No. 663,164. Patented Dec. 4, 1900.

W. H. FAUBER.

BALL CASTER.

(Application filed Aug. 5, 1899.)

(No Model.)

Fig 1

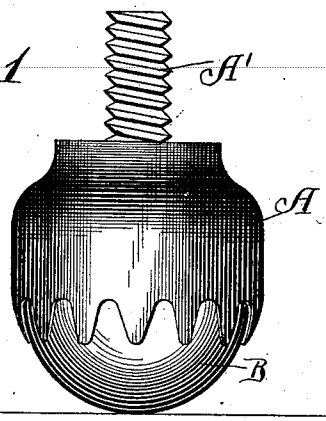


Fig 2

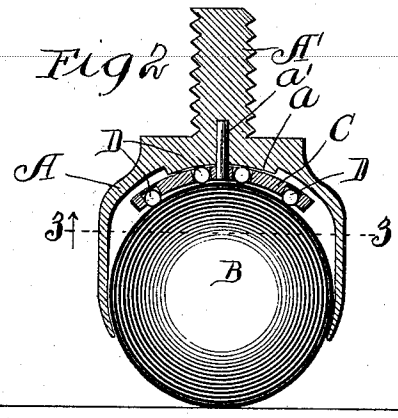


Fig 3

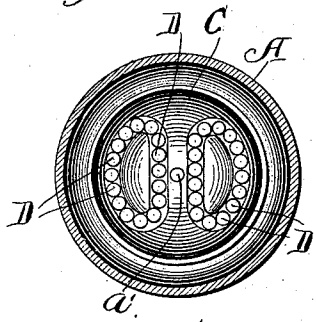


Fig 4

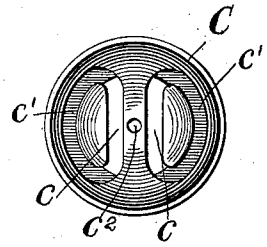


Fig 5

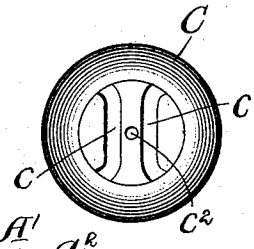


Fig 6

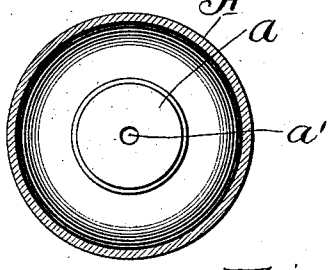


Fig 7

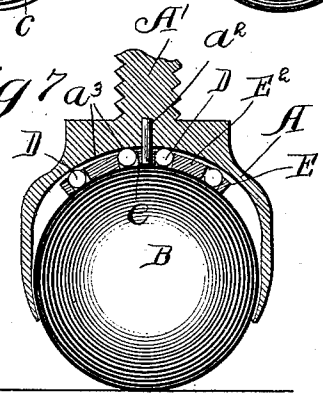


Fig 8

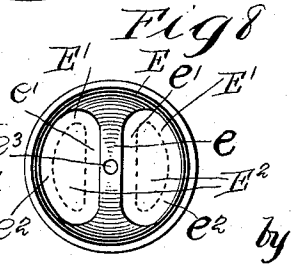


Fig 9



Witnesses:-
Carl H. Crawford
William H. Hall

Inventor:-
William H. Fauber
by Poole & Brown his Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM H. FAUBER, OF CHICAGO, ILLINOIS.

BALL-CASTER.

SPECIFICATION forming part of Letters Patent No. 663,164, dated December 4, 1900.

Application filed August 5, 1899. Serial No. 726,273. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. FAUBER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Ball-Casters; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in ball-casters wherein one of the bearing members is formed by a spherical rotative element and antifriction-balls are interposed between the rotative element and the other bearing-surface.

The invention is shown as embodied in a furniture-caster; but it may be otherwise embodied where a bearing of this character is desired.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of a caster made in accordance with my invention. Fig. 2 is an axial section thereof. Fig. 3 is a horizontal section taken on line 3 3 of Fig. 2, showing in bottom plan view the arrangement of the antifriction-balls. Figs. 4 and 5 are bottom and top plan views, respectively, of the shifting guide-plate which is interposed between the supporting-roller and the bearing-surface of the casing and in which guide-grooves or races for the antifriction-balls are formed. Fig. 6 is a horizontal section of the casing, showing in bottom plan view the bearing-surface therein. Fig. 7 is an axial section of a modified form of a caster. Fig. 8 is a bottom plan view of the shifting guide-plate used therein. Fig. 9 shows a part of such plate removed from the other parts thereof.

