

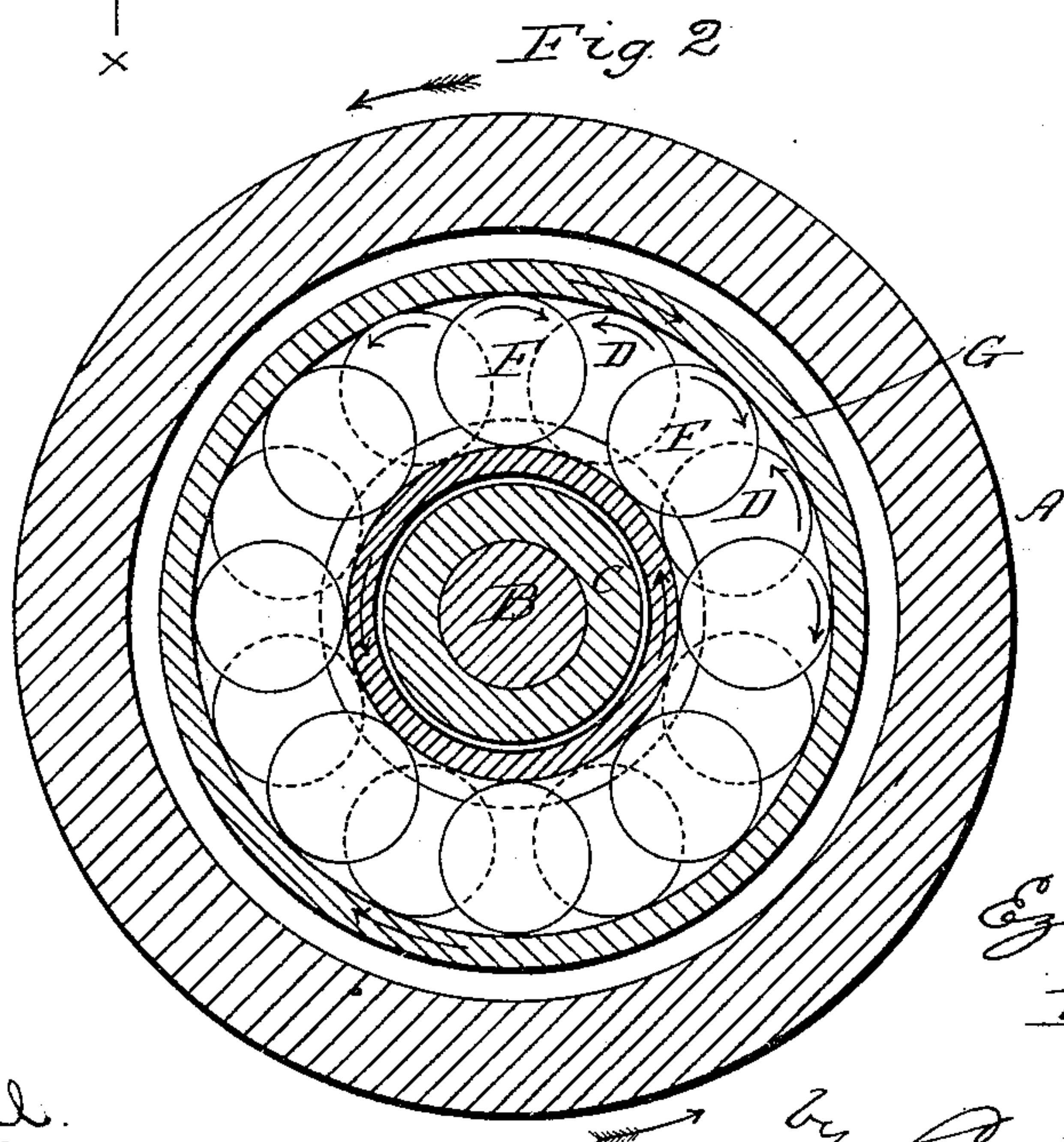
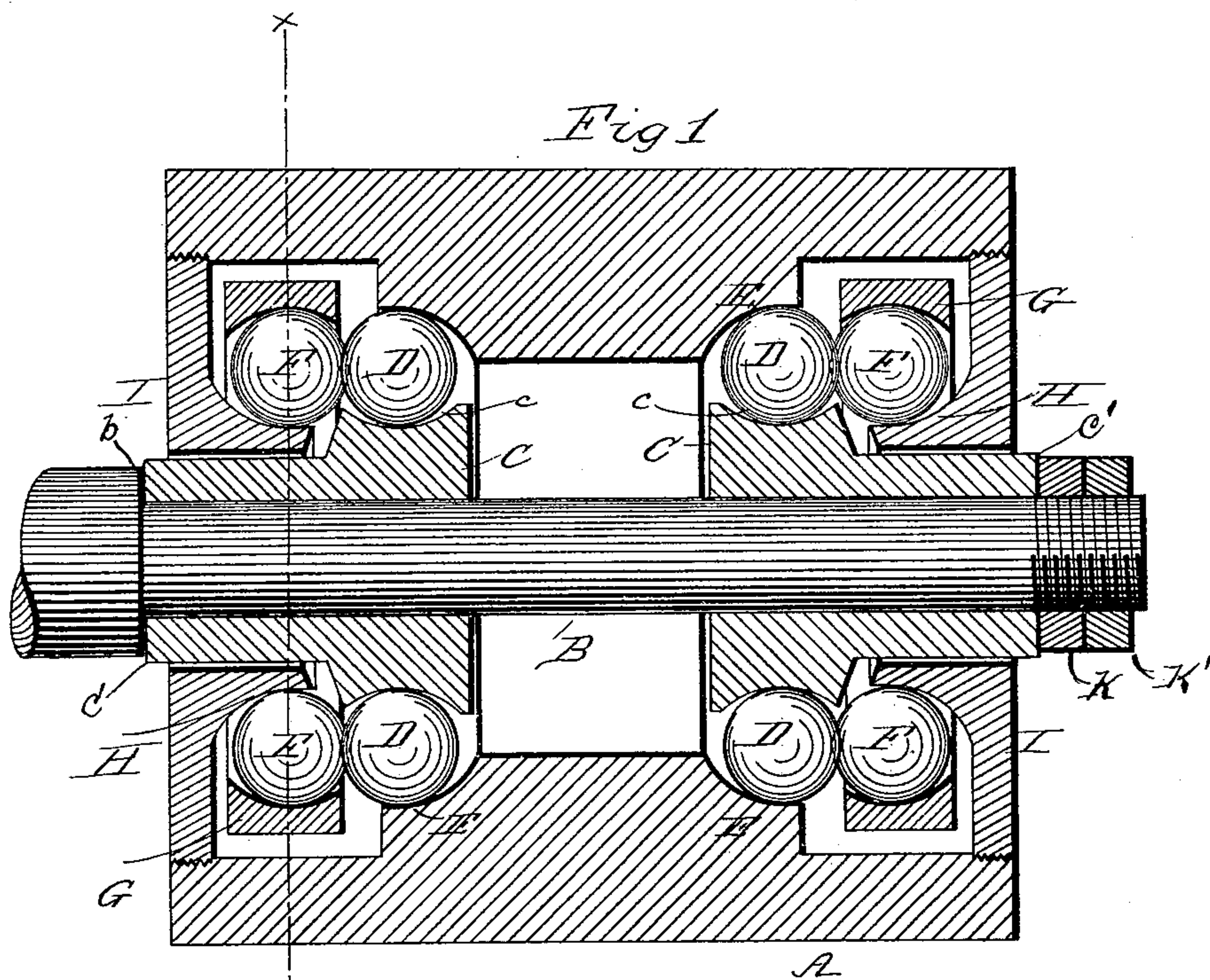
(No Model.)

