

Oct. 31, 1939.

C. STERN

2,177,752

RAIL LUBRICATING DEVICE

Filed April 3, 1936

2 Sheets-Sheet 1

Fig. 1.

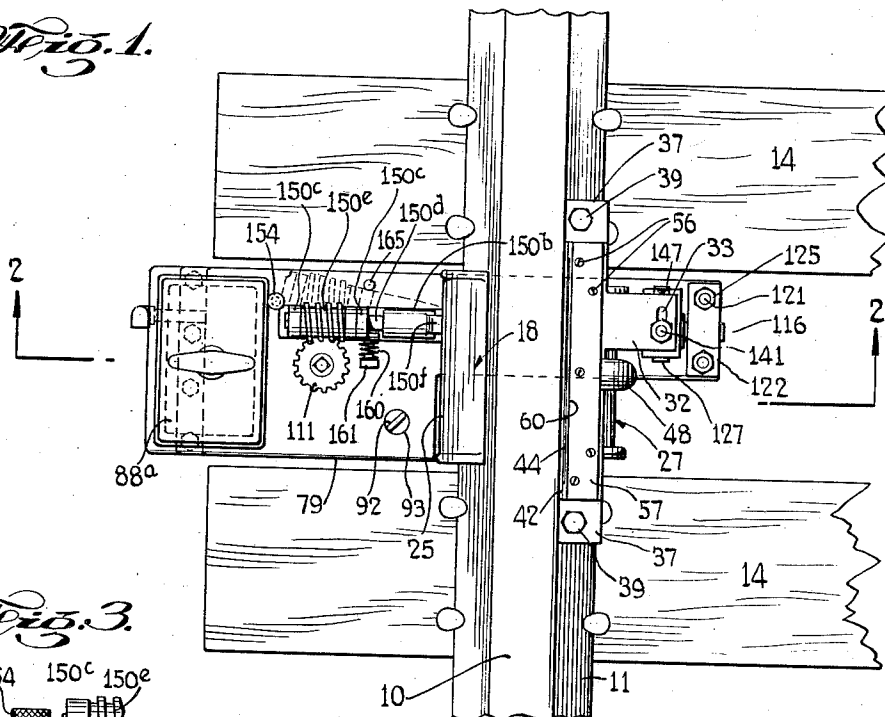


Fig. 3.

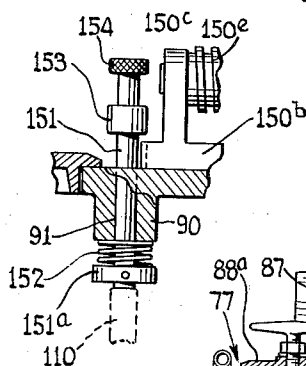
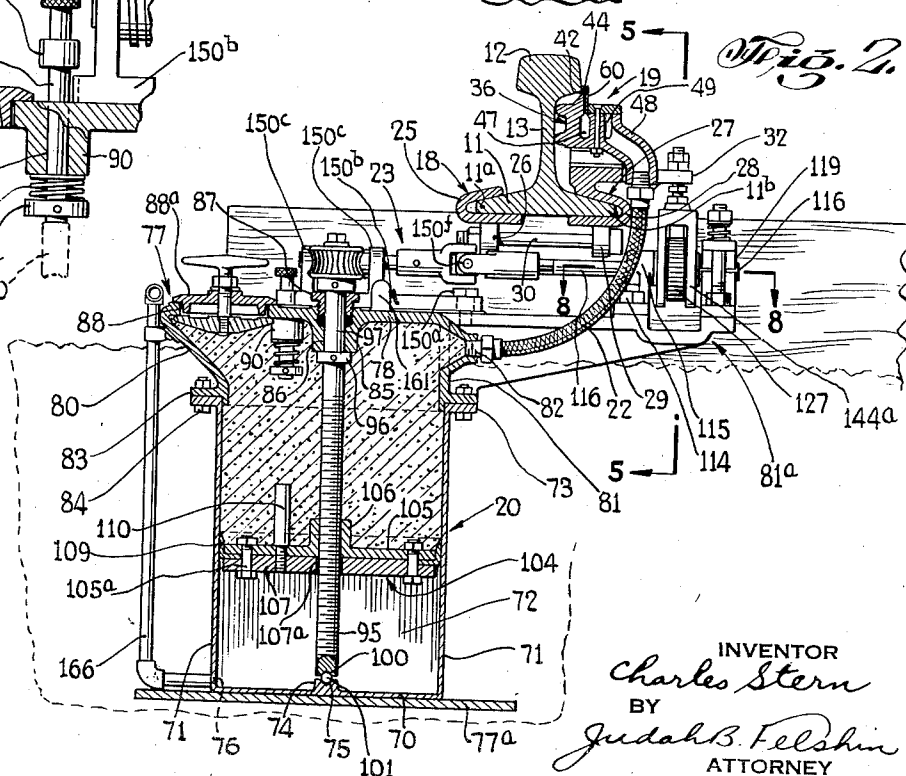


Fig. 2.



