

C. F. DIECKMANN.
COMPASSES.

APPLICATION FILED JUNE 11, 1919.

1,343,664.

Patented June 15, 1920.

2 SHEETS—SHEET 1.

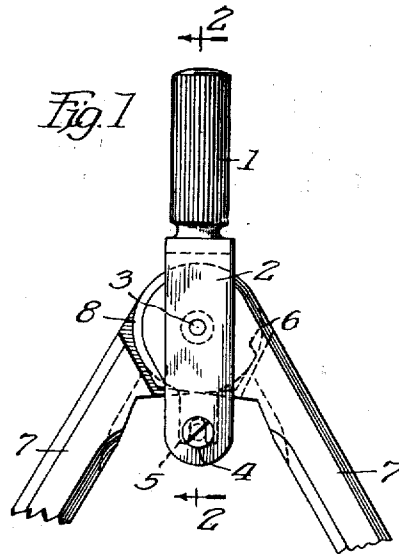


Fig. 8

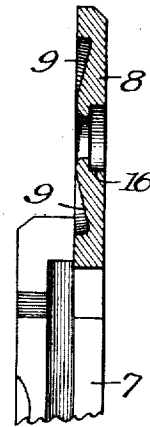


Fig. 3

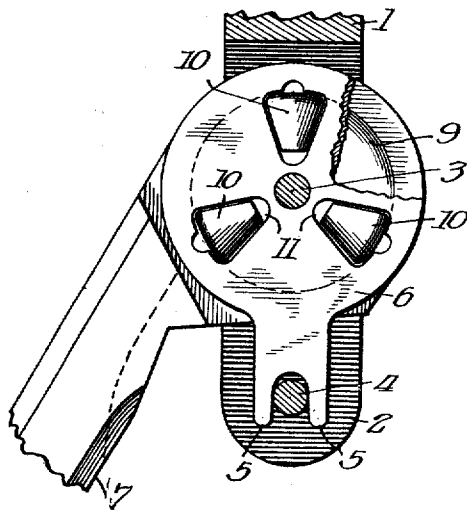
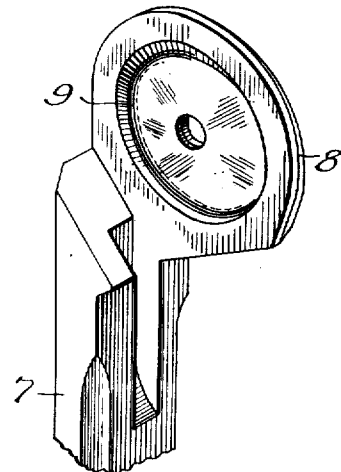


Fig. 4



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Fig. 5

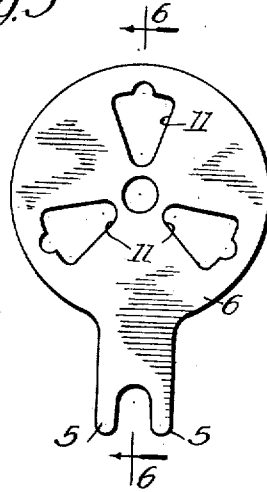


Fig. 6

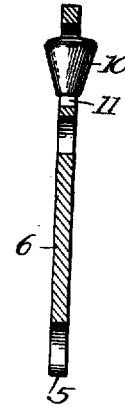


Fig. 2

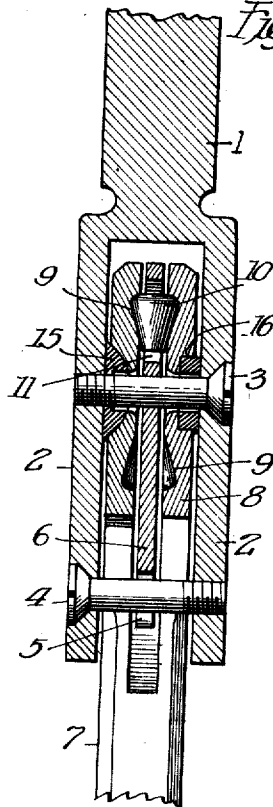
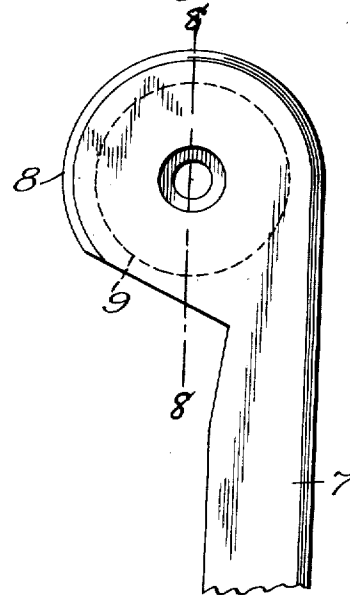


Fig. 7



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UNITED STATES PATENT OFFICE.

