

No. 747,947.

PATENTED DEC. 29, 1903.

H. S. CROSS.
BALL CASTER.

APPLICATION FILED JUNE 4, 1900.

NO MODEL.

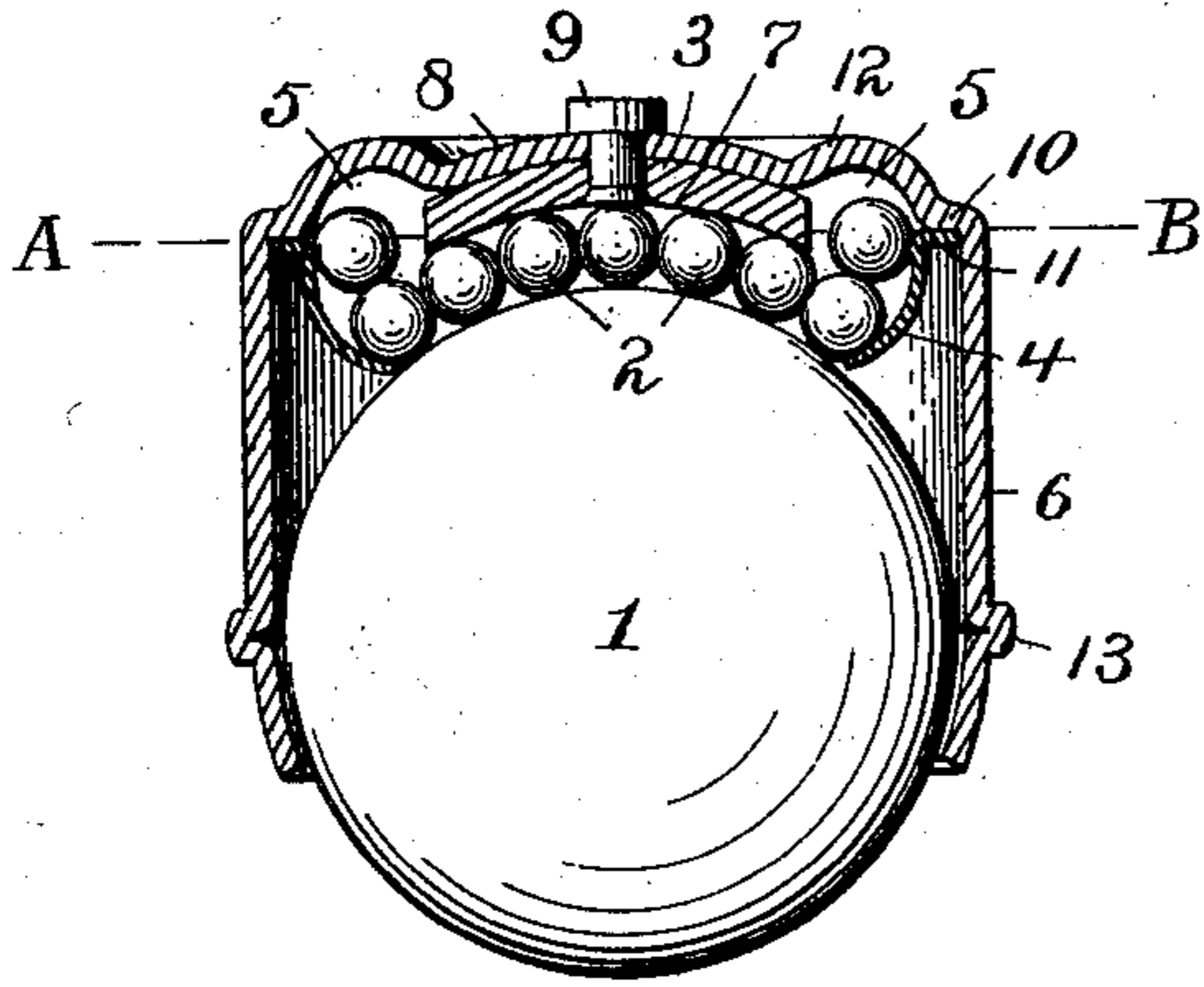


Fig. 1.

