

Installing Butt Hinges

The right hinges make a difference when it comes to looks, performance and longevity

BY GARRETT HACK

You can't beat butt hinges for durability, clean looks and straightforward installation. I'll demonstrate the most common use for this hinge: hanging an inset cabinet door. If you can install hinges in this type of flush door, you can handle any other butt-hinge application.

Woodworking catalogs offer a variety of butt hinges—some steel, others brass; some with thick extruded leaves; others pressed from thin metal. Some hinges, such as those for a jewelry-box lid, have a built-in stop. While these hinges come in a range of lengths and widths, they all have two flat leaves—usually the same size—with a barrel, or knuckle, joining them.

For fine furniture, brass hinges are always my first choice. The best of these have thick leaves that make a strong hinge. Often the leaves are tapered, so they're thicker toward the knuckle for strength where you need it. Low-cost butt hinges are made by pressing thin sheet metal around the pin to form the knuckle. Extruded hinges are



tighter than these pressed hinges because the knuckle is fitted together and then drilled in one shot for a precisely fitted hinge pin. Extruded hinges cost more and may not be available in your local hardware store, but they will keep your doors swinging smooth and true for a long time.

Steel is stronger and tougher than brass, but brass hardware usually looks better on fine furniture and ages well. I avoid steel hinges for another reason: They rust. Summer humidity or storage in a basement or

unheated space can discolor and tighten a steel hinge. For these reasons, there's a far wider selection of brass hinges than steel.

Pick the right hinge for your door

Two numbers typically describe a butt hinge: the length of the hinge (listed first) and the fully open width (second). A typical cabinet-door hinge is 2 in. by 1¼ in., with leaves 2 in. long and ⅝ in. wide. Some catalogs further classify butt hinges as narrow or wide, but what really matters is the

CHOOSING A HINGE

Don't compromise. Choose a high-quality extruded brass hinge (bottom) for your furniture. Cheaper stamped hinges (top) will not be flat, square or drilled accurately, and there will be slop around the hinge pin.

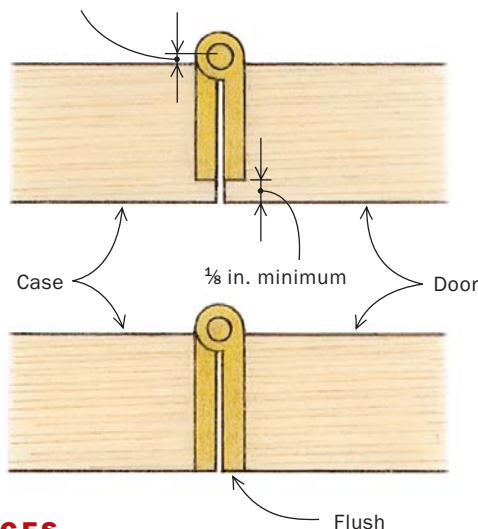


The top hinge is the wrong size for this door. It would leave a fragile sliver of wood at the edge of the mortise. The bottom hinge is a more appropriate size.

