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Shop-built Disc Sander

In this plan you will be getting:

- Step by Step construction instruction.
- A complete bill of materials.
- Exploded view and elevation drawings.
- How-to photos with instructive captions.
- Tips to help you complete the project and become a better woodworker.



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Shop-built Disc Sander

A dedicated disc sander is a useful addition to any shop, but it's another tool expense that often falls down the list of "must haves" until it never gets purchased. What you may not know is that an ordinary bench grinder is easy to convert into a disc sander by simply replacing a grinding wheel with a plywood disk and a spacer (see page 46). Once you've made that switch, your new "sander" will need a sturdy platform and sanding table — the genesis for this project. If you're the resourceful sort or feed your wood-working hobby from a lean budget, this Shop-built Disc Sander should have instant curb appeal!

If you decide to build this project, use a grinder that revolves at 1,725 RPM to avoid burning your wood. The slow-speed variety used for sharpening turning tools is ideal.

Making the Base Cabinet

Get started on the cabinet by cutting the bottom, shelf, top, sides, front and back (pieces 1 through 7) from a sheet of oak veneered plywood. And while you're at the table saw, make the storage bin shelves (pieces 8) from 1/4" plywood.

While most of the milling on this project takes place on the edges of the stock, there is a little routing required. Chuck a 3/4"

straight bit in your router and clamp a straightedge in place to plow the dado in the cabinet back for the cabinet shelf. Its location is shown in the Elevation Drawings on page 45. Switch to a 1/4" bit and mill the dados for the storage bin shelves on the inside faces of the upper sides.

All the panels are trimmed to some degree with 1/4"-thick solid walnut (piece 9), and some of this trim must be attached before you start milling grooves. See the technique shown on the next page to attach trim to the back edge of the cabinet top, the front edge of the shelf and both the front and back edges of the cabinet bottom.

When the glue is dry, mount a 3/8" dado head in your table saw and mill the appropriate dados, grooves and rabbets, as shown in the *drawings*. The grooves will be captured by the hardwood edging. As you assemble the cabinet, the method behind this construction technique will become clear.

Assembling the Base

Glue and clamp walnut trim (ripped to 1/4" thickness) along the remaining plywood edges of the cabinet pieces, as shown in the Exploded View on page 45. Note that the trim stops short of the rabbets on the front, back and shelf. Dry-fit and temporarily clamp the front, back, bottom and shelf together. Double-check the size and fit of the lower side and upper sides. The sides are installed with biscuits, so you can mark their locations and cut their slots now. Glue up and clamp the cabinet, dropping the lower side (and its biscuits) in place as you do.

Next, install the upper sides and the top with glue, clamps and biscuits, capturing the storage bin shelves. Check that everything is square as you tighten the clamps.

Converting the Grinder

Here's how to convert your grinder to a sander: We decided to retrofit ours with a 12" disc to match the standard size stick-on discs available through catalogs and home