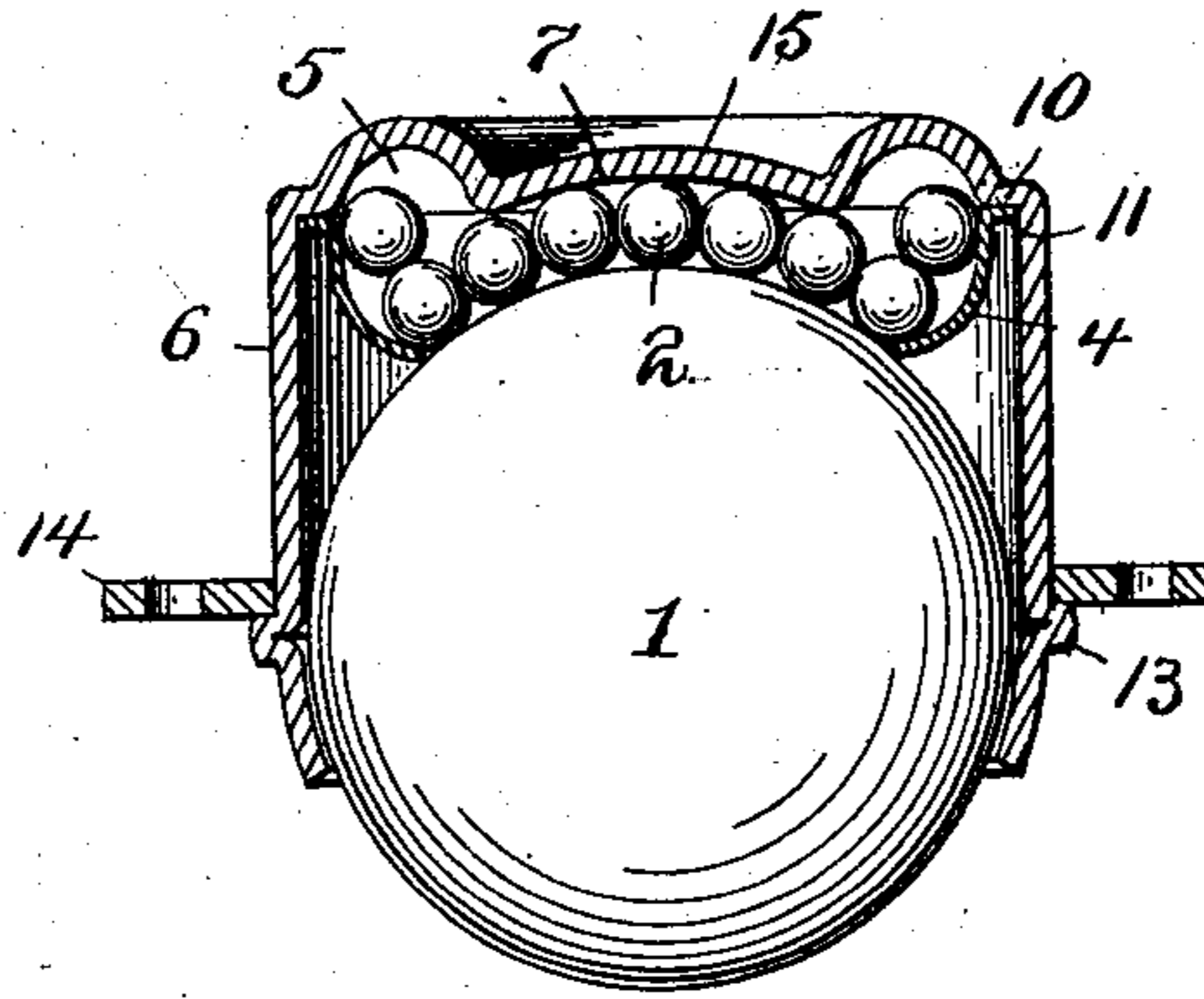


Fig. 4.

