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F. W. WITTE.

BALL BEARING.

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900,635.

Patented Oct. 6, 1908.

Fig. 1

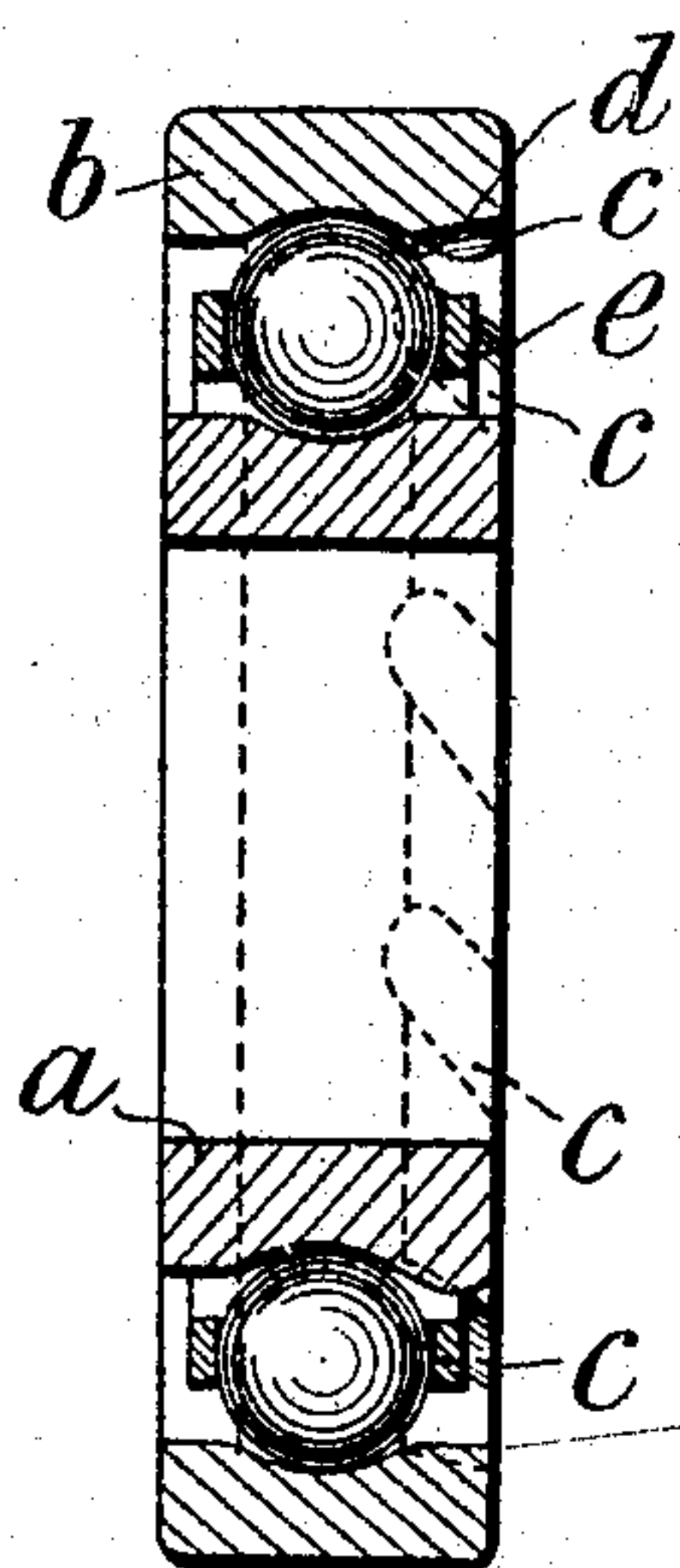
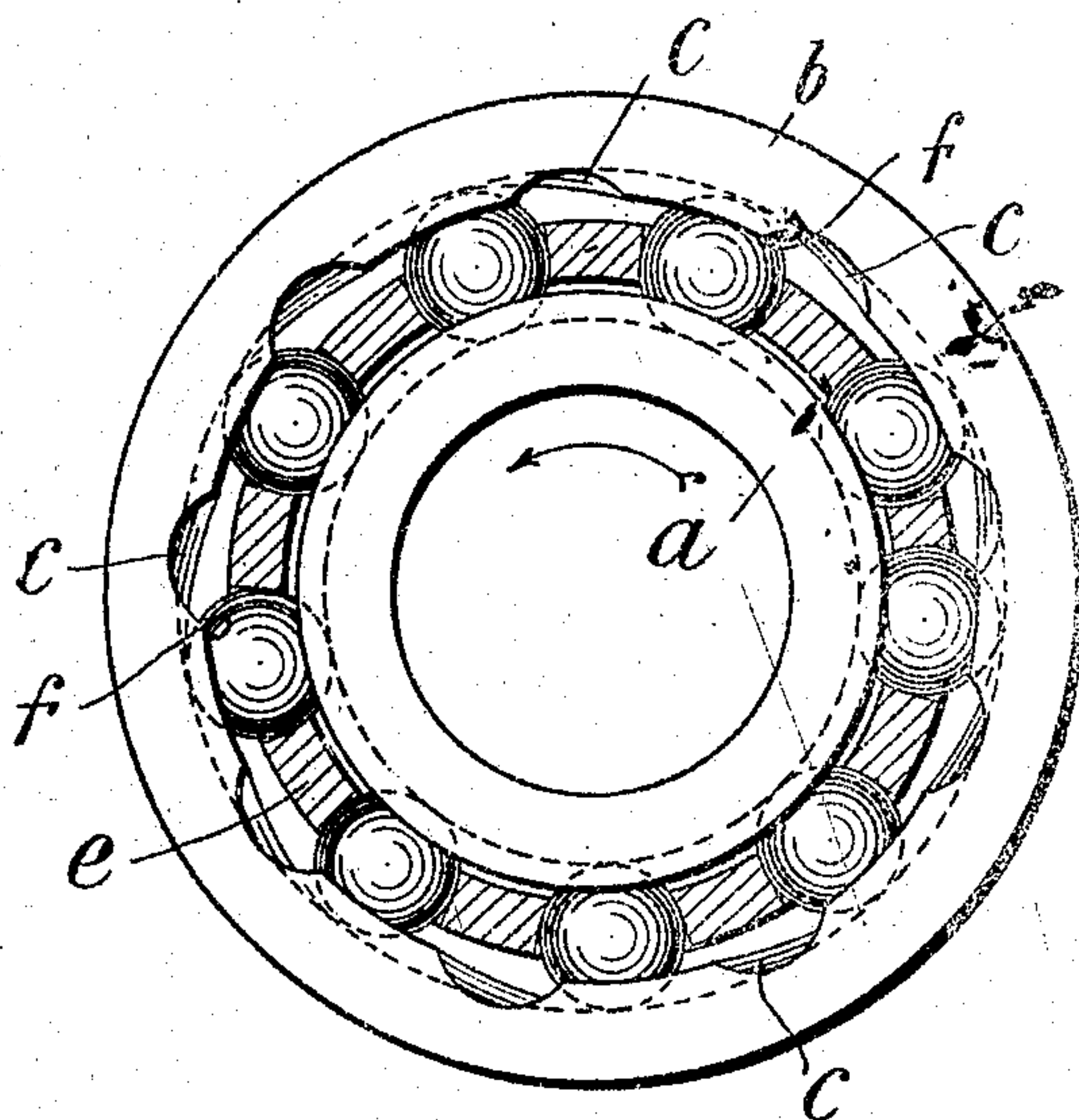