THE RIGHT SIZE FOR THE JOB

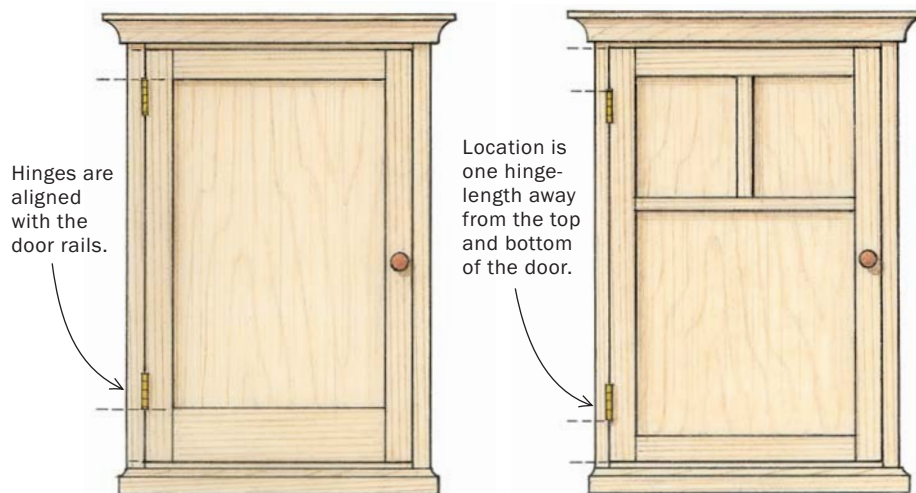
Choose a hinge size that leaves at least $\frac{1}{8}$ in. of wood at the back of the mortise, or this area will be too fragile. Another option is to choose a hinge that reaches all the way across the stile.

The centerline of the hinge knuckle should be about $\frac{1}{2}$ in. proud of the door and case.



WHERE TO LOCATE THE HINGES

It's pleasing to the eye if you relate the hinge locations to the rails (below left). However, this may not be possible on doors with thin rails (below right).



length and width. I prefer fixed-pin hinges over loose pins (the hinge comes apart for lifting off a door easily) because they are stronger with less play in the knuckle.

Choose and purchase hinges during the design stage of a project. You don't want to be ready to hang a door and then realize that the hinge leaf to be mortised into the door is wider than the door stile, or that it leaves just the thinnest ribbon of wood at the back of the mortise to break away someday. Knowing door and carcass dimensions, you can narrow down the possibilities of hinges that will fit. If you're unsure of the best choice, buy two sizes.

How many hinges and where?—Typically, I use two hinges on cabinet doors under 3 ft. high. For greater strength and stability (for heavy doors or for doors on which objects will be hung), I prefer to use longer, heavier hinges rather than add a third hinge in the middle of the door. With the leaves snugly mortised and screwed into place, two butt hinges will support a surprisingly heavy door. However, for passage doors and very tall cabinet doors, adding a third hinge in the middle can help hold the stile and door in alignment, keeping them from binding.

A critical aspect in the appearance and action of the door is how far the hinge knuckle sticks out from the front of the door. For the door to swing smoothly without binding, the centerline of the hinge pin need only be slightly proud of the door—about $\frac{1}{2}$ in.

Hanging a flush inset door

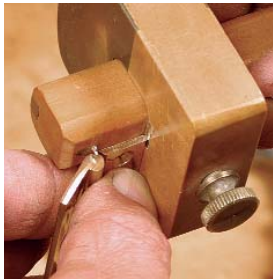
After choosing the right hinges for the job, the challenge is to set the hinges precisely, leaving a fine, even gap around the door and a flush surface between the door and the case.

Hinging a door neatly depends as much on building a true door and an untwisted carcass as it does on accurately mortising for the hinges. Slip the door into place and look for any misalignment. There often is some twist in the case or the door, especially if the door is large; this can be addressed in a variety of ways. You can plane the door or case slightly, and you can set one or both of the hinges farther into or out of the case to minimize the effect of the twist. Of course, the idea is to head off these problems by using solid construction

LAYING OUT THE HINGE MORTISE

Use marking gauges and a marking knife to make fine layout lines. Take all of your settings directly from the hinge for accuracy.

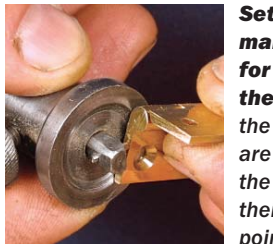
WIDTH



Set the first marking gauge for the width of the hinge. Set it about $\frac{1}{32}$ in. short of the centerline of the hinge knuckle. The light pencil lines at the end of the mortise indicate where to stop the marking-gauge cut.



DEPTH



Set a second marking gauge for the depth of the mortise. If the hinge leaves are tapered, set the gauge at their thickest point.



