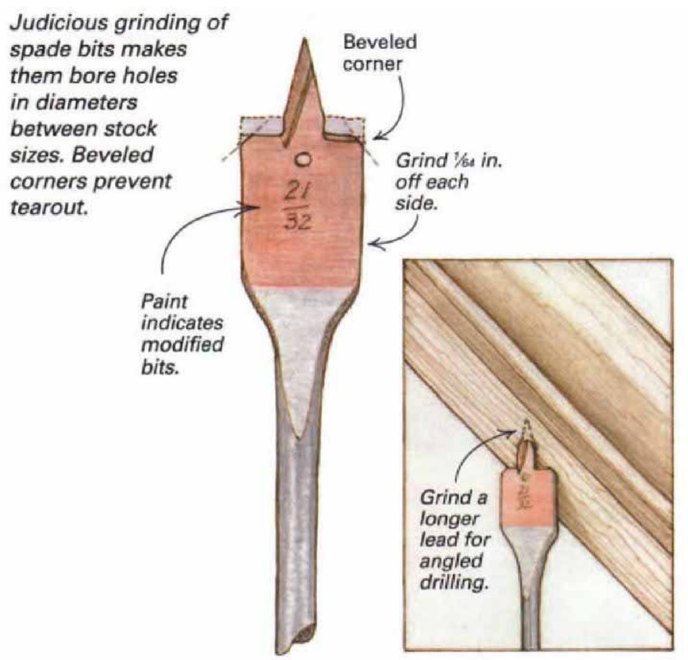
A Veteran Stairbuilder's Tools and Tips

Modified tools and custom jigs expedite staircase assembly

by Michael von Deckbar-Frabbiele

If you've ever poked around in an old toolbox, you're likely to have pulled out some strange-looking gizmo that, even after careful scrutiny, confounded all by its presence. Such tools typically elicit the comment "I wonder what they used *that* for?" As a woodworker who specialized in stairbuilding, I made plenty of special tools and jigs that'll probably end up as curiosity-provoking what's-its. These tools and jigs made my job easier, and, as someone once told me, it's not doing hard work that makes one a master, it's making hard work easier. So let's take a look at a stairbuilder's gizmos and at some techniques that should help you do a few things in your work: reduce effort, increase productivity, elevate your degree of accuracy and, ultimately, increase your profit.

Reground spade bits work better



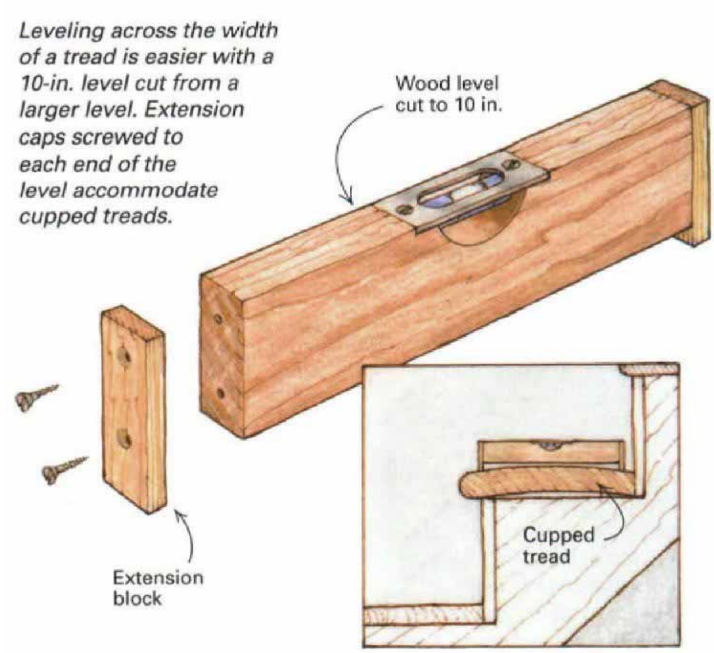
The worst thing in the entire world that can befall a stair man is to hear his just-installed treads squeak. The second-worst thing is to have the spindles rattle. Children love it; they never seem to tire of running up and down the balustrade with an arm extended, slapping the spindles to produce a staccato to which their youthful nervous systems seem immune.