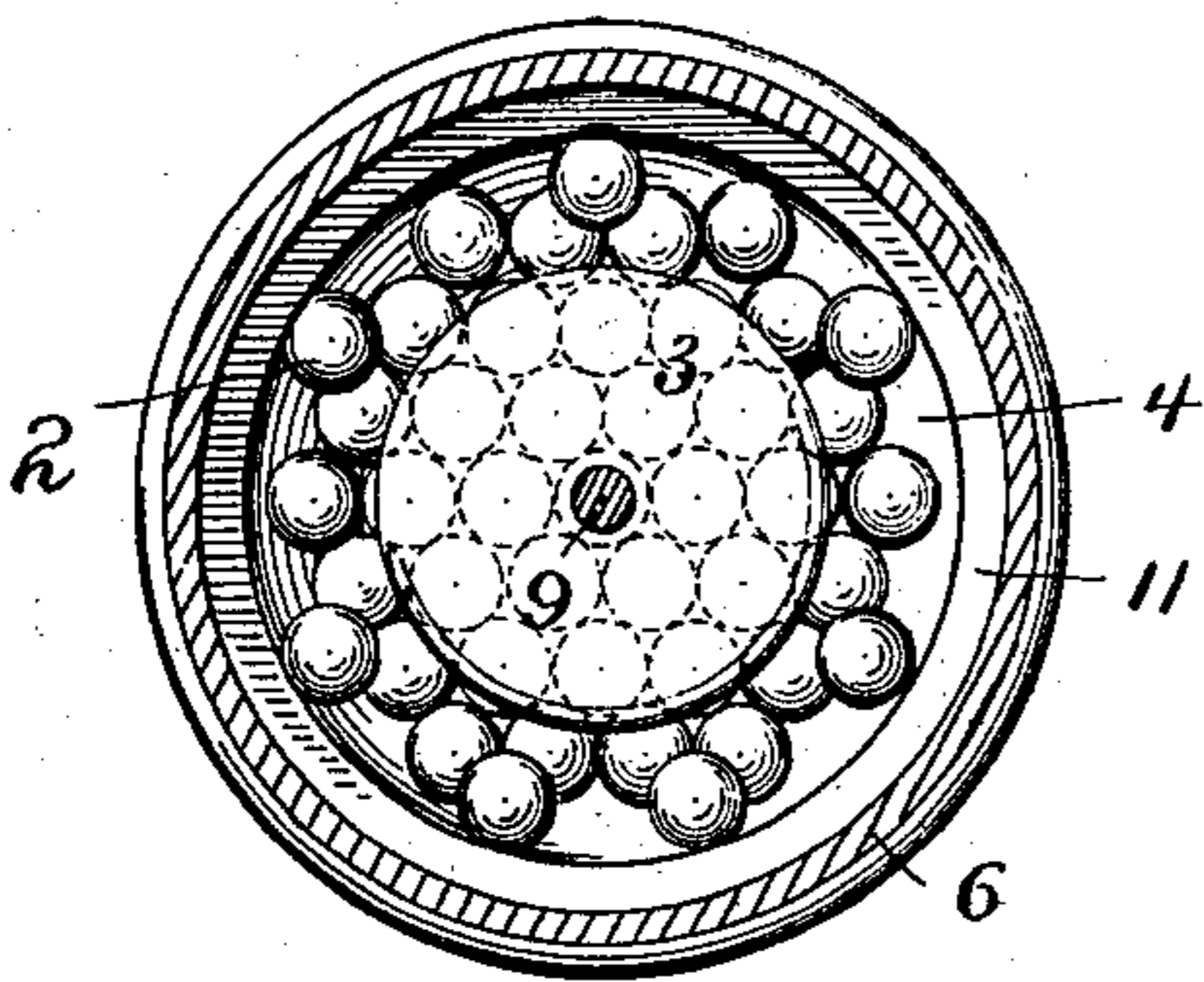


Fig. 2.