As shown in said drawings, A designates a casing which is open at its lower end and is provided interiorly in its upper part with a bearing-surface or cup *a*, which is shown as projecting slightly below the inner face of the upper wall of the casing, and at its upper end with an exterior screw-threaded shank A', by means of which it may be attached to an article of furniture. B designates a spherical supporting-roller which is contained loosely within said casing and protrudes at its lower part from the open end of said casing, so that it may rest in contact with a supporting-surface.

C designates a guide-plate which is interposed between the supporting-roller and the upper wall of the casing, said plate having the general form of a segment of a hollow sphere, so as to conform to the adjacent surfaces of the cup *a* and supporting-roller.

D D designate a plurality of antifriction-balls which are adapted to transmit to the supporting-roller the weight brought on the casing.

The plate C is constructed to provide endless guide-grooves or races, within which the balls are seated and which serve to hold said balls in proper position with respect to the cup *a* and supporting-roller, and is adapted to be moved or shifted, so as to change the position of the guide-grooves or races therein in accordance with the direction of travel of the caster over its supporting-surface on which the supporting-ball rests. One guide-groove or race is provided on each side of the center of said plate, and each guide-groove consists of a substantially straight portion *c* and a curved portion *c'*, giving thereto approximately the form of the letter **D**. Said substantially straight portions *c* of said grooves or races are located between the curved portions thereof and the center of the plate and are substantially parallel with each other, while the curved portions of the grooves are located adjacent to the outer margin of the plate.

Said parallel portion *c* of the guide-grooves extends entirely through the thickness of the plate; but the curved portions of the guide-grooves are formed in the lower surface of said plate only, so that the antifriction-balls which occupy such parts of the grooves have contact with the supporting-roller and the upper walls of said grooves and serve to hold the plate out of contact with the supporting-roller. Said antifriction-balls are made of greater diameter than the thickness of the plate, so that the balls which occupy the straight portions *c* of the guide-grooves or races extend beyond both the upper and lower

sides of the plate and have bearing contact with the cup *a* and with the top surface of the supporting-roller. The guide-grooves or races are made of sufficient width to permit free movement of the balls therein. Only the balls D, which at any given time occupy said substantially straight portions of the grooves or races, receive the weight which is sustained by the caster, the remaining balls sustaining only the weight of the plate C. Said plate is connected with the casing in such manner that it may be shifted or rotated about its central axis, whereby the portions *c* of the guide-grooves or races may be always parallel with the line of movement of the caster, and therefore parallel with the plane of rotation of the supporting-roller. As herein shown, said plate is provided with a central aperture c^2, which is loosely engaged by a pin a', which projects downwardly from the bearing-surface of the cup *a* centrally thereof.

The lower margin of the casing may be crimped inwardly, as shown, to hold the supporting-roller properly in place, as when the caster is being handled or when it is lifted away from its supporting-surface.

The operation of the caster may be readily understood from the foregoing description. When weight is brought upon the caster and it is caused to move in a manner to rotate the supporting-roller, the antifriction-balls D being in contact with the cup *a* and with the supporting-roller said balls roll or travel between the supporting-roller and the cup and through the endless guide-grooves or races. When the direction of movement of the caster, and therefore the direction of rotation of the supporting-roller, is changed, the pivotal connection of the guide-plate with the casing permits said plate to be shifted or turn about the pin a', so as to bring the portions *c* of the guide-grooves or races parallel with the new plane of rotation of the supporting-roller, after which the operation of the device is the same as before. Such turning or shifting of the plate necessarily takes place, because if the supporting-roller be turned when the straight parts *c* of the guide-grooves are at an angle or transverse with respect to the plane of rotation of the supporting-roller the balls D in rolling between the supporting-roller and cup *a* will be carried against and exert pressure upon the sides of the guide-grooves in the guide-plate in such manner as to turn or shift said plate until the straight parts *c* are again parallel with the plane of rotation of the supporting-roller. Those of the antifriction-balls D which are at any time beneath or in contact with the cup *a*, and which therefore receive the weight brought on the caster, being free to move in a path parallel with the plane of rotation of the supporting-roller, and which is the path of least resistance, the friction between said parts is reduced to a minimum and the supporting-roller may freely rotate.

The provision of the shifting guide-plate C, constructed and arranged in the manner described, is an important feature of my invention, as it enables the path of movement of those of the balls which are in their active or operative position to be maintained parallel with the plane of rotation of the supporting-roller and prevents said antifriction-balls being pressed against the side walls of the races or guide-grooves, which would result in increased friction and impair the efficiency of the caster.