For spindles not to rattle, they have to fit perfectly in their holes. To make a perfect fit, I modify common spade bits. It's easy to grind down the bits by 1/32 in. (or 1/64 in. on each side). So, for example, instead of jumping from 5/8 in. to 11/16 in., you'll have a bit that's 21/32 in.

Another hint: Because the newly modified bits will have their former sizes stamped on them, it's important to paint new numbers on the sides of each bit. Once, a carpenter who was setting a balustrade went into my toolbox without my knowledge and bored 35 holes with what he thought was a 3/4-in. bit.

Another thing about spade bits: When boring at an angle, say, into an oak handrail, a spade bit's 90° corners tend to tear out chunks of wood as they start a hole. Grinding off the bit's corners makes a clean cut by producing a scraping action as the bit spins into wood. I grind a long lead on some bits to make them useful for grinding holes in steep handrails. The long lead establishes the bit in its hole before the shoulder engages wood.

Shortened level fits on tread



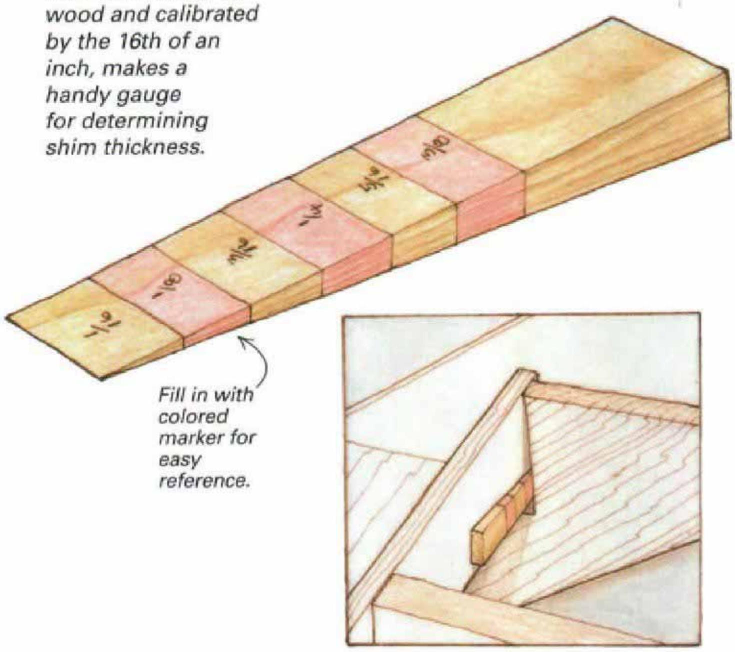
When leveling treads from front to back, it's handy to have a small level. You could buy a small bullet level, but I've never found one that didn't seem like a toy. I cut down a larger wood level to 10 in. and screwed small extension blocks of wood on the ends. The blocks extend past the bottom of the level because sometimes a tread isn't exactly flat, so the extension blocks allow the body of the level to clear the belly of a chubby tread and

Drawings: Bob Goodfellow

give an accurate read. For years I used a longer 2-ft. level when I was setting treads, but I was constantly bumping into the level where it was protruding past the tread and knocking it down the staircase. Aside from the fact that the tumbling level dented and dinged up the treads during its descent, I got pretty tired of buying new levels because the old ones got knocked out of whack.

Gauge measures shim thickness

A tapered shim gauge, cut from a scrap of wood and calibrated by the 16th of an inch, makes a handy gauge for determining shim thickness.



In many cases, the stair carriage (or horse, or rough stringer) is built by the framing carpenter, who is long gone by the time you come along to make a silk purse out of an old sow's ear. No offense to the framers; many do a great job. Nonetheless, it is in your best interest to build the rough stringers yourself, or at least check them with level and rule before you bid on finishing the stairs. It once took me three days with a reciprocating saw, a firmer chisel and a mass of shim stock to straighten out a circular-stair string (pun intended) before I could trim it out.

I make a shim gauge out of a scrap of wood. I measure along both edges of the shim and make marks every 1/16 in. in thickness. I take a marker and color in every other segment. After I've got the gauge made, I rip shims of different thicknesses and keep them on hand. Some people use shingles as shims, but their tapered profile gives them uneven bearing; the surface to be shimmed only hits the high point of the shingle.

