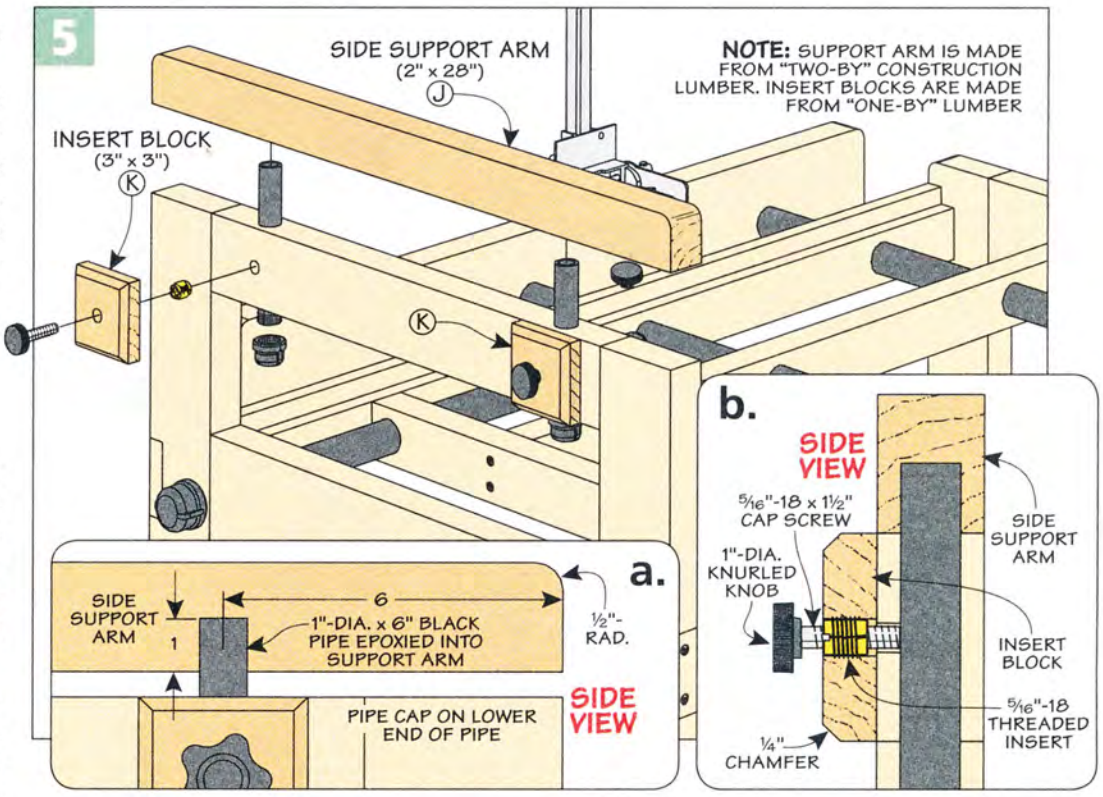
Side Support. When crosscutting long boards or working with large panels, a little support to the left of the saw is pretty handy. The support assembly is easy to add, as in Figure 5. The support rail is a piece of "two-by" stock that has rounded ends to match the end frames and prevent a workpiece from catching or getting marred by a sharp edge (Figure 5a). Short pipe sections let you set the support to match your saw.

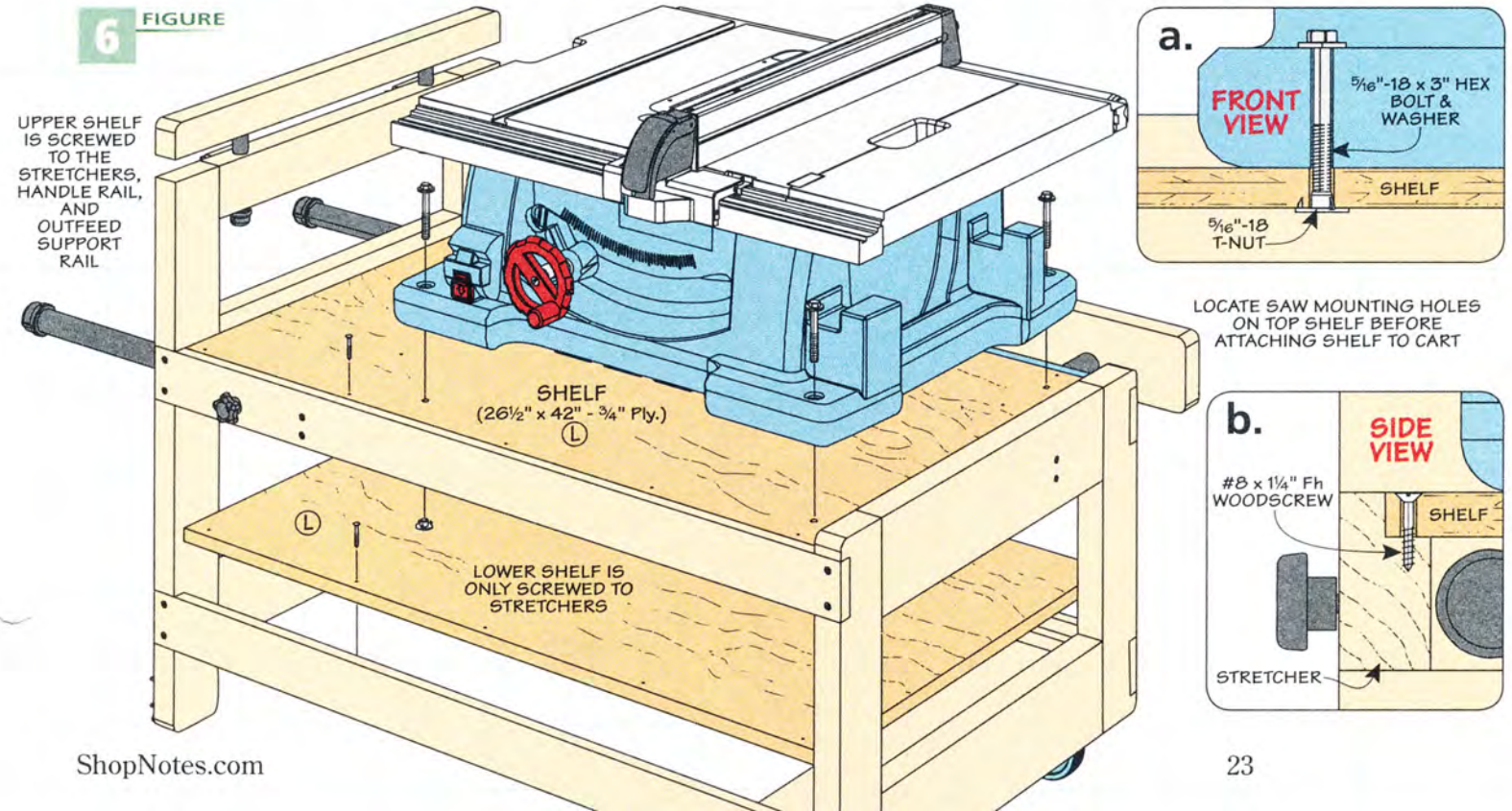
There isn't enough "meat" in the upper rail to install threaded inserts to lock the rail. So you need to make and attach a pair of blocks that house the inserts and are glued to the upper rail, as shown in Figure 5b.

Plywood Panels. All it takes to complete the stand is to make and install a pair of plywood panels. They're identical in size and are screwed into the rabbets in the stretchers (Figures 6 and 6b).

Before installing the top panel, set your saw on it and mark the location of the mounting holes. Then drill through holes and install T-nuts on the bottom face to lock the saw in place with a bolt and washer, as in Figure 6a.

This completes the main part of the stand. I finished it with wiping varnish for protection. Then it's ready for use.





add some Storage

▲ ***Smooth-Sliding Drawers.*** *The optional plywood storage case fits into the opening below the saw. Five drawers run on full-extension slides for smooth operation and easy access to all your gear.*

At the risk of sounding like a television infomercial — "But wait, there's more!" On its own, the stand turns a small benchtop table saw into a versatile, mobile workstation. However, the open bottom shelf doesn't make the most of the space below the saw.

That's where the next and final component comes in. The storage cabinet you see in the photo divides the space into five drawers. Besides increasing the utility, the drawers keep the contents better protected and dust-free.

The drawer case is built as a stand-alone unit and just slides into place. So this means you can add it any time you want.

Case Construction. The case is built primarily from ¾" plywood, as in Figure 7. Straightforward joinery means you can have the case assembled in no time.

The two sides are sized to slide into the opening between the stretchers of the stand. A dado near each end accepts the top and bottom panel, as in Figure 7a.

To determine the length of the top and bottom in Figure 7, I clamped the sides in position to the end frames of the stand and measured the distance between the dadoes. It's a good idea to cut the panels a hair shorter than this dimension, however. That gives you a little wiggle room to slide the case in easily.

Cut a rabbet on each end of the top and bottom. This forms a tongue that fits the dadoes on the sides, as illustrated in Figure 7a. You also need to cut dadoes on the inside face of each piece to hold the two vertical dividers.

Dividers & Assembly. You can dry assemble the case and determine the height of the vertical dividers. To make assembling the case less frantic, tackle the operation in two steps.

FIGURE 7

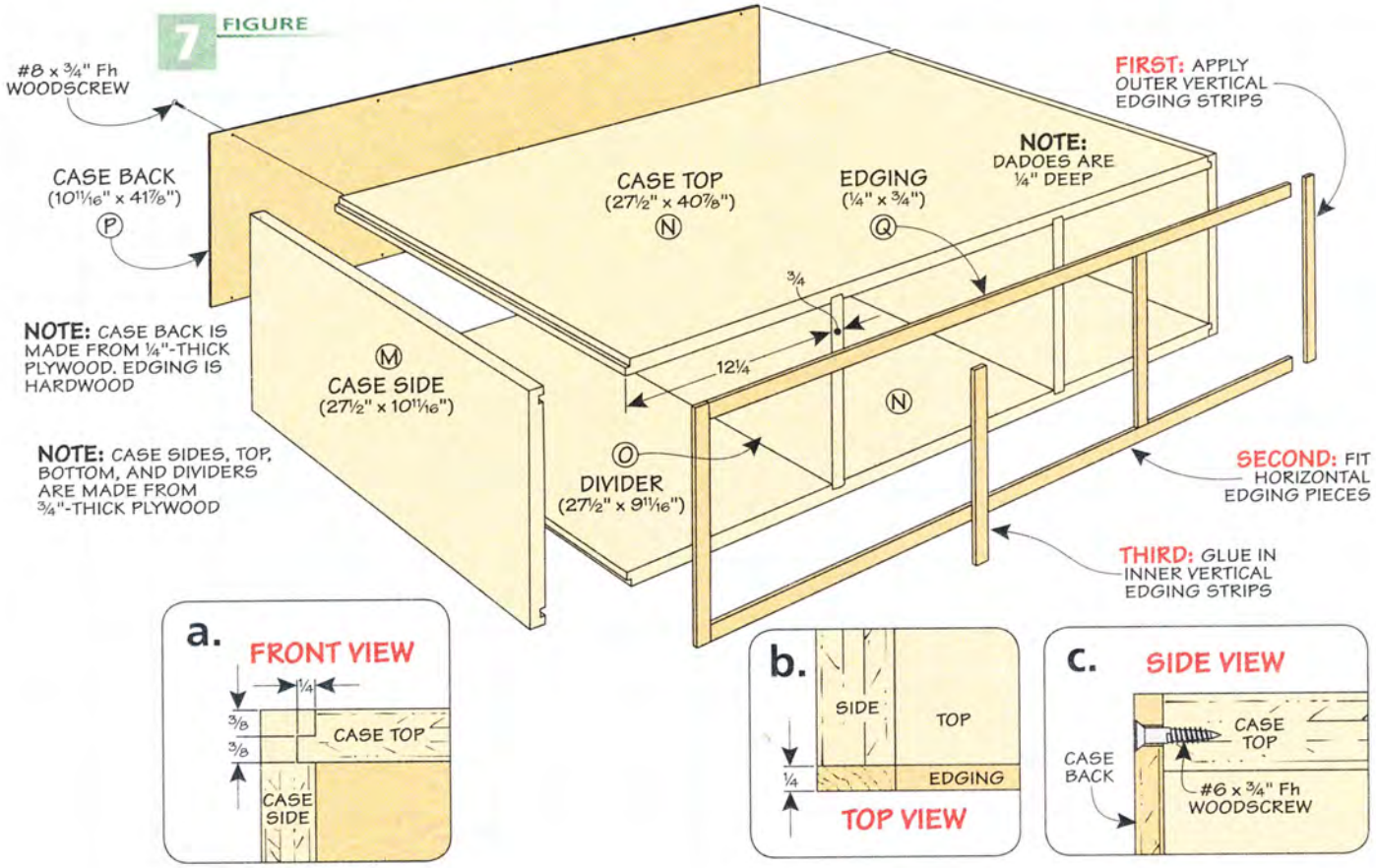
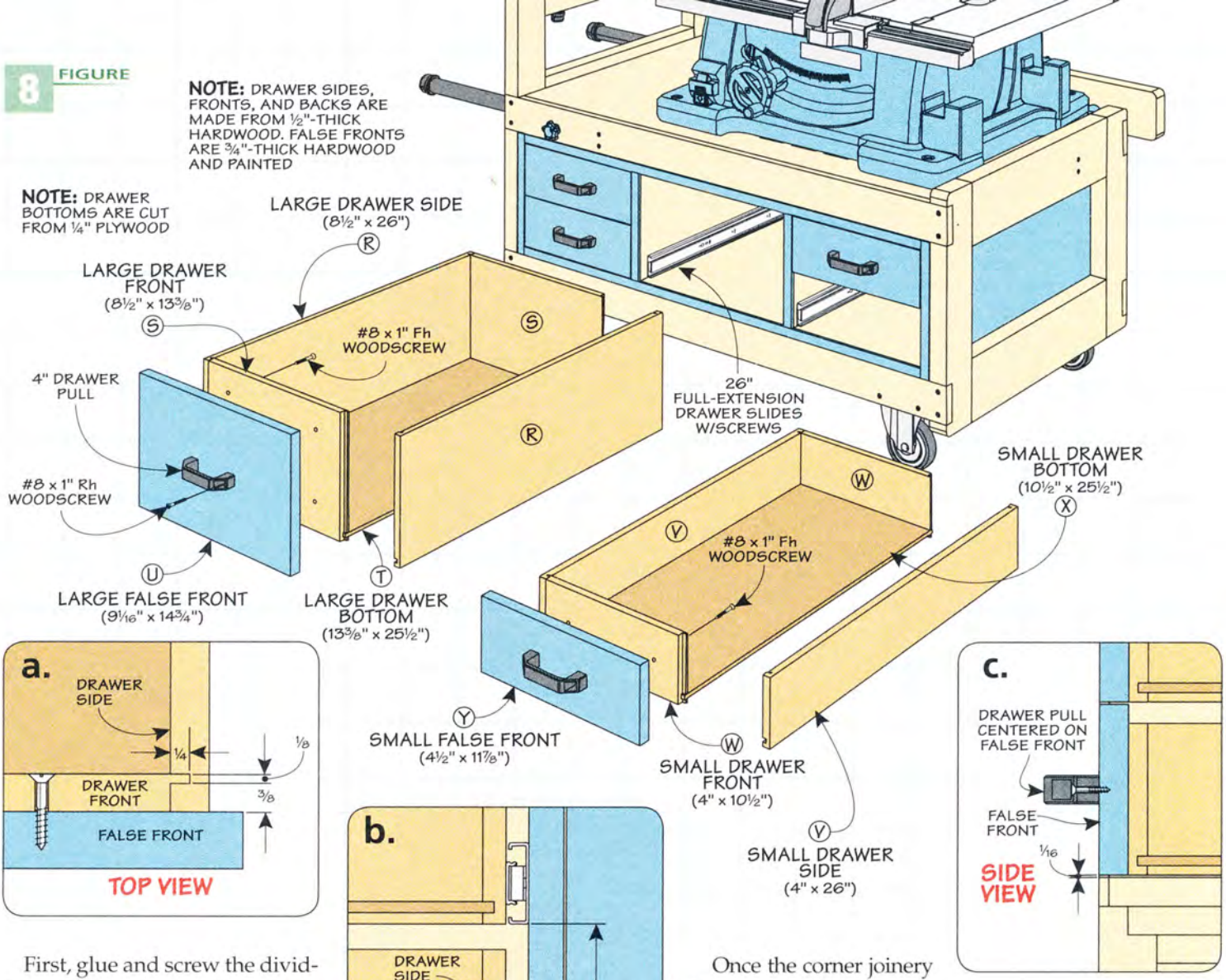


FIGURE 8



First, glue and screw the dividers into the case top and bottom. After that, you can glue and clamp the sides into place.

At the back of the case, I cut a ¼" plywood panel to match the overall height and width of the case. Since the back of the case is visible, a single-piece back gives the case a seamless look. It's screwed into place, as you can see in Figure 7c.

Even though I planned to paint the case, I covered the exposed front edges of the case with hardwood strips. The strips make getting a smooth paint job that much easier. Figure 7 shows the order of how the strips are attached for a consistent look.

Drawers. Inside the case are five drawers that travel on full-extension metal drawer slides. Four identical shallow drawers are housed in the two outer compartments of the case. The deep center drawer is the full height of the middle compartment, as shown in Figure 8.

The drawer boxes are assembled with tongue and dado joinery, as in Figure 8a. When sizing the parts, you need to account for the thickness of the drawer slides (usually ½"). This means the overall drawer box measures 1" narrower than the compartment. The dadoes in the drawer sides are cut first. The mating tongues on the front and back pieces can then be cut to fit.

Once the corner joinery is complete, you need to cut a groove on the inside edge of all the parts to accept the ¼" plywood bottom, as in Figure 8b. The drawers can then be glued up.

Hardwood false fronts complete the drawers and cover the slides. I sized the false fronts for a consistent (1/16") gap on all sides.

Paint. Before attaching the false fronts, you can do a little painting. Sand and prime the sides, front, and back of the case along with the false fronts on the drawers. When the primer dries, lightly sand down any dust nibs.

Apply two coats of paint. I chose a color to match the main body of the table saw cabinet. When the paint is dry, you can slide the case into the stand.

So not only does the stand add capacity and safety to your benchtop table saw, it now has the looks to match.

gluing Thin Stock

Follow these tips and tricks to create flat, smooth panels without using traditional clamps.

Thin stock is a must for building small drawers, boxes, and trays. And if you need to create glued-up panels from thin stock, you'll quickly realize that working with material that's ½" thick or less isn't the same as gluing up a tabletop. The good news is it's a skill that doesn't take long to master.

Prepare the Edges. As with any edge-to-edge glueup, the starting point is to prepare the edges of the boards that will make up the panel. The edges that will be glued together need to meet in a tight line. In thin stock, even small gaps are going to be noticeable.

The trick is to prepare each pair of mating edges at the same time. After arranging the boards into a pleasing panel, take a pair of adjacent boards and fold them together like a book. With the mating edges aligned, clamp them in a vise, as you can see in the left photo.

The doubled-up boards are easier to plane than a single narrow edge. (A long sanding block works well if you aren't comfortable with using a hand plane.) Now when you trim the edges, you cancel out any inconsistencies and they'll be a perfect match when the parts are unfolded.

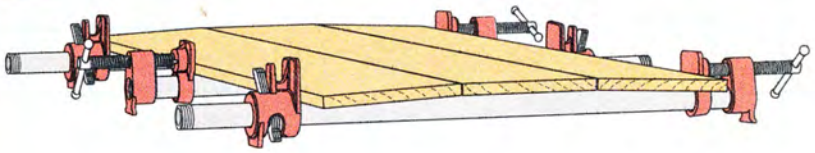
No-Clamp Assembly. With the edges prepared, you're ready to put them together into a completed panel. Gluing and clamping thin stock presents a few challenges. And it requires a different approach to creating a flat, smooth finished proeduct.

Figure 1 illustrates some of the issues you're dealing with. Even more than thicker stock, the

Perfect Match. *Trim the mating edges of two boards at the same time to get a tight-fitting joint.*

1 PROBLEM

TYPICAL CLAMPING SETUP SHOWS A THIN STOCK PANEL BEGINNING TO BOW UNDER PRESSURE



narrow edges of thin boards are prone to buckling once clamping pressure is applied with pipe or bar clamps. This can leave you with a cupped panel that's nearly impossible to flatten. Or the boards may simply pop out of the clamps unexpectedly.

