H. HESS.

SEPARATOR FOR BALL BEARINGS.

APPLICATION FILED FEB. 13, 1909.

1,015,441. Patented Jan. 23, 1912.

Fig. 1.

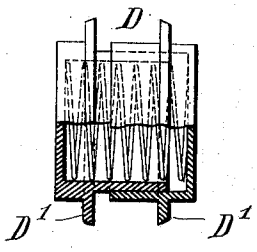


Fig. 3.

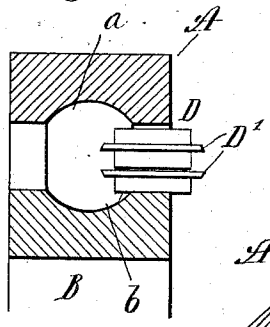


Fig. 4.

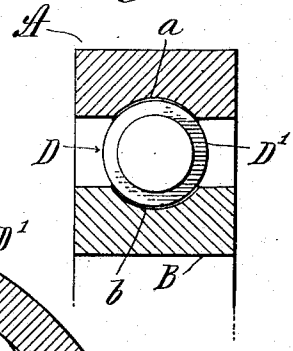
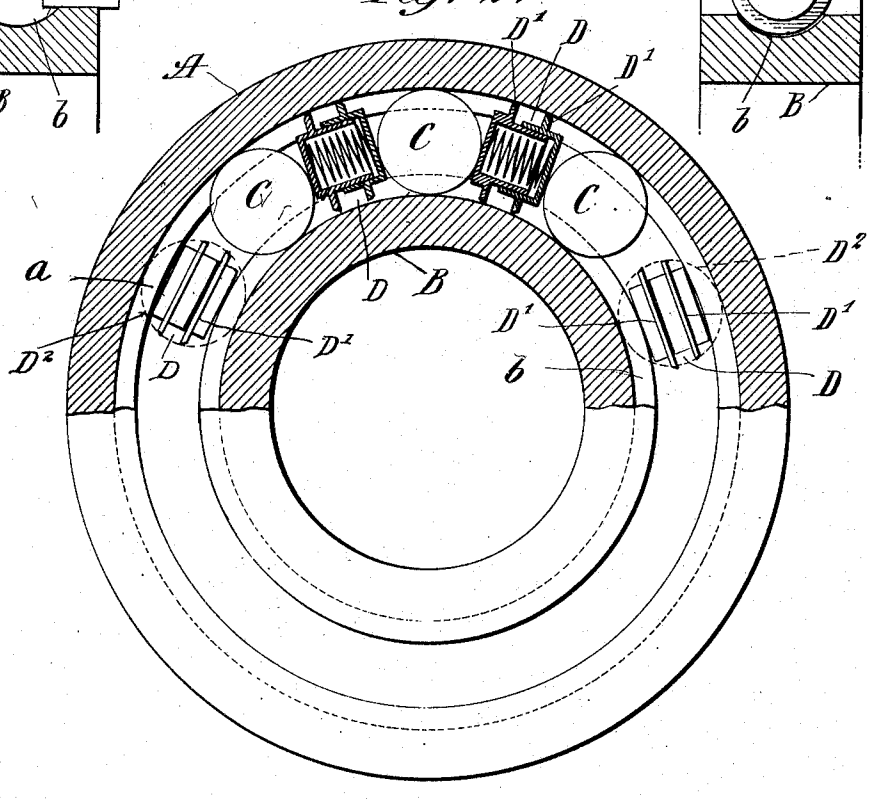


Fig. 2.



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UNITED STATES PATENT OFFICE.

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SEPARATOR FOR BALL-BEARINGS.

1,015,441. Specification of Letters Patent. Patented Jan. 23, 1912.

Application filed February 13, 1909. Serial No. 477,742.

To all whom it may concern:

Be it known that I, HENRY HESS, a citizen of the United States, residing at Wawa, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Separators for Ball-Bearings, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to separators for ball bearings, and more particularly to the telescopic class thereof consisting of a plurality of sections and a spring tending to force them apart. I have found in practice that with separators of this type there is a tendency at times for the parts to become detached, thus causing the dismemberment of the separator, and if this occurs during actual operation, it occasions not only the destruction of the separator but probably also grave injury to the bearing itself. In normal operation under load it quite frequently occurs that the balls are not equally spaced, and that some of them in certain parts of the raceway are much closer to each other than are other balls in other portions of the raceway. This condition is most apt to happen when the separators employed are unduly collapsible, as in such circumstances their too great compression occasions a consequent increase of unfilled space in other portions of the raceway, wherein the telescopic separators will be greatly extended and the sections thereof possibly disconnected by their springs, with the disadvantageous results previously mentioned.

