WOODWORKER'S JOURNAL downloadable plans:
"America's leading woodworking authority"™

Woodworker's Magnetic Drill Press Vise

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.

Get Adobe Reader To download these plans, you will need **Adobe Reader** installed on your computer. If you want to get a free copy, you can get it at: **Adobe Reader**.

Having trouble downloading the plans?

- If you're using Microsoft Internet Explorer, right click on the download link and select "Save Target As" to download to your local drive.
- If you're using Netscape, right click on the download link and select "Save Link As" to download to your local drive.

$7.95

WJ068

Published in Woodworker's Journal "The Home Woodworker: Classic Projects for Your Shop and Home"

Use a single liner or both at once to effectively grip and secure a wide variety of moldings or other shaped pieces. Even difficult end grain drilling is made easy with this vise fixture.

Woodworker's Magnetic Drill Press Vise

Every now and then it's necessary to clamp odd-shaped or small parts to a drill press table to drill them safely and accurately. If your only option is a metalworking vise, you've probably discovered that the jaws aren't really shaped correctly for woodworking. It's virtually impossible to clamp a wooden dowel or molding securely between them without doing damage to the wood. No one likes to sacrifice a carefully made part! If you cringe each time you tighten the screw, we've got a more gentle option here. Build this wood-jawed vise and put your other one out to pasture.

If you're still using a metalworking vise to hold (and crush!) delicate wood parts, this drill press vise fixture is a gentler solution for woodworking.

Every vise is built around a screw or spindle mechanism. If only one jaw moves, this is a single threaded spindle, and it's the common configuration for metalworking vises. In designing this project, we wanted a vise with both jaws controlled from a single handle, eventually meeting in the center of the fixture. Two moving wooden jaws would make the vise easier to operate as well as provide a more forgiving clamping surface.

Starting with the Jaws

We built this vise out of oak because it's easy to work with and plenty strong. To take maximum advantage of that strength, face-glue and screw eight pieces of stock together to create the laminated jaws (pieces 1). Predrill for the twelve screws (pieces 2: see *Elevation Drawings* on page 38 for locations) and counterbore the screw holes for walnut plugs (pieces 3). The screws add extra strength to the finished jaws and work as clamps during the glue-up process.

After the glue dries, use the *Face and End Views Drawing* and *Figure 1* on page 38 to locate and drill holes for the ring magnets (pieces 4) in the front face of each jaw. This is easier to do while the jaws are still rectangular. We used 3/4"-diameter magnets, but you should have yours in hand before drilling any holes to drill accurately. You want the magnets to drop into their shallow bores with a snug friction fit. Use a Forstner bit on the drill press to bore these holes cleanly.

Now cut each jaw to shape on your band saw (see *Figure 2* and the *Jaw and Drive Block Subassembly Drawing*). Glue and plug the screw bores and, after the glue dries, trim the plugs flush with a sharp chisel. Then sand the jaws and set them aside.

Building Removable Liners

Not everything a woodworker needs to clamp is nice and square, and the removable jaw liners on this vise are designed to handle a diverse assortment of shapes. By inserting just one liner, you can clamp irregular stock such as triangular or decorative moldings that only have one flat surface. With both liners installed, drilling dowels and other round stock is a breeze to clamp firmly either vertically or horizontally.

After cutting the liners (pieces 5) to size, set your table saw blade to 45° and use a combination of the saw's miter gauge and rip fence to create the angled grooves in their faces. You'll find all the dimensions for setting up these angled cuts in the *drawings* on the next two pages.

Set the saw back to 90° to clean out the squared-off bottom of each groove, then head for the drill press to bore holes for the magnets that hold the liners to the vise jaws (but don't install the magnets yet).

