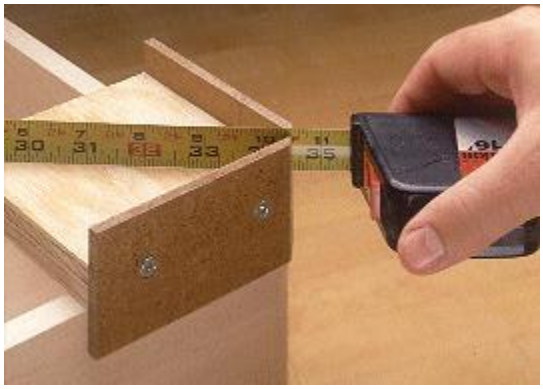
Checking Diagonals



Comparing the diagonals of a cabinet or a box is a great way to check it for square. But when you're working alone in the shop, measuing long diagonals accurately can be difficult. To make this job easier, I made a pair of simple tape holders.

Each holder is just a scrap of ¾″ thick plywood cut to 4½″ square. Two pieces of ¼″ Masonite 2″ × 4½″ are screwed to two edges of the plywood that make up a corner. Then, to hold the tape and allow for an accurate reading, the corner is mitered to form a slot that fits the blade.

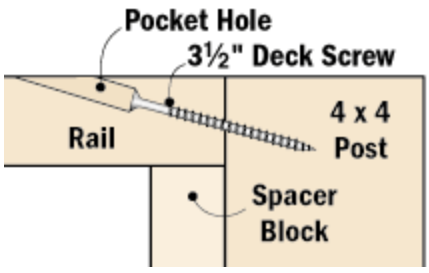
Assembly Blocks

Sometimes you almost need a third hand to assemble a project. Especially working with large pieces of plywood. To help me keep the pieces aligned, I use assembly blocks made from scrap.

I made these blocks from medium density fiberboard (MDF) with intersecting dadoes cut in the middle (pieces of plywood or solid wood would work as well). Just set the workpieces in the assembly blocks or place the blocks on top to hold the pieces in place until the clamps are installed.

Pocket holes in thick stock

Pocket hole joinery can be a quick, efficient way to pull your woodworking project together, especially if you don't have the time or need to cut tenons, dadoes, and rabbits. A simple pocket hole jig, as shown in the drawings below, makes the work even easier by guiding your drill bit exactly 15° — ideal for securing two pieces of stock at a right angle.

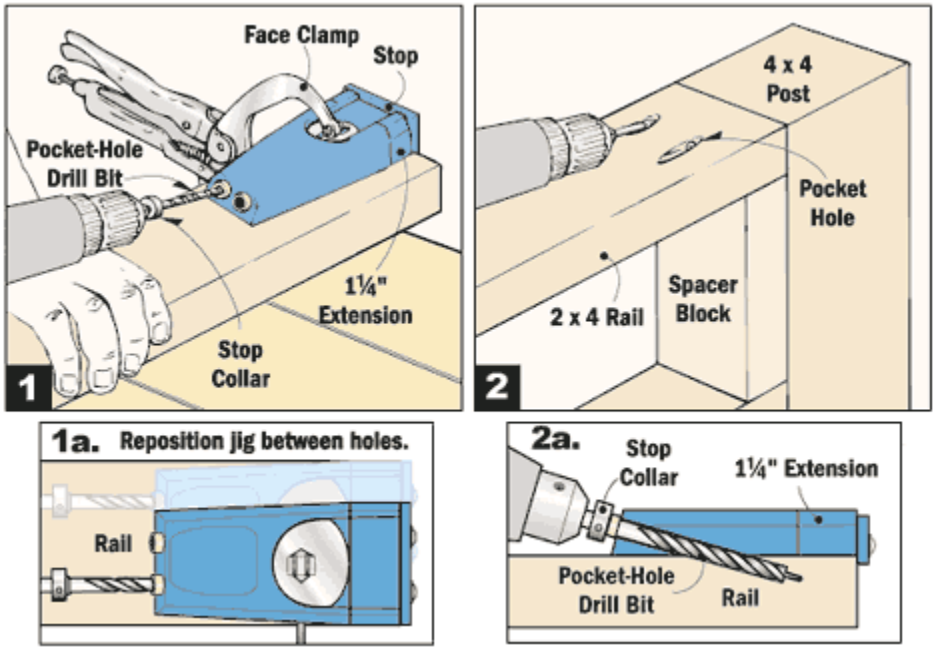


In our *Workbench* Rustic Retreat Deck project, we needed a quick way to secure 2×4 hand rails to the posts. Pocket hole joinery was the perfect solution. We used a pocket hole jig from the Kreg Tool Company to make sure all the deck screw holes were positioned exactly where we wanted them.

