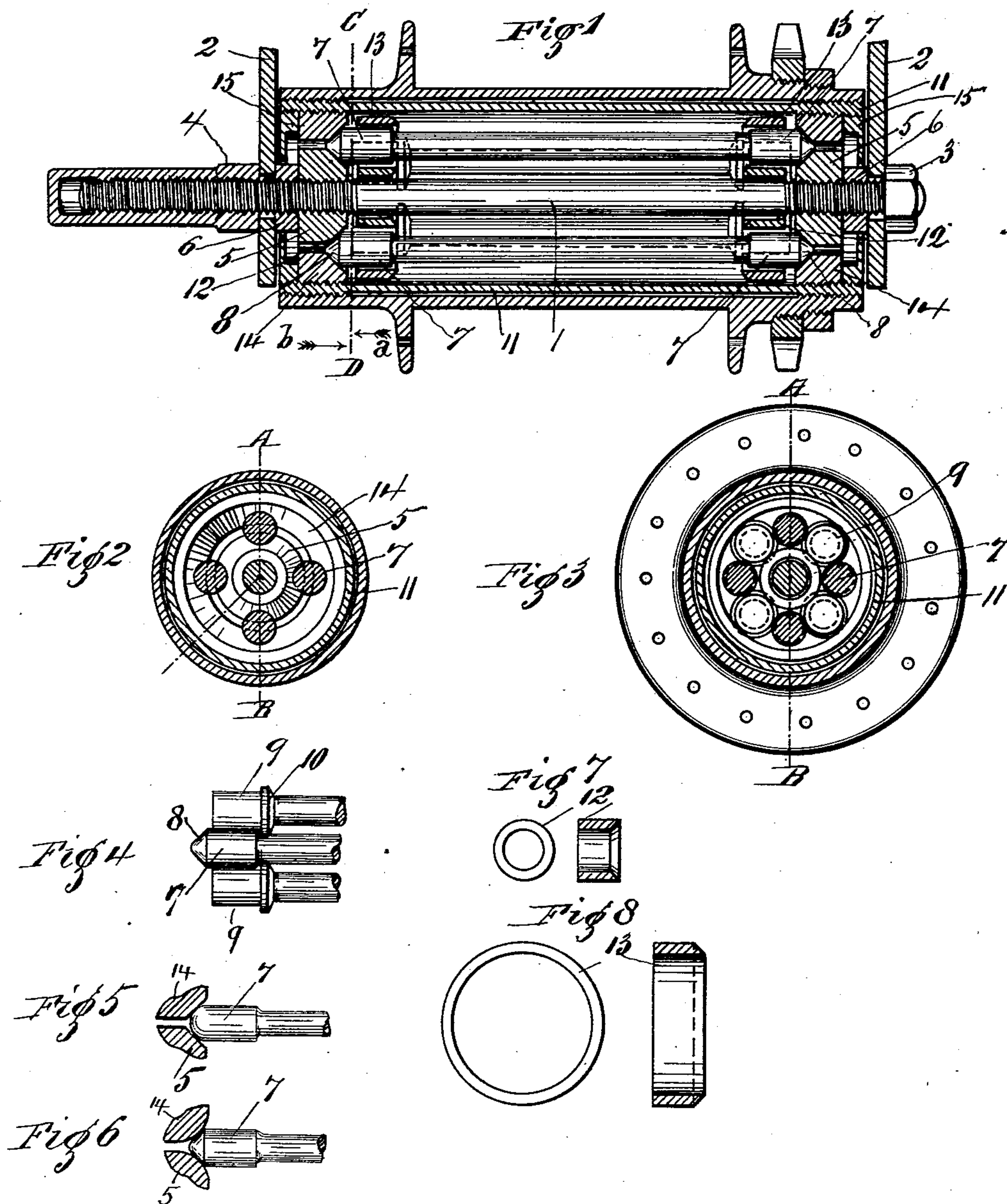


(No Model.)

C. BENDER & C. G. S. MUELLER.  
ROLLER BEARING.

No. 563,251.

Patented July 7, 1896.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

CONRAD BENDER AND CHARLES G. S. MUELLER, OF INDIANAPOLIS,  
INDIANA.

## ROLLER-BEARING.

SPECIFICATION forming part of Letters Patent No. 563,251, dated July 7, 1896.

Application filed March 30, 1896. Serial No. 585,517. (No model.)

*To all whom it may concern:*

Be it known that we, CONRAD BENDER and CHARLES G. S. MUELLER, citizens of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented new and useful Improvements in Antifriction Cone Roller-Bearings, of which the following is a specification.

Our invention relates to certain new and useful improvements in antifriction roller-bearings; and it consists in a new and improved arrangement of roller-bearings and the means for taking up the wear of the same, as hereinafter set forth.

The object of this our invention is to construct an antifriction roller-bearing the main or bearing rollers of which will be so formed that the play or lost motion due to wearing or abrasion of the wearing-surface of said rollers may be readily taken up; also, to provide races, whereon said rollers work, that may be readily removed without disconnecting all parts of the bearing; also, to construct a roller-bearing that will be effective and durable and will be free from end friction. We attain these objects by means of the construction of the roller-bearings illustrated in the accompanying drawings, in which similar reference-numerals designate like parts throughout the several views.