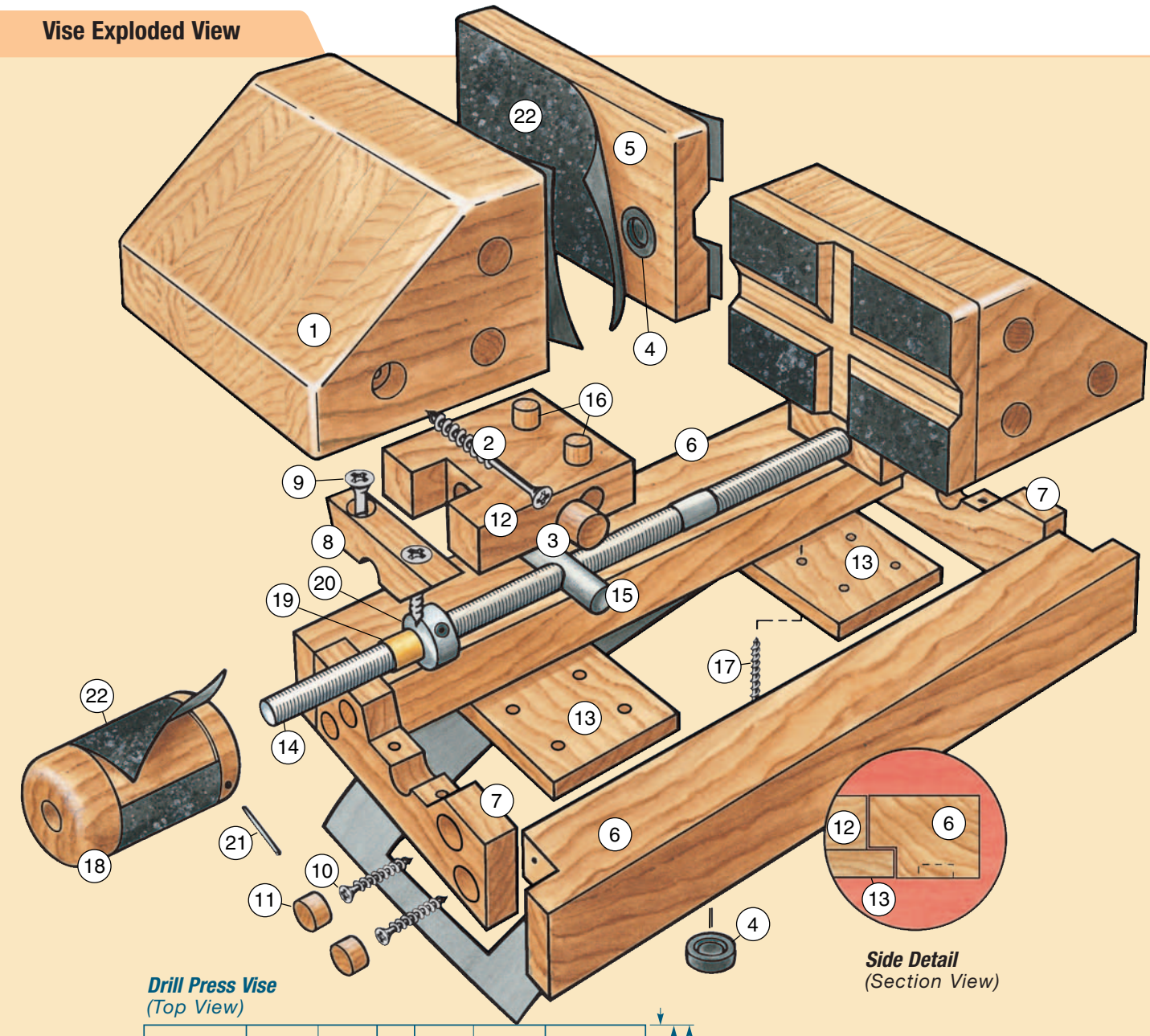
Making the Frame

The jaws of this vise slide along a frame composed of two sides (pieces 6) and a couple of endcaps with removable wedges (pieces 7 and 8). The sides are rectangular stock with a rabbet cut on one edge (see the *Side Detail* on page 38). Cut these rabbets on your table saw, then adjust the height of the blade and use your miter gauge to nibble out the notches on the ends of each frame side. You could do this on your band saw, but it might be difficult to get an absolutely square cut.

See the *Frame Endcap With Wedge Drawing* to locate the 1/2"-diameter hole (for the threaded spindle) in each endcap, then drill these holes. To make assembling the vise easier, a wedge-shaped part of each endcap must lift off. With your drill press, predrill and countersink holes for the two screws (pieces 9) used to reattach the wedges, then follow the *drawings* and use your scroll saw to remove each wedge.