Finally, the clamps can mar the thin edges. So instead, I skip the clamps and turn to an assembly jig like you see in Figure 2.

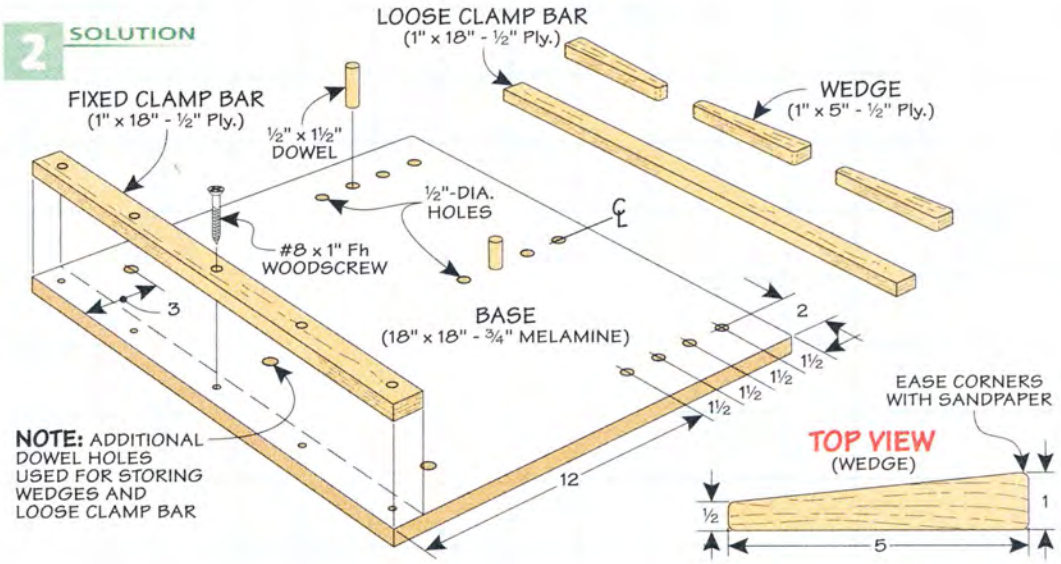
Clamping pressure is supplied by a set of wedges that bear against dowels and a pair of clamping bars. One bar is screwed to a melamine base. The melamine keeps the panel from being glued to the jig.

The other clamping bar, along with the dowels and wedges, are adjustable using a set of evenly spaced holes in the base.

Clamping Up. The photos below and on the opposite page show the steps. But I want to highlight a few points. First, use a thin bead of glue to assemble the panel. A lot of squeezeout is a hassle to clean up. And heavy sanding can leave noticeable divots and reduce the panel's thickness.

Once the boards are in place, lightly set the wedges. To prevent bowing, I like to place some weight on the joints (lower right photo). Then use a few light taps from a mallet to the ends of the wedges to apply more force.

In about an hour or so, you can remove the panel from the jig. It will take only a little light sanding before it's ready to use in the next stage of your project.



▲ ***Into the Clamping Jig.*** *Lay out the boards on the clamping jig. After applying a thin bead of glue to the mating edges, set the loose clamp bar in place.*

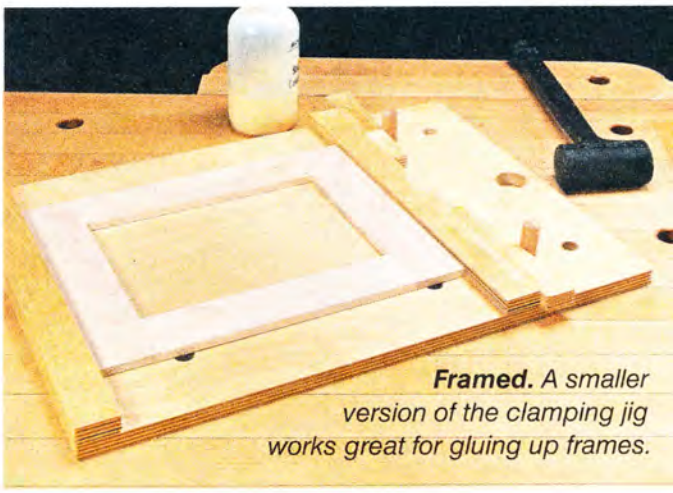
▲ ***Add Some Weight.*** *A couple of hand planes keep the panel from cupping while the glue dries. Masking tape across the joint lines prevents glue stains on the planes.*

glue small frames with a Mini Jig

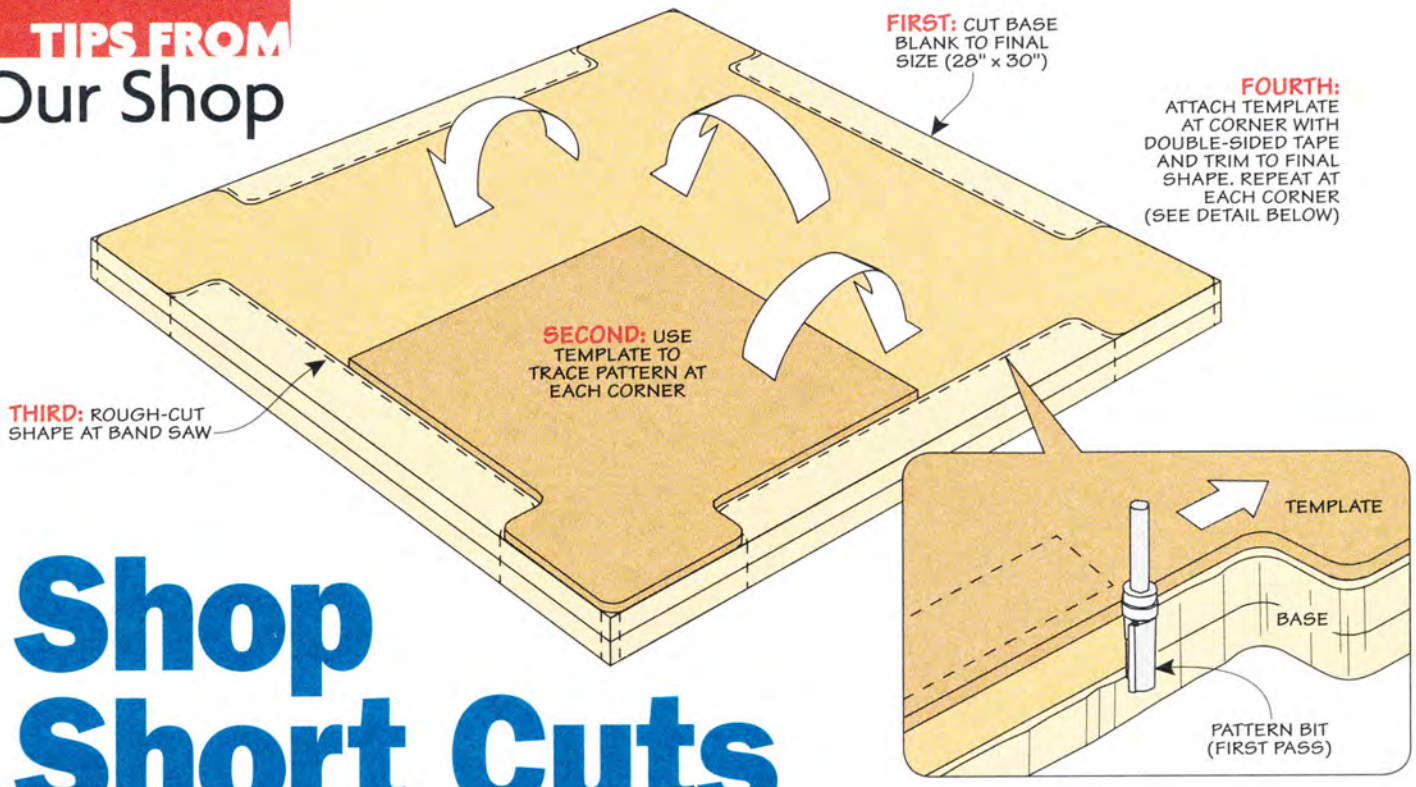
I'm not going to argue against the old proverb that says you can never have too many clamps. But I will say it's just as important to have the right sort of "clamp" to suit the task at hand.

Just like panels, frames that are made from thin stock can be problematic to assemble with the usual clamps. Since it doesn't require that much material, I quickly made a smaller version of my panel clamping jig that uses only two wedges, as you can see in the photo at right.

I used ½" plywood for the base (12" x 16"), bars, and wedges. A few coats of finish and some wax keep the project from getting glued to the jig base.



Framed. *A smaller version of the clamping jig works great for gluing up frames.*

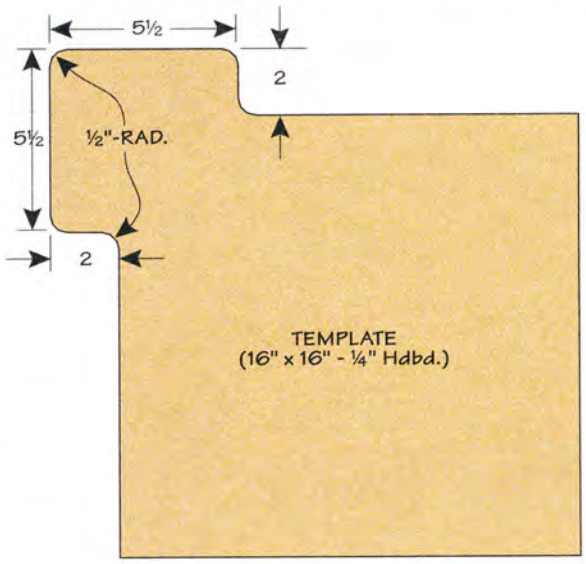


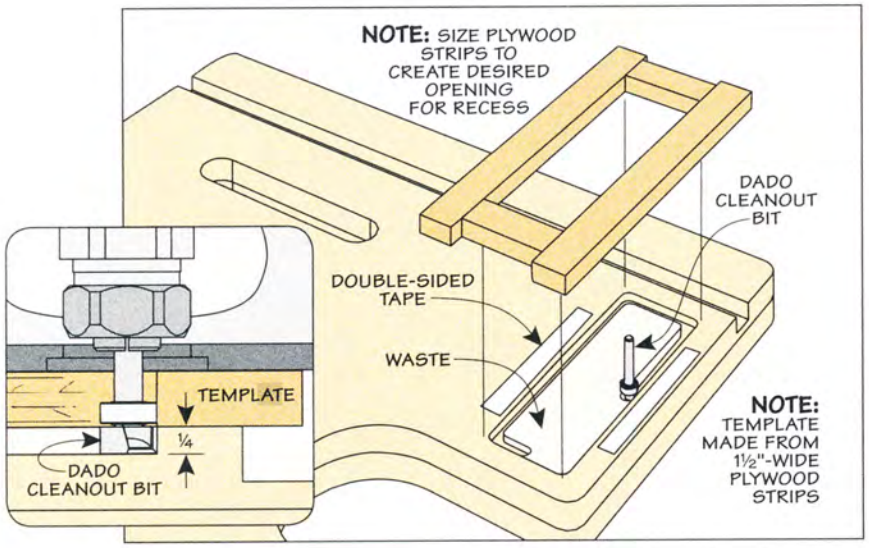
Shop Short Cuts

Routing Template

Making the shaped base for the tower cart on page 14 is easy with the help of a template. I made the template from hardboard. It's designed to be used at each corner of the base blank to trace the shape before cutting it to rough shape. Then you can use the template again to flush-trim the final shape.

I aligned the outside corner of the template with each corner of the base blank to trace the shape. After rough-cutting the shape at the band saw I used double-sided tape to secure the template before using a pattern bit for the final shaping. You may need to make two passes if the bit isn't long enough. A little sanding finishes the job.



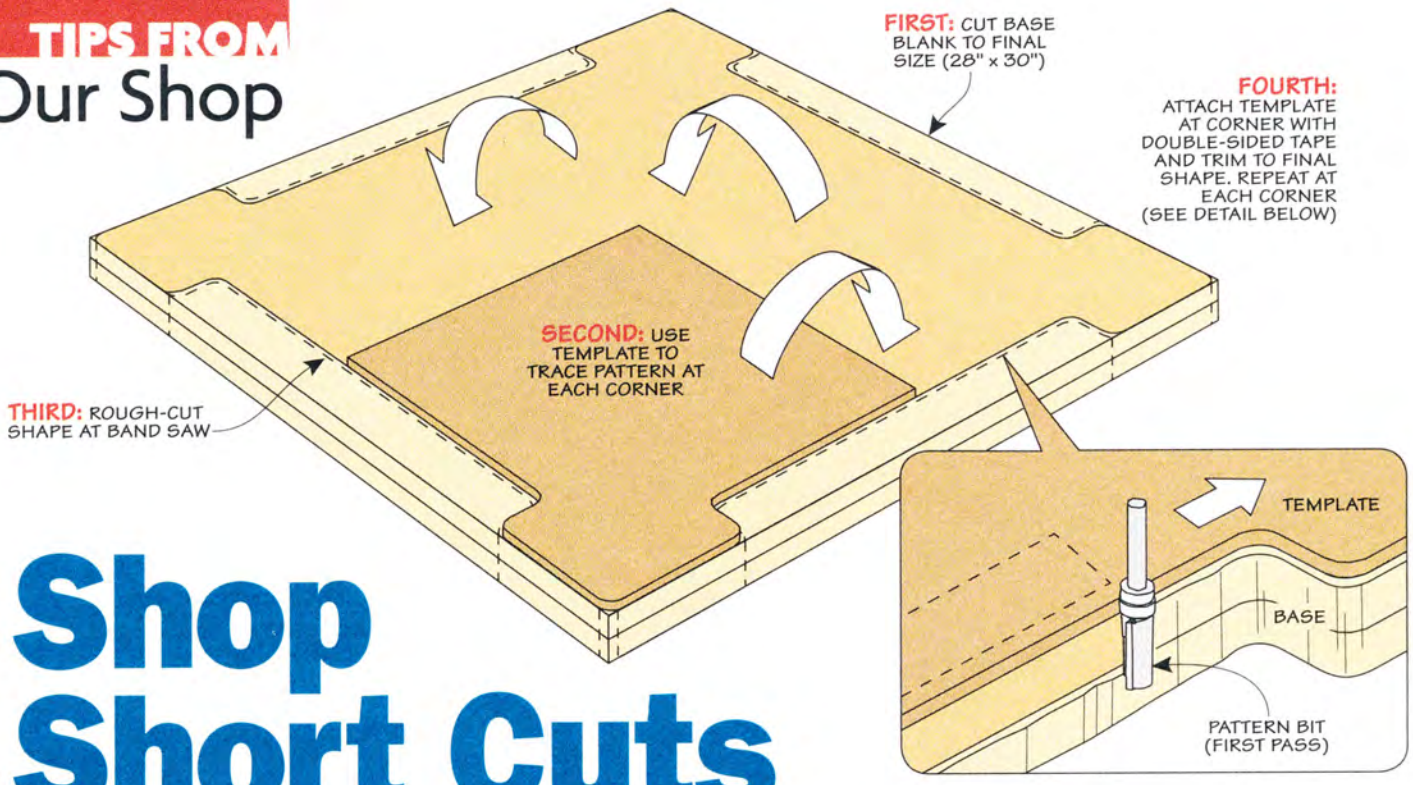


Creating a Recess

To keep small items and the chuck key close at hand, I created a shallow recess in the top of the drill press table on page 34. The key to routing this accurately is a shop-made template and a dado cleanout bit.

The template is just some narrow strips of plywood sized and glued together so the opening matches the desired size of the relief area. To securely attach the template to the table, use a couple strips of double-sided tape.

Using a plunge router, set the bit for a ¼"-deep cut and carefully plunge the bit into the table. After routing clockwise around the inside of the template, remove the rest of the waste, working back and forth across the recessed area.

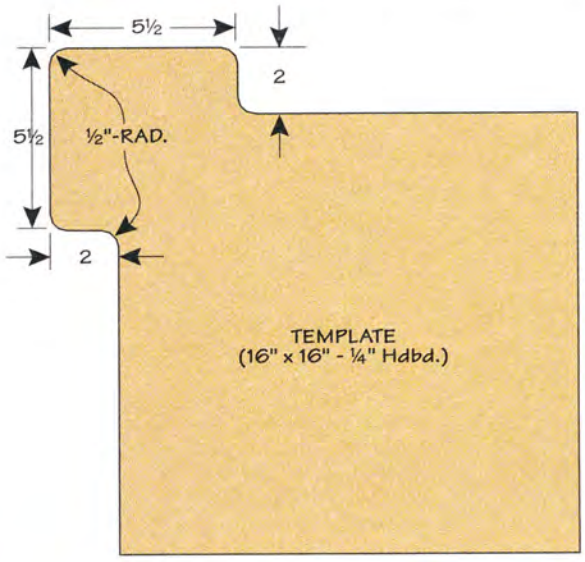


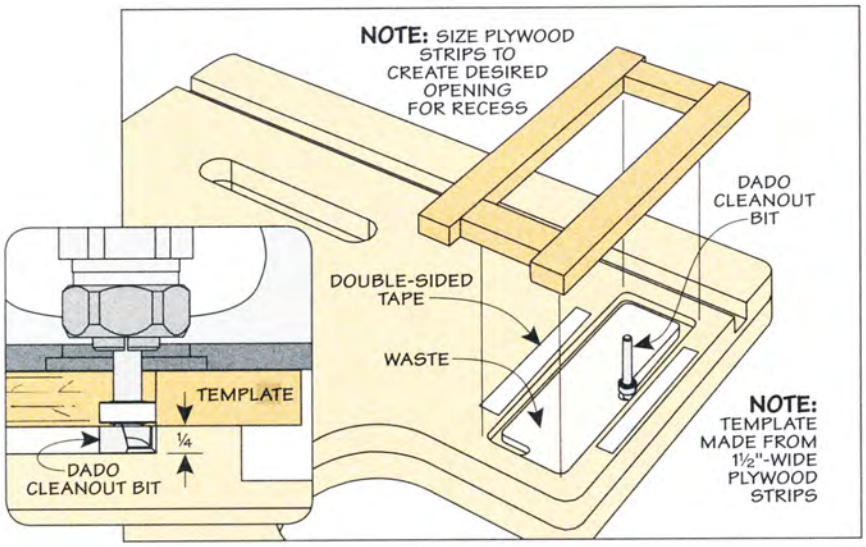
Shop Short Cuts

Routing Template

Making the shaped base for the tower cart on page 14 is easy with the help of a template. I made the template from hardboard. It's designed to be used at each corner of the base blank to trace the shape before cutting it to rough shape. Then you can use the template again to flush-trim the final shape.

I aligned the outside corner of the template with each corner of the base blank to trace the shape. After rough-cutting the shape at the band saw I used double-sided tape to secure the template before using a pattern bit for the final shaping. You may need to make two passes if the bit isn't long enough. A little sanding finishes the job.





Creating a Recess

To keep small items and the chuck key close at hand, I created a shallow recess in the top of the drill press table on page 34. The key to routing this accurately is a shop-made template and a dado cleanout bit.

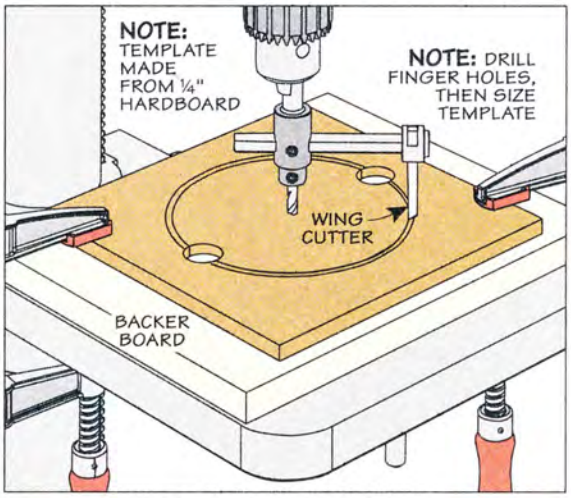
The template is just some narrow strips of plywood sized and glued together so the opening matches the desired size of the relief area. To securely attach the template to the table, use a couple strips of double-sided tape.

Using a plunge router, set the bit for a ¼"-deep cut and carefully plunge the bit into the table. After routing clockwise around the inside of the template, remove the rest of the waste, working back and forth across the recessed area.

Making Inserts

Over time, the plywood insert for the drill press table on page 34 will get chewed up. To make it easy to create new ones, I made a hardboard template to match the opening in my table. After drilling out finger holes, I cut the template to size (drawing at right).