Carcass Exploded View

MATERIAL LIST—CARCASS

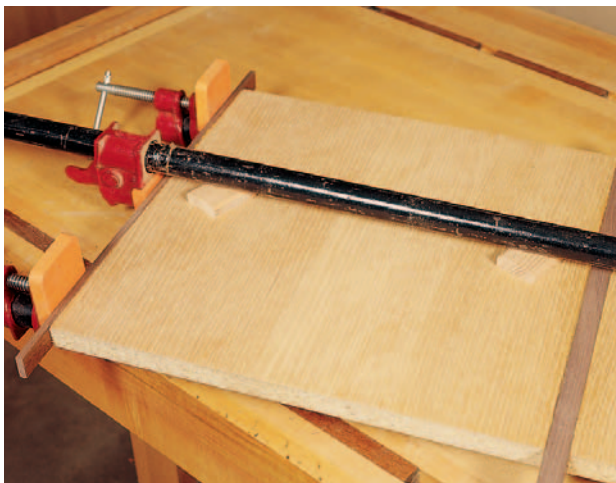
		T x W x L
1	Cabinet Bottom (1)	$\frac{3}{4}$ " x 16" x 15 $\frac{1}{2}$ "
2	Cabinet Front (1)	$\frac{3}{4}$ " x 16" x 16 $\frac{1}{2}$ "
3	Cabinet Shelf (1)	$\frac{3}{4}$ " x 16" x 15 $\frac{3}{8}$ "
4	Cabinet Lower Side (1)	$\frac{3}{4}$ " x 16 $\frac{1}{8}$ " x 14 $\frac{1}{2}$ "
5	Cabinet Upper Sides (2)	$\frac{3}{4}$ " x 12 $\frac{1}{4}$ " x 12 $\frac{1}{2}$ "
6	Cabinet Top (1)	$\frac{3}{4}$ " x 16" x 12 $\frac{3}{4}$ "
7	Cabinet Back (1)	$\frac{3}{4}$ " x 16" x 29 $\frac{3}{4}$ "
8	Storage Bin Shelves (2)	$\frac{1}{4}$ " x 15 $\frac{3}{4}$ " x 11 $\frac{7}{8}$ "
9	Walnut Trim (1)	$\frac{1}{4}$ " x $\frac{3}{4}$ " x 400"
10	Disc (1)	$\frac{3}{4}$ " x 12"
11	Disc Laminate (1)	$\frac{1}{32}$ " x 13" x 13"
12	Disc Spacer (1)	Cut to fit
13	Grinder Sub-base (1)	Cut to fit
14	Table (1)	1 $\frac{1}{2}$ " x 12" x 18"
15	Walnut Table Edging (1)	$\frac{1}{2}$ " x 1 $\frac{1}{2}$ " x 43"
16	Table Laminate (1)	$\frac{1}{32}$ " x 13" x 19"
17	Miter Gauge Channel (1)	Aluminum, trim to length
18	Table Mounting Blocks (2)	1 $\frac{1}{2}$ " x 5" x 12"
19	Block Bolts & Nuts (4 Sets)	$\frac{5}{16}$ " x 4"
20	Table Hinges (1 Pair)	1 $\frac{1}{2}$ " Brass
21	Table Support (1)	Brass lid support
22	Cabinet Casters (2)	3" Dia.
23	Cabinet Feet (2)	1 $\frac{1}{2}$ " x 3" x 3 $\frac{1}{2}$ "
24	Cabinet Handle (1)	1 $\frac{1}{4}$ " Dia. x 14 $\frac{1}{2}$ "
25	Cabinet Handle Brackets (2)	1 $\frac{1}{2}$ " x 3" x 3 $\frac{1}{2}$ "



Start by gluing and clamping a strip of solid hardwood between two pieces of plywood. With this approach, the clamping pressure is even and strong across the entire joint.

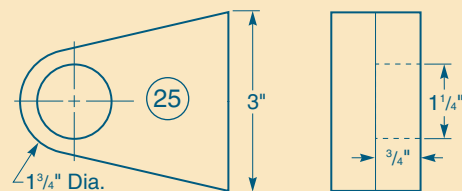


Rip the assembled pieces down the middle, leaving two securely attached strips of hardwood in place. The strip is machined to be a bit thicker than the plywood.