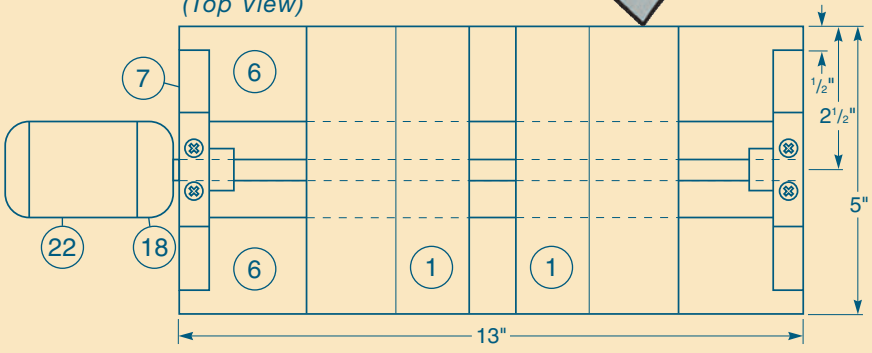
To complete the frame assembly, predrill and counterbore holes for the screws to hold the assembly together (pieces 10) and the plugs to cap them (pieces 11). Now bore ten holes in the frame sides for the magnets (see the *drawings* for hole locations). Magnets will help in set-ups, but don't rely on their holding strength alone; the vise should always be clamped securely to the

Vise Exploded View

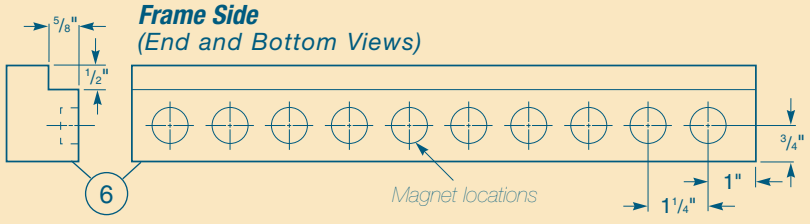


Side Detail
(Section View)

Drill Press Vise
(Top View)



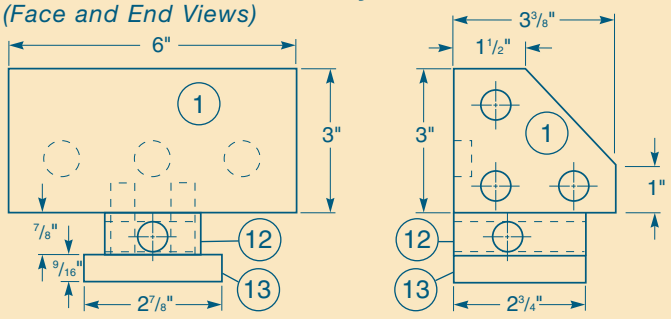
Frame Side
(End and Bottom Views)



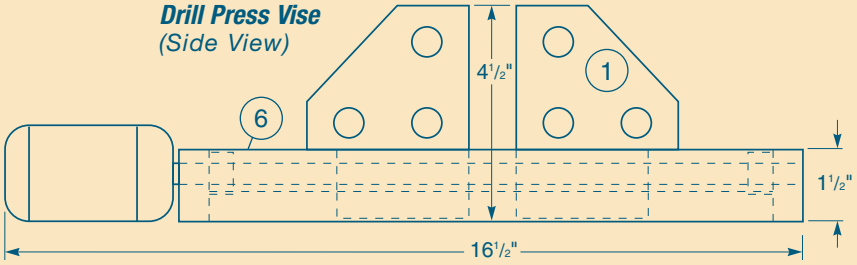
MATERIAL LIST

		T x W x L			T x W x L
1	Laminated Jaws (2)	3" x 6" x 3⅜"	12	Drive Blocks (2)	⅞" x 2" x 2⅜"
2	Jaw Screws (12)	2½" x #10 *Square-X*	13	Lock Plates (2)	9/16" x 2¾" x 2⅞"
3	Jaw Plugs (12)	⅝" Dia. x ⅜"	14	Double Threaded Spindle (1)	7/16" Dia. x 14¼"
4	Ring Magnets (32)	¾" OD	15	Spindle Nuts (2)	⅝" Dia. x 1¾"
5	Liners (2)	¾" x 3" x 6"	16	Drive Block Dowels (4)	½" Dia. x 1½"
6	Frame Sides (2)	1½" x 2" x 13"	17	Drive Block Screws (8)	1" x #6, *Square-X*
7	Frame Endcaps (2)	⅝" x 1½" x 5"	18	Handle (1)	2" Dia. x 3½"
8	Wedges (2)	⅝" x ½" x 2⅜"	19	Brass Sleeves (4)	½" OD x ⅝"
9	Endcap Wedge Screws (4)	1¼" x #6, *Brass*	20	Spindle Collars (2)	½" ID
10	Frame Screws (8)	1½" x #8, *Square-X*	21	Retaining Pin (1)	⅛" Dia. x 1⅞"
11	Frame Screw Plugs (8)	⅝" Dia. x ¼"	22	Non-skid Tape (1)	3" x 60"