To use the template, attach it to a blank with double-sided tape and then cut it to rough size. After drilling out the finger holes with a Forstner bit (upper right photo), trim the insert flush at the router table (inset).



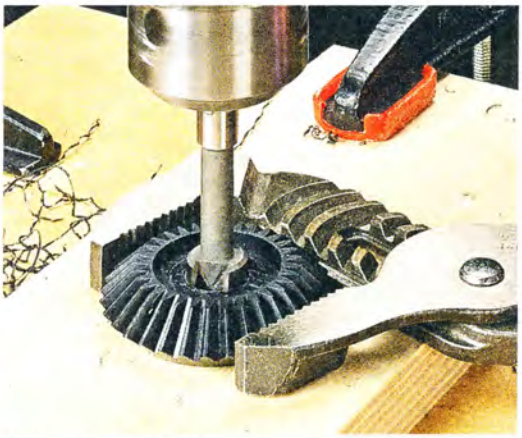
▲ ***Insert Steps.*** *Using the template as a guide, drill the finger holes. Then trim the insert flush (inset).*

Enlarge Gear Hole

For the drill press table on page 34, you may need to enlarge the hole in the nylon miter gear to fit the shaft used for the height adjustment. The challenge is centering the hole in the gear.

The solution is shown at right. Start by clamping a scrap block to the drill press table and drill a 1¼"-dia. hole to match the hub of the gear. To ensure a snug fit, I wrapped tape around the hub and slipped it in place. Now, change over to a Forstner bit to match the height adjustment shaft and enlarge the hole.

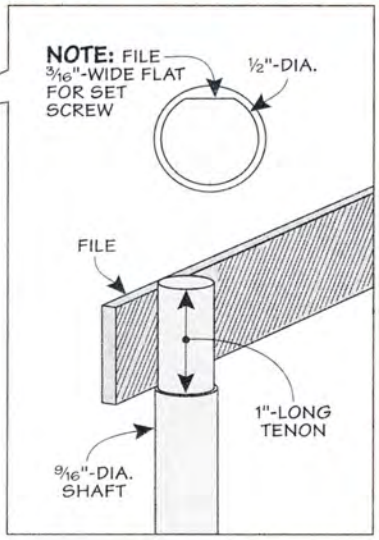
▲ ***Locate Hole.*** *A hole in a piece of scrap holds the miter gear for drilling. Use masking tape to ensure a snug fit.*

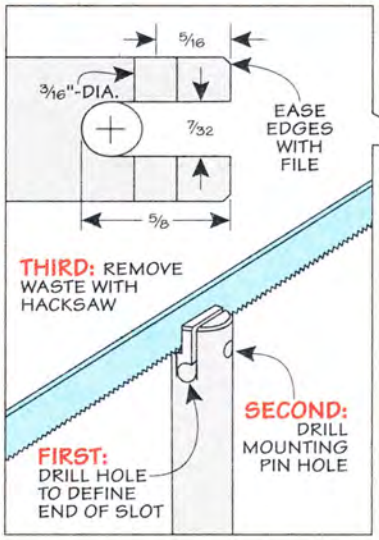


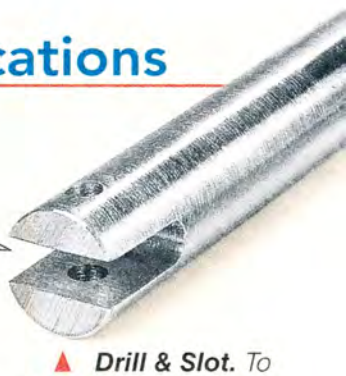
▲ ***Enlarge Hole.*** *After changing to a bit that matches the drill press height adjustment shaft, enlarge the hole.*

Drill Press Table Locking Shaft Modifications

▲ ***Reduce, Then Flatten.*** *Using a file, reduce the diameter of the locking shaft until the handle slips in place. Then, file a flat on the shaft so you can secure the handle to the shaft with a set screw.*







▲ ***Drill & Slot.*** *To attach the shaft, drill a through hole to define the end of the slot. A second through hole allows you to secure the shaft. Finally, remove the waste with a hacksaw.*

lathe Sanding Drum

Turn your lathe into a double-duty machine with a standard sanding belt and this shop-made drum.

Materials & Hardware

A	Mounting Plate (1)	4-dia. x ¾ Ply.
B	Baseplate (1)	7⅝-dia. x ¾ Ply.
C	Jaw Block (1)	7⅝-dia. rgh. x 3 Ply.

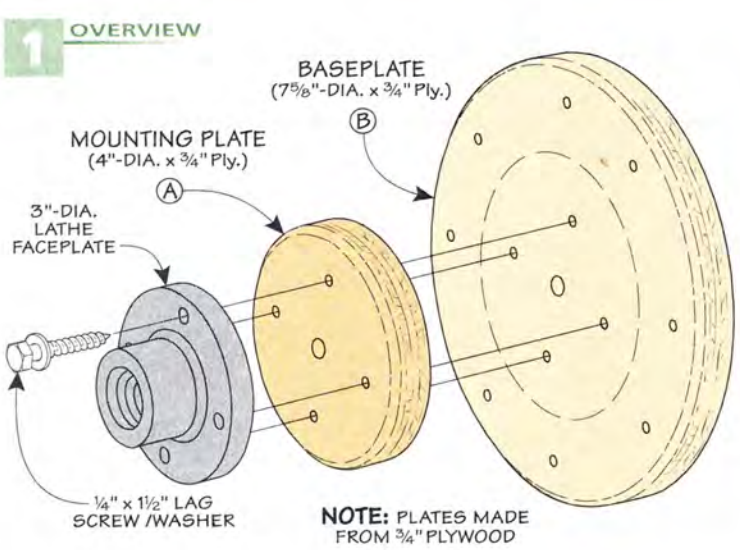
- (1) 3"-dia. Lathe Faceplate
- (1) ⅜"-16 x 5½" Carriage Bolt
- (1) ⅜"-16 Star Knob
- (1) ⅜" Fender Washer
- (4) ¼" x 1½" Lag Screws
- (8) ¼" x 3½" Lag Screws
- (12) ¼" Washers

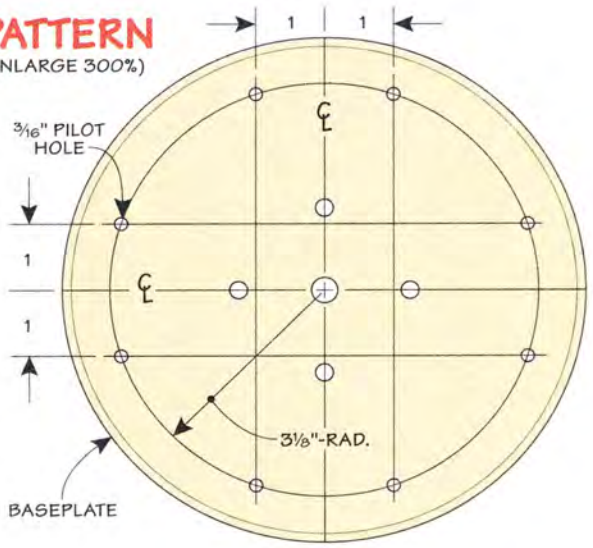
Most of the time my lathe sits idle in my shop as I'm using other tools to build projects. So I decided to get more use out of it by adding a sanding drum.

The one I designed uses 3" x 24" sanding belts you can find at any hardware store or home center. It's a common size belt used on portable belt sanders.

What's great about this sanding drum is how easy it is to make. The unique construction and band saw cutting techniques create expandable jaws to grip the sanding belt.

The jaws are attached to a baseplate through slotted holes. The inside faces of the jaws are tapered to accommodate





a center wedge block. As the wedge is tightened, it forces the jaws outward against the belt.

Getting Started. Building the sanding drum starts with a 3"-dia. faceplate for your lathe. You'll want to have one dedicated to the drum sander since it stays attached to the drum.

I made a mounting plate for attaching the drum assembly. A baseplate is then added to form a foundation for the movable jaws and wedge. Figure 1 shows how they go together.

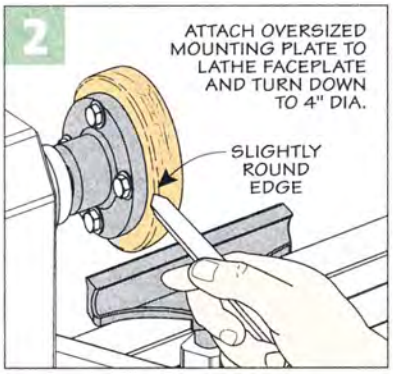
Start by laying out the two circles on plywood. Then it's an easy task to cut the rough shapes for the two plates at the band saw. You'll want to leave them a bit oversized because you'll turn them to the final diameter on the lathe, as in Figures 2 and 3. I first attached the faceplate to the mounting plate blank. It's okay that the lag screws poke through. Just be sure to avoid them while the lathe is on. Turn the mounting plate to its 4" diameter. While it's on the lathe, turn a slight roundover on the outside edge.

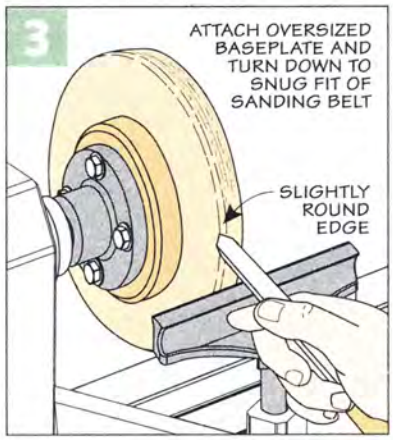
You can back out the lag screws and center the larger baseplate blank onto the mounting plate and faceplate. Use the existing holes in the mounting plate as a guide to drill pilot holes into the baseplate. Attach it with the lag screws before remounting the assembly on the lathe (Figure 3). I turned the diameter of the baseplate so the sanding belt just slipped over it.

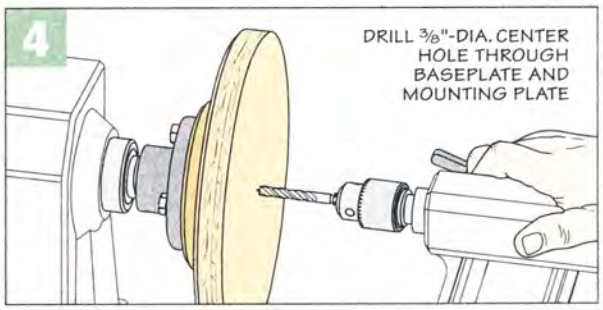
While it's still mounted on the lathe, mark the center of the baseplate with a center mounted in the tailstock. Figure 4 shows how to drill a hole through the exact center of both plates. You can do this at the drill press if you don't have a drill chuck for your lathe. This hole is used to attach the jaw and wedge assembly.

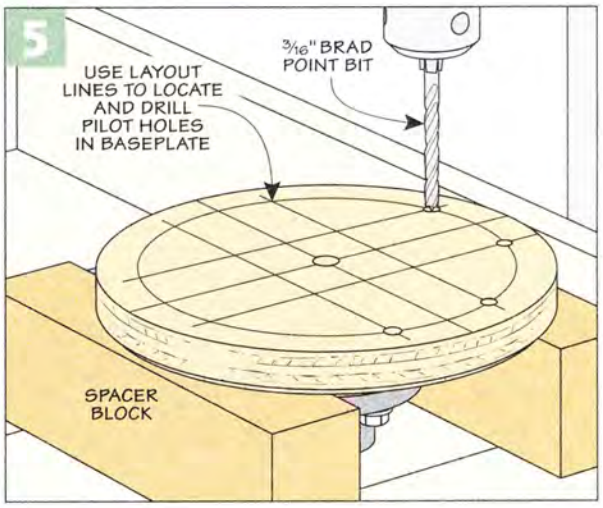
Layout & Drilling. Remove the assembly from the lathe to do a little layout work. To make laying out and drilling holes in the baseplate easier, I drew lines through the center at 90° to one another. These lines help to lay out the locations for the holes that will be used for attaching each of the four jaws. Figure 5 and the pattern above show you where they're located.

I drilled 3/16" pilot holes that serve as guides for locating holes on the jaws later. You'll eventually enlarge the holes to create parallel slots that allow the jaws to move slightly in and out.









forming the Jaws

The jaw and wedge assembly is made from one blank created from four layers of ¾" plywood. So the first order of business is to glue up the plywood to create a blank a little over 8" square.

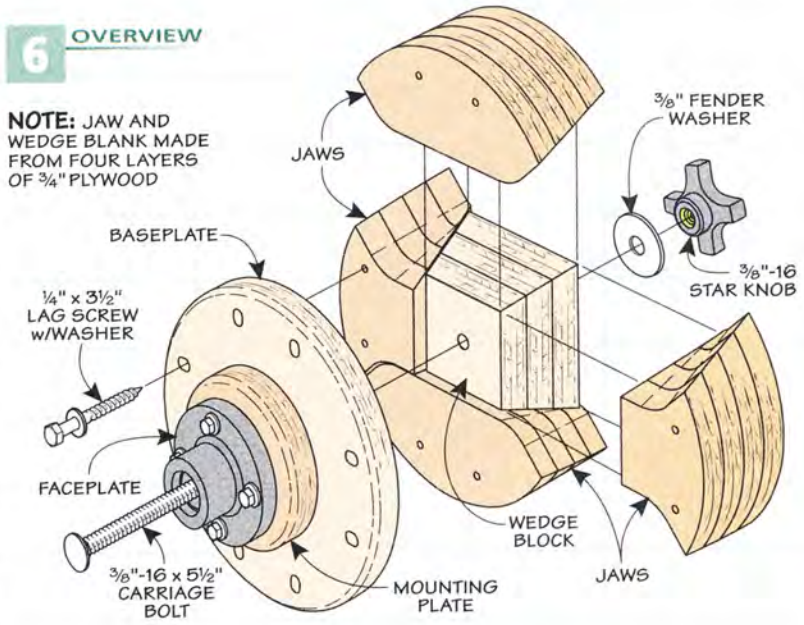
Turning the Blank. After the glue dries, lay out an 8"-dia. circle and then mark and drill a ⅜" hole through the center of the blank. You'll use this hole to mount the blank on the baseplate for turning it round. But first, you'll need to rough-cut the blank into a circle at the band saw.

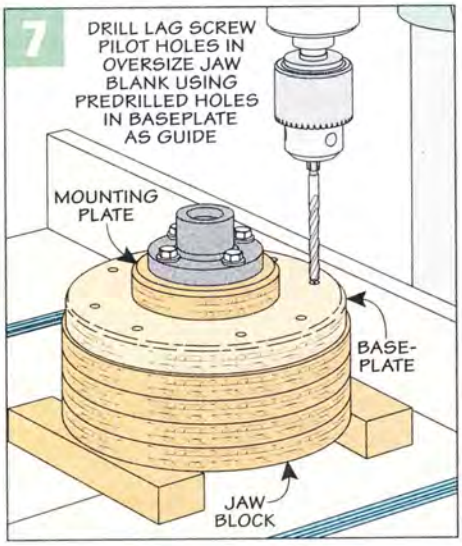
Using a long carriage bolt, washer, and knob, mount the blank to the baseplate. Then drill pilot holes into the blank using the baseplate as a drill guide and install a pair of lag screws, as you can see illustrated in Figures 7 and 8. Finally, you can mount the assembly on the lathe.

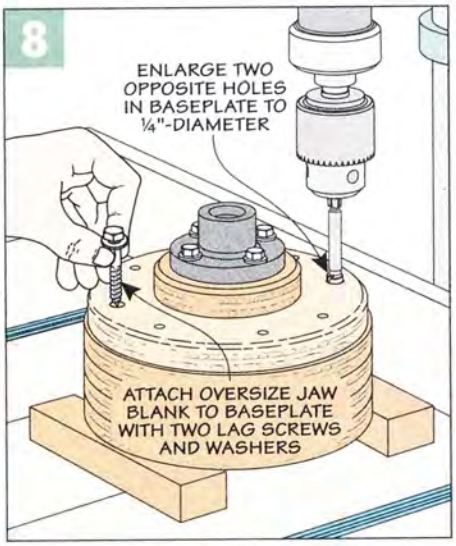
The key point to remember when turning the jaw blank round is that the sanding belt should almost, but not quite, fit over the circumference of the blank (Figure 9). The reason is that you'll later cut the four jaws and wedge block free from the blank at the band saw. The saw kerfs create enough "slack" to allow the belt to slip over and be held securely by the jaws.

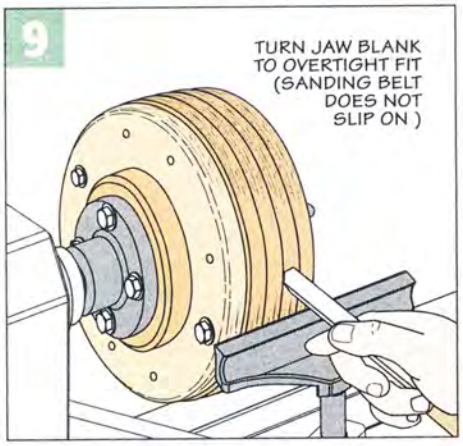
Slotted Holes. Before removing the assembly from the lathe, make a witness mark (Figure 10). This helps you orient the jaw assembly when assembling it on the baseplate later.

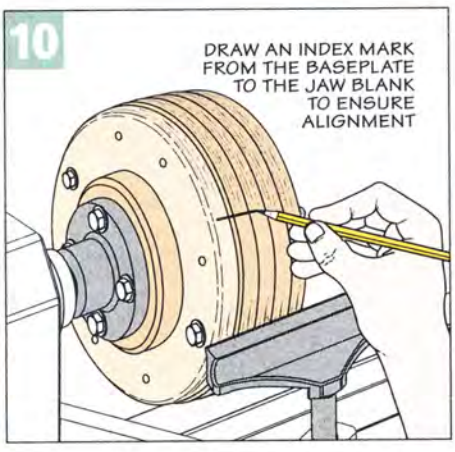
The next step is to create parallel slots in the baseplate that allow the jaws to slide in and out as you tighten or loosen the wedge block. You'll remove the jaw block to do this. As you can see in Figure 11, the slots are aligned parallel with the layout lines. I drilled overlapping holes in the baseplate with a Forstner bit before filing the slots smooth.

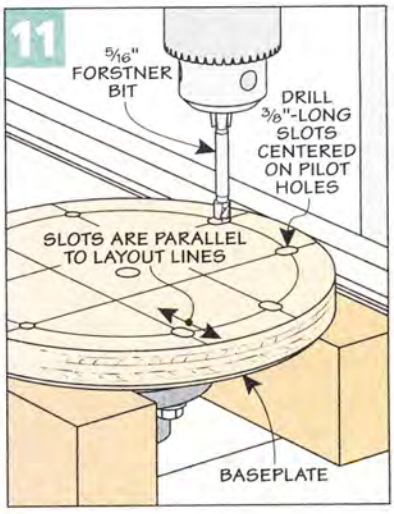


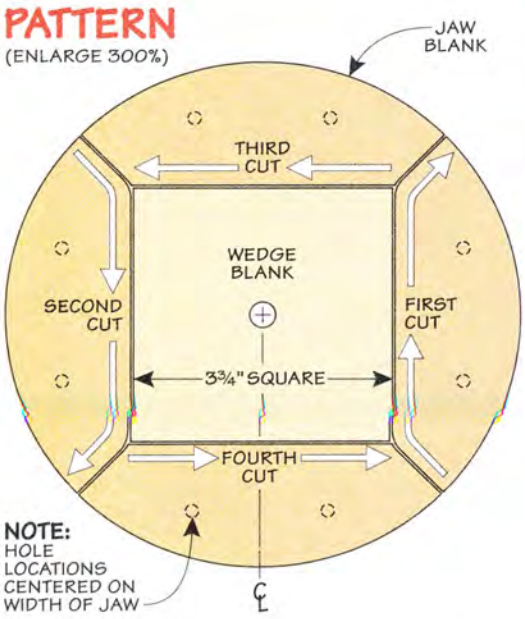


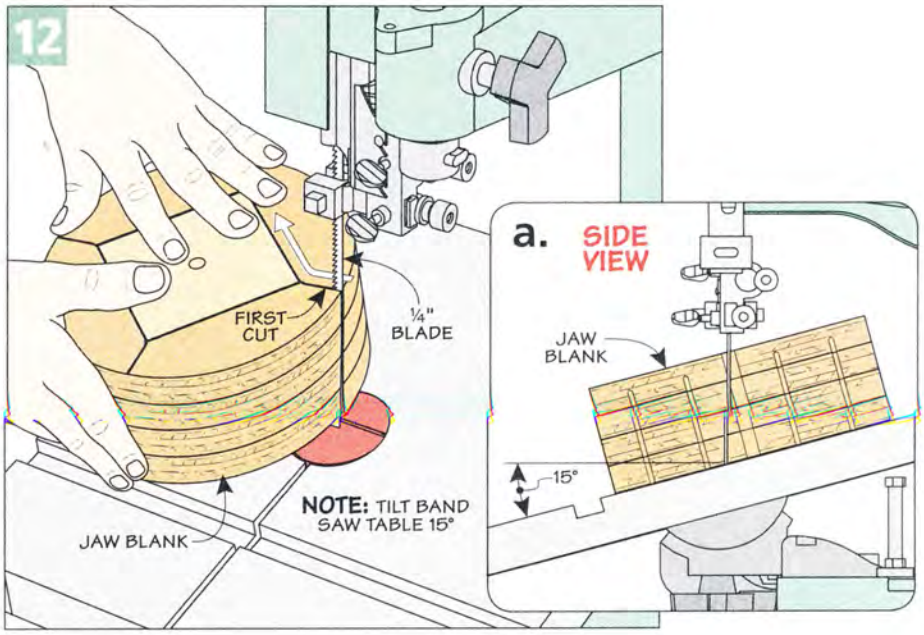












Forming the Jaws & Wedge. The process of cutting out the jaws and wedge block from the blank you turned earlier might seem like magic. But it's not as tricky as it looks.

