Feb. 25, 1930. W. V. JOHNSON 1,748,131

MINE CAR

Filed Feb. 1, 1926

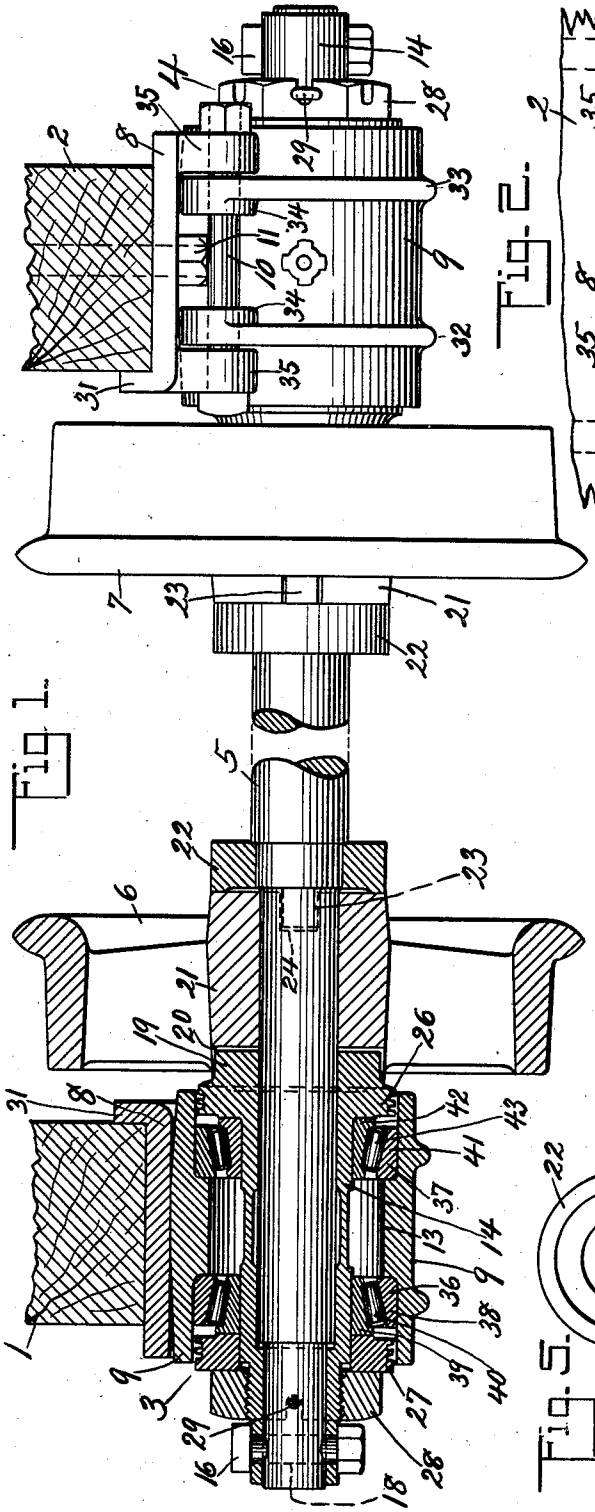


Fig. 1.

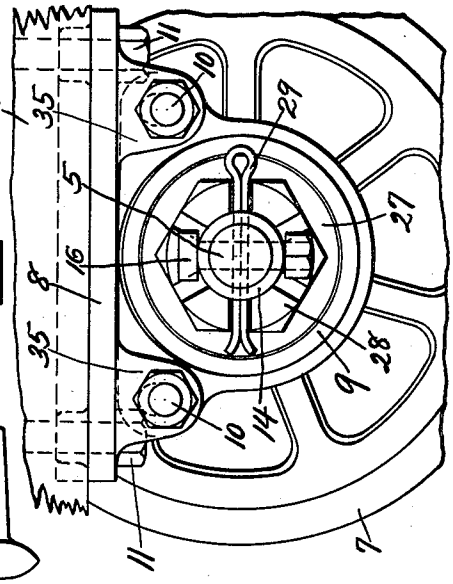


Fig. 2.

