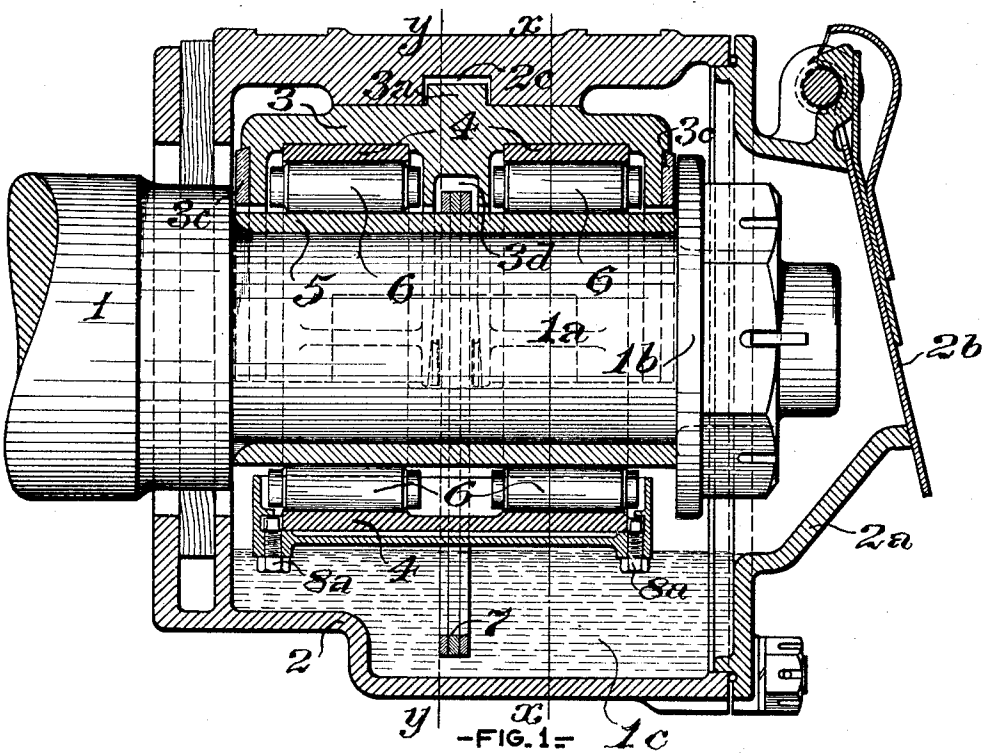
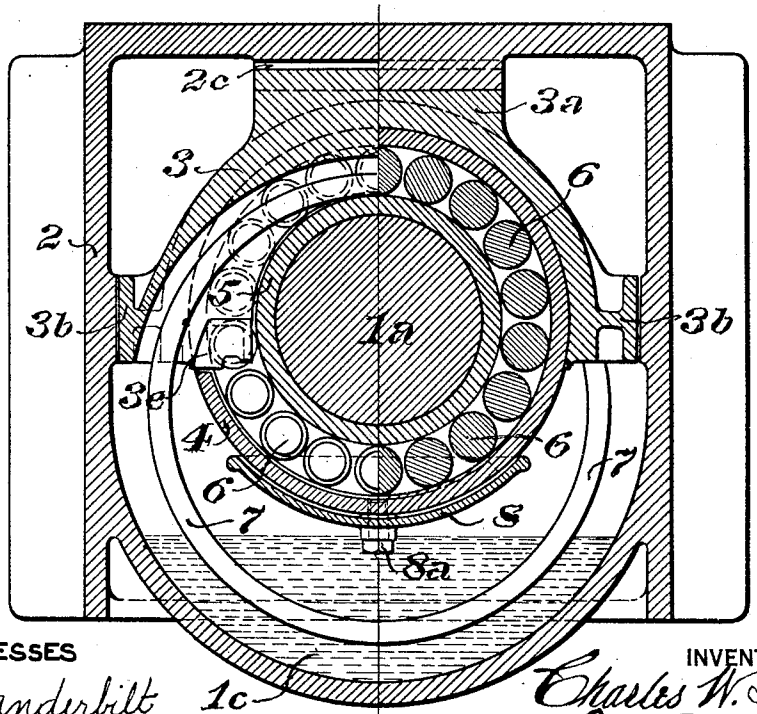
May 9, 1933. C. W. TODD 1,908,379

JOURNAL BEARING FOR RAILROAD VEHICLES

Filed Aug. 5, 1927 2 Sheets-Sheet 1



-FIG. 1-



-FIG. 2-

WITNESSES

A. S. Vanderbilt

S. R. Bell

INVENTOR

Charles W. Todd,

by J. Snowden Bell.