The key is laying out the cutlines as shown in the pattern above. You'll use these lines to cut the jaws and wedge block free at the band saw. The lines are drawn opposite the face that attaches to the baseplate.

There's one thing I need to mention as you lay out these cut lines. You'll be making these cuts with the table of the band saw tilted to 15°. You can see what I mean in Figure 12. So, the one thing to watch for is that the saw kerfs don't cut through the pilot holes for the lag screws.

Four Cuts. After laying out the cutlines, it's time to step over to the band saw. I installed a ¼"-wide blade to make the cuts.

Cutting out the four jaws and wedge block takes four cuts. The order of cuts is shown in the pattern above. The first two cuts form two of the jaws on opposite sides of the blank. The last two cuts separate the two remaining jaws from the wedge block.

Once the wedge block is cut free, cut about ¾" off the bottom (small) end at the band saw, as in Figure 6. This is easy to do while the table is still tilted. This cut enables the wedge block to slide into the jaw assembly further to force the jaws outward.

I used a sanding block to smooth the cut surfaces of the jaws and wedge block. It only takes a light touch. It's important not to remove too much material. Doing so might make the jaws too loose and unable to tightly grip the sanding belt.

Final Assembly. With the five parts in hand, reassemble them in their original orientation. You can use the witness mark and grain of the plywood as a guide to put the pieces together.

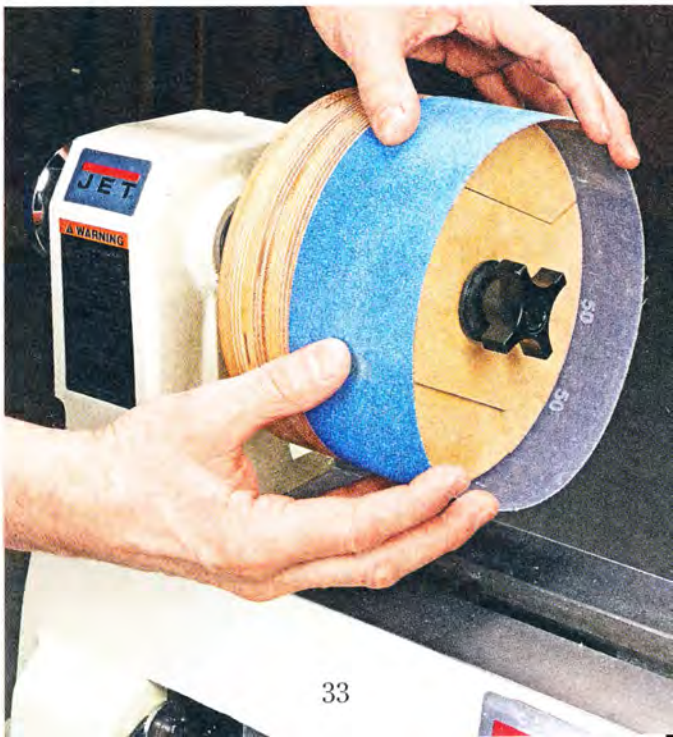
Attach each of the jaws to the baseplate with a pair of lag screws and washers (Figure 6). You'll want to snug them up just so the lag screws slide within the slots without being too loose.

The last piece to attach is the wedge block. Use the same carriage bolt, washer, and knob as before, leaving the wedge a little loose for now.

After spinning the assembly onto the headstock of your lathe, slip a sanding belt over the jaws. As you tighten the knob on the wedge block, it forces each of the jaws outward. You'll want to make sure the belt is tight enough that it won't slip on the jaws during use.

Using the Sanding Drum. Before using the sanding drum, it's important to move the tool rest away from the drum. You don't want to risk anything getting caught between the spinning drum and the tool rest. And you need to remember the direction of rotation of the drum. The top of the drum is rotating toward you. It doesn't really matter which part of the drum you use, but you need to remember to maintain a firm grip on the workpiece.

With this new shop-made tool, your lathe will find more use as it serves dual purposes for sanding as well as turning.



▼ ***Belt Change.*** *To install a sanding belt, loosen the knob, slip on the belt, then retighten the knob to force the jaws outward.*

Drill Press Table

Upgrade your drill press with this handy add-on that features up-front adjustment handles.

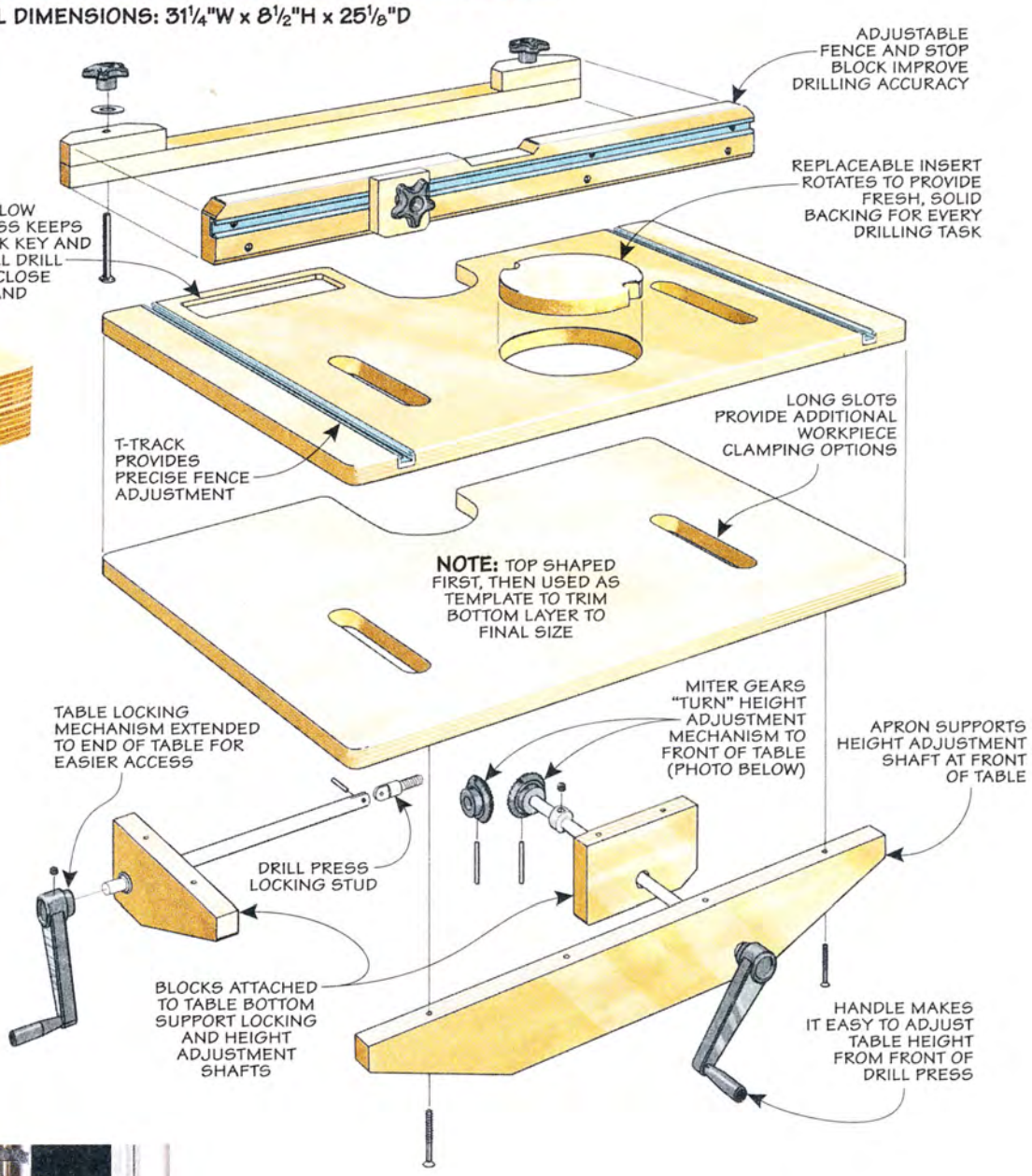
Adding an auxiliary table to a drill press is a sure-fire way to improve its capabilities. An increased work area, a precision fence, and a replaceable insert are just some of the benefits.

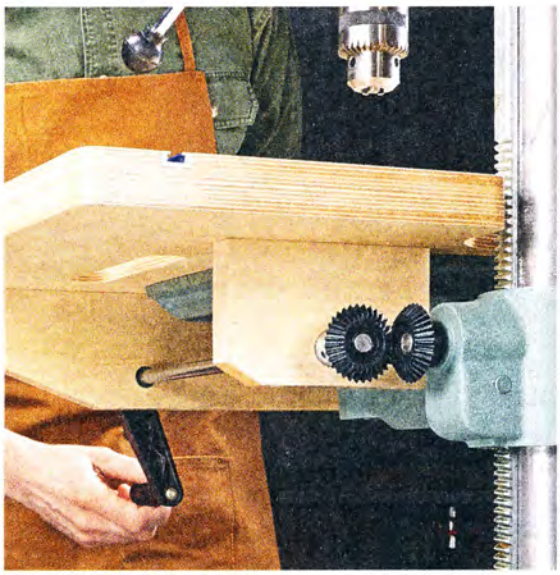
All of these features are standard on the drill press table you see above. But what makes this table different is actually underneath. Instead of the hassle and challenge of having to reach behind and below the table to access the locking lever and the height adjustment crank, I've made a few changes and repositioned them for better access.

A steel rod with a handle extends the locking shaft to the side, where a half turn locks (or unlocks) the table. And a second shaft, along with a pair of miter gears (photo at right), repositions the height adjustment handle to the front of the table. This way, making an adjustment to the height of the table is a quick and hassle-free process.

Exploded View Details

OVERALL DIMENSIONS: 31¼"W x 8½"H x 25⅛"D





▲ ***Geared Up.*** *Miter gears make it easy to reposition the height adjust mechanism to the front of the table for ready access.*

Materials & Hardware

A	Top (1)	22 x 28 - 1½ Ply.
B	Insert (1)	6-dia. - ¾ Ply.
C	Fence Face (1)	1¼ x 2½ - 28
D	Fence Base (1)	1 x 2 - 28
E	Stop Block (1)	¾ x 2½ - 2½
F	Riser Blocks (2)	1 x 2 - 4¾
G	Apron (1)	1 x 4 - 26
H	Rear Bearing Block (1)	1 x 4 - 6
I	Height Adj. Shaft (1)	½ x 17½ Steel Rod
J	Side Bearing Block (1)	1 x 4 - 9¾
K	Locking Shaft (1)	⅝ x 3½ Steel Rod

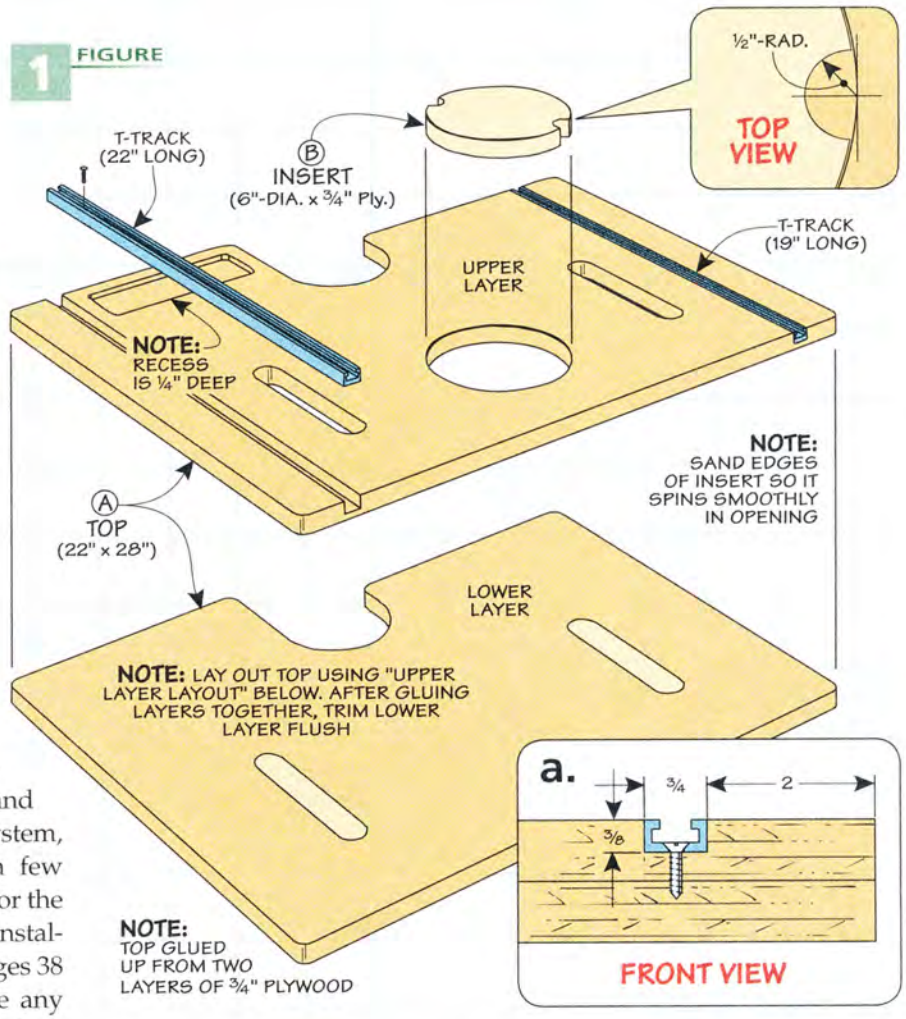
- (1) ½" I.D. x ⅝" O.D. x 1" Bronze Bushing
- (1) ⅝" I.D. x ¾" O.D. x 1" Bronze Bushing
- (1) ½" I.D. x ¾" O.D. x 1" Flanged Bushing
- (1 pr.) Miter Gears
- (1) ½" Steel Shaft Collar
- (2) 5/32" x 1¼" Spring Pins
- (2) Revolving Crank Handles
- (3) 5-Lobe Knobs w/¼"-20 Insert
- (1) ¼"-20 x 1½" Hex Bolt
- (2) ¼"-20 x 2½" Hex Bolts
- (3) ¼" Washers
- (1) 3/16" x ⅞" Steel Rod
- (8) #9 x 3" Fh Woodscrews
- (1) 24" T-track w/screws
- (1) 48" T-track w/screws
- (2) ¼"-20 x ⅜" Set Screws

start with the Table

There are three main sections to the drill press table: The top, the fence, and a set of bearing blocks underneath the table for the locking and height-adjust mechanisms. Since the fence and bearing blocks attach to the table, the best place to start on the drill press table is by making the top.

One thing I should mention is that the dimensions shown here are for a *Delta 17-900* drill press. If you have a different drill press with a rack and pinion height adjustment system, you may need to make a few changes to the dimensions for the set of bearing blocks. The installation process shown on pages 38 and 39 will help determine any changes you may need to make.

FIGURE 1



TWO-LAYER TOP

To provide a solid foundation for both the fence and the bearing blocks, I made the top from two layers of ¾" plywood. But I didn't glue up two layers of plywood to start. Instead, I began by completing all the work on the upper layer first and then, after gluing on an oversized lower layer, I trimmed everything to match.

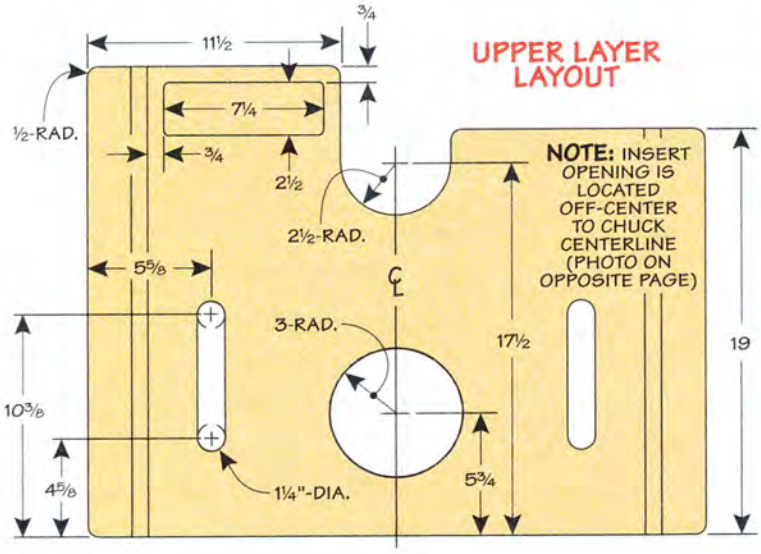
Layout. The first step is to cut the upper layer to its overall size. Then you're ready to lay out the shape using the Upper Layer Layout dimensions shown at left. Shaping the upper layer starts with using a circle cutter to cut the openings for the insert and the circular clearance notch along the back for the drill press column.

A jig saw makes quick work of removing any remaining waste so you can sand all the edges smooth. Removing the waste at the back provides clearance for adding the rear bearing block and miter gears once the table is installed.

Keeping a workpiece secure while you drill is important. To make it easy to clamp a workpiece in place, a wide slot on each side of the insert opening allows access for clamps. I used a Forstner bit to drill out the ends and then removed the remaining waste with a jig saw. Finally, I sanded a smooth radius on all the outside corners.

Add the Lower Layer. You're ready to add the lower layer at this point. To make sure it matched exactly, I used the upper layer as a pattern, tracing it onto an oversized piece of plywood, including all the openings. This way, you can remove most of the waste with a band saw (and a jig saw for the slots).

