TIP 94 — Rotary Table Degree Disc/William Nichol

Innovation 1
90-degree press fit dial for the rotary table (see photos)

Necessity being the mother of invention, I created this (dial) because I'd rubbed most of the numbers away with accumulated rust. However, it places the numbers on the same 90-degree plane as the handwheels making them more visible because as they are white and because the user stands above the rotary table not level with it. (I no longer have to squat down to read the angle). It's simply a press-fit, 5mm thick, black, laser cut cast acrylic disc. Very quick and cheap to produce.

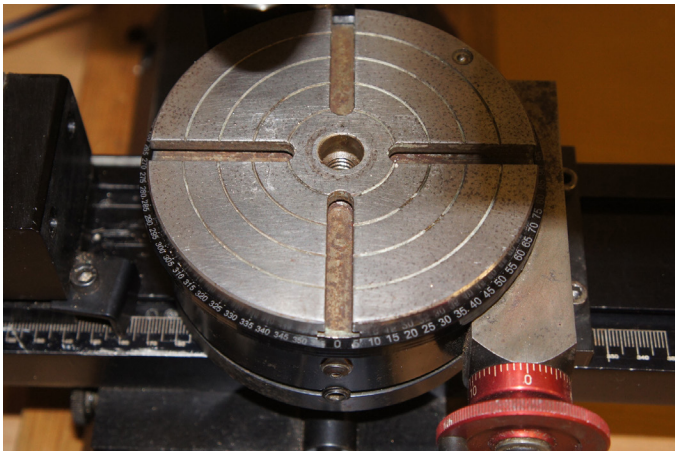

FIGURE 1—A closeup view of William's press-fit dial prototype mounted on his rotary table.

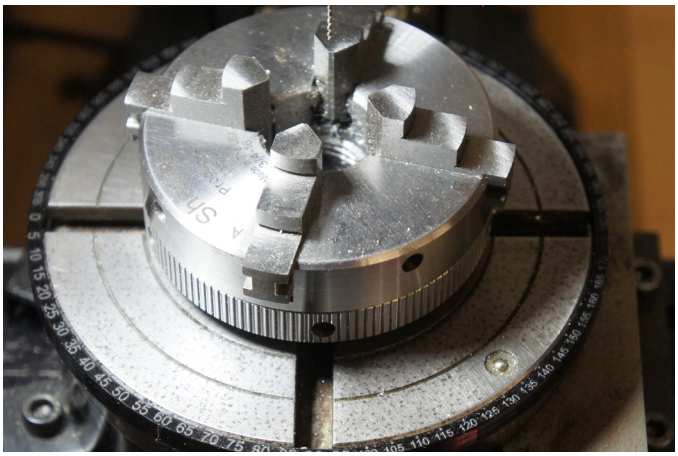

FIGURE 2—A top view of the dial elevation moved up level with the table surface for maximum clarity after mounting a 'job' onto the rotary table.

The laser I used was a Gravograph LS900 (not sure what the US equivalent would be). The resolution used to raster the numbers and cut out the disc would either have been the standard 300 or 600 dpi, but not more than 600 (1200 was possible) - so a much crisper scale and an outline is possible. Very quick to fit and remove without affecting the clearance at the back of the machine (against Z-column).

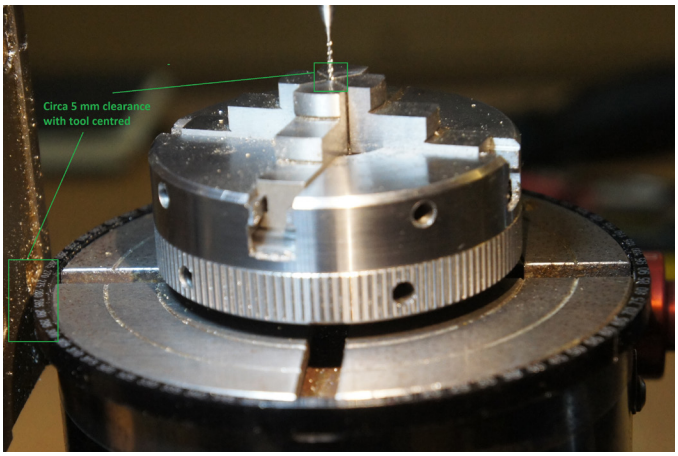

FIGURE 3—This side view shows the clearance distance between the dial and the mill column bed.

I've not used it for more than a few weeks so how the numbers stand up to oil and debris is another matter —so good so far but maybe they may benefit from a surface lacquer treatment—you'd have to test them. An anodized aluminum disc fitted with grub screws (not unlike the handwheels) may be an alternative as the numbers could be crisper and whiter if you wanted a more high-end look.

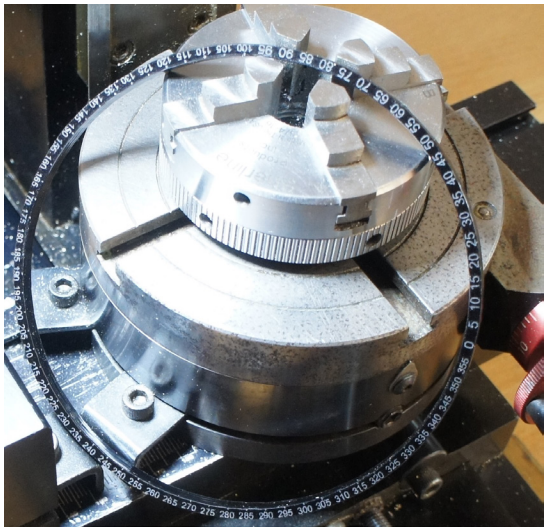

FIGURE 4—Showing the dial ring removed from the rotary table.

