

No. 632,438.

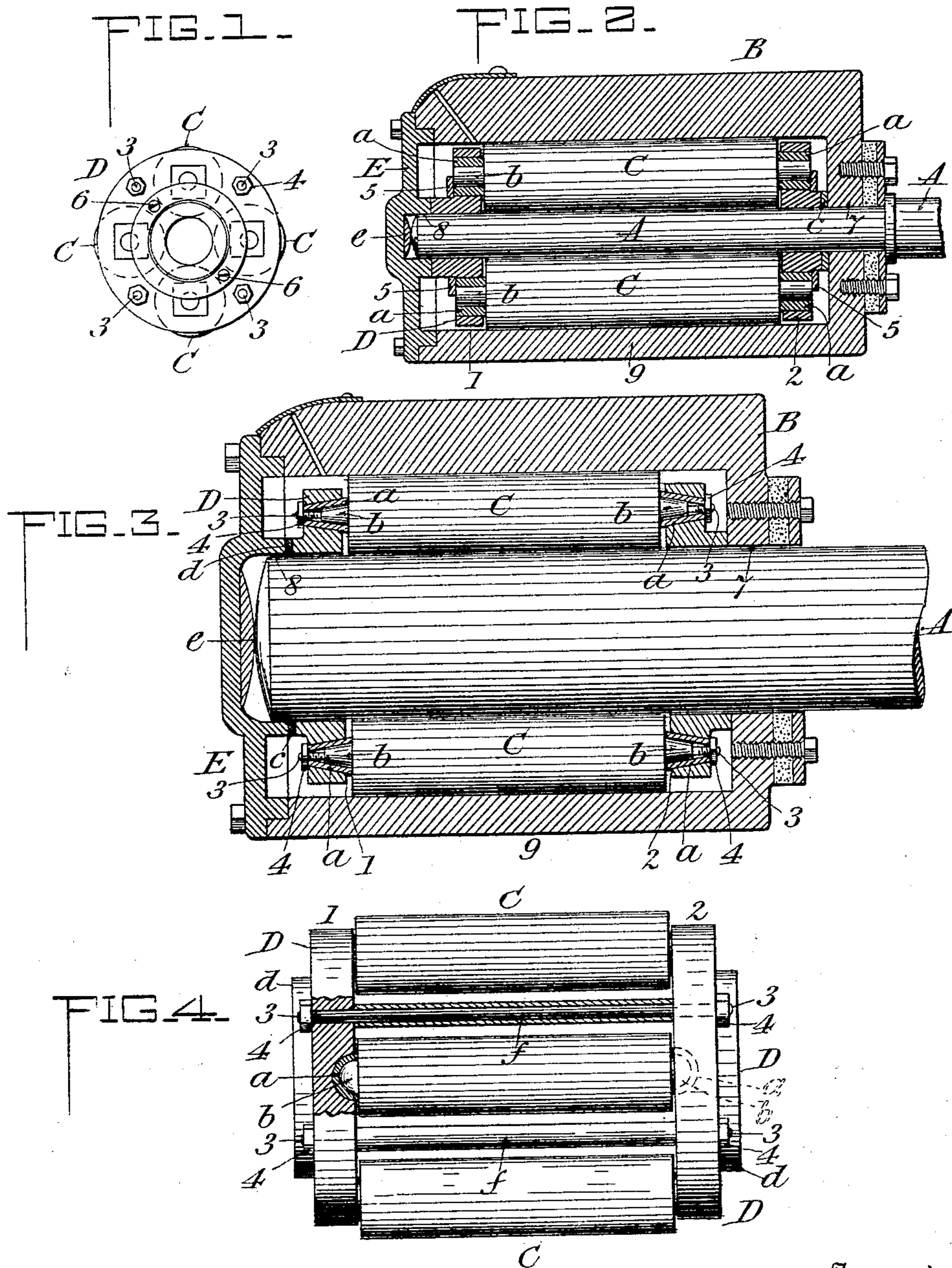
Patented Sept. 5, 1899.

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MEANS FOR REDUCING FRICTION OF AXLES AND JOURNALS.

(Application filed May 4, 1899.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## MEANS FOR REDUCING FRICTION OF AXLES AND JOURNALS.

SPECIFICATION forming part of Letters Patent No. 632,438, dated September 5, 1899.

Application filed May 4, 1899. Serial No. 715,587. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. BREWER, C. E., a subject of the Queen of Great Britain and Ireland, and a resident of London, England, having my place of business at Nos. 11 and 12 Clements lane, in the city of London, have invented a new and useful Improvement in Means for the Reduction of Friction of Axles and Journals, of which the following is a specification.

This invention relates to the reduction of the friction of axles and journals, such as the axles of cabs and like vehicles, those of railway and tramway rolling-stock, engine and propeller shafts, ships' pulleys, and other hoisting-blocks, and the like.

The invention consists in improved means for cradling antifriction-rollers, whereby the rollers of a given journal are adapted not only to be removed and handled, together with their revolving cradle, as one piece, but are rendered capable of being adjusted at any time to take up wear and insure true and frictionless motion, and the improved bearings are provided with interchangeable bushes or equivalent parts, to which wear is confined, that can be quickly and inexpensively replaced by new parts when the limit of adjustment is reached.

The present invention further consists in certain novel combinations of parts in the same, as hereinafter described and claimed.

A sheet of drawings accompanies this specification as part thereof.

Figure 1 of the drawings is a small scale end view of the cradle of an improved roller-bearing with its complement of rollers and their appurtenances in position. Fig. 2 is a longitudinal section through an improved axle-box for tramway-cars embodying the present invention as a whole. Fig. 3 is a longitudinal section through a modified axle-box; and Fig. 4 is an elevation, partly in section, of an improved roller-bearing cradle with its complement of rollers and appurtenances, illustrating additional modifications.