Setting up the jig was easy. We positioned it on the top surface of the rail where we wanted the screws to enter and used a face clamp to hold

it in place while we drilled (Fig. 1). Pull the jig snug against the end or your stock and the jig stop will position your holes in the same place on every board. If you're working with 2×4 rails like we were, use the extension stop (included with the jig) to make sure the screw will exit at the center of the board (Fig. 2a). The jig includes two drill holes, which provide some different hole spacing options when you align the jig against the left and right edges of your board (Fig. 1a).

Notice in Figure 2a. that we used a special bit (included with the jig) to create a deep counterbored pocket and shank hole for the screw. Note that the shank hole doesn't go through the end of the board, but enters just far enough to get the deck screw started in the right direction. We also used a spacer block to support the rail while driving the screws into the post (Fig. 2).



Installing Hinges

When installing hinges, you need to be ready to make a few adjustments. This can mean putting on and taking off the door a few times. And one thing to avoid is breaking one of the brass woodscrews. So I use a single steel woodscrew to hold each leaf during the fitting process, see top photo below.

And if the hinge mortise is too deep, use a thin piece of cardboard as a shim, see bottom photo below.

Steel Woodscrews

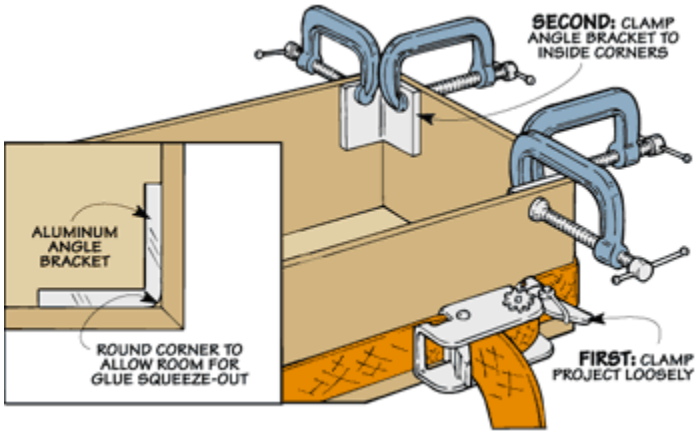
One frustration you want to avoid is breaking a brass woodscrew. So when fitting a door, use a steel woodscrew in the hinge leaf.

Cardboard Shim

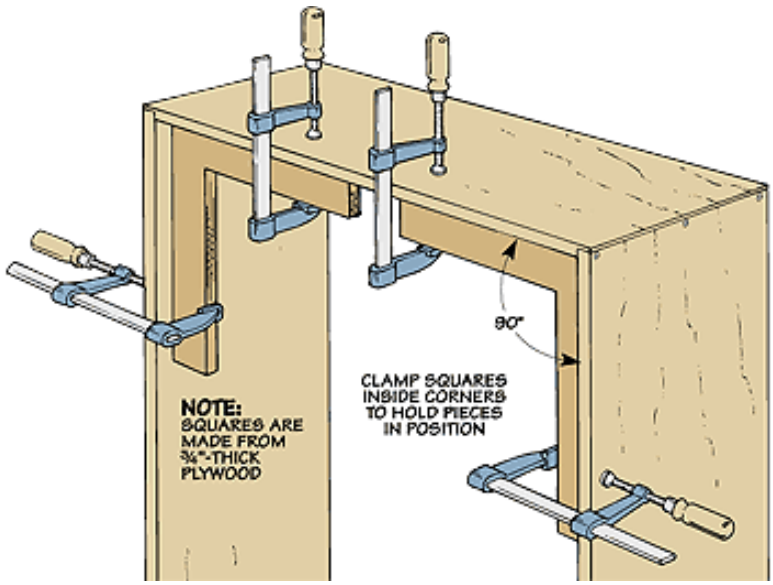
If the gap between the door and the case is too narrow, of if the gap tapers from top to bottom, try adding a thin cardboard shim under one or both hinge leaves.

Squaring a Mitered corner

For some projects, like the mitered box shown below, a band clamp is the easiest way to hold the project together while the glue dries. But there is one small problem. The mitered corners tend to slip out of alignment as the clamp is tightened. So in addition to the band clamp, I clamp short pieces of aluminum angle bracket to the inside of each corner to draw the miter together. As you can see in the detail, filing a slight roundover on the outside corner of the bracket provides room for glue squeeze-out.



Squaring large projects



The problem with assembling a large project is it's hard to keep it from racking after you add the glue and then try to screw it together. As shown in the drawing, I solved this problem by making several plywood "clamping squares" that resemble a framing square. When clamped in place, they square up the cabinet and hold the pieces in position.