Fig. 2.



WITNESSES

Geo. A. Bevel
A. W. Neale, Jr.

INVENTOR.

F. W. Witte

By Wilkinson, Fisher & Witherspoon
ATTORNEYS.

UNITED STATES PATENT OFFICE.

FREDERICK WILLIAM WITTE, OF LEIPZIG-PLAGWITZ, GERMANY.

BALL-BEARING.

No. 900,635.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Original application filed April 23, 1906, Serial No. 313,254. Divided and this application filed April 11, 1908.
Serial No. 426,624.

To all whom it may concern:

Be it known that I, FREDERICK WILLIAM WITTE, a citizen of the United States, formerly residing at Chelmsford, in the county of Essex, England, but now residing at Leipzig-Plagwitz, Germany, have invented a certain new and useful Improvement in Ball-Bearings, of which the following is a specification.

10 This invention relates to ball bearings of the self contained single row two point type in which the balls travel in two tracks of equal depth and approximately of the same curvature as the balls and of which many
15 forms are in use.

The present invention (which was described in an application filed by me on the 23rd April 1906 Serial No. 313,254 and of which this is a divided case) consists of a
20 bearing of the type having gaps in the side of one of the rings all the way round same, each ball having its own gap appropriated to it. In the type above described, the gaps pass directly into the track at the full depth
25 of same which is a disadvantage as will be hereinafter pointed out, and the object of the present invention is to obviate this defect.