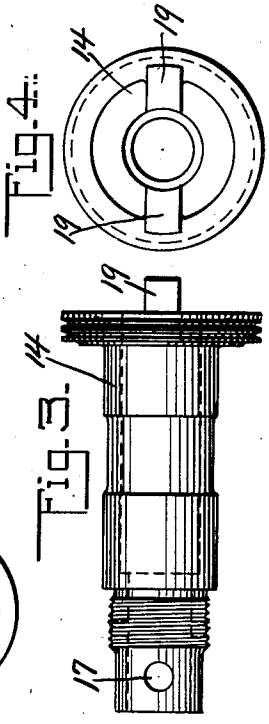


Fig. 3.

Fig. 4.

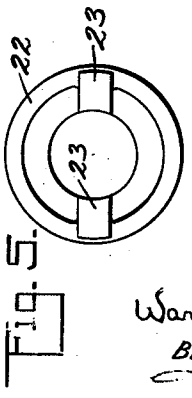


Fig. 5.

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UNITED STATES PATENT OFFICE

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MINE CAR

Application filed February 1, 1926. Serial No. 85,312.

Reference is had to the accompanying drawings which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof within the scope of the claims will occur to persons skilled in the art.

In said drawings:

Figure 1 is an elevational view partially in section and looking from the end of a mine car, of an axle and journal boxes constructed in accordance with the invention;

Fig. 2 is an end view of the axle and journal boxes shown in Fig. 1;

Fig. 3 is an elevational view of the sleeve projecting through the journal box;

Fig. 4 is an end elevational view of the sleeve shown in Fig. 3, and

Fig. 5 is an end view of the collar on the car axle.

One object of the invention is to provide a mine car with outside bearing boxes having roller bearing assemblies which can be adjusted to compensate for wear and which can be removed from the wheel axle without disturbing the adjustment thereof. Journal boxes of mine cars are commonly of the "inside" type as in my Patent No. 1,605,440, November 2, 1926, with friction reducing rollers in the wheel as illustrated in that patent, that is, there are two such journal boxes as 20 therein disposed near opposite ends of the axles between the supporting wheels. When wider car bodies are desired, of increased capacity, journal boxes on the axles and outside of the wheels have been positioned under the car sills as 1—2 herein and straight cylindrical rollers used as friction reducing means, as illustrated in my Patent No. 1,534,123, of April 21, 1925, but adjustment to compensate for wear of such rollers is practically impossible without removal of the rollers from the assembly, hence the tapered roller of the well known Timken type is sometimes used, though heretofore there has been provided in mine cars no convenient means of adjustments thereof to compensate for wear for the reason that, without my invention, readjustment and usually re-assembly of the roller bearings has been required if wheels are removed from axles of mine cars equipped with such outside journal boxes. To overcome this difficulty and to provide relatively permanent adjustments of the roller bearings is one of the objects of this invention.

Another object of the invention is to provide an outside journal box for mine cars wherein an adjustable anti-friction assembly removably receives the car axle and thereby permits a new wheel to be substituted for one that has become worn without disturbing the bearing adjustment.

Another object of the invention is to provide a mine car axle with outside journal boxes having conical roller bearing assemblies which may be conveniently adjusted when in position on the axle and which may be removed without disturbing the adjustment, and furthermore mounted in each journal box is a sleeve which serves to carry the roller bearing assemblies and to connect the wheel to the axle and insure its rotation therewith.

In many structures such for example as the journal boxes on mine cars, anti-friction bearing assemblies are provided which are difficult to adjust and which are not adapted to be removed from the axle without spoiling the bearing adjustment. In the journal boxes herein shown on a mine car axle roller bearing assemblies are provided which are preferably of the conical type and which are easily adjusted to compensate for wear when in position on the car axle.

Referring to the drawing, the side sills 1 and 2 of a mine car are shown mounted on two outside journal boxes 3 and 4. The journal boxes are carried by an axle 5 which extends through wheels 6 and 7. The journal boxes 3 and 4 are similar in construction and accordingly only one journal box will be described in detail and like reference characters will be used in referring to the parts of the two journal boxes.

