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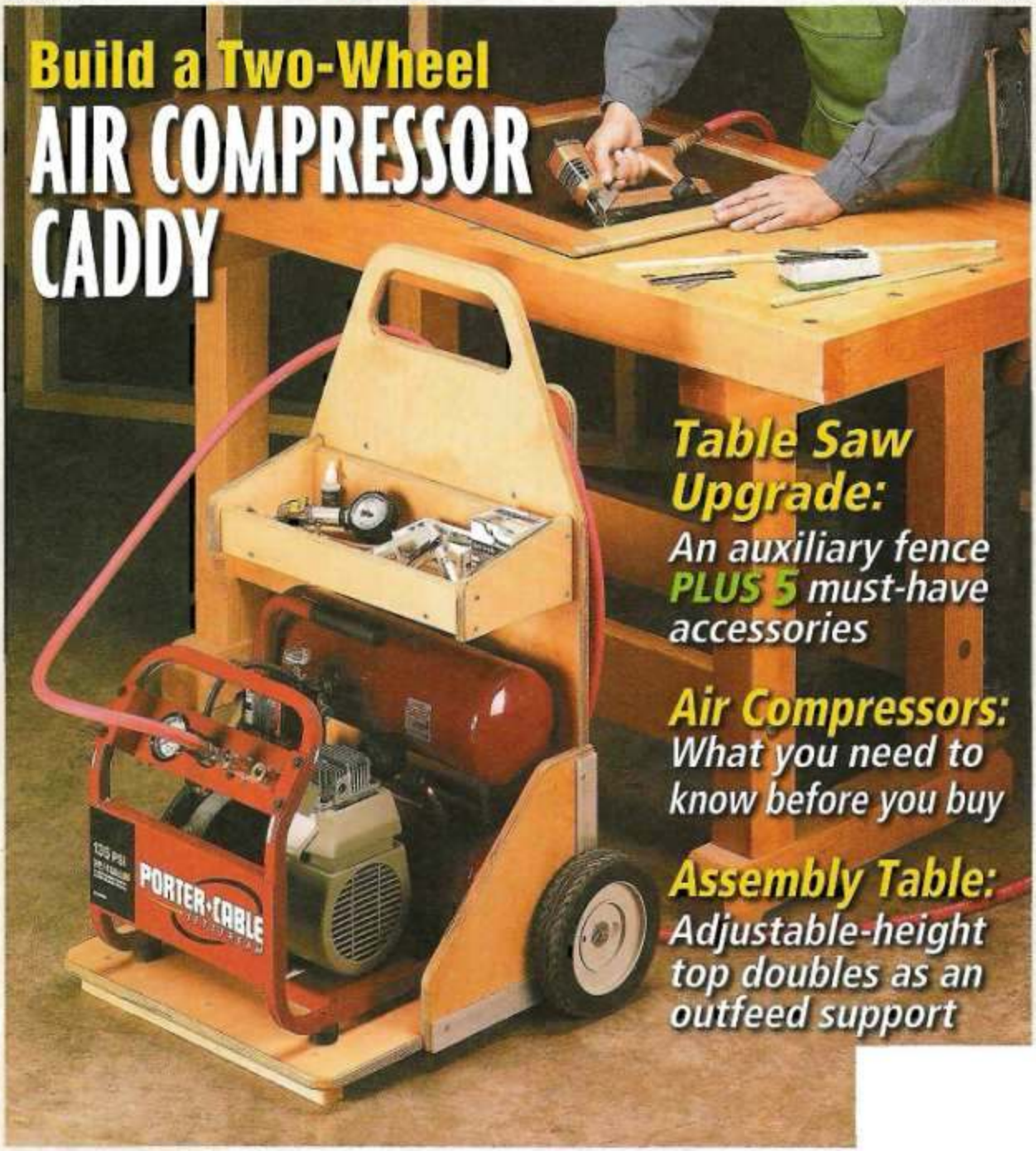
ShopNotes

Vol. 10 Issue 60



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EDITOR'S NOTE

Cutoffs

I always look forward to telling you about the projects and techniques that we are featuring in the current issue of *ShopNotes*.

However, as we were wrapping up this issue terrorists attacked our nation. So instead of talking about what we've built, I would like to focus on rebuilding. In that spirit, I would like to share with you a letter from the founder and publisher of August Home Publishing.

Terry

Payday for Charity
Aid for September 11, 2001

All of us at August Home Publishing offer our thoughts and prayers to those who lost loved ones and friends in the September 11th tragedy. And to the heroes who continue the work of rescue, rebuilding, and protecting us.

During the past few days, as we tried to turn our attention back to our jobs, we also began thinking of ways we could help those in need. As a way to extend a helping hand, our company, August Home Publishing, is making a contribution to charities in an amount equal to our payroll for September 11, 2001. In addition, individuals on the *ShopNotes* staff and the rest of the company are voluntarily contributing all or part of that day's pay.

It's our sincere hope that this contribution helps those who have suffered so much, and aids in the vital work of rebuilding our hopes and dreams for the future. And I add my prayers that God may guide our efforts to work for a better world of peace and harmony.

Donald B. Peschke, Publisher


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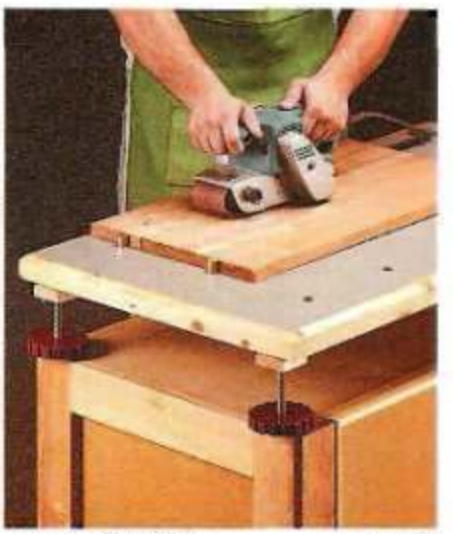

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Readers' Tips

Workbench with Lumber Storage

■ Since I have my shop in a small, one-car garage, finding the space for lumber storage has always been a problem for me. So when I was building a new workbench recently, I decided to incorporate lumber storage into the base of the bench.

The base of the bench is built primarily out of "two-by" stock. It consists of four trestles that support the benchtop and provide a place for creating a rack to hold lumber.

Each trestle is made up of two legs and an upper and lower rail. The legs are built up by gluing together two 2x4s. Then a series of holes is drilled in the outside face of each leg. (These holes are for short lengths of iron pipe that will serve as the lumber rack.)

Lap joints connect the upper and lower rails to the legs. The lower rails also have a couple of notches that will hold some stretchers. Once the joinery is complete, the trestles are assembled with glue and screws.

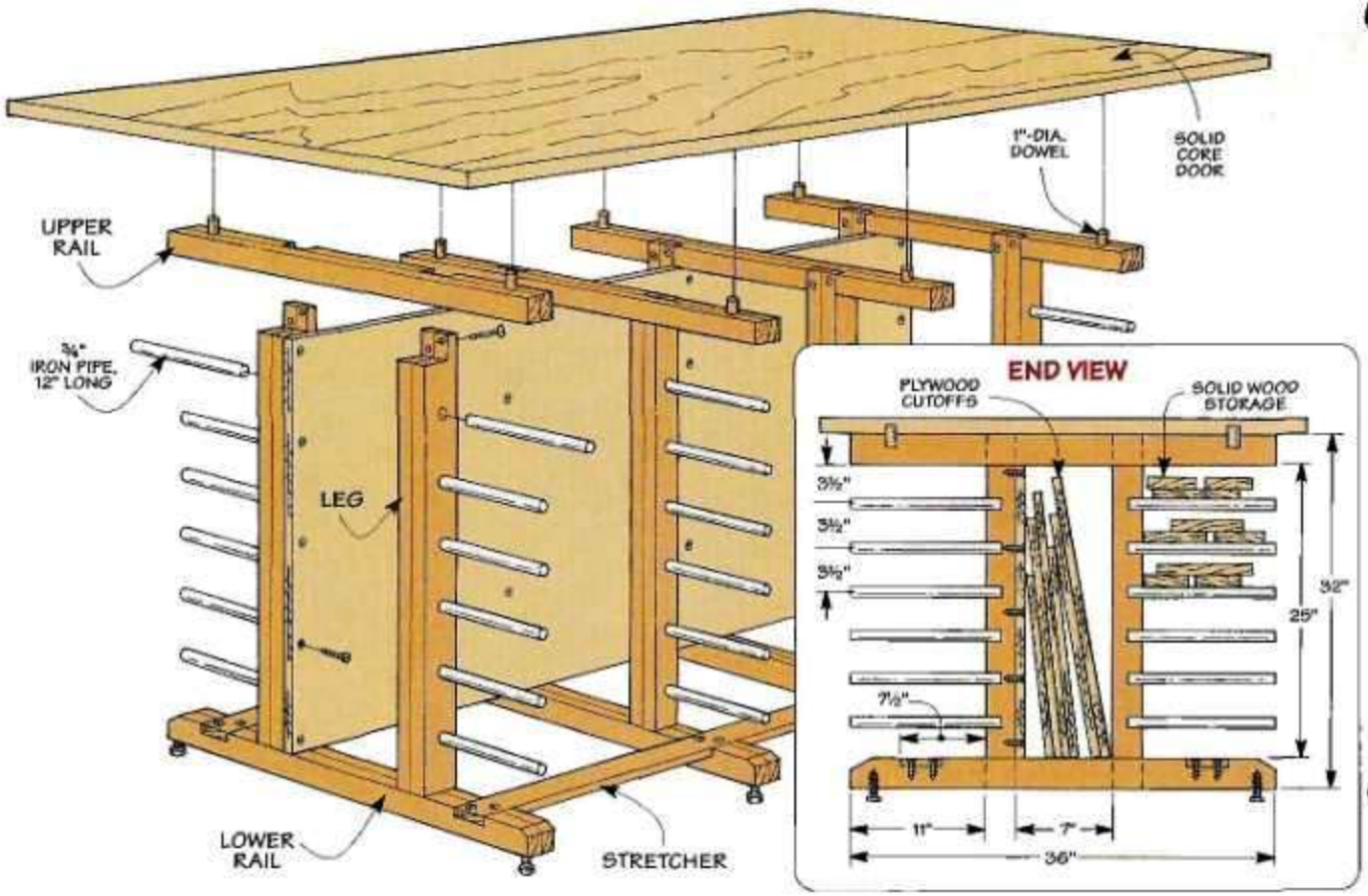
The trestles are braced with stretchers that fit into the notches cut in the lower rails. These stretchers are just a couple of 1x4s that are screwed in place.

As an extra precaution against racking, a piece of ¾"-thick plywood is screwed to the inside face of the legs on one side of the trestles. This serves as a stiffener and also creates a convenient place for storing left-over sheet goods.

The top of the workbench is held in place with dowels. Simply drill matching holes in the top of the trestles and the underside of the workbench top. Then glue short dowel pins into the trestles and set the top down over them.

The last step is to create the racks for the lumber storage. This is just a matter of inserting some foot-long pieces of iron pipe into the holes drilled in the sides of the workbench legs. Then the lumber can be placed on top of the racks.

Eric Johnson
Edgewood, Kentucky



Quick Tips

▲ To lubricate screws before driving them, **Gary Ratajczak**, of Broadalbin, NY, drilled a couple of holes in the edge of his bench and filled them with beeswax.

▲ To get a better grip on her keyless chuck, **Yolanda Gilissen**, of Beloeil, Quebec, slips a rubber band taken from a bunch of broccoli over the chuck.

◀ By clamping his cleaning stick in a hand screw, **R. B. Himes**, of Vienna, OH, has both hands free to hold his belt sander when cleaning the sanding belt.

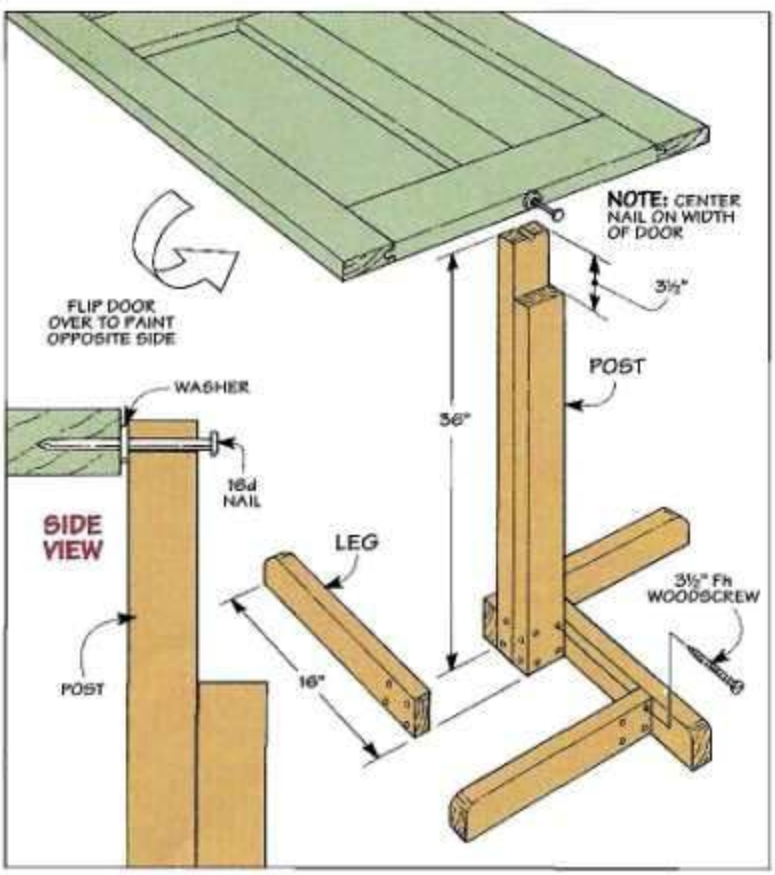
Finishing Stand

■ Painting a door is one of those projects that always seems to take twice as long as it should. That's because after painting one side of the door, you have to let the paint dry before you can turn the door over to paint the other side. To get around this problem, I came up with a simple solution. I built a couple of support stands that hold the door without touching it, allowing you to paint both sides at one time.

The support stands are made out of 2x4s (see drawing below). The vertical post of each stand is made by gluing togther two pieces of 2x4 material. One of the pieces is about 3½" longer than the other and has a half-round slot or groove on the end. Four legs screwed to the bottom of the post in a pinwheel fashion provide a wide base for good stability.

To use the stands, simply drive a nail or screw into each end of the door, centered on the door's width. Then just set the door on the stands, with the nail resting in the grooves on the ends of the posts (see side view drawing at left). The door should be perfectly balanced now, allowing you to paint one side and then gently flip the door over to paint the opposite side.

Jim Burgess
Clancy, Montana



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Air Compressor Caddy

You can have compressed air wherever you need it with this handy compressor caddy.

When I bought a portable air compressor, I was excited at the thought of being able to take the compressor with me anywhere I wanted. But what I didn't realize is what an effort it is to lift one of these "portable" compressors and carry it around. In addition to the weight, it's hard to move the compressor any distance without getting tangled up in the cord or air hose.

This caddy solves those problems. It's actually a bit like a moving dolly for your compressor. All you have to do is tilt it back and wheel the compressor to where you want it. As a bonus, there's a handy storage tray for accessories and a place on the back to coil the air hose when you're done using the compressor, see photo.

The caddy is constructed almost entirely of plywood. To build it, start by cutting out blanks for the back, sides, and bottom from a sheet of ¾" plywood, as shown in Figure 1. Note: You may need to adjust the width of the back and the width and length of the bottom to suit your compressor.

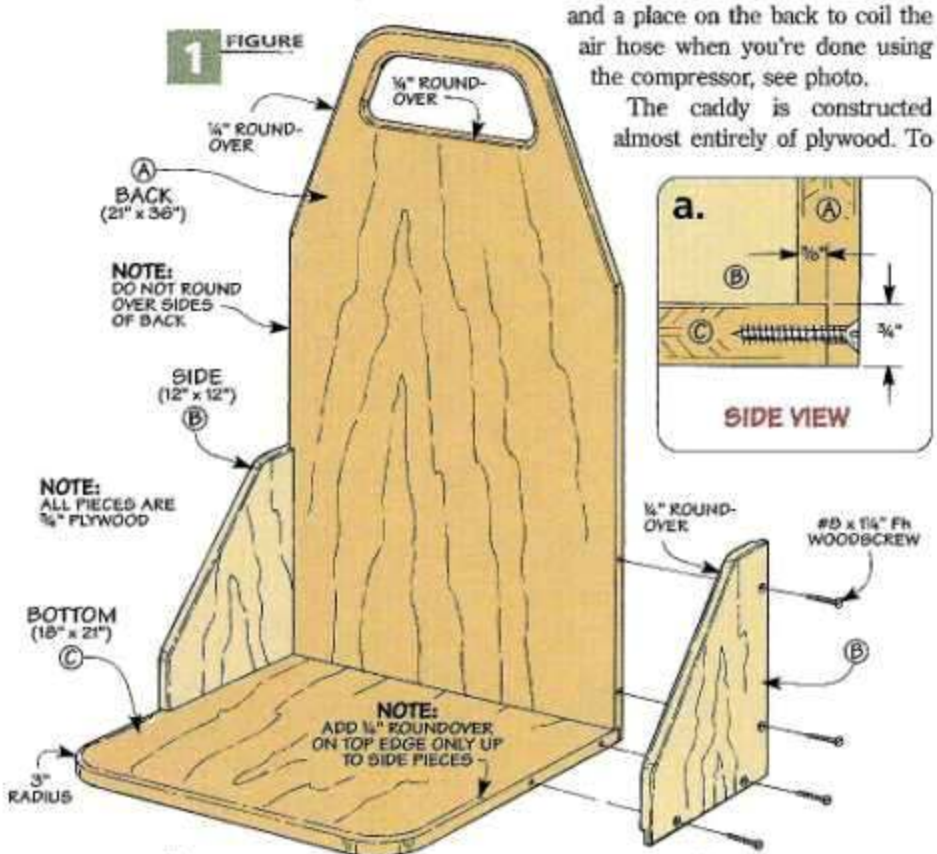
Back – To make the *back (A)*, start by laying out and cutting the opening near the top for the handle. This opening is large enough to allow you to get a two-handed grip on the caddy, making it easier to lift it over a step or obstacle.

To lay out the opening, you'll need to draw a few circles to establish the corners, like you see in Figure 2. Then after drilling a starter hole, the waste can be cut out using a sabre saw. To smooth out the edges of the opening, I used a drum sander in my drill press.

With the cutout for the handle complete, you can cut the tapers on the sides of the back, again using a sabre saw (or a band saw).

Sides – I made the *sides (B)* of the caddy next. As you can see in Figure 3, this is simply a matter of cutting a taper on the front edge of each side piece and rounding over the sharp corners.

