J. F. FOSTER.

ROLLER BEARING.

APPLICATION FILED MAY 5, 1910.

1,011,337.

Patented Dec. 12, 1911.

2 SHEETS—SHEET 1.

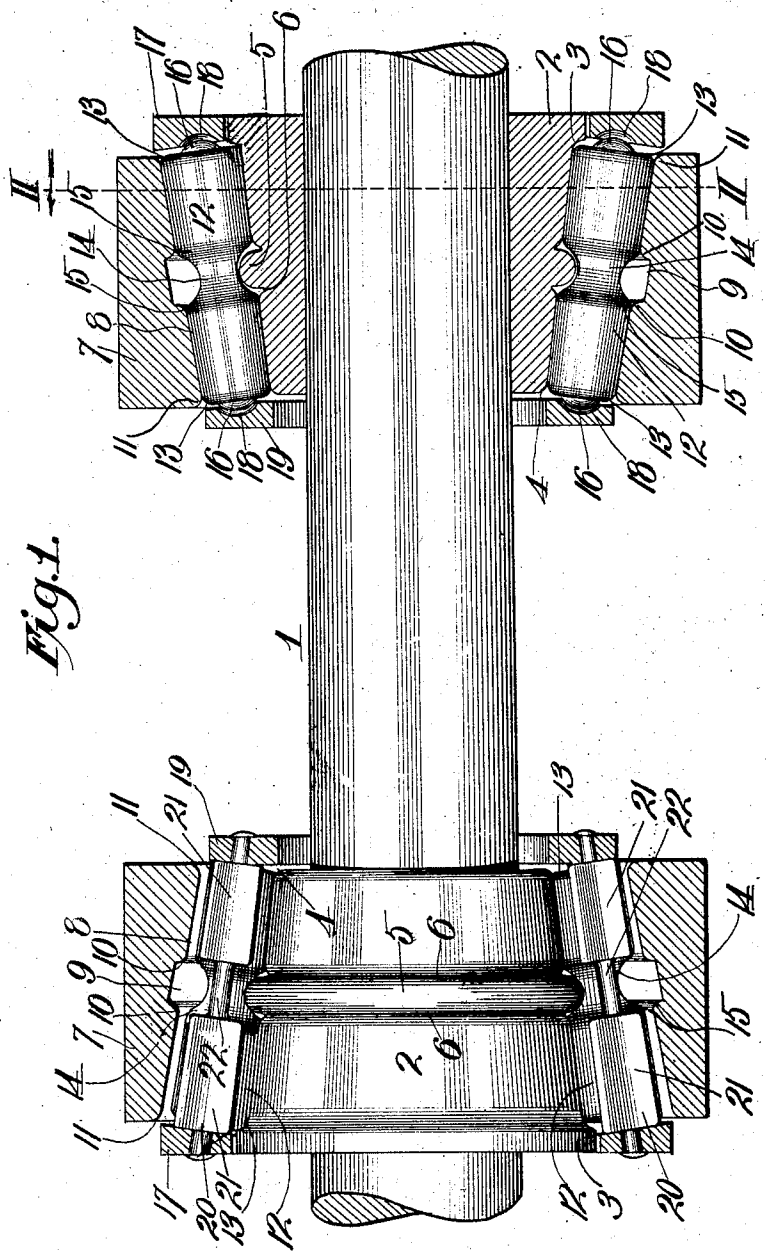

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 3.

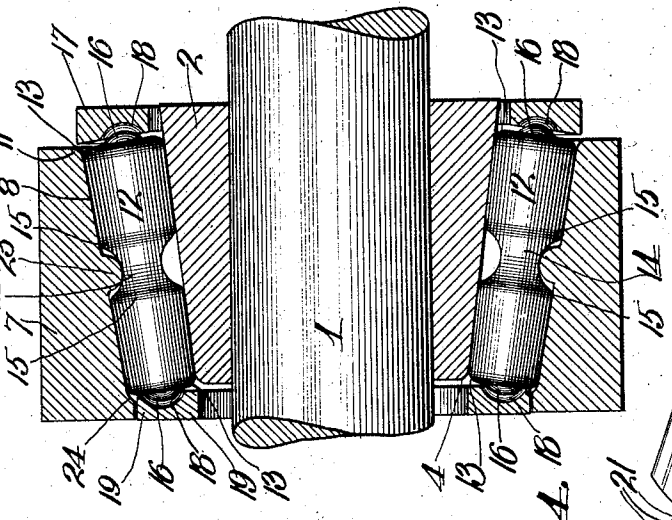


Fig. 4.