CLAMPING

Extending your pipe clamps

Adding new sections of pipe to your existing pipe clamps is a low cost way to get yourself a set of longer pipe clamps without buying new clamps. You need to buy only various lengths of pipe with threaded ends and a few couplers. But no new clamp jaws.

Then assemble the length and number of clamps you need for a project from the pipe clamp parts.

Pipe Clamp Blocks

Tightening a pipe clamp can be a real knuckle buster when the pipe clamp sits on the workbench. So I made a couple ¾″-thick wood spacer blocks to raise the pipe clamps up and make it easy to turn the handle.

These clamp blocks have the added advantage of acting as clamps pads to protect the workpiece from the clamps.

TOOLS

Table Saw

Check Table Saw blade alignment

To get an accurate crosscut on the table saw, the blade has to be parallel with the saw's miter gauge slots. A quick way to check this is to use a combination square and a marker, see top photo.

If your blade isn't parallel to the miter gauge slots, the table saw trunnion needs to be adjusted. (The trunnion is the assembly that holds the saw's arbor to the underside of the saw table.) Normally, all you need to do is loosen the bolts that hold the trunnion and tap the trunnion in the direction needed.

Mark Tooth

To check that your blade is parallel with the miter gauge slot, first mark a tooth. Then place a square in the slot and adjust it so the end of the square just touches the side of the marked tooth.

Rotate Saw Blade

Next, slide the square and rotate the blade backward until the marked tooth aligns with the square. If the square just touches the side of the tooth, the slot and the blade are aligned.

Cutting Stopped DADOES on the Table Saw

Cutting stopped dadoes on the table saw is easy if you use this technique:

1. Cut the front edge off the panel (this is the part of the panel that you don't want the dadoes to go through).
2. Cut a dado or series of dadoes in the panel.
3. Glue the front edge back on the panel, creating the stopped dadoes, see photo.

Cutting wide boards on the Table Saw

Crosscutting wide boards on my table saw has always been a challenge. The pieces are awkward to handle, and it's hard to control my miter gauge when its head is off the table. I know some saws have a T-slot in the table and a miter gauge bar with a plate that catches in the slot. But mine isn't equipped this way.

That makes it difficult to hold everything and guide the board. I've had cuts come out crooked, and I got concerned that the blade might bind in the kerf, causing the board to kick back.

To make cutting wide boards easier, I turn my miter gauge around, so the miter gauge head is in front of my board, instead of behind. I hold the workpiece snug against the gauge with my left hand, and use my right to push the workpiece through.

On some boards, the miter gauge head may be off the saw table when you complete your cut, so make sure you keep a firm grip on the gauge.

Miter Gauge set up jig

I used to spend quite a bit of time adjusting my miter gauge and testing the setup. Now I have a simple jig that allows me to quickly and accurately set the miter gauge to both 90° and C, see photo.

To make the setup jig, all you need is a scrap piece of plywood. (Mine was 8" × 12".) The first thing to do with this piece is to rip both sides so they're parallel.

Next, cut one end of the jig at 90° and cut the other end at 45°. These cut must be accurate, so take your time. After all, if they're off, even slightly, then your miter gauge will always be off, and the jig won't be much help.

When the ends are cut, all that's left to do is to cut two grooves sized to hold the bar. of your miter gauge. (I made mine ½" deep.) Cut one groove on each face, offsetting them so as not to create a weak point in the jig. I cut two grooves so that you can set the jig to a 45° angle in either direction. To set the jig to 90°, simply use the square end.

Routers

Easy set up for routing chamfers

A block of wood with pre-cut chamfers makes it easy to set the height of the chamfer bit in your router.

Using this block as a chamfer gauge saves you the time and effort of making test cuts in scrap stock to check the height of the bit.

O-Ring stop

When changing bits, one thing you want to avoid is inserting the bit too far into the collet — the radius (fillet) at the point where the cutting head meets the shank may prevent the collet from gripping the shank tightly.

But it's hard to hold the bit and tighten the collet at the same time. So I slip a common rubber O-ring around the shank of the bit, see photo. It holds the bit at the correct height.

Router Retro Fit

On my router, I've always had a difficult time turning the thumb screw that's used to adjust the bit up or down, see top photo. As a matter of fact, I even had to use pliers for additional leverage (and ended up cracking the aluminum housing).

So recently, after coming across a push-button ratchet lever ($4) in a woodworking mail-order catalog, I decided to remove the thumb screw and replace it with the ratchet lever to make it easier for me to adjust the bit, see bottom photo.