FIGURE 1

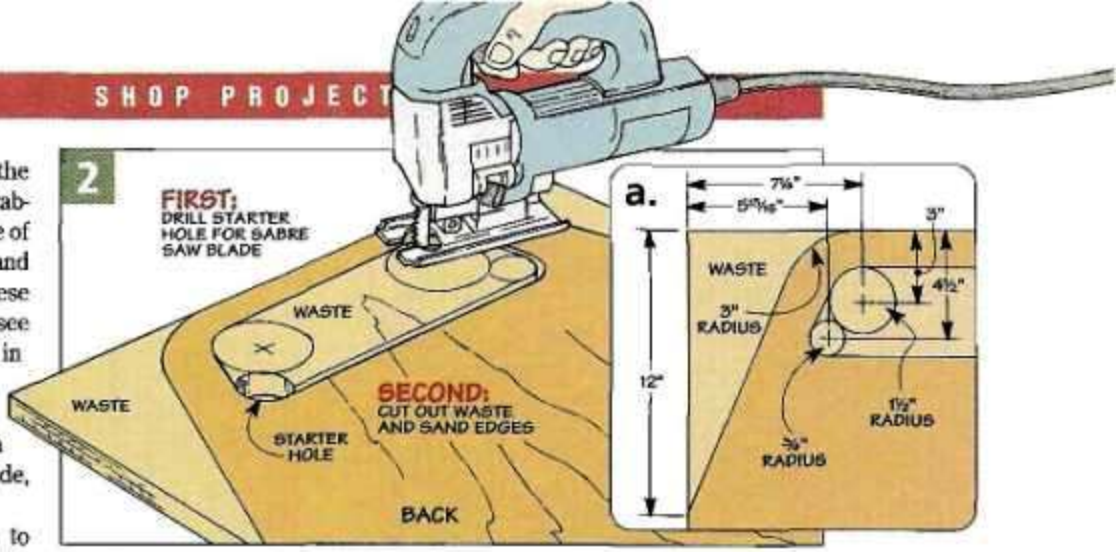


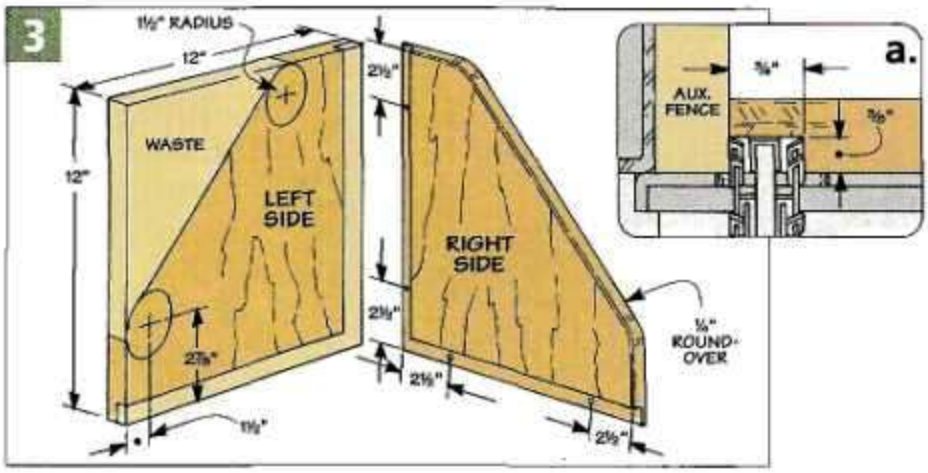
Rabbets – To help keep all the parts aligned during assembly, rabbets are cut along the bottom edge of the back and along the bottom and back edges of the side pieces. These rabbets are all identical. You can see how I set up my saw to cut them in Figure 3a. Just remember that when cutting the rabbets in the sides, you'll need to make a left-hand side and a right-hand side, like you see in Figure 3.

Bottom – There's not much to making the *bottom (C)*. It's just a matter of rounding off the front corners of the blank, as shown in Figure 1 on the opposite page.

Before assembling the pieces, I routed roundovers on some of the sharp edges to make them a little more comfortable to handle. But not all the edges are rounded over. To see which ones are and which ones aren't, take a look at Figure 1.

Assembly – With the roundovers complete, you can assemble the caddy. This is just a matter of gluing and screwing the pieces together, as shown in Figures 1 and 1a.





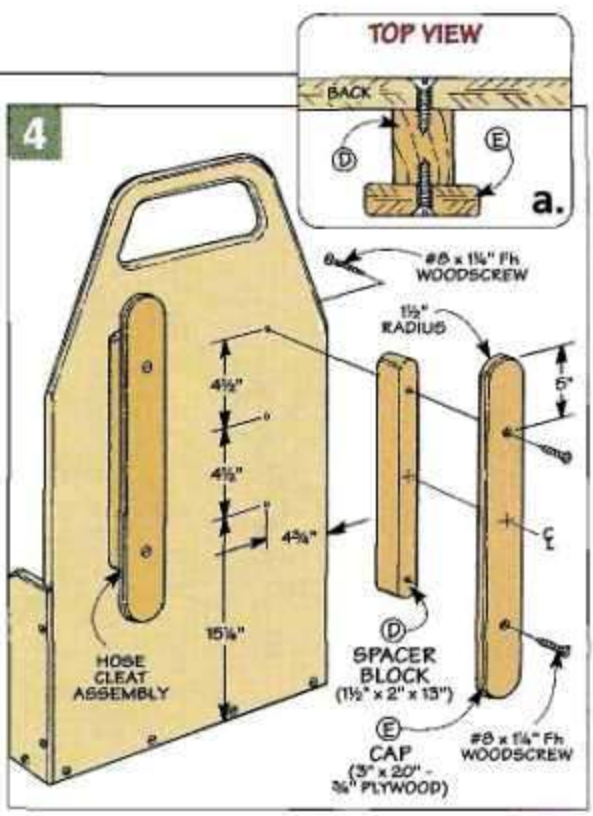
Hose Cleats

One of the things that's always been a bit of a problem for me when it comes to using a compressor is keeping the air hose organized. Mine is usually lying in a heap on the floor like a plateful of spaghetti.

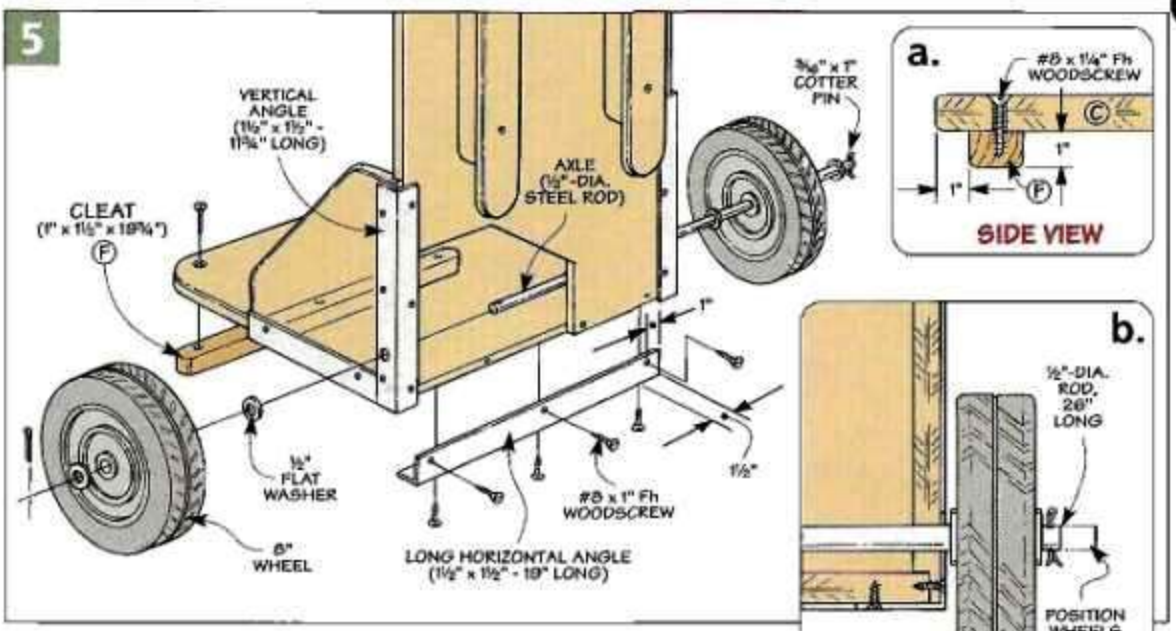
To remedy this situation, the air hose is wrapped around a pair of hose cleats mounted to the back of the caddy, as shown in the photo at left. This makes it easier to quickly coil the hose up after each use.

As you can see in Figure 4, each hose cleat is made up of two parts — a hardwood *spacer block (D)* and a plywood *cap (E)*. To protect the hose from getting kinked or damaged while it is wrapped around the cleats, the ends of each spacer block are rounded over. You can cut the waste away with a band saw or sabre saw and then sand the ends smooth.

The plywood caps hold the hose in place. The ends of these caps are also rounded to match the blocks and the edges are rounded over with a router. The plywood caps are simply glued and screwed to the blocks. Then the hose cleats are screwed to the back of the caddy, as shown in Figure 4a.



Aluminum Angle & Wheels



▲ *Drilling Round Stock. To drill the cross hole for the cotter pin, hold the axle in a V-shaped block.*

At this point, the basic structure of the caddy is complete. But there are a couple of key elements that remain to be added. First, in order to strengthen the caddy and protect it from damage as it's moved around, aluminum angle is applied to the corners. Once this is done, wheels will be added to make the caddy mobile.

Aluminum Angle – If you take a look at Figure 5 you'll notice that the caddy uses five pieces of aluminum angle. There are two vertical pieces that fit over the sides and back, two short horizontal pieces that fit over the sides and bottom, and one long horizontal piece that fits over the back and bottom. I cut these pieces to length with a hacksaw. Aluminum is fairly soft as metals go, so it cuts easily. The lengths for each piece are shown in Figures 5 and 7.

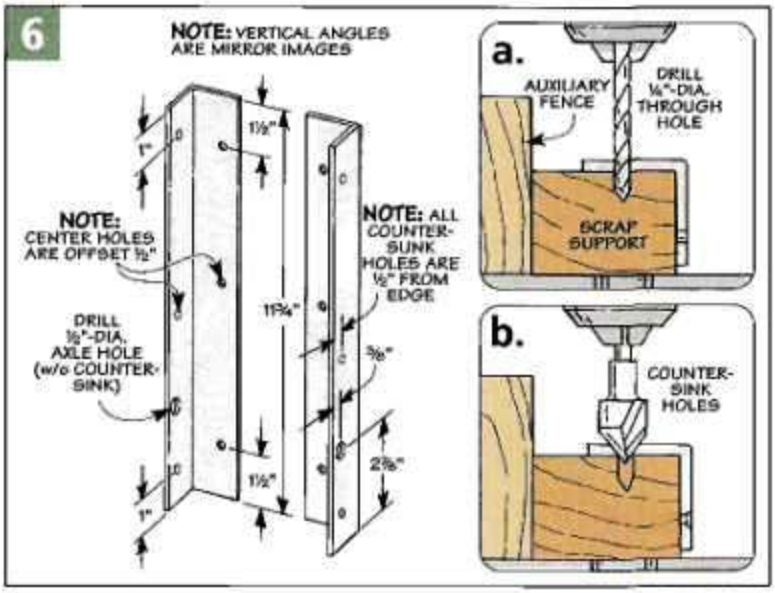
After cutting all the angle pieces to length, you can lay out the screw hole locations. Once this is done, go ahead and drill and countersink each hole, just as you see being done in Figures 6a and 6b.

In addition to the screw holes, a ½"-dia. hole is drilled in the two vertical pieces of aluminum angle for the wheel axle (Figure 6). It's important to lay these holes out carefully so that they will line up.

With all the holes drilled, you can screw the aluminum angle pieces to the caddy. Start with the two vertical pieces. These should be positioned to extend ⅛" beyond the bottom surface of the caddy (so they will end up flush with horizontal angle pieces). Next, the back and side pieces can be screwed in place (Figure 7).

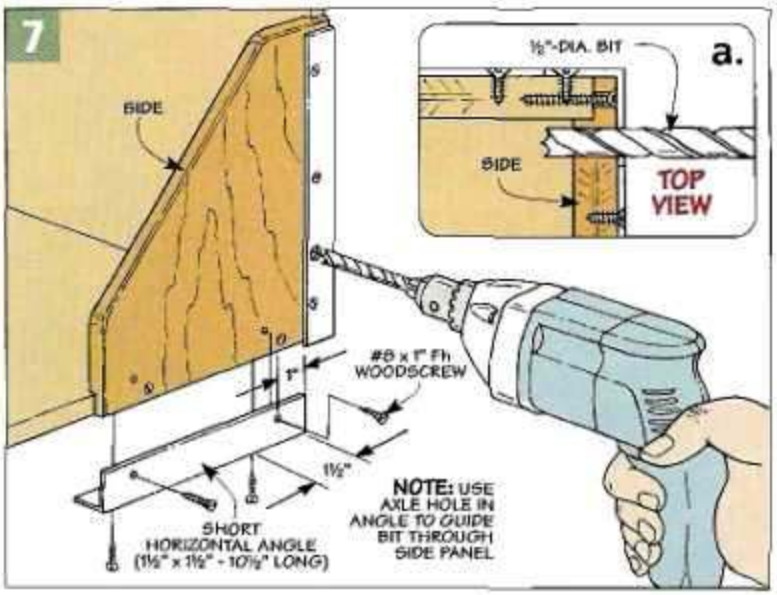
Wheels – The caddy rolls on a couple of 8"-dia. rubber wheels. These are mounted on an axle that passes through both sides of the caddy. To drill the holes for the axle, I simply used the aluminum angle as a template, just like you see in Figures 7 and 7a.

The axle for the wheels is nothing more than a piece of ½"-dia. steel rod. A cross hole is drilled at one end for a cotter pin (see photo in margin at left). Once this is done, the first



wheel is installed, and the axle is inserted through the holes in the sides of the caddy. Then the second wheel is slipped in place, and the axle can be marked for length (Figure 5b). With the axle removed from the caddy, it can be cut to length, and the hole for the second cotter pin can be drilled. Then the axle and wheels can be reinstalled on the caddy (Figure 5).

Cleat – To allow the caddy to sit level, a cleat is added to the front edge of the bottom. This *cleat (F)* is just a piece of 1"-thick hardwood. The ends of the cleat are rounded and then it is screwed in place on the underside of the bottom of the caddy (Figures 5 and 5a).



Storage Tray

The caddy makes it a lot easier to move your compressor from place to place. But what about all the fittings and accessories that go along with the compressor? That's where this storage tray comes in (see photo).

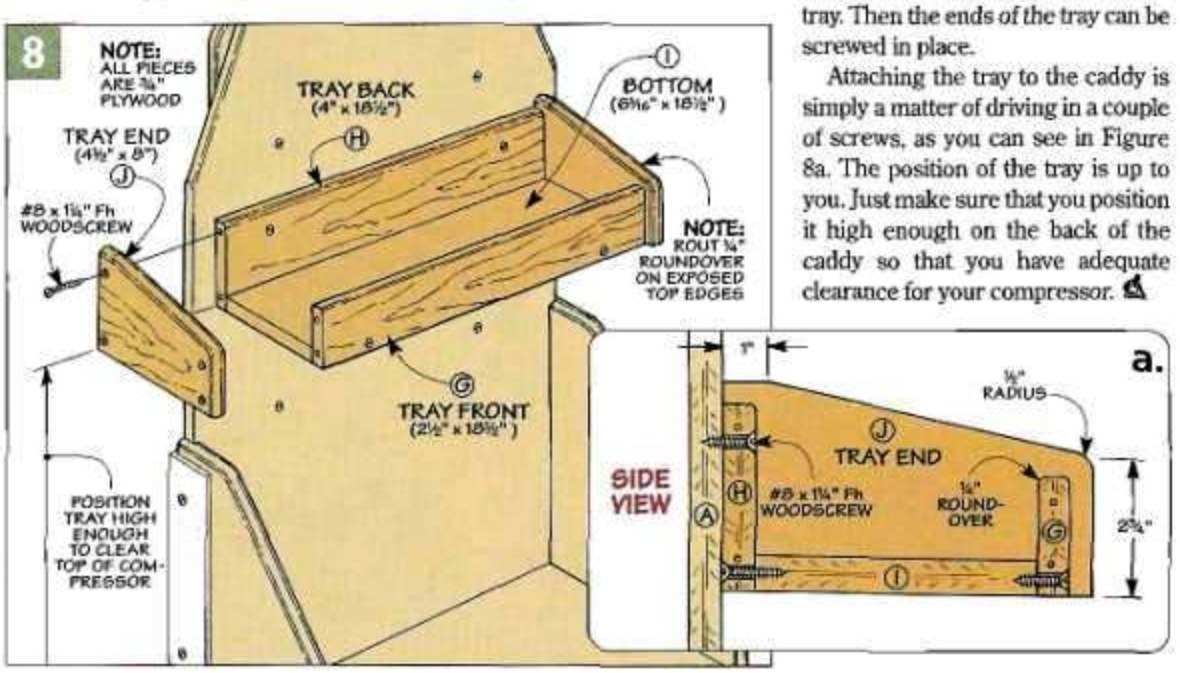
There isn't much to the tray. It's basically just an open plywood box that's screwed to the front of the caddy. All the parts of the tray are cut from ¾" plywood, just like you see in Figure 8. The *front (G)*, *back (H)*, and *bottom (I)* are simply cut to width and length. But the *ends (J)* are cut to size and then tapered to match the profile shown in Figure 8a. You can cut this bevel with a band saw or sabre saw and then sand the edge smooth.

To soften the edges, I routed roundovers on all the exposed edges of the tray ends, front, and back.

◀ *Tray. This tray makes a convenient catch-all for fittings, air nozzles, and other accessories.*

Once this is done, the front and back can be screwed to the bottom of the tray. Then the ends of the tray can be screwed in place.

Attaching the tray to the caddy is simply a matter of driving in a couple of screws, as you can see in Figure 8a. The position of the tray is up to you. Just make sure that you position it high enough on the back of the caddy so that you have adequate clearance for your compressor.



Purchasing a Portable Air Compressor

More and more woodworkers are finding uses for an air compressor in their shop. Here's how to pick the right one.

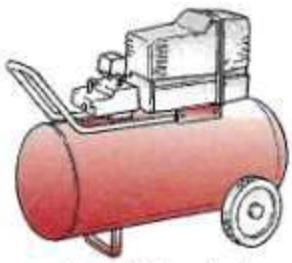
It used to be that an air compressor was a tool that you'd expect to see only in an auto garage or a commercial shop. That's because they took up a lot of space and they were fairly expensive. But in the last several years, manufacturers have introduced a number of smaller, less expensive compressors, along with a slew of air-powered tools to go with them. As a result, contractors, carpenters, and home woodworkers have begun to discover the benefits of air tools and compressed air.

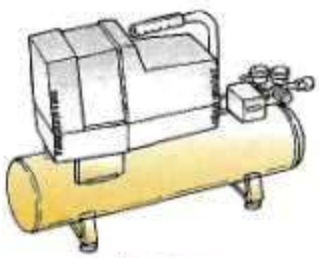
Chances are if you don't already own a compressor, you've probably thought about getting one. But once you start looking at all the choices available, it can get pretty overwhelming. So here's a look at some of the design features and points to consider when making a portable air compressor purchase.

