

No. 693,815.

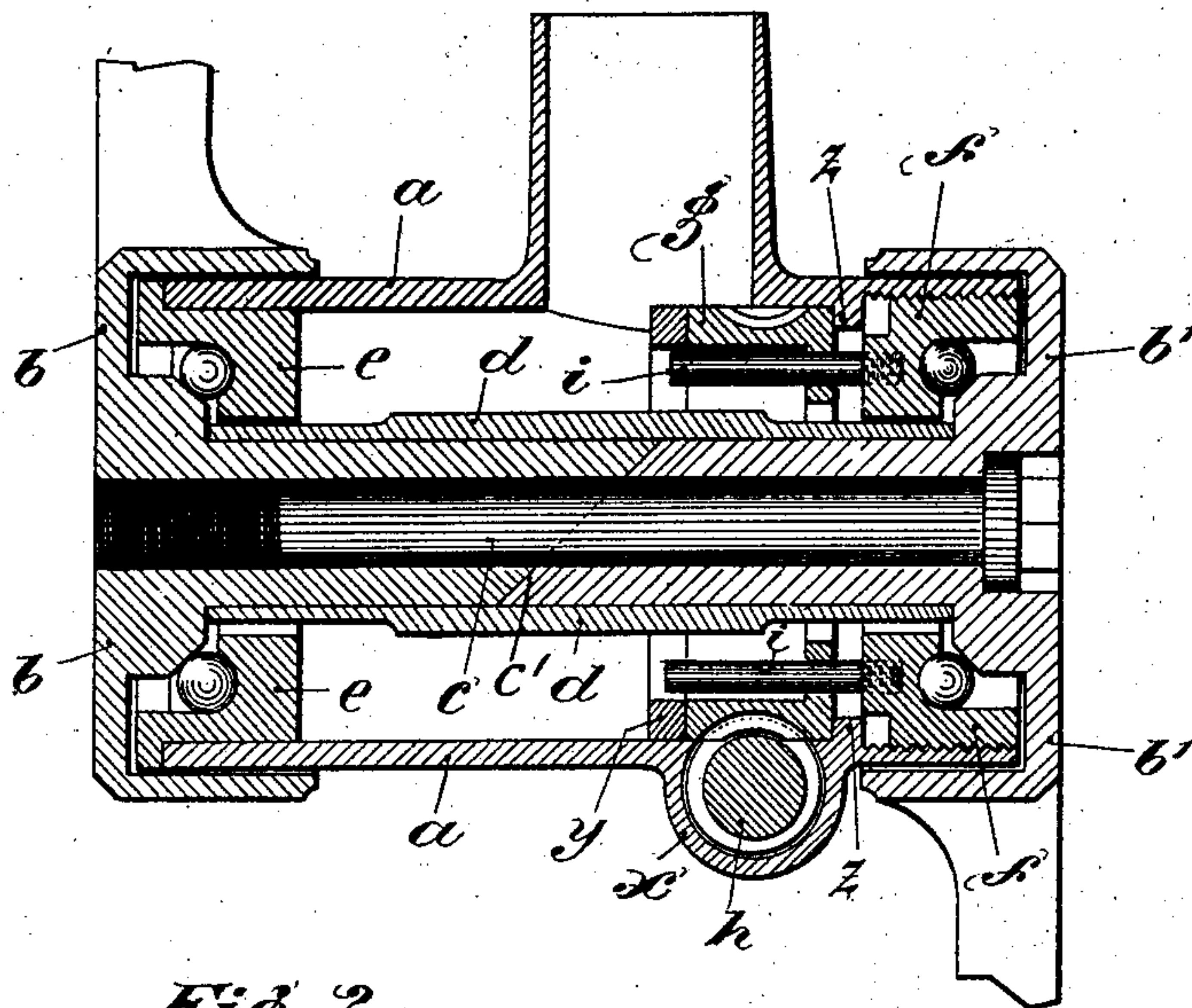
Patented Feb. 18, 1902.

