April 7, 1942. J. J. HENNESSY 2,278,583

JOURNAL LUBRICATOR

Filed April 18, 1940 2 Sheets-Sheet 1

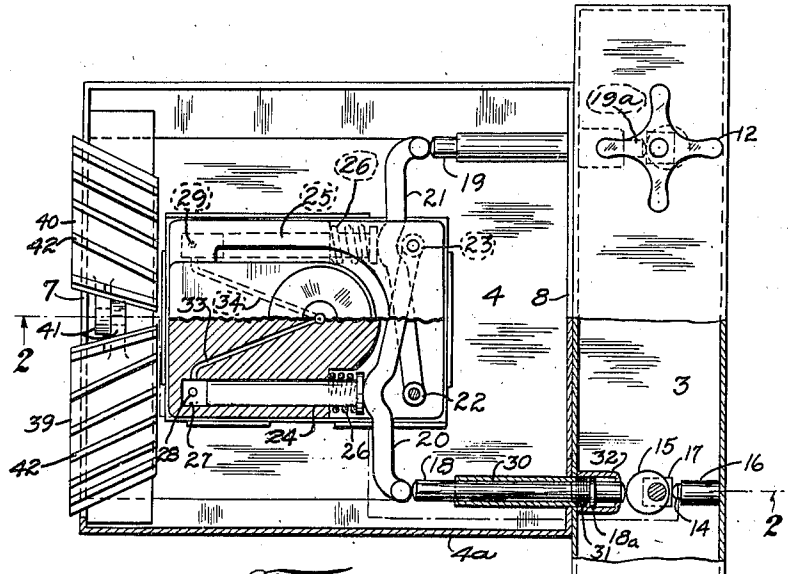


Fig. 1.

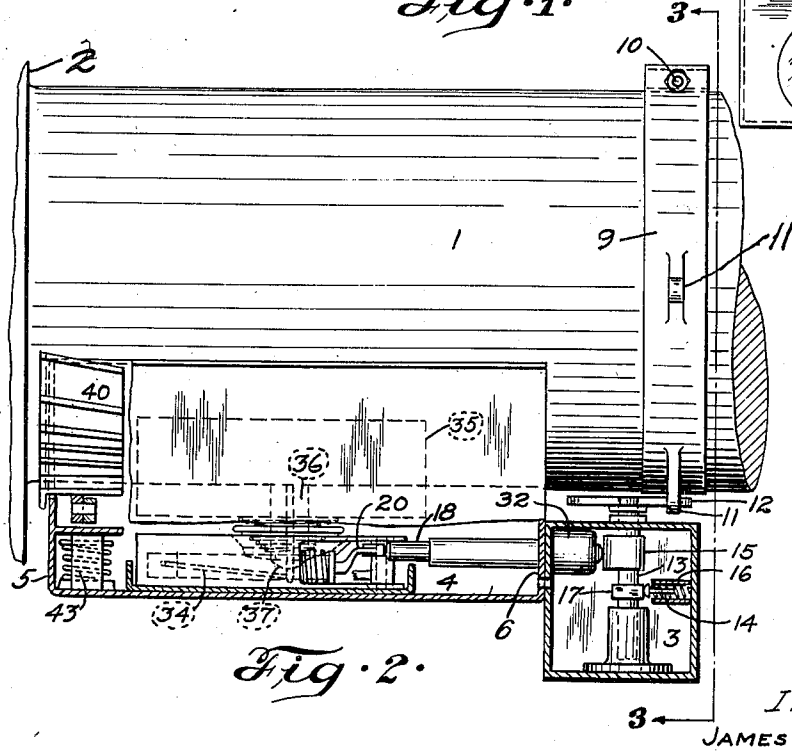


Fig. 2.

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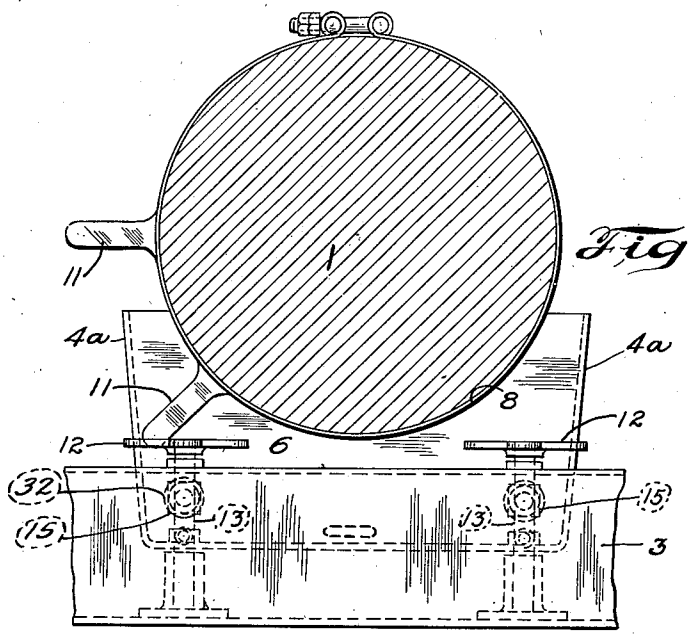


Fig. 3.