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COMPASSES.

1,343,664.

Specification of Letters Patent. Patented June 15, 1920.

Application filed June 11, 1919. Serial No. 303,271.

To all whom it may concern:

Be it known that I, CARL F. DIECKMANN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Compasses, of which the following is a specification.

My invention relates to compasses, dividers and like instruments and the object is to provide a compass having a self centering handle and so constructed that the device readily lends itself to quantity production. Another object is to provide a device of this character in which the handle may move out of center in case it forcibly collides with some external object, but will offer considerable resistance to such accidental displacement. If the head of a compass is rigidly held in central position with respect to the two legs, it is apt to become bent or broken in case it is dropped or subjected to rough usage. It is advantageous, therefore, to make the handle yieldable, but as a result of my invention it is able to offer considerable resistance to displacement, the resistance being limited sufficiently, however, to prevent breakage or distortion of the parts.

I accomplish my objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is a side view of an instrument embodying the invention, the lower portion of the legs being broken away.

Fig. 2 is a sectional view on the line 2—2—, Fig. 1.

Fig. 3 is a detail view showing the centering plate, the conical rollers and associated parts.

Fig. 4 is a perspective view showing the inner face of the shank of one of the legs.

Fig. 5 is a face view of the centering plate.

Fig. 6 is a sectional view on the line 6—6, Fig. 5, this view showing the rollers in position.

Fig. 7 is a view of one of the shanks.

Fig. 8 is a sectional view on the line 8—8, Fig. 7.

Like numerals denote like parts through the several views.

In the type selected to illustrate the invention, the head comprises a handle 1 having two depending arms 2, 2. A pivot pin 3 is adapted to pass through one of said

arms and screw into the opposite one as best shown in Fig. 2. A pin 4 is fastened at the lower end of the arms in such position as to pass between the branches 5, 5 of the lower end of the centering plate 6.

The two legs 7, 7 have shanks 8, 8 with recesses 9 formed in their inner faces for receiving the conical rollers 10. The rollers are arranged radially with their smaller ends toward the center. The centering plate has an aperture 11 for each of the rollers, the apertures being arranged equidistantly and practically conforming to the outline of the rollers.

The shanks 8 are countersunk on the outer faces to receive two washers 15, 16. The washer 15 is in the form of a segment of a sphere, the flat base resting upon the inner surface of one of the arms 2 and the spherical crown fitting into the countersink in the adjacent shank. The washer is thick enough to maintain a space between the inside of the arm and the outside of the shank. The washer 16 is in the form of a plain ring which, however, is thick enough to maintain a space between the shank in which it is countersunk and the adjacent surface of the arm 2. Both of the washers encircle the pin 3, but the washer 16 has an internal diameter which is appreciably larger than the diameter of the pin, while the internal diameter of washer 15 is such as to make a turning fit with the pin. The consequence is that the washer 16 is free to move slightly in a plane transverse to the pin. When such movement occurs, the opposite shank will articulate upon the washer 15 after the manner of a ball and socket joint.

In operation, when the legs 7, 7, are swung toward each other or away from each other they will cause the rollers 10 to roll about their longitudinal axes, said axes naturally remaining stationary and hence causing the rollers to hold the centering plate stationary. As the centering plate engages the pin 4, which is rigid with the handle, it follows that the handle 1 will remain stationary, *i. e.*, centered with respect to the two legs. As a result of the slant of the bottom of the recesses 9, the rollers have a constant tendency to move radially outward which causes their outer ends to bear against and frictionally engage the outer rims of the recesses 9.

This generates, altogether, a large amount

of friction. In the case of ball bearings a ball cannot, theoretically, bear at more than one or two points on a given member at a given time, but with my construction, the rollers make line contact with one slope of the recess in the shank and surface contact with the other slope (or the rim) of the groove, where the end of the roller engages it. Consequently, the amount of friction produced is very much greater than it is with a ball bearing and yet the amount of friction may be confined within proper limits by suitably adjusting the screw pin 3. This construction also produces a very durable instrument because the wear is distributed over the entire side, and upon the end of the roller. By thus distributing the wear over a much larger area than is obtainable in a ball bearing, the life of the device is greatly prolonged and adjustment is required only at long intervals. My construction has another advantage in that it lends itself to quantity production. It will be noted that the apertures 11 in the centering plate are somewhat longer than the rollers and thus afford the rollers a certain freedom of movement in a radial direction. Hence, if the recesses 9 should not be perfectly accurate, the parts may adjust themselves, especially in view of the ball and socket connection between one of the arms 2 and the adjacent shank.