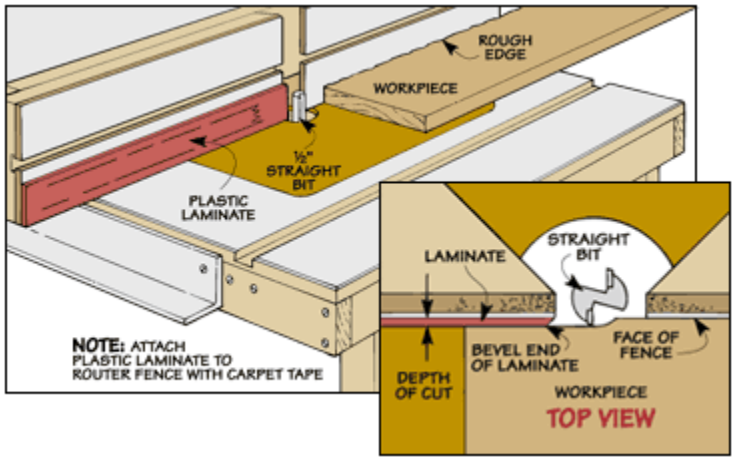
After the ratchet is adjusted, you can loosen and tighten the housing with a single throw of the lever.

Router Table Jointer

With just a strip of plastic laminate, you can convert a router table into an edge jointer. In fact, a "router-jointer" puts a surprisingly straight edge on a workpiece.

To turn a router table into an edge jointer, simply attach the laminate to the left (outfeed) side of the router fence with carpet tape. The idea is to align one end of the laminate with the opening in the fence, see detail. I also file a bevel on this end to reduce the chance of a workpiece catching on the laminate.

This is nothing more than a squared-up scrap block that rides against the fence as you push the workpiece past the bit. To prevent chipout, just be sure the block is at least as thick as the workpiece.



Straight Bit

All it takes to joint an edge is an ordinary straight bit. I prefer using a bit with a ½" shank. The thick shank helps reduce vibration and chatter. Note: One limitation with this setup is that the thickness of the workpiece can't exceed the length of the cutting edge on the bit.

Align Fence

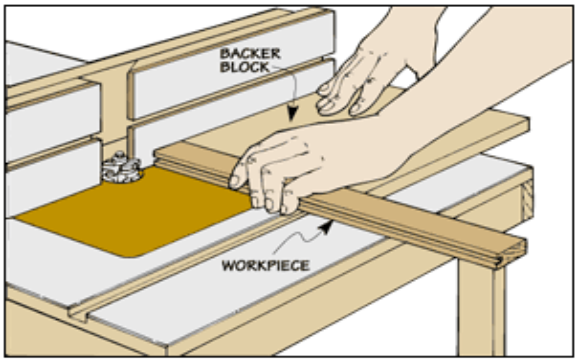
After mounting the bit in the router, the next step is to align the fence. The goal is to position the fence so the surface of the laminate is flush with the outermost cutting edge of the bit, see detail. This will produce a cut that equals the thickness of the laminate.

Joint Edge

After locking the fence, you can turn the router on and joint the edge of the workpiece. To do this, hold the workpiece firmly against the fence as you slide it past the bit, making as many passes as needed to produce a straight edge.

Routing end grain

There are many times when I want to rout the end of a narrow workpiece. The problem is the wood fibers on the back edge splinter as the bit exits the cut. Fortunately, all it takes to produce a crisp, clean cut is a simple backer block.



This is nothing more than a squared-up scrap block that rides against the fence as you push the workpiece past the bit. To prevent chipout, just be sure the block is at least as thick as the workpiece.

Routing Multiples

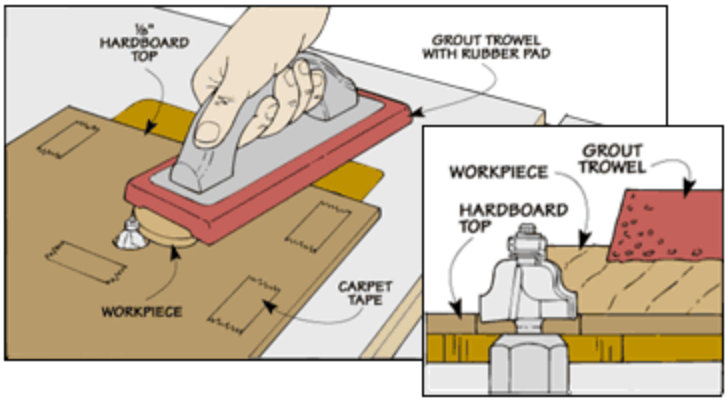
One of the simplest ways to duplicate curved parts is to use a template and a flush trim bit, see photo. It's quicker and more accurate than roughing out the shape on a band saw and sanding up to a layout line — especially when you're making multiples.