Spray adhesive is a great way to glue the two layers of the table together. Just mask off the area of the insert on the lower layer, spray the adhesive on the mating surfaces of each layer, and then carefully glue them together. Then to trim the outside edges and slots of the lower layer flush, I used a flush-trim bit and a hand-held router. A quick trip to the



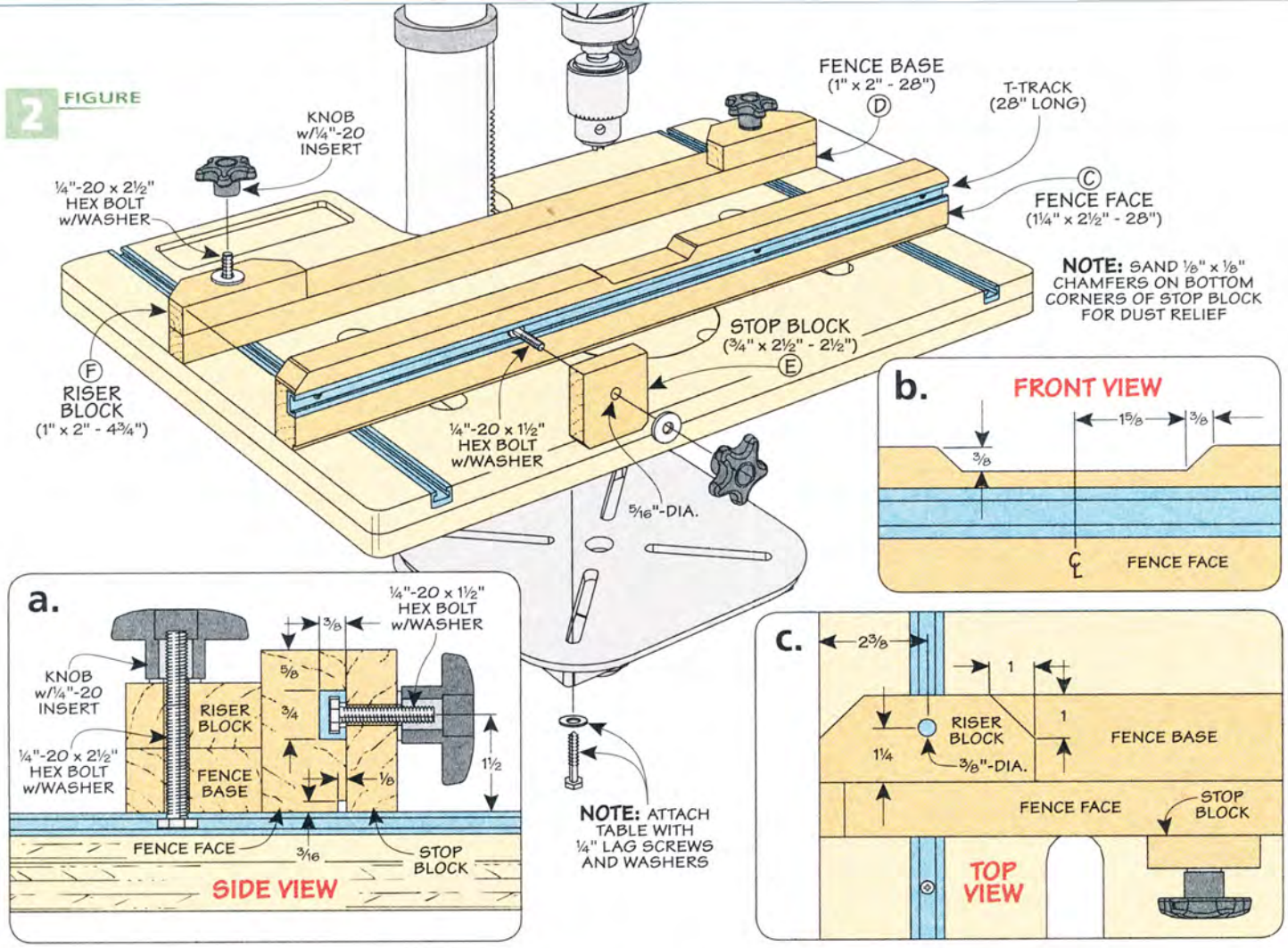


table saw takes care of cutting a groove near each edge for the T-track used to mount the fence.

Creating Storage. Keeping track of the chuck key for the drill press always seems to be a challenge. To solve the problem, I routed a small recess along the back edge of the table to hold the key and a few bits. Shop Short Cuts on page 28 covers this process.

Replaceable Insert. Installing the T-track completes the top. But you still need to add the insert (lower right photo). When the table is installed, the center of the opening is offset from the center of the chuck, allowing you to rotate the insert to create a fresh area for drilling. Shop Short Cuts on page 29 shows an easy way to make replacement inserts with a simple hardboard template.

Finally, you can attach the completed table to the metal table of the drill press. I used a set of lag screws and washers to secure it after centering the column of the drill press in the circular notch at the back of the table.

BUILD THE FENCE

Compared to the table, you'll find the fence a pretty quick build, as in Figure 2. To keep the fence stout, I used thick hardwood for both the face and base.

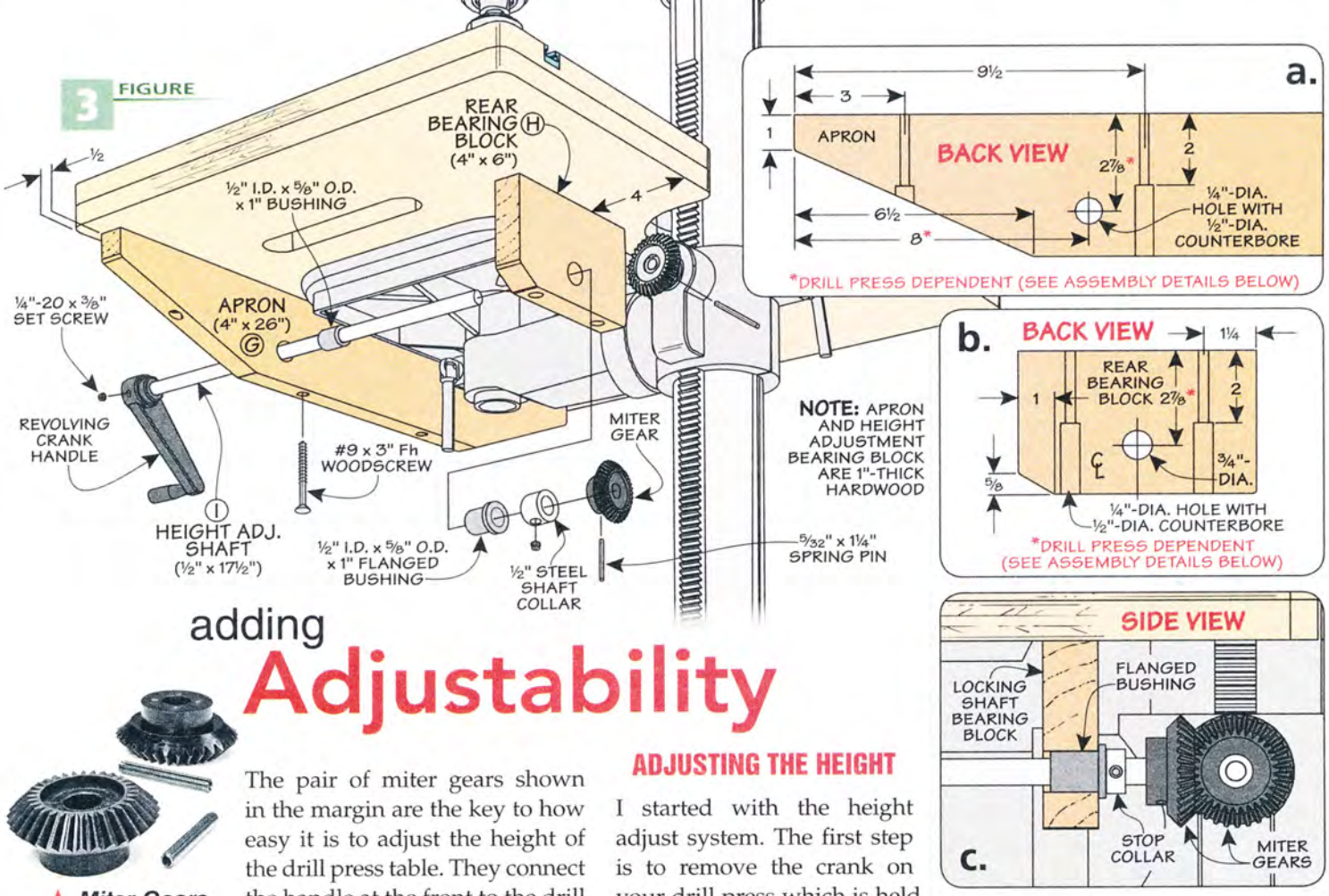
Fence Face. Before gluing the base to the fence face, you'll want to cut a notch in the center of the fence (Figure 2b). The notch provides extra clearance for the chuck when drilling close to the fence.

Next up is a stop block and a length of T-track in the fence (Figure 2a). This makes drilling identically located holes in multiple workpieces a snap. Since dust buildup will affect how accurate your holes are, I eased the corners of the stop block and cut a rabbet along the bottom front edge of the fence face.

Assembly. After gluing the base to the fence face, you can add a pair of shaped riser blocks. They raise the knobs used to lock the fence in place above the face for easier access.

A couple of minor tasks remain. The first is to ease a few edges by knocking off the corners of the fence face and trimming the back corners of the base to match the riser blocks. Then all that's left is to drill the holes for mounting the fence to the T-track (Figure 2c).

▲ ***Solid Support.*** *The insert is offset from the centerline of the bit. To provide solid backing for a new bit, simply rotate the insert to a fresh area.*



adding Adjustability

▲ ***Miter Gears.*** *These gears mate at a right angle to transfer the motion of the height adjustment mechanism to the front of the drill press table.*

The pair of miter gears shown in the margin are the key to how easy it is to adjust the height of the drill press table. They connect the handle at the front to the drill press, essentially "turning" it 90° (Figure 3). To lock the table, a second shaft extends that mechanism to the side, as in Figure 4.

An apron and two bearing blocks support these shafts. Locating these parts depends on the design of your drill press. But the process for determining where everything goes is covered in the Assembly Details below. I'll just hit the highlights.

ADJUSTING THE HEIGHT

I started with the height adjust system. The first step is to remove the crank on your drill press which is held in place with a set screw.

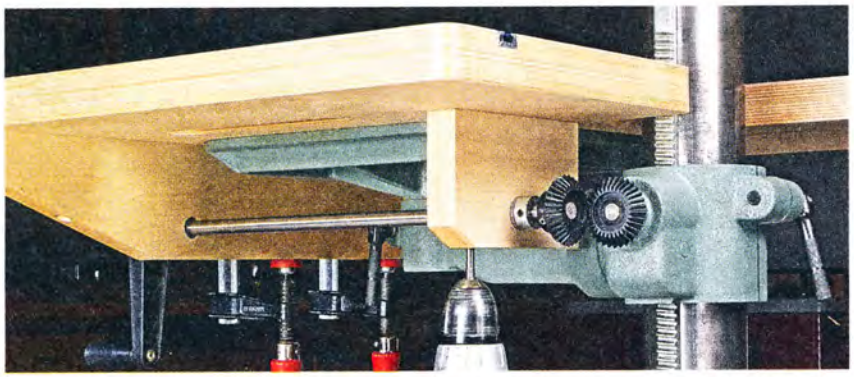
Measure, Then Add Gear. The key measurement is the distance from the bottom of the table to the centerline of the handle shaft (inset A below). You'll use this measurement to locate the bushings in the apron and bearing block.

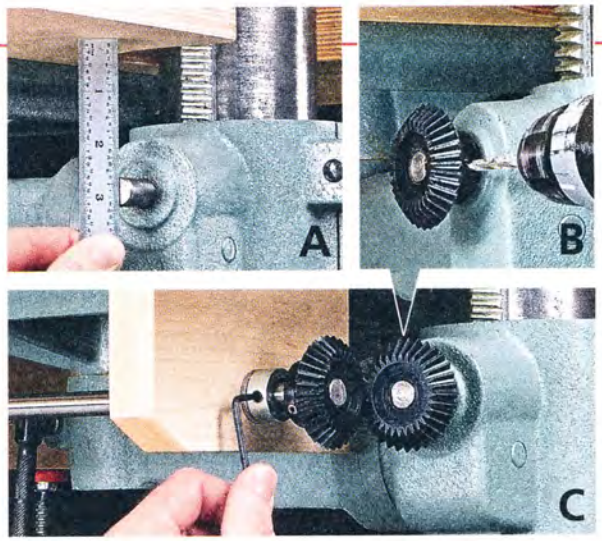
The shaft on my drill press for the height adjustment was larger than the hole in the miter gear, so I had to "upsize" the hole to match. Shop Short Cuts on page 29 covers the procedure for that.

Next, make sure the shaft is positioned all the way out (turning the handle to raise the table ensures this). After slipping the gear onto the shaft and against the shaft hub, drill a hole through the gear and shaft (inset B below), and tap in a spring pin.

Shape & Drill. Using Figures 3a and 3b, shape the apron and

Assembly Details





▲ ***Height Adjust.*** *Locate the centerline of the handle shaft (A). After drilling and pinning a miter gear in place (B), install the remaining hardware (above). A stop collar keep the gears together (C).*

bearing block. The measurement you made earlier comes into play next. The centerline of the hole for the flanged bushing in the bearing block needs to be located that distance down from the top edge, as illustrated in Figure 3b. (Mine was 2⅞".)

The bushing hole in the apron is located the same distance down, but its distance from the end will depend on your drill press. I found it easiest to assemble all the parts and temporarily clamp them in place to determine the horizontal location of the hole with the apron centered on the table.

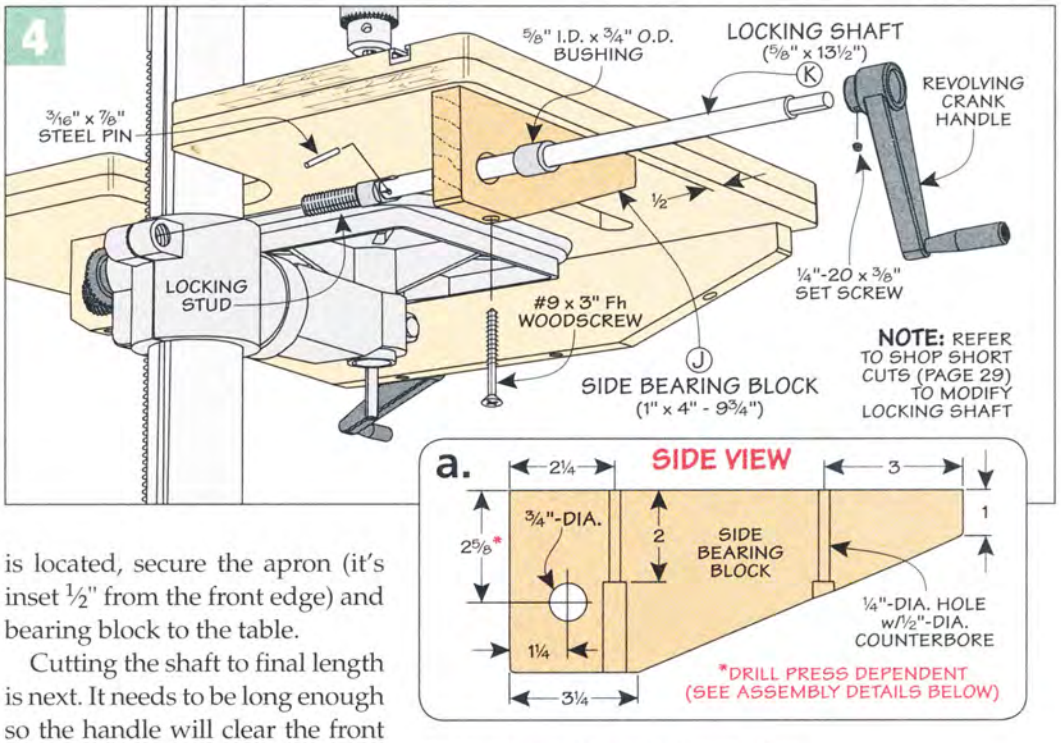
Assembly. Once you have all the holes drilled, you're ready for installation. (I left the shaft extra long.) First, press the flanged bushing into the bearing block.

Then, add the miter gear and pin it in place just like before. After slipping the stop collar on, slide the shaft through the bushing (Figure 3c).

For the next step, it helps to have an extra hand. You'll need to hold the bearing block against the bottom of the table, positioning it so the miter gears mesh together. (lower left photo, opposite page).

After attaching the bearing block, slide the stop collar against the bushing and tighten the set screw (inset C on opposite page). The stop collar prevents the gears from separating as you raise (or lower) the table. Once everything is located, secure the apron (it's inset ½" from the front edge) and bearing block to the table.

Cutting the shaft to final length is next. It needs to be long enough so the handle will clear the front of the table. Note: You'll need to temporarily remove the apron and bearing block. To secure the handle, file a flat on the shaft, and then drill and tap a hole in the handle for the set screw.

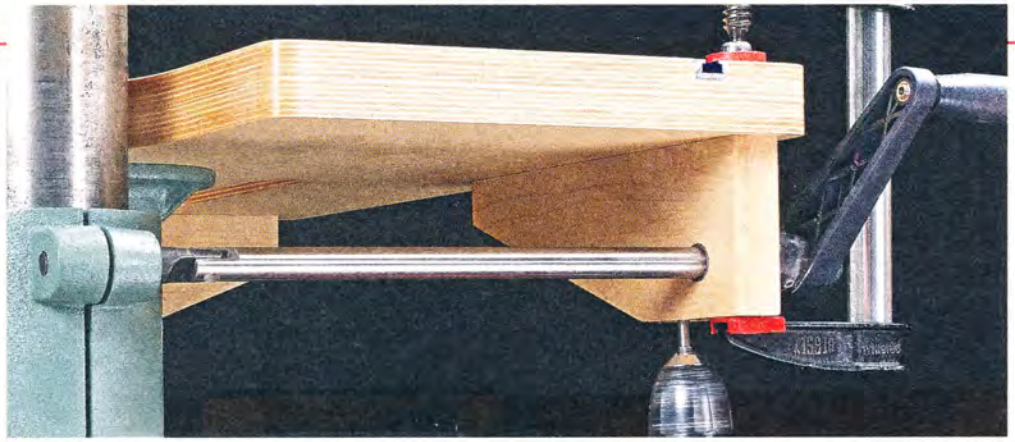


LOCKING THE TABLE

Completing the installation of the height adjustment assembly will make extending the locking shaft to the side seem like a snap (Figure 4). Like before, it starts with removing the locking lever from the threaded stud and measuring where the centerline of the stud is located (inset A below). To make it easy to connect to the threaded stud of the locking lever, this shaft is larger in diameter. Modifying the shaft is covered in Shop Short Cuts on page 29.

Since the shaft is pinned to the stud (inset B below), you only need one bearing block for the shaft. After shaping the bearing block (Figure 4a), slip the hardware in place and clamp the bearing block to the table (left photo below). Here again, the handle is secured with a set screw.

That completes the table installation. Now adjusting the height of your drill press table will be a quick and easy operation — right from the front of the table.

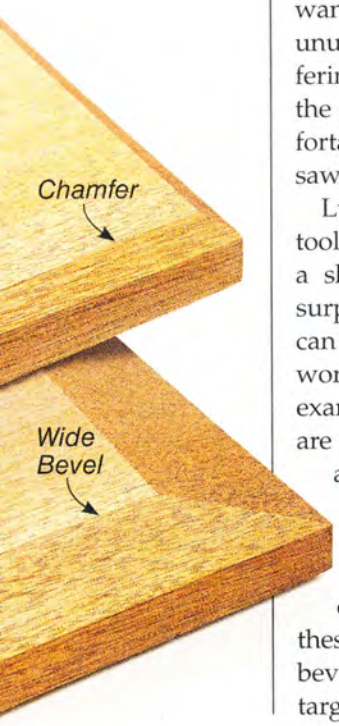


▲ ***Lock It Down.*** *You'll need to locate the centerline of the table locking stud first (A), then pin the shaft to the locking handle stud (B). Finally, clamp the locking shaft bearing block in place and screw it to the table (above).*

HANDS-ON Technique

planing Bevels & Chamfers

Creating crisp, wide bevels and small chamfers is easy using these simple hand plane techniques.



Creating a chamfer or bevel on the edge of a workpiece such as a large panel usually involves a router or table saw. But if you want to create a profile at an unusual angle, standard chamfering bits can't be used. And if the panel is too large to be comfortably supported at the table saw, your options are limited.

Luckily, there's a traditional tool that can handle the job. With a sharp hand plane, you'd be surprised at how quickly you can create these profiles on a workpiece. You can see a couple examples on the left. All it takes are a few simple techniques and a little muscle power.

Layout Lines. Other than a hand plane, the only tools you'll need are a pencil and combination square. I use these to lay out the edges of the beveled profile and provide a target to shoot for as I'm planing. The photos at the top of the opposite page show the process.

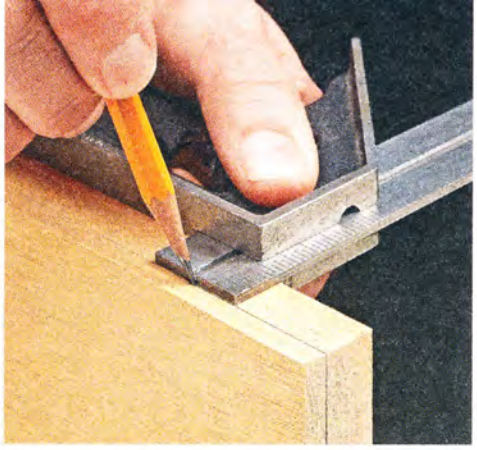
For 45° chamfers, draw a layout line on both the edge and face of the workpiece the same distance from the corner. For wider bevels, the layout line on the edge of the workpiece defines the final thickness of the panel's edge. This is an important consideration for a door panel. It needs to fit into a groove in the door's frame. The layout line on the face of the workpiece defines the bevel's width.