LENGTH



Again, use the hinge itself to set the length of the mortise. Holding the hinge in place, cut tick marks into the corner of the door stile. Then carry those lines across the mortise with a square.



techniques and stable material to build square cases and doors.

Mind the gap—Every door has to have a gap around all four edges (as uniform as possible) so that the door doesn't stick as it grows or shrinks during seasonal changes in humidity. A narrower gap looks better. Knowing how much of a gap to leave is a matter of experience and skill. I'm guided

by a wide board hanging in my shop whose width I measure from time to time and mark on the board. I can tell in early May that I should leave a slightly wider gap to allow for the higher humidity in the coming months. Somewhere between $\frac{1}{16}$ in. and $\frac{1}{32}$ in. is about right.

Hinges vary in one way that usually isn't indicated in catalogs. If the two leaves do not close flat on one another, you have an

unswaged hinge. This built-in space will be the gap between the door and carcass along the hinge line if you mortise both leaves fully flush. The leaves on a swaged hinge close flat to one another, so to set the door gap, mortise the leaves slightly proud of the door or frame stile, or both.

At this point trim the edges of the door for a close fit all around, leaving a tighter gap than the final one and thus some extra wood for trimming after you've set the hinges. Then shim the door into position with veneer scraps and locate the hinges.

Laying out the mortises—Before you lay out your first mortise, look over each hinge. For a neat mortising job, the leaves should have square and straight sides. Sometimes they will need a little dressing with a fine file.

To set butt hinges consistently and accurately, use a fine-bladed marking knife, a couple of marking or cutting gauges, one wide and one narrow chisel and a pencil. Set the mortise width slightly less than the width of the leaf to the center of the hinge pin, to make the hinge pin and knuckle protrude the proper amount.

Sometimes I mortise the case sides or the frame first, before they are glued up, and then transfer them to the door later. It's easier to work with case pieces loose on the benchtop than it is to wrestle with a large cabinet and to work in the cramped corners of an assembled case or face frame. The cabinet pictured here, however, is small, so I mortised the door first.

Cut very fine lines; heavy cuts will leave a less precise mortise. To see the knife marks more clearly, sharpen a pencil to a very fine point and drag it along the lines.

After scribing the width and depth with marking gauges, lay the hinge in position and cut a precise tick mark at both ends. For small cabinet hinges like these, the safest way to lay out the ends of the mortise is to extend these tick marks with a square. For larger hinges, like those used in passage doors, it's better to use the hinge itself to lay out the ends of the mortise. Just be careful the hinge doesn't slip while you are marking.

Rough out the mortise, then chop and pare to the lines

I usually cut hinge mortises completely by hand, with chisels. The first step is to chop out the waste, leaving each knife line un-

CUTTING THE HINGE MORTISE



Whether by hand or by machine, the idea here is to clear out the bulk of the mortise while staying clear of your layout lines.

TWO WAYS TO REMOVE THE WASTE

Chop it out with a chisel. Make a series of chopping cuts in one direction, then remove small chunks of wood by chopping in the other direction.



Or rout it out freehand. Set the bit depth to the thinnest part of the hinge and stay clear of the layout lines. For thin doors, you can clamp on an extra board to help support the router base.

Watch it on the web

To see the author chop a hinge mortise, go to www.finewoodworking.com.



Finish the mortise with sharp chisels. Chop and pare gradually until you reach your layout lines and get a good fit. Save your widest chisels for the final cuts.

ATTACHING THE HINGES TO THE DOOR



Mark for the center screw. Offset this location slightly toward the back of the mortise to draw the hinge tightly into place.