E. B. LAKE.

BALL BEARING.

No. 389,231.

Patented Sept. 11, 1888.



Witnesses
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UNITED STATES PATENT OFFICE.

EZRA B. LAKE, OF CAMDEN, NEW JERSEY.

BALL-BEARING.

SPECIFICATION forming part of Letters Patent No. 389,231, dated September 11, 1888.

Application filed November 16, 1887. Serial No. 255,335. (No model.)

To all whom it may concern:

Be it known that I, EZRA B. LAKE, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Ball - Bearings; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a vertical longitudinal sectional view, and Fig. 2 a transverse sectional view, of my improved ball-bearing.

My invention has relation to ball-bearings, and relates in particular to that class of bearings of which the device shown and described in Letters Patent of the United States granted to me the 5th day of July, 1887, and numbered 366,117, is a type.

My present improvement has for its object the provision of means for securing an absolute rolling motion of all the balls at every point and period during which they are in motion, and thereby avoiding all rubbing contact, and consequently all such friction and wear as must ensue where the balls slide upon one another or the case in which they are contained.

I have found that in ball - bearings of the class to which my invention belongs if the balls used are of two sizes and the circumference of the surface upon which the separator-balls travel is different from the corresponding surface upon which the "load-balls" travel, one of the sets of balls must travel a greater distance in a given time than the other, and hence there must be a certain amount of slip, which eventually results in an uneven wearing away of the balls and an impairment of the anti-frictional quality of the bearing.