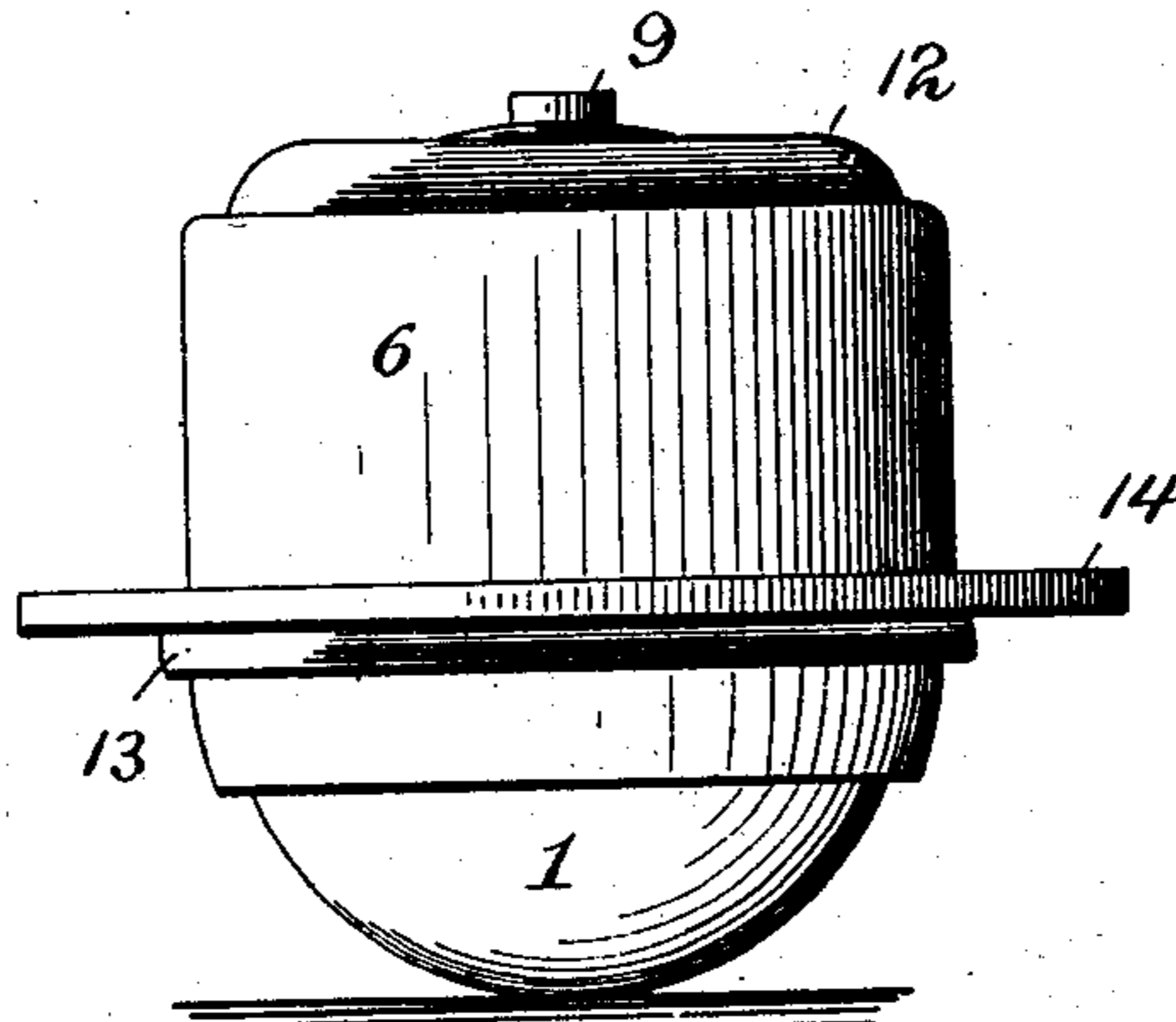


Fig. 3.

WITNESSES:

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HENRY S. CROSS, OF MOUNT VERNON, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ACME BALL BEARING CASTER COMPANY, A CORPORATION OF NEW YORK.

BALL-CASTER.

SPECIFICATION forming part of Letters Patent No. 747,947, dated December 29, 1903.

Application filed June 4, 1900. Serial No. 19,007. (No model.)

To all whom it may concern:

Be it known that I, HENRY S. CROSS, a citizen of the United States, and a resident of Mount Vernon, Westchester county, and State of New York, have invented certain new and useful Improvements in Ball-Casters, of which the following is a specification.

My invention relates to that class of ball-casters in which the larger bearing-ball supports its load through the intervention of a number of relatively smaller antifriction-balls, and more particularly to that type of such casters in which a ball-guiding relief-chamber is provided to receive the antifriction-balls as they leave the bearing-ball and guide them back to another point on the bearing-ball, where they are needed to take active part in supporting the load carried by the caster and prevent friction.