In the assembly is shown a sill plate 8 and a journal box 9. The top portion 8 is secured to the sill by means of bolts 11 and is provided with an upwardly extending flange 31 engaging the side of the sill. The journal box has

two ribs 32 and 33 extending around a portion of the outside circumference thereof and terminating in lugs 34 each having an opening therethrough for receiving securing bolts 10. The sill plate 8 is provided with downwardly projecting ears 35 having openings therethrough in alinement with the openings in the lugs 34 to receive the bolts 10 to retain the journal box in position. Within the journal box are mounted two roller bearing assemblies 36 and 37. The raceways of each of these roller bearing assemblies 36 and 37 are what I term "correlatively oblique"; i. e., one, at least, of the cooperating raceways of each assembly has some extent radially with reference to the axis of rotation, so that shifting of such cooperating raceways in an axial direction relative to one another will adjust the space between them. The roller bearing assembly 36 comprises an outer race member 38, an inner race member 39 and interposed conical rollers 40. As shown, the raceways 38 and 39 are not only correlatively oblique, with reference to the axis of rotation, as above explained, but are both of them individually oblique relative to said axis, and also relatively oblique with reference to each other. The outer race member 38 is secured to the bottom portion 9 of the bearing box and the inner race member is mounted on a sleeve member 14 so as to be movable for adjusting the bearing assembly. The rollers 40 are formed as a frustum of a cone in shape and the bearing surfaces of the race members are inclined to fit the rollers. The roller bearing assembly 37 is provided with an outer race member 41, an inner race member 42 and rollers 43 which are similar in construction and mounting to the parts in the roller bearing assembly 36. The two outer race members 38 and 41 in the two bearing assemblies are positioned adjacent to a rib 13 formed in the journal box and the open space within the journal box between the rib 13 and the sleeve 14 is adapted to be filled with lubricating material.

The sleeve member 14 projects through the journal box and is mounted on the axle. A bolt 16, which projects through openings 17 in the sleeve and an opening 18 in the axle, serves to secure the sleeve to the axle and insures its rotation therewith. The sleeve is also provided with lugs 19 which project into orifices 20 formed in the hub 21 of the wheel which in the case under consideration is the wheel 6. By such means it is apparent that the axle, sleeve and wheel are locked together in order to have common rotative movement. The wheel 6 is not only connected to the axle 5 by means of the lugs 19 on the sleeve 14 but is shown connected to the axle by means of a collar 22. The collar 22 is fixedly secured to the axle by being shrunk or pressed in position. Such collar 22 is provided with lugs 23 projecting into orifices 24 formed in the end of the wheel hub 21. It is to be understood that if so desired the wheel may be connected to the axle solely by the collar 22 or by the sleeve 14.

A dust collar 26 is formed integral with the sleeve 14 on one side of the roller bearing assembly 37 and a removable dust collar 27 is mounted on the sleeve adjacent to the roller bearing assembly 36 on the opposite side of the journal box. A castle nut 28 is threadably connected to the sleeve 14 adjacent to the collar 27 for adjusting the roller bearing assemblies 36 and 37 to compensate for wear. In adjusting the position of the castle nut on the axle it is apparent the movable dust collar 27 is operated to adjust the positions of the inner race members of the bearing assemblies, so that the adjustment of the bearings is effected and maintained independently of any other parts, and is unaffected by removal of the parts from the axle. The longitudinal movement of the inner race members serves to adjust the bearing assemblies for wear by reason of their wedge shape or correlative obliquity, as above explained. The castle nut is held in any adjusted position by means of a cotter pin 29 which projects through the sleeve 14 and the axle 5.

In the above described construction for a mine car it will be noted the axle 5 is provided with outside journal boxes adjacent to the wheels 6 and 7. Each of the outside journal boxes is provided with roller bearing assemblies which may be adjusted conveniently and the journal boxes may be removed without in any manner disturbing the adjustment of the roller bearing assemblies. If it is desired to remove a wheel from the axle it is only necessary to remove the bolt 16, which secures the sleeve to the axle, and to remove the bolts which secure the journal box in position. Inasmuch as the roller bearing assemblies are adjusted by means of the nut 28 on the sleeve it is apparent the removal of the sleeve and journal box in no way affects the adjustment of the bearing assemblies. After removal of the sleeve and journal box the wheel may be removed with ease.

What is claimed is:

1. In combination, a car axle extending through a wheel and adapted to rotate therewith, a sleeve removably mounted on the axle, an outside journal box, a plurality of anti-friction bearing assemblies removably mounted on the sleeve in said box comprising correlatively oblique raceways, and means carried by said sleeve for adjusting said raceways axially relative to one another and thereby directly adjusting the bearings, and for maintaining their adjustment when journal box and bearings are removed from the axle.