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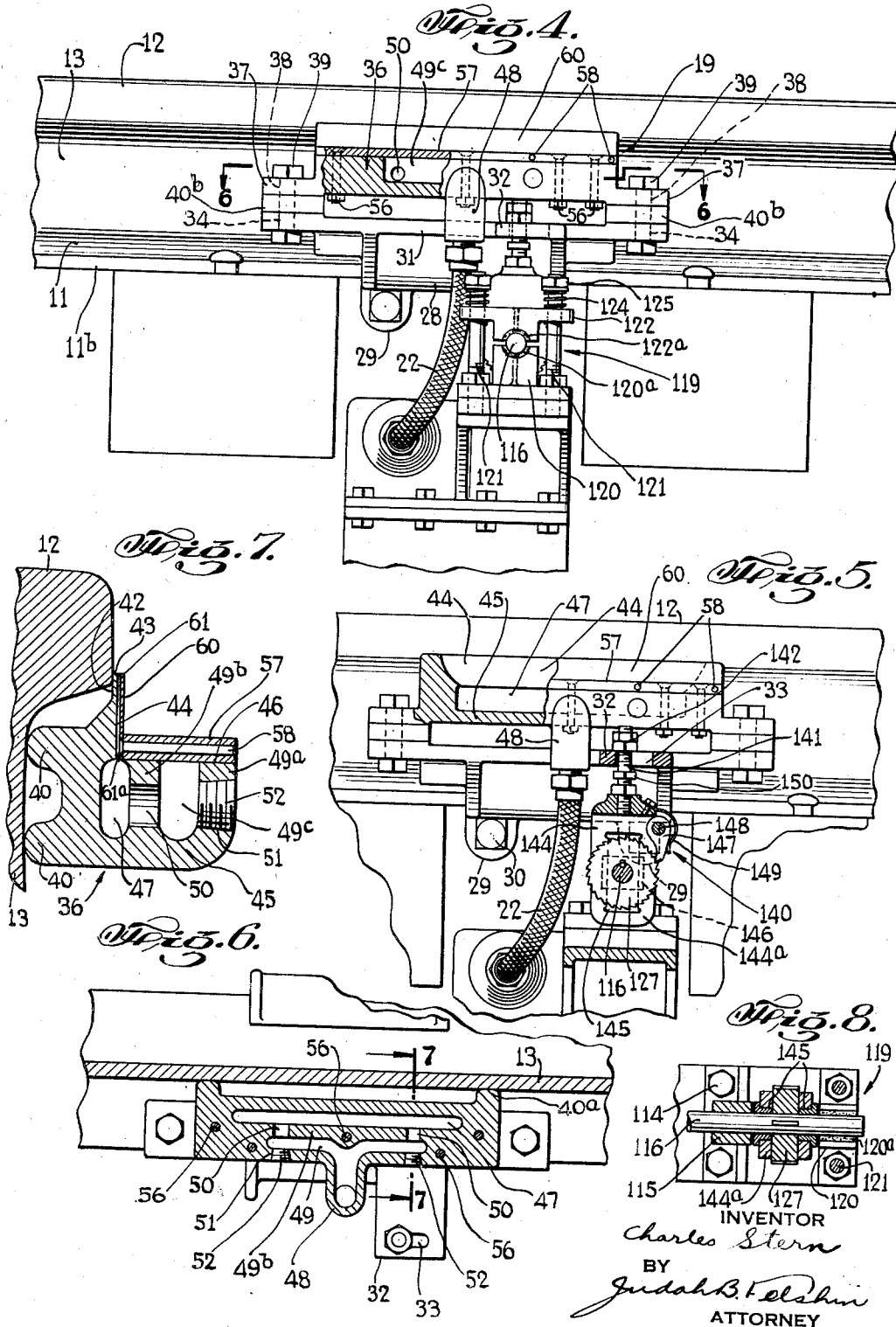
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,177,752

RAIL LUBRICATING DEVICE

Charles Stern, Jersey City, N. J.

