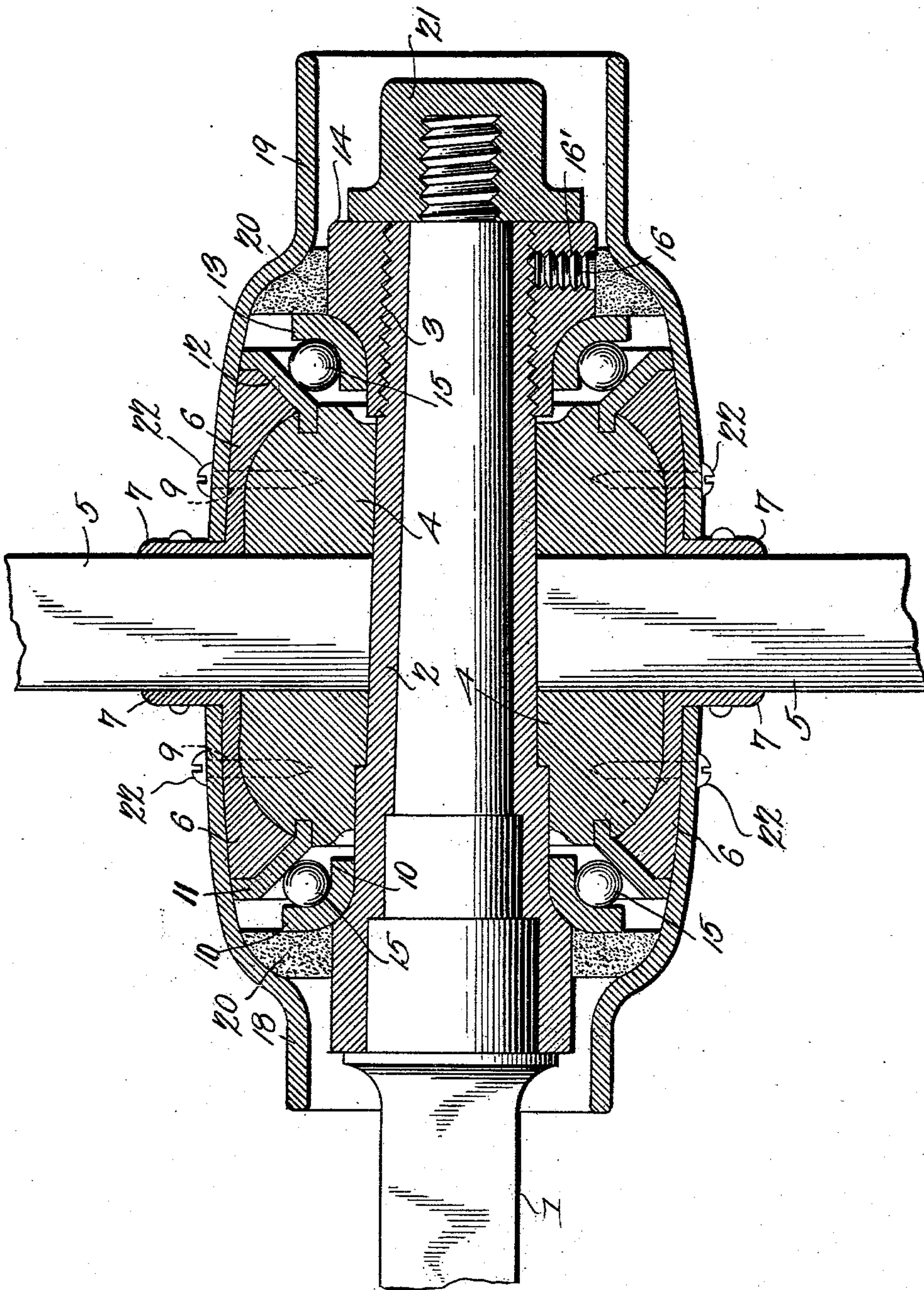


No. 745,638

PATENTED DEC. 1, 1903.

W. H. MAKUTCHAN.
BALL BEARING CONSTRUCTION.
APPLICATION FILED JUNE 29, 1903.

NO MODEL.



