

(No Model)

W. C. QUIGLEY.
BALL BEARING.

No. 583,769.

Patented June 1, 1897.

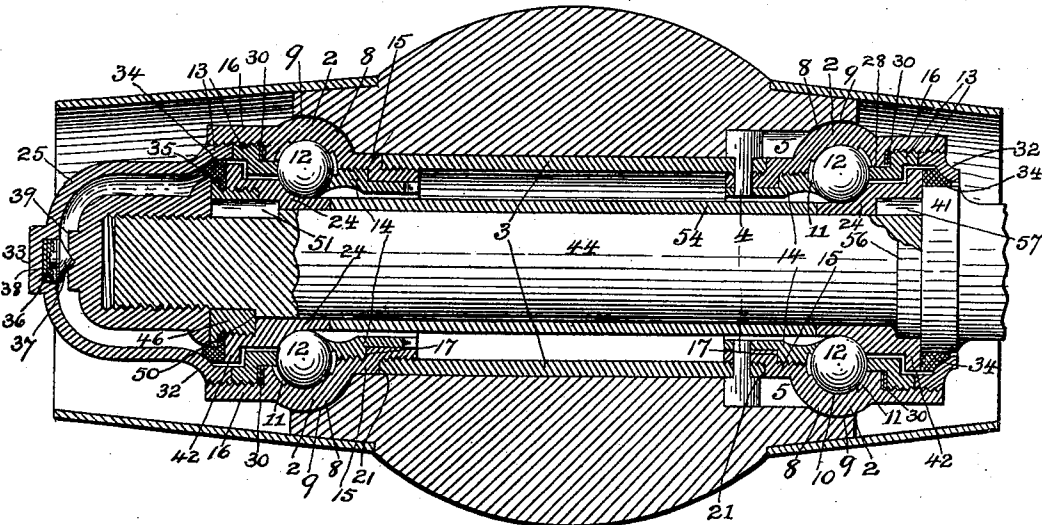


Fig. 1.

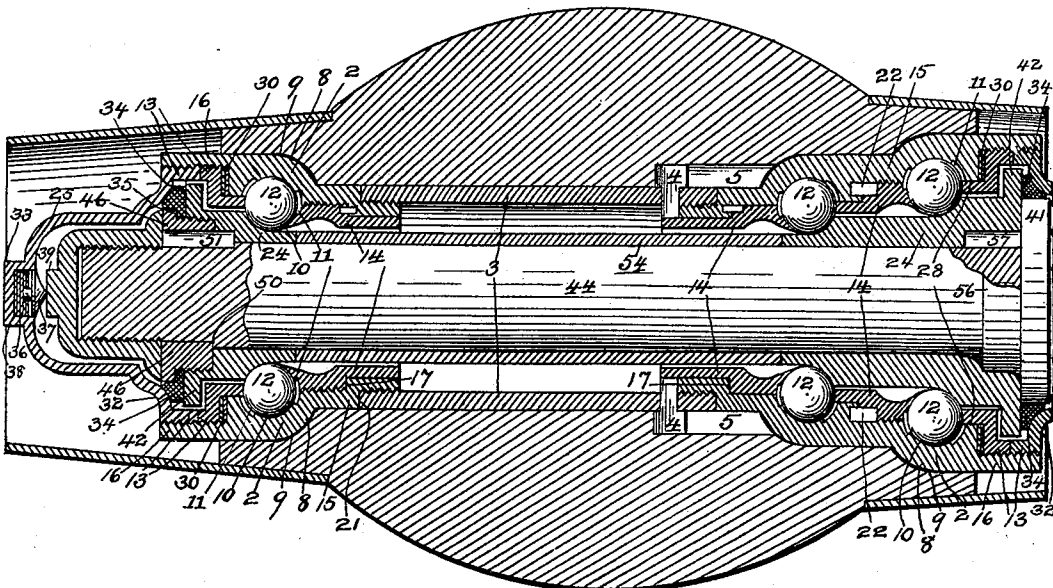


Fig. 2.

Witnesses
J. H. Blackwood
Hartwell P. Heath

Inventor
William C. Quigley
by L. A. Gourick
Atty. Atty.

UNITED STATES PATENT OFFICE.

WILLIAM C. QUIGLEY, OF MARION, OHIO.

BALL-BEARING.

SPECIFICATION forming part of Letters Patent No. 583,769, dated June 1, 1897.