To use the gauge, I simply slip it under the tread or behind the riser (inset drawing above) that needs shimming and tap it in until the tread is level or the riser is plumb. I note the mark on the gauge, remove the gauge and replace it with one of my precut shims. Once you have the shim in place, the difficult work is done, and then it's just a matter of fastening the tread or riser to the carriage.

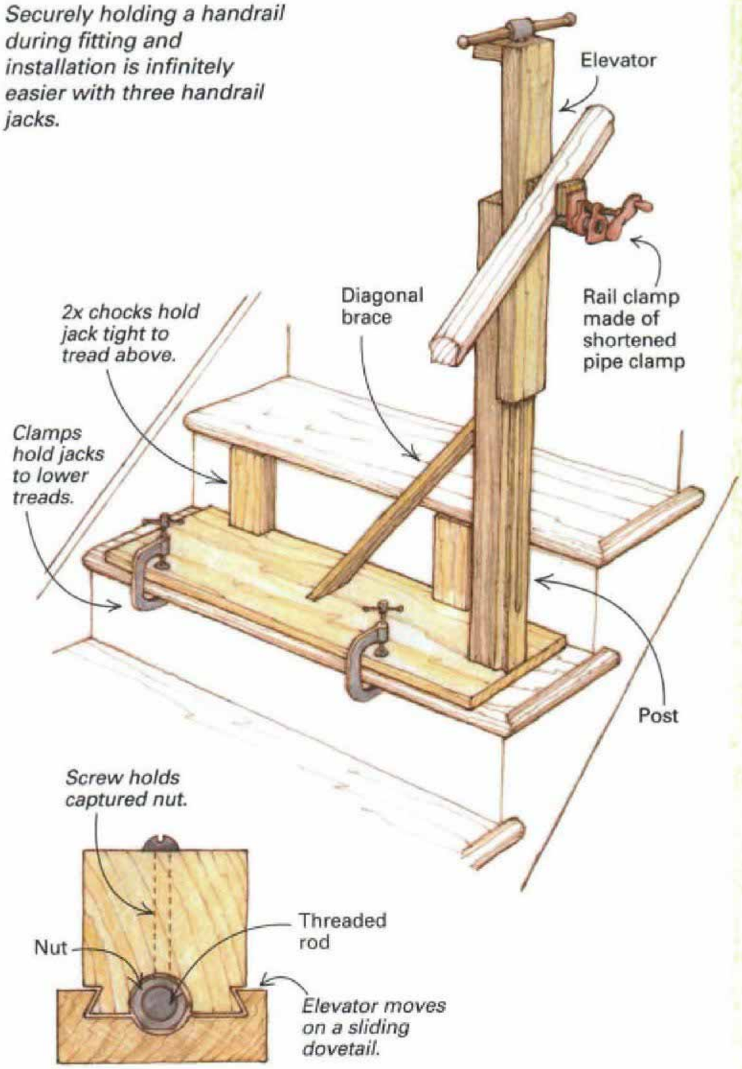
The whole process of shimming treads is slowed or voided if the center carriage is too high. When I cut my own carriages, I eliminate the possibility of the condition arising by overcutting both the treads and risers of the center carriage 1/2 in. to 3/8 in. By doing this I've eliminated the chance that the treads of the middle carriage will protrude past the line formed between the two outside carriages.

When it comes time to install the treads, I level and shim the two outside carriages. Then, it is simply a matter of gluing and screwing a 1 1/2-in. cleat to the center carriage, which is brought into contact with the finish tread.

You can use the same process for the risers. By eliminating the center horse in the initial shimming process, leveling and shimming is transformed from a struggle into a dance.

Handrail jacks support rails in place

Securely holding a handrail during fitting and installation is infinitely easier with three handrail jacks.



One day when I was scheduled to install a circular handrail, my helper didn't show up. To take his place, I made three rail jacks. The jacks are fairly complex, and they took a while to make. But they were well worth the effort: These rail-jack "helpers" are always on time in the morning, and they don't require a paycheck.

The jacks are made of a post and an elevator that ride along one another by means of a sliding dovetail. A piece of threaded rod, controlled by a T-handle at the top of the elevator, screws through a long nut (sold in hardware stores as a coupling for threaded rod) held captive in the stationary post. C-clamps at the base of the jack hold it to the finish tread. Short blocks of 2x brace the jack against the tread above. A diagonal brace, screwed to both the post and base of the jack, keeps the jack steady. Rail clamps are made of shortened pipe clamps.