Application April 3, 1936, Serial No. 72,463

16 Claims. (Cl. 184—3)

This invention relates to rail lubricating devices.

An object of this invention is to provide a rail lubricating device operable by the wave of the rail and having a lubricant applicator attached to the rail for depositing a wide ribbon of lubricant on the rail head, said applicator being so constructed as to insure long use without substantial injury or wear.

A further object of this invention is to provide a rail lubricating device of the character described having a tank or reservoir which may be embedded in the roadbed between an adjacent pair of rail ties, the tank being so constructed as to contain a relatively large amount of lubricant although fitting between the ties, and the operating mechanism for forcing lubricant from the tank being of such construction that the tank may be located on either the outside or inside of the rail.

A still further object of this invention is to provide in a rail lubricating device of the character described highly improved means for rendering the actuating means inoperative when the grease or lubricant of the tank has been used up to a predetermined point.

Yet another object of this invention is to provide a device of the character described so constructed as to permit creeping of the rail without affecting the lubricating operation.

Yet another object of this invention is to provide a rugged and compact rail lubricating device of the character described which shall comprise comparatively few and simple parts, which shall be relatively inexpensive to manufacture, easy to install and clean, positive in operation, and withal, practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the drawings:

Fig. 1 is a top plan view of a rail lubricating device embodying the invention applied to a rail;

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged detailed cross-sectional view of the releasing mechanism;

Fig. 4 is a side elevational view of the lubricating mechanism;

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 2;

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 4;

Fig. 7 is an enlarged, cross-sectional view taken on line 7—7 of Fig. 6; and

Fig. 8 is a cross-sectional view taken on line 8—8 of Fig. 2.

Referring now in detail to the drawings, 10 designates a rail having a base 11, head 12, and web 13 and mounted upon a pair of spaced, adjacent parallel ties 14. The rail lubricating device embodying the invention comprises generally a clamp 18 attached to the base 11 of the rail, and supporting a lubricant applicator 19 disposed at the side of the rail. A tank 20 embedded within the roadbed between the ties 14 is connected through conduit 22 to the applicator, lubricant from the tank being forced to said applicator by mechanism 23.

More specifically, the clamp 18 comprises an elongated member 25 of angular cross-section engaging one edge 11a of the rail base 11, and provided with a pair of spaced depending apertured ears 26 parallel to the web of the rail. The clamp 18 furthermore comprises an elongated member 27 having an angular portion 28 receiving the opposite edge 11b of the base, and likewise provided with a pair of spaced depending apertured ears 29 aligned with and parallel to the ears 26. Bolts 30 extending through the apertures in the ears 26, 29 serve to clamp the members 25, 27 onto the base of the rail. The member 27 is furthermore provided with a horizontal wall 31 disposed above the base of the rail, and has adjacent one end thereof an outwardly extending horizontal arm 32 formed with a slot 33 parallel to the rail. The wall 31 has at the ends thereof apertures 34 for the purpose hereinafter appearing.

Mounted on said wall 31 is the applicator 19. The same comprises a member 35 which may be in the form of a casting having horizontal extensions or ears 37 at the ends thereof aligned with the apertured ends of the wall 31 and likewise being apertured as at 38 to receive the bolts 39 extending through apertures 34, whereby to attach said member 35 to the member 27. Shims 40b receiving the bolts 39 therethrough are interposed between the members 31 and 35 to adjust the height of the applicator with respect to the rail. Said member 35 furthermore has a pair of parallel horizontal ribs 40 inter-

connected by vertical end ribs 40a engaging the web 13. Said member 36 is furthermore formed with a vertical elongated upstanding thin wall 42 having a horizontal edge 43 at the upper end thereof and an outer vertical depressed face or surface 44 terminating short of the ends thereof. Said member 36 is also formed with a portion 45 extending outwardly from the face 44 and provided with a horizontal upper face 46. Said portion 45 has an elongated chamber 47 open at the top and communicating with the depressed surface 44. Said portion 45 is furthermore formed with a central downwardly curved nipple 48 and with passages 49 of U shaped cross-section, extending to surface 46 and communicating with said nipple and extending on opposite sides thereof. Said passages 49 which may be formed by coring the casting 36, divide the portion 45 of the casting into an outer wall 49a and a wall 49b between chamber 47 and said passages. The passage 49 communicates with the chamber 47 by means of holes 50 in wall 49b on opposite sides of the mid-section of the applicator, drilled by passing the drill through preformed threaded holes 51 in the front wall 49a closed by plugs 52.