Atty.

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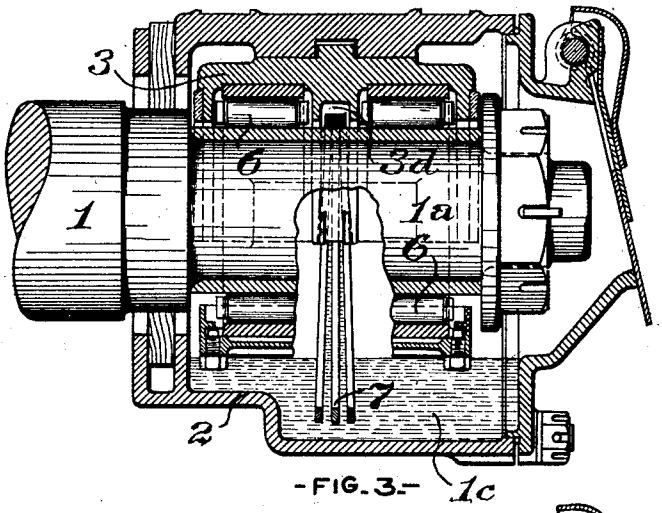
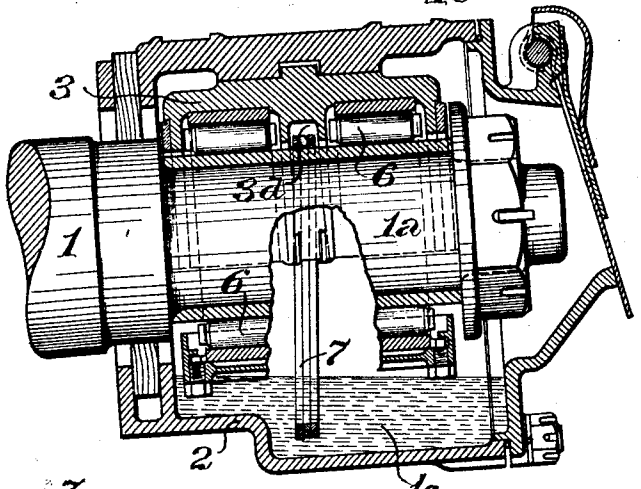


-FIG. 3.-



-FIG. 4.-

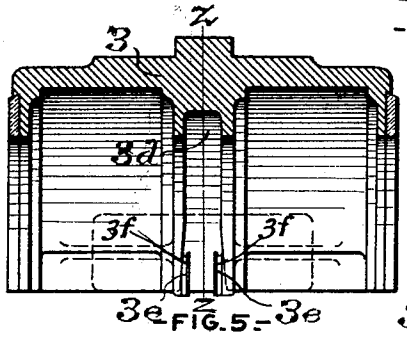
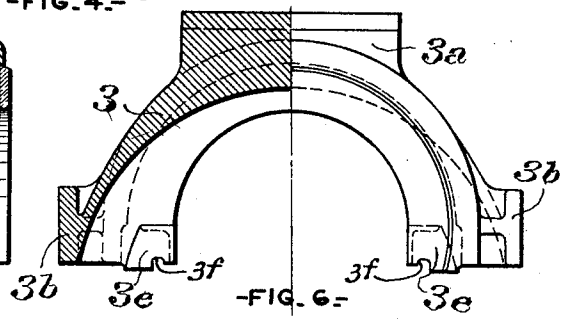


FIG. 5.-



-FIG. 6.-

WITNESSES

A. J. Vanderbilt

S. R. Bell

INVENTOR

Charles W. Todd.

by J. Snowden Bell.

Atty.

Patented May 9, 1933 1,908,379

UNITED STATES PATENT OFFICE

CHARLES W. TODD, OF SCHENECTADY, NEW YORK

JOURNAL BEARING FOR RAILROAD VEHICLES

Application filed August 5, 1927. Serial No. 210,754.

This invention relates to journal bearings, of the "roller" type, for railroad vehicles, and its object is to provide an appliance of such character, which will be of simple and inexpensive construction, of ready applicability in standard practice, and operative to ensure the effective lubrication of the moving surfaces in contact.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a vertical axial section through a railroad vehicle journal box, illustrating an application of the invention; Fig. 2, a view, in vertical transverse section, of the same, the right hand half being taken on the line *x x* of Fig. 1, and the left hand half, on the line *y y* thereof; Figs. 3 and 4, vertical axial sections; Fig. 3 showing the parts in positions occupied when the vehicle is moving at normal speed on a tangent track, and Fig. 4, when the journal box is passing over the elevated outer rail of a curve; Fig. 5, a vertical longitudinal middle section, through the bearing cage or shell, and; Fig. 6, a view, the right hand half of which is an end elevation, and the left hand half a vertical transverse section, on the line *z z* of Fig. 5.