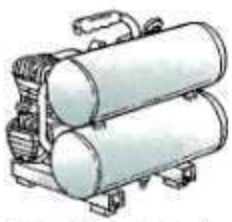
Tank Size and Style – The first thing you'll probably notice when you start looking at compressors is that they come in a variety of tank sizes and styles, see drawings below. Some (like the one above) are just scaled-down versions of larger, more traditional-looking air compressors, while others are compact enough to pick up and toss in the trunk of a car. And with names like "hot dog" and "pancake" some compressors sound more like menu items at a restaurant than power tools. But the thing to keep in mind is that no matter what style of tank they use, portable compressors all work more or less the same way.

An electric motor drives a piston that compresses the air and pumps it into a metal storage tank. When the air pressure reaches a certain level, a pressure-sensitive switch automatically shuts off the motor. Then as you start to use the compressed air, the pressure inside the tank begins to drop. Once it falls below a certain level, the switch cuts in, and the motor starts back up.

Although the style of tank is really


Two-Wheeled

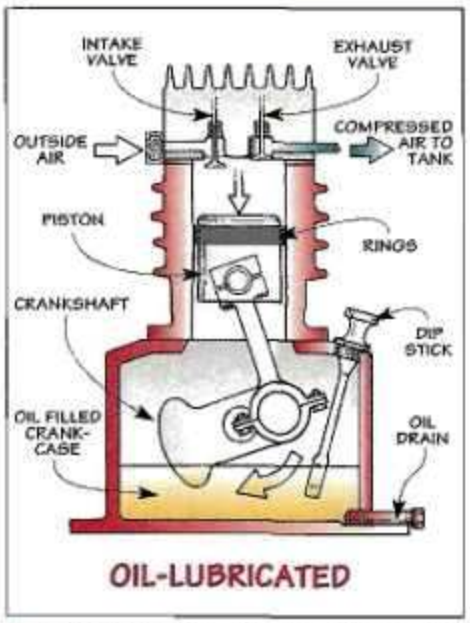

Hot Dog


Twin Side-Stack

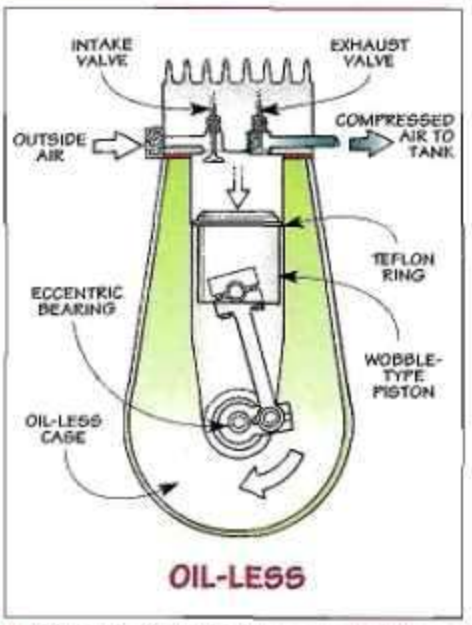

Pancake

a matter of preference, the size of the tank is a little more important. The larger the tank, the less frequently the compressor will have to cycle on. This means that you won't have to stop working as often while you wait for the compressor to catch up. The trade off is that as the tank gets larger, you sacrifice portability.

Oil vs. Oil-less – One of the first things to consider when shopping for a portable air compressor is whether you want an oil-lubricated compressor or one that is oil-less. Traditionally, compressors have used an oil-filled crankcase to lubricate the piston and keep it moving freely (see first drawing at right). Today, however, there are also a number of compressors that don't require any oil. Instead, these oil-less compressors have a piston with a Teflon ring to reduce friction (see second drawing.)



▲ *Oil-Lubricated. As the piston and crankshaft turn, they sling oil onto the moving parts, keeping them lubricated.*



▲ *Oil-Less. Oil-less compressors utilize an eccentric bearing and a Teflon ring at the top of the piston to minimize friction.*

There are advantages to both designs. Oil-lubricated compressors tend to last longer and run a bit quieter than oil-less compressors. But they also require a little more maintenance. You'll need to check the oil level regularly and change the oil periodically. This isn't difficult, but by contrast, the oil-less compressors are more or less maintenance free (See the box on page 13 for some maintenance tips.)

One nice thing about oil-less compressors is that you can use them on a slope or uneven ground. (Oil-lube compressors should be set on a level surface to ensure proper lubrication.) You also don't have to worry about oil leaking out of the compressor. And oil-less compressors are a little less expensive than oil-lubricated compressors.

Belt-Drive or Direct-Drive – Another feature to consider when selecting a portable compressor is whether you want a belt-driven unit or a direct-drive unit. On a belt-driven compressor, the motor and pump are two separate units, connected by a V-belt (see first photo below). So if the motor ever goes out, it's a simple matter to replace it with a new one.

▲ *Belt-Drive. A V-belt transfers power from the motor to a flywheel on the compressor pump.*

▲ *Direct-Drive. With a direct-drive compressor, the motor and pump are combined into one unit.*

Many of the newer portable compressors are direct-drive. In this type of compressor, the motor and the pump are all one unit. The piston connecting rod attaches directly to the shaft of the motor, making for a smaller, more compact compressor (see second photo below). But the downside is that it can be costly to repair the compressor if the motor should fail. In fact, it may be cheaper to just buy a new compressor.

Both types of drive systems work well. Typically, however, you'll find the traditional belt-drive system on larger compressors, which will also have other heavy-duty features such as a solid-cast iron pump for long life and durability.

The direct-drive compressors typically have all-aluminum cylinders or an aluminum cylinder with a cast iron sleeve (like some of the newer automobile engines). This makes the compressor lighter. If you will be carrying your compressor around from jobsite to jobsite, you might want to go with a direct-drive compressor. But if you're more concerned with longevity than portability, a belt-driven model makes more sense.

Sizing Your Compressor

Before making a compressor purchase, you should ask yourself what it is you plan on doing with the compressor. The reason for this is simple. You want to make sure that the compressor you buy can handle the tools you plan to use with it. Different tools have different air requirements, and if you buy a compressor that is too small, it won't be able to properly power the tool.

Air Pressure – There are two things to be aware of here. One is air pressure, measured in PSI (pounds per square inch). Most of the portable compressors on the market operate in the 95-135 PSI range. Since most nailers, sprayers, and other woodworking air tools are designed to run at 90 PSI or less, you should have adequate air pressure regardless of the compressor you select. All you have to do is set the regulator on the compressor to the appropriate pressure.

Air Delivery Rate – But more important than air pressure is the compressor's air delivery rate — the amount of air that the compressor can produce in a given time. This amount is measured as CFM (cubic feet per minute). Checking CFM ratings is really the best way to compare compressors.

However, you should be aware that the CFM rating of a compressor will vary depending on the regulated pressure at which it is operating. For example, a compressor that delivers 6.0 CFM when set at 40 PSI might only produce 4.8 CFM when set at 90 PSI. So if you're comparing CFM ratings between two compressors, make sure the ratings are given for the same air pressure reading.

In addition to comparing CFM ratings between compressors, it's also a good idea to make sure that the CFM rating of the compressor you are considering will be adequate for the tools you plan to use. You can check the CFM requirements of individual tools before you buy them. Or take a look at the chart at left for some idea of the air requirements of commonly used woodworking tools.

Brad nailers and staplers have fairly low CFM requirements, so they can be operated with even the smallest pancake compressors. Finish and framing nailers work better with a bit larger compressor, especially when used for long stretches at a time. And if you're wanting to do some occasional spray finishing or sanding, you'll need one of the largest portable units. In fact, if you plan on doing a lot of finishing, you may want to step up to a bigger, industrial-type compressor.

▲ *Brad Nailer.* Brad nailers and staplers are popular tools with woodworkers as well as carpenters.

▲ *Vacuum Press.* A compressor can be used along with a vacuum press for veneering or clamping.

▲ *Spray Finishing.* Larger compressors will handle a spray gun for applying a perfect finish.

▲ *Framing Nailer.* Portable compressors can also be used for the occasional framing job.

Typical Air Consumption Rates

Type Of Tool	CFM (Cubic Feet Per Minute)	PSI (Pounds Per Square Inch)
Blow Gun	2.5	100
Vacuum Press	1.8	80
Brad Nailer/Stapler	1-2	60-100
Finish Nailer	2.2-3	60-100
Framing Nailer	4-5	60-100
Spray Gun	7.8-11.5	30-50
Orbital Sander	6-11	90

Accessories

Regardless of which compressor you buy, you'll also need to purchase some accessories in order to use it. To start with, you'll need an air hose. Air hoses come in different sizes (lengths and diameters) as well as different materials. I typically use a 3/8"-dia. rubber hose. Rubber is strong and remains flexible, even in low temperatures. Vinyl hoses are less expensive, but they can become stiff when the weather gets cold.

I keep two lengths of hoses on hand. When hauling the compressor around, I grab the shorter hose (25'). Its shorter length makes it lighter and easier to carry. Sometimes though, it's handy to have a longer hose, particularly when there isn't a convenient outlet nearby for the compressor. Since most portable compressors draw a high amount of amperage, it's best not to use them with extension cords. Instead, use a longer air hose.

Couplers – In addition to a hose, you'll need couplers to attach the hose to your compressor and to your tools. My preference here is for quick connection couplers. These come in two pieces. One piece attaches to the end of the hose, and the other is attached to the tool or compressor. By sliding back a spring-loaded collar on the female half, you can quickly attach or remove the hose, see photo above.

Some air compressors are sold with one or more quick connect couplers already installed right on the compressor. With other models, you'll have to purchase your own coupler and fittings. It's also a good idea to purchase several of the coupler plugs so you can attach one to each air tool. This way, you're always ready to go. (See the photo tip at right.)

One thing to be aware of is that there are different styles of quick-connect couplers available, and they are not all interchangeable. So make sure you pick one style and stick with it. (I use the Milton "M"-style quick couplers that are shown in the photo above.)

▲ *Air-Tight Seal. To get a good seal between couplers, wrap the threaded ends of the fittings with Teflon tape.*

▲ *Air Hoses. In addition to vinyl and rubber hoses, the vinyl recoil hose shown on the right automatically retracts out of the way when not in use.*

Maintenance

Maintaining a compressor doesn't take much time or effort, but it will help your compressor last longer. If you have an oil-lubricated compressor, make sure to check the oil level regularly (once a week) and add oil if necessary (photo A). You should also change the oil periodically. (Follow the manufacturer's specifications for the type of oil to use and the frequency of oil changes.)

Whether you have an oil-lubricated or an oil-less compressor, you should also check the air filter from time to time (photo B). Some filters can be cleaned out and reused. Others should be replaced altogether.

Finally, one aspect of maintenance that is often overlooked is draining the tank(s). Whenever you use the compressor, you should open the valve at the bottom of the tank and drain out any moisture at the end of the day (photo C). This prevents the tank from rusting out.

Adjustable-Height Assembly Table

Adjust the height of this assembly table to match the project. Or use it as an outfeed support anywhere in the shop. This table can handle it all.

Ever wish you could raise (or lower) the top of your workbench just a few inches to make it a little bit easier to work on a project? Or use the bench as an outfeed support by rolling it around the shop so it's right next to one of your stationary tools?

That's where the idea came from for the adjustable-height assembly table shown in the photo above. As you can see, the mechanism for raising and lowering the top is a set of handwheels and threaded rods. A few turns of each wheel is all it takes to raise (or lower) the top of the table so it's at just the right height.

Outfeed Support – As I hinted at earlier, you can also use the table for more than just assembling a project. Since the table rests on large swivel casters, you can roll the table right up to a tool (like the table saw shown in the lower left photo) where it doubles as an outfeed support. Just lock the casters and adjust the height of the table to an exact match. The laminate top provides a smooth, slick surface for stock to slide across.

Worksurface – Besides outfeed support, I find the assembly table makes a good general-purpose worksurface. So whether I'm belt sanding (lower right photo) or doing something else, I can change the height of the top to suit what I'm working on. The holes in the top allow you to easily secure a workpiece with bench dogs.

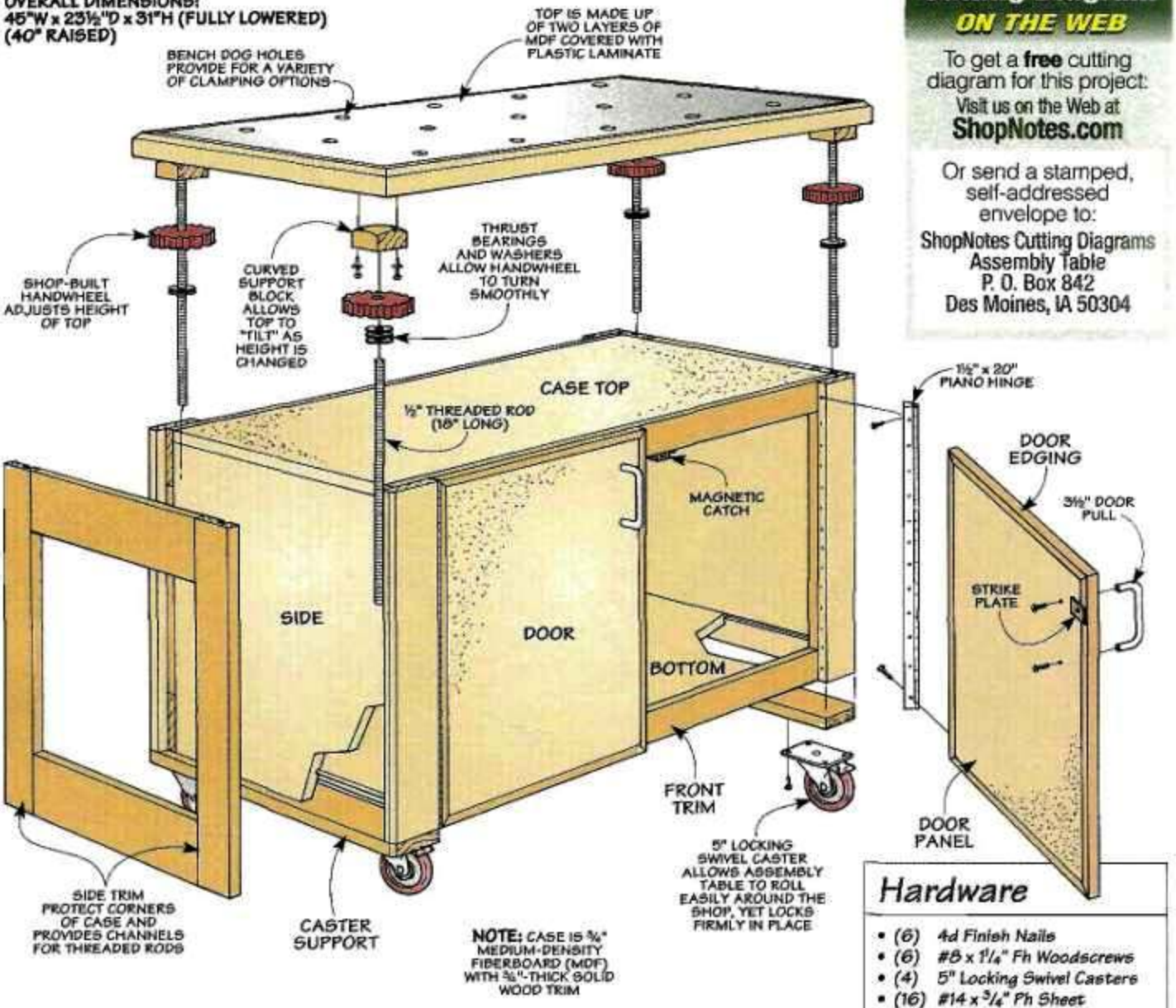
Storage – Finally, the assembly table has two convenient storage areas. Just under the top there's a small area that's perfect for keeping clamps and other assembly items right at hand. Or swing open the double doors at the bottom, and you'll find a large compartment for storing shop tools and accessories (photo above).

▲ *Outfeed Support. Need an extra hand? The assembly table doubles as an outfeed support for the table saw as shown above. Just raise (or lower) the top to match the height of the saw table.*

▲ *Worksurface. You don't have to use the table just for assembling a project. The top makes a perfect worksurface for a variety of woodworking tasks, like belt sanding a panel flat.*

EXPLODED VIEW

OVERALL DIMENSIONS:
45"W x 23½"D x 31"H (FULLY LOWERED)
(40" RAISED)



Cutting Diagram
ON THE WEB

To get a **free** cutting diagram for this project:
Visit us on the Web at
ShopNotes.com

Or send a stamped, self-addressed envelope to:
ShopNotes Cutting Diagrams
Assembly Table
P. O. Box 842
Des Moines, IA 50304

Materials

Case

A	Top (1)	19½ x 40½ - ¾ MDF
B	Bottom (1)	19½ x 39½ - ¾ MDF
C	Sides (2)	19½ x 19½ - ¾ MDF
D	Back (1)	17¼ x 39 - ¾ MDF
E	Front Trim (2)	¾ x 2 - 40½
F	Back Trim (2)	¾ x 3½ - 40½
G	Side Leg Trim (4)	¾ x 2¾ - 20
H	Upr./Lwr. Side Trim (4)	¾ x 3½ - 15½
I	Front Support (2)	¾ x 2¾ - 16
J	Back Support (2)	¾ x 2¾ - 13
K	Front/Back Leg Trim (4)	¾ x 3½ - 20

Caster Support & Doors

L	Caster Support (2)	¾ x 3½ - 22½
M	Door Panels (2)	16⅝ x 19 - ¾ MDF
N	Door Edging	¾ x ½ - 14 Lnr. Ft.