Attached to the top surface 46 of said portion 45 as by bolts 56 and closing passage 49, is a flat, horizontal, elongated bar 57, to the inner edge of which there is fixed as by rivets 58 a flat thin vertical plate 60 of spring metal having a horizontal upper edge 61 at the same level as the edge 43. The plate 60 is somewhat spaced from the depressed surface 44 thus forming an elongated narrow passage 61a communicating with the chamber 47. Said plate 60 contacts the ends of the wall 42, thus closing the opposite ends of the passage 61a. It will now be understood that the depth of the depression in the wall 43 is equal to the width of the passages 61a or the distance separating the surface 44 from the plate 60.

The tank 20 may be of oblong cross-section and has a bottom wall 70, parallel side walls 71, and parallel end walls 72 integrally formed with said bottom wall, said side and end walls having outwardly extending horizontal flanges 73 at the upper end thereof. Said bottom wall has an upwardly extending central boss 74 formed with a socket or depression 75 for the purpose hereinafter appearing. One of the side walls 71 is furthermore formed with an opening 76 at the bottom, likewise for the purpose hereinafter explained.

Mounted on the flanges 73 and closing the top of the tank is a tank head 77. The same may be in the form of a casting having a top wall 78, parallel end walls 79, an upwardly and outwardly inclined side wall 80, and an upwardly extending side wall 81. The wall 81 is provided with a nipple 82 to which one end of the conduit 22 is attached, the other end thereof being attached to the nipple 48 of the applicator 19. The tank head 77 has flanges 83 complementary to flanges 73 and fixed thereto by bolts 84 passing through said flanges. The top wall 78 has a central downwardly extending boss 85 formed with a central bore 86. Screwed within the boss 85 is a packing gland 87 for the purpose hereinafter explained. Said top wall is also formed with a substantially oblong opening 88 at the side thereof adjacent the wall 80. Said top wall is furthermore formed with a downwardly extending boss 90 adjacent the end wall 79 and formed with a through bore 91. Said

top wall also has a plug opening 92 for receiving a plug 93 closing said opening. Extending from wall 81 of the tank head 77 is an integral arm 81a passing beneath the rail 10 and disposed at right angles thereto. The tank may be supported on a wide plate 77a within the roadbed. Rotatably mounted within the bore 86 in the boss 85 is a central, vertical, axial screw 95 having a collar 96 contacting the underside of said boss and a smooth portion 97 passing through the packing gland 87 and upwardly above the top of the tank. The bottom end of the screw 95 has a socket 100, aligned with socket 75, a ball bearing 101 being received within said sockets on which said screw is supported. Screwed on said axial screw 95 is a piston 104 comprising an oblong shaped top plate 105 formed with an internally screw-threaded boss 106 engaging the threads of said screw. Attached to the underside of the plate 105 as by bolts 105a is an oblong bottom plate 107 formed with a central opening 107a through which the screw passes. A wiper 109 clamped between the plates 105 and 107 engages the inner surfaces of the tank to prevent leakage around the piston. For the purpose hereinafter appearing, there is screwed to the piston 104 an upstanding pin 110 aligned with the opening 91 in the boss 90.

Attached to the upper end 97 of screw 95 and disposed above the tank head 77 is a worm wheel 111. Fixed to the arm or bracket 81a as by screws 114 is a bearing 115 in which is journaled a shaft 116 disposed beneath the rail 10 and at right angles thereto. There is furthermore mounted on the bracket 81a a brace and brake 119 for the shaft 116. Said brace and brake comprise a lower brake portion 120 fixed to the arm 81a by a pair of vertical screws 121. Slidably mounted on the screws 121 is an upper brake portion 122 complementary to the portion 120. Said brake portions have semi-cylindrical brake linings 120a and 122a riveted thereto and engaging opposite sides of the shaft 116. Springs 124 on the screws 121 engaging the nuts 125 at the upper ends of said screws, serve to press the upper brake portion downwardly on the shaft. Fixed to the shaft and disposed between bearing 115 and brake 119, is a ratchet wheel 127 for the purpose hereinafter appearing, the same being disposed substantially in alignment with the slot 33 in the arm 32 of the member 27.