Application filed April 9, 1897. Serial No. 631,456. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. QUIGLEY, a citizen of the United States, residing at Marion, in the county of Marion and State of Ohio, have invented certain new and useful Improvements in Ball-Bearings, of which the following is a specification.

My invention relates to improvements in ball-bearings for wheeled vehicles, and has for one of its objects to provide a ball-bearing that may be easily applied to an ordinary wheel with wooden hub.

Another object of my invention is to provide means whereby balls of larger or smaller size may be used in a ball-bearing, as may be most convenient.

Another object of my invention is to provide means for tightening the bearings by the direct pressure of the cap-nut, the inward movement of which is limited by improved means rendering the combination positive and permanent and requiring no attention until the usual wear requires a new adjustment.

Another object of my invention is to provide means, by a duplication of parts, to adapt the ball-bearings to greatly-increased weights.

Another object of my invention is to provide improved ball-bearings for wheels.

These objects I accomplish in the manner and by the means hereinafter more fully described in detail, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which the same numerals indicate like parts in both the figures.

Figure 1 is a central longitudinal sectional view of my improved ball-bearing with axle-arm. Fig. 2 is a central longitudinal sectional view of my improved ball-bearing with certain parts duplicated for especially heavy work.

My invention consists in countersinking each end of the bore of an ordinary wheel-hub, Fig. 1, for the reception of the annular ball-chambers 2 2. Into this bore is inserted a straight or tapering tube 3, interiorly screw-threaded at the ends and provided at the inner end exteriorly with studs or pins 4 4, adapted to be inserted into slots 5 5 in the hub to prevent the tube 3 from turning in the bore of the hub. Annular ball-chambers 2 2 are screwed tightly into the ends of the tube 3,

entering the countersinks 8 8, against which said annular ball-chambers 2 2 abut, a rubber or felt washer 9 being interposed between the parts. The annular ball-chambers 2 2 have annular ball-races 10 formed on their inside circumferences, corresponding in cross-section to the contour of the balls 12, annular recesses 11, larger or smaller according to the weight to be carried, being cut in the walls of said ball-races 10, lessening or increasing the contact frictional surface. The ball-chambers 2 2 conform exteriorly to their inside formation. Said ball-chambers 2 2 have necks 15 15 extending inwardly, the interiors of which necks 15 are screw-threaded to receive the bushing-ring 14, and the diameters of which necks 15 are reduced to form the shoulder 17, against which said bushing-ring 14 abuts. The inner ends of said necks 15 15 are exteriorly similarly reduced in diameter, forming the shoulder 21 equal in thickness to the tube 3 and provided with screw-threads complementary to the screw-threads in the interior of the ends of the tube 3, by means of which said ball-chambers 2 2 are securely fixed on the ends of said tube 3, said shoulder 21 abutting against the end of said tube 3. Said ball-chambers 2 2 also have necks 16 16, extending outwardly, the interiors of which necks are enlarged in diameter to form the annular shoulder 28, of a diameter a little greater than the diameter of the horizontal axis of the balls 12, and outwardly from said annular shoulder 28 still further enlarged in diameter and furnished on their inner circumference with screw-threads.

Bushing-rings 14 14 are inserted from the front on the center line of the axis of the balls 12. Said bushing-rings 14 have their inner ends adapted to fit snugly in the inner ends of the necks 15 15 and their exterior circumferences enlarged to form a shoulder complementary to the shoulder 17 of the said neck 15 and furnished with screw-threads complementary to the screw-threads in said neck 15. The inner end of the neck 15 of the ball-chamber 2 may be dispensed with and the exterior circumference of the inner end of the bushing-ring 14 made to correspond with the interior circumference of the ends of the tube 3 and furnished with screw-threads complementary with the screw-threads in the

ends of the tube 3 into which said bushing-ring 14 is screwed, firmly holding the inner end of the ball-chamber 2 against the end of the tube 3. The outer ends of said bushing-rings 14 14 are exteriorly cut away to form part of the annular recesses 11 in the walls of the ball-races 10 and part of the walls of said ball-races 10, a side not an end bearing being offered to the balls 12. The interior of the outer ends of the bushing-rings 14 14 is cut out to give greater clearance to the axle-journal. Keys 22 may be inserted in the shoulders of the necks 15 of the ball-chambers 2 and the bushing-rings 14, locking the same and preventing the bushing-rings 14 turning in said neck 15. If increased weights are to be placed on the ball-bearing, the ball-chambers 2 2 may be duplicated, the inner one joined to the outer at the inner end of the neck 15 of the outer ball-chamber. In such case the bushing-ring 14 is placed in the inner end of the inner ball-chamber 2 and between the inner and outer ball-chambers a bushing-ring similar in form to the bushing-ring 14, having its outward end exteriorly cut out to form part of the annular recesses 11 and to form part of the wall of the annular races 10, a side not an end bearing being offered to the balls 12, and interiorly hollowed out to give greater clearance to the axle-journal and having its inner end in contact with the balls 12 in the annular races 10 in the inner ball-chamber 2 upon the center line of their horizontal axis, just out of contact with the axle-journal, and furnished exteriorly with screw-threads complementary to the screw-threads in the neck between the inner and outer ball-chambers 2, by means of which said bushing-ring is firmly attached to said ball-chambers 2.