When I installed the handrail, I used one jack at the top of the staircase, one at the middle of the staircase and one at the bottom of the staircase. When I am setting a circular rail, movement at any one of these three points is critical because any movement at one point has an effect on the other two points.

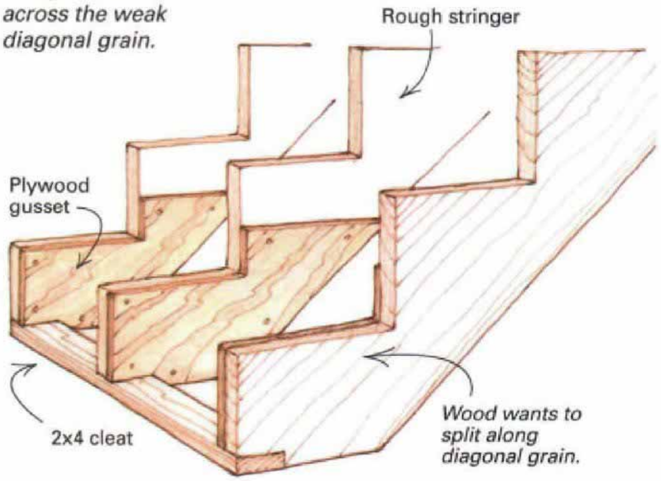
After using the jacks to ensure the rail is situated, marked, cut and fit correctly to the newels, I use a jack or two to steady the rail while boring holes for the spindles. Because of their unwieldiness, circular rails must be bored in situ, unlike straight rails, which can be bored upside down on sawhorses by means of a pitch gauge.

I attach a level vial to my drill when I bore spindle holes; this ensures the plumbness of the spindles.

...continued on next page

Reinforcing the first step

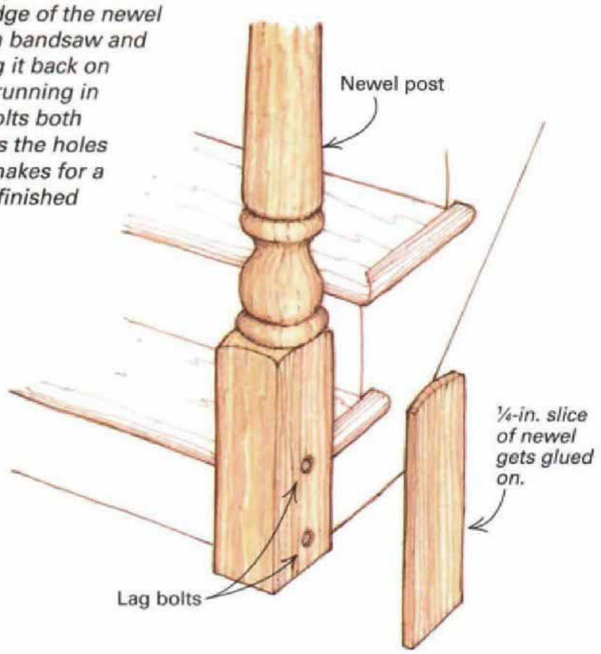
Strengthening the rough stringer's first step with glued and nailed plywood gussets ensures the stringer won't break across the weak diagonal grain.



Often, because the carriage at the first tread must be cut shorter than the unit rise to allow for tread thickness (usually 1 in.) and also notched for a 2x4 floor cleat, the bottom of the carriage is weakened. I always beef up the carriages by screwing and gluing a piece of plywood to the sides.