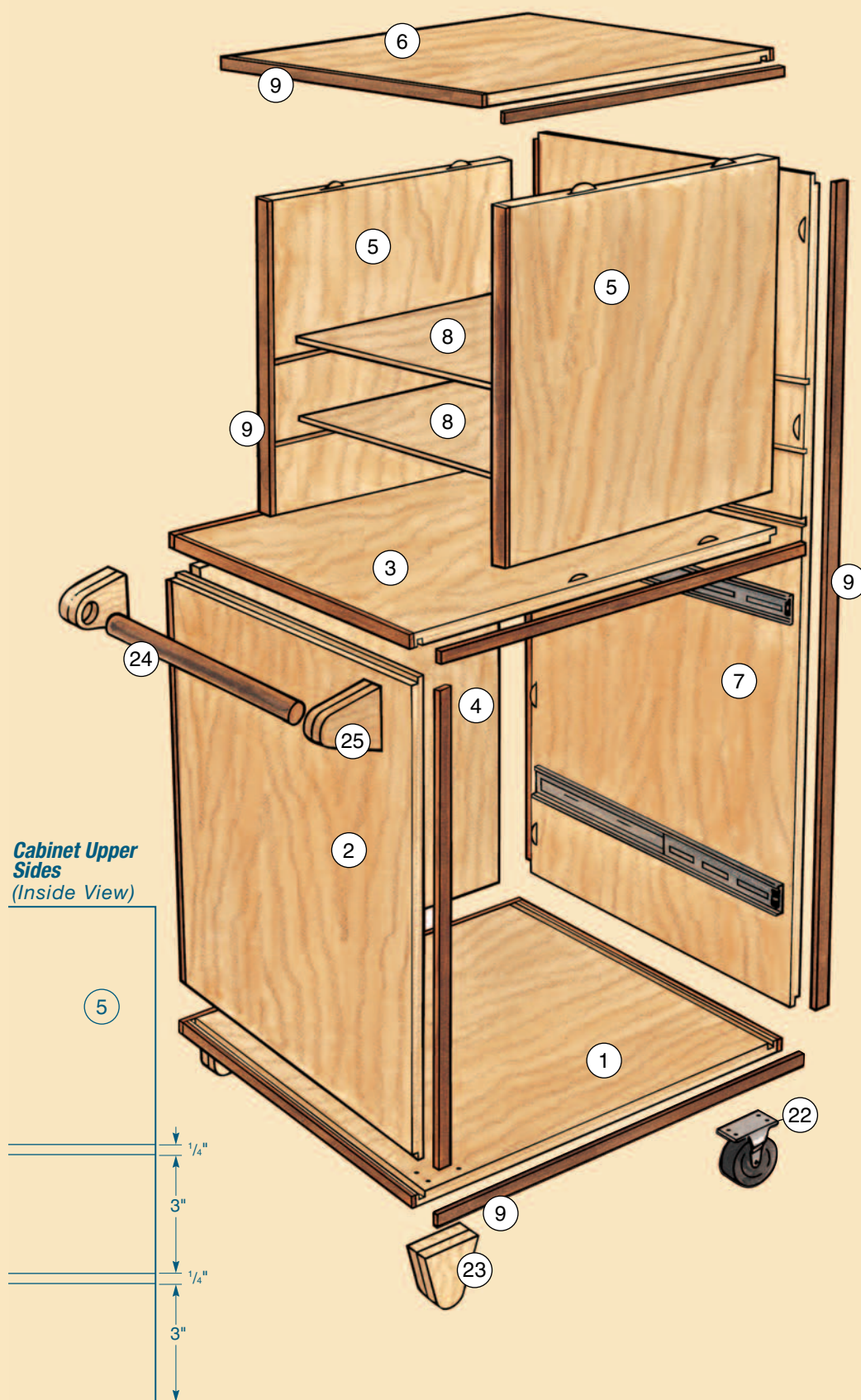


Now simply spin the plywood panels around and repeat the process. Whenever your trim is likely to get abuse, this method of glue-up provides a slightly stronger bond.

The handle brackets and cabinet feet are shaped exactly the same. The brackets for the feet have no borings for a handle.

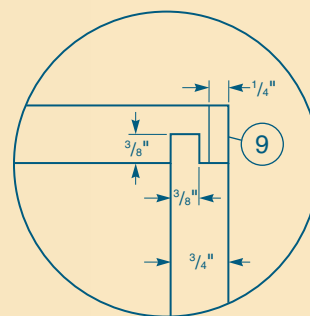


Handle Brackets
(Inside and End Views)

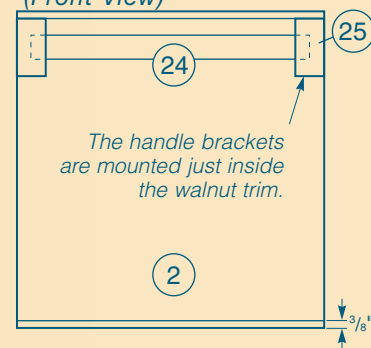


Cabinet Upper Sides
(Inside View)

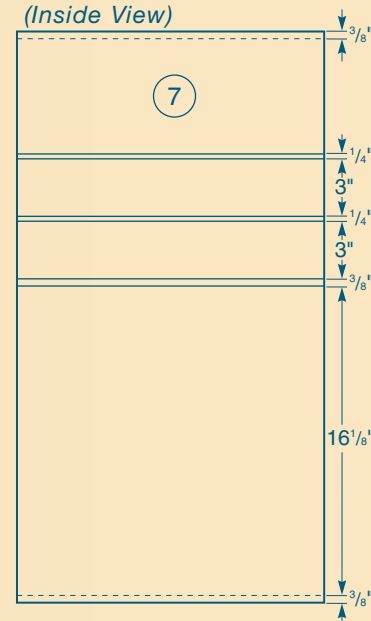
Typical Carcass Joint Detail



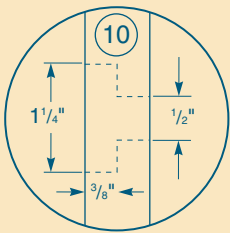
Cabinet Front
(Front View)



Cabinet Back
(Inside View)



Disc & Table Exploded View



**Disc Arbor
Boring
(Side View)**

Locate the miter gauge groove to fit your specific miter gauge.