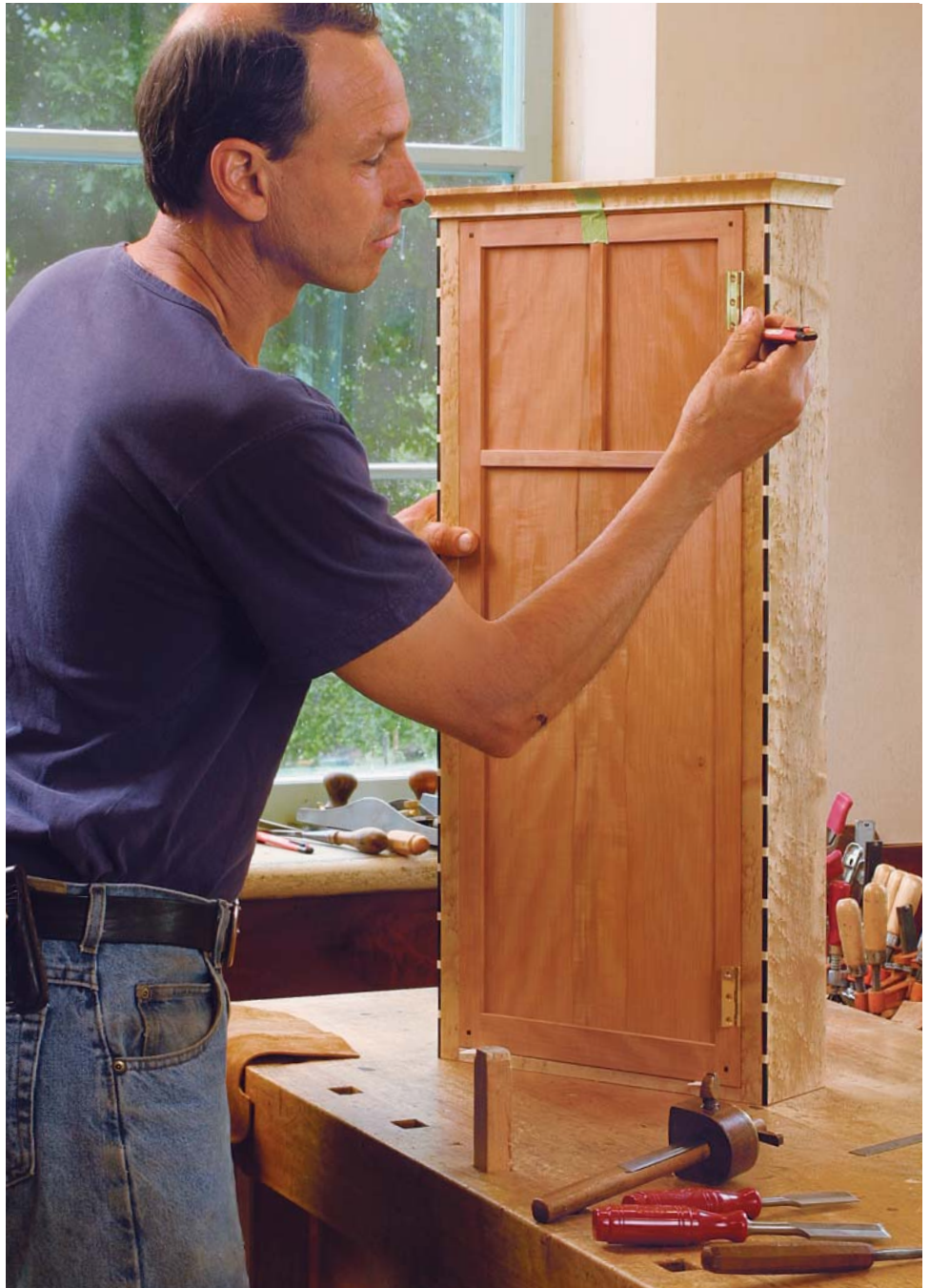


Drive in one steel screw. This leaves two hole locations unused to allow the hinge to be adjusted in or out later. Use a steel screw to avoid damaging your softer brass ones.

touched. Remove much of the wood with a series of aggressive chops down the length of the mortise, then do the same thing in the opposite direction. When 98% of the wood has been removed, creep up to the layout lines with a wide chisel. If you chop down into your layout lines first, the wood in front of the chisel will push it backward, leaving a wider mortise than you intended. Finally, to establish the floor of the mortise, make paring cuts inward from the open side.