It is the purpose of my invention, therefore, to provide a separator wherein such great compression is prevented, as thereby I avoid the extreme irregularity in the spacing of the balls above described. Such extreme collapsibility is ordinarily attributable to the large amount of compression required for the purpose of introducing the separator between the casing rings, and a prominent feature of my present invention is therefore the construction of a separator which may be introduced into the raceway with the minimum amount of compression. Another advantage arising from this form of construction is that the small play decidedly reduces the stress on the springs so that they retain their elastic life for a much greater period.

I have shown my invention as embodied in a type of bearing, wherein it is illustrated in a preferred form, but I do not confine it to this particular type and obviously other forms may be devised to effect the same results. Generally speaking, I desire it to be understood that my invention is not limited to any specific form or arrangement of parts, except in so far as such limitations are specified in the claims.

Referring to the drawing: Figure 1 is a view partly in section of a separator embodying my invention; Fig. 2 is a side view of a ball bearing, partly in section, showing the application of my separator thereto, and Figs. 3 and 4 are sectional details.

The bearing comprises an outer ring A, an inner ring B, formed respectively with the tracks or ways *a*, *b*, wherein are located the balls C—C, all in the customary and well-known manner. Between the balls C—C, and also located in the tracks or ways *a*, *b*, are the separators D—D, which are the subject-matter of the present invention.

Referring first to the earlier form of separator, this consists of two telescopic sections normally forced apart by an inclosed spring and provided at its ends and in direct contact with the balls with enlarged portions or disks, which disks have substantially the same diameter as the balls and which engage in the raceway and are thereby retained in assembled position. In order to introduce this form of separator into the bearing, it is compressed by a suitable tool or otherwise and inserted between the rings, and after its introduction it is turned through a right angle and permitted to take its normal position between the balls. In order to be turned into the raceway after having been passed through the rings, it is obvious that it must be compressed enough so that no portion of it will lie outside of an imaginary sphere corresponding to one that will approximately fill the raceway; but as these disks are located at the extreme ends of the separator, its compression for the purpose of introducing it into the raceway in the manner previously described must be very great, and it is this feature of construction which subsequently permits the similar extreme compression of the separator when mounted in its assembled relation to the balls. To obviate this disadvantage, my improvement consists mainly in locating the disks D^1, D^1, on the separator D, at

some little distance from the contacting ends thereof, as shown in Fig. 1. In this manner I avoid the extreme compression of the separator D, as will be clearly seen from an inspection of Fig. 2, wherein the imaginary sphere is represented by the dotted line D^2. In order to reduce the size of the separator D to a compass which will bring it within the imaginary sphere D^2, and to permit its introduction into the raceway, a materially less amount of compression is required, and the parts are therefore so arranged as to afford no more compressibility than is necessary for the purpose mentioned, Figs. 3 and 4 showing respectively the position of the separator during its insertion between the rings and when subsequently turned into place in the raceway. The immediate result of this construction is that when located in operative relation to the balls, the collapsibility of the separator D will be similarly limited, and the greater range possible in the earlier form of separator will be avoided, thus insuring the more uniform spacing of the balls and obviating the liability to disconnection of the parts with its attendant disadvantages as previously described. And as also before mentioned, the smaller play of the separators materially reduces the strain on the springs and thus increases their durability.

Evidently many variations will suggest themselves to those skilled in the art, and I do not limit myself to the exact embodiment of the invention shown, which I have illustrated only in a preferred form, as many equivalents are equally comprised within its scope.

Having thus described my invention, its construction and mode of operation, what I claim and desire to secure by Letters Patent of the United States is as follows:

1. A separator for ball bearings, comprising a plurality of telescopic sections and resilient means tending to force the sections apart, each of the sections being formed with a portion to engage in the raceway of the bearing and with its outer or ball-engaging end of smaller size than that of said portion.

2. A separator for ball bearings, comprising a plurality of telescopic sections and resilient means tending to force the sections apart, the said sections being formed with projecting portions located at a distance from the ends of the separator and designed to engage in the raceway of the bearing.

3. A separator for ball bearings, comprising two telescopic sections and resilient means tending to force the sections apart, the said sections being each formed with a projecting disk or flange located at a distance from the ends of the separator and designed to engage in the raceway of the bearing.

In testimony whereof I have affixed my signature in presence of two witnesses.

HENRY HESS.

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