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Innovation 2
Zero scale for the rotary table (see 3D CAD images)

This evolved out of the above idea. A resettable zero disc for the rotary table. (like the X, Y, and Z resettable handwheels. See Figures 5 and 6.) I don't know if this would be of any use, but I've done some 3D CAD graphics of how it may look and work. This is a concept, not a working model.

NOTES

Care must be taken when dimensioning the disc, as acrylic is relatively brittle and the disc needs to be positioned with pressure and twisting, and remain tightly in place. I found 5mm much easier to use than 3mm (which snapped).

I needed knowledge of the laser beam thickness to make the disc accurately (.11mm on the laser model Gravograph LS900).

I aimed for a precision of .01mm, however, the error range of my calipers was ±.02 and the laser cutter machine is ±.1 (I think). That said, after a small number of attempts, I had the disc cut accurately.

William Nichol

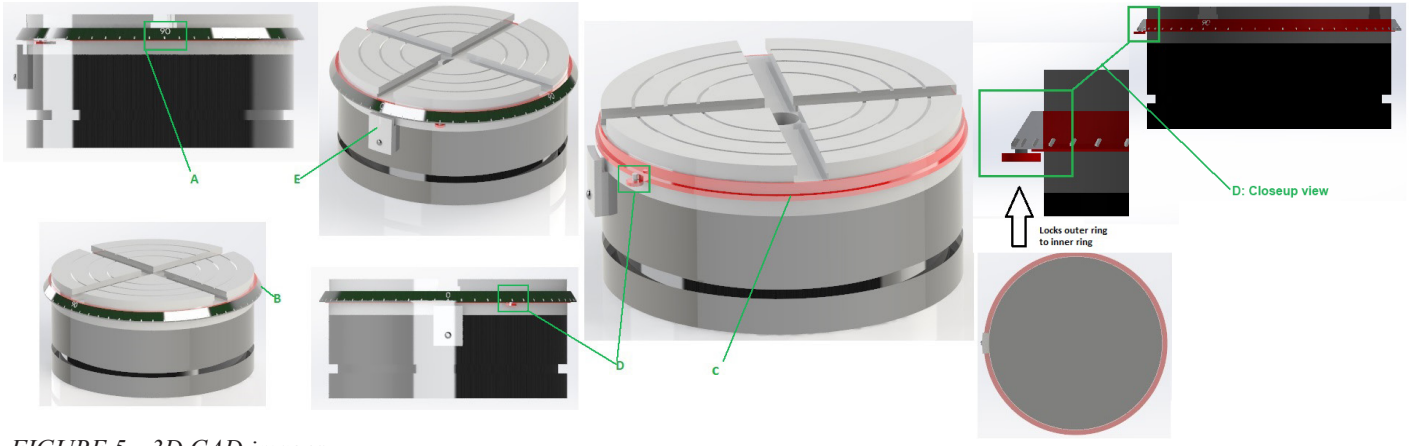

FIGURE 5—3D CAD images

A. Indents etched on the outer ring
B. Outer ring – anodized black aluminum (able to be twisted left/right). The black outer ring rotates around the red inner ring (via a push button or perhaps a cam lock) when setting to zero
C. Inner ring – close interference fit (anodized aluminum, tap on/tap off)
D. Locking screw – locks out ring to inner ring (see closeup view for more detail)
E. Zero Line (screw fixture/replaces metal pointer)

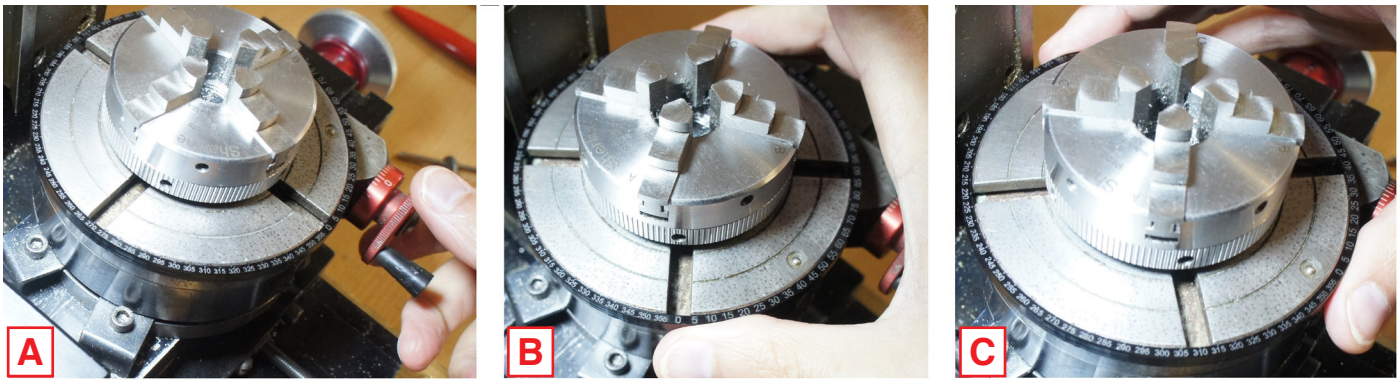

FIGURE 6—Photos A, B, and C using the press-fit dial to show how the Zero scale would work (The press-fit dial is not designed to be rotated).

A. The rotary table set at zero
B. The rotary table wound to forty-five degrees
C. The rotary table still at forty-five degrees with the dial re-set to zero

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