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JOURNAL ASSEMBLY FOR RAILWAY TRUCKS

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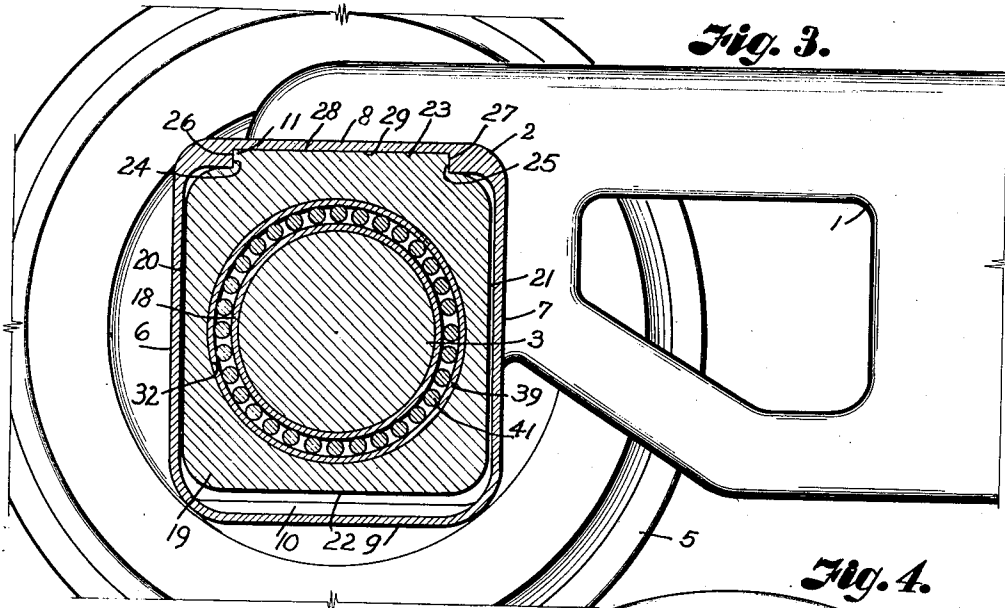


Fig. 3.