To start, make an exact template of the part (we use ¼"-thick Masonite). Then trace the template onto the workpiece and rough cut the shape to within 1/16" of the layout line. Once the part is roughed out, attache the template to the workpiece with double-sided carpet tape.

To rout the final shape, adjust the flush trim bit to the bearing rides against the template. Feed the workpiece into the bit is a right-to-left direction — on the left side of the bearing.

Routing small work pieces

When routing small pieces on a router table, how do you keep them from tipping into the hole in the insert plate?



One solution is to add an auxiliary top made of 1/8" hardboard. To provide clearance for the router bit, you'll need to drill a hole in the top. Note: Drill the hole slightly larger than the bit.

All it takes to attach the top to the router table is a few strips of carpet tape. With the top in place, raise the bit through the hole to the desired height and you're ready to start routing. The only problem is how to safely hold a small workpiece.

The best way I found to do this is to hold them with a rubber-bottom grout trowel. This way, I can control the cut without getting my fingers close to the bit. Note: Grout trowels are available at most hardware stores and home centers.

Spring-loaded hold down

We often use a router table for cutting joints such as rabbets and dadoes. One of the secrets to routing an accurate joint is to make sure the workpiece is pressed firmly against the router table top.

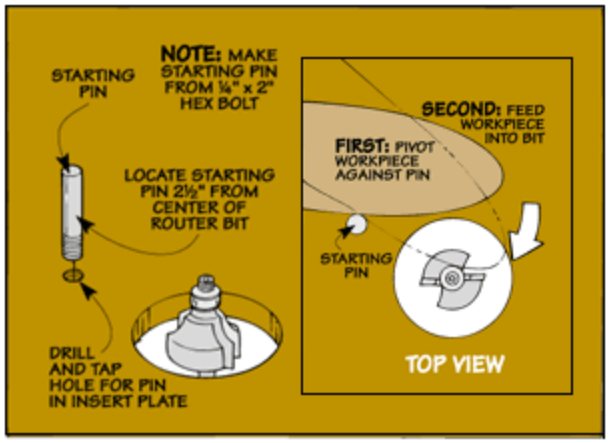
To apply constant downward pressure, we made a simple "spring-loaded" hold-down. It's nothing more than a piece of wood about 12" long and 6" wide with a 1/8"-thick strip of wood glued to one edge.

To build in some spring, however, remove two corners from the piece of wood before attaching the strip.

In use, the hold-down is clamped to the fence so enough downward pressure can be applied to the workpiece to keep it flat against the table top — without causing the workpiece to bind.

Using a starting pin

If you're using a piloted bit to rout an irregular-shaped workpiece, the beginning of a cut can be a bit tricky. That's because the bit has a tendency to grab the workpiece.

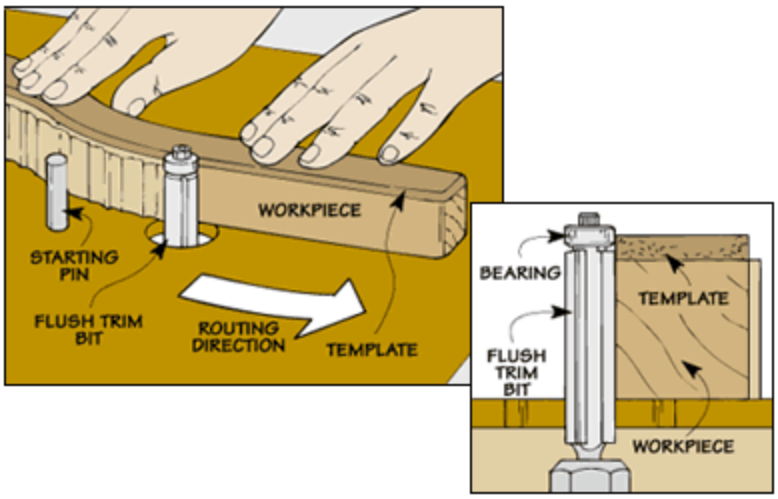


To reduce the chance of that happening, I use a starting pin. This is just a cutoff bolt that threads into a hole in the insert plate.

It's easy to use a starting pin. Simply pivot the workpiece against the pin as you feed it into the bit. The pin provides the leverage needed to make a controlled cut.

Using Templates

Few things in woodworking are as frustrating as trying to make several irregular-shaped pieces exactly the same. The solution is to use a template and a flush trim bit. The bearing on the bit rides against the edge of the template and trims the workpiece to the exact shape of the template.



Template

I use ¼" hardboard to make the template. It's an inexpensive, hard material that doesn't have any voids or knots, and you can shape it easily.

To make a template, start by laying out the shape you want on the hardboard. Or you can cut a full-size pattern out of paper and glue it to the hardboard. Then cut out the shape slightly oversize, and file (or sand) carefully up to the line.