In the practice of the invention, referring descriptively to the specific embodiment thereof which is herein exemplified, the journal 1*a*, of the vehicle axle, 1, is adapted to rotate in a journal box, 2, the inner end of which is open to admit of the passage of the journal, through it, any suitable form of dust guard being applied to seal the aperture in the box, in the usual manner. The outer end of the journal box is closed by a detachable front plate, 2*a*, in which there is formed an opening to afford access to the interior of the box, said opening being closed by a hinged spring lid, 2*b*, or by a lid of any other known and preferred description.

A recess, 2*c*, is formed in the inner side of the top of the journal box, for the reception of a tongue, 3*a*, formed on the top of a bearing cage or shell, 3, which is substantially of semi-cylindrical form, and is provided, at the bottoms of its sides, with vertical flanges, 3*b*, which abut on the side walls of the journal box. Liners, 3*c*, are interposed between the ends of the bearing cage and the journal, at one end, and between the bearing cage and a collar, 1*b*, on the journal, at the other end, for the purpose of absorbing wear due to the lateral thrust of the axle. The bearing cage is recessed for the reception of portions of the outer race way, 4, of the roller bearing elements, and is provided with a recess or channel, 3*d*, at its middle portion, to receive oil rings, 7, hereinafter described. The outer raceway 4 is cylindrical and is provided at its upper portion, intermediate its ends, with a transverse slot, the two portions of the raceway 4 at the sides of the slot being disposed on opposite sides of the recess or channel 3*d*. The side walls of the recess, 3*d*, diverge downwardly through the slot of the raceway 4, to provide clearance for the oil rings when the vehicle is running on road curves with maximum super-elevation of the outer rail. On the side walls of the channel 3*d* at the inner lower ends thereof, projecting lugs 3*e* are formed, and grooves or recesses 3*f* are formed in the upper and inner surfaces of the lugs 3*e* adjacent the surfaces of their respective side walls (see Figs. 5 and 6), forming thereby passageways walled at their upper ends and open at their lower ends.

The inner race way, 5, of the roller bearing elements, is a sleeve or bushing, bored to fit the journal, 1*a*, and of sufficient thickness to withstand the strains of the load carried. It is hardened and its outer surface ground, to make contact with a plurality of bearing rollers, 6, which are disposed in two diametrically parallel circular sets, and are interposed between the outer and inner race ways, 4 and 5.

The journal box is downwardly extended to form a sump or lubricant reservoir, 1*c*, and lubricating members, extending into said reservoir, are disposed between the two sets of roller bearings. In the instance exemplified, said lubricating members are in the form of a plurality of oil rings, 7, suspended in the recess, 3*d*, of the bearing cage, 3, on the inner race way, 5, between the two sets of bearing rollers, 6, said oil rings extending downwardly into the lubricant reservoir

1*c*. An auxiliary sump, 8, of segmental form, which is provided to afford initial lubrication, is secured to the outer raceway, 4, by bolts, 8*a*, engaging the raceway. The end walls of the oil sump also assist in maintaining the roller bearings in assembled relation with the raceways.

In the operation of the invention, the weight imposed upon the journal box, is sustained by the bearing rollers in the usual manner, and lubrication is effected by the oil rings, which carry the lubricant from the sump into which they dip, to the bearing rollers. As shown in Fig. 3, when running on tangent tracks, the oil rings are spread at their bottoms, and when running on curves, they swing inwardly in the direction of the lower inside rail of the curve, as shown in Fig. 4. The auxiliary sump acts to feed lubricant to the bearing rollers at the bottom of the raceways. The oil supply preliminarily picked up by the oil rings is brought to the top of the bearing surface of the inner raceway 5 and is deposited in part thereon, and as the sides of the oil rings, during their movement, engage the surfaces of channel 3*d*, a part of the oil carried by the rings is transferred to the surfaces of the channel and passes downwardly and is guided through the grooves 3*f* so as to drain into the auxiliary sump, the oil of the sump being carried by the bearing rollers around the raceways, supplementing the oil ring supply. The drainage to the auxiliary sump supplies initial lubricant when starting.