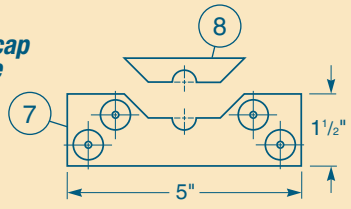
Jaw and Drive Block Subassembly
(Face and End Views)



Drill Press Vise
(Side View)



Frame Endcap with Wedge
(End View)



drill press table during use. Complete the frame by gluing and screwing it together, then install and sand the plugs.

Adding Drive Blocks and Lock Plates

An oak drive block (piece 12) is attached to the bottom of each jaw: these ride between the frame sides to keep the jaws in line. A simple rectangular lock plate (piece 13) is attached to the bottom of each drive block (one of the final assembly steps). These plates ride in the rabbets on the frame sides and prevent the jaws from lifting off the frame during clamping.

After cutting the drive blocks to size, use your miter gauge to nibble a rectangular notch in one end of each (see the *Exploded View Drawing* on the facing page). Then move to your drill press and (using your old steel vise one last time!) bore a 1/2"-diameter hole through the middle of each block; this allows the threaded spindle (piece 14) to pass through.

Switch to a 5/8"-diameter bit to bore a large hole across the grain in each drive block (see *drawing* for location). These holes are for the cylindrical spindle nuts (pieces

15) that thread onto the spindle and allow the blocks to move when the spindle is turned. Predrill for the dowels (pieces 16) and screws (pieces 17) to lock the blocks to the jaws. All of these locations can be found on the *drawings*.

Use dowel centers to lay out the dowel drilling locations in the bottom of each jaw and drill these holes. When everything lines up, glue the dowels in place and glue the blocks to the jaws, but leave the lock plates aside until final assembly.

Figure 1: Make the laminated oak sliding jaws first. Stack the jaw parts and machine them while they are still rectangular in shape.

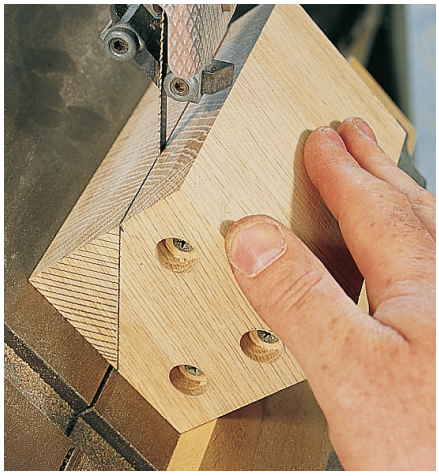


Figure 2: Use your band saw to complete the laminated jaw's shape. See the Elevation Drawings *for all the dimension details.*

Turning the Handle

The cylindrical handle (piece 18) on this vise is large enough to grasp and twist tightly, yet its shape allows for delicate adjustments equally well.

If you don't own a lathe, you should be able to locate 2" oak handrail stock at your local lumberyard. If you decide to turn the handle, use glued-up stock rather than a single piece of wood, to avoid splitting. Either way, bore the center out on your drill press (for the spindle) before rounding over the ends. Make this this boring 7/16" in diameter. Then round over the ends of the handle on your router table, using a bearing-guided 3/8"-radius roundover bit. If you're turning the handle on a lathe, do all your shaping and sanding while the handle is chucked in the machine.

Sand all the wooden parts and dry-fit them together, then apply your finish. Use a hard finish like varnish here; oil is not a good choice, as it tends to soak into clamped parts when they are under pressure.

Time for Final Assembly

Begin the assembly process by sliding the spindle nuts into their borings in the drive blocks, then threading the spindle through them. Twirl the drive blocks (and, of course, the jaws) until each is an equal distance from the unthreaded area in the middle of the spindle. Cut a pair of brass sleeves (pieces 19) from a length of rigid brass 1/2" OD tube. Now, with the wedges removed, spread epoxy on the top half of each of the frame's endcap holes (the halves drilled into the removable wedges) and press the brass sleeves in place.