Keep in mind that any notches or gouges on the edge of the template will show up later on the finished pieces, so it's important to take the time to work the edges smooth.

After the template is made, attach it to the workpiece with carpet tape. Then use a band saw (or sabre saw) to cut around the template so the workpiece is about 1/16" larger than the template.

Once the workpiece is cut to rough size, you can rout the last 1/16" of material with a flush trim bit on the router table, see drawing. With the template still taped to the top of the workpiece, raise the router bit up until the bearing rides on the edge of the template, see detail. Then rout in a clockwise direction around the bit.

One thing to keep in mind is the cutting edge of the bit. It should be slightly longer than the thickness of the workpiece. That way, the bit trims the entire thickness of the piece.

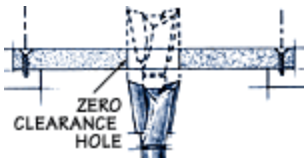
Zero Clearance Routing Table Insert

Question

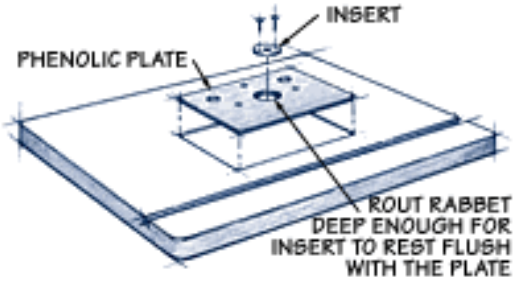
My router table plate has a hole that the bit sticks through. The trouble is, the hole is far too big when I'm using some of my smaller bits. And that seems unsafe. What can I do?

Greg Brenner
Huntington Beach, CA

Answer



Greg, you're right. This is an unsafe situation. Many pros make custom inserts for every router bit in their shop (see drawing at right). This is the best way to get the tightest possible fit.



Replace your current insert, or make a new one from scratch. Buy a piece of plastic or hardboard, no more than half the thickness of your phenolic plate. Rout a rabbet into the current hole in your plate. Trace the outline of your insert on the plate, then bandsaw the new insert to size, and screw it in.

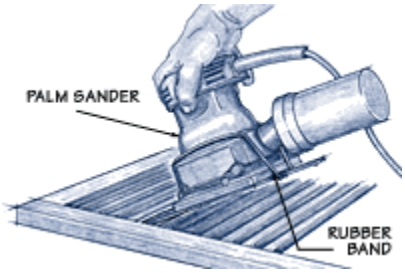
Once it's installed, you can slowly raise your router bit (while it's turned on) into the plastic to cut a hole the exact size you need. Bearing bits will require you to drill a properly sized hole first.

SANDING

Sanding Louvered Doors

Here's a solution to the time consuming task of sanding slats in louvered doors. All that's required is a simple device on your palm sander.

Take a wooden paint stir stick and cut it about 9" long, measuring from the handle end. Form indentations similar to those on the handle end 2" from the cut end. Cut strips of sandpaper the width of the stir stick and about 6" long. Then fold the sandpaper over one end of the stick, and secure it with duct tape.



Hold the stick against the pad of your palm sander. Next, place a size 84 rubber band (available at office supply stores) onto the handle indentation of the stick and pull the rubber band up and over the edges of your sander. Hook it onto the other end of the stick. When

you turn on your sander, the stir stick acts as a thin extension and fits perfectly between the louvered slats and into the corners, eliminating hours of tedious hand sanding.

A couple of hints: Keep several large (size 84) rubber bands handy, because they do break. And when the sandpaper wears out on one side of the stick, just flip the stick over to the new side.

LAYOUT

Layout tool

The idea for this layout tool came up as the *Woodsmith* shop foreman, Steve Curtis, was preparing to install a plywood back in a cabinet. The plans called for a large number of woodscrews to be placed evenly around the edge of the plywood. That was a lot of screws to lay out, so Steve decided to make the job easier.

To mark all the screw holes the same distance in from the edge of the plywood back, he mounted a ruler on a piece of scrap wood, see photo. This eliminated the need for a tape measure.

First, Steve cut the piece of scrap 3½″ wide and to match the length of his ruler (12″). Then he cut a shallow rabbet along one edge to hold the rule in position.

But Steve cut the width of the rabbet narrower than his rule. That way, it overhung the edge of the scrap. And the amount of overhang equaled the inset he wanted for the position of the screw holes.

After we saw Steve's clever lay-out tool, we though it could be made even more useful by cutting a rabbet on the other three edges of the tool, too, see photo. This way, the tool can be used to lay out screw holes that require different inset.