Top & Support System

O	Top Panels (2)	22 x 42½ - ¾ MDF
P	Top Edging	¾ x 1⅜ - 12 Lnr. Ft.
Q	Support Blocks (4)	¾ x 2¼ - 2¼
R	Handwheels (4)	4 x 4 - ¾ MDF

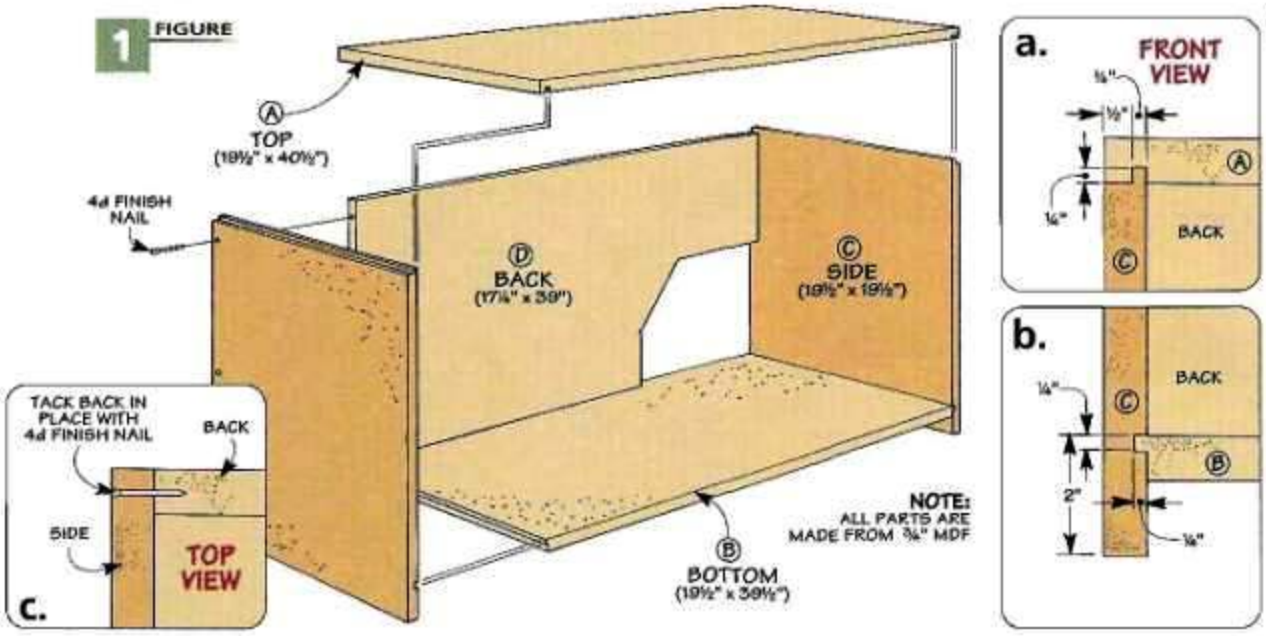
Note: To build the assembly table, you'll need one and one-half sheets of MDF, (3) 8'-long 1x6s, (2) 8'-long 1x8s, and (1) 2' x 4' piece of plastic laminate.

Hardware

- (6) 4d Finish Nails
- (6) #8 x 1¼" Fh Woodscrews
- (4) 5" Locking Swivel Casters
- (16) #14 x ¾" Ph Sheet Metal Screws
- (2) 3½" Door Pulls w/screws
- (2) Magnetic Catches w/screws
- (2) Strike Plates w/screws
- (2) 1½" x 20" Piano Hinge w/screws
- (8) #8 x 2" Ph Sheet Metal Screws
- (8) 5/32" Flat Washers
- (4) ½" I.D. x 15/16" O.D. Thrust Bearings w/Washers
- (4) ½"-Dia. Threaded Rods (18" Long)
- (4) ½"-Dia. Hex Nuts

The casters and thrust bearing/washer set are available from the sources listed on page 31.

Case



I began work on the assembly table by building the main case. As you can see in Figure 1 above, it's really nothing more than a large, rectangular box made from 3/4" medium-density fiberboard (MDF).

MDF is a great choice for a utility project like this assembly table since it's very stable, heavy, and quite inexpensive. But you could also use shop-grade plywood for the case.

One of the biggest problems when building a large project like this case is assembling all the pieces. Although you could build the case using a basic butt joint, it wouldn't be very strong. And the pieces would slip out of alignment as you tried to clamp everything together.

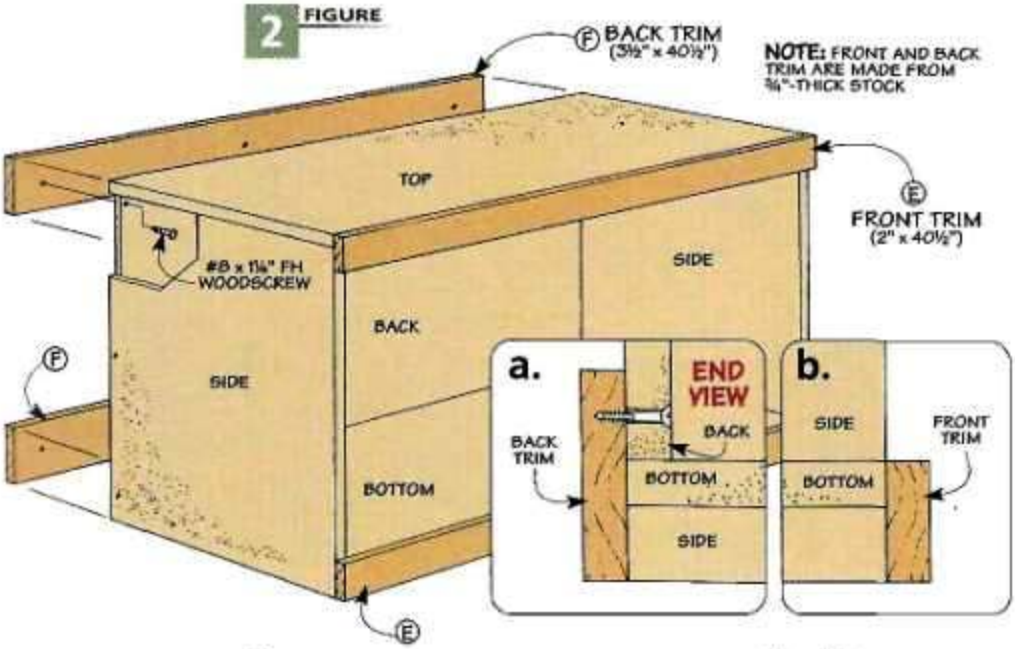
Tongue & Groove – To avoid this problem, I used tongue and groove joinery to act as an additional "helper" when it came time for assembly. The tongue and groove joints practically "lock" together, making it easy to add the clamps without things moving out of position.

After cutting the *top (A)*, *bottom (B)*, and *sides (C)* to final size, you can cut the grooves along the bottom edge of the sides and the ends of the top, as shown in Figures 1a and 1b. Then all that's left to do is cut rabbets on the sides and bottom to make the tongues.

Assembly – With the joinery complete, assembling the case is a simple task. Start by adding a little glue to the grooves in the sides. Then slip the bottom in place and add some clamps. Finally, add some glue to the grooves in the top and then slip it over the tongues along the upper edge of each side.

The next step is to add the back of the case. The *back (D)* is cut to fit the case opening (Figure 1). Although it's secured later to some trim pieces, you'll need to hold the back in place temporarily until the trim is added. To do this, I predrilled a few holes and then tapped in some finish nails through the sides of the case, as shown in Figure 1c.

Trim Pieces – Now that the shell of the case is complete, you're ready to "wrap" it with solid wood



trim made from "one-by" lumber. Besides protecting the edges of the MDF, the trim will have grooves that create channels for the threaded rods that support the top.

Adding the trim pieces is a little like building with Lincoln logs. You just add one piece at a time until you're done.

I started by gluing a pair of *front (E)* and *back trim pieces (F)* to the case (Figures 2, 2a, and 2b). You'll notice that the back pieces are wider than the front. This provides a solid surface for securing the back of the case, as shown in Figure 2a.

Now you're ready to add the trim pieces to the sides. As you can see in Figures 3 and 3b, the *side leg trim (G)* has a groove cut in it to create the channel for the threaded rod that will be used to raise and lower the top of the assembly table.

After cutting the grooves in each piece using a dado blade in the table saw (Figure 3a), you can glue the side leg trim in place. Then just cut and glue the *upper* and *lower side trim (H)* to fit in between (Figure 3).

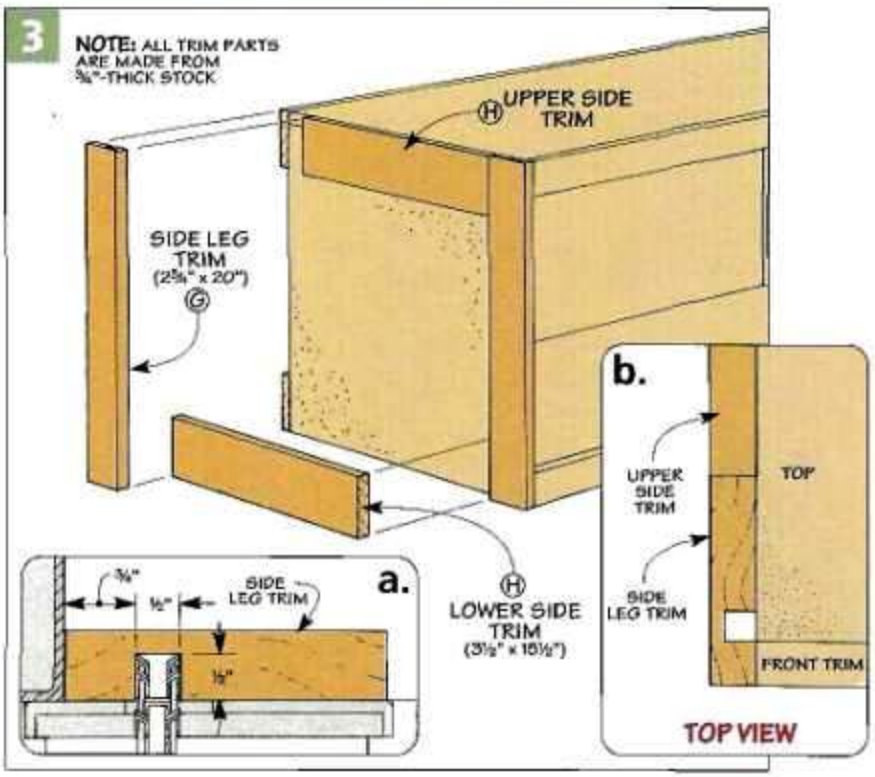
Leg Trim – All that's left to complete the trim is to add some additional pieces to form "legs."

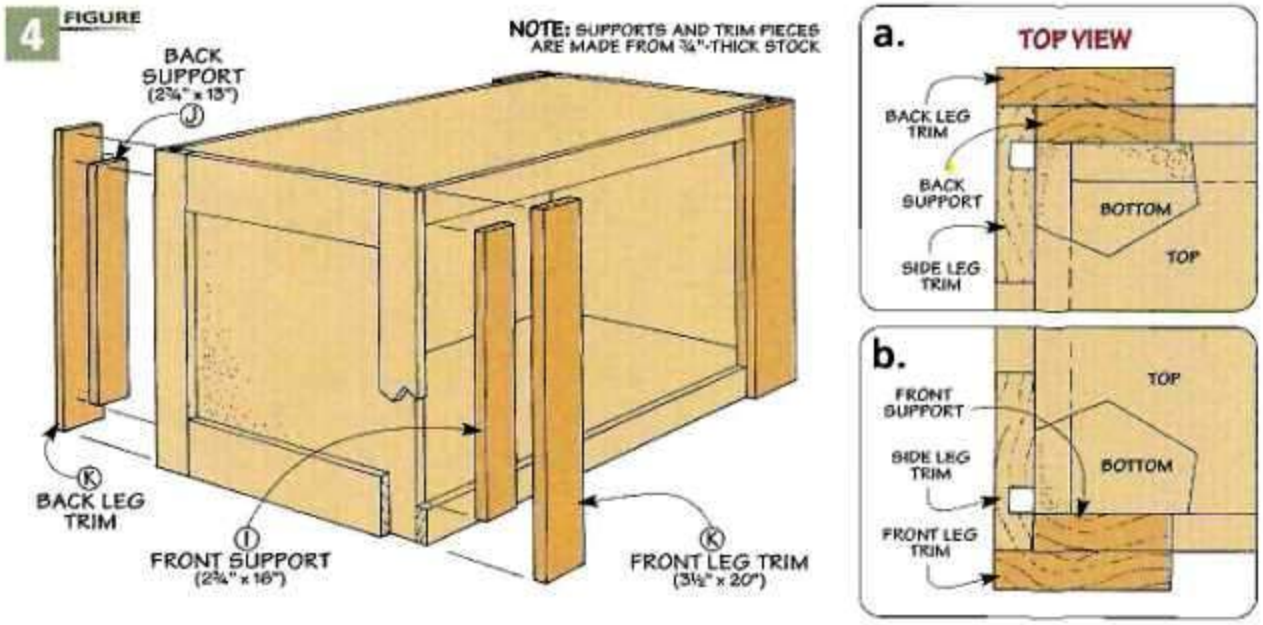
Start by adding the *front (I)* and *back supports (J)*, as shown in Figure 4. These pieces are cut to fit between the front and back trim pieces and end up flush with the side leg trim (Figures 4a and 4b).

Once the supports are glued in place against the sides, you're almost done. All that's left to do is add the front and back leg trim.

The *front/back leg trim (K)* pieces are made from the same material as all the other trim. And they're sized to fit flush at the top and bottom of the case, as you can see in Figure 4.

When you glue the trim in place, just be sure the *inside* edges are flush with the trim behind it, as illustrated in Figures 4a and 4b. This way, when it's time to install the doors, it won't take long to get a good fit.





Casters & Doors

To provide a solid platform for the casters, I added a pair of supports (Figure 5). Each *caster support (L)* is sized so it's flush with the front, back, and side trim (Figure 5a).

After gluing the supports in place, it's a good idea to rout a chamfer on the corners of the case (Figures 6 and 6a). Then just screw the casters to the support (Figures 7 and 7a).

▲ *Stability & Mobility. Locking swivel casters provide roll-around capability and rock-solid stability once they're engaged.*

DOORS

At this point, you're ready to add the two doors. They're just 3/4" MDF panels surrounded with solid wood edging (Figure 8).

Size – Making the doors is easy. The tricky part is determining the final size. The height of the *finished* doors is easy to figure out — they're flush with the top and bottom of the case (Figures 8 and 8b).

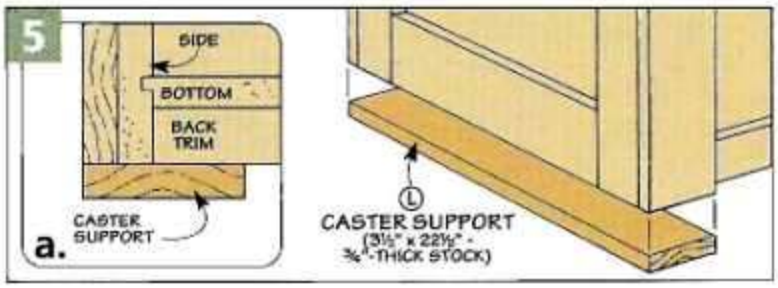
Determining the width takes a little more work. That's because you have to account for the thickness of each hinge knuckle *and* the small gap (1/16") between the two doors.

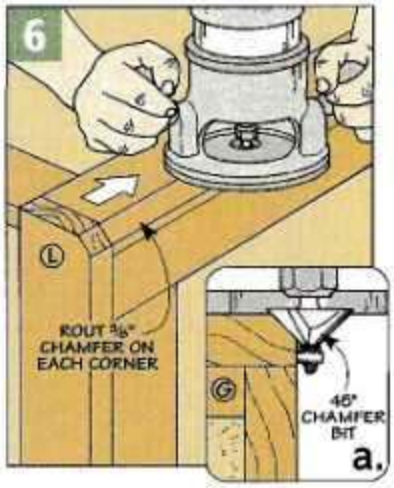
To make this easier, I concentrate on only the hinge knuckles when figuring out the finished width. Then to create the gap, I sand the *inside* edge of each door once they're installed.

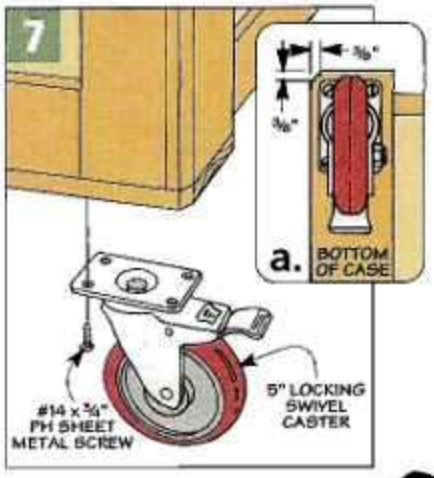
Now it's just a matter of cutting the two *door panels (M)* to final size. Then rip enough *door edging (N)* to fit around the doors and glue it in place.

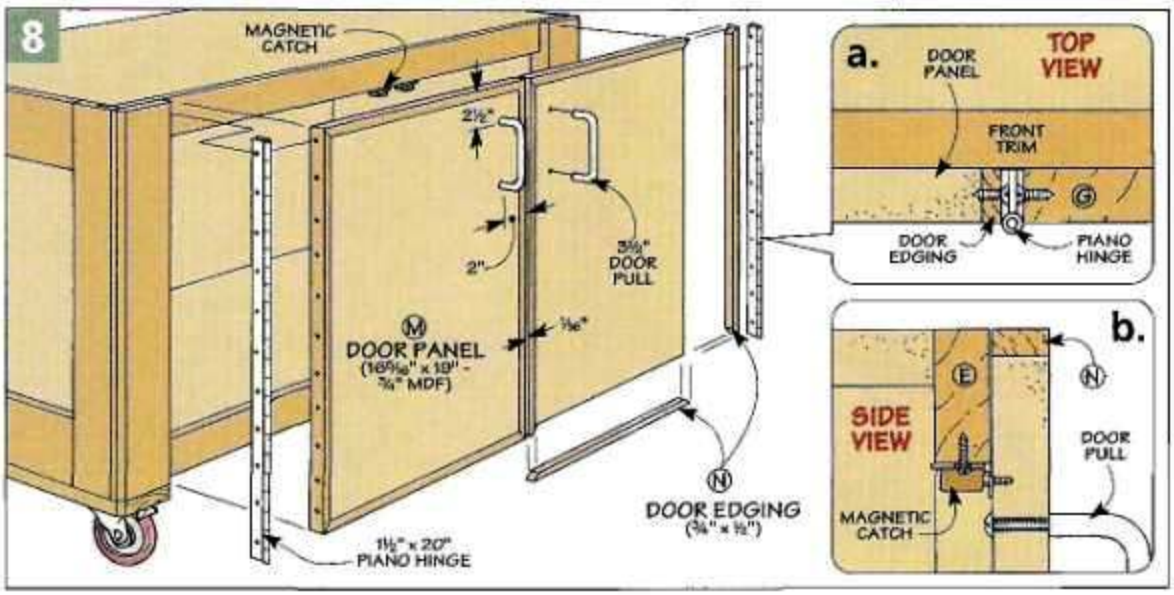
Hinging the Doors – With the doors complete, the next step is to fasten them to the case. As you can see in Figures 8 and 8a, they're held in place with piano hinges.

After screwing the hinges in place, you can add a set of magnetic catches and strike plates to keep the doors closed (Figures 8 and 8b). Then to complete the doors, I installed two metal pulls (Figure 8).









Top

It's a pretty good bet that the top of the assembly table will see some heavy-duty use. So it needs to be strong, durable, and easy to clean. To achieve this, I made the top out of two layers of $^3/_4$" MDF covered with plastic laminate (Figure 9).

Now your first thought might be to cut these pieces to final size and then just glue them up. But it's nearly impossible to do this so the edges are perfectly flush. An easier way is to start by cutting one *top panel (O)* to final size. Then cut the other top panel and the plastic laminate *oversized*.

After gluing the two panels together, I used contact cement to attach the plastic laminate to the oversized top panel. Now it's just a matter of using a hand-held router and flush trim bit to remove the waste (Figures 10 and 10a).

