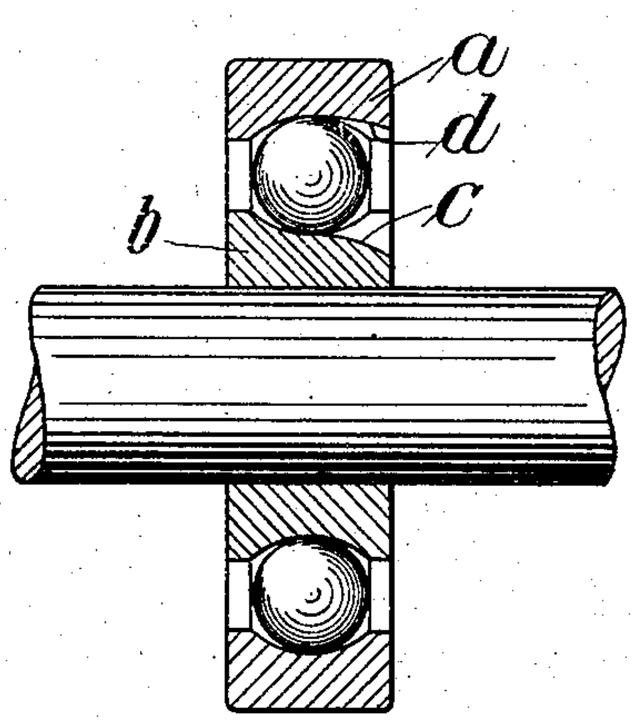
S. G. WINGQUIST & E. JUNGHANS.

BALL BEARING.

APPLICATION FILED JAN. 6, 1915.

1,166,800. Patented Jan. 4, 1916.



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UNITED STATES PATENT OFFICE.

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BALL-BEARING.

1,166,800. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed January 6, 1915. Serial No. 755.

To all whom it may concern:

Be it known that we, SVEN GUSTAF WINGQUIST, a citizen of the Kingdom of Sweden, residing at Gottenborg, Sweden, and ERHARD JUNGHANS, a citizen of the Empire of Germany, residing at Cannstatt-Stuttgart, Germany, have invented new and useful Improvements in or Relating to Ball-Bearings, of which the following is a specification.

This invention relates to ball bearing of the kind in which the balls are filled in between bearing-rings provided with ball-tracks, through side fill-passages, without necessitating any deformation of the balls, or the bearing-rings, such deformations being scarcely practicable without damaging the balls, or the bearing rings. While in ball bearings of this kind heretofore used the balls tend to escape through the fill-passage when passing the same, this inconvenience is obviated according to one feature of the present invention, without the use of any shoulder rendering the filling in of the balls difficult, by so forming the fill-passage, which extends to the outer side face of the bearing-ring, that it slopes outwardly toward the axis of the bearing. On account thereof, the balls under the action of centrifugal force, tend to remain on the bottom of the ball-track in the outer bearing-ring where the balls are at the greatest distance from the axis of the ball bearing. Preferably the fill-passage is constituted by recesses in the side of each bearing-ring so formed that their junction with the ball-tracks does not interfere with, but maintains the continuity of the bottoms of the latter.

A further feature of the invention relates to a process of grinding bearing-rings provided with recesses to constitute fill-passages formed as above described, wherein the ball-track is first ground by swinging the grinding wheel across the track about the center of curvature of the cross-section of the track, and the recess is ground by swinging the same grinding wheel outward about the center of curvature of the recess.

A suitable form of this invention is illustrated in the accompanying drawing showing a sectional view of a ball bearing, the section being taken through the fill-passage.

The outer bearing-ring *a* and the inner bearing-ring *b* are each provided with the usual groove the bottom of which constitutes a ball-track having in cross section a greater radius of curvature than the balls. At one point of the periphery recesses *c* and *d* are formed in one edge at least of each track and constitute a fill-passage curving from the bottom of the track in the direction toward the axis of the bearing, preferably along an arc, the center of which is located in the plane through the centers of the balls. In this way the continuity of the bottoms of the ball-tracks is not interfered with. Preferably, as shown, the bottom of the fill-passage in the outer bearing ring has a less curvature that is a curvature of greater radius than the cross-section of the ball-track.

The shape of the recess *c* of the inner bearing ring *b* is so suited to the shape of the recess *d* of the outer bearing-ring *a* that the balls may be introduced through the passage formed by the two recesses without the necessity of exercising on the balls a greater pressure than that to which they are subjected in the bearing, when mounted.

The recess of a given bearing-ring may be suitably finished, after the track and the recess have been ground roughly, by the finishing track-grinding wheel, which after being swung about one center in finishing the track, may be swung laterally to finish the recess about another center, namely the center of curvature of the recess.

The invention may, although with less advantage be carried out in such manner that the lateral recess of the outer bearing ring is omitted. The inner bearing ring only is in this case provided with a recess which curves sharply inward, forming in conjunction with the curved side-surface of the part of the track in the outer bearing ring to which it is opposite, a fill-passage which slopes outwardly toward the axis of the bearing.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. A ball bearing having bearing rings formed with grooves the bottoms of which constitute ball-tracks and recesses in the bearing rings forming a side fill-passage, each of said recesses sloping outwardly from the side of the ball-track toward the axis of rotation of the bearing, the bottom of each of said recesses extending to the said bottom

of the ball-track groove and being connected thereto so as to maintain the continuity of the bottom of the latter, substantially as and for the purpose set forth.

2. A ball-bearing having bearing rings formed with grooves the bottoms of which constitute ball-tracks and recesses in the bearing rings forming a side fill-passage each of said recesses sloping outwardly from the side of the ball-track toward the axis of rotation of the bearing, the bottom of each of said recesses extending to the said bottom of the ball-track groove and being connected thereto so as to maintain the continuity of the bottom of the latter, the curvature of the fill-passage being slighter than the said curvature of the ball-tracks, substantially as and for the purpose set forth.

In testimony that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

SVEN GUSTAF WINGQUIST.
ERHARD JUNGHANS.

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