Covering newel-mounting bolts

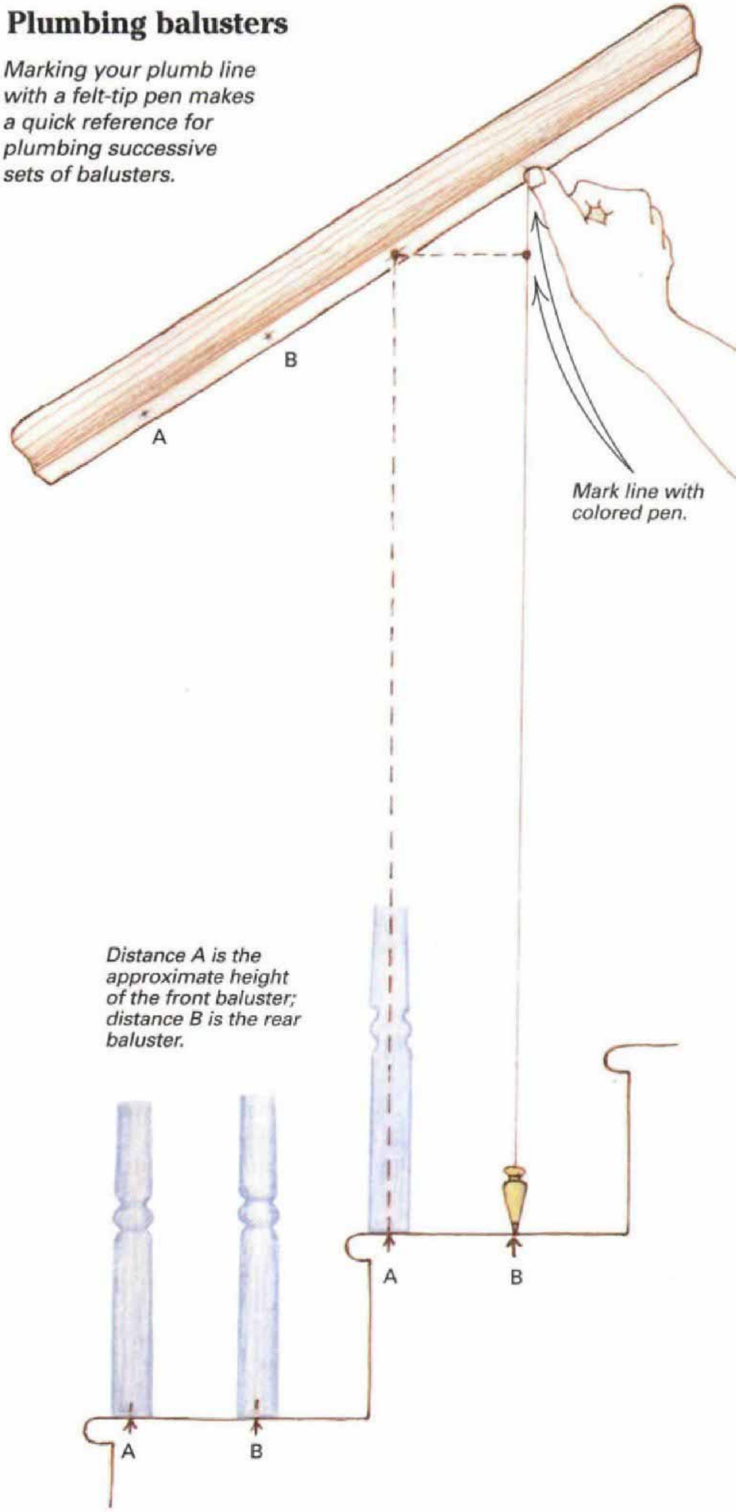
Cutting a ¼-in. slice off the edge of the newel with a bandsaw and gluing it back on after running in the bolts both covers the holes and makes for a neat, finished look.



Sometimes the only way to fasten the newel post is to anchor it to the rough horses. (For an alternative method of attaching newels, see *FHB* #82, p. 63.) Often, the bolt holes you have to drill are at an angle other than square to the face of the newel. Off-angle holes can be hard to plug, and when you do plug them, they usually don't look right. Instead of plugging holes, I saw ¼ in. off the face of the newel with a bandsaw, drill and install the bolts and then glue the piece over the holes. The bandsaw limits the loss of stock to about ⅓₂ in.—hardly noticeable—or you can plane off ¼ in. and make a new faceplate to glue over the holes.