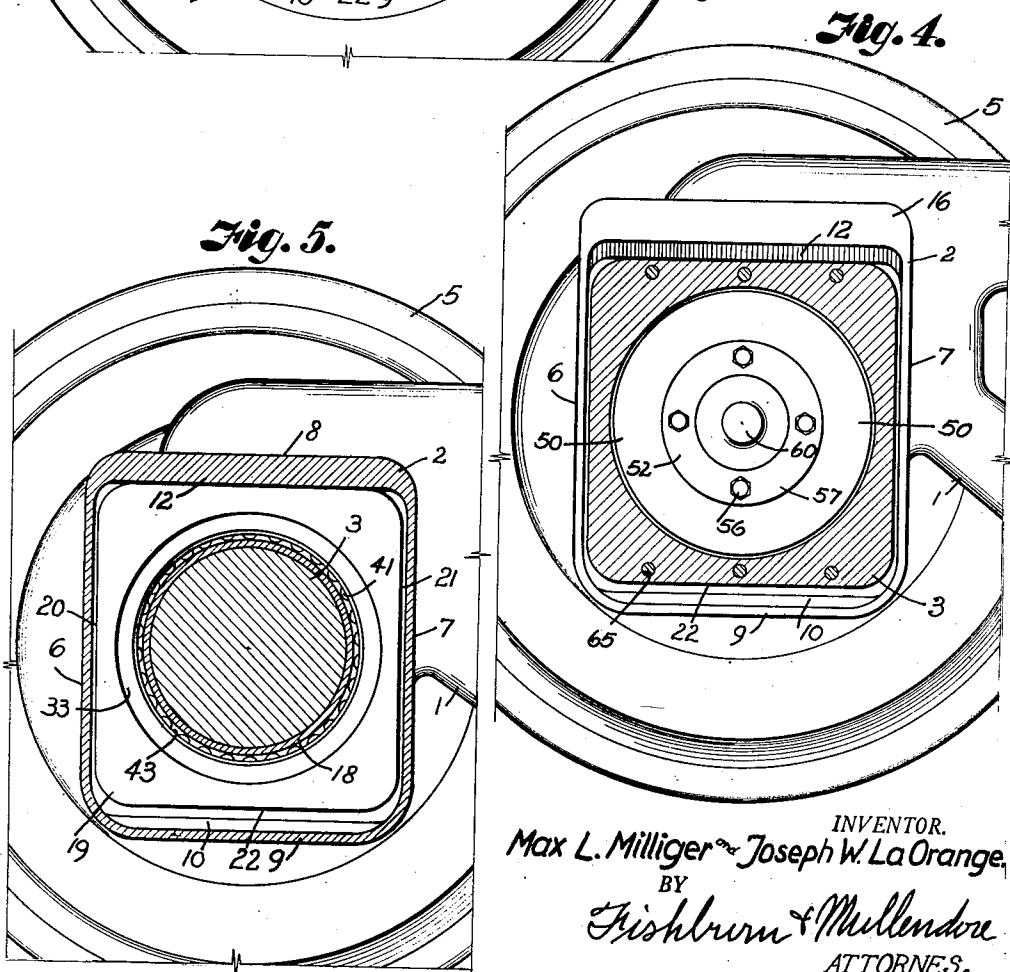


Fig. 4.

Fig. 5.

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JOURNAL ASSEMBLY FOR RAILWAY TRUCKS

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4 Claims. (Cl. 308—180)

This invention relates to a journal assembly for railway trucks and has for its principal object to provide a journal box and journal assembly having anti-friction bearings that can be readily applied and removed when it becomes necessary to change a pair of car wheels.

Other objects of the invention are to provide a journal assembly having anti-friction bearings for replacing the ordinary bronze bearing journals of railway freight trucks with a minimum alteration of the present journal boxes; to provide a solid journal block in which the bearings are mounted and which substantially conforms with the block that is replaced thereby; to provide a lubricating system that is entirely contained within the journal block; and to provide an improved oil-dust seal between the journal and the wheel axle and the journal block.

A further object of the invention is to provide a roller bearing assembly which gives the axial play and end thrust that are necessary when the truck is in motion.

In accomplishing these and other objects of the invention, we have provided improved structure the preferred forms of which are illustrated in the accompanying drawings wherein:

Fig. 1 is a fragmentary side view of one end of a railway truck equipped with a journal assembly constructed in accordance with the present invention.

Fig. 2 is a vertical section on the line 2—2 of Fig. 1 illustrating the journal box and journal assembly therein.

Fig. 3 is a cross section on the line 3—3 of Fig. 2.

Fig. 4 is a cross section through the cap of the journal block on the line 4—4 of Fig. 2.

Fig. 5 is a cross section on the line 5—5 of Fig. 2.

Fig. 6 is a fragmentary side view of one end of a car truck equipped with a modified form of journal box for containing the journal assembly.

Fig. 7 is a cross section through the journal box and assembly of Fig. 6, the section being taken on the line 7—7 of Fig. 8.

Fig. 8 is a vertical section on the line 8—8 of Fig. 6.

Referring more in detail to the drawings, and first to the form of invention illustrated in Figs. 1 to 5 inclusive wherein the invention is applied to a standard railway truck previously equipped with ordinary bronze journals (not shown).

Standard railway trucks of this character include side frames 1 which carry the truck bolster, springs, and sand boards (not shown), and the ends thereof are equipped with journal boxes 2 that are integrally connected with the frame 1 for mounting a journal assembly for the journals 3 of an axle 4 carrying wheels 5. The wheels and axle are a single unit and the journal blocks and journal boxes are constructed to provide a lateral sliding movement to provide the action necessary between the wheels and truck frame when the truck is in motion.

The journal box 2 is of generally rectangular cross

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section and includes side walls 6—7, a top 8, and a bottom 9 formed as a unitary structure and which has an inner end 10 that ordinarily carries the oil and dust cards (not shown) and which have been removed in the application of the present journal assembly. The inner side of the top 8 of the journal box has a recess 11 extending parallel with the axle for containing a wedge (not shown) which retains the brass bearings that have also been removed in the adaptation of the present invention.

The top 8 of the journal box also has a wedge lip 12 that extends across the outer end of the recess 11 for retaining the wedge in place. The journal 3 of the axle 4 extends outwardly from a shoulder 13 of the adjacent wheel and terminates at the outer end of the journal box in a flat end face 14 having a centering recess 15 whereby the axle may be mounted in a lathe incidental to resurfacing of the wheels and journals. The end of the axle is also provided with an integral thrust collar (not shown) and which is adapted to limit the relative movement between the axle and truck frame. The outer end of the journal box usually extends beyond the end face of the axle and has a hinged lid that is also removed in adapting the present invention, the lid being hinged to lugs 16 carried by the top 8.