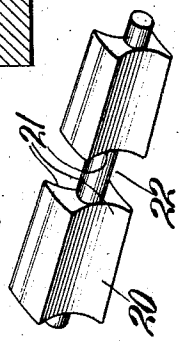
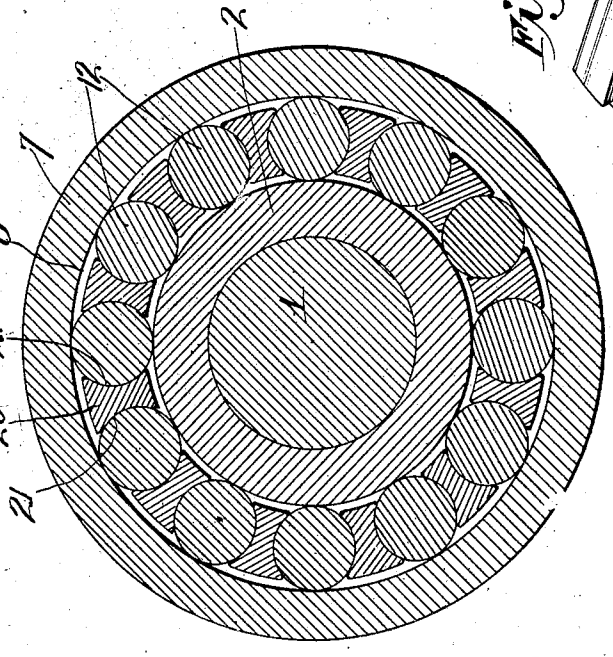


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN F. FOSTER, OF KANSAS CITY, KANSAS.

ROLLER-BEARING.

1,011,337. Specification of Letters Patent. Patented Dec. 12, 1911.

Application filed May 5, 1910. Serial No. 559,501.

To all whom it may concern:

Be it known that I, JOHN F. FOSTER, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Roller-Bearings, of which the following is a specification.

This invention relates to roller bearings and my object is to produce a bearing which is flexible to eliminate danger of breakage by effecting an equal distribution of the strain, if the weight through wear or any other cause is unequally imposed upon it.

A further object is to produce a bearing provided with rollers capable of independent endwise movement to accommodate unequal wear to effect an equal distribution of the weight or strain.

Another object is to produce a bearing of simple, strong, durable compact and inexpensive construction.

To these ends the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings in which—

Figure 1, is a double bearing partly in side elevation and partly in section, the section of one part of the bearing showing the spacers of the bearing in elevation in the foreground and the section of the other part of the bearing showing the rollers in the foreground. Fig. 2, is a section on the line II—II of Fig. 1. Fig. 3, is a view similar to the right-hand portion of Fig. 1 but showing a slightly modified type of construction. Fig. 4, is a detail perspective view of one of the spacers of the bearing.

In the said drawings, 1 indicates a shaft and mounted thereon at a suitable distance apart is a pair of cones 2, arranged with their ends of smallest diameter facing each other, it being understood that the preferred method of mounting the cones is to key them on the shaft in a common and well known manner, not shown, so that they can be removed therefrom should necessity arise. At their outer or remote sides the cones are diametrically enlarged to provide rounded inwardly facing shoulders 3, and at their inner edges the cones are rounded as at 4. In the preferred construction the cones are provided with central circumferential ribs 5 and by preference will be grooved at opposite sides of the ribs as at 6, the walls of the grooves being preferably rounded.

Concentrically surrounding the cones are collars 7, the passages or openings 8 of the collars being of tapering form and bearing an inwardly converging relation to the cones, and said collars are preferably provided at their inner sides with circular channels 9, the side walls of the channels being preferably rounded as at 11.

12 are inwardly tapering rollers arranged between and engaging the cones of the collars and preferably rounded at their opposite ends as at 13, and said rollers are diametrically reduced to form annular grooves 14 to receive the rib 5, the walls of the grooves where they merge into the periphery of the rollers being rounded at 15. The rollers are reduced diametrically as described in order to be capable of flexing or springing slightly midway their length and also to enable the ribs of the cones to more successfully resist undesirable endwise movement of the rollers in the event that one or more of them becomes so worn as to tend to creep or work downwardly and engage both the cones and collars, and in this connection, it should be stated that the various parts described as rounded are so made to avoid any chance of the cones, collars or rollers chipping under the imposition of heavy pressure or pounding on a sharp edge or corner.

The rollers are preferably provided at their ends with rounded axial projections 16, capable of entering shallow rounded cavities 18 in the rings 17 and 19 disposed at the outer and inner ends respectively of the rollers, the rings 17 loosely surrounding the large ends of the cones and the rings 19 loosely surrounding the shaft inward of the small ends of the cones, and arranged between and riveted to said rings alternately with respect to the rollers are spacers 20 which in conjunction with the rings 17 and 19 constitute skeleton cages which revolve with the rollers. Each spacer is provided at opposite sides with segmental recesses 21 in which the adjustable rollers project so that the spacers shall hold the rollers equal distances apart and shall be prevented by the latter from moving inward and outward and therefore guard against the rings of the

cages coming into frictional engagement with the cones or shaft. The spacers like the rollers are preferably diametrically reduced centrally at 22, so that they shall be capable of flexing midway their length and thus avoid danger of breaking should they be compelled to sustain more pressure at one end than at the other.