After the epoxy sets, slip a couple more brass sleeves onto the spindle, then slide the spindle collars (pieces 20) over these. Pass the spindle ends through the brass sleeves in the frame endcaps, then

With magnets to hold this drill press vise in place and a variety of clamping options available, drilling dowels and circular-shaped objects is a breeze. We used oak to ensure strength and durability.

Drilling odd-shaped stock is easy with this drill press fixture. The double threaded spindle allows for single-handed adjustability, and the overall stability adds a level of safety to drilling operations.

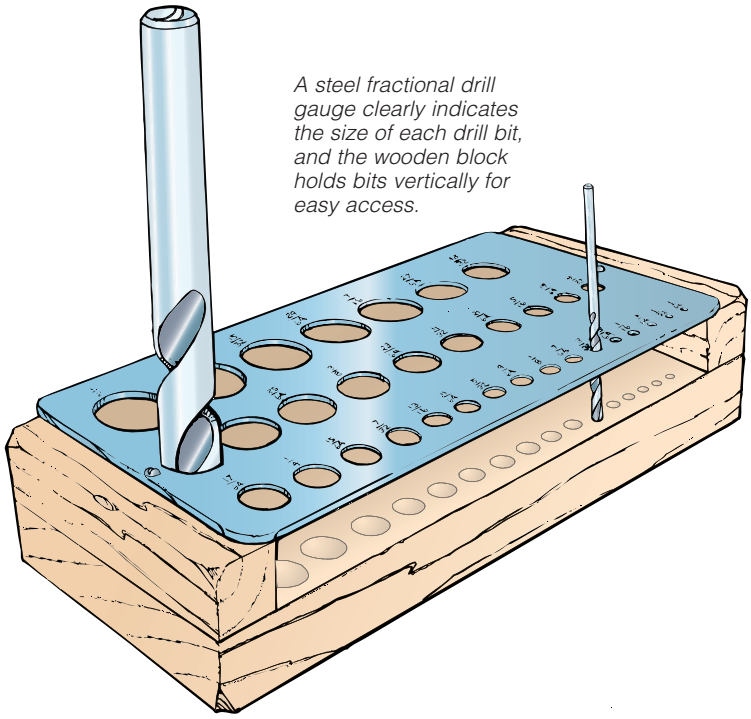
The operating hardware for this drill press vise is a double threaded spindle (allowing both jaws to be driven by a single handle) teamed up with spindle nuts and collars.

line up the spindle/drive block assembly on the frame and screw the wedges (piece 13) in place. Secure the lock plates with screws driven into their predrilled holes (don't epoxy them in — you may need to remove them in the future), then center the jaws along the frame and secure them there by tightening the Allen bolts in the spindle collars.

Slide the handle onto the long end of the spindle, and drill a 1/8"-diameter hole through it at the location shown on the *Elevation Drawings* so it pierces the handle and the spindle, then remove the handle. Apply epoxy in the handle cavity and remount the handle on the spindle, capping its end with a plug. While the epoxy is still liquid, secure the retaining pin (piece 21) in the handle with more epoxy dabbed in the 1/8" hole you just drilled.

Continue using epoxy to secure all the magnets in place, keeping in mind the ones in the jaws and liners should be installed so they attract rather than repel (a matter of flipping them the correct side). To finish up, apply non-skid tape (piece 22) to the jaw and liner faces, the frame bottom and the handle as shown on the *Exploded View Drawing*. All that's left to do is to find some strangely shaped parts to lock into your new drill press vise, because you're ready to make some shavings!

Quick Tip



A steel fractional drill gauge clearly indicates the size of each drill bit, and the wooden block holds bits vertically for easy access.

Drill Bit Holder

If you only have a few twist drill bits, finding the one you need usually isn't a problem — but it's a bigger hassle if you own a full fractional set. Here's a clever way to keep them all organized next to your drill press: Buy a fractional gauge from a metalworking mail-order catalog. This is a 3" x 6" metal plate with holes ranging from 1/16" to 1/2", in 1/64" increments. Screw the plate to two wood blocks glued to a wooden base. Use your drill press to drill down into the base through each of the fractional gauge holes with the correct diameter bit. Make a 1/2"- or 3/8"-deep hole for each bit. This way, the holes in the base will hold the bits securely and straight up. Then load the holder with bits. Now your bits are visibly numbered and neatly organized. Store them with the cutting end down for added safety.