Like letters and numbers refer to like parts in all the figures.

In all the embodiments of this invention the improved means for reducing friction include the combination, with the axle or journal A,

of a box B, having a bearing concentric with the axle spindle or journal, with a suitable space between, a suitable number of longitudinal rollers C within this space in contact with the opposing surfaces, and a cradle D, within which said rollers are mounted and which revolves between said opposing surfaces without contact with either of them, the improved cradle comprising end rings 1 and 2, provided in common with renewable and interchangeable bushes or equivalent parts to which wear is confined (shown at *a* in the drawings and hereinafter termed "wear" parts) and through-bolts 3, provided at one or each end with screw-nuts 4, uniting the end rings 1 and 2, with the rollers in place to complete the cradle and to draw the end rings toward each other to take up wear.

The wear parts *a* press against the ends of the roller C and are fitted internally to the pivots *b* of the rollers, which may be cylindrical, as represented in Fig. 2, conical, as represented in Fig. 3, or hemispherical, as represented in Fig. 4, the two forms last described and modifications thereof being obviously best adapted to be tightened by end-wise adjustment.

The wear parts of the entire roller-bearing are interchangeable and are castings of Bab-bitt metal or the like, receiving all necessary surfacing in the molds in which they are cast. They may consequently be readily and inexpensively replaced by new parts when the limit of adjustment is reached.

One or more washers *c* of the same antifriction metal as the wear parts *a* may be introduced, as required, between the hub-flange *d* of either or each of the end rings and its abutment within the box B to compensate for the shortening of the cradle D by adjustment.

In the specific arrangement represented by Figs. 1 and 2 the wear parts *a* are rectangular in cross-section and extend through the end rings 1 and 2, being held in place by annular keepers 5, surrounding the hub-flanges *d* of the end rings and fastened by screws or through-screw bolts 6, Fig. 1, which draw the keepers against the outer faces of the end rings and the outer ends of the wear parts.

To support the axle A in a positive man-



ner at both ends of the roller-bearing, as aforesaid, the back of the box B is provided with a hole 7 just large enough to accommodate the axle A within it without friction, and a cap E at the face of the box is provided with a socket 8, embracing in like manner the outer end of the axle and preferably and conveniently provided with an end-thrust disk *e* of the antifriction metal to engage with the extremity of the axle. The axle is thus kept in contact with the roller or rollers above it, so as to prevent their momentary separation and the crushing of a roller by the sudden return of the parts to normal position, and the bottom 9 of the box may be dropped to any desired extent to enlarge its oil-space.

In the modification represented by Fig. 3 the rollers C and their pivots *b* are hollow, and the rods 3 extend through the same and through the end rings 1 and 2, and the wear parts *a*, being tapered externally as well as internally and inserted from within outwardly, are kept in place by the rollers B without other means.

In the modification represented by Fig. 4 the end rings 1 and 2 are provided with cups in place of holes to receive the wear parts *a*, the latter being conveniently hemispherical externally as well as internally. The wear parts are held in place by the rollers C, as in said arrangement shown in Fig. 3, and the rods 3 are provided with sleeve-tubes *f*, which form the equivalents of shoulders on the rods in contact with the end rings and contribute to the rigidity of the cradle, while said tubes are readily shortened by filing their ends to permit the required endwise adjustment to take up wear.

Details of the axle-boxes shown in Figs. 2 and 3, not above described, may be of any known or improved construction and form no part of the present invention.

It will be understood that the roller-pivots *b* in the arrangement represented by Figs. 1 and 2 may preferably be conical, hemispherical, or of equivalent shape and the wear parts *a* shown in these figures of corresponding shape internally; also, that these wear parts are non-circular externally in cross-section to keep them from turning and that any non-circular shape will answer this purpose; also, that such conical, hemispherical, and like pivots may be of the full diameter of the rollers at the larger diameters of the pivots or, in other words, that the rollers may be made

without shouldered ends, and other like modifications will suggest themselves to those skilled in the art.

I do not claim herein broadly a roller-bearing comprising longitudinal antifriction-rollers, a revolving cradle uniting said rollers and removable therewith, means for adjusting the rollers to take up wear, and renewable bushes or equivalent parts to which wear is confined and that may be renewed when worn out, but claim the same in a companion specification forming part of my application for patent, filed May 3, 1899, Serial No. 715,447. My present improvement is confined to those embodiments of my "means for the reduction of friction of axles and journals" common to both inventions, in which the roller-cradle itself is adjusted lengthwise to take up wear.

Having thus described said improvement, I claim as my invention and desire to patent under this specification—

1. The combination with longitudinal antifriction-rollers, in a roller-bearing, of renewable and interchangeable wear parts to coact with the individual pivots of said rollers, and a revolving cradle for said rollers comprising end rings provided with said wear parts and through-bolts drawing said end rings toward each other for taking up wear.

2. The combination with longitudinal antifriction-rollers, in a roller-bearing, of end rings forming parts of a revolving cradle for said rollers, wear parts carried by said end rings to coact with the individual pivots of said rollers, said wear parts being removable outwardly through said end rings, through-bolts for drawing said end rings toward each other for taking up wear, keepers applied to said end rings to hold said wear parts in place, and means for removably attaching said keepers.

3. The combination with longitudinal antifriction-rollers, in a roller-bearing, of end rings forming parts of a revolving cradle for said rollers, wear parts to coact with the individual pivots of said rollers carried by said end rings and removable outwardly through the rings, annular keepers for retaining the wear parts in working position; means for drawing said keepers toward each other to secure the wear parts in working position, and means for drawing said end rings toward each other to take up wear.

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