Witnesses
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WILLIAM H. MAKUTCHAN, OF PRINCETON, ILLINOIS.

BALL-BEARING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 745,638, dated December 1, 1903.

Application filed June 29, 1903. Serial No. 163,640. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. MAKUTCHAN, a citizen of the United States, residing at Princeton, in the county of Bureau and State of Illinois, have invented a new and useful Ball-Bearing Construction, of which the following is a specification.

This invention relates to ball-bearing wheels; and it consists in the construction and combination of parts of a ball-bearing wheel hereinafter fully described, and illustrated in the accompanying drawing, forming a part of this specification, in which corresponding parts are designated by the same characters of reference throughout.

In the drawing there is shown a view in longitudinal section through the hub in the plane of its axis, the end of the axle and the inner ends of some of the spokes being shown in connection with the hub construction.

In ball-bearing wheels for vehicles as heretofore constructed numerous attempts have been made to provide a ball-bearing wheel adapted for use upon vehicle-axles of the ordinary type without change in the axle and also adapted to effectively exclude from the interior of the bearings all moisture and grit which would injure the bearings if allowed to enter therein. These objects have been more or less completely accomplished in various constructions; but, so far as I am aware, in those wheels in which the objects sought were completely attained the constructions employed are needlessly complicated and expensive. Moreover, the constructions are of such character that very delicate adjustment thereof is required, and the parts tend to work loose when subjected for any considerable period to actual service.

In the ball-bearing wheel hereinafter described a prime object of the construction is to produce a ball-bearing wheel which is adapted for use upon axles of the ordinary type without any modification of the axle, which may be put on and removed from the axles as an entirety and without any alteration of the adjustment of the parts of the bearing, which will effectively exclude moisture and grit from the bearings, and which is simple in construction and is adapted to

remain in adjustment for an indefinite period of time after the parts have once been placed in proper relation.

Referring to the drawing, 1 designates an axle of the ordinary type used upon light-wheeled vehicles and also adapted for use upon heavier vehicles, if desired. 2 designates the box of the wheel, which is of the usual form, except that the outer end thereof is externally threaded at 3 for a suitable distance. The box is adapted to fit smoothly on the axle and to be freely rotatable thereon without binding and without unnecessary play.

The numeral 4 designates the wooden body portion of the hub, in which are secured the spokes 5. The outer metallic casing of the hub is shown at 6 and consists of two members, each of which is provided with a flange 7, as usual, and is pierced at a suitable point with a screw-hole 9.

At the inner end of the box 2 there is mounted thereon a ball-cup 10 in suitable relation to the inner end of the wooden hub 4, which is provided with an annular recess in which is seated a cone 11. The cone 11 is supported by contact with the inner surface of one of the hub-casing sections 6, which projects over the cone far enough to extend over the outer portion of the ball-race and form a partial protection for the balls provided in the cup. The outer end of the wooden hub 4 is provided with a similar annular groove in which is seated a cone 12, which is also supported by contact with the inner surface of the adjacent section of the hub-casing 6, and a cup 13 is secured upon the nut 14, which is adapted for engagement with the threads 3 on the outer end of the box 2. Balls 15 are provided in the cups and the balls are partially protected by the extension of the sections of the hub-casing over the cups.

In order to hold the nut 14 in adjusted position, it is provided with a radial opening 16, which is threaded and contains a screw 16', which is adapted to engage the threads 3 upon the box 2 and hold the nut securely when it has been once adjusted thereon.

To afford complete protection to the balls in the bearings, there is provided at each end of the hub a band which is adapted to fit

closely over one section of the hub-casing and which is constricted at its distal end to afford means for securing in position on the box 2 or the nut 14 a felt washer or packing-ring. The hub-band at the inner end of the hub is designated 18 and is shorter than the outer hub-band 19. In other respects the two bands are substantially alike, each having its distal end reduced in diameter and affording a seat for a felt washer 20, which is forced by the hub-band into contact with one of the ball-cups, so as to form effective means for excluding moisture and grit from the interior of the hub.

The wheel is secured in position upon the axle 1 by means of an ordinary nut 21, which engages with a threaded projection on the end of the axle, as usual.