The invention claimed as new and desired to be secured by Letters Patent, is:

1. The combination of a railroad vehicle axle journal; a journal box; a bearing cage within the box; a channel, having flaring side walls, formed in the cage; anti-friction bearing means within the cage, bearing on the journal; a lubricant main reservoir; a lubricant auxiliary reservoir disposed beneath the axle journal, and within which the anti-friction bearing means projects, said auxiliary reservoir being arranged so as to supply lubricant to the anti-friction bearing means at all times, including the starting period of journal movement; and means extending into the channel, and into the main reservoir, carried by, and revoluble with, the journal for conveying lubricant to and upon the top thereof, said revoluble means cooperating with said channel, whereby the side walls of the channel engage the revoluble means, thereby removing part of the lubricant while being conveyed, for supplying the auxiliary reservoir, the said flaring side walls being adapted to compensate for varying vehicle angularity of the journal.

2. The combination of a railroad vehicle axle journal; a journal box; a bearing cage within the box; a channel formed in the cage; anti-friction bearing means within the cage, bearing on the journal; a lubricant main reservoir; a lubricant auxiliary reservoir disposed beneath the axle journal, and within which the anti-friction bearing means projects, said auxiliary reservoir being arranged so as to supply lubricant to the anti-friction bearing means at all times, including the starting period of journal movement and a multiple lubricant conveyer extending into the main reservoir, carried by, and revoluble with, the journal for conveying lubricant to and upon the top thereof, the elements of the conveyer being adapted to spread with the speed of the journal, for increasing the amount of lubricant conveyed, during its movement, engaging the surfaces of the walls of said channel, and a part of the lubricant carried by said conveyor being thereby transferred to said channel walls and thereupon being guided by said walls so as to drain into said auxiliary reservoir for supplying said auxiliary reservoir with lubricant.

3. In a bearing for the axle of a railway vehicle, adapted to be installed on, and removed from, the end of the axle as a unit, the combination of a cage having spaced grooves each adapted for the reception of an outer raceway; a roller bearing outer raceway in each of said grooves; a set of roller bearings on each raceway; and a detachable oil sump adapted to maintain the roller bearings in assembled relation with their raceways.

4. In a bearing for the axle of a railway vehicle, adapted to be installed on, and removed from, the end of the axle as a unit, the combination of a cage having spaced grooves; a cylindrical bushing having an intermediate portion cut away to provide spaced portions each fitted in one of the spaced grooves; a set of roller bearings disposed on each of the spaced portions of the bushing; and detachable means for maintaining the roller bearings in assembled relation with the bushing.

5. A device for railway vehicles comprising, in combination, an axle journal; a journal box; a cylindrical bushing on the axle journal; a second cylindrical bushing surrounding and spaced from the first bushing and having a transverse slot intermediate its ends; and two sets of roller bearings between the bushings one on each side of the slot.

6. A device for railway vehicles comprising in combination an axle journal; a journal box; a cylindrical bushing on the axle journal; a second cylindrical bushing surrounding and spaced from the first bushing and having a transverse slot intermediate its ends; two sets of roller bearings between the bushings one on each side of the slot; an oil sump; and an endless band dipping into the sump, disposed in the slot in the second bushing, and bearing on the first mentioned bushing.

7. A device for railway vehicles comprising, in combination, an axle journal; a jour-

nal box; a cylindrical bushing on the axle journal; a second cylindrical bushing surrounding and spaced from the first bushing and having a transverse slot intermediate its ends; two spaced sets of roller bearings between the bushings, one on each side of the slot; a main oil sump; an endless band dipping into the sump, disposed in the slot in the second mentioned bushing, and bearing on the first mentioned bushing; and an auxiliary oil sump disposed above the main oil sump and beneath the journal and receiving the sets of roller bearings so as to supply lubrication thereto.

8. A device for railway vehicles comprising, in combination, an axle journal; a journal box; a cylindrical bushing on the axle journal; a second cylindrical bushing surrounding and spaced from the first bushing and having a transverse slot intermediate its ends; two spaced sets of roller bearings between the bushings, one on each side of the slot; an oil sump; an endless band dipping into the sump, disposed in the slot in the second mentioned bushing, and bearing on the first mentioned bushing; an auxiliary oil sump disposed above the first mentioned oil sump and beneath the journal and receiving each set of roller bearings to supply lubrication to the same; and a cage comprising channels adapted to receive the portions of the second mentioned bushing on each side of the slot, and a flange projecting through the slot adapted to space the sets of roller bearings.

9. In a device for railway vehicles, the combination of a journal box; an axle having a journal portion disposed in the box; and a bearing adapted to be installed in the box and on the journal, and removed therefrom, as a unit, comprising a cage having top and side faces adapted to engage the box, spaced roller races in the cage, each embodying an outer raceway and a set of roller bearings, and a detachable oil sump for maintaining the roller bearings in assembled relation with the outer raceways.