In adapting the present invention to car journal boxes of this character, a few alterations are required in addition to the removal of the brass bearings and bearing wedge. The front of the box is cut off transversely at a point substantially in plane with the end face 14 of the axle, this removes the lid, portion of the hinge lugs, the lid retention spring, and an upwardly curving extension of the bottom 9 against which the lid seats. Removal of this portion of the journal box provides a front opening 17 which permits insertion of a bearing assembly embodying the present invention, the opening 17 being substantially the full cross sectional size and shape of the journal housing.

The abutment protrusion (not shown) for the brass bearings are also removed which may leave a hole that can be closed, if desired, by an electric welded coldpatch on the outside of the box. When the journal box is thus altered, it leaves a completely clean and square box on the inside for the full depth thereof.

It is also necessary to place the axle and wheel unit in a lathe and remove the journal flange thereof and to reposition the shoulder 13 nearer the wheel. It may also be necessary to true-up the outer surfaces of the journals 3 for application of a sleeve 18 which will serve as the inner race for the roller bearing sets of the new journal assembly as later described. The wedge lip 12 must be left intact when the front of the box is removed as it is this lip and the wedge recess that retains the present bearing assembly in position within the converted journal box.

The journal assembly includes a solid unitary block 19 having side faces 20—21, and a bottom face 22 substantially conforming to the inner cross section of the journal box while the upper portion thereof is provided with a longitudinally extending rib 23 forming shoulders 24 and 25 that engage the side faces 26 and 27 of the wedge recess while the upper face 28 of the rib engages the transverse face 29 of the wedge recess.

The ends of the journal block have substantially flat faces 30 and 31 and the block is of a length to fit snugly within the space between the lip 12 and the flange 10, to fix the journal block within the journal box when the parts are assembled as later described. The journal block has an axial cylindrical bore 32 extending inwardly from the end face 30 and terminating short of the outer face 31 to provide an internal annular flange 33 to encircle the journal 3 of the axle 4 as shown in Fig. 2.

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The opposite end of the bore 32 is provided with a counterbore 34 to furnish an internal shoulder 35 at that end of the block. In the present illustration, the bearing assembly includes inner and outer anti-friction bearing sets 36 and 37 having outer sleeves 38 and 39 that cooperate with the inner sleeve 18 in forming inner and outer races for sets of rollers 40 and 41 that are retained in an annular series by cages 42 and 43. The bearing sleeves 38 and 39 are spaced apart by a spacing ring 44 that is also pressed within the bore 32 of the journal block 19. The outer bearing sleeves 38—39 and spacing ring 44 are retained between the flange 33 and a split ring 45 that is contained within an annular groove 46 in the inner face of the bore 32. Seated within the counterbore 34 and engaging the shoulder 35 is a resilient sealing ring 47 having an inner annular face 48 closely encircling the inner sleeve 18 to form an oil seal between the journal block 19 and axle journal 3. The ring 47 is preferably formed of a material that is not affected by the oil such as one of the synthetic rubbers, namely neoprene. A felt ring 49 is pressed within the counterbore to seat against the sealing ring 47 for excluding dirt and other foreign matter that might enter that end of the journal block. The journal flange is replaced in the form of a plate 50 having a recess 51 in the inner side to accommodate the end of the journal 3 and sleeve 18 therein, whereby the plate is centered on the axle with the periphery thereof forming an annular abutment 52 for a thrust ring 53 that floats upon the sleeve 18 and which in turn is adapted to be engaged by the end face 31 of the bearing block 19 for providing the necessary lateral movement of the journal. Mounted on the outer end of the block 19 is a cap 54 which conforms with the shape and dimensions of the outer end face 31 of the journal block. The inner side of the bearing cap has a recess 55 to accommodate freely the end of the axle journal 3 therein and to provide the necessary lateral movement of the journal. The plate 50 is retained on the journal 3 by fastening devices such as cap screws 56 that extend through a retainer plate 57, through openings 58 in the plate and into threaded sockets 59 in the end of the journal. The retaining plate 57 is preferably formed of a long wearing material such as bronze and has a circular boss-like central projection 60 that is arranged to abut a boss 61 at the axial center of the end wall 62 of the cap. The cap is fixed to the outer end of the journal block by fastening devices such as cap screws 63 having the shanks 64 thereof extending through openings 65 in the annular wall of the cap and into threaded sockets 66 that are provided in the end of the journal block 19.