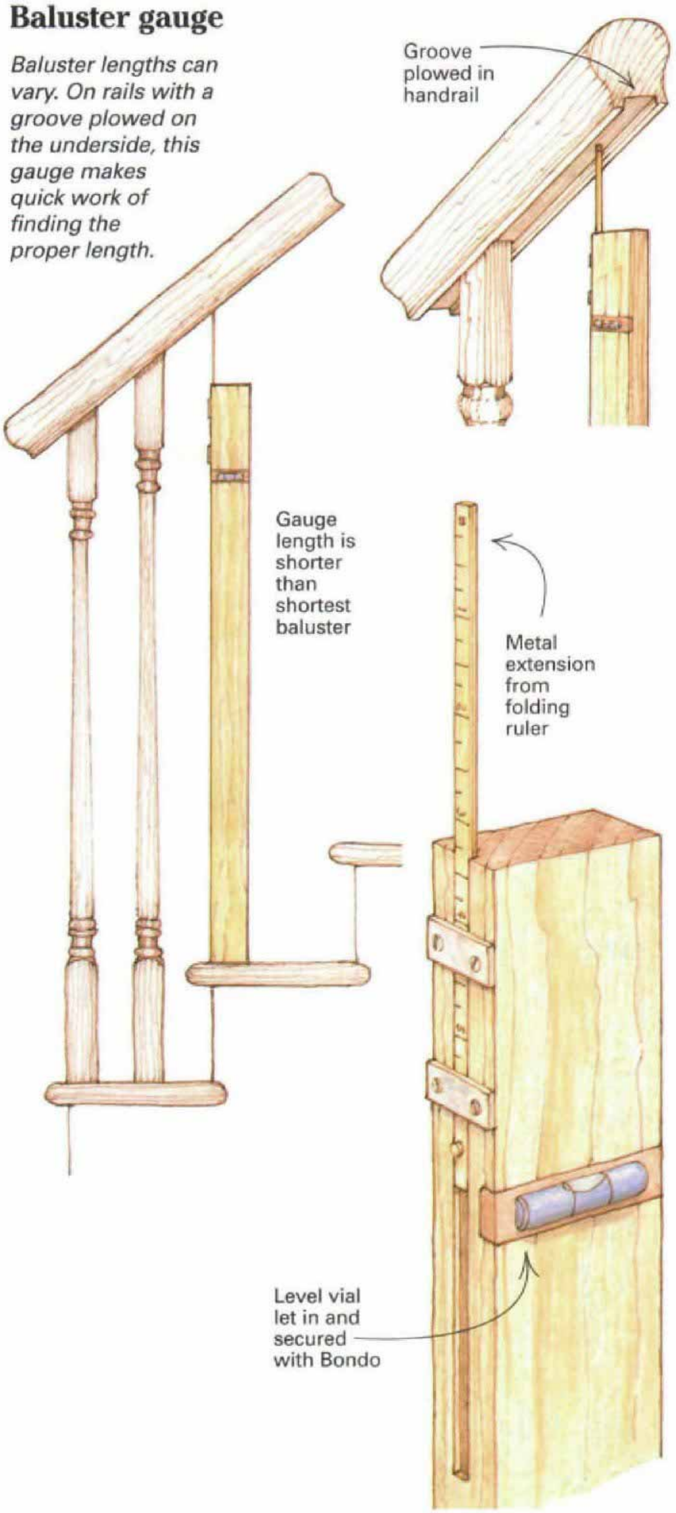
Plumbing balusters

Marking your plumb line with a felt-tip pen makes a quick reference for plumbing successive sets of balusters.



When laying out a handrail to drill holes for balusters, I use a plumb bob to get a vertical line from the marks I've laid out on the treads. I used to fiddle with the plumb bob's string length on each tread and wait for the bob to stop swinging. But now I make marks with a felt-tipped pen on the plumb bob's string—one at the height of the front baluster, one for the rear. When I go up to the next tread, all I have to do is hold the line on the mark for the particular baluster location and hold it on the rail. The approximate marks make a quick reference, and half the battle is over; I don't have to fumble with string length. Here's another hint: I've found that using braided string, as opposed to the more common twisted-strand string, helps to keep my plumb bob from spinning and swinging around when the bob is hanging free.