Dog Holes – Although the top makes a great assembly area as it is, adding a series of dog holes allows you to make use of some handy clamping accessories like the ones shown in the margin.

Because of the size of the top, it's difficult to accurately drill the dog holes (and impossible to drill the center holes on most drill presses).

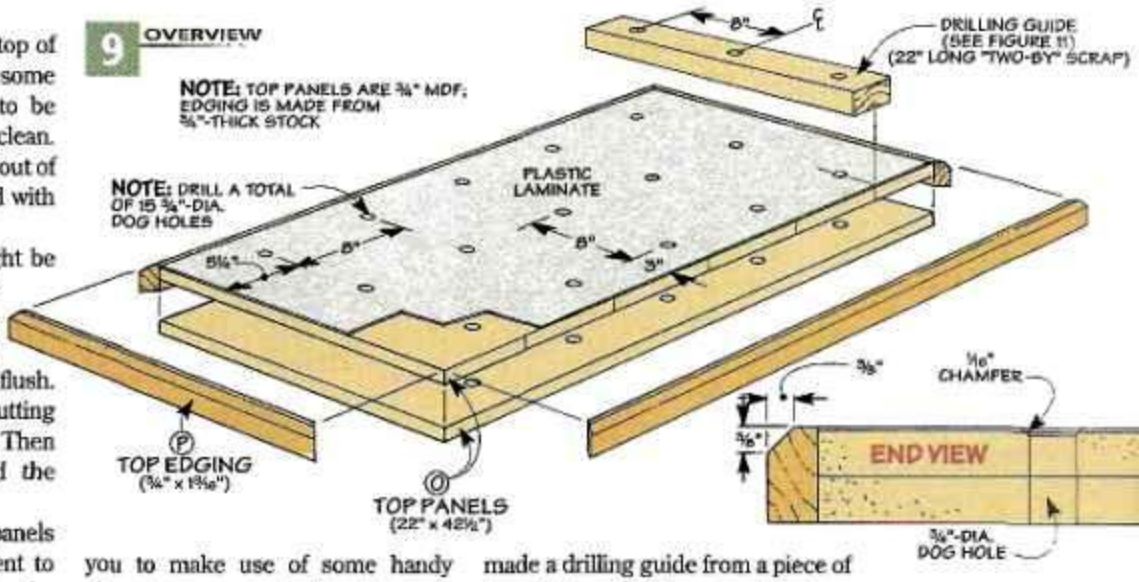
Drilling Guide – To make it easy (and accurate) to do this, I made a drilling guide from a piece of "two-by" scrap. The scrap is cut to match the width (depth) of the top, as shown in Figure 11.

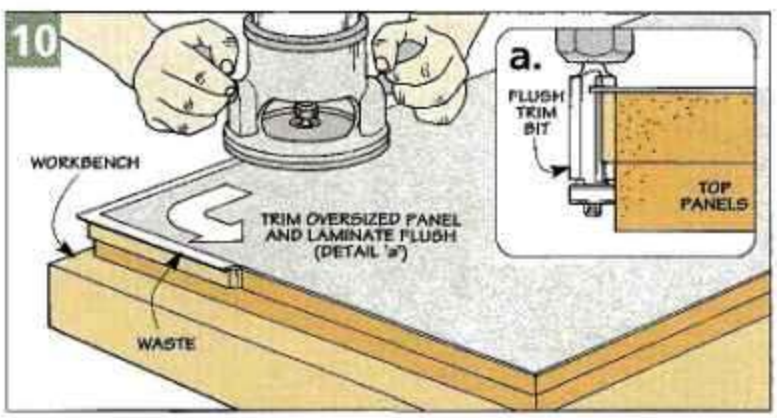
After laying out a set of three holes on the scrap to match the spacing shown for the holes in Figure 9, I used a spade bit in the drill press to make sure the holes were perfectly straight (Figure 11a). A centerline mark on each end of the drilling guide helps to align the guide during use.

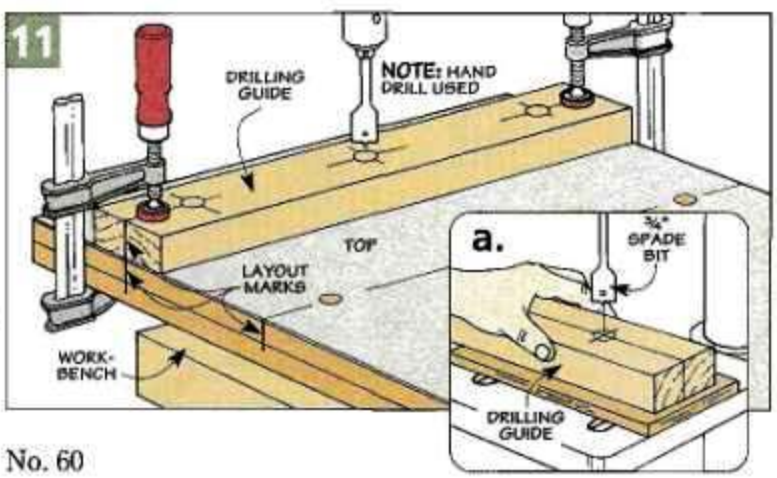
Layout Marks – To position the drilling guide on the top, you'll need to make a few layout marks along the front and back edges of the top. Here again, I used the dimensions shown in Figure 9.

Drill Dog Holes – Now you're ready to drill the holes. To do this, use the layout marks to align the guide on the top (Figure 11). After clamping the guide in place, use the same spade bit as before to drill the holes. Adding the rest of the holes is just a matter of repeating the process for each set of layout lines.

Edging – All that's left to do at this point is wrap the top with some edging. Here again, the *top edging (P)* is mitered to wrap around the four edges. Then to relieve the edges, I routed a chamfer all the way around (End View in Figure 9).







▲ *Bench Dogs. Using one (or more) pairs of bench dogs and adjustable clamps lets you hold work tightly against the top without any clamps getting in the way.*

Top Support

▲ *Support Blocks. The key to allowing the top to move freely is to "loosely" screw the support blocks to the top.*

▲ *Bearing. A pair of washers and a thrust bearing make it easy to turn the handwheel to adjust the height.*

The key to making the top of the assembly table adjustable is the support system. As you can see in Figure 12, it consists of a threaded rod that fits into a wood block attached to the top. Turning a shop-made handwheel raises (or lowers) the top.

One thing you'll notice is the upper face of the support block is curved and attached loosely to the top (upper margin photo). The reason for this is simple. It allows the top to "tilt" freely as you change the height, as illustrated in Figure 12a.

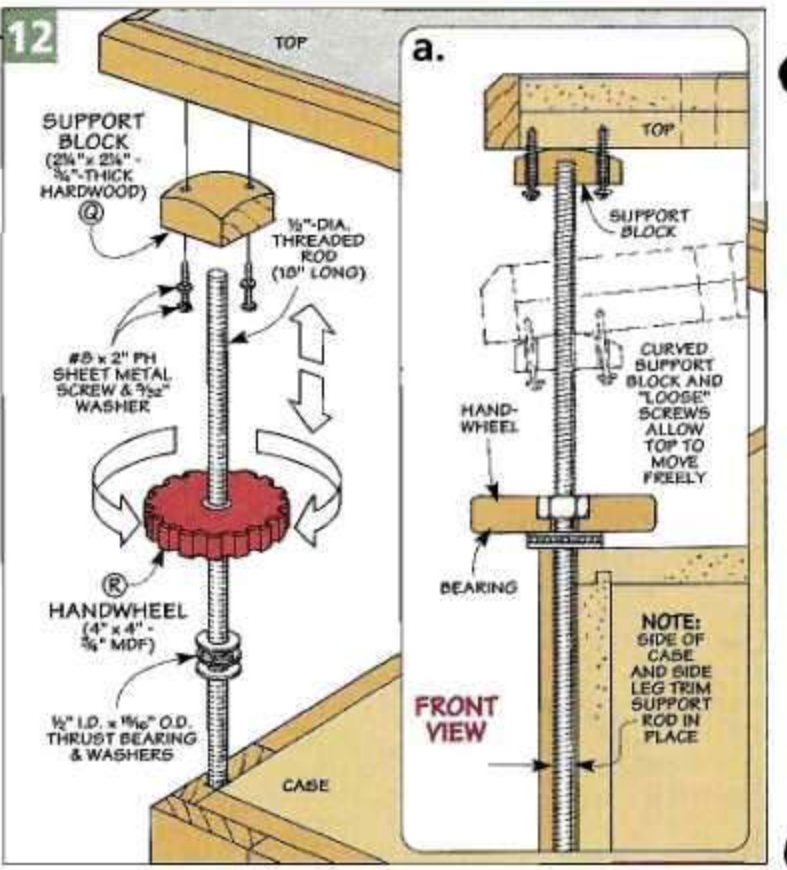
The threaded rods fit into the channels you cut in the trim pieces earlier. So as you raise (or lower) the top, the rods simply travel up (or down) inside the channels. And to make it smooth and easy to spin the handwheels, they ride on small bearings and washers (lower margin photo).

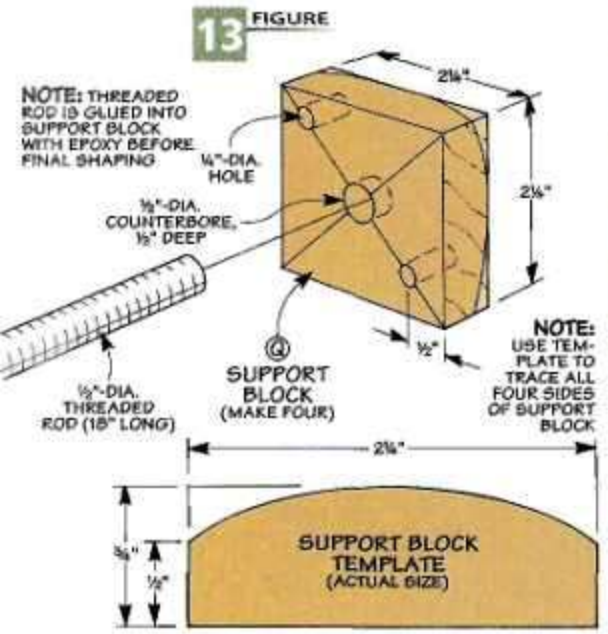
SUPPORT BLOCKS

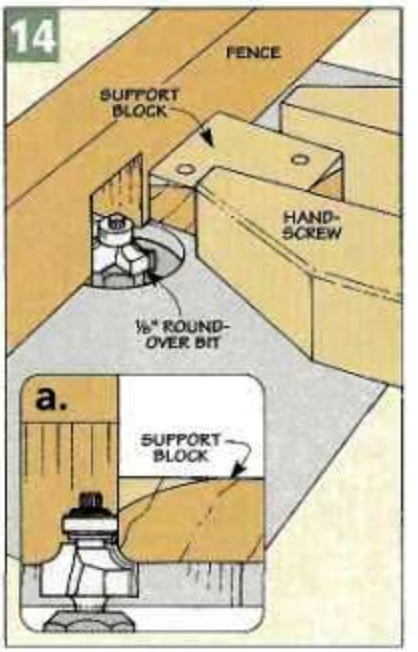
The first step in making the system is to work on the support blocks. Each *support block (Q)* starts out as a $2^1/_4$"-square piece of $^3/_4$"-thick hardwood. (I used maple.)

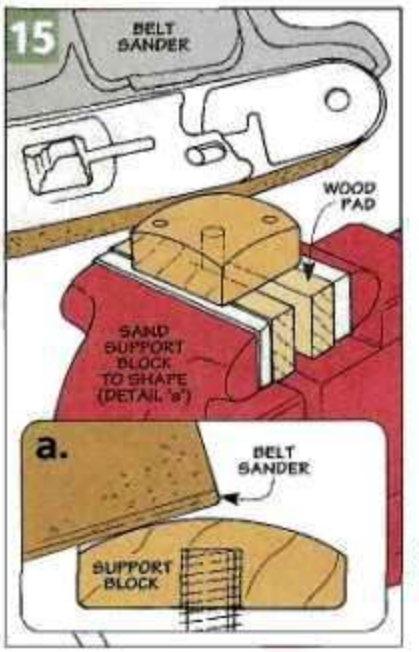
After cutting the blocks to size, you're ready to drill three holes in each block. The center hole is for the rod, and the other two holes are oversized (to prevent binding) and used to attach the top (Figure 13).

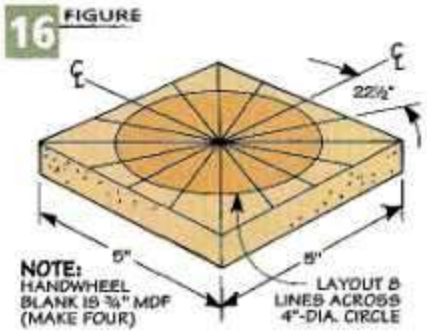
Once the holes are drilled, it's a good idea to relieve the bottom edge of each support block. This way, you won't bang your knuckles on any sharp corners. The trouble is trying to round over the edges on such a small workpiece.











To solve this problem, I used a handscrew to hold the block as I routed the edges (Figures 14 and 14a).

Shape Support Block – Now you're ready to round the top of the support block. Here again, the problem is holding the block while you shape the top.

To do this safely, I glued the rod into the support block with epoxy first. Then just clamp the rod in a vise (with wood pads to protect the threads) and round the top with a belt sander (Figures 15 and 15a).

HANDWHEELS

At this point, you can set the supports (and rods) aside and work on the set of four handwheels.

Handwheel – Each *handwheel (R)* starts out as 5"-square blank of ¾" MDF. Then to create the finger grips and locate the threaded rod, a series of holes are drilled in each blank. So as you may have guessed, the next step is to lay out the location of the holes on each blank, as shown in Figure 16.

Drill Holes – After laying out each blank, drilling the counterbored hole in the center of each blank is the next step (Figures 17 and 17a). The counterbore accepts a hex nut that the threaded rod feeds through.

Making the finger grips is next. And that's a two-step process. Start by drilling a series of holes around the edge of the wheel (Figure 18). Then cut the wheel to shape using a band saw (or jig saw), as shown in Figure 19. Note: To remove the sharp corners, I softened the edges by sanding a roundover on each handwheel, as you can see in Figure 20.

Add Hex Nut – The next step is to add the hex nut that allows the threaded rod to raise (or lower) the top of the assembly table. To do this, simply glue the nut in the counterbore with some epoxy, as shown in Figure 20. Just make sure to keep the threads of the nut free of any epoxy.

Note: To make the handwheels stand out, I painted them a bright red (see margin photo). But you can simply leave them natural if you'd like.

Attach the Top – Now you're ready to add the top to the base of the assembly table. This is a two-person task, but before tracking down a friend to help you, there's a little work to do.

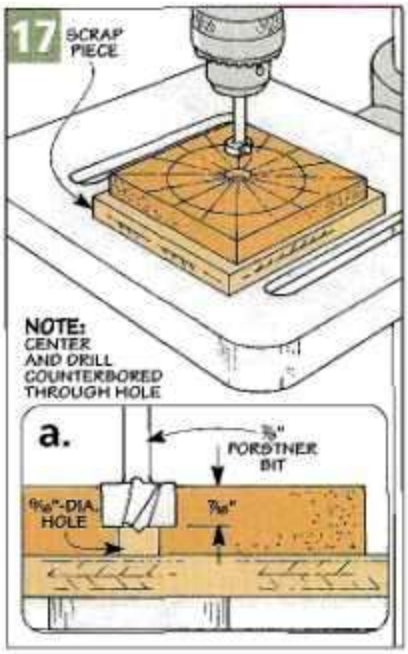
First, thread a rod into each handwheel and then slip the rods into the channels in the base (with a thrust bearing and pair of washers on each rod). After adjusting all the support blocks to the same height (8"), set the top in place so it's centered over the base.

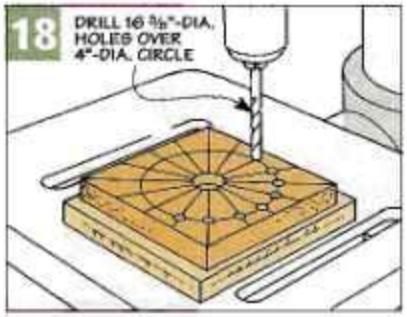
Then use an awl to mark the location of the attachment holes in the bottom surface of the top. Now you can remove the top and drill pilot holes for the mounting screws.

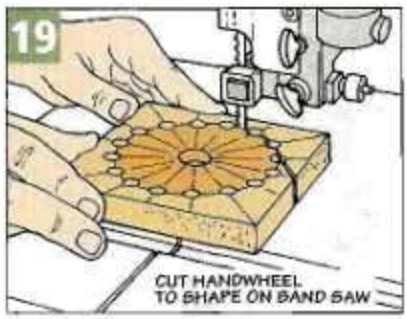
After pulling the support blocks and rods from the case and screwing them loosely to the top (Figure 12a), you can give that friend a call. As you each hold the thrust bearings and washers in place, flip the top right side up. Then feed the rods into the channels in the base and lower the top.

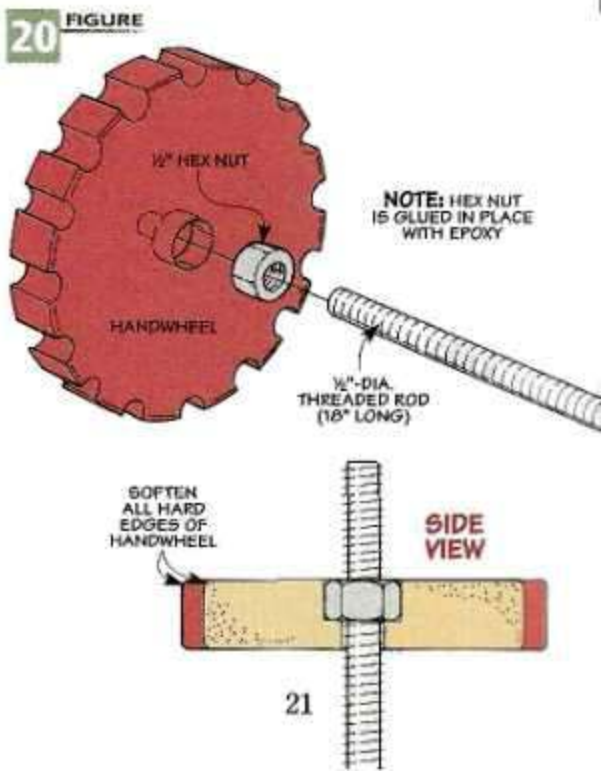
With the assembly resting on the washers and bearings, a few turns of the handwheel is all it takes to change the height of the top.

▲ *Handwheel. Turning a shop-made handwheel raises (or lowers) the top of the assembly table.*









6 Solutions For Successful Ripping

The table saw is the workhorse of most woodworking shops. Crosscuts, rabbets, dadoes, and grooves can all be routinely cut on it. But there's one job that a table saw excels at — ripping.

A table saw's blade and rip fence make it the safest and most accurate tool there is for ripping boards. So there's really not much to think about. All you need to do is set the fence, raise the blade, and start ripping, right?