My invention consists in the provision of load and separator balls of the same size, and in the provision of means for causing the two classes or sets of balls to roll over the same amount of surface in a given time.

My invention further consists in the provision of means for relatively adjusting the separator and load ball, to insure a proper fit and to take up such wear as may occur from long and constant use.

My invention still further consists in the novel construction, combination, and arrangement of parts hereinafter described and specifically claimed.

Referring to the accompanying drawings, which illustrate my improvement, and in which Fig. 1 is a vertical longitudinal sectional view, and Fig. 2 a transverse sectional view on line *xx* of Fig. 1, I have found it necessary, for reasons hereinafter set forth, to impart motion to the outside casing which contains the balls, instead of to the shaft, as has been heretofore the customary manner, and in the drawings have illustrated by arrows the direction of motion of the several parts, it being understood that the shaft is stationary.

In the drawings, A designates a case or box adapted and designed to revolve upon a fixed shaft, B. Upon the shaft B are placed the collars C C, the peripheries of which are hollowed out or grooved, as at *c c*, and in said grooves lie the load-balls D D, being held in said grooves by concave inclined surfaces E E on the interior of the case or box A.

F F designate the separator-balls, which, it will be observed, are of precisely the same size as the load-balls D D. The separator-balls are held in place by means of rings or bands G G, having their inner surfaces concaved, as shown, and by the inclined and concave surfaces H H, formed upon heads I I, which screw into the ends of the case A.

It will be observed that there are two sets of separator-balls and two sets of load-balls, one set of each kind being at each end of the case A, and I prefer this arrangement, for the reason that it gives greater stability to the device; but it may be found expedient in certain cases to use but one set of each kind of balls.

The circumference of the surfaces *c E* upon which the load-balls D D travel are, it is to be noted, exactly the same as the circumference of the surfaces G H, upon which the separator-balls F F travel; and I call particular attention to this fact, as it is essential to the proper operation of the bearing and the carrying out of my invention.

The necessary fitting and adjustment of the balls in the case are obtained by means of a shoulder, *b*, upon the shaft B and a nut, K, upon the end of the same. The collars C C are formed with sleeves or bosses *c' c'*, which

project through holes in the heads I I, and the sleeve of one collar impinges against the shoulder *b*, while the nut K bears against the sleeve of the other collar. When the nut K
 5 is screwed home, the load-balls on one side of the case are forced against the bearing-surface E, and the case A is thereby forced over and against the load-balls on the opposite side, which are held stationary by the collar on that
 10 side impinging against the shoulder *b*. There is also provided a jam-nut, K', for the purpose of preventing the working loose of nut K.

The parts being constructed and arranged as described and illustrated, operate in the fol-
 15 lowing manner: Supposing the case or box A to be turning in the direction indicated by the arrows, the surfaces E E will of course go in the same direction and will cause the load-balls D D to turn toward the left, and, rolling
 20 upon the grooved surfaces of collars C C, will progress around the same. The revolving motion of the case A is communicated also to the separator-balls F F, which consequently turn upon their axes, but in opposite direction to
 25 the load-balls. The movement of the separator-balls being communicated to the rings G G, the latter travel in opposite direction to the case or box A. The surfaces H H travel, of course, in the same direction as the case A
 30 and its curved surfaces E E, and the direction of motion of the said surfaces H H coinciding with the direction of motion of the inner sides of these separator-balls, the latter roll upon these surfaces, and hence there is absolutely no slip
 35 between the balls and surfaces.

What I claim as my invention is as follows:

1. In a ball-bearing, the combination, with a stationary shaft, a revoluble box or case, load-balls inclosed in said case and bearing
 40 thereon and upon collars on the shaft, of separator-balls of the same size as said load-balls, and a bearing upon which said separator-balls roll equal in circumference to the circumfer-
 45 ence of the collar at the point where the load-balls touch the same, substantially as de-
 scribed.

2. In an anti-friction bearing, the combina-
 tion, with case A, having bearing-surfaces E E and H H, of the load-balls D D, alternating
 50 separator-balls F F, and collars C, having bearing-surfaces *c c*, the said load and separator balls being of substantially the same size, and the bearings *c* and H being of the same
 circumference, as set forth.

3. In an anti-friction bearing, the combina-
 55 tion, with case A, having bearing-surfaces E E and H H, the load and separator balls D D and F F, and the rings G G, of the shaft B, having shoulder *b*, the collars C C, and the ad-
 60 justing-nut K, all constructed and arranged
 substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 3d day of No-
 vember, 1887.

EZRA B. LAKE.

Witnesses:

THOS. A. CONNOLLY,
 R. DALE SPARHAWK.