Clamping. Once the layout is complete, clamp the workpiece to your bench. I use the tail vise on my workbench, clamping the workpiece between bench dogs. The edge of the workpiece slightly overhangs the edge of the bench. This way, I can use my fingers along the edge to help guide the hand plane in a straight line, if necessary.

Planing. When planing these edge profiles, I start with the end grain. So, if there's any tearout at the end of the plane stroke, planing the long-grain edges last will clean up any damage.

For narrow chamfers, a block plane is adequate for the job, as demonstrated in the photo below. You won't be removing much material at first, but use those first few strokes to adjust the angle of the plane. Keep your

▲ ***Narrow Chamfers.*** *A small block plane is ideal for creating eased edges on workpieces.*



▲ **Edge Lines.** *Lay out lines along the edges of the panel to serve as a guide for planing the depth of the bevel.*

▲ **Face Lines.** *Lines on the face of the panel act as the goal line to determine the overall width of the bevel.*

▲ **End Grain First.** *Skew the plane slightly as you slice off the end grain. Then work on the long-grain edges.*

eyes on both layout lines as your cuts increase in width. You can continually make adjustments to stay parallel to the lines as you approach them.

Wide Bevels. For wide bevels, the process is the same. You can save some elbow grease if you're able to remove the bulk of the material at the table saw and then make the finishing cuts with a smoothing plane. If that's not possible, it's not much work to plane the entire bevel.

When planing the end grain, you might find it helpful to slightly skew the plane so the toe of the plane is pointed toward the edge of the workpiece, as shown in the right photo above. This helps the iron slice through the grain. As you approach the layout lines, you can make the final few passes with the plane parallel to the edge. This helps ensure the bevel is flat and straight.

The Corners. Another important guide as you plane is the line at the corner where the two edge profiles meet. As you plane, you'll want to form a crisp miter line that meets at the corner.

To Sand or Not. With a sharp plane you shouldn't need to sand the profile much. If anything, a light touch using a sanding block is all you need. You'll want to maintain the edges of the profile without rounding them over.

In the end, you'll have a clean, crisp profile that you finished entirely by hand.

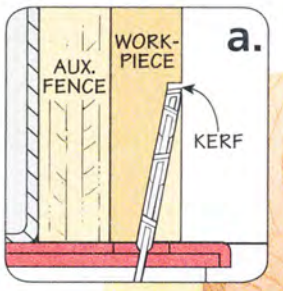
raised panels with a Rabbet Plane

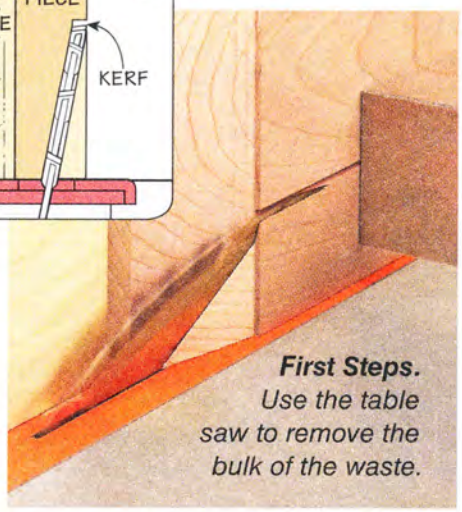
Creating raised panels follows a similar process to the one you'd use to plane a chamfer or bevel. The difference is that you're forming a stepped shoulder to elevate the field of the panel, as in the right margin photo.

For this operation, you'll need to use a rabbet plane, like the one shown at right. The iron on a rabbet plane extends to the side edge of the plane's body. It's designed to cut into a corner.

To create a raised panel, start by cutting kerfs parallel to the edges at the table saw. These define the shoulder of the raised field. Then, remove the bulk of the waste on the bevel by tilting the blade on the saw and using a tall auxiliary rip fence to support the panel on edge (left photo).

Rabbet Plane. Using a rabbet plane, you can clean up the bevel and remove any saw marks right into the corner of the shoulder.





First Steps. *Use the table saw to remove the bulk of the waste.*

Another advantage to using a rabbet plane is that you can set the fence to guide the plane throughout the length of the bevel. The fence rides along the edge of the workpiece to ensure a consistent bevel width.

▲ **Special Features.** *A rabbet plane cuts tight into a corner while the fence helps maintain the width of the bevel along the panel's edge.*

the nitty gritty on Sanding Blocks

The right sanding block can make creating smooth, even surfaces fast, easy, and comfortable.

Most woodworkers know that sanding is an important part of building a great-looking project. However, the temptation to make nothing more than a few quick swipes with a bit of sandpaper can be hard to resist.

The problem you run into is the uneven pressure from your fingertips creates an inconsistent surface. Using a sanding block or two can make a big difference.

You may think that commercial sanding blocks are just gimmicks. But a good block not only produces an even scratch pattern on the workpiece, it also provides a cushioned surface that helps sandpaper last much longer.

A Basic Block. For most projects, a rectangular sanding block will meet your needs. As you can see on these pages, there are several options to choose from. Turn to page 51 to find sources.

Cork. For years, I've used a lightweight cork sanding block (lower left photo). It's just the right size for sanding large surfaces and getting into tight places. I like to use adhesive-backed sandpaper with it, so I don't have grip the block tightly to keep the paper in place.

Rubber Block. The rubber block in the middle photo strikes a good balance between rigidity and softness

▲ ***Cork Block.*** *Using adhesive-backed sandpaper means you don't need to hold the paper to the block.*

▲ ***Rubber Block.*** *Dense rubber gives this block just the right amount of cushion. Slits in the ends securely grip the sandpaper.*

▲ ***Stikit Block.*** *A roll of adhesive-backed sandpaper stores in the front so you can quickly pull out a fresh section.*

▲ ***Sanding Sponge.*** *A 320-grit sanding sponge is ideal for leveling coats of finish.*

▲ ***Profile Blocks.*** *Each block features several profiles, so you can find one that matches the workpiece.*

to create a cushioned surface. The contoured back makes it comfortable to use. Metal teeth inside a slit on each end holds a 3" x 9" strip of sandpaper in place, so you don't have to hold it.

***Stikit* Block.** The *3M Stikit* block holds a roll of sandpaper in the nose (lower right photos on the previous page). You pull out what you need and the paper sticks to the felt bottom. This makes refreshing the paper quick.

Preppin' Weapon. The previous three sanding blocks are small, lightweight tools. The *Preppin' Weapon* shown in the main photo on the facing page is a different story. It's about 50% longer than the other blocks.

This sanding block will hold a quarter sheet of sandpaper with a pair of built-in clips. This makes it ideal for sanding large surfaces quickly. Another welcome feature is that the top is nicely shaped for a comfortable grip.

SPECIALTY BLOCKS

A basic sanding block carries the load, but it doesn't hurt to have a few special-purpose sanding blocks on hand.

Sanding Sponge. A sanding sponge combines sandpaper and sanding block into a single item. You can find them in a range of grits, but I usually keep a fine (320-grit) sponge on hand for sanding between coats of finish (upper left photo).

Profile Blocks. Even if most of the work you do is flat and square, chances are you'll have some molding or a profile that needs to be smoothed. That's where the *Soft-Sander* blocks in the upper right photos come in.

What's nice about these is that each of the six blocks incorporates several profiles. So you're find to find a profile that matches your workpiece. These blocks work best with adhesive-backed paper.

A good hand sanding kit consists of a basic sanding block and one or more of the specialty blocks. (Check out the box below for a couple other specialty blocks.) While you still may not look forward to sanding, at least the results you get will be smoother and more consistent.

blocks for Discs & Belts

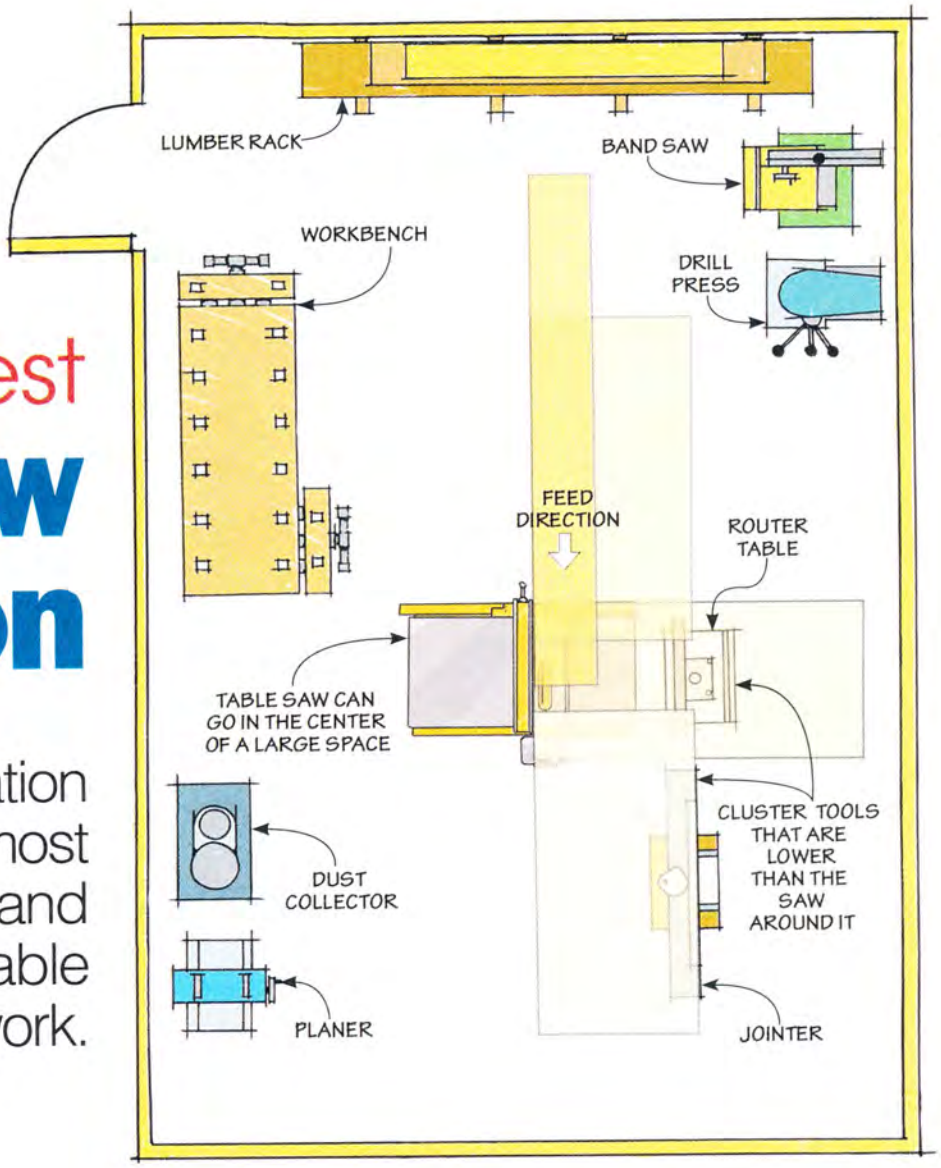
If you rely on power sanders for the lion's share of your sanding and smoothing chores, then you may want to consider adding one or more of these blocks to your kit. The blocks accept either a random orbit sanding disc (near right) or a belt sander belt (far right photo). These blocks let you tackle most hand sanding tasks without having to keep a separate supply of sandpaper sheets.

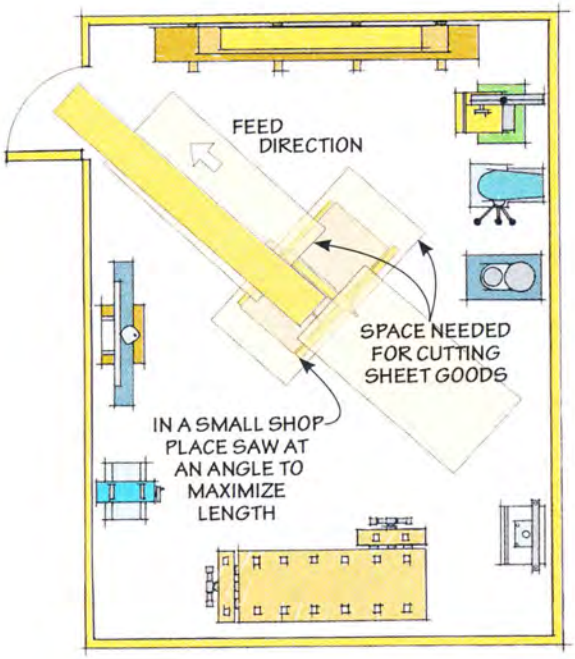
▲ ***SandDevil.*** *A spring-loaded lever tensions a belt on this versatile sanding block.*

◀ ***Random Orbit Discs.*** *A hook-and-loop pad provides cushion and holds sanding discs in place to this comfortable block.*

the best Table Saw Location

The right saw location helps you get the most out of your shop and makes it an enjoyable place to work.





One of the main considerations for setting up a woodworking shop is locating the large tools and worksurfaces in a way that makes sense and uses the space well. It can feel like putting together a puzzle without the picture. I'd like to share a couple of approaches that start with the most common (and most used) tool — the table saw.

The drawings on these pages provide a good rundown on the things you need to consider for each arrangement. But there are a few other points you should think about along the way.

How Much Space. One of the first things you'll notice in the drawings is that — more so than any other tool — a table saw requires far more space than its physical footprint. You need space in front and behind the saw to accommodate moving a workpiece through the saw. In addition, some free space to the sides is required for crosscutting long boards and wide panels.

Consider, for example, the amount of space it takes to cut a full sheet of plywood, as shown in the drawing above. You should have 8' in front and behind the saw, and at least 6' to the side. Long boards, too can require a lot of infeed and outfeed space.

Saving Space. Cutting full sheets of plywood at the table saw requires the maximum amount of space. But you can shrink the amount of working space you

need by turning to other tools. A circular saw can be used to break down sheet stock. And a miter saw makes quick work of crosscutting long boards.

Play the Angles. In a small shop, you may not have the straightline distance you need to cut long boards. One solution is to position the saw diagonally (lower left drawing on the opposite page). You can even "borrow" space from another room or outside by locating your saw near a door or window.

Not an Island. Just because a table saw needs a lot of room to work with panels and boards doesn't mean that it has to be all by itself in the center of the shop. You can create a cluster of other tools around your saw by taking a look at the height of each tool. Positioning tools with lower surfaces nearby allows a workpiece to pass over the top without catching during a cut.

You can still locate taller tools near your table saw. If you rip wide panels only occasionally, then feel free to locate a tool like your band saw or dust collector behind your saw on the far right side. Then when the need arises, you can simply reposition the tool temporarily to make a few cuts.

However, it's a good idea to keep the area directly in front of the saw clear. This helps you avoid a tripping hazard while you're working at the saw.

ALONG THE WALL

Locating a table saw in the center of a workshop seems to be the most common spot. And it makes sense considering the importance and frequency of its use. But, it isn't your only option.

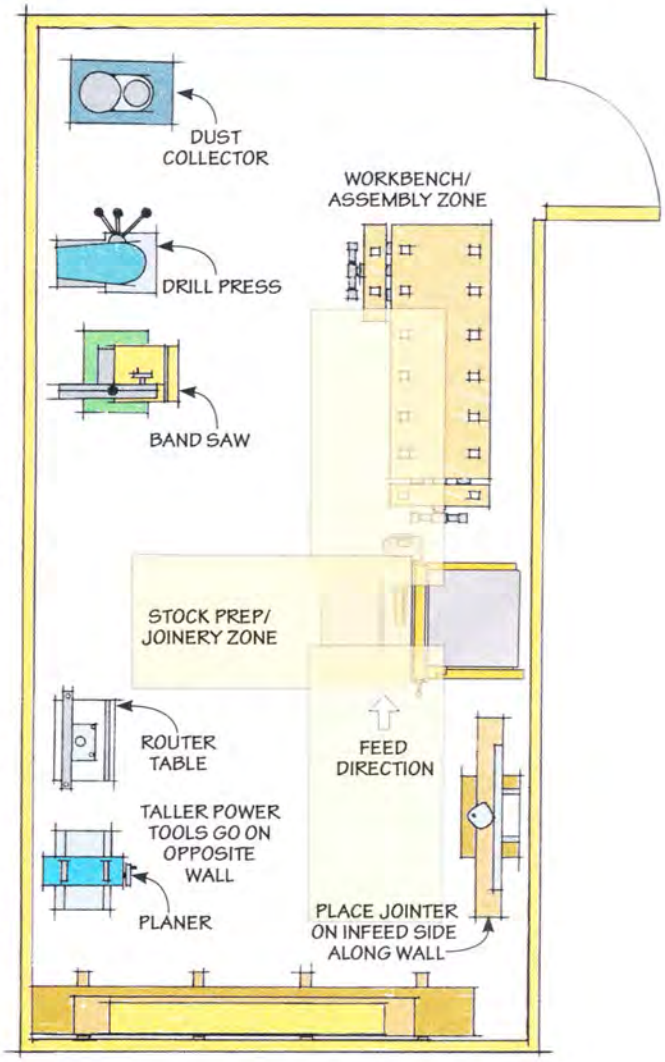
One Side. The drawing at right shows another arrangement that works well. The idea behind it is simple: The capacity of your table saw is limited by the length of your rip fence rails. So many woodworkers butt the right end of the saw against a wall.

This setup confines the amount of space needed along one side of the shop. The benefit of this is that it creates a wide aisle in the middle of your shop that can serve other needs as you're working on a project.

Shared Space. The bench on the backside of the saw serves as an outfeed table. Like I mentioned before, you can borrow space without sacrificing saw capacity. Taller power tools can be positioned along the opposite wall, out of the way.

The arrangement shown also serves to divide the workspace into specific zones. Stock preparation and major joinery cutting take place on one end of the shop. The other end can be used for finer bench work and project assembly. This can help you organize the other tools in your shop.

As you can see, thinking about how you use your table saw can be the key to unlocking your shop's full potential.

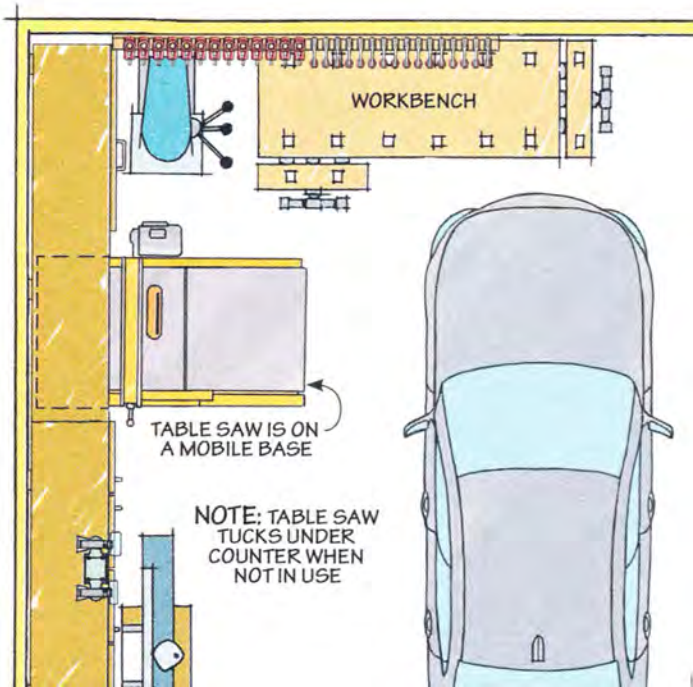


benchtop Tuck-Under

Not everyone has a dedicated shop space. For example, if your shop is in the garage, chances are you need to share the space with a car or two. The obvious solution here is to put your table saw on a mobile base, so you can roll it out of the way when necessary.