Bushing-rings 13 13 in two parts are fitted into the outer ends of the ball-chambers 2 2. The inner end of the inner part of said bushing-ring 13 is of such exterior circumference as to fit in the annular shoulder 28 of the outer neck 16 of the ball-chamber 2 and come in contact with the balls 12 upon the center line of their horizontal axis, the interior circumference of said bushing-ring 13 just out of contact with the axle-journal. The exterior circumference of the bushing-ring 13 is enlarged to form a shoulder complementary to the annular shoulder 28 in the outer neck 16 of the ball-chamber 2, thin rings or gaskets 30 being interposed between said shoulders. The interior of the outer necks 16 of the ball-chambers 2 is furnished with screw-threads complementary to the screw-threads on the outer circumference of the inner part of the said bushing-ring 13, by means of which said bushing-ring 13 is firmly screwed up against the gaskets 30. The inner end of the outer part of said bushing-ring 13 is of the same exterior diameter as the interior of the outer end of the neck 16 of the ball-chamber 2 and furnished with screw-threads complementary to the screw-threads in the interior of the outer

end of the neck 16 of the ball-chamber 2. The outlying part of the outer end of said bushing-ring 13 is necked down to form a rounding shoulder 32 overlying a flange formed on a bushing-ring 35 of the axle-journal 24 and ending at the outer end of the hub in a rounded cap 25. Upon the outer end of said cap 25 a hexagon extension 33 is formed, by means of which said outer part of said bushing-ring 13 is firmly screwed into the outer neck 16 of the ball-chamber 2, abutting and locking against the outer end of the inner part of said bushing-ring 13, the rounded shoulder 32 of the bushing-ring 13 in slight contact with an elastic antifriction-ring 34, placed upon the flange of the bushing-ring 35, inserted in the end of the axle-journal 24, said elastic ring 34 receiving the shock incident to any lateral thrust of the axle and preventing concussion of the balls 12 and races 10. The hexagonal extension 33 is cupped out on the inside 36 to receive a rubber cushion 38, supplemented by an antifriction metallic head 37, cone-shaped, the outward end of said metallic head 37 furnished with a stem, which stem is inserted into the rubber cushion 38. When thus prepared, the rubber cushion 38 is placed in the cupped recess 36, the point of the metallic head 37 in slight contact with the center of the axle-nut 39.

A sleeve 54, fitted to the axle-arm 44, is provided of suitable length and interposed between the inner ends of the axle-journals 24, by which means the inner axle-journal 24 is forced back into contact with the axle-collar 41. The inner axle-journal 24 is enlarged circumferentially on its outer end, forming the flange 42, which occupies the groove or channel formed by the inner and outer parts of the bushing-ring 13, out of contact with either, and serves to protect the antifriction devices. Between the flange 42, the axle-collar 41, and the rounded shoulder 32 of the outer end of the outer part of the bushing-ring 13 is placed an antifriction-ring 34. The interior of the outer end of the inner axle-journal 24 is enlarged complementary to the enlarged portion 56 of the axle-arm 44 adjoining the axle-collar 41 and has a groove 57 formed upon the horizontal line with a corresponding groove formed in the axle-arm 44, into which grooves a key fits and prevents said axle-journal 24 from turning on the axle. The outer axle-journal 24 is formed interiorly complementary to the axle-arm 44, its outer end enlarged circumferentially and furnished with screw-threads to receive a bushing-ring 46, forming a shoulder against which said bushing-ring 46 abuts when screwed into said axle-journal 24. The interior circumference of said bushing-ring 46 is complementary to the outer end of the axle-arm 44, which outer end is furnished with screw-threads and slightly smaller in diameter than the axle-arm 44, resulting in the annular shoulder 50, a little beyond the threaded end of the axle-arm 44, permitting the axle-jour-