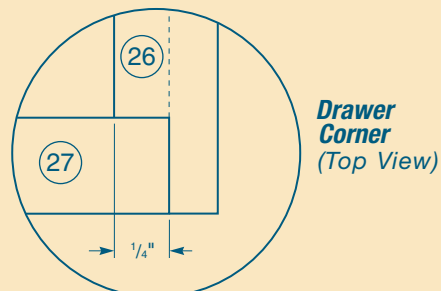
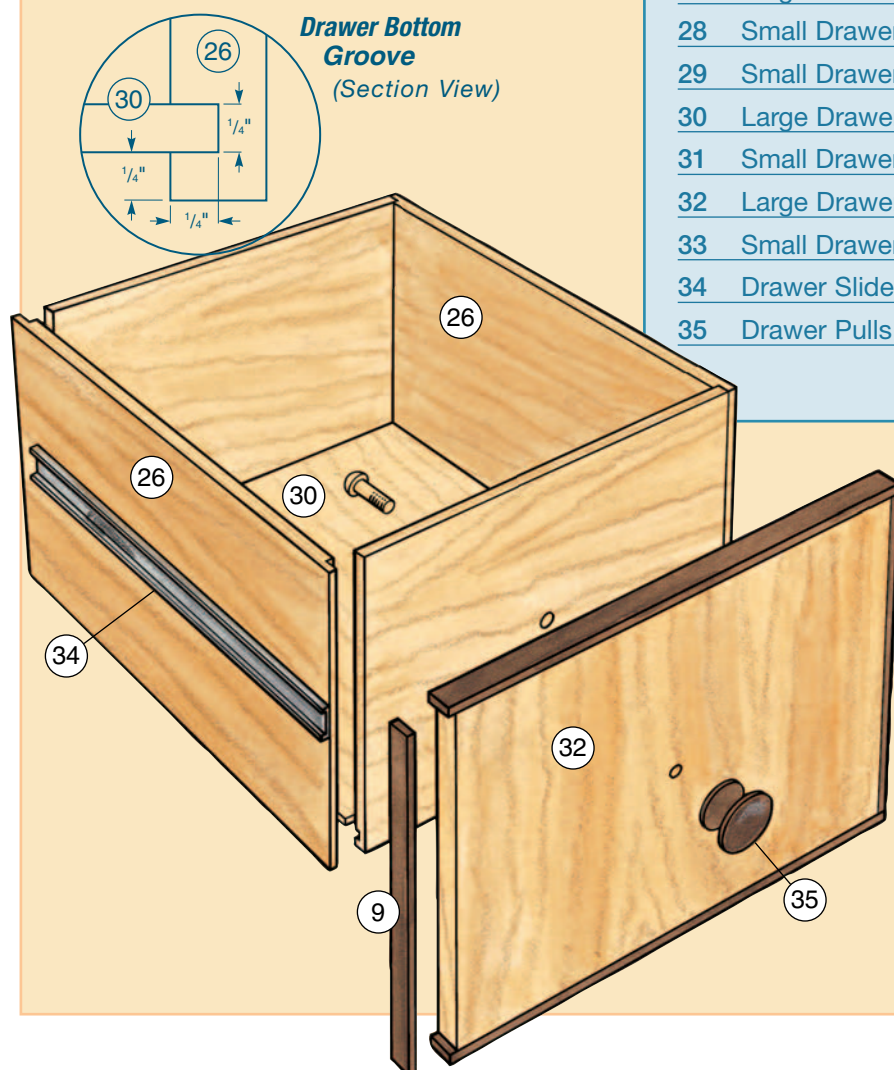
Table and Mounting Block Assembly (Side View)

Attach the lid support bracket to the mounting block, which is positioned just inside the walnut trim.