F. ERDSIEK.  
BALL BEARING.

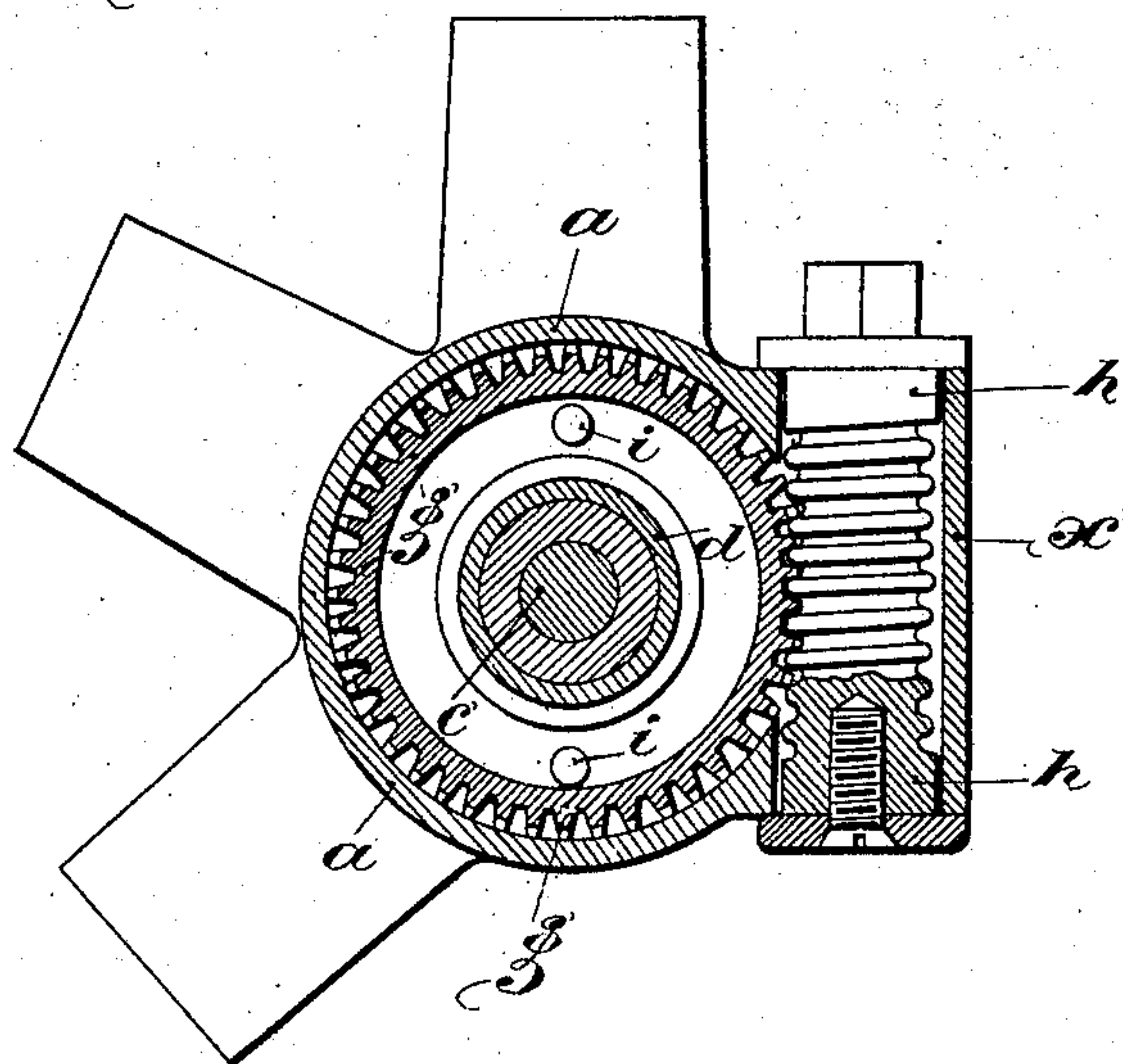
(Application filed Sept. 7, 1901.)

(No Model.)

*Fig. 1,*



*Fig. 2,*



Witnesses:

*J. B. Keefe*  
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# UNITED STATES PATENT OFFICE.

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## BALL-BEARING.

SPECIFICATION forming part of Letters Patent No. 693,815, dated February 18, 1902.

Application filed September 7, 1901. Serial No. 74,697. (No model.)

*To all whom it may concern:*

Be it known that I, FRIEDERICH ERDSIEK, workmaster, a subject of the King of Prussia, German Emperor, residing at Minden, Westphalia, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Ball-Bearings, of which the following is a specification:

My invention relates to ball-bearings.