My invention has for an object to simplify and cheapen the construction of this special type of caster. To that end my invention consists of the novel features of construction and combinations of parts herein described.

The accompanying drawings, which are referred to herein and form a part hereof, illustrate by way of example two embodiments of my invention.

In the drawings, Figure 1 is a vertical central section of the casing of a caster constructed in accordance with my invention, the bearing-ball and antifriction-balls being shown in elevation. Fig. 2 is a transverse section of the same, taken on the line A B, Fig. 1. Fig. 3 is a side elevation of the caster shown in Fig. 1; and Fig. 4 is a view similar to that of Fig. 1, showing a modification.

Like numerals of reference refer to like parts throughout the several views.

Referring to the drawings in detail, and particularly to the construction shown in Fig. 1, 1 represents the main bearing-ball of the caster; 2, a plurality of smaller antifriction-balls; 3, a bearing member, between which and the bearing-ball 1 the antifriction-balls 2 are adapted to roll; 4, a ball-guiding member; 5, a ball-guiding relief-chamber, and 6 a casing forming a cavity in which said parts are inclosed. In accordance with my invention the casing 6 is formed of a single piece of metal, preferably such as may be pressed

or drawn into the desired shape—as, for example, rolled or sheet steel. The bearing-ball 1 projects through the lower open end of the casing to such extent as to enable it to make contact with a floor or other track upon which it is designed to roll. The bearing member 3 is centrally located at the closed end of the casing and is provided with a concave bearing-surface 7, facing the bearing-ball. The bearing-surface 7 should have a curvature such that when the bearing-ball 4 is separated therefrom by the antifriction-balls 2 or by a space equal to the diameter of said balls the bearing-surface and the bearing-ball will be substantially concentric with each other. The bearing member 3 is preferably concavo-convex in form, as by this construction it can be formed out of sheet metal by one stamping or punching operation. In the form of the device shown in Fig. 1 the casing 6 is provided at its closed end with a centrally-located concavo-convex portion 8, to the inner concave side of which the separate concavo-convex bearing member 3 is fitted and to which it is secured by suitable means, such as the rivet 9. The bearing member 3 is preferably circular in outline, and it should be of such dimensions that there are always three at least of a diametrical line of antifriction-balls in contact therewith.

The guiding member 4 is in the form of a ring, which may be stamped or pressed out of suitable thin sheet metal, such as tin-plate or sheet-brass, or it may be made of other suitable material. The upper surface of the member 4 constitutes an annular ball-guiding surface, which is concave in section and so located as to guide the antifriction-balls 2 away from the surface of the bearing-ball 1 as said balls 2 pass from between the bearing-ball and the bearing-surface 7 or very soon thereafter. In order to hold the guiding ring or member in its proper position with relation to the bearing-surface and the bearing-ball, the casing 1 is provided with an annular shoulder 10, against which the outturned flange 11 of the ring abuts. The ring 4 may be held in place against the shoulder 10 by any suitable means. Preferably, however, it is made slightly larger in diameter than the inner diameter of the casing, so that when the ring

has been sprung into place it will be held there by friction.

The ball-guiding relief-chamber 5 surrounds the bearing member 3 and in the example shown is made up partly by the concave surface of the guiding-ring 4, partly by the outer edge of the bearing member 3, and partly by an annular recess 12, formed in the end of the casing 6, adjacent to and concentric with the bearing member. It is essential that the distance between the walls of the chamber 5 thus formed should be materially greater in every direction than the diameter of the antifriction-balls 2 in order to prevent the binding of said balls when in action. On the other hand, it is desirable to make the space in said chamber as small as possible in order that the caster may be constructed with a minimum number of antifriction-balls. The caster may be made to operate smoothly and without binding when the ball-guiding relief-chamber 5 is made substantially as shown—that is to say, substantially oblong or oval in cross-section, with the minor axis not more than one and a half and the major axis not more than two diameters of the antifriction-balls 2. It will be seen that the relief-chamber 5 is arranged with its major axis at substantially a right angle with the general plane of the bearing-surface 7 and with the annular opening therein through which the balls enter and leave the chamber located at the inner side of the portion thereof which is adjacent to the main bearing-ball. This arrangement is desirable on account of the economy in space and materials of construction afforded thereby, which advantages are attained in a very perfect manner by my invention.