In Fig. 3, the construction and arrangement of the parts are the same as that described except that the collar 7 is provided centrally with an inwardly projecting rib 23 instead of the cone being provided with an outwardly projecting rib, it being also noticed that in Fig. 3, the collar 7 is provided at its inner end with a rounded shoulder 24 facing the inner ends of rollers 15 instead of the cone being provided at its large end with a shoulder 3, facing the outer end of said rollers, being further noted that the inner ring 19 of the cage in Fig. 3, is arranged within the inner edge of the collar 7.

In practice the hub of a wheel, not shown, may be secured to the shaft 1 or to the collar 7; in the former case the shaft and cones will revolve and cause the rollers to travel around within the collars which will be stationary. In the other case the shaft and cones will be stationary and the collars will revolve with the wheel and cause the rollers to travel around upon the cones, the cages in both cases traveling with the rollers. Under the tendency of the wheel to move laterally in the first case, one of the rounded shoulders of one of the cones will impose an endwise inward thrust against the adjacent ends of the rollers the collar 7 counteracting such movement owing to its wedge relation to said cone and the interposed rollers. In the construction shown in Fig. 3, the tendency of the wheel to move laterally will cause one of the collars 7 to move outward against the inner ends of the inclosed rollers, this movement being counteracted by the cone engaged by said rollers. It will thus be seen that in both cases the cones and collars are practically fixed as regards relative movement longitudinally of the shaft.

To dismantle a bearing of the type shown in Fig. 1, relative separating opposite movement of the cones and collars will be effected, it being understood that when the cones are withdrawn from the collars in the construction shown by Fig. 1, the cages and cones will be likewise withdrawn owing to the engagement of the ribs of the cones with the rollers. In the construction shown by Fig. 3, the cones may be withdrawn but will leave the cages and rollers within the collars because the ribs of the latter engage the grooves of the rollers. It will thus be seen that the rollers when once arranged in proper relation to the cages need not be disturbed and that the parts of the bearing can therefore be more quickly secured in and removed from operative position than would be the case if it were necessary to remove the rollers independently.

It will be noticed that when the parts are completely assembled in operative relation that provision is made for a slight independent endwise movement of the rollers within the cages, this being so in order that should one roller become worn more than another it may creep or work downward slightly between its cone and surrounding collar and thus maintain its wedge like relation to the same and insure a continuous bearing at equi-distant points on the cone and collars and by thus affording a continuous bearing maintain an equitable distribution of strain and avoid subjecting any one or more of the rollers to a greater strain than the remaining rollers.

From the above description it will be apparent that I have produced a roller bearing possessing the features of advantages enumerated as desirable and I wish it to be understood that I do not desire to be restricted to the exact details of construction shown and described as obvious modifications will suggest themselves to one skilled in the art.

Having thus described the invention what I claim as new and desire to secure by Letters Patent, is:

1. In a roller bearing, a cone, a collar surrounding the same and tapered internally in the same direction as the cone and internally bearing a converging relation to the latter, a plurality of equi-spaced inwardly tapering rollers interposed between the cone and collar and holding the same spaced apart and reduced to form circular grooves between their ends, means projecting into the grooves of said rollers to limit excessive endwise movement thereof, and a cage rotatable with the rollers and consisting of a pair of rings and a plurality of equi-spaced spacers interposed between the cone and collar and adjacent rollers and secured at their ends to said rings; said spacers being diametrically reduced between their ends and in the vertical plane of the reduced portions of said rollers.

2. In a roller bearing, a cone, a collar surrounding the same and tapered internally in the same direction as the cone and internally bearing a converging relation to the latter, a plurality of equi-spaced inwardly tapering rollers interposed between the cone and the collar and holding the same spaced apart and reduced to form circular grooves between their ends, means projecting into the grooves of said rollers to limit excessive endwise movement thereof, and a cage rotatable with the rollers and consisting of a pair of rings and a plurality of equi-spaced spacers interposed between the cone and collar and adjacent rollers and secured at

their ends to said rings; said spacers having segmental cavities into which the adjacent rollers project, and being diametrically reduced between their ends in the vertical plane of the reduced portions of said rollers.

3. In a roller bearing, a cone, a collar surrounding the same and tapered internally in the same direction as the cone and internally bearing a converging relation to the latter, a plurality of equi-spaced inwardly tapering rollers interposed between the cone and the collar and holding the same spaced apart and reduced to form circular grooves between their ends, and provided at their ends with rounded axial projections, means projecting into the grooves of said rollers to limit excessive endwise movement thereof, and a cage rotatable with the rollers and consisting of a pair of rings and a plurality of equi-spaced spacers interposed between the cone and collar and adjacent rollers and secured at their ends to said rings, said spacers having segmental cavities into which the adjacent rollers project, and said rings having segmental cavities in their inner faces loosely receiving the rounded axial projections at the ends of the rollers.

In testimony whereof I affix my signature, in the presence of two witnesses.

JOHN F. FOSTER.

Witnesses:
HELEN C. RODGERS,
G. Y. THORPE.