Well, not really. Getting glue-ready edges when ripping on a table saw isn't automatic. Binding, burning, saw marks, and kickback are just some of the problems you might run across.

But to get quality edges when ripping on a table saw, all you need to do is pay attention to details. So I came up with six steps that make ripping easier and safer. They could be the difference between quality cuts and rough ones.

1. The Set-Up

Safety Note: We don't typically show a blade guard on the table saw so the operation can be shown more clearly. But please, use your guard whenever possible.

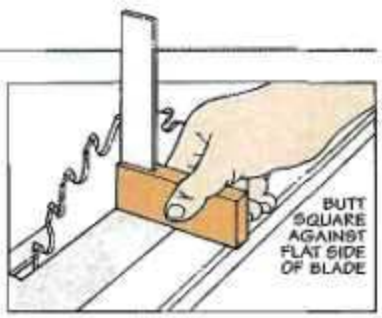
It won't take too long to figure out if your table saw is out of alignment — the cut will bind. So the first secret to safe, accurate ripping is to make sure your table saw is set-up properly.

Check The Blade – To get the blade and fence aligned, I check them both against the only fixed reference point on the table top — the miter gauge slot. In both cases, all you need is a combination square.

To determine whether the blade is out of alignment, start by referencing the blade to the miter slot. To do this, use the combination square to check the distance between the slot and a tooth on the front of the blade, see the photo below left.

If there's a gap from front to back, you'll need to adjust the saw's trunnion. To do this, refer to the owner's manual provided with your saw.

Check The Fence – Once the blade is parallel, check the fence using the same technique, see photo below right. Lower the saw blade below the table and adjust the combination square to check the fence. If it's not aligned, you'll need to make a few adjustments on the fence itself. Again, check your manual for information on making fence adjustments.



Square Blade – There's one last step before ripping — be sure to adjust the blade so that it's set at 90° to the table top, see drawing above.

▲ *Check Blade. First place the square in the miter slot and set it to touch a tooth. Rotate the blade and slide the square back to touch the same tooth. If it's not parallel, the trunnion will need to be adjusted.*

▲ *Check Rip Fence. Once the blade is aligned, adjust the square out, as shown. Then slide the rip fence in until they touch. Now lock the fence down and move the square back to see if it's parallel to the miter gauge slot.*

2. The Blade

Like many woodworkers, the blade I use for almost every job is a combination blade, see the photo near right. Thanks to the design (one flat-topped tooth with a deep gullet in front to remove chips quickly and four alternating top-bevel teeth), it can be used to produce a nearly glue-ready edge with very few ridges.

But let's face it. A combination blade can cause your table saw motor to bog down during heavy ripping operations. The fact is, when I have a lot of ripping to do, I switch to a dedicated rip blade.

Rip Blade – What a rip blade does best is speed up the process. It has fewer teeth and they're angled forward with deeper gullets, see photo far right. These angled teeth make a slicing cut that allows you to feed the workpiece quickly and almost effortlessly. One drawback is that the cut may be slightly rougher.

Before I do any cutting though, I make sure that all my blades are clean and sharp. No matter which blade you end up using, a dirty or dull one can affect the performance of your table saw.

▲ *Combination Blade. This blade produces clean cuts. It's designed to work well at both ripping and crosscutting.*

▲ *Rip Blade. The deeper gullets and forward slanting teeth make this blade ideal for fast, easy ripping.*

3. The Technique

Now you're all set up, *and* you've got the right blade installed for the job. It's tempting to jump right in and start ripping. But before you do, take a bit of time to think about your technique.

Probably the most important factor to *safely* ripping on a table saw comes from using the proper technique. Things like where you stand, what to do with your hands, plus feed rate and blade height should all be considered. There's nothing complicated about it. You just need to keep these things in mind.

Blade Height – I start with the height that the blade is set above the workpiece. If the teeth on your blade are too low, they'll be in contact with the wood longer, and there'll be more friction created. This means a greater risk of burning the edges.

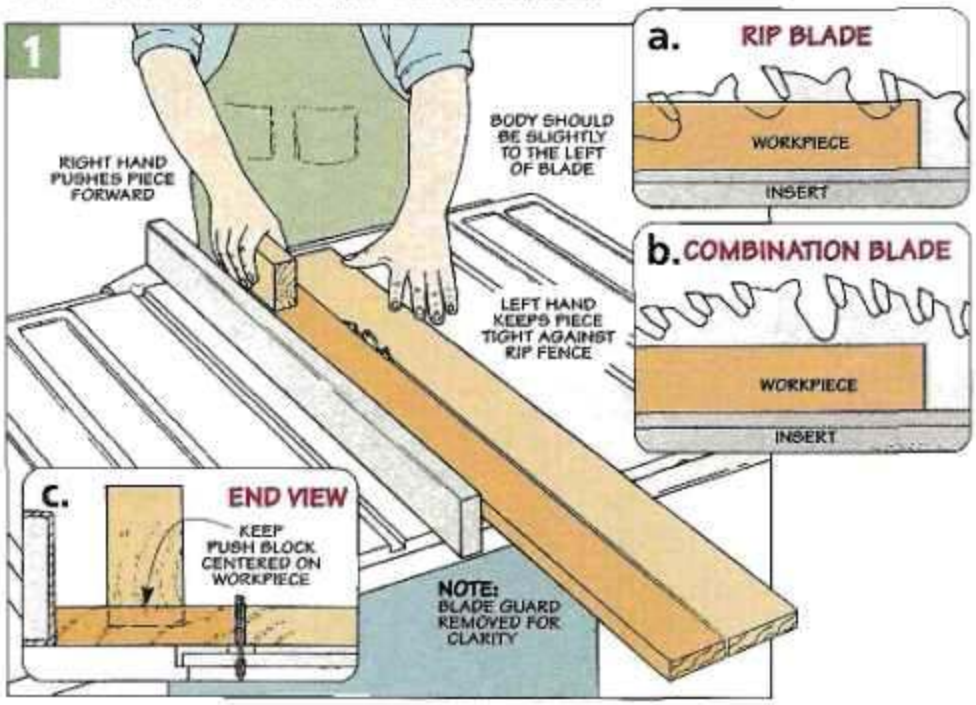
With a rip blade, the deeper gullets are designed to help clear debris, so I set the blade with the bottom of the *teeth* just clear of the top face of the workpiece, see Figure 1a.

But a combination blade has groups of alternating teeth with several *shallow* gullets that give you smooth crosscuts. To help with ripping, each group of teeth also has a flat-topped tooth with a *deep* gullet in front for removing chips quickly. So this blade needs to be raised slightly higher, with the bottom of the deepest *gullet* visible, see Figure 1b.

Basic Technique – In addition to the blade height, your technique is also going to make a big difference in the kind of rip cut you end up with. The trick is to follow a few "rules" that will greatly reduce your chance of kickback and burned or rough edges.

Feed Rate – First, feed the workpiece through the blade at a constant speed *without* stopping. If you go too fast, the motor can bog down. Too slow, and you may burn the edge. And make sure not to stop during the cut, otherwise you'll end up with bad saw marks, burning, or both.

Body Position – Second, avoid standing directly behind the cut-off portion of the workpiece, see Figure 1. Use your left hand to guide the board along the fence and use your right hand to do the pushing. And *always* push the board all the way through the cut. If possible, use a push block to keep your right hand away from the blade, see Figure 1c.

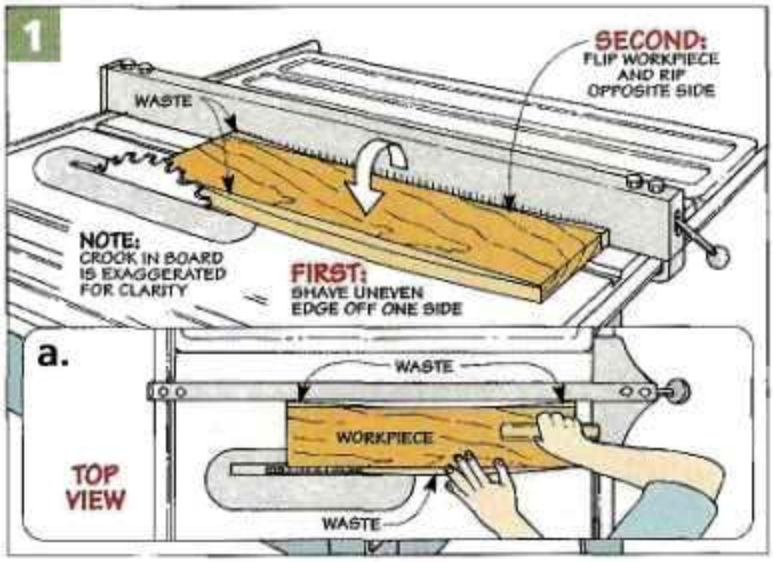


4. Crooked and Cupped Boards

In a perfect world, every board is flat and square. But occasionally, you may have to deal with boards that are crooked or cupped.

A board with just a slight crook can easily be straightened on a table saw. But for safety reasons, don't try to rip long, crooked boards on a table saw. Dangerous kickback can result when the leading edge curves past the end of the rip fence.

Severely crooked boards that can't be ripped on a table saw can still be salvaged. They just need to be cut into more manageable lengths. Then they can be safely straightened on a table saw, see Figure 1.

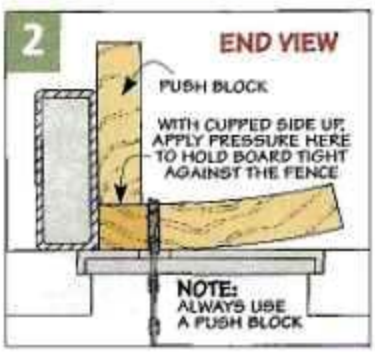


Rip and Flip – Glue-ready edges can easily be ripped on shorter boards, using a technique I call "rip and flip" to take out any remaining crook. An initial shaving takes off a small portion of the uneven edges, see Figure 1a. **Safety Note:** Run the concave edge of the board against the rip fence first to keep the board from rocking and pinching the blade.

Then flip the board over and make another light pass, cutting away as much of the crooked edge as possible, see Figure 1. Continue making light cuts as needed until one edge of the board is square with the face.

Cupped Boards – Boards that are cupped also require special care. I try to keep the cup *up* to avoid possible kickback.

As shown in Figure 2, the secret is to press the board firmly against the table (as well as the fence), so that the pieces fall away from the blade.



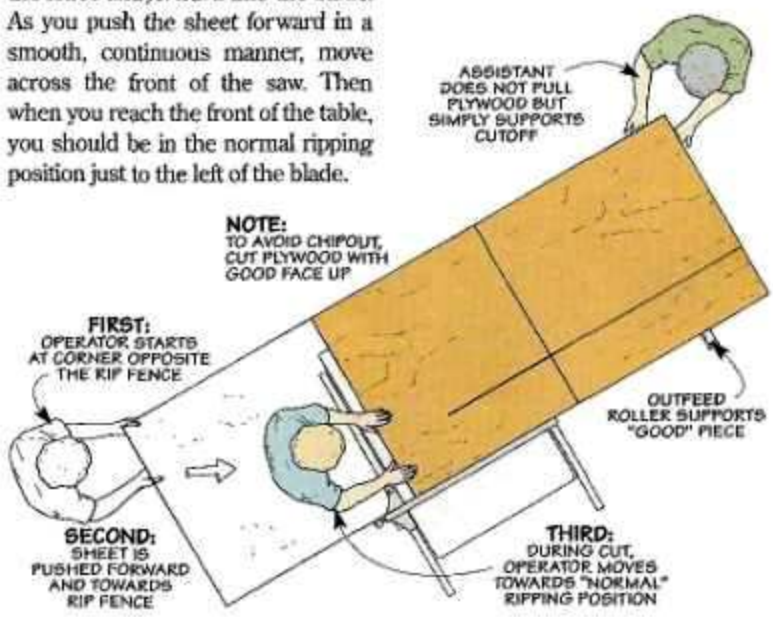
5. Ripping Sheet Goods

Plywood has built-in advantages for ripping on a table saw. Since it has a factory edge, it's a lot easier to use it to get straight cuts. But a full sheet of plywood presents different problems when ripping.

Sheet Goods – If you've ever wrestled with a full sheet of plywood, you know how difficult it can be to rip it down into manageable pieces on a table saw. Because of its size, it tends to drift away from the rip fence. That's why a helper *and* a good outfeed support offer real benefits for straight cuts, see the drawing at right.

When directing the cut, the operator needs to be the one that's in control. And the key to being in control is in how you move your body.

I like to start at the corner opposite the rip fence and push both *towards* the fence and *forward* into the blade. As you push the sheet forward in a smooth, continuous manner, move across the front of the saw. Then when you reach the front of the table, you should be in the normal ripping position just to the left of the blade.



6. Accessories

Sometimes all it takes is a simple accessory to make ripping on the table saw an easier task. Four accessories that I use frequently are shown below.

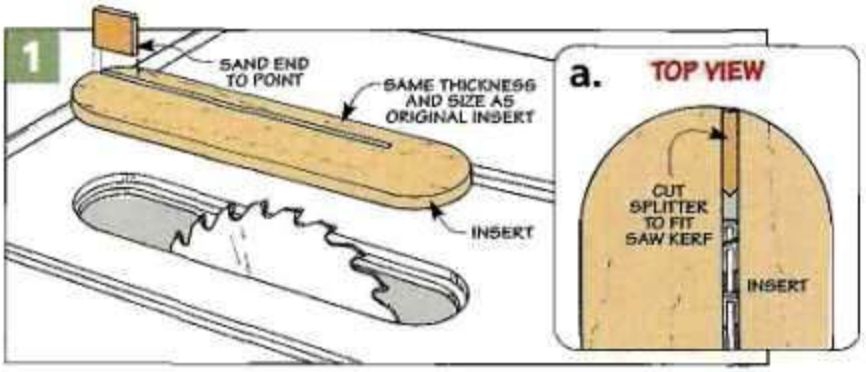
The splitter reduces binding by preventing the saw kerf from closing up on the saw blade. The push block lets you maintain firm control and pressure on the workpiece, keeping your hands away from the blade.

An outrigger and featherboard help control what could be awkward cuts. The outrigger attaches to the rip fence, and the featherboard is placed in front of the rip blade.

SPLITTER

To prevent the saw kerf from closing on the blade, I made an insert for my saw with a built-in hardboard splitter, see Figure 1.

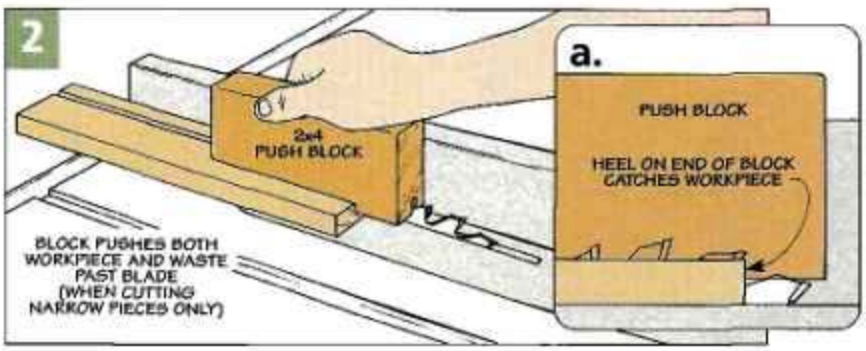
The splitter keeps the kerf open the same width as the blade. Note: To prevent your workpiece from catching on the splitter, sand the end to a point, see Figures 1 and 1a.



PUSH BLOCK

One of the most important accessories you can use when ripping is a push block. It allows you to maintain firm control on the workpiece, while keeping your fingers away from the blade, see Figure 2.

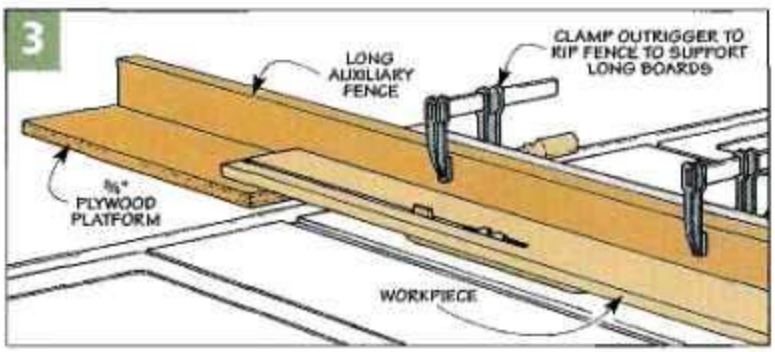
Mine has a heel that helps when pushing the workpiece and the waste through the blade, see Figure 2a.



OUTRIGGER

To provide additional support, particularly when working with long or large workpieces, I built a simple outrigger, see Figure 3.

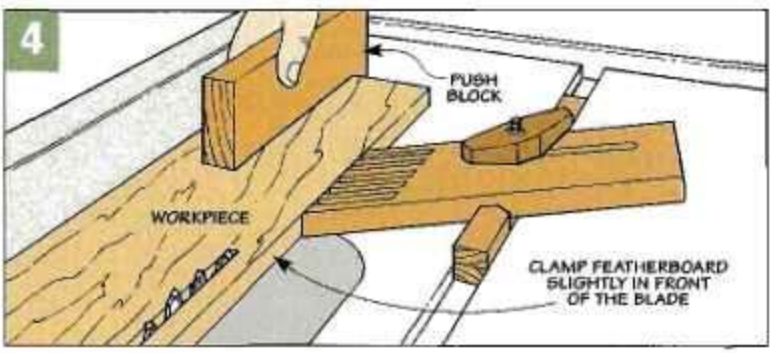
The outrigger can be made from plywood. A long auxiliary fence clamps to your rip fence and an attached platform serves as a quick and easy outfeed extension.



FEATHERBOARD

Clamped to the table, a featherboard applies constant pressure to the side of the workpiece, while it's being pushed along the fence, see Figure 4.

Placement here is critical. It should be clamped slightly in *front* of the rip blade, putting even pressure against the stock but *not* the blade.



Auxiliary Table Saw Fence

This is one fence that covers all the bases — "bury" a dado blade, hold a workpiece with a featherboard, add a stop block — well, you get the idea.

It seems like I'm always having to add an accessory to my rip fence. Sometimes I need to attach an auxiliary fence to "bury" a dado blade for cutting a rabbet. Or I need to position a featherboard to hold a workpiece against the saw table. Regardless, the rip fence needs a little extra help.

The problem is it can be a hassle to do this without a clamp or two getting in the way of the cut. To make this job easier, I built the auxiliary fence shown above.

The fence couldn't be much easier to build. It consists of three strips of plywood with a pair of rabbets and grooves (Figure 1).

