The present invention relates to centerless compasses particularly adapted for drawing circles.

The primary object of the invention is to provide a device for drawing circles quickly, accurately, and uniformly.

Another object of the invention is to provide a device by means of which circles can be drawn without punching holes in the surface on which the circle is being drafted.

A further object of the invention is to provide a device of the character described above having antifriction means to permit its operation with little or no resistance when drafting circles.

A still further object of this invention is to provide a device of the above type having a straight edge in combination with a right angle and 45 degree angle edge.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawings, in which:

Figure 1 is a plan view of the invention.
Figure 2 is a vertical sectional view, taken on the line 2—2 of Figure 1, looking in the direction of the arrows.
Figure 3 is an enlarged fragmentary sectional view, taken on the line 3—3 of Figure 5, looking in the direction of the arrows.
Figure 4 is an enlarged fragmentary sectional view, taken on the line 4—4 of Figure 5, looking in the direction of the arrows.
Figure 5 is an enlarged fragmentary plan view of the bearing mounting of the revolving disk, partially broken away for convenience of illustration.
Figure 6 is a perspective view of the bearing retaining ring and locking ring.
Figure 7 is an enlarged plan view of the assembled device showing the indicia thereon.
Figure 8 is a view similar to Figure 3 of a modified bearing structure for the invention.

Referring now to the drawings in detail wherein like reference numerals indicate like parts throughout the several figures, the reference character C indicates generally a centerless compass constructed in accordance with the invention.

The centerless compass C includes a flat plastic body B having a base edge 10 joined by a perpendicular edge 11 and spaced therefrom having a 45 degree angle edge 11a.

Revolverly mounted within the body B is a disk 12.

The disk 12 has an upstanding annular rim 12' having a bearing groove 13 formed therearound. A bearing groove 14 is formed internally of an annular rim 15 formed on the body B. Operating in and extending between the grooves 13, 14 are balls 16. The balls 16 are spaced apart circumferentially by bearing retaining ring 17 engaging in the notches 18 formed in the ring 17.

The retaining ring 17 is held within the assembly between the rims 12' and 15 by action of offset portions 19 formed on the ring 17 and contacting undersurface 20 of a flange 21 formed on the periphery of the rim 12'.

The offset portions 19 bear under the flange 21, preventing the rim 17 from being removed through the annular space 22 between the rim 15 and the rim 15 of the body B, referring particularly to Figures 3 and 4.

One of the outstanding features of this invention is that the disk 12 is mounted to the body member B about its periphery within suitable bearings, there being no center point as far as attaching the disk 12 to the body B is concerned.

The lower edge 24 of the disk 12 is slightly recessed above the lower edge 25 of the body B so as not to contact the surface upon which the device is being used. The body B is further raised from this surface by downward extending projections 26. By the above construction raising the disk 12 above the surface of the drawing being executed, as well as further raising the body B, little or no smearing of the drawing occurs.

Holes 27 pass through the disk 12, as best illustrated in the drawings, each hole being a spaced distance from the center 28 of the disk 12. Referring particularly to Figure 2, the holes 27 are cone shaped, larger on the upper surface than on the bottom surface. The primary reason for this is to prevent breaking pencil points in the operation of the disk 12 in making circles. The holes 27 are marked off as indicated by the numerals 29 along their center line.

In order to draw circles of smaller diameter than those provided by the holes in the disk 12, holes 30 in the body B of the device are provided. The center hole 28 in the disk 12 enables the operator to place the instrument over cross-lines or center lines on the drawing board for making the circles, which further marks the center of the circle where cross-lines are not available. The hole 28 has a great deal more taper than the holes 27 so that the operator can observe more closely the location of the same over the drawing paper, such as observing center lines or the like. Because of the fact that the disk 12 is raised above the surface of the paper, inking pens may be employed in the use of the device without smearing.

We will now explain how this new and improved centerless compass is used. The center hole 28 is placed over the center of a circle to be drawn, the pencil or pen is placed in the desired hole 27 corresponding to the diameter of the circle to be drawn. The operator then holds the body B down firmly and revolves the disk 12 by action of the pen or pencil, drawing the circle about the center 28.

By mounting the disk 12 at its periphery on bearing balls 16, clear vision is had at all times of the drawing of the circle and free movement is permitted of the disk 12.

One of the advantages of this instrument is that concentric circles may be drawn with the least amount of time. Where bow type instruments are used, considerable time is consumed in changing the setting for various diameters of concentric circles.

Referring particularly to Figure 7, every other row of holes 27 is numbered as indicated by 29 in regards to the diameter of circles that they will make. It will be noted that a move clockwise within the disk 12 provides a difference of $\frac{\pi}{2}$ inch in diameter between each row of holes. For quick reference, due to the fact that each other row of holes is numbered, it can be readily figured as to what diameter will result in putting the pencil in each particular hole, either numbered or unnumbered.

A modified form of the invention is illustrated in Figure 8 wherein a roller bearing 23 is substituted for the ball bearing 16 to support the disk 12 for antifriction movement in the body B.

Having thus described the preferred embodiments of the invention, it should be understood that numerous
structural modifications and adaptations, in addition to those illustrated, may be resorted to without departing from the scope of the appended claim.

What is claimed is:

A drafting implement comprising a generally flat plastic body, said body having a central circular opening formed therein and a plurality of graduated circular openings arranged in aligned relation adjacent one edge thereof, an upstanding annular rim integrally formed on said body surrounding the circular opening therein, said rim having an annular inner peripheral groove extending thereof, projections integrally formed on the lower face of said body extending oppositely of said annular rim to space said body above a supporting surface, a disk positioned concentrically within said circular opening in spaced relation to said rim, an upstanding peripheral rim integrally formed on said disk, said peripheral rim having an outer annular groove formed therein in facing relation to the groove formed in said annular rim, said grooves having central vertical walls, upper upwardly converging walls, and lower downwardly converging walls, rotatable antifriction ball bearings engaging in said grooves supporting said disk for rotary movement in said body, with the converging walls of said grooves engaging said ball bearings to maintain said disk aligned with said body, and means between said disk and said body circumferentially spacing said bearings, said disk having a plurality of sets of radially spaced guide openings for guiding a pencil in a pre-selected circular path on rotary movement of said disk, said means comprising a ring having bearing engaging notches arranged in circumferentially spaced relation thereabout and having means securing said ring between said disk and said body.

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