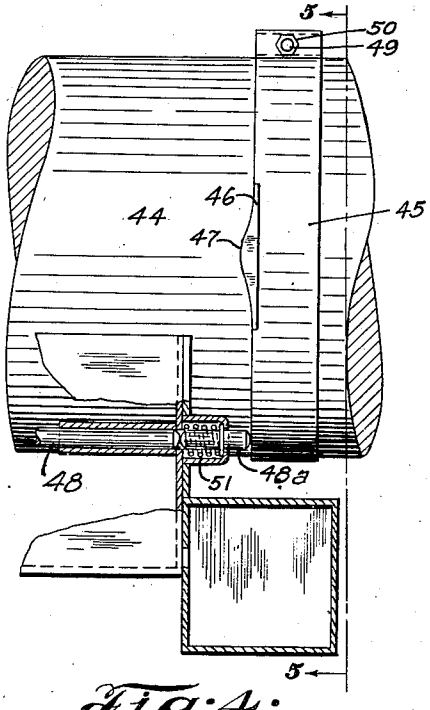


Fig. 4.

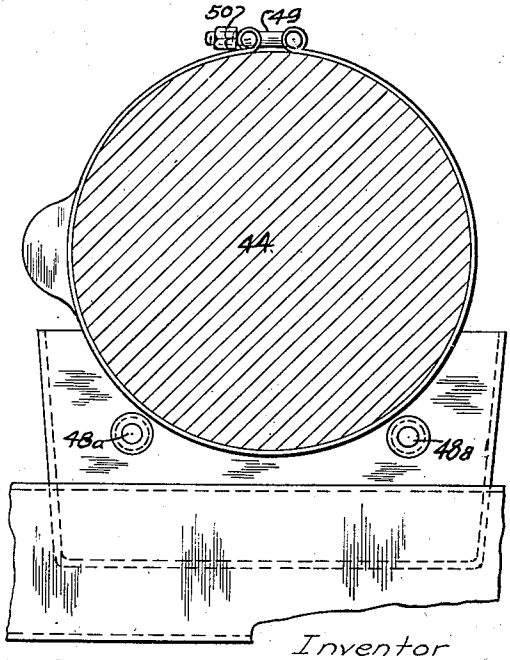


Fig. 5.

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UNITED STATES PATENT OFFICE

2,278,583

JOURNAL LUBRICATOR

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Application April 18, 1940, Serial No. 330,241

12 Claims. (Cl. 308—84)

The invention relates to mechanical lubricator pumps for application to railway rolling stock axle journals and are particularly adapted for locomotive driver axles.

One object of the invention is to provide relatively simple cam operated lubricant pump which is automatic in operation and positive in its action of circulating the lubricant.

In previous journal lubricators of this type longitudinal movement of the journal relative to the journal box has been relied upon to operate the pump. One of the objects of the invention is to operate a lubricator pump independently of this horizontal movement of the journal.

Further objects of the present invention are to provide for sufficient supply of oil under all conditions and to effect a thorough distribution of oil to the entire journal surface at all times.

These and other detailed objects of the invention, which will be apparent from the following description, are attained by the structures illustrated in the drawings in which—

Figure 1 is in part a top view of the lubricator arranged for a locomotive driver journal and in part a horizontal section through the pump mechanism, the journal being omitted.

Figure 2 is a vertical longitudinal section through the lubricator taken on the line 2—2 of Figure 1, a portion of the journal being shown.

Figure 3 is a vertical transverse section taken on the line 3—3 of Figure 2.

Figure 4 is a vertical longitudinal section showing a modified form of the structure.

Figure 5 is a vertical transverse section taken approximately on the line 5—5 of Figure 4.

In Figures 1 to 3 the axle journal is indicated at 1 and the hub of the driver is shown at 2.

The lubricator is applied to the lower portion of the journal behind the hub and includes a rectangular tank or reservoir 3 and a cellar extending therefrom longitudinally of the journal and having upstanding side walls 4a, which project a substantial distance above the level of the bottom of the journal, and having front and rear walls 5 and 6 respectively with arcuate top edges 7 and 8 respectively following the contour of the journal. The bottom wall of the cellar is spaced above the bottom wall of the reservoir, and one or more apertures through the abutting walls of the reservoir and cellar provide for the passage of oil from the reservoir to the lower portion of the cellar.