The space within the cap cooperates with spaces that exist between the axle journal and journal block to provide a reservoir 67 for containing a lubricant to supply the bearings and the thrust surfaces of the floating ring 53. The cap 54 is provided near the bottom of the recess with drain openings 68 closed by a plug 69, while the upper portion of the cap is provided with a downwardly and inwardly inclined opening 70 through which the lubricant is inserted and which is closed by a plug 71. The cap 54 may be provided with an inspection opening 72 at substantially the level of the lubricant to be maintained in the reservoir 67. The opening 72 is closed by a plug 73.

The form of the invention shown in Figs. 6 to 8 inclusive is for a new truck construction, the difference being solely within the journal box and the method of mounting the journal therein. The journal assembly, with the exception of the top of the journal block, is of the same construction as the journal assembly previously described and therefore like reference numerals are used on those parts as illustrated in the drawings.

In this form of the invention, the journal box 74 has a top 75 and side walls 76 and 77 extending downwardly therefrom and the ends thereof are provided

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with keeper flanges 78 and 79 for engaging the inner and outer ends of the journal block 80. The bottom 81 of the journal box is a removable plate 82 that fits under the journal block 80 and between the lower marginal edges of the side walls 76 and 77 for attachment thereto by cap screws 83 and 84 that extend through suitable openings in the lower marginal edges of the side wall and into threaded sockets 85 that are provided in side edges of the bottom plate.

In this form of the invention, the wedge recess and journal block rib are not needed and therefore the under side 86 of the top 75 is substantially flat to conform with the similarly shaped top face 87 of the journal block 80. The size of the journal block is preferably less than the corresponding top and side faces of the journal box to accommodate a resilient material 88 that extends across the top and down the sides of the journal box. The journal block thus is resiliently contained within the journal box.

In assembling the first described form of the invention in a reconverted journal box, the bearing sets 36 and 37, together with spacing ring 44 are pressed into the bore 32 from the inner face of the journal block so that the outermost sleeve 39 abuts against the internal flange 33, the spacing ring 44 against the inner end of the outer sleeve 39 and the inner sleeve 38 abuts against the innerface of the spacing ring. The split ring 45 is then inserted in the groove 46. The sealing and dust rings 47 and 49 are then inserted in the counterbore 34.

Assuming that the journal box 2 and journal 3 have been converted, as above described, the sleeve 18 is pressed on the journal 3, the journal block assembly is then slipped on over the outer end of the journal 3 followed by the thrust ring 53. The thrust plate 50 is then applied together with the retainer plate 57 and secured to the end of the journal by the cap screws 56. The journal box is then passed over the journal block with the block passing between the lip 12 and the bottom 9 until the rib 23 thereon is in registry with the wedge recess 11. The journal box is then lowered so that the rib on the journal block enters the recess of the journal box. The cap 54 is then applied over the projecting end of the journal and secured by the cap screws 63 to complete the assembly.

In operation, the axle journal 3 turns within the bearing sets 36 and 37, while the lateral movement necessary when the truck is in motion is allowed by the play which is provided between the floating ring 53 and the outer face of the bearing block and the inner face of the thrust plate 50, thus the journal may move inwardly through the bearing assembly until the play at the sides of the thrust ring have been taken up. Outward movement is restricted by contact of the thrust boss 57 with the boss 61 on the journal cap 54.

The lubricant for the bearings is inserted through the fill opening 70 upon removal of the plug 71. A sufficient amount of lubricant is poured therethrough until the level thereof reaches the inspection opening 72, which level may be noted by removal of the plug 73, after which the plug is replaced. When it becomes necessary to remove the lubricant, it is readily drained from the lubricant reservoir upon removal of the plug 69 from the drain opening 68.