2. In combination, an axle having a collar fixedly secured thereto, a wheel mounted on the axle and connected to said collar for rotation therewith, an outside journal box carried

by the axle, roller bearing means in said journal box, a sleeve projecting through the bearing means and said journal box, said sleeve being secured to the axle and to said wheel, and means carried by the sleeve for adjusting said roller bearing means.

3. In combination, an axle having a collar fixedly secured thereto, a car wheel mounted on the axle and having recesses formed therein to receive lugs projecting from said collar, an outside journal box carried by the axle, roller bearing means in said journal box, a sleeve secured to said axle and extending through said journal box and roller bearing means, and means carried by said sleeve for adjusting said roller bearing means.

4. In combination, an axle having a collar and a sleeve secured thereto, a car wheel mounted on the axle between and connected to the sleeve and said collar, an outside journal box having roller bearing means therein, said sleeve having a dust collar formed integral therewith for one side of said journal box, a detachable dust collar for the opposite side of said journal box, and means carried by said sleeve for adjusting said roller bearing means.

5. In combination, an axle having a car wheel mounted thereon, an outside journal box on the axle, a sleeve on the axle projecting through said journal box, said sleeve being secured to the axle and having lugs projecting into recesses in said wheel for compelling the wheel, sleeve and axle to rotate together, roller bearing means in said journal box, and means carried by said sleeve for adjusting said roller bearing means.

6. In combination with a car axle, a mounting therefor comprising a journal box and a sleeve on said axle, tapered rollers, a plurality of inner and outer inclined raceways for said rollers, said inner raceways being mounted on the sleeve, means for simultaneously adjusting said inner raceways relative to each other to compensate for wear, and means for retaining said raceways in adjusted relation when said mounting is removed from an axle.

7. In combination, a car axle, an outside journal box, roller bearing means for the axle in said journal box comprising a plurality of pairs of correlatively oblique inner and outer raceways, a sleeve detachably secured to the axle and projecting through the said journal box and on which the inner raceways are mounted for movement relative thereto, and means carried by the sleeve for adjusting said raceways axially relative to one another and thus directly varying the space between them and thereby adjusting said roller bearing means, said journal box and sleeve being removable from the axle without disturbing said adjusting means.

8. In combination, a mine car axle, a journal box for said axle, anti-friction means in said journal box comprising a plurality of inner and outer raceways having roller bearings therebetween, a sleeve mounted on the axle and on which the anti-friction means are mounted, and means on said sleeve for adjusting the inner raceways axially to vary the space between them to adjust the anti-friction means, said journal box, sleeve and anti-friction means being removable from the axle without disturbing the adjusted position of said anti-friction means.

9. In combination with an axle, an anti-friction mounting therefor comprising a plurality of bearing assemblies each having inner and outer raceways with roller bearings interposed therebetween, a sleeve on the axle upon which said assemblies are mounted, means for adjusting the inner raceways relative to the outer raceways whereby to adjust the assemblies, and a journal box in which said sleeve and bearings are mounted, said sleeve and adjusting means being so formed as to permit removal of the mounting in assembled relation.

10. An axle mounting comprising a unit freely removable from the axle including a journal box, a sleeve secured to the axle, and spaced bearing assemblies interposed between the sleeve and journal box, each of said assemblies comprising an outer raceway and inner raceway mounted on the sleeve and roller bearings interposed between said raceways, and means for retaining said journal box, bearing assemblies and sleeve in assembled relation, said means being movable to move at least one of said inner raceways axially whereby to adjust the bearing assemblies.

11. An axle mounting comprising a journal box having an annular recess at each end thereof, an outer raceway seated in each recess and removable therefrom, a sleeve mounted on the axle and provided with a retaining flange, inner raceways mounted on the sleeve, one thereof arranged adjacent the retaining flange, roller bearings interposed between the inner and outer raceways, and means on the sleeve for retaining the journal box, raceways, roller bearings and sleeve in assembled relation when the sleeve is on or removed from the axle, said retaining means being movable to adjust the inner raceways relative to each other and relative to the outer raceways to compensate for wear of said roller bearing.

In witness whereof I have hereunto set my hand.

WARREN V. JOHNSON.