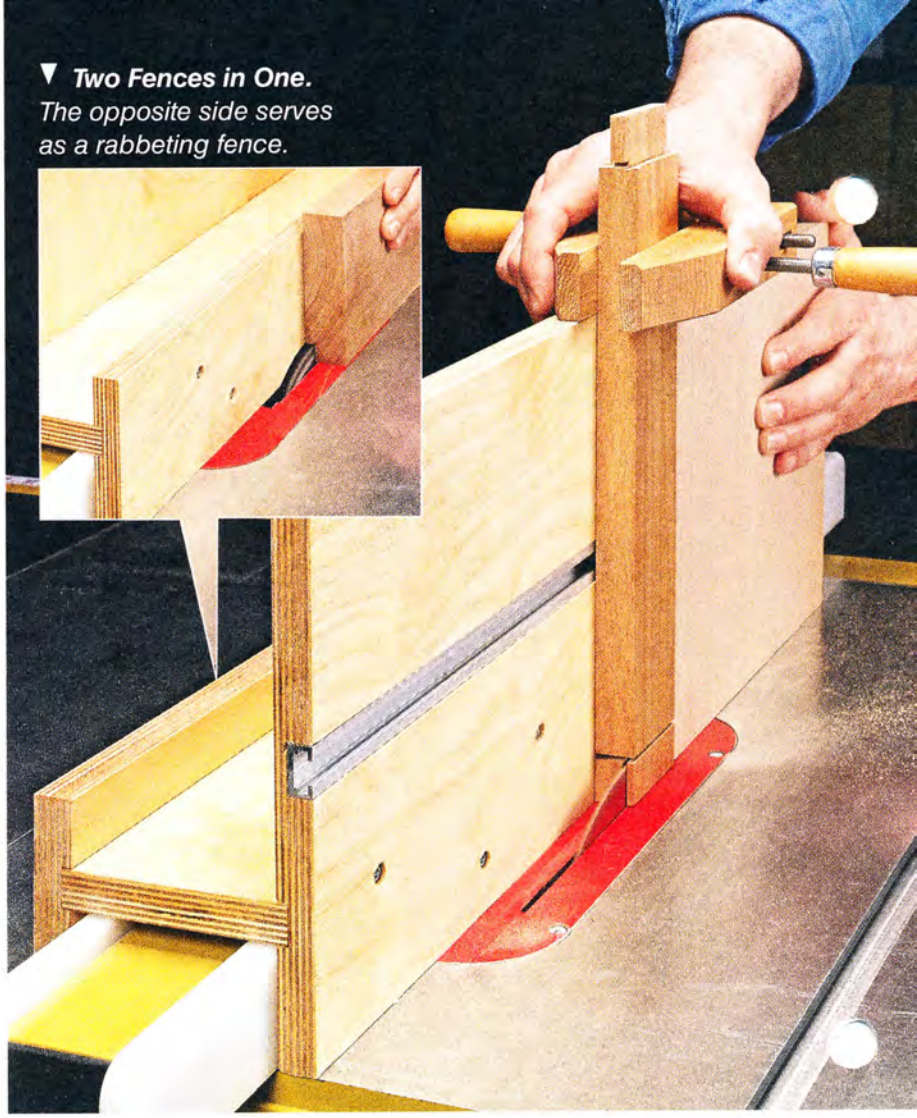
Even backed up against a wall, a table saw still takes up a large amount of space. One option to consider is shown in the drawing at right. Instead of putting the back of the saw against the wall, you can roll the saw under a taller worksurface.

The advantage here is that the saw stores away under existing worksurfaces and doesn't rob you of any available floor space. Another benefit of this orientation is that for small parts and crosscutting, you can still use the saw while the right side is under the benchtop. This creates a multipurpose workstation.

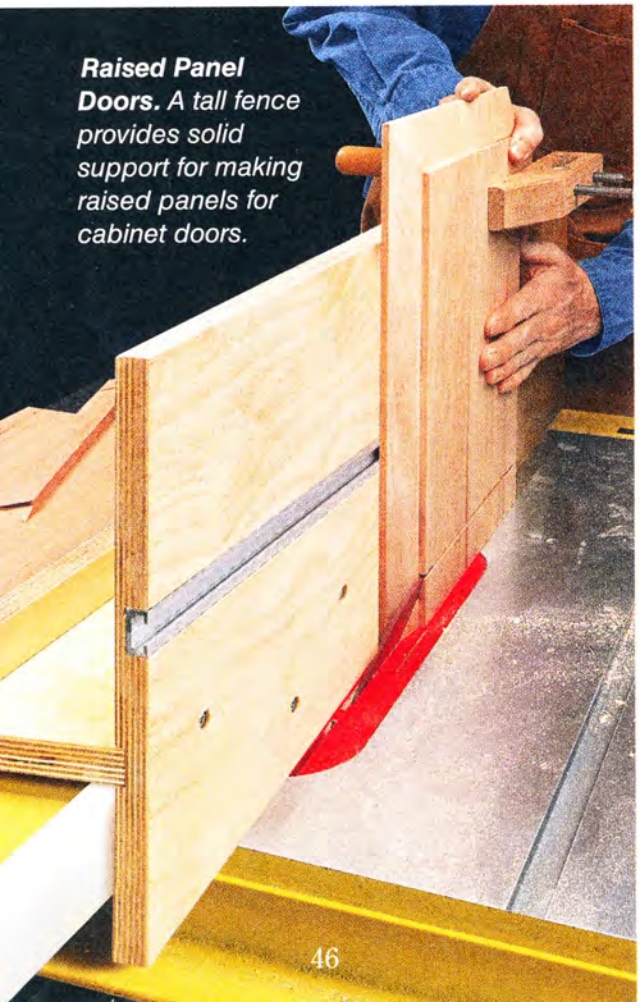


safe & reliable Auxiliary Fences

Take your table saw skills to the next level with a few shop-made attachments for specialized cuts.



▼ ***Two Fences in One.*** *The opposite side serves as a rabbeting fence.*



Raised Panel Doors. *A tall fence provides solid support for making raised panels for cabinet doors.*

The versatility of the table saw is hard to overstate. It's the go-to tool for most ripping and cross-cutting duties. And by installing a dado blade, you can also cut rabbets, dadoes, and grooves.

But it's possible to get even more from your table saw. The secret is to build some simple auxiliary fences. With these fences, you can make a wide variety of cuts with ease — and you can make them safely and accurately every time.

I use auxiliary fences for a few different reasons in my shop. Sometimes, for example, I need to make a unique cut, such as passing a board on end through the blade (photo above). Other times, I simply want to introduce more accuracy and repeatability to my table saw setups. These simple fences will get you there with a minimal amount of work required to build them.

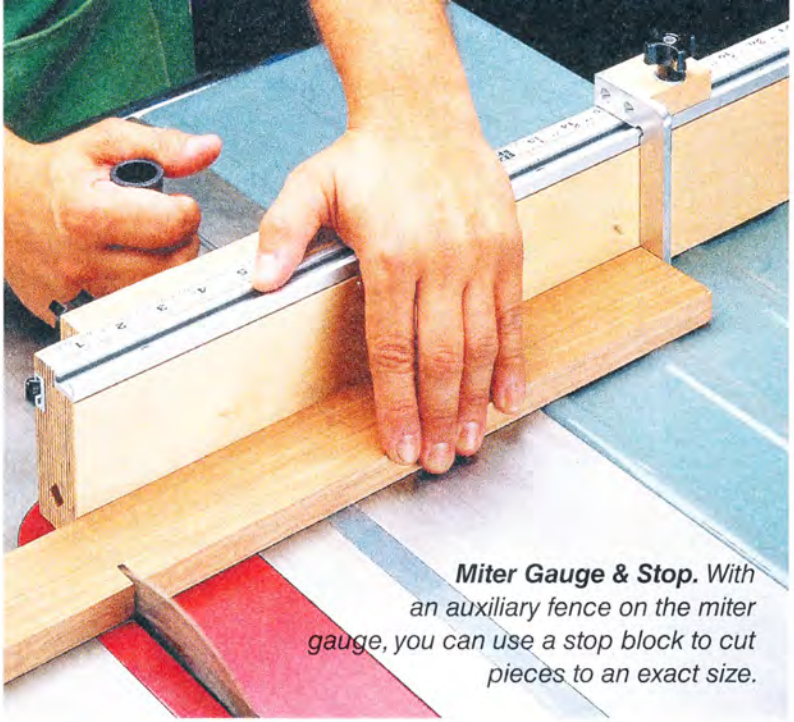
RIP FENCES

The first area where an auxiliary fence comes in handy is as an add-on to the saw's existing rip fence. On its own, the rip fence is great for conventional rip cuts where the stock sits flat on the table. But there are times when you need to cut the edge or ends of a workpiece.

The main photo shows how a tall fence allows you to cut a tenon on the end of a workpiece. With the help of a backer board to push the workpiece and a hand screw to keep it level, the tall fence gives the workpiece solid support. You can use this fence to cut tenons for even the largest projects.

The margin photo at left shows the same fence in action cutting a hardwood raised panel for a cabinet door. It's a great look for a door, and it's faster than routing a raised panel.

The tall fence in these photos is simple to build, but loaded



Miter Gauge & Stop. *With an auxiliary fence on the miter gauge, you can use a stop block to cut pieces to an exact size.*

with capability. A tall, wide face is joined to a shorter fence by a spacer to fit snugly over the fence on your saw. I use plywood for auxiliary fences because it's nice and flat. And I use screws instead of glue to join them in case I want to take them apart and modify the fence later on.

One handy feature I included on this fence is a length of aluminum T-track on its face. The T-track is a simple addition to a basic tall fence, and it gives you the capability to quickly attach a featherboard or other accessories to your fence.

Rabbets. Another commonly used type of auxiliary fence is a rabbeting fence. As you can see in the inset on the main photo, I added the rabbeting fence on the opposite side of the tall fence. It's an easy way to create a single solution for two different woodworking problems.

With a dado blade buried in the fence, cutting a rabbet on the edge of a workpiece is both simple and safe. The fences both have threaded inserts in each face, so you can attach the fence with a pair of knobs. The middle photo at right gives you the idea. The other two photos show a couple of other ways to install an auxiliary fence to your saw's rip fence.

CROSSCUT FENCE

An auxiliary fence for the miter gauge is designed to improve the safety and accuracy of crosscutting a workpiece. The photo above shows a typical miter gauge auxiliary fence in use. This arrangement improves the capability of the miter gauge by adding a long fence to support more of the workpiece as you cut it.

Features. But there's a lot more to it than just support. In addition, this fence backs up the cut and helps prevent the workpiece from splintering or tearing out on the back side. It also includes a measuring tape on top and a stop block, so you can dial in a very precise cut and then repeat it with several workpieces.

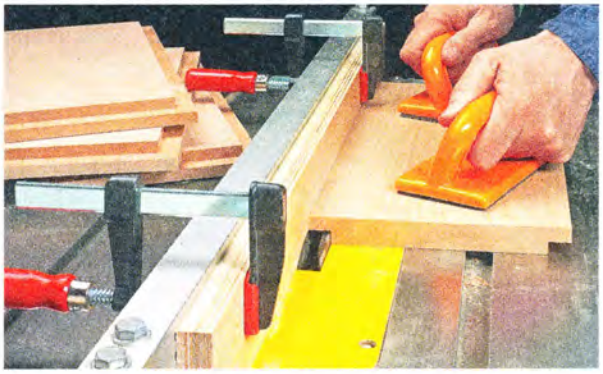
Results. The value of having identically sized workpieces becomes apparent at assembly time. Any variations in the workpieces tend to show up in the form of gaps or other irregularities in the glueup. This simple fence helps prevent that kind of mistake. It's a must-have item.

By now, you can see the value of having auxiliary fences on hand for both the rip fence and the miter gauge. Fortunately, they're easy to build. Once they're complete, you can store them away for the next time you need to make these specialized cuts.

attaching auxiliary Rip Fences

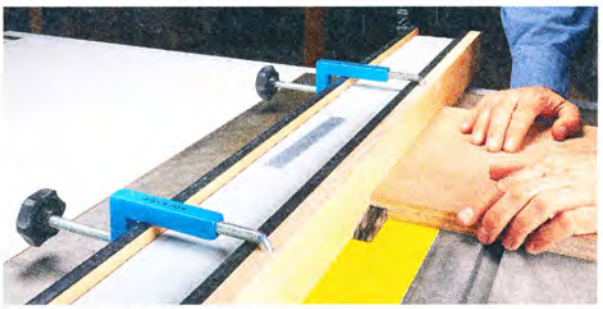
Using an auxiliary fence can make a huge difference in the quality of your work, but only if you can attach it securely to your saw's rip fence. If it wobbles or isn't straight, then you may end up creating problems that affect the quality of the workpiece.

Below are three methods of attaching a fence. The method you choose will depend on your situation and how often you use the fence. If you cut a lot of rabbets, for instance, taking the time to install threaded inserts and knobs is well worth the effort. But for a one-off cut, a couple of clamps are all you need.



▲ ***Clamp.*** *The simplest way to attach an auxiliary fence is to clamp it to the rip fence. But this only works if your workpiece will fit under the clamps.*

▲ ***Threaded Inserts & Knobs.*** *For a fence that will see lots of action, it's worth going to the trouble of installing threaded inserts and knobs.*



▲ ***Rockler Fence Clamps.*** *These commercial clamps are made for the job. Just drill a hole in the fence, insert the steel end, and tighten the clamp.*

specialty Shop Pencils

Get to the point with these upgraded marking tools for your shop.

NOTE: *Pencils shown actual size*

▲ ***Rockler.*** *This pencil has a small ruler on the side and comes with an eraser and sharpener.*

▼ ***Options.*** *A variety of leads are available for the Pica-Dry pencil.*

▲ ***Long-Nosed.*** *The Pica-Dry specializes in marking in tight areas. The sharpener is built into the cap.*

I'm willing to bet that your go-to tool for marking and layout work is a standard No. 2 wood pencil. But I recently looked at some other options for shop pencils and found a few that are worthy of consideration. You can find out where to get them in Sources on page 51.

Metal FixPencil. The *FixPencil* shown in the main photo is like most mechanical pencils. But it uses 3mm lead refills. The *FixPencil* leads are an HB hardness, like your No. 2 pencil. These leads are much thicker than the usual, office-variety mechanical pencils. This means they won't break as easily. Pressing the cap releases the lead to advance it.

I found the *FixPencil* makes a mark easily and holds a point well. The sharpener is built into the removable cap. And the durable metal body stands up to everyday shop use. It's an investment at about $32.

Cabinetmaker's Pencil. Sold by *Rockler*, the *Cabinetmaker's Pencil* ($12), is much beefier than most mechanical pencils (upper

left photos). The stout body incorporates a scale, which can be handy in the shop. The 2mm lead is plenty tough for shop use. This pencil includes extra lead refills and a separate eraser holder with a sharpener. The only real complaint I have is that the sharpener can be easy to lose. It's best to keep it in an apron pocket.

Pica-Dry. The unique pencil shown in the lower left photos, opposite page, is another heavy-duty pencil for the shop ($13). Its long nose makes it convenient for marking hole locations. The oversized cap includes a sharpener.

The cap doesn't store on the pencil's body during use. Instead, the cap is meant to stay in your pocket acting as a "holster" for the pencil. The long nose is convenient for marking in tight areas, though it takes a little getting used to the feel of the pencil. Lead refills are available in a variety of colors and types.

Carpenter's Pencils. We're all familiar with the large, wood carpenter's pencils. The two you see on the right are upgrades you may want to consider.

The *SuperPencil* ($6) is unique in that it's made entirely of a graphite composite. This means that 100% of it is usable for marking. You can sharpen it like a traditional carpenter's pencil for fine marking tasks or use it as is for labeling boards and individual workpieces.

The *Striker* pencil ($3) is a hybrid mechanical pencil and carpenter's pencil. It uses replaceable leads that can be sharpened with sandpaper or on any rough surface like concrete. The lead is notched to mesh with "teeth" in the jaws that hold it in place.

If you're looking for the last carpenter's pencil you'll have to buy, the *Striker* is it. Its heavy-duty plastic body is designed to be used and abused.

The *Accutrax Pencil Blade* is another marking tool made from a graphite composite. You can read about it in the box below.

Mistakes Happen. I can't talk about shop pencils without talking about erasers. For removing errant or stray marks, the best tool is a plastic eraser from the office supply store, as shown at right. I keep one in my pocket to erase pencil marks cleanly on all types of wood.

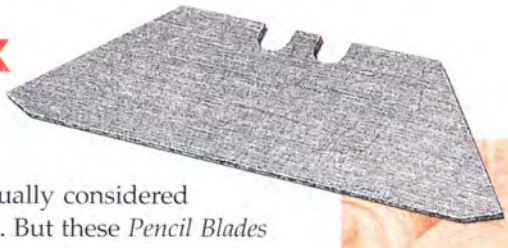
► ***Rough Use.*** *You can use the SuperPencil without sharpening for marking parts. Or sharpen it to create crisp layout lines.*

▲ ***Heavy Duty.*** *The Striker uses beefy, replaceable pencil leads.*

▲ ***Multipurpose.*** *The Striker is as useful in the shop as it is on a construction job site.*

◄ ***Cleanup.*** *Remove pencil marks easily with a plastic eraser.*

Accutrax Blade



A utility knife isn't usually considered to be a fine layout tool. But these *Pencil Blades* from *Accutrax* can change that perception.

The blades are made from a graphite composite reinforced with carbon fibers. They'll mark a line about 0.5mm wide and never need sharpening. They're sold in packages of three blades.

True to the claim, the blades lay down a fine line. But they do require some care to avoid breakage. You have to remember not to apply too much lateral pressure, or the blade can snap. And it's best to get into the practice of retracting the blade after use. This way, it's protected from breakage.

◄ ***Fine Line.*** *The Accutrax Pencil Blade installs in your utility knife like any other blade. Use light downward pressure to draw a fine line.*

questions from
Our Readers

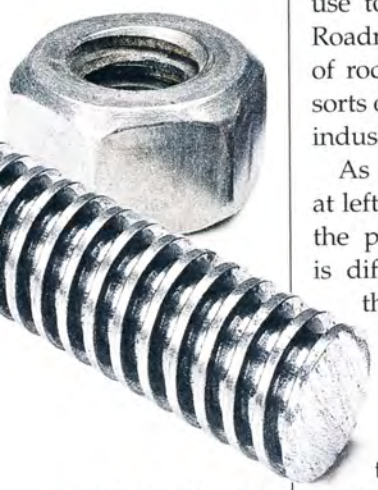
Acme Threaded Rod

I notice that a lot of projects in ShopNotes call for "Acme" threaded rod. But when I ask for this at my local hardware store, I just get a blank stare. What is it, and where can I find it?

Richard Hagood
Pickens, South Carolina

Acme threaded rod sounds like something Wile E. Coyote might use to construct a trap for the Roadrunner. But in fact, this type of rod is commonly used in all sorts of everyday machinery and industrial applications.

As you can see in the photo at left and the drawings at right, the profile of an Acme thread is different from the V-threads that you'll find on typical threaded rod (all-thread). Standard V-threads are cut at a 60° angle and end in a sharp peak. Acme threads have a trapezoidal shape with a steep, 29° thread angle and a flat top.



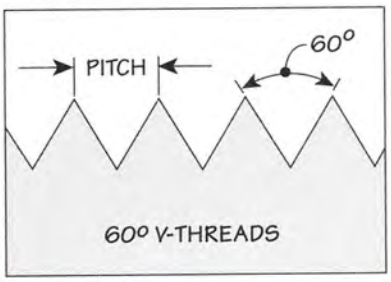
▲ ***Acme Thread.*** *Unlike V-threads, Acme threads are flat on top, and have a trapezoidal shape.*

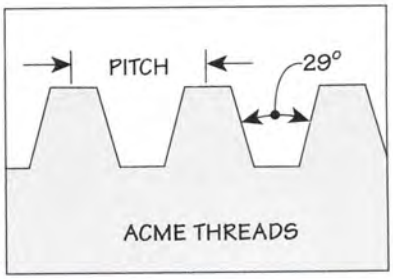
Strength. Because they're thicker in cross section, Acme threads are stronger and less prone to stripping than V-threads. This makes them better suited for heavy loads. They're often used for motion and power transfer on machinery, such as lead screws, screw drives, and conveyors. You'll also find Acme threads on clamps, vises, jacks, and even stools, like the one shown above.

Speed. Another feature of Acme threaded rod is that it has a larger thread pitch (fewer threads per inch) than the equivalent diameter of V-threaded rod. So it requires fewer turns to tighten or thread a nut onto the rod. This can be a real timesaver for clamps or vises.

For shop projects, we like to use Acme threaded rod if the part is going to be subjected to a heavy load. Of course, you'll also have to use a matching Acme nut with the Acme threaded rod.

Sources. You won't find Acme threaded rod and nuts at most hardware stores or home centers. However, they're available from a number of online supply companies, such as *McMaster-Carr*, *MSC*, or *Essentra Components*.





▲ ***Get a Grip.*** *Acme threaded rod is ideal in applications that need to withstand heavy loads, such as this benchtop vise.*

Sources

Most of the materials and supplies you'll need to build the projects are available at hardware stores or home centers. For specific products or hard-to-find items, take a look at the sources listed here. You'll find each part number listed by the company name. See the right margin for contact information.