No-Mar Compass

With a scrap of Plexiglas carpet-taped to his work, Matt TeRonde of Madrid, Iowa keeps the point of a compass from marring the surface.

Transferring a pattern

To transfer a pattern to a workpiece (in this case a hold-down arm for a taper jig), we used a simple trick. All it required was a photocopy of the pattern and an ordinary household iron.

With the photocopy placed face down against the workpiece, slowly move the iron (set on high) back and forth, see top photo.

The heat from the iron reactivates the toner on the photocopy and transfers the image to the workpiece, see bottom photo.

Drilling

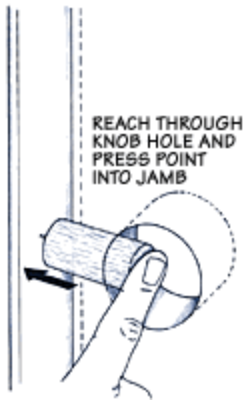
Drill Holster

Here's a handy way to store your electric drill — a "holster" that hangs on a pegboard rack.

The holster is a scrap of "two-by" material with two openings cut in it. The drill chuck fits in a large hole. And the power cord slips into a keyhole-shaped notch.

By installing two L-hooks in the back edge, you can hang the holster securely on the pegboard.

Drilling a door jamb



I recently purchased deadbolt locks for all my exterior doors. To be sure that they would work smoothly, I wanted a precision installation.

Each deadbolt lock came with a template to position it on the door, but no similar method for locating the strike plate on the jamb. I was worried about making a measurement error and positioning the hole and strike plate incorrectly. So I came up with a simple tool that perfectly aligns the hole in the jamb with the latch.

I centered a brad in one end of a short dowel the same diameter as the latch hole (1" in my case), then cut off the head, leaving a sharp point.

After drilling the holes in the doors, I put the dowel in the latch hole with the brad facing out. Then I closed the door tight,

reached in through the knob hole, and pushed the dowel against the jamb. The brad left an impression showing me exactly where to center the strike plate.

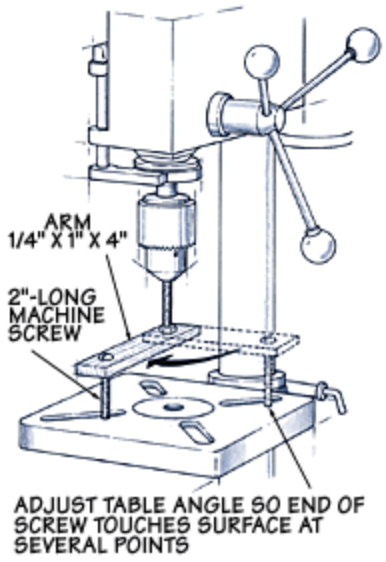
Handy Chuck Key

I'm always misplacing the chuck key to my drill press. So I fastened it to a retractable key chain that's attached to the column of the drill press, see photo.

The key chain is held in place with an ordinary hose clamp. And it's connected to the chuck key by means of a short dowel.

A hole drilled in one end of the dowel accepts the handle of the chuck key. (I used epoxy to hold it in place.) An eye hook is screwed into the opposite end of the dowel. Now the eye hook is simply slipped onto the ring at the end of the key chain.

Double Checking a Drill Press Table



I have a small bench top drill press with a table that tilts to accommodate drilling angled holes, which is very handy. Unfortunately, it doesn't have any stops or markings to let me know when I've got the table set back square to the spindle and bit.

I've seen techniques using a square to set the table perpendicular to the drill press column. But I figured it was more important that the table be perpendicular with a bit, so I made a simple jig I could insert in the chuck to set the table correctly.

The jig took me no more than five minutes to put together. It's just a narrow piece of ¼"-thick scrap wood that I cut about four inches long. I drilled a hole through the face near each end and pushed a 2"-long machine screw through each hole, pointing in opposite directions. Nuts hold the screws snug so they are roughly parallel.

To set the table, I tighten one of the screws in the chuck. Then I raise the drill press table until the screw sticking down from my jig just touches the table surface at one corner. I rotate the chuck by hand to four or five different positions, and adjust the table angle until the screw just barely touches the table at every point.

This process is easy, but I don't want to go through it every time I change the table angle. So once I had the table set, I drew a thin line with permanent marker where the table meets its mounting arm.

FINISHING

Ebonizing Wood

When I'm going to ebonize a project, I start with a dark-colored wood, such as walnut. You can ebonize any wood, but a darker wood gets black more quickly.