It will be understood by those skilled in the manufacture of devices of this class that very slight inaccuracies of manufacture will, in an ordinary instrument, produce a more or less inferior article. To produce great accuracy, however, requires skilled and patient workmen and entails considerable time and expense. It is a great advantage, therefore, to obtain a construction such as mine which enables the manufacturer to produce a smooth acting, long wearing, and accurate instrument by methods which utilize to an unusual extent jigs, dies, and similar labor saving devices.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:

1. A device of the class described, having a head, conical rollers, legs having shanks with annular recesses sunk in their inner faces to accommodate said rollers, and a centering plate interposed between said shanks and having apertures to accommodate said rollers, said centering plate being connected to the head for holding it in central position.

2. A device of the class described, having a head comprising a handle and two depending arms, conical rollers, legs having shanks with annular recesses sunk in their inner faces to accommodate said rollers and a centering plate interposed between the shanks and having apertures to accommodate said

rollers and be held in central position by them, said rollers being adapted to make end contact with the outer rims of said recesses.

3. A device of the class described having a head comprising a handle and two depending arms, conical rollers, legs having shanks with annular recesses sunk in their inner faces to accommodate said rollers, a centering plate interposed between said shanks and having apertures to accommodate said rollers, the edges of the apertures being fairly close to the sides of the rollers whereby the rollers keep the plate centered, said plate being connected to the head for holding it in central position, said rollers being adapted to make end contact with the outer rim of the annular recesses.

4. A compass having a head comprising a handle and two depending arms, two legs having shanks with concentric recesses sunk in their inner faces, said recesses having sloping sides, conical rollers the sides of which make line contact with one slope of the recesses and the ends make surface contact with the remaining slope of the recesses, and a centering plate interposed between said shanks and having apertures the sides of which are adapted to engage the sides of the rollers for holding the plate centered, the plate being connected to the head for holding the handle centered.

5. A compass having a head comprising a handle and two depending arms, two legs having shanks with concentric recesses sunk in their inner faces, said recesses having at least one sloping wall, conical rollers the sides of which make line contact with the sloping wall of the recesses and the ends make surface contact with the remaining wall of the recesses, a centering plate interposed between said shanks and having apertures the sides of which are adapted to engage the sides of the rollers for holding the plate centered, the plate being connected to the head for holding the handle centered, and a pivot pin mounted in the two depending arms, said pin making a turning fit with the centering plate.

6. A device of the class described having a head comprising a handle and two depending arms, two legs having shanks with concentric recesses formed in their inner faces, the recesses having sloping sides, truncated conical rollers rolling in said recesses and making line contact with one slope of the recesses and end contact with the other slope, the shanks having sockets in their outer faces, washers seating in said sockets and protruding from the outer surfaces of the shanks, and means for drawing the arms into contact with the protruding ends of the washers for holding the parts centered.

7. A device of the class described having a head comprising a handle and two depending arms, two legs having shanks with

- concentric recesses formed in their inner faces, said recesses having sloping sides, truncated conical rollers rolling in said recesses and making line contact with one slope of the recess and end contact with the other slope, a centering plate interposed between said shanks and having apertures adapted to accommodate said rollers, the shanks having sockets in their outer faces, washers seating in said sockets and protruding from the outer surfaces of the shanks, and means for drawing the arms into contact with the protruding ends of the washers for holding the parts centered.
8. A device of the class described having a head comprising a handle and two depending arms, two legs having shanks with concentric recesses formed in their inner faces, at least one side of said recesses being sloping, truncated conical rollers rolling in said recesses and making line contact with one side of the recess and end contact with the other side, the shanks having sockets in their outer faces, washers seating in said sockets and protruding from the outer surfaces of the shanks, and a screw pin for drawing the arms into contact with the protruding ends of the washers for holding the parts centered, one of said washers being in the shape of a segment of a sphere, and the socket in the shank which receives it being spherically concave to fit over the spherical portion of the washer, and the opposite washer having an enlarged internal diameter so that it may move slightly transversely to said pin.
- In witness whereof, I have hereunto subscribed my name.

CARL F. DIECKMANN.