In order to secure the caster in position, the casing 6 is provided with an annular flange 13, preferably formed near the bottom thereof, against the upper side of which a ring 14 may be forced into position. The ring 14 is provided with openings through which screws may be passed to hold the caster permanently in place on an article of furniture or other object.

In operation the antifriction-balls 2 are guided away from the advancing side of the bearing-ball 1 and into the relief-chamber 5 by the inner guiding-surface of the ring 4, through which chamber the balls are passed laterally in either direction by means of such of their number as are at the time being advanced by the bearing-ball while rolling over the floor or other surface. By reason of the annular form of the ball-guiding surfaces the caster as a whole is free to move easily and without friction in any direction.

My invention is not limited to the particular construction shown, as many changes may be made therein without departing from the principles of my invention or sacrificing its chief advantages. For example, where it is desirable the separate bearing member 3 may be omitted, the concave bearing-surface 7

being in that case formed directly by the inner surface of the concavo-convex portion 15 of the closed end of the casing 16, as shown in Fig. 4. Many other changes will readily suggest themselves to skilled mechanics.

What I claim as new, and desire to secure by Letters Patent, is—

1. A ball-caster comprising an integral casing open at one end and closed at the opposite end, said closed end having a central concavo-convex portion, a bearing-ball held in the open end of said casing, an annular chamber formed within said casing around said concavo-convex portion and adjacent to the bearing-ball, and antifriction-balls located between said central concavo-convex portion and said bearing-ball and also in said chamber, the distance between the walls of said chamber and the conformation of said walls being such as to form the return-ball guiding-chamber of the caster.

2. A ball-caster comprising an integral casing open at one end and closed at the opposite end, said closed end having a central concavo-convex portion and an annular concavo-convex portion, a bearing-ball held in the open end of said casing, a ring having an annular concave surface located in said opening and forming with said annular concavo-convex portion an annular chamber, and antifriction-balls located between said central concavo-convex portion and said bearing-ball and also in said annular chamber, the distance between the walls of said annular chamber and the conformation of said walls being such as to form the return-ball guiding-chamber of the caster.

3. A ball-caster comprising an integral casing open at one end and closed at the opposite end, said closed end having a central concavo-convex portion, a concavo-convex bearing member secured with its convexed portion within the concave portion of the closed end of said casing, a bearing-ball held in the open end of said casing, an annular chamber formed within said casing around said concavo-convex portion and adjacent to the bearing-ball, and antifriction-balls located between said central concavo-convex portion and said bearing-ball and also in said chamber and the conformation of said walls being such as to form the return-ball guiding-chamber of the caster.

4. A ball-caster comprising an integral casing open at one end and closed at the opposite end, said closed end having a central concavo-convex portion and an annular concavo-convex portion, a concavo-convex bearing member secured with its convex portion within the concave portion of the closed end of said casing, a bearing-ball held in the open end of said casing, a ring having an annular concave surface located in said opening and forming with said annular concavo-convex portion an annular chamber, and antifriction-balls located between said central concavo-convex portion and said bearing-ball

and also in said annular chamber, the distance between the walls of said annular chamber and the conformation of said walls being such as to form the return-ball guiding-chamber of the caster.

5 5. A ball-caster comprising an integral casing struck up or otherwise formed from a single piece of sheet metal, said casing being open at one end and closed at the opposite
10 end, a concave bearing-surface on the inner side of the closed end of said casing, said closed end having formed therein and adjacent to and surrounding said bearing-surface an inner annular recess and an outer annular shoulder, a
15 bearing-ball held in the open end of said casing and in coöperative relation with said bearing-surface, an annular guiding-ring seated

against said annular shoulder, and antifriction-balls located between said bearing-surface and said bearing-ball and also in the chamber formed between said annular recess and said guiding-ring, the distance between the walls of said chamber being materially greater than the diameter of the antifriction-balls, whereby binding of the balls when in
20 operation is prevented.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY S. CROSS.

Witnesses:

J. H. FREEMAN,
EDWIN SEGER.