Drawer Exploded View

MATERIAL LIST—DRAWERS

		T x W x L
26	Large Drawer Sides (2)	$\frac{1}{2}$ " x $8\frac{3}{4}$ " x 14"
27	Large Drawer Front & Back (2)	$\frac{1}{2}$ " x $8\frac{3}{4}$ " x 13"
28	Small Drawer Sides (2)	$\frac{1}{2}$ " x $5\frac{1}{2}$ " x 14"
29	Small Drawer Front & Back (2)	$\frac{1}{2}$ " x $5\frac{1}{2}$ " x 13"
30	Large Drawer Bottom (1)	$\frac{1}{4}$ " x $13\frac{1}{2}$ " x 13"
31	Small Drawer Bottom (1)	$\frac{1}{4}$ " x $13\frac{1}{2}$ " x 13"
32	Large Drawer Face (1)	$\frac{3}{4}$ " x 9" x 14"
33	Small Drawer Face (1)	$\frac{3}{4}$ " x $5\frac{5}{8}$ " x 14"
34	Drawer Slides (2 Pairs)	14" Full-extension
35	Drawer Pulls (2)	Walnut



improvement centers. Use plywood for making the disc (piece 10). MDF and particleboard are not structurally stable enough for this application. Start with a plywood blank, and drill a step-down center hole to match the diameter of your grinder's arbor as well as the nut and washer, then cut the disc to size on the band saw. Stay just outside your layout lines and finish to the center of the pencil line with a belt sander.

Apply plastic laminate (piece 11) to the sandpaper side of the disc, using a good-quality contact adhesive, then trim it to size

with a bearing-guided flush-trim bit in a router. Break the sharp edges of the disc with sandpaper, and don't forget to remove the laminate over the center hole.

The cylindrical hardwood spacer (piece 12) provides support for the disc, but it also takes up space on the arbor so the threads are set in from the sanding disc face. Band-saw the spacer after boring the arbor hole on the drill press (to ensure that it is exactly 90° to the disc face). Slide the spacer and disc onto the arbor and lock them in place with the nut and a washer. Then stick on an

80-grit disc and mount the grinder on the cabinet. Depending on the model, you may have to install a sub-base (piece 13) under your grinder to achieve 1/4" of clearance between the bottom of the disc and the top of the cabinet. Alter the thickness of this piece as required by your machine.

Building an Adjustable Table

The tabletop (piece 14) is comprised of three thicknesses of 1/2" plywood, face-glued together. The hinged edge is chamfered on the table saw at 45°, and the other



Storage is always useful in the shop, and the two drawers in this cabinet will hold plenty of supplies.



By adding a miter gauge slot, this shop-built disc sander can help create compound angles.



This heavy-duty lid support allows for accurate and infinite angle adjustments. Drop the table down for storage.

three edges are then laminated with 1/2"-thick walnut table edging (piece 15), mitered at the corners. After sanding, apply plastic laminate (piece 16) to the top surface, then use a straight bit in your router table to plow the groove for the aluminum miter gauge channel (piece 17). Locate this groove so the edge of your miter gauge (use the one from your table saw) is about 1/4" away from the disc when it's set at 60°, then screw the channel in place.

Glue up two thicknesses of 1x stock to form blanks for the two mounting blocks (pieces 18), and band-saw them to the shape shown in the *drawings*. Sand the blocks smooth, then secure each to the cabinet with a pair of predrilled, counterbored bolts (pieces 19), washers and nuts. Attach the table to the mounts with a pair of brass hinges (pieces 20), making sure the screws are not so long that they penetrate the tabletop.

You can adjust and set the angle of the table with a heavy-duty brass lid support (piece 21). This is surface-mounted by means of predrilled screws at the locations shown on the *drawings*.

Mobilizing the Cabinet

To make the disc sanding center mobile, add two locking casters (pieces 22), a pair of feet (pieces 23) and a handle (piece 24). The feet and the handle brackets (pieces 25) are identical, except that the brackets feature a shallow bore to accommodate the walnut handle (see the *drawings*). All four parts are secured with predrilled screws driven home from inside the drawer cavity. The casters are simply screwed to the bottom of the cabinet.