In assembling the parts of my improved ball-bearing wheel the box 2 is inserted into the wooden hub 4, which has rigidly fastened thereto the hub-casing 6 and the cones 11 and 12. The balls 15 are then introduced into the ball-cup 10 and the hub is shifted on the box so as to bring the cone 11 into proper relation to the cup 10 and balls. The nut 14 is then placed on the box and the balls are introduced between the cup 13 and cone 12. The nut 14 is then screwed into position on the box, and when the desired adjustment has been obtained the screw 16' is brought into firm engagement with the box, so as to prevent any shifting of the nut 14 upon the threaded portion thereof. The hub-bands 18 and 19 are then secured in position on the ends of the hub-casing by means of screws 22, extending through holes 9, and the felt washers or packing-rings 20, which are preferably saturated with oil to form more effective means for excluding moisture, are thereby forced into contact with the ball-cups. All of the parts of the wheel having been thus assembled, the wheel can be placed upon the axle 1 and removed therefrom just as an ordinary wheel can, and no special care is necessary to prevent the throwing of the bearings out of adjustment.

Normally the box will remain practically stationary on the axle or have a slight movement thereon in the direction opposite to that of the wheel; but if through any shifting of the nut 14 or from any other cause the bearings jam, so that the balls do not travel freely in the cups, the box 2 will turn upon the axle in the same manner that it would if the ball-bearings were not provided.

It will be seen from the foregoing description that the parts of the ball-bearing wheel may be readily assembled and disassembled; that only one adjustment is necessary to bring the balls, cones, and cups into proper relation, and that when the parts have been adjusted they may be readily kept in proper relation by means of set-screw 16', which will, if brought into firm engagement with the box,

prevent any movement of the nut 14 thereon. It will also be seen that the felt washers or packing-rings form, together with the hub-bands and casing, an effective protection of the bearings from moisture and other foreign substances which would injure the bearings if allowed to enter.

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

1. In a ball-bearing wheel, a hub having a body portion provided at the ends with annular recesses, a casing on said body portion, cones seated in the recesses in said body portion, a box having the outer end threaded, an inner ball-cup carried by said box, an adjusting-nut on the outer threaded portion of the box, an outer ball-cup on said nut, means for positively locking said nut to said box, and balls disposed between said cups and cones.

2. In a wheel, a hub having a body portion provided with annular recesses in the ends thereof, a casing on said body portion, cones seated in said annular recesses, a box having its outer end threaded, an adjusting-nut mounted on the threaded outer portion of said box, an inner ball-cup on said box, an outer ball-cup on said nut, both of said cups presenting shoulders, means for positively locking said nut to said box, hub-bands detachably mounted on the casing, felt washers or packing-rings carried by said hub-bands and held in contact with the shoulders formed by said cups, and balls disposed between said cups and cones.

3. In a wheel, a hub having a body portion provided with annular recesses in the ends, a casing having screw-holes, cones seated in said recesses and supported by said casing, a box having its outer end threaded, an adjusting-nut mounted on said threaded end, an inner ball-cup on said box, an outer ball-cup on said nut, both of said cups presenting shoulders, balls disposed between said cups and cones, a set-screw carried by said nut and adapted to engage said box to lock the nut positively thereon, hub-bands having screw-holes adapted to register with the holes in the casing and having distal ends of reduced diameter to form washer-seats, screws to hold said hub-bands in position, and felt washers carried by said hub-bands and held thereby in contact with the shoulders of said cups.

4. In a wheel, the combination of a hub comprising a body portion and a casing formed in two sections extending beyond the ends of said body portion, said body portion having annular recesses in the ends thereof whose outer walls are continuous with the end surfaces of said casing-sections, cones seated in said recesses, a box disposed within said hub, an inner ball-cup on said box, an adjusting-

nut on the outer end of said box, an outer
ball-cup on said nut, balls disposed between
said nut and said cones, means for positively
locking said nut upon said box, hub-bands
5 having constricted distal ends, and felt wash-
ers carried by said hub-bands.

In testimony that I claim the foregoing as

my own I have hereto affixed my signature in
the presence of two witnesses.

WILLIAM H. MAKUTCHAN.

Witnesses:

J. O. BROKAW,
S. L. SMITH.