nal 24 and bushing-ring 46 to pass readily over the threaded portion of the axle-arm 44 until the bushing-ring 46 abuts against the shoulder 50. Grooves 51 are provided in the bushing-ring 46, with a corresponding groove in the axle-journal 24 and axle-arm 44, into which grooves the key 52 may be inserted. When thus in place, the axle-journal is inserted on the arm 44, the elastic antifriction-ring 34 interposed between the flange 42 of the axle-journal 24 and the rounded shoulder 32 of the outer part of the bushing-ring 13, and the axle-nut 39 brought into contact with the bushing-ring 46 and screwed tightly up, holding the axle-journals 24 rigidly upon the axle-arm 44. The axle-journals 24 are exteriorly hollowed out to form part of said annular races 10.

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

1. In a ball-bearing in a wheel-hub, a series of ball-chambers joined by necks in which a bushing-ring is inserted having its inner circumference adapted to clear the outer circumference of the axle-journals and its outer circumference furnished with screw-threads complementary to the screw-threads in the said necks, said bushing-ring at its outer end being exteriorly cut out to form part of the wall of said races and at its inner end coming in contact at the center line of the horizontal axis of the inner series of said balls, said ball-chambers having annular races with annular recesses cut in their walls in the inner circumferences of said ball-chambers forming with an annular groove in the axle-journal and the end of the bushing-ring annular ball-races and outwardly conforming to their inside formation with an outwardly-extending neck enlarged in diameter and furnished with screw-threads by means of which a bushing-ring is screwed into said neck and an inwardly-extending neck interiorly furnished with screw-threads by means of which a bushing-ring is inserted having its outer exterior circumference cut out to form part of an annular recess in the walls of said ball-races and its outer end dipped under said balls forming part of the wall of said ball-races and offering a side rather than an end bearing, and its interior circumference cut out to give greater clearance to the axle-journals and its inner end coming in contact with the balls in the inner races upon the center line of their horizontal axis when more than one set of balls is used, substantially as shown and described.

2. In a ball-bearing device having an axle, axle-journals having their outer ends exteriorly enlarged circumferentially forming a flange occupying the groove formed by the two sections of the bushing-ring, annular grooves cut in their exterior circumferences complementary to the annular races cut in the interior of the ball-chambers forming the ball-races, and interiorly fitted to the axle-

arm to which they are locked by keys inserted in longitudinal grooves in the axle-arm, the axle-journal and the bushing-ring, and the outer end of the outer of said axle-journals interiorly enlarged forming an annular shoulder against which the bushing-ring abuts when screwed into the end of said axle-journals, said bushing-ring being exteriorly enlarged at its outer end forming an annular shoulder between which and the outer end of the said axle-journal is interposed an elastic antifriction-ring, substantially as shown and described.

3. In a ball-bearing device for wheel-hubs, a bushing-ring adapted to screw into the outer end of the outer ball-chamber and having its outer end necked down to form a rounded shoulder overlying at the inner end of the hub the flange on the outer end of the axle-journal, and the axle-collar in slight contact with the elastic antifriction-ring interposed between the axle-collar and the rounded shoulder and at the outer end of the hub overlying a flange formed exteriorly on the outer end of the axle-journal in slight contact with an elastic antifriction-ring interposed between said flange and said rounded shoulder, and ending in a round cap on which is a hexagon extension adapted to receive a wrench and permit of screwing said bushing-ring up in said ball-chamber until its inner end abuts against the outer end of the inner section of said bushing-ring, said hexagonal extension being cupped out on its inner side to receive the rubber cushion into which is inserted, by means of a stem projecting from its base, a cone-shaped head having its point in contact with the center of the axle-nut, substantially as shown and described.

4. In a ball-bearing device having an axle, the axle-nut adapted to be screwed on the outer end of the axle-arm until it abuts against the bushing-ring inserted into the outer end of the outer axle-journal, locking the antifriction devices into place, substantially as shown and described.

