

## TIP 29—Making an Inexpensive Edge Finder/Forrest Atkinson

### Locating the edge of a part with a home-made "edge finder"

To accurately locate a hole when a dimension is given from the edge of the part, you must first have a way to align the center of your spindle with the edge of your part. Starratt and other instrument companies make "edge finders" that are held in an end mill holder or collet to help you locate an edge accurately, but you can make one yourself and save some money. Using your handwheels to measure from the side of a part is also more accurate than trying to measure with a ruler, scribe center lines and then visually centering your drill by eye over the marks. Multiple holes can be drilled without having to relocate the edge again as long as you keep track of the rotations of the handwheels.

### Making and using the edge finder

Take a dull or broken 1/8" (.125") drill bit and grind off what's left of the fluted portion. (Measure the shank with a micrometer first to make sure that it is accurately sized.) On the side of the new end of the shank, grind a small flat about 1/4" long and 0.040-0.060" deep. Install the shaft in a 1/8" collet in the spindle. Bring the edge of the shaft near the edge of your part and turn on the spindle at a high speed. Using the X or Y handwheel, slowly bring the spinning edge of the shaft up to the edge of your part. As the shaft just starts to touch the part you will hear a slight "rapping" sound as the corner of the flat hits the part intermittently. At this point you know the spindle center is exactly .0625" (half the diameter of the shaft) from the edge of the part. If you have an adjustable zero handwheel or DRO, set it to zero. Move the edge finder away from the part and remove it and the collet from the spindle. Install your drill chuck or a collet of the proper size, insert your drill bit and raise the Z-axis so the drill clears the part. Return to your zero setting. Now move the spindle .0625" further (one handwheel revolution plus another twelve and a half thousandths of an inch). The 0.0005 can be interpolated by centering the back stop mark half

way between the hand-wheel marks. Your spindle center is now exactly aligned with the edge of the part. Remember that each handwheel revolution moves the spindle .050". To drill a hole exactly 1" from the edge of the part, for example, advance the handwheel 20 revolutions (.050" x 20 = 1.000").

A center drill inserted in the drill chuck will work too. This method works best with a drill chuck that is in good condition, check the run out first if you aren't sure. One of the first steps for accurately drilling a hole is the use of a center drill anyway so no change of tooling will be required after locating the edge with the center drill. The center drill comes with two spots conveniently ground on the sides.

Unlike the commercial edge finders that visually pop off center when the part is touched, this method depends on being able to hear the sound as soon as the tool starts to touch the part, so you will need the shop environment to be as quiet as possible while finding the edge. Also, drill sizes other than 1/8" could be used depending on what you have on hand, but it should be a size for which you have a collet and one that is relatively easy to divide by two to keep your figures simple. I also own a Starrett edge finder, but have found that I can locate an edge more accurately using my "free" broken drill bit tool, and it was made at no cost from a drill bit I was going to throw away anyway.

Don't forget about backlash. When using the handwheels for moving the mill table, a rule of thumb is to always move in one direction on each axis. If the need for reversing directions should arise, go past the ending point further than the amount of backlash in the lead screw and then crank in the original direction to the final handwheel setting. The method of adding or subtracting the estimated lead screw back lash to each reversed table movement isn't very accurate and should be avoided.