In Figs. 7, 8, and 9 is shown a modified form of the caster. In said figures the casing A and the supporting-roller B are made substantially as shown in the previous figures. The antifriction-balls are also arranged in the same manner as before described. In this instance, however, the caster is provided with a shifting guide-plate E, which, though performing the same function as the similar part of the previously-described construction, is made of a slightly-modified construction. In this instance said plate is provided on each side of its center with oblong openings E′, which are divided by a central part *e*, and within said openings are contained loose or floating pieces E^2, which are made of the same shape as the openings, but smaller than the same, thereby providing between said floating pieces and the main body of the plate endless ball-races or guide-grooves comprising parallel portions e' e' and curved portions e^2 e^2. The part *e* of said plate is provided with an aperture e^3, which is adapted for engagement with a depending pin a^2, and by means of which said plate may be shifted or turned about its center to bring the antifriction-balls which occupy the parallel portions of the races in a plane parallel with the plane of rotation of the supporting-roller B. The part of the interior surface of the upper wall of the casing located immediately above the outer or curved portion of the ball-races is not concentric with the bearing-surface a^3, which is engaged by the balls in the portions of the races nearest the center of the plate, but is more widely separated from the supporting-roller than such part a^3, so that the balls occupying the said curved portions of the races are out of contact with said upper wall of the casing. As in the prior construction, the supporting-balls are made of such diameter as to extend beyond the upper and lower surfaces of the plate, so that when occupying the portions e' of the guide-grooves or races they will be in contact with the supporting-roller and the bearing-surface a^3 and in position to transmit weight from the casing to the supporting-roller. Said grooves are made of a width slightly greater than the diameter of the balls, so that said balls may pass freely therethrough. As the curved portions of the grooves in this construction extend entirely through the plate, said plate is not supported on the antifriction-balls, as in

the prior construction, but rests directly upon the upper surface of the supporting-roller. The operation of this form of device is obviously the same as that of the previously-described construction.

I claim as my invention—

1. A ball-caster comprising a part having a concave bearing-surface, a spherical body, a plurality of antifriction-balls, and a generally horizontal plate between said body and concave bearing-surface provided with two endless races for the balls, one on each side of the center of said plate, and the adjacent parts of which races extend through the plate and are generally parallel with each other and with the plane of rotation of the sperical body, the part of the concave bearing-surface adjacent to the parallel portions of the races being located at a distance from the spherical body, when the caster is in its operative position, equal to the diameter of the antifriction-balls, and the remaining portions of the spherical body and the concave bearing-surface being located at a greater distance apart.

2. A ball-caster comprising a part having a concave bearing-surface, a spherical body, antifriction-balls, and a shifting guide-plate for said antifriction-balls, constructed to guide the balls successively away from and toward the space between the spherical and concave bearing-surfaces.

3. A ball-caster comprising a part having a concave bearing-surface, a spherical body, antifriction-balls, and a shifting guide-plate located between said body and the bearing-surface provided with an endless race or guide-groove for said balls, a part of which groove extends through the plate.

4. A ball-caster comprising a part having a concave bearing-surface, a spherical body, two sets of antifriction-balls, and a rotating guide-plate pivoted to said part concentrically of said bearing-surface, and provided with two grooves or races within which said balls travel, one of said grooves being located on each side of the center of the plate.

5. A ball-caster comprising a part having a concave bearing-surface, a spherical body, antifriction-balls, and a shifting guide-plate interposed between said bearing-surface and spherical body, and provided with an endless race within which said balls are seated, a portion of said race having its sides located in parallel planes and acting to guide the balls in a path parallel with the plane of rotation of the spherical body.

6. A ball-caster comprising a part having a concave bearing-surface, a spherical body and antifriction-balls, of a shifting guide interposed between said bearing-surface and spherical body, and provided with two endless races within which said balls are seated, portions of said races being parallel with each other and adapted to guide the balls in parallel paths across said concave bearing-surface.

7. A ball-caster comprising a part having a concave bearing-surface, a spherical body, antifriction-balls, a shifting guide-plate between said body and bearing-surface provided with a guide-groove or ball-race having parallel side walls which extend therethrough and within which said antifriction-balls travel, said balls having a diameter greater than the thickness of the said plate.

8. A ball-caster comprising a part provided with a concave bearing-surface, a spherical body, two sets of antifriction-balls, a guide-plate between said body and the bearing-surface which is rotatively mounted on a pin which projects from said bearing-surface, said plate being provided at each side of the center thereof with an endless groove or race in which said antifriction-balls travel, and the balls only which at a given time occupy the adjacent parts of the grooves receiving the weight brought upon the caster.

9. A ball-caster, comprising a part provided with a concave bearing-surface, a spherical body, two sets of antifriction-balls between said spherical body and the bearing-surface, and a rotative plate interposed between said supporting-roller and bearing-surface which is provided with two endless guide-grooves or races, within which said balls travel, the parts of said grooves adjacent to the center of the plate being parallel with each other and adapted to guide the balls in parallel paths across said concave surface.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 3d day of August, A. D. 1899.

WILLIAM H. FAUBER.

Witnesses:
C. CLARENCE POOLE,
WILLIAM L. HALL.