For extruded hinges with tapered leaves, the mortise must be slightly deeper at the hinge knuckle. Approximate this taper when you're wasting out the mortise, and fine-tune it later when trial-fitting.

A router can be quicker—Although I finish all of my mortises by hand, I sometimes rough them out with a router, working freehand and going as close to my lines as



Transfer the hinge locations to the case. With the hinges installed temporarily in the door, shim the door into its final position and use a marking knife for a precise transfer.

I dare. Afterward, I finish up the mortise by hand as usual, paring and chopping carefully for a tight fit.

Trial-fitting is important—Trial-fit each hinge to check and adjust its mortise. To find any high spots in the mortise, I scribble on the back of the hinge with a soft pencil, which rubs off when I slide the leaf into place. Trial-fitting can damage the

fragile edges of the mortise, so the fewer times you do it, the better.

Attach the hinge temporarily and cut the other mortise

When you are satisfied with the fit of the first hinge leaf, mark for its center screw with an awl, drill and fix the leaf with a single steel screw.

Cutting the mortises on the carcass is ex-

actly the same as in the door stiles. To transfer the hinge locations from the door, slip or wedge the door into position with the hinge fully open and make fine knife lines along the top and bottom of the knuckle. A spare hinge of the same size makes it easy to test-fit the mortise and to mark the screw locations. Otherwise, you have to remove a hinge from the door.

Secure each hinge with one steel screw and see how the door swings. The advantage of leaving the door snug in its opening while fitting the hinges is that it allows for some slight mortising errors. You can adjust for these by deepening a mortise or mortises and by planing the door edges for a consistent gap all around.

There's still room for adjustment

A typical problem is that the gap along the hinge line is too large or uneven. The solution is to mortise in one or both leaves of each hinge slightly deeper.

Sometimes, to get a better-fitting door, you may need to pull out a hinge from its mortise slightly, in essence pushing the door further back into the opening. Fixing the door with only a single screw in each leaf at this point gives you some flexibility to do this, but it creates a noticeable gap at the back of the hinge leaf. Cut a filler piece from a scrap of the same wood, glue it and then clamp it in place by screwing the hinge leaf into its new position.

Set the brass screws, and you're done

The final step to fitting the hinges is setting the screws. Each hinge is drilled and countersunk for a specific size screw, which is often noted in the catalog description. I order the screws along with the hinges—with a few extras.

If the countersinks are not deep enough, the heads of the screws will stop slightly proud of the hinge leaf. This can cause a hinge to bind and exert tremendous leverage on the screws. If necessary, deepen the countersinks so that the heads end up just below the surface of the leaf. In setting the brass screws, I try to have some consistency in the pattern of the head slots.

If the hinges are installed correctly, your doors and lids should swing sweetly for many decades to come. □

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INSTALLING THE DOOR AND CHECKING THE FIT



Cut the mating mortises in the case and attach the door. Continue to use only one steel screw at this point. Check the fit of the door. If necessary, remove the door and plane it to fit.



Adjust the countersinks. Use a countersink bit to deepen the holes in the hinge so that the screw heads can sit just below the surface.

Making fine adjustments

Sometimes you must shim a hinge up (below) or out (right) to even out the hinge-side gap on a door or adjust the fit of a lid.



If you've cut too deep. To shim a hinge outward, trim a card to fit into the bottom of the mortise.



If you've cut too wide. To move a hinge out toward the front of the case, plane a sliver of long-grain wood to fill the gap at the back of the mortise. Glue it in and plane it flush for an invisible repair.