The journal assembly shown in Figs. 6 to 8 inclusive is put together in the same manner as the journal assembly previously described. However, it is mounted in the journal box of the truck frame in a different manner. In this instance it is not necessary to remove the truck bolsters and other parts. With the bottom plate 81 removed, the truck may be raised by placing jacks under the ends of the side frames at a point adjacent the bearing boxes and the entire frame raised to the point where the wheel and axle unit with the journal assembly mounted thereon may be rolled along the rails to bring the journal blocks under the journal boxes at the respec-

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tive sides of the truck. The jacks are lowered to permit the boxes to move downwardly over the sides of the journal blocks after which the bottom plates 81 are inserted between the side walls 76 and 77 and secured in position by the cap screws 83. The operation of this form of the invention is otherwise the same as the first described form with the exception that shocks are taken up by the resilient material lining the walls of the journal box.

What we claim and desire to secure by Letters Patent is:

1. A journal assembly for mounting a wheel and axle unit in the frame of a railway truck, said journal assembly including a cylindrical journal on said axle unit and of uniform diameter along the length thereof, a one piece journal block having an axial bore for passing the journal, a journal box containing the journal block and having means engaging the journal block to retain the journal block from rotational and axial movement in the journal box, anti-friction bearings in the axial bore of the journal block and encircling the journal to provide a rolling support for the journal and in which the journal is slidable in an axial direction, means for fixing the bearings within the bore of the journal block, a stop on the journal having an annularly projecting portion, a corresponding stop forming a part of the journal block and extending inwardly in encircling relation with the journal to lap the annular stop of the journal and provide abutment for thrust applied through the annular stop on the journal when the journal moves in one axial direction, and a cap covering the outer end of the journal and having a part engaging the journal block in encircling relation with said annular stop and having a part adapted to be engaged by a part on the journal when the journal shifts in the opposite direction.

2. A journal assembly as described in claim 1 and including a resilient pad between contact areas of the journal block and the journal box.

3. A journal assembly for mounting a wheel and axle unit in the frame of a railway truck, said journal assembly including a cylindrical journal on said axle unit and of uniform diameter along the length thereof, a one piece journal block having an axial bore opening through ends of the journal block for passing the journal with an outer end of the journal projecting from the journal block, a journal box containing the journal block, means on opposite ends of the journal box providing a downwardly opening recess within the upper portion of the journal box to seat an upper part of the journal block therein to retain the journal block from rotational and axial movement in the journal box, anti-friction bearing means in the axial bore of the journal block and encircling said journal to provide a rolling support for the journal and in which the journal is slidable in an axial direction, means for fixing the anti-friction bearing means within the bore of the journal block, an annular stop on the projecting end of the journal, an annular stop forming a part of the journal block and normally

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spaced from the annular stop on the journal, a floating thrust ring on the journal and having an effective width less than the width of said space between said annular stops, said thrust ring having a peripheral portion on one side adapted to abut against the annular stop on the journal block and having an inner peripheral portion on the other side engageable by the annular stop on said journal to limit said axial movement of the journal and to apply end thrust of the journal to the journal block when the journal shifts axially within the journal block.

4. A journal assembly for mounting a wheel and axle unit in the frame of a railway truck, said journal assembly including a cylindrical journal on said axle unit and of uniform diameter along the length thereof, a journal block having an axial bore for passing the journal, with an end of the journal projecting from the corresponding end of the journal block, a journal box containing the journal block and having means engaging the journal block to retain the journal block from rotational and axial movement in the journal box, anti-friction bearing means in the axial bore of the journal block and encircling the journal to provide a rolling support for the journal and in which the journal is slidable in an axial direction, means for fixing the bearing means within the bore of the journal block, said corresponding end of the journal block providing an annular stop portion, a plate on the end of the journal and having an annular stop portion projecting annularly of the journal and normally spaced from the annular stop portion on the journal block, means fixing the plate to the outer end of the journal, a floating thrust ring on the journal between said annular stop portions and having an effective width less than the width of said space between said annular stop portions, said thrust ring having a peripheral portion on one side adapted to abut against the annular stop portion on the journal block and having a peripheral portion on the other side engageable by the annular stop portion on said plate to limit said axial movement of the journal and to apply end thrust of the journal to the journal block when the journal shifts axially in one direction within the journal block, and a closure cap covering the outer end of the journal and having an annular part engaging the outer end of the journal block in encircling relation with said annular stop portion and having a part adapted to be engaged by a part of the plate to limit axial movement of the journal in the opposite direction.

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