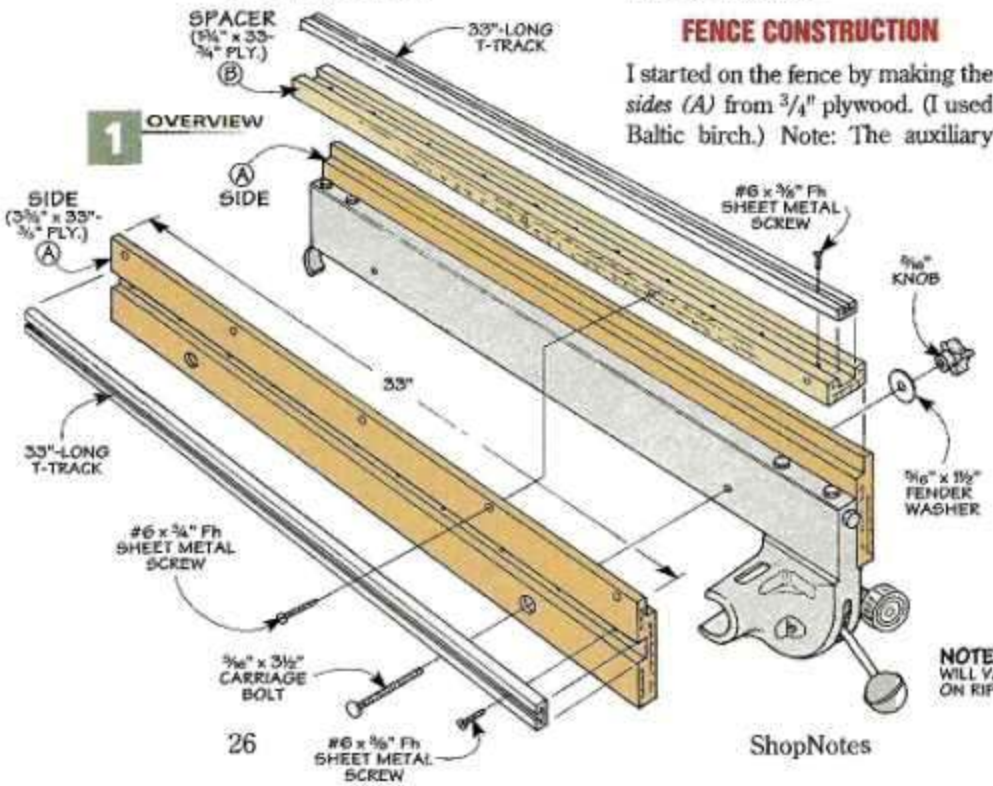
But what makes this fence work so well is the T-tracks that rest in the grooves (see margin on opposite page). Adding an accessory only takes a couple seconds. Just a slide the accessory (and toilet bolt) into position and then lock it in place with a washer and knob.

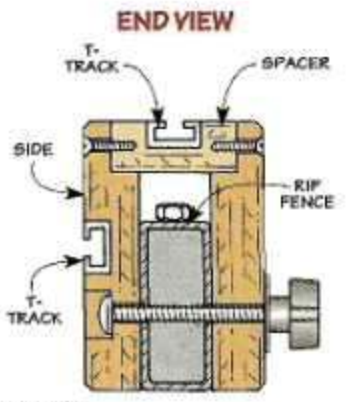
FENCE CONSTRUCTION

I started on the fence by making the *sides (A)* from 3/4" plywood. (I used Baltic birch.) Note: The auxiliary fence is designed to fit rip fences that lock at the front and rear. Depending on your rip fence, you may need to adjust some of the dimensions.

The sides are cut to match the length of the rip fence (Figure 1). And they're wide (tall) enough to provide good support for a workpiece and clear any obstructions on the top (see End View in Figure 1).

Rabbets & Groove – Once the sides are cut to final size, you can cut a rabbet at the top of each piece (Figure 2a) and a groove in the face of one side (Figure 2). Why only one





NOTE: DIMENSIONS WILL VARY DEPENDING ON RIP FENCE MODEL

side? Simple. If you ever need to use the auxiliary fence on the opposite side of the blade, it's quick and easy to remove the fence and flip it around (see inset photo on opposite page and back cover).

The only thing critical about cutting the groove is to size it so the T-track will fit flush with the face of the fence. This way, the T-track won't interfere with any accessories. Note: I positioned the groove $1^3/_4$" from the bottom edge (Figure 2a).

Drill Mounting Holes – The next step is to locate the mounting holes used to attach the auxiliary fence. It's secured with knobs, washers, and a couple carriage bolts (more on this later). Here again, there are a couple things to keep in mind.

First, the holes are drilled the same distance in from each end (Figure 3). This way, the fence can be used on either side of the blade. And second, to avoid interfering with the cut, the head of the carriage bolt rests in a counterbore drilled in the face of the fence (Figure 3a and End View on page 26).

Spacer – Now you're ready to join the sides with a *spacer (B)*. The trick is determining the width of the spacer. What you're looking for here is a snug fit. I found it easiest to sandwich the rip fence between the sides (Figure 3). Then all you have to do is measure the distance between the rabbets and cut the spacer to match.

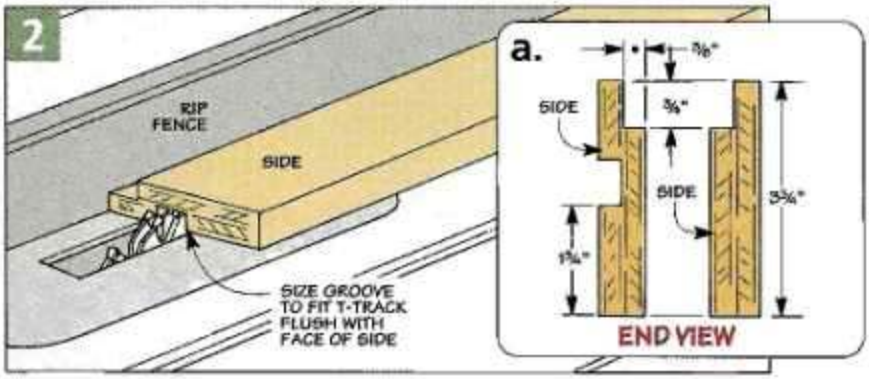
Second Groove – The spacer has a groove to accept a second T-track (Figures 3 and 3a). Here again, it's sized so the T-track will fit flush. And regardless of the width of the spacer, the groove is positioned $^7/_8$" in from the *outside* face of the fence.

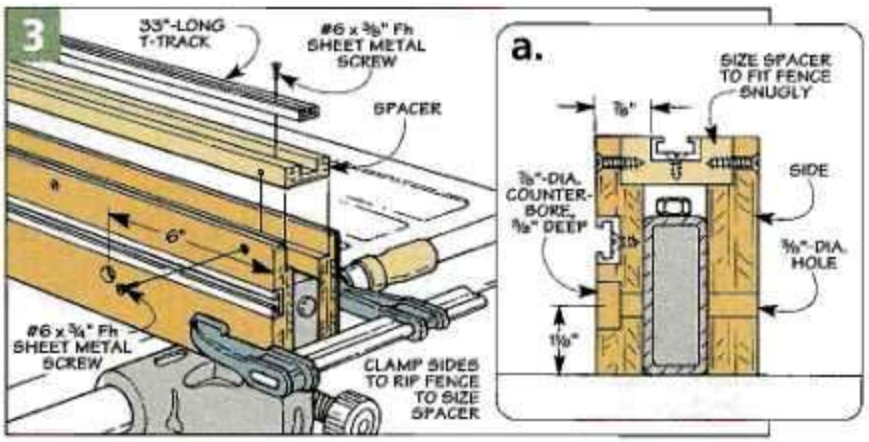
Assembly – Now, you're ready to assemble the fence by gluing and screwing the sides to the spacer. Then all that's left is to screw the T-tracks in the grooves.

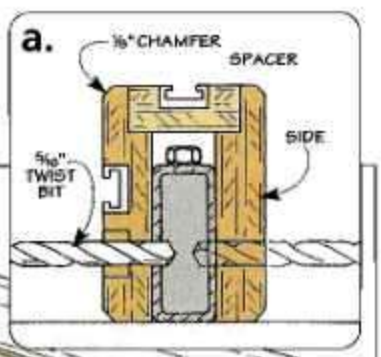
One problem with the exposed edges of plywood is the tendency to catch an edge and split off the veneer (or get a splinter). To avoid this, I eased the outside edges with a carbide-tipped, 45° chamfer bit (Figure 4a).

Installation – As I mentioned before, the auxiliary fence is attached with a pair of a carriage bolts. Now you might be asking why use bolts if the fit is snug? The answer is to avoid lifting the auxiliary fence when you use the featherboard and slide a workpiece underneath. (For more on using this auxiliary fence with a T-square style rip fence that only locks at the front, refer to page 30.)

To attach the auxiliary fence, drill through the mounting holes on each side of the auxiliary fence (Figures 4 and 4a). Then just slip the carriage bolt, washer, and knob in place to lock the fence securely.

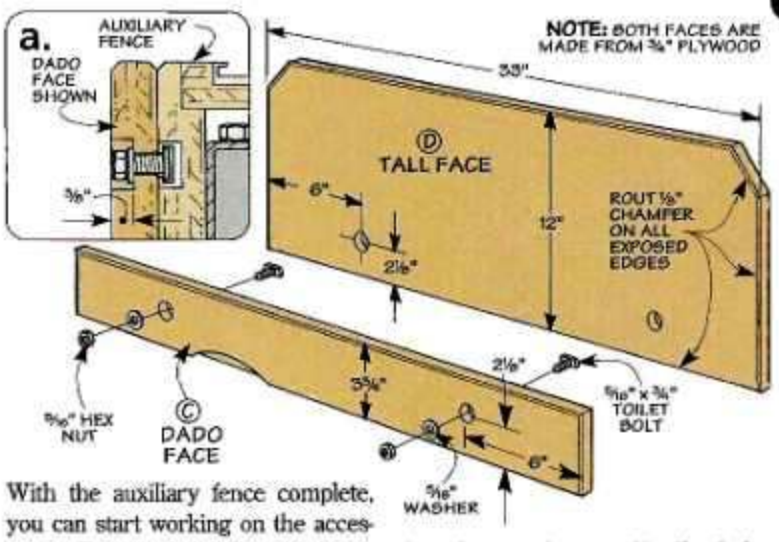






▲ *T-Track Hardware. A toilet bolt, washer, and star knob are all you need to clamp an accessory to the T-track. For sources of T-track, refer to page 31.*

Auxiliary Faces

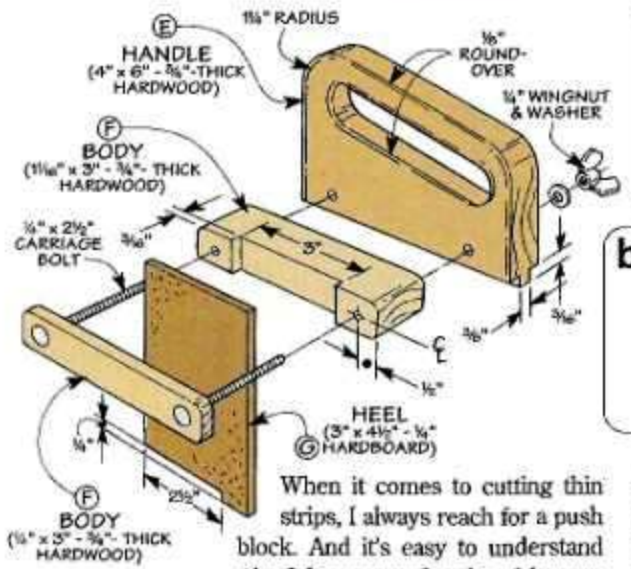


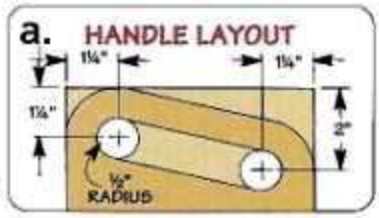
With the auxiliary fence complete, you can start working on the accessories. Two easy-to-make accessories I use quite often are the auxiliary faces shown in the photos at left.

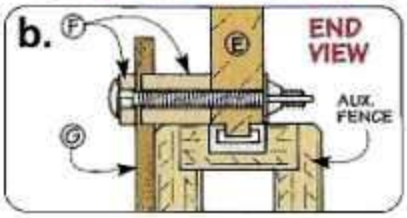
As you can see in the drawing above, they're nothing more than pieces of 3/4" plywood that mount to the T-track in the side of the auxiliary fence using cutoff toilet bolts, nuts, and washers (detail 'a').

The *dado face (C)* allows you to "bury" a dado blade for cutting tenons and rabbets. And the *tall face (D)* provides additional support for wider (taller) workpieces.

Push Block







When it comes to cutting thin strips, I always reach for a push block. And it's easy to understand why. It keeps your hands safely away from the blade *and* pushes the strip through once the cut is complete.

To accomplish this with the auxiliary fence, I made the push block shown in the photo above. What makes this push block a little different is the handle of the push block rides in the T-track on the top of the fence. To push a thin strip through, there's a hardboard heel that can be adjusted up (or down) to match the thickness of the workpiece.

Handle – The *handle (E)* is made from a piece of 3/4"-thick hardwood. After cutting a short tongue along the bottom to fit the T-track (detail 'b'), cut the handle to final shape and round over the edges (detail 'a').

Body – Attached to the handle is a two-part *body (F)*. A shallow notch (3/16") in the main body provides room for the heel. And a narrow outside strip "pinches" the heel in place with a pair of carriage bolts, washers and wing nuts (detail 'b').

Heel – All that's left to do to complete the push block is add the *heel (G)*. It's a replaceable piece of 1/4" hardboard with a small tab on the bottom edge. This tab catches the workpiece to push it past the saw blade.

Featherboard

Featherboards are a natural for the table saw. Besides holding a workpiece firmly against the saw table for an accurate cut, they can also prevent a workpiece from kicking back at you.

As you can see in the drawing below, this featherboard consists of two parts: a *base* for attaching the featherboard to the auxiliary fence, and a *hold-down* with flexible fingers that press against the workpiece.

Base – The *base (H)* is nothing more than a $^3/_4$"-thick piece of hardwood that rests on top of the auxiliary fence. To allow you to use the hold-down with the dado face installed, there's a short slot cut in the top of the base. And two holes drilled through each end provide a way to attach the hold-down with carriage bolts, washers, and knobs.

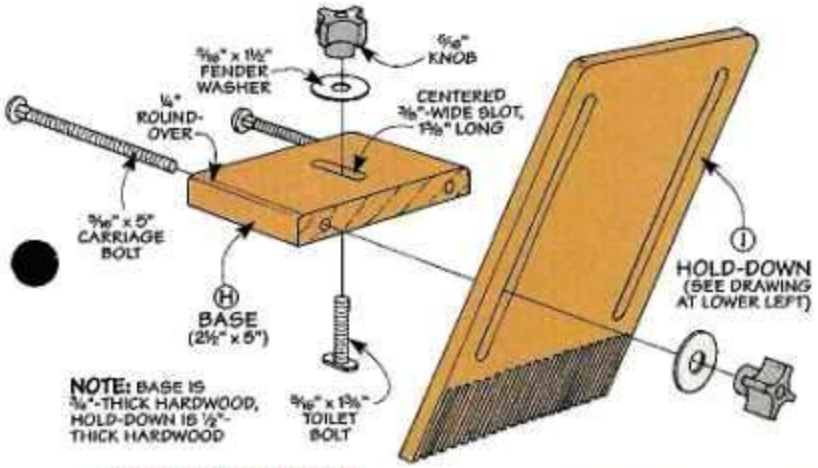
Hold-down – With the base complete, you're ready to make the hold-down. Since it's going to take a lot of abuse, I made the *hold-down (I)* from $^1/_2$"-thick hardwood.

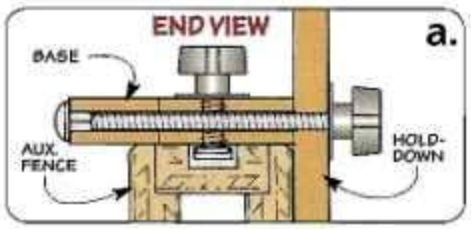
The hold-down starts out as a blank cut to rough width and length. After laying out the location of the slots, you can cut and sand them smooth.

To allow the fingers to "grip" the workpiece during use, I cut one end of the blank at a 30° angle. Then I cut the opposite end to match.

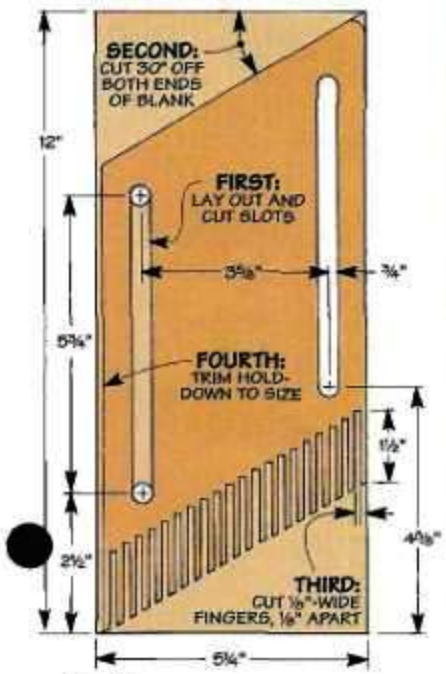
Cut Fingers – The next step is to cut a series of kerfs to create the fingers. To space the kerfs evenly, I made an indexing jig for my miter gauge (see the box below).

Once the fingers have been cut, you can trim the hold-down so there's a full finger along each edge. Then all that's left to do is attach the hold-down to the base.





HOLD-DOWN LAYOUT



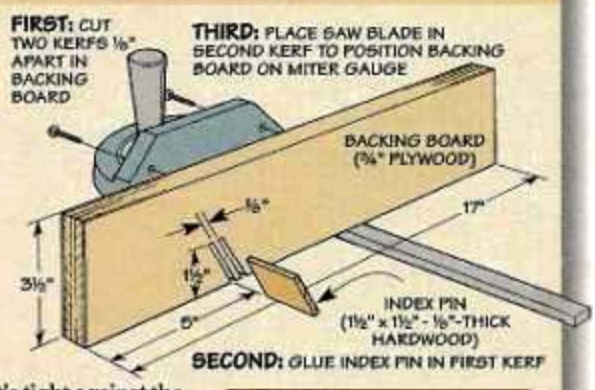
Indexing Jig

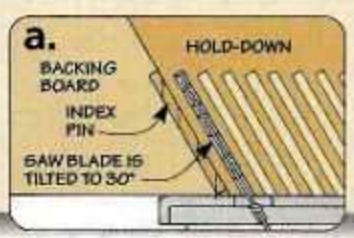
Cutting evenly-spaced kerfs for the hold-down is quick and easy with the indexing jig shown in the drawing at right.

The jig has two saw kerfs that are spaced $^1/_8$" apart. One kerf has a hardwood index pin glued in it. And the other kerf lines up with the saw blade. Note: Tilt saw blade to 30° angle.

To cut the first kerf, clamp the workpiece to the backing board so it's tight against the pin (detail 'a'). Then make the first pass.