The cellar forms a receptacle for a pumping device including cylinders, piston rods and operating levers for the rods, and a distributor supplied from the pumping device and applied to the lower face of the journal.

A band 9 is fastened on the journal outside of cellar 4 by a bolt 10 and carries one or more knobs 11.

When the vehicle is moving and as journal 1 rotates, knobs 11 come into contact with star wheels 12 attached to shafts 13 journaled in reservoir 3. A spring actuated contact piece 14, below eccentric cam 15, on shaft 13, within housing 16, contacts with a squared portion 17 of the shaft, and yieldingly resists reversal of said shaft.

Eccentric cams 15 on shafts 13 operate pump rods 18 and 19 as star wheels 12 are revolved. Pump rods 18 and 19 are positioned to contact overlapping pump operating levers 20 and 21 fulcrumed at 23 and 22 respectively. Levers 20 and 21 contact with the outer ends of pump pistons 24 and 25, respectively.

Plungers 24 and 25 are engaged by compression springs 26 which thrust the plungers outwardly whenever latter are released from inward thrust by levers 20 and 21. The outward movement of plungers 24 and 25 draws lubricant in the cellar into pump chambers 27 through the corresponding inlets 28 and 29 fitted with ball checks. The operating rods 18 and 19 include separately formed parts, 18a and 19a, respectively, in the reservoir. The main portion of each rod slides in a bearing 30 on the cellar and the part 18a is surrounded by a spring 31 which thrusts the part 18a against the inner end of a housing 32 in the reservoir. Because of this construction reservoir 3 and the cellar may be disassembled without unduly interfering with the pump mechanism.

Operating rods 18 and 19 engage levers 20 and 21 both of which extend across the pump body and are pivoted at the far end. These levers overlap and each is offset at the fulcrum of the other to facilitate inward movement.

Springs 31 thrust operating rods 18a and 19a outwardly whenever the end of the rods are released by the rotation of eccentric cams 15.

When rod 18 is forced inwardly by rotating eccentric cam 15, lever 20 is likewise pushed forward, thereby forcing plunger 24 inwardly.

Passages 33 and 34 lead from the pump chambers 26 and 27 to an upright conduit 36 which has a spherical-surface bottom seated in a corresponding recess 37 in the top face of the pump body, whereby the conduit and parts mounted thereon have a universal joint movement relative to the body and thereby accommodate any relative inclination of the journal and cellar.

Conduit 36 leads to the distributor pan 35 applied to the under part of the journal.

In journal lubricators of this general type, as used previously, the reciprocation of the journal in the box actuated the pump, and as the speeds of railway trains have been increased, such reciprocation has been stepped up to an extent that the lubricators have delivered an excessive quantity of oil, and there have been various suggestions for avoiding this result. For example, means have been provided for limiting the extent of the reciprocal movement of the pump piston. Also it has been suggested to by-pass some of the pumped lubricant back to the cellar before it reaches the journal. Also it has been suggested to use wipers for removing surplus oil after it has been delivered to the journal. Such a wiper is indicated in Figures 1 and 2 at the forward end of the journal and comprises a pair of arcuate wings 39 and 40 pivoted together through their overlapping lugs 41. On their upper surfaces are diagonal ribs 42 which engage the journal to scrape surplus lubricant therefrom and drain it back into the interior of cellar 4. Separate spring pressed plungers 43 thrust wings 39 and 40 upwardly into contact with journal 1. This wiper is described and claimed in my Patent No. 2,191,468, issued February 27, 1940.

However, with the pump device described above, the action of the pump depends upon the revolution of the journal and not upon its reciprocation axially, and the action of the pump is readily controlled by reducing or increasing the number of knobs 11 on band 9.

This device is especially suitable for handling extremely heavy lubricant due to the large leverage on the pump plungers and the length of time permitted for the plunger to return to its outer position after being forced inwardly.

Figures 4 and 5 show a modified form of the structure. Positive driving means for the operating rods is supplied by the rotation of journal 44 through a band 45 which is provided with one or more cams 46 each having a rise 47 adapted to contact with the outer end of the operating rod, comprising two parts 48 and 48*a*, upon each revolution of journal 44. Band 45 is securely fastened on journal 44 by a bolt 49 and nut 50. Compression spring 51 on rod part 48*a* thrusts the rod outwardly whenever the latter is released from the extended cam surface 47 by the rotation of journal 44.