The *Woodsmith Store* in Des Moines, Iowa is an authorized *Rockler* dealer. They carry many of the hardware items used in our projects. And they ship nationwide. Their customer service representatives are available for your calls from 8am – 5pm Central Time, Monday through Friday.

LOCK MITER BITS *(p.8)*

- **Infinity Cutting Tools**
  Lock Miter Jig LMM-002

BOX JOINT JIG *(p.10)*

- **Woodhaven**
  Portable Box Joint Jig 4556

TOWER CART *(p.14)*

- **Essentra Components**
  Drawer Pulls KHO-5
  4" Locking Casters WC-249

TABLE SAW STAND *(p.18)*

- **Lee Valley**
  Panel Bracket 01S04.05
  Leveler Foot 01S06.02
  4" Rigid Caster 00K20.02
  1" Knurled Knobs 00M60.02
  1½" Cap Screws 00M60.13
  1½" Rose Knobs 00M60.01
  2" Cap Screws 00M60.14
- **Essentra Components**
  Drawer Pulls KHO-5

DRILL PRESS TABLE *(p.34)*

- **SDP-SI.com**
  Miter Gears . . . . . A 1M 4-Y16032
- **amazon.com**
  Miter Gears B004NYAFLS
- **McMaster-Carr**
  ½" Steel Shaft 1346K18
  ⅝" Steel Shaft 1346K25
  ½" ID Bushing 2868T106
  ⅝" ID Bushing 2868T17
  ½" ID Bushing 2938T17
  Steel Shaft Collar 9414T11
  Spring Pins 98296A897
- **Essentra Components**
  Crank Handle JCL-1295
  ¼"-20 Knobs KHY-530
- **Kreg Tool**
  24" Mini-Trak KMS7507
  48" Mini-Trak KMS7509

CHAMFERS & BEVELS *(p.40)*

- **Lee Valley**
  Rt. Skew Block Plane . . . 05P76.01
  Lt. Skew Block Plane . . . 05P77.01
- **Lie-Nielsen**
  Rt. Skew Block Plane . . 1-140B-R
  Lt. Skew Block Plane . . . 1-140B-L

SANDING BLOCKS *(p.42)*

- **Woodcraft**
  Rubber Sanding Block 07A06
  Preppin' Weapon 833902
  Hook & Loop Block 158293
- **Rockler**
  SandDevil Block 47598
- **Highland Woodworking**
  Soft-Sanders 156971

SHOP PENCILS *(p.48)*

- **Rockler**
  Cabinetmaker's Pencil 33140
- **Lee Valley**
  Mechanical Fixpencil . . 61N03.10
  Pica-Dry Pencil 25K04.19
  SuperPencil 61N05.10
  Carpenter's Pencil 61N03.20
  Pencil Blades 61N03.30

MAIL ORDER SOURCES

Woodsmith Store
800-444-7527

Rockler
800-279-4441
rockler.com

amazon.com

Essentra Components
800-847-0486
essentracomponents.com

Highland Woodworking
800-241-6748
highlandwoodworking.com

Infinity Cutting Tools
877-872-2487
infinitytools.com

Kreg Tool
800-447-8638
kregtool.com

Lee Valley
800-871-8158
leevalley.com

Lie-Nielsen Toolworks
800-327-2520
lie-nielsen.com

McMaster-Carr
630-600-3600
mcmaster.com

MSC Industrial Supply
800-645-7270
mscdirect.com

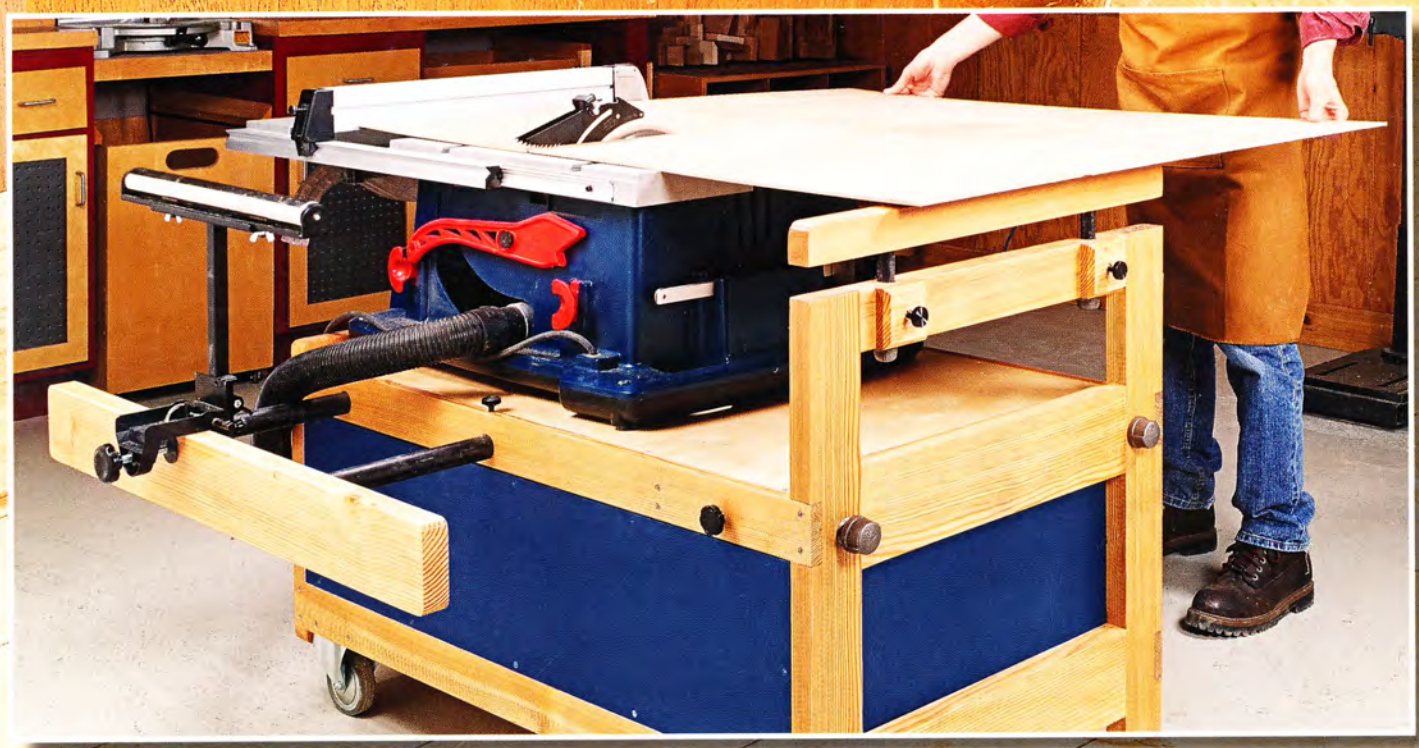
SDP/SI
800-819-8900
sdp-si.com/estore/catalog

Woodcraft
800-225-1153
woodcraft.com

Woodhaven
800-344-6657
woodhaven.com

Scenes from the Shop

Routing box joints on large projects is a snap with this new box joint jig. It allows you to take the tool to the work rather than the other way around. Read more about it on page 10.



Even though it's designed for a benchtop saw, the adjustable outfeed and side support built into this table saw stand allow you to cut large pieces of plywood or other sheet goods easily and safely. A pair of casters and two retractable handles make moving the saw around your shop a simple task. You'll find complete plans for the stand starting on page 18.

ShopNotes

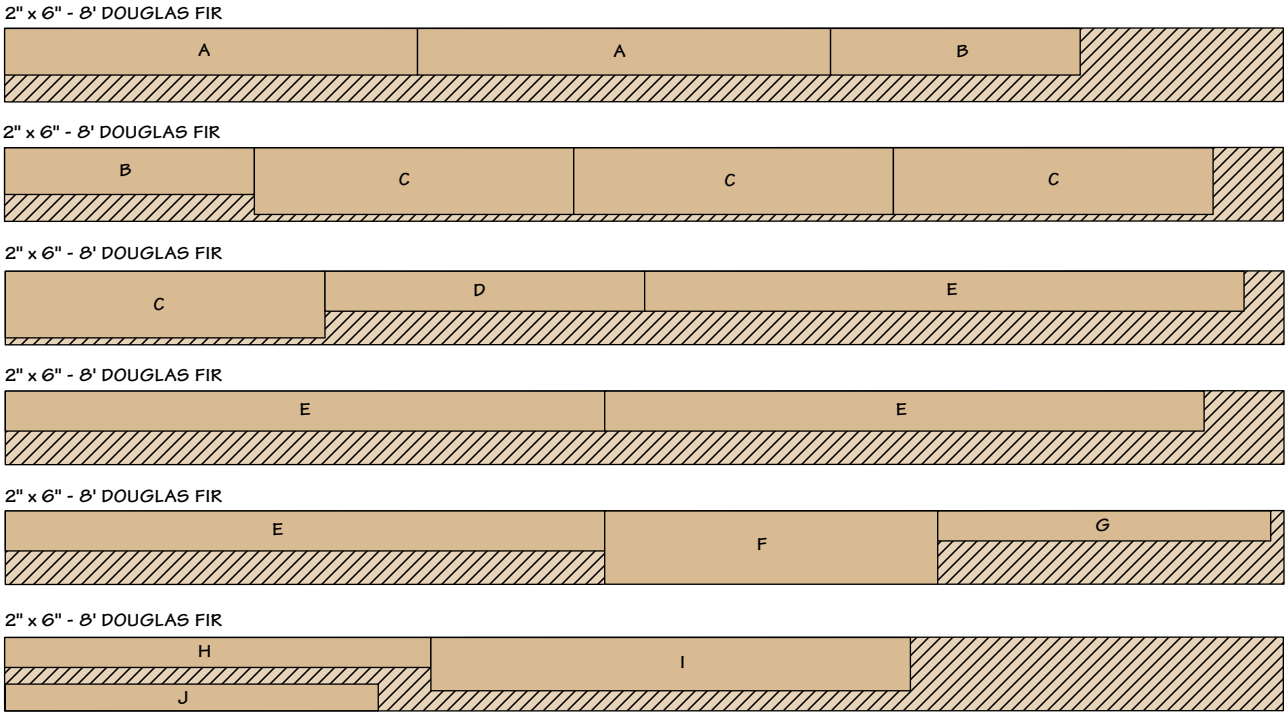
Table Saw Stand

Materials List

A	Left Stiles (2)	1½ x 3½ - 31
B	Right Stiles (2)	1½ x 3½ - 18¾
C	Rails (4)	1½ x 5 - 24
D	Upper Rail (1)	1½ x 3 - 24
E	Stretchers (4)	1½ x 3 - 45
F	Caster Plate (1)	1½ x 5½ - 25
G	Handle Rail (1)	1½ x 2¼ - 25
H	Outfeed Support Rail (1)	1½ x 2¼ - 32
I	Outfeed Bracket (1)	1½ x 4 - 36
J	Side Support Arm (1)	1½ x 2 - 28
K	Insert Blocks (2)	¾ x 3 - 3
L	Shelves (2)	26½ x 42 - ¾ Ply.
M	Case Sides (2)	27½ x 10 11/16 - ¾ Ply.
N	Case Top & Bottom (2)	27½ x 40⅞ - ¾ Ply.
O	Dividers (2)	27½ x 9 11/16 - ¾ Ply.
P	Case Back (1)	10 11/16 x 41⅞ - ¼ Ply.
Q	Edging (1)	¼ x ¾ - 125 rgh.
R	Large Drawer Sides (2)	½ x 8½ - 26
S	Lg. Drawer Front/Back (2)	½ x 8½ - 13⅜
T	Lg. Drawer Bottom (1)	13⅜ x 25½ - ¼ Ply.
U	Lg. False Front (1)	¾ x 9 1/16 - 14¾
V	Small Drawer Sides (8)	½ x 4 - 26
W	Sm. Drawer Fronts/Backs (8)	½ x 4 - 10½
X	Sm. Drawer Bottoms (4)	10½ x 25½ - ¼ Ply.
Y	Sm. False Fronts (4)	¾ x 4½ - 11⅞

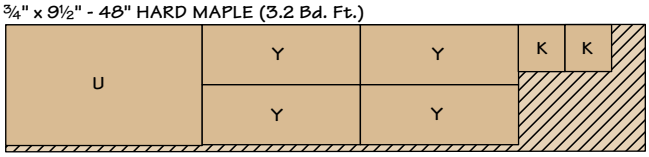
- (16) #8 x 1¾" Fh Woodscrews
- (12) #8 x 3" Fh Woodscrews
- (5) 5/16"-18 Threaded Inserts
- (2) 1½"-dia. Rose Knobs
- (2) 5/16"-18 x 2" Cap Screws
- (2) Leg Levelers w/Screws
- (2) 4" Fixed Casters
- (8) #12 x 1" Ph Woodscrews
- (8) #12 Flat Washers
- (3) 1"-dia. Knurled Knobs
- (3) 5/16"-18 x 1½" Cap Screws
- (4) 1"-dia. x 24" Black Iron Pipes
- (6) 1"-dia. Pipe Caps
- (2) ½"-dia. x 6" Black Iron Pipes
- (2) ½"-dia. Pipe Caps
- (4) 5/16"-18 T-Nuts
- (4) 5/16"-18 x 3" Hex Bolts
- (4) 5/16" Flat Washers
- (1) Clamp-On Roller Support
- (16) #8 x 1¼" Fh Woodscrews
- (20) #8 x 1" Fh Woodscrews
- (5) 4" Drawer Pulls
- (10) #8 x 1" Rh Woodscrews
- (12) #6 x ¾" Fh Woodscrews

Cutting Diagram

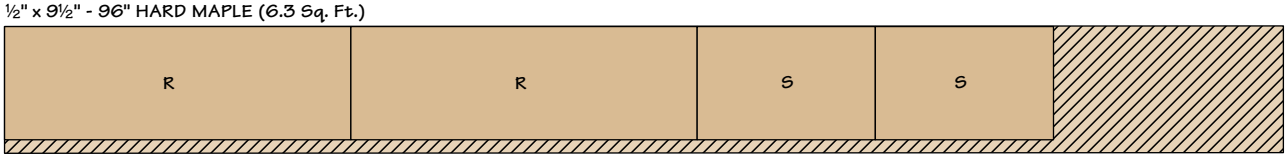


Cutting Diagram cont.

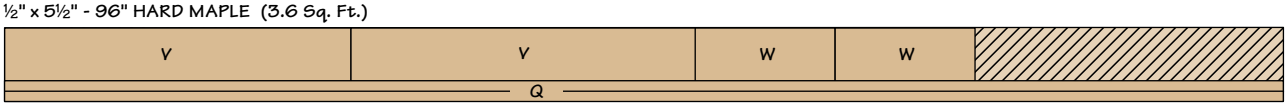
¾" x 9½" - 48" HARD MAPLE (3.2 Bd. Ft.)



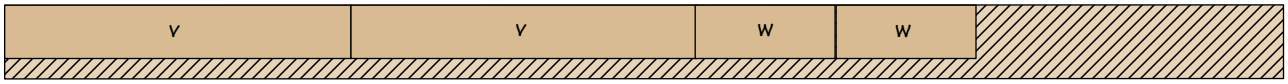
½" x 9½" - 96" HARD MAPLE (6.3 Sq. Ft.)



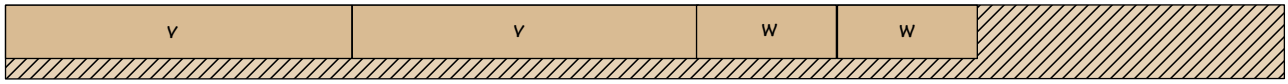
½" x 5½" - 96" HARD MAPLE (3.6 Sq. Ft.)



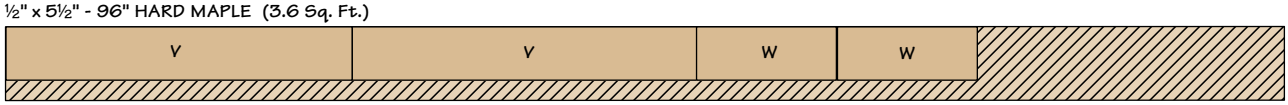
½" x 5½" - 96" HARD MAPLE (3.6 Sq. Ft.)



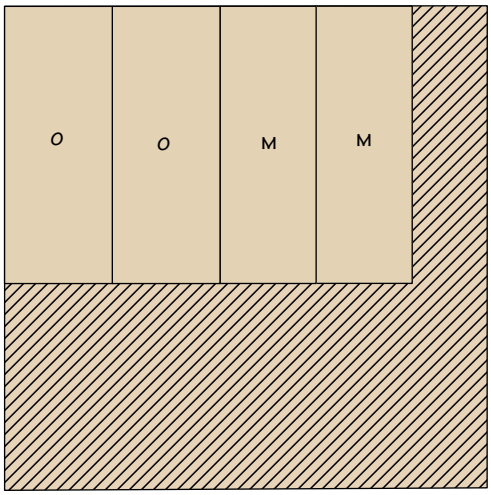
½" x 5½" - 96" HARD MAPLE (3.6 Sq. Ft.)



½" x 5½" - 96" HARD MAPLE (3.6 Sq. Ft.)

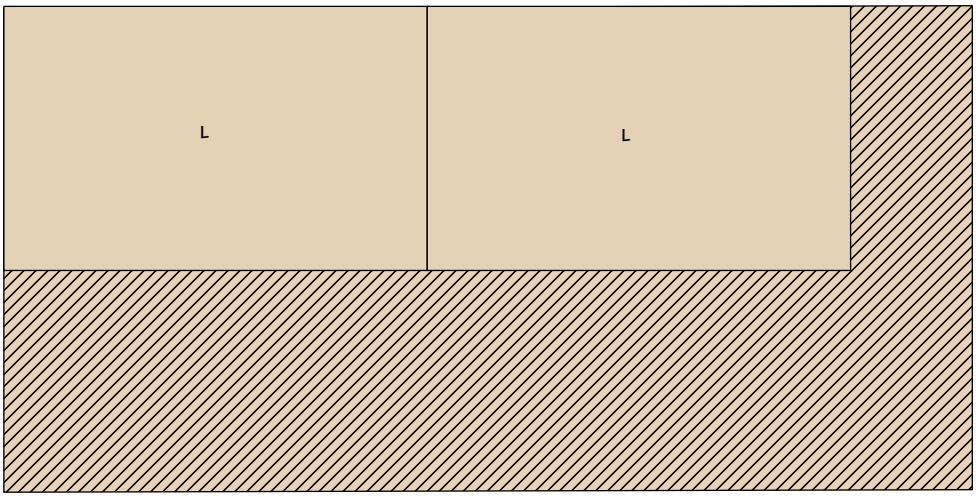


48" x 48" - ¾" BIRCH PLYWOOD

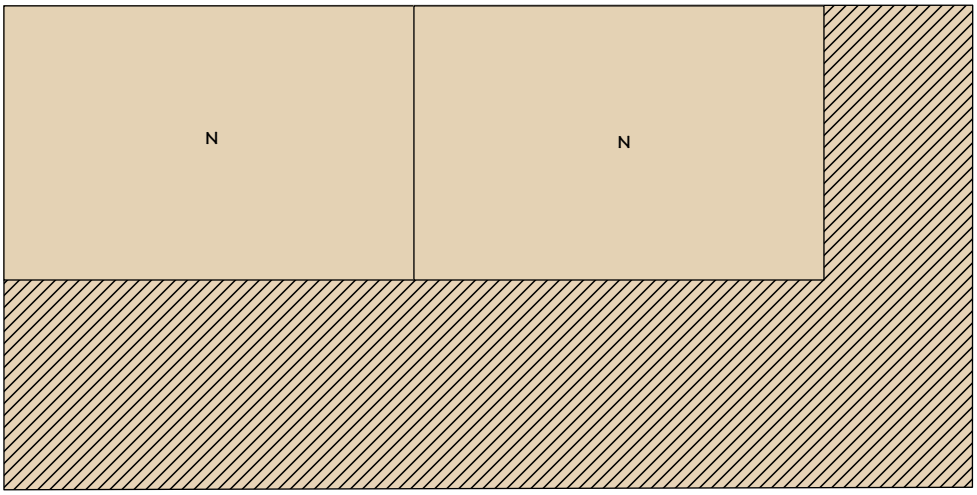


Cutting Diagram cont.

48" x 96" - ¾" BIRCH PLYWOOD



48" x 96" - ¾" BIRCH PLYWOOD



48" x 96" - ¼" BIRCH PLYWOOD