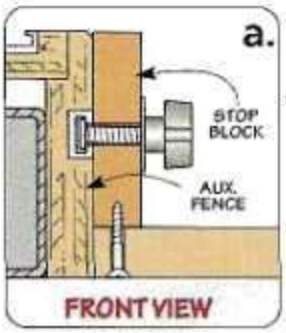
After the first kerf is cut, unclamp the workpiece and shift it over onto the index pin. Then reclamp the workpiece and take another pass. Repeat this process to complete all the fingers on the hold-down.

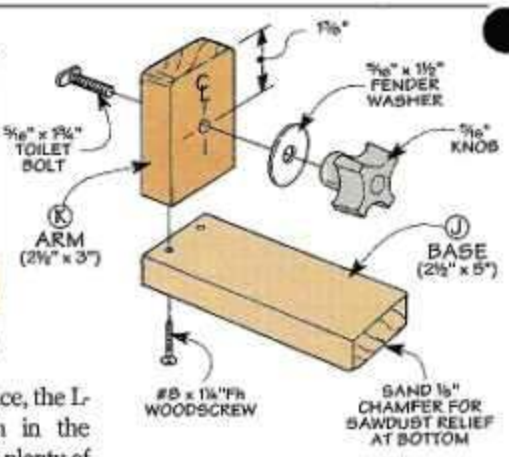




Stop Block

One last accessory you can use with the auxiliary fence that doesn't take much time to make (but comes in handy) is an ordinary stop block. It's an easy way to cut a number of small workpieces to identical length.



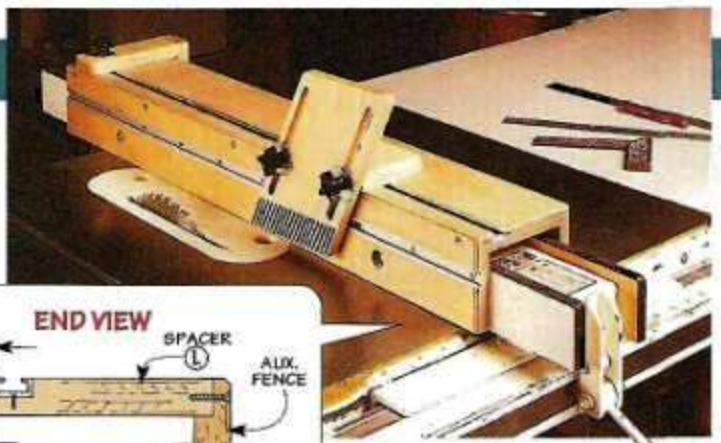


Besides locking easily in place, the L-shaped stop block shown in the photo and drawing provides plenty of space between the blade and fence to avoid trapping the workpiece.

The stop block consists of only two parts: a *base (J)* and an *attachment arm (K)*. They're made from 3/4"-thick hardwood and simply glued and screwed together (detail 'a').

A centered hole in the arm allows you to attach the stop block to the T-track. And a small chamfer along the bottom edge of the base provides clearance for dust and chips.

T-Square Style Rip Fence



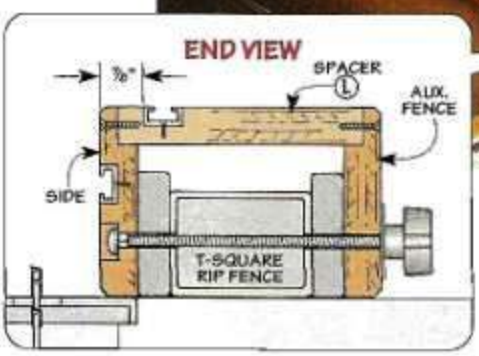
As I mentioned before, the auxiliary fence shown on page 26 is designed for rip fences that lock at both the front *and* rear of the table saw.

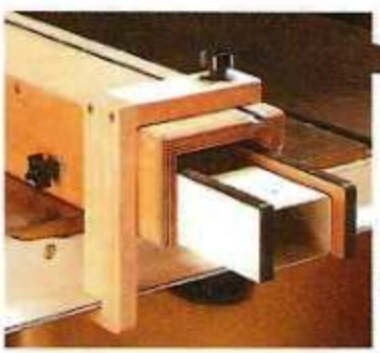
So what do you do with a T-square style rip fence that only locks at the front? A quick glance at the photos and drawings at right provides the answer — an L-shaped hold-down. But before getting to that, you'll need to address the fact that the auxiliary fence is also wider than before.

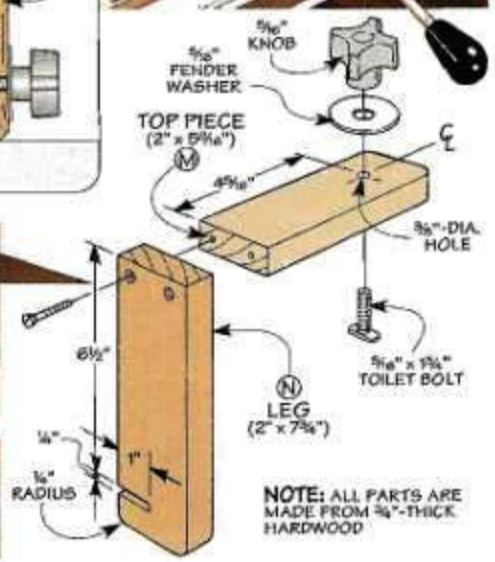
The nice thing about this is it doesn't make a lot of difference in building the auxiliary fence. All the parts are the same size as before, except for the *spacer (L)* which is wider. And don't forget when you cut the groove for the T-track, it's still the same distance in (7/8") from face of the auxiliary fence as before (see detail).

After assembling the auxiliary fence and mounting it with longer carriage bolts, you're ready to add the hold-down. Here again, it's an L-shaped assembly consisting of a *top piece (M)* and *leg (N)* that are glued and screwed together.

A small notch cut in the leg allows you to slip the hold-down over the back of the rip fence assembly like a hook (see inset). This holds the fence firmly against the table.







Sources

PRODUCT INFORMATION

▲ Veritas Bench Pup & Wonder Pup

Clamping a workpiece to the top of the Assembly Table (page 14) is a snap with the Lee Valley bench dogs shown above. We purchased the shorter versions called a *Bench Pup* (05G04.03) and *Wonder Pup* (05G10.02). You can also buy them as a set (05G10.03) that includes one of each. The nice thing is they're made from brass, so they're kind to the sharp edge of a tool if you slip and strike one. And they can be used in any bench top that has ¾"-dia. holes drilled in it.

• Lee Valley 800-871-8158

▲ Heavy-Duty Locking Swivel Casters

The locking swivel casters (31845) shown above were used on the Assembly Table (page 14) for a couple good reasons. First, when you lock them in place, they won't roll *or* swivel. So you can be sure the table will be rock-solid to work on. And second, the 5"-dia. wheels make it easy to roll the table around the shop without having to worry about hanging up on chips, debris, or that occasional power cord.

• Rockler 800-279-4441

Project Kits
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ShopNotes.com

Fence Hardware Kit ►

ShopNotes Project Supplies is offering a hardware kit for the Auxiliary Fence shown on page 26. This kit includes all the hardware necessary to build the fence and accessories except the T-track and the carriage bolts required to attach the auxiliary fence to your rip fence. You'll also need to supply the plywood, hardboard, and hardwood. Note: The T-track and a plastic featherboard (see margin at right) can be ordered separately.

36" T-Track (Each)
4502-076 ..... $13.95
Plastic Featherboard
4502-526 ..... $19.95
Hardware Kit
6860-100 ..... $12.95

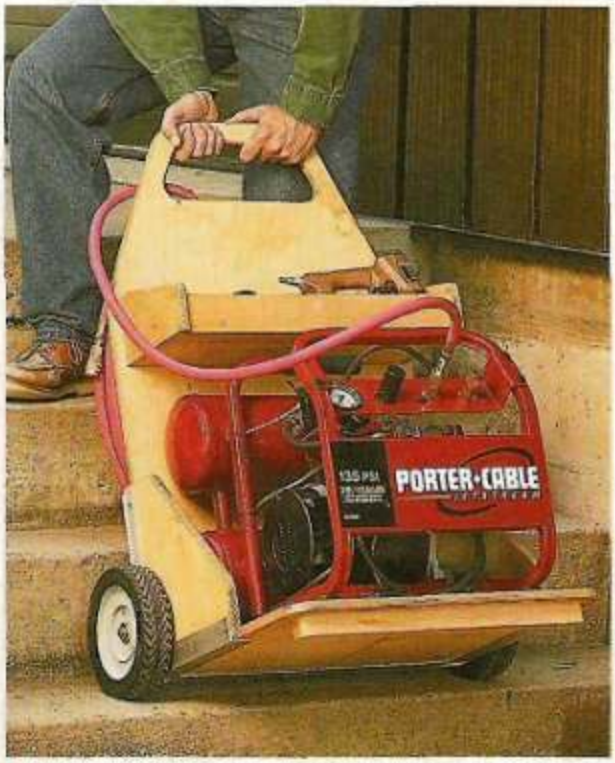
◄ Thrust Bearings

One piece of hardware used on the Assembly Table (page 14) that you probably won't find at the local hardware store is the thrust bearing set (TQ-050) shown at left. To make adjusting the height of the table smooth and easy, the handwheels rest on a thrust bearing sandwiched between a pair of hardened steel washers.

• Reid Tool Supply Co. 800-253-0421

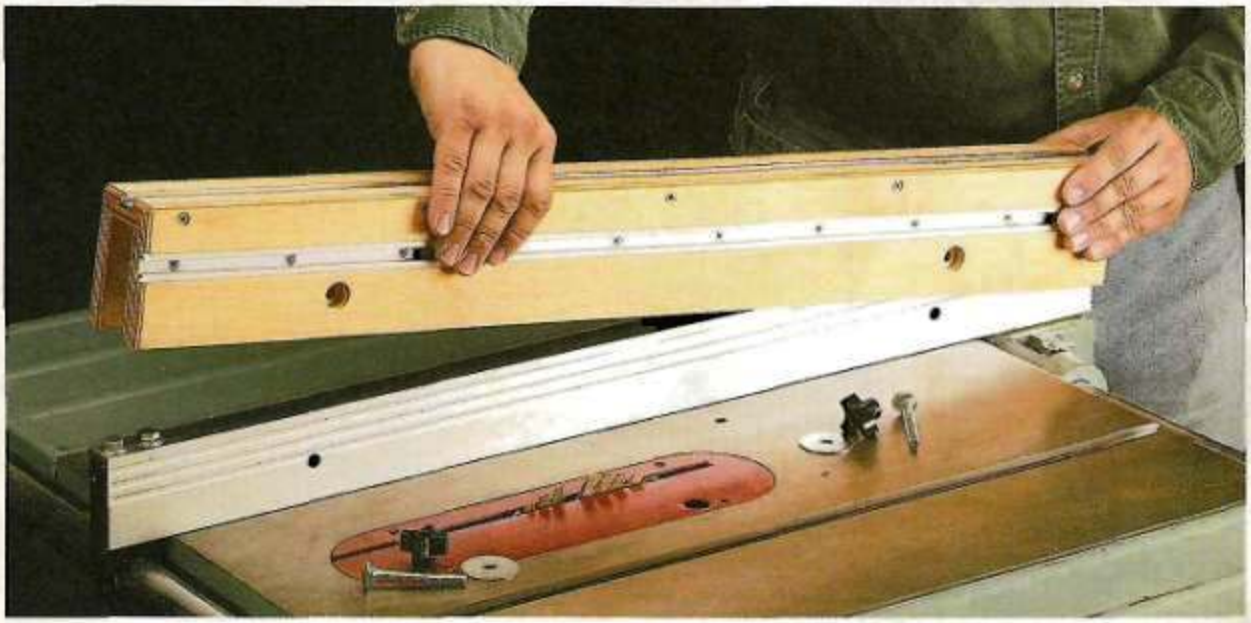
ShopNotes Project Supplies *is offering some of the hardware and supplies needed to build the projects in this issue.*
To place an order for some of the items shown on this page, call:
800-347-5105
(Key Code: SN 60)

Scenes from the Shop



▲ *Large-diameter wheels and built-in handle make it a cinch to lift this air compressor caddy over stairs or other obstacles. Plans begin on page 6.*

▲ *A unique height-adjusting mechanism allows you to lower the top of this assembly table to a convenient working height. See page 14 for step-by-step plans.*



▲ *This auxiliary fence slips right over your standard rip fence and bolts in place. But it's not the fence that makes this a project worth building. It's the five accessories that go along with it. They attach directly to the fence, making your table saw easier and safer to use. Plans for the fence and accessories are on page 26.*

ShopNotes Cutting Diagram

Adjustable-Height Assembly Table

Materials

Case

A Top (1)	19 1/2 x 40 1/2 - 3/4 MDF
B Bottom (1)	19 1/2 x 39 1/2 - 3/4 MDF
C Sides (2)	19 1/2 x 19 1/2 - 3/4 MDF
D Back (1)	17 1/4 x 39 - 3/4 MDF
E Front Trim (2)	3/4 x 2 - 40 1/2
F Back Trim (2)	3/4 x 3 1/2 - 40 1/2
G Side Leg Trim (4)	3/4 x 2 3/4 - 20
H Upr./Lwr. Side Trim (4)	3/4 x 3 1/2 - 15 1/2
I Front Support (2)	3/4 x 2 3/4 - 16
J Back Support (2)	3/4 x 2 3/4 - 13
K Front/Back Leg Trim (4)	3/4 x 3 1/2 - 20

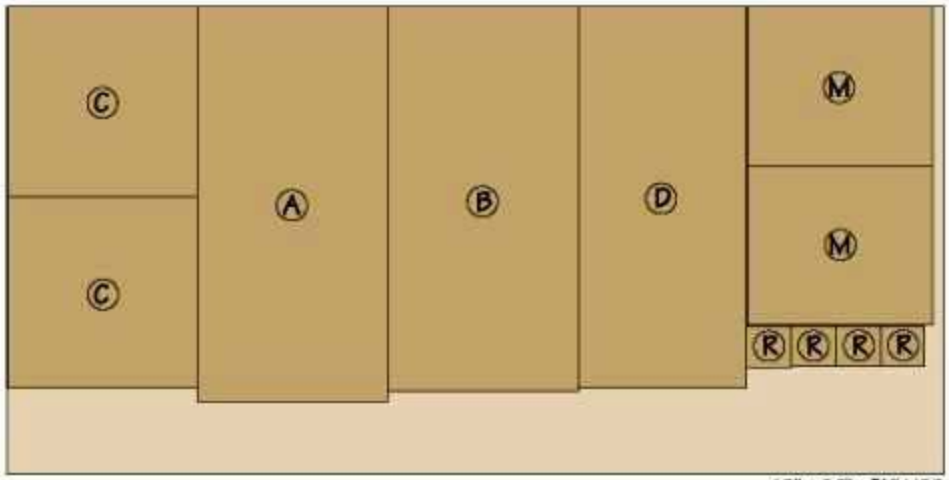
Caster Support & Doors

L Caster Support (2)	3/4 x 3 1/2 - 22 1/2
M Door Panels (2)	16 5/16 x 19 - 3/4 MDF
N Door Edging	3/4 x 1/2 - 14 Lnr. Ft.

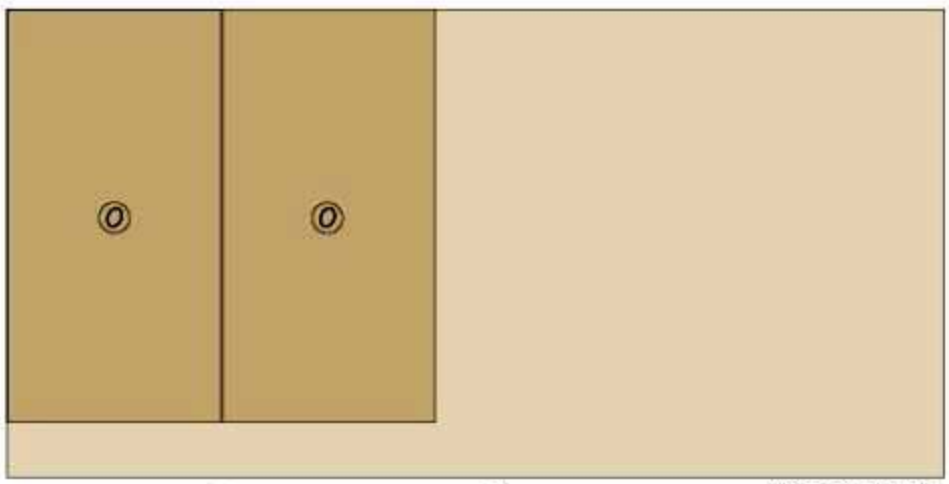
Top & Support System

O Top Panels (2)	22 x 42 1/2 - 3/4 MDF
P Top Edging	3/4 x 1 9/16 - 12 Lnr. Ft.
Q Support Blocks (4)	3/4 x 2 1/4 - 2 1/4
R Hand Wheels (4)	4 x 4 - 3/4 MDF

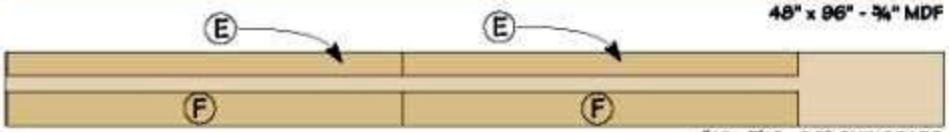
Note: You'll also need (1) 2' x 4' piece of plastic laminate for the top of the assembly table.



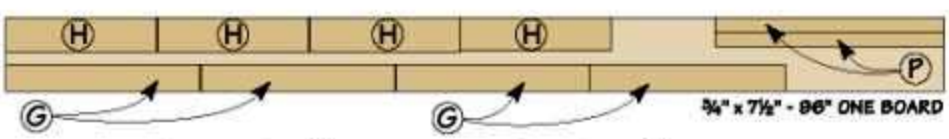
48" x 96" - ¾" MDF



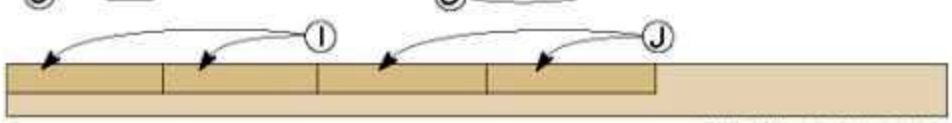
48" x 96" - ¾" MDF



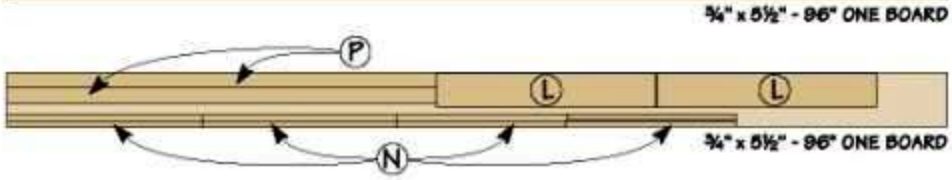
¾" x 7½" - 96" ONE BOARD



¾" x 7½" - 96" ONE BOARD



¾" x 5½" - 96" ONE BOARD



¾" x 5½" - 96" ONE BOARD

¾" x 5½" - 96" ONE BOARD