10. In a device for railway vehicles, the combination of a journal box; an axle having a journal portion disposed in the box; a bearing adapted to be installed in the box and on the journal, and removed therefrom, as a unit, comprising a cage having top and side faces adapted to engage the box, spaced roller races in the cage, each embodying an outer raceway and a set of roller bearings, and a detachable oil sump for maintaining the roller bearings in assembled relation with the outer raceways; and means for detachably locking the bearing to the box to prevent same from moving longitudinally thereof.

11. In a device of the character described, an axle member having two spaced outwardly extending circumferential shoulders, and a journal disposed between the shoulders; a bearing cage disposed above and extending part way around the journal at each side thereof and provided with inwardly extending flanges forming a semi-circular channel, the flanges being adapted to engage with the shoulders on the axle member to resist end thrusts of that member; a journal box housing said cage and connected therewith to take up the end thrust of the cage; an outer raceway entirely encircling the journal and having its upper portion fitted in the channel in the cage and its lower portion depending below the cage; an anti-friction bearing encircling the journal, disposed within the raceway, and confined against displacement longitudinally outward of the axle member by the outer flange of the cage; an auxiliary oil sump beneath the journal into which the anti-friction bearing dips, said sump being provided with an upstanding end wall confining the anti-friction bearing against displacement longitudinally outward of the axle member; and means for supplying lubricant to said sump.

12. The combination of a railroad vehicle axle journal; a journal box; a bearing for the journal comprising an outer raceway surrounding the journal, and rollers between the raceway and journal supporting the box from the top of the journal; a lubricant main reservoir; endless conveyor means extending into the reservoir, and extending around, carried by, and revoluble with, the journal; means adapted to engage said conveyor means during its movement to effect a transfer of a part of the lubricant carried by said conveyor means thereto and to guide said lubricant so as to effect its delivery to the lower concavity of the raceway; and means including retaining walls extending upwardly at each end of said concavity arranged to provide with said concavity an auxiliary lubricant reservoir through which the rollers pass, whereby lubricant is supplied to the parts at all times, including the period of initial movement.

13. The combination of a railroad vehicle axle journal; a journal box; a bearing cage within the box; a bearing within the cage for the journal comprising an outer raceway surrounding the journal, rollers between the raceway and journal supporting the box from the top of the journal; a lubricant main reservoir; endless convevor means extending into the reservoir and extending around, carried by, and revoluble with, the journal, whereby the lubricant will be carried above the lower concave inner wall of the raceway; means formed on the cage for collecting part of the lubricant conveyed for supplying the said lower concavity with the lubricant; and means including retaining walls extending upwardly at each end of said concavity arranged to provide with said concavity an auxiliary lubricant reservoir through which

the rollers pass, whereby lubricant is supplied to the parts at all times, including the period of initial movement.

14. In combination with a journal, an anti-friction bearing construction comprising anti-friction bearing members, means providing an outer raceway for the bearing members and an auxiliary lubricant supply reservoir including side walls and end walls providing a receptacle for continually holding a supply of lubricant, said receptacle being disposed directly beneath the journal and through which receptacle the bearing members travel, said reservoir serving to lubricate the bearing, and as a reserve reservoir for initial lubrication when the parts start to move; a main lubricant reservoir; endless conveyor means extending into the main reservoir and extending around, carried by, and revoluble with, the journal, whereby lubricant will be carried above the journal and conveyed upon the top thereof; and means engaging said conveyor means during its movement for effecting a transfer thereto of a part of the lubricant carried by said conveyor means and the delivery of said part to said receptacle for lubricating the members passing therethrough and for serving as an auxiliary supply for initial lubrication when the parts initially move.

15. The combination of a railroad vehicle axle journal; a lubricant main reservoir beneath the journal; a lubricant auxiliary reservoir between the main reservoir and journal, having its bottom entirely surrounded by retaining walls, adapting said auxiliary reservoir to continually hold a supply of lubricant; anti-friction bearing means surrounding the journal comprising a plurality of anti-friction rotatable elements, said bearing means extending into said auxiliary reservoir a substantial distance beneath the upper edges of said retaining walls whereby a part of said plurality of anti-friction elements will be at all times rotatably disposed within the body of lubricant contained in said auxiliary reservoir throughout their entire lengths; means carried by, and revoluble with, the journal independently of said elements, extending into the main reservoir for conveying lubricant from the main reservoir to said journal; and means for collecting a part of the conveyed lubricant for the supply of said auxiliary reservoir.

CHARLES W. TODD.