10 In ordinary ball-bearings two conical running or working faces have hitherto been used for receiving the pressure of the balls, said conical faces being exactly adjusted to the two series of balls in order to obtain the  
15 smallest friction with the smallest possible extent of play or looseness and to compensate for wear of the surfaces. Great exactness, (for instance, one one-thousandth of a millimeter,) as is well known, is desirable for the  
20 adjustment, so as to obtain the best effect. The adjustment of the ball-bearings hitherto used has been effected by direct screwing of conical cups against the series of balls. To  
25 secure the cups in position, clamping of the same or fixing by means of teeth or pins has been resorted to hitherto. Both the direct adjustment as well as the methods of fixing the cups have great disadvantages, especially  
30 on the road or racing-path in case the parts become worn or require adjustment. All these disadvantages are overcome by the construction forming the subject-matter of the present invention.

35 The new construction comprises in contradistinction to the ball-bearings hitherto used two conical ball-race devices not adjustable toward and from one another, a screw-threaded ball-bearing cup being provided for the  
40 adjustment capable of being indirectly rotated by means of a worm-wheel and two or more pins or equivalent devices actuated thereby in order to effect an exact positioning of the bearing-cups. A special fixing of  
45 the ball-bearing cup after adjustment has taken place is not necessary, as the worm-wheel is secured against rotation by its worm, and therefore also the ball-bearing cups themselves are secured against unintentional  
50 movement. A form of construction of such a ball-bearing (as applied to the bottom

bracket of a cycle) is shown in the accompanying drawings.

Figure 1 represents the same in longitudinal section, and Fig. 2 in cross-section. 55

*a* is the hub, bottom bracket, or ball-bearing casing, with a lateral chamber *x* for a worm-spindle *h*.

*b b'* are two outer or end cups, to which the cranks are attached or formed integral there- 60 with, these cups having central tubular extensions, the beveled ends *c'* of which meet or nearly meet in the center of the hub and are drawn together by means of a screw-bolt *e*. In order to prevent the beveled ends or 65 faces *c'* from sliding over one another, the tightly-closed casing *d* is slipped over the box of *b*. The rotation and adjustment of the outer ball-race part or cup *b* is avoided by means of this simple arrangement after 70 tightening of the screw-bolt, so that the two cups or running surfaces must be considered as immovable toward each other.

*e* is the inner bearing-cup for the left-hand series of balls, rigidly mounted in the casing *a*. 75

*f* is the adjustable bearing-cup for the right-hand series of balls. The bearing-cup *f* is screwed into the casing *a* and is provided with two pins *i i* or the like, which pass through or into the worm-wheel *g* and rotate 80 with it. The rotation is effected by means of a worm *h* gearing with the worm-wheel *g*, the worm *h* being easily rotatable, but not longitudinally movable within the chamber *x*. The worm-wheel *g* is prevented from lateral 85 displacement by means of a projection *z* on the right-hand side in the casing *a* and by means of a ring *y* at its left-hand side. A rotation of the worm *h* to the left or to the right effects a corresponding rotation of the worm- 90 wheel *g* and indirectly by means of the pins a similar rotation of the ball-bearing cup *f*, which is screwed thereby either farther into the casing *a* or out of the same, whereby the adjustment of the sets of balls in their races 95 takes place. The bearing-cup *f* is secured in any position against unintentional movement by the worm-wheel.

Having now particularly described and ascertained the nature of my said invention and 100 in what manner the same is to be performed, I declare that what I claim is—



1. In a ball-bearing, the combination with a hub or casing and two non-adjustable ball-bearing surfaces therein, of an adjustable ball-bearing cup screwed into said hub or casing, a worm-wheel connected with said ball-bearing cup, and a worm mounted in said hub or casing and gearing with said worm-wheel, the said hub or casing completely inclosing all said parts and serving as a housing there-  
10 for, substantially as described.

2. A ball-bearing for cycles and other uses, comprising a casing or hub, two outer ball-bearing cups having central tubular extensions, a bolt connecting said cups, two inner

ball-bearing cups one of which is screwed into the casing or hub, a worm-wheel rotatably movable but incapable of longitudinal movement in the casing behind said cup, a worm for operating said worm-wheel and a connection between the latter and the ball-bearing  
15 cup, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRIEDERICH ERDSIEK.

Witnesses:

FRITZ BURGMANN,  
L. RASCH.