5. A ball-bearing consisting of a straight or tapering tube with the interior of its ends furnished with screw-threads and having near its inner end a stud adapted to engage a socket in the hub for insertion in any ordinary wheel-hub, the ends of the bore through which have been countersunk to receive the ball-chambers, ball-chambers having ball-races cut in their interior circumferences with annular recesses in the walls of said races and outwardly conforming to their inward formation, adapted to screw into the ends of said tube, a bushing-ring complementary to the interior formation of the inner part of said ball-chambers adapted at its outer end to form part of one of said annular recesses and part of said ball-races, out of contact with the axle-journal, a bushing-ring in two sections, the inner section adapted to screw into the outer end of said ball-chambers and pass the annular shoulder in the outer part of said

ball-chambers and come in contact with the balls on the center line of their horizontal axis out of contact with the axle-journal, gaskets being interposed between said annular shoulder and said bushing-ring, and the outer section of said bushing-ring adapted to screw into the outer end of said ball-chambers and outwardly necked down to form a rounded shoulder overlying the axle-collar on the inner end and ending on the outer end in a round cap on which is a hexagonal extension having on its inner side a capped recess adapted to receive a rubber cushion into which cushion a conical-shaped head is inserted by a stem fixed in the base of said cone, the point of said cone being in contact with the center of the axle-nut, a sleeve of suitable length fitted on the axle-arm, axle-journals having annular grooves formed in their exterior circumferences to form ball-races and having their outer ends circumferentially enlarged to form a flange adapted to fill the channel or groove formed by the two sections of the said outer bushing-rings, an elastic antifriction-cushion between said flange and said rounded shoulder, the inner of said axle-journals having its interior circumference of its outer end enlarged to conform to the enlargement of the axle-arm adjoining the axle-collar and having a groove corresponding to a groove formed in said enlarged portion of the axle-arm, into which grooves a key is fitted, the outer of said axle-journals having its interior circumference at its outer end enlarged to receive a bushing-ring adapted to adjust the axle-journals upon the axle-arm and furnished with grooves formed to correspond with grooves in the axle-journal and axle-arm into which grooves a key is fitted and an axle-nut adapted to be screwed on the end of the axle-arm and abut against the bushing-ring locking the axle-journals in place on the axle-arm, substantially as shown and described.

6. A ball-bearing consisting of a straight or tapering tube with the interior of its ends furnished with screw-threads and having near its inner end a stud adapted to engage a socket in the hub for insertion in any ordinary wheel-hub, the ends of the bore through which have been countersunk to receive the ball-chambers, a series of ball-chambers joined by necks in which a bushing-ring is inserted having its inner circumference adapted to clear the outer circumference of the axle-journals and its outer circumference furnished with screw-threads complementary to the screw-threads in the said necks, said bushing-ring at its outer end being exteriorly cut out to form part of the wall of said races and at its inner end coming in contact at the center line of the horizontal axis of the inner series of said balls, said ball-chambers having ball-races cut in

their interior circumferences with annular recesses in the walls of said races and outwardly conforming to their inward formation, adapted to screw into the ends of said tube, a bushing-ring complementary to the interior formation of the inner part of said ball-chambers adapted at its outer end to form part of one of said annular recesses and part of said ball-races, out of contact with the axle-journal, a bushing-ring in two sections, the inner section adapted to screw into the outer end of said ball-chambers and pass the annular shoulder in the outer part of said ball-chambers and come in contact with the balls on the center line of their horizontal axis out of contact with the axle-journal, gaskets being interposed between said annular shoulder and said bushing-ring, and the outer section of said bushing-ring adapted to screw into the outer end of said ball-chambers and outwardly necked down to form a rounded shoulder overlying the axle-collar on the inner end and on the outer end in a rounded cap on which is a hexagonal extension having on its inner side a capped recess adapted to receive a rubber cushion into which cushion a conical-shaped head is inserted by a stem fixed in the base of said cone, the point of said cone being in contact with the center of the axle-nut, a sleeve of suitable length fitted on the axle-arm, axle-journals having annular grooves formed in their exterior circumferences to form ball-races and having their outer end circumferentially enlarged to form a flange adapted to fill the channel or groove formed by the two sections of the said outer bushing-rings, an elastic antifriction-cushion between said flange and said rounded shoulder, the inner of said axle-journals having its interior circumference of its outer end enlarged to conform to the enlargement of the axle-arm adjoining the axle-collar and having a groove corresponding to a groove formed in said enlarged portion of the axle-arm into which grooves a key is fitted, the outer of said axle-journals having its interior circumference at its outer end enlarged to receive a bushing-ring adapted to adjust the axle-journals upon the axle-arm and furnished with grooves formed to correspond with grooves in the axle-journal and axle-arm into which grooves a key is fitted and an axle-nut adapted to be screwed on the end of the axle-arm and abut against the bushing-ring locking the axle-journals in place on the axle-arm, substantially as shown and described.

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

WILLIAM C. QUIGLEY.

Witnesses:

D. R. CRISSINGER,
S. D. BERINGER.