Building the Drawers

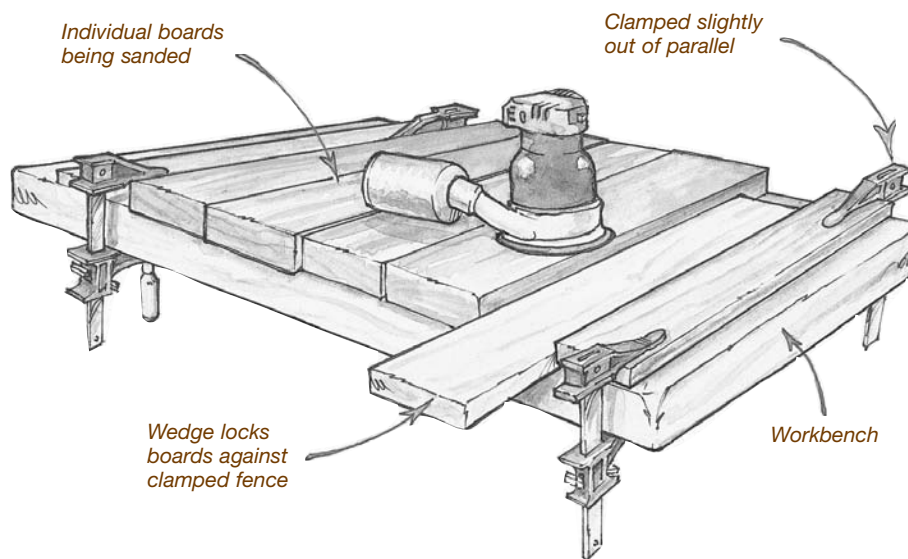
Choose high-quality, 1/2" plywood for the drawer sides, fronts and backs (pieces 26 through 29). Baltic birch is an excellent choice. After cutting these parts to size, install a 1/2" dado head in the table saw and plow two rabbets on the inside face of each drawer side (see the *drawings*). Switch to a 1/4" dado head to mill a groove in each drawer side, front and back for the drawer bottoms (pieces 30 and 31). Assemble the drawers with glue and clamps.

Both drawers fit in the same opening, so it's a good idea to install them before sizing the drawer faces (pieces 32 and 33). Use full-extension slides (pieces 34), following the manufacturer's instructions. Mount the slides after placing the drawers in the opening.

Cut the drawer faces from 3/4" plywood, with the grain running vertically. Wrap the edges with walnut trim. Test-fit the drawer faces using double-faced tape (allow 1/8" between the two drawers). Permanently mount the drawer faces with glue and screws, then drill a hole dead-center in each and install the hardwood pulls (pieces 35).

After sanding the entire project down to 180 grit, spray or brush on three coats of satin finish. Now you have an extremely useful addition to your woodworking tool arsenal. Better yet, half the grinder still remains for touching up those chisels or the mower blade!





Sanding Jig for Multiple Boards

When you need to sand several boards of the same size, clamp two fences to your bench, leaving one at a very slight angle to the other. Then load up the boards you need to sand and wedge them in place between the fences with a piece of scrap. It makes for quick and easy board changes, which is great on big jobs. Just make sure the fences and wedge are thinner than the boards being sanded so they don't get in the way along the edges of the outermost boards you're sanding.

Keep It Grounded

As dust flies through your collector hoses, it builds up static electricity on the walls of the hose. This can also occur if you use rigid plastic pipe for dust collection ductwork. To prevent sparks (and even explosions), ground metal hoses by attaching a piece of plastic-covered copper wire to the hose and a cold water pipe (or similar ground). Run bare wire through plastic hoses and ground one end of this in the same fashion.

One Person's Trash...

Anyone who owns farm animals or small pets like gerbils and hamsters would be delighted to get your sawdust for bedding. Just be sure you let them know what species

you've been milling, and have them call their vet to make sure the particular wood type won't harm the animals. For example, horses have been known to get colic when exposed to some species like walnut.

Making Perfectly Round Wheels

If you need a pair of wheels (or maybe even four), scribe circles on your stock and cut the wheels out on the band saw, staying just outside the lines. Drill a 1/4" hole at the center of each wheel, then slide the wheels onto a 1/4" threaded rod and tighten with nuts. Chuck the rod into your portable drill, clamp a wooden guide block onto the table of your disc sander and, with the drill in reverse, sand the wheels to their final size.