Figure 1 is a longitudinal sectional view showing the antifriction bearing-rollers, and taken through the line A B. (See Figs. 2 and 3.) Fig. 2 is a transverse sectional view of the same, taken through the line C D, Fig. 1, and looking in the direction of the arrow *a*. Fig. 3 is a similar view taken through the same line, but looking in the direction of the arrow *b*. Fig. 4 is a broken-off detail view of the rollers, showing the manner of assembling the same. Fig. 5 is a broken-off view of a modified form of the bearing-rollers and their races, showing a spherical bearing end of the rollers running on beveled bearing-races. Fig. 6 is a similar view showing a bearing-roller having a mitered or beveled end running in rounded races. Fig. 7 is a detail front and sectional view of the inner retaining-ring of the bearing-rollers, and Fig. 8 is a detail front and sectional view of the outer retaining-ring of the intercepting rollers.

The axle 1 is secured and rigidly held in its end supports 2 by the securing-nut 3 and the end box-nut 4. On the threaded ends of the said fixed axle 1 are adjustably screwed the race-washers 5, which are securely held in position thereon by their locking-nuts 6. The washers 5 are annular and turned to a bevel on their inner peripheral edges. Arranged round the race-washers 5 are a series of bearing-rollers 7, which are slightly reduced at their central portions, said rollers having their enlarged projecting end portions 8 beveled or coned to correspond with the beveled bearing-surface of the race-washers 5, on which they roll in a circular path concentric with the axis of the axle 1. Between each of the rollers 7 are placed a series of intercepting rollers 9, which are slightly larger in diameter, at their bearing ends, than the bearing-rollers 7, for the purpose of not only more completely filling up the space between the cylindrical bearing ends of said rollers 7 and taking up the lost motion between them, but also to more readily either apply or remove their outer retaining-rings 13 without removing the other parts connected to the fixed axle 1. On the intercepting rollers 9 and contiguous to the inner bearing cylindrical ends thereof are formed the collars 10, which are adapted to loosely fit between the shoulders formed at the juncture of the reduced central portion of the rollers 7, for the purpose of preventing the lateral movement of said rollers 9. Surrounding and inclosing all the rollers is the casing or boxing 11, which may be applied equally well to any form of wheel-hub, and in the drawings said boxing is threaded exteriorly at its ends to be firmly screwed or otherwise secured in the bicycle-wheel hub. The hub may be of the usual or any of the well-known forms of hub and need not be described.

The end interior-bearing-rings 12 are loosely mounted on the axle 1 and have their inner sides reduced or beveled toward their periphery to contact against the collars 10 and are provided for the purpose of preventing the bearing-surfaces of the rollers 7 contacting with and rolling on the fixed axle should the beveled wearing-surfaces of the washers 5 become worn or when the latter are not sufficiently screwed on the axle 1 to increase the



distance of the rollers 7 from their common plane of rotation to take up the lost motion.

Surrounding all the rollers and bearing on the intercepting rollers 9 are the exterior retaining-rings 13, which are also beveled on their inner sides or the sides toward their interior peripheries and are provided for the purpose of retaining all the rollers in their relative working positions. The exterior rings 13 are free to rotate on and permit the free rotation of the series of intercepting rollers. The exterior race-washers 14 are threaded to be screwed into or otherwise adjustably secured in the ends of the casing or boxing 11 and are beveled on their inner edge to form an exterior bearing-surface on the beveled ends 8 of the rollers 7, whereon said washers and the hub and parts secured thereto freely rotate. The dust-guard washers 15 are also threaded to be securely screwed into the boxing 11 and are also adapted to serve the purpose of a lock-nut for firmly retaining said washer 13 in any set position.

We do not confine ourselves solely to a beveled form of roller and a correspondingly-formed inner fixed and outer rotating race-washer, as a roller having spherical or rounded ends running between race-washers of the form described, or race-washers having rounded bearing edges, instead of straight bearing roller surfaces, in connection with the bearing-rollers having straight beveled bearing ends, may be used without departing from the spirit of our invention, (see Figs. 5 and 6;) but we prefer to use the form of rollers and race-washers previously described, as they are more easily constructed and assembled and lost motion between the beveled bearing ends 8 of the rollers 7 and the beveled bearing-surfaces of the race-washers are more readily taken up and the parts are more easily adjusted.

Having thus described the nature and con-

struction of this our invention, what we claim as new and useful, and desire to cover by Letters Patent of the United States therefor, is—

1. In an antifriction roller-bearing, the combination with a fixed axle, of end fixed race-washers 5 on said fixed axle, said washers having their opposing bearing edges beveled, a series of main rollers having enlarged cylindrical ends and terminating in bearing beveled ends, a series of intercepting rollers between said bearing-rollers and bearing only on the cylindrical ends of said rollers, means for preventing said intercepting rollers from sliding longitudinally, an inclosing boxing, and washers 14 secured therein and having their opposing beveled bearing edges encircling the bearing ends of the main rollers, all substantially as and for the purpose set forth.

2. In an antifriction roller-bearing, the combination with a fixed axle, and beveled race-washers 5 adjustably secured on the ends of said axle, of a series of longitudinally-extending rollers having beveled bearing ends adapted to roll on the beveled edges of said washers, intercepting rollers between said main rollers and extending between said washers but bearing on said rollers only, an outer inclosing boxing, end washers 14 having their beveled bearing-faces contacting with the beveled ends of said main rollers, and means whereby said washers are held in adjusted position in said box, all substantially as and for the purpose set forth.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

CONRAD BENDER.

CHARLES G. S. MUELLER.

Witnesses:

THOMPSON R. BELL,

FRANCIS M. SPRINGER.