The general principle of operation of this modification is the same as that of the structure previously described and the essential features of the latter are retained. In both structures the operating rod is in two separate parts to facilitate the assembly of the units.

Obviously, various other modifications in the structure may be made without departing from the spirit of the invention, and the exclusive use of all such modifications as come within the scope of the claims is contemplated.

What is claimed is:

1. In combination with a railway axle journal lubricator having a lubricant cellar and a reservoir adjacent thereto and communicating therewith, a pump including a piston in said cellar, driving mechanism in said reservoir arranged for actuation by relative movement of the journal to which the lubricator is applied, and a pump operating rod between said mechanism and piston, said rod comprising two separate parts, one part being mounted in said cellar and the other part being mounted in said reservoir.

2. In combination with a railway axle journal lubricator having a lubricant cellar and a reservoir adjacent thereto and communicating therewith, a pump including a piston in said cellar, driving mechanism in said reservoir arranged for actuation by relative movement of the journal to which the lubricator is applied, individual mounting elements in said reservoir and cellar, respectively, and a two part operating rod between said mechanism and said pump piston, each part being slidably mounted on one of said elements.

3. In combination with a lubricator pump of the class described, a pump operating mechanism including a pair of substantially parallel cylinders and pistons and individual overlapping levers for said pistons with spaced fulcrums and each lever being offset between its ends about the fulcrum of the other lever.

4. In combination with a railway journal and a lubricator for said journal including spaced cylinders, pistons therein, operating mechanism for said pistons comprising a pair of overlapping levers each fulcrumed at one of its ends, each lever being offset at the fulcrum of the other lever, and means actuated by said journal for oscillating said levers.

5. In a railway journal lubricator, a cellar, a pump in said cellar having two oil receiving chambers, pistons within the chambers, and driving mechanism for operating said pistons, said mechanism including individual pump levers positioned one above the other, each lever extending across said cellar and being fulcrumed at one end, the fulcrumed end of one lever being adjacent the power receiving end of the other lever and each lever being offset about the fulcrum of the other lever, and means operated by a device on the journal for actuating both of said levers successively.

6. In actuating mechanism for an axle journal lubricator pump, an element to be secured to the periphery of the axle and to rotate therewith, a star wheel to underlie the journal and to be engaged by said element as it rotates with the journal and an operative connection between said star wheel and the pump for driving the latter.

7. In combination, a railway axle journal, a lubricant cellar beneath the same, a pump and a conduit leading from said cellar to said pump and to said journal, an element secured to the periphery of the journal and rotatable therewith, a star wheel beneath the journal exteriorly of said cellar and engageable by said element, and pump actuating means within said cellar and driven by said star wheel.

8. In a journal lubricator, a lubricant reservoir, a pump supplied from said reservoir and arranged to feed lubricant to the journal, a pump operating cam in said reservoir, a cam shaft extending through the top of said reservoir, a star wheel outside of said reservoir and mounted on said shaft, and a knob for attachment to the journal in position to engage said star wheel as the journal rotates.

9. In a journal lubricator, a pump including a piston and a spring thrusting said piston in one direction, a cam for moving said piston in the opposite direction, a shaft on which said cam is mounted, a star wheel on said shaft, an element for attachment to the journal and rotatable therewith to engage said star wheel and thereby operate said cam, and a device yieldingly resisting reversal of the direction of rotation of said shaft by said star wheel and thereby prevent the

movement of said cam in the wrong direction by said piston spring.

10. In combination with a railway journal box, a journal lubricator device comprising a lubricant cellar, and pump structure resting on the bottom of said cellar and including two cylinders spaced apart and lying on opposite sides of the center line of the cellar, pistons in such cylinders, individual actuating devices for said pistons each including a star wheel, and an element for attachment to the journal to which the device is applied and arranged to engage said star wheels successively.

11. In a journal lubricator, a reservoir, a cellar in communication therewith, a pump in said cellar, a journal actuated cam in said reservoir, and an operating connection between said pump and cam, said connection comprising separate parts coacting with each other, one of said parts being mounted in said reservoir and the other of said parts being mounted in said cellar.

12. In combination with a lubricant cellar and a pump device for a railway axle journal in the cellar, a pair of horizontally disposed pump cylinders, with pistons, arranged in parallel and spaced relation to each other, horizontally disposed operating levers for said pistons, each having a vertical fulcrum at one side of the device near one of said cylinders and pistons and each extending across the device transversely of the cylinders and pistons, beyond the other cylinder and piston, said levers being arranged one above the other and each being offset about the fulcrum of the other lever.

JAMES J. HENNESSY.