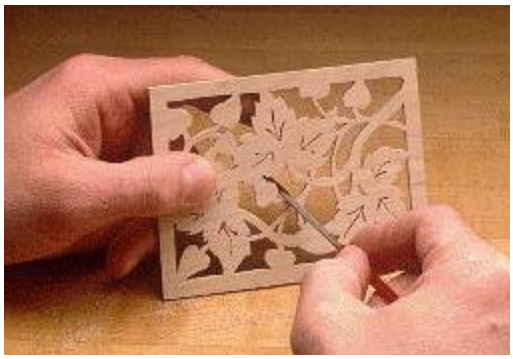
The process of ebonizing is as easy as applying a stain. I mix up a fairly concentrated black aniline dye. I like to use a water-based dye because it's the easiest to work with and the most lightfast. But because you are putting water on the wood, you need to raise the grain first. To do this, wet the surface of the wood, and then when it's dry, lightly sand off the raised "whiskers".

To dye the wood, I mix three teaspoons of dye in a quart of hot water. Then I brush a heavy coat on the wood and let it set. Since the idea is to get the wood as dark as possible, I don't bother to wipe off the excess. In fact, you may want to apply a couple more coats. When it's dry, simply apply a finish.

Finishing Dowels

To provide better coverage when applying stain to a dowel, *R. B. Himes of Vienna, Ohio* cuts a V-shaped notch in a foam brush.

Finishing Fretwork



Here are a couple of tricks you can use to put the finishing touches on fretwork panels.

Tiny ridges, kerfs, and burns marks are common problems. Traditionally, small files (rifflers) are used for getting into the fretwork openings. But we found that a inexpensive modern diamond file works just as well, in some instances better, see photo at left. It has a round side and a flat side for both curved and flat edges.

As for applying a finish, we get into the tiny openings by dipping the panel in an oil finish, see photo at right. When dipping a fretwork panel, aluminum foil shaped into a tray acts as a reservoir for the oil finish. To remove the excess finish, you can blot the panel dry with a cloth or blow it out with compressed air.

Plugging Mortises Temporarily

Recently I was working on a project that had a series of slats that fit in mortises. Because of the way the project was designed, it was easier to apply the finish before assembling all the pieces. The trick was keeping the finish out of the mortises — I wanted good glue joints later on.

To do this, I plugged each mortise temporarily with foam caulking rod, see photo. The caulking rod I used was slightly wider than the mortises. After the finish dried, I just removed the foam rod.

A twenty foot length of 3/8"-diameter caulking rod purchased from my local hardware store cost $2.50.

Shop made foam brushes

I use foam brushes to touch up small areas. But it seems that I never have any when I need them.

So I make "instant" foam brushes by sticking pieces of self-adhesive foam weatherstripping on sticks made from scrap pieces of wood. For larger brushes, wrap the weatherstripping around the end of the wooden stick.

Staining End Grain

When applying liquid stains, the stain soaks more deeply into the pores of the end grain than the face grain, darkening the ends much more than the faces, see top photo.

One way to even out the stain color is to sand the end grain with a higher-grit sandpaper than the face grain.

In the bottom photo, the face is sanded with 220-grit and the end grain with 600-grit, resulting is a much better color match.

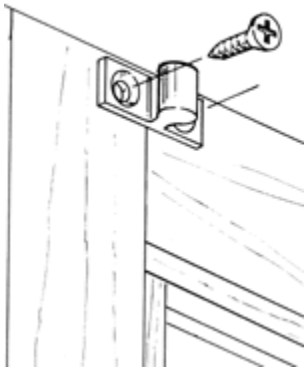
General Shop Tips

Air Gun Plugs

Dust and dirt can cause the seals of air-powered tools to wear out too quickly. To protect my brad and nail guns from sawdust and debris when they're not being used, I simply plug the air inlet holes with golf tees.

Ball Catch Installation

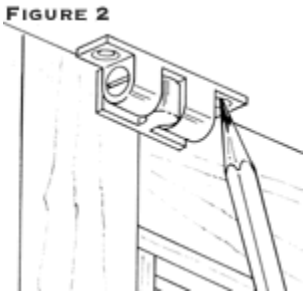
FIGURE 1



Typically, when installing ball catches, I mount the "strike" part of the catch to the inside of the door first, see Fig. 1. (Make sure the strike is just below the top of the cabinet.)

Next, I put the ball catch on the strike and closed the door, see Fig. 2. This way, I can reach inside the cabinet and mark the pilot holes for the ball catch in exactly the right position.

FIGURE 2



Cam Action Levers

A cam-action knock-down fastener needs to fit tightly in its hole to create a good, tight joint. And the depth of the hole is critical, too. But once the plastic cam is tapped into the hole, its tough to get it out again to adjust the depth of the hole without damaging the fastener.

To ensure that the depth is perfect the first time, I set my drill press depth by drilling a hole in the *edge* of a test piece. Of course, the test piece must be exactly the same thickness as the workpiece.