Baluster gauge

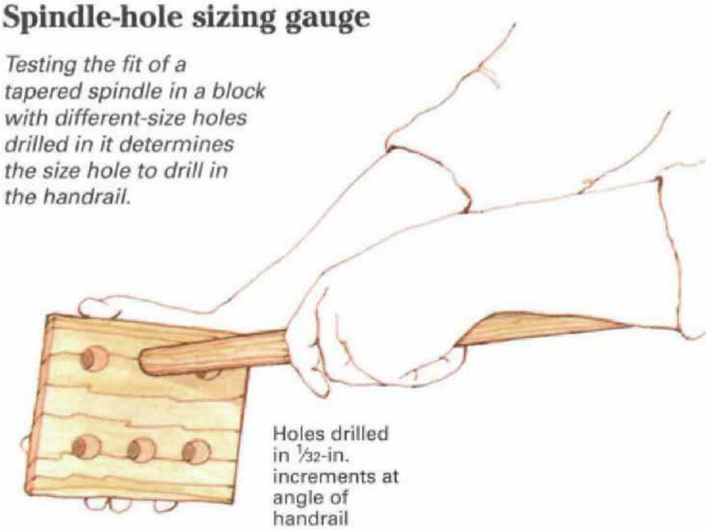


Baluster lengths can vary. On rails with a groove plowed on the underside, this gauge makes quick work of finding the proper length.

Some staircases call for square-ended balusters that fit into a groove plowed into the underside of the handrail. In an ideal world all the balusters for a given position on each tread would be the same, and you could just go along and cut sets of short and long balusters. For various reasons, though, baluster lengths can vary as much as $\frac{3}{16}$in.

I made a baluster gauge that employs the sliding metal ruler taken from the end of a folding rule. The thin metal ruler is let into a piece of wood cut a couple of inches shorter than the shortest baluster. Small wood straps hold the ruler in place. A level vial let into the piece of wood makes plumbing easy. I secured the vial to the wood with Bondo. The same measurements could be had by trying to juggle a level and a folding rule, but the time saved using this shop-made gauge more than makes up for the time spent making it.

Spindle-hole sizing gauge

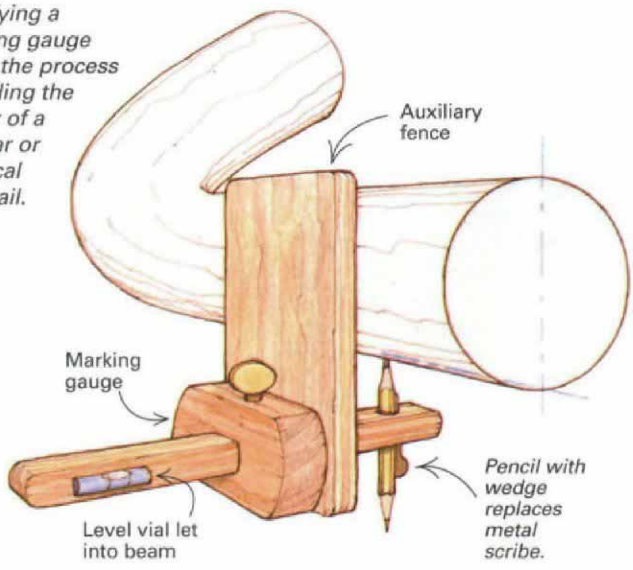


Testing the fit of a tapered spindle in a block with different-size holes drilled in it determines the size hole to drill in the handrail.

The diameter of the top, or thin end, of a tapered spindle can decrease as the spindle gets longer. Therefore, the hole drilled into the handrail for the back spindle on a tread can be smaller than the hole for the front baluster.

I take a block of wood and drill a series of different-diameter holes in it. The holes are drilled at the same angle that the spindles meet the handrail. After I cut a tapered spindle to length, I plug it into the sizing gauge to determine which size hole fits best, then I bore the hole in the rail. To save time, it's best to have two or three drill motors chucked up with the bits you'll most likely need.

Circular-rail center finder



Modifying a marking gauge eases the process of finding the center of a circular or elliptical handrail.

For finding the center on oval or round handrails that have been fit and either permanently or temporarily fastened, I modified a marking gauge by letting a level vial into the gauge's beam and replacing the metal scribe with a pencil held in place by a wood wedge. An auxiliary fence provides the additional height that is needed to compensate for the increased length of the pencil. By watching the level vial, I can keep the beam horizontal as I run the gauge down the length of the handrail, and I make a pencil line along its bottom center.

On a similar note, I've found that one of the most useful tools for both shop work and work in the field is a regular marking gauge with the metal scribe replaced with a mechanical pencil. □

Michael von Deckbar-Frabbiele is a former stairbuilder in New Orleans, La.