In the accompanying drawing there is
30 illustrated by way of example a form of bearing in which my present invention appears. In this Figure 1 is a cross section, and Fig. 2 is a face view but with the ball cage in section.

35 The inner ring *a* and the outer ring *b* as will be seen have the usual curved tracks for the balls, while from one side of one of these rings, in this case the ring *b* (or less desirably the ring *a*) there are formed the
40 usual ball gaps or grooves *c* one for each ball, said balls being spaced apart by some form of cage *e* or other spacing device. The gaps are shown in the form illustrated in the drawing as entering the track spirally
45 or similarly to a rifling, but they may be straight. In the arrangement shown two of the balls are similarly closer together but this forms part of the subject matter of my application previously referred to and need
50 not be described here. Heretofore these gaps have passed directly into the track their bottoms entering same at the point of the depth of the lowest part of the track. In assembling this form of bearing all the
55 balls (with or without the cage) are placed

in the track of the ring *a*, one of such balls being in each gap, and the balls will then pass into the track of the ring *b* through the gaps without any pressure being required, but conversely they are equally easily dis-
60 lodged and the bearing destroyed by side pressure. Further the track being cut into on the running line of the balls speedily wears and breaks up for this reason.

According to my invention I form each
65 gap or groove *c* so that it enters the side of the track on an incline as shown in the upper part of Fig. 1 but owing to the fact that it enters the track at the side and less than the full depth of same, that is not on the
70 running line or point of ball contact an abutment *d* is preserved which necessitates the bearing being assembled under pressure and conversely presents an effective means of re-
75 sisting side thrust and the consequent dissolution of the bearing. Moreover the running line or point of contact with the balls of the track, is preserved thus rendering a bearing of this type efficient as to wear. In
80 addition to the gaps inclining downwardly or inwardly (whereby a flared opening is presented on the extension of the ring for receiving the balls) they may be as shown
formed spirally (as has before been pro-
85 posed for single ball filling gaps), that is spirally to the axial line of the bearing, and of such a pitch that the rear end of the gap just where it terminates before the track or
in the abutment *d* is below the front edge *f* of the full wall of the track which is between
90 each gap. Thus owing to the gradual entry of each gap toward the abutment *d* there is a very small point where such abutment is of its minimum height, and even at this point the contact line of the ball with the track
95 will be behind the front edge *f* or full depth of the wall which is preserved between each gap. Thus excess of lateral pressure will have little effect in displacing the balls unless it were accompanied by a twist in the
100 direction of the spiral gap or reversely to the entering direction of the balls which is unlikely to occur under ordinary running conditions.

The bearing either with the straight or
105 spiral gaps is assembled as in the older form, but pressure is put upon the balls, or the ring *a*, to force the balls past the abutment *d*, the elasticity of the ring *b* being taken ad-
vantage of for this purpose.

I am aware that a low abutment partly around a ring has been proposed and that the balls are forced over this by pressure or by expansion of the ring but this arrangement produces a defective ring for resisting strains as the portions of the side walls of full depth between the gaps which is the advantage of this form of bearing is lost.

A particular advantage of the spiral form of gap is that in assembling the parts the pressure necessary to get them in causes them to roll up the inclined gaps instead of partly sliding as they might do when forced in on a line parallel to the axis of the bearing, so that not only is the assembling rendered easier but owing to such rolling action a larger abutment d may be left between the end of the gap and the track as the ball with such a movement will pass over the latter more easily.

In the expression "spirally" is included any suitable angular gap which is not in an axial line from the outside of the ring toward the track.

The present invention differs from those heretofore known having a single gap or opening in one ring fully entering the track

or in both rings with an abutment as I describe as the method of assembling in that case is to put the last few balls in singly through the gap after the rings were brought concentric and in the same plane and they have the disadvantage that the single gap weakens the ring (or rings) to a far greater extent than a series of smaller gaps equally, or practically equally, spaced apart all round same.

What is claimed is:—

A ball bearing comprising balls, an inner and an outer ring, each having a curved track, and one of said rings having gaps around its edge for the balls, each gap passing spirally from one side inwardly toward the track and being of a depth where it enters the track which is less than the full depth of such track, whereby an abutment for the balls is left at the end of each gap.

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

FREDERICK WILLIAM WITTE.

Witnesses:

RUDOLPH FRICKE,
JULIUS ORB.