Mounted on and depending from the arm 32 of the member 27 is pawl mechanism 140 for rotating the shaft 116 through coaction with the ratchet 127 in the manner hereinafter appearing as the rail waves when trains or cars pass over the rail. The mechanism 140 comprises a screw threaded rod 141 extending through the slot 33 and having lock nuts 142 at the upper end thereof engaging the upper surface of the arm 32. Attached to the lower end of the screw 141 is a yoke 144 having parallel walls 144a provided with vertical slots 145, and disposed on opposite sides of ratchet 127. On the shaft 116 are blocks 146 slidably received within slots 145 and maintaining the yoke 144 in vertical position. Said blocks 146 are disposed between ratchet wheel 127 and bearing 115 and brake 119, thus preventing axial shifting of shaft 116. A pawl 147 pivoted on a pin 148 interconnecting the walls of said yoke, is spring pressed by spring 149 into engagement with the ratchet wheel 127. A nut 150 screwed on the screw 141 may be adjusted axially to provide variable lost motion between said screw and the arm 32. As the rail moves

up and down, the screw 141 will also be moved up and down, whereby engagement of the pawl 147 with the ratchet wheel 127 will cause intermittent rotation of the shaft 116. If a greater angle of rotation is desired for each wave of the rail, the screw 150 is merely tightened or rotated in a direction to move the same toward arm 32. The slot 33 furthermore permits creeping of the rail longitudinally without interfering with the operation of the mechanism 140.

Pivoted to the tank head 77 as at 150a is a bracket 150b having a pair of upstanding ears 150c rotatably supporting a shaft 150d. Said shaft carries a worm 150e meshing with the worm wheel 111. The shaft 150d is connected by universal joint 150f to the shaft 116 at a point directly above the pivot point 150a.

The opening 38 in the tank head 77 may be closed by any suitable clamping closure member 38a for tightly sealing the tank. The operation of the device will now be described.

Grease may be inserted into the tank above the piston through the opening 38. After the tank is full with the piston at the bottom of the tank, the closure member 38a is applied to the opening 38. As trains pass over the rail 10, the same has a waving or up and down movement, as is well known in the art. The up and down movement of the rail will cause the mechanism 140 to intermittently rotate the shaft 116 which causes rotation of the shaft 150d. Such operation will cause rotation of the screw 95 for raising the piston and pressing the grease through the conduit 22 and nipple 43 into the passages 49 and through the openings 50 into the chamber 47, the grease being forced upwardly through the thin passage 61a onto the side surface of the headed rail coming up in a thin coiling sheet. The flanges of the wheel take up the grease for lubricating said flanges and carry the lubricant for long distances along the rail.

Means is provided to prevent operation of the lubricating mechanism when the tank has been emptied to a predetermined point. To this end, there is slidably mounted within the bore 91 of the boss 90 a pin 151 having a collar 151a at the bottom end thereof. A coil compression spring 152 is interposed between the collar 151a and said boss 90. At the upper end of the pin is a circular head 153 and a handle 154. The head 153 normally engages the outer end of the bracket 150b to retain the worm 150e in engagement with the worm wheel 111. However, as the piston moves upwardly during operation of the rail lubricating mechanism, the pin 110 will engage the underside of the pin 151 and lift the latter against the pressure of the spring 152 to raise the head 153 above the bottom wall of the bracket to give the necessary clearance to permit said bracket to be pivoted about its axis, whereby the worm 150e moves out of engagement from the worm wheel 111. A coil compression spring 160 interposed between a lug 161 on the tank head and the bracket 150b serves to move said bracket together with the shaft 150d away from the worm wheel 111. A pin 165 fixed to the tank head serves as a stop to limit rotation of said bracket. The handle 154 on the pin 150 permits the pin to be raised manually should it be desired to unmesh the worm and worm wheel 150e and 111.

Escape of air from beneath the piston is permitted through pipe 166 attached to the opening 76 on the bottom of the tank. The pipe prefer-

ably extends above the rail bed as shown in Fig. 2 of the drawings.

The plug 93 may be removed to permit a stick or gauge to be inserted into the tank for the purpose of determining how much grease is in the tank.

It will be noted that edges 43 and 61 of the wall 42 and plate 60 are only a short distance above the bottom of the rail head. Said wall and plate are very thin and normally the flanges of the wheels will not contact the same. However, should an extremely worn wheel flange on rare occasion strike the plate 60, no damage or injury will result because of the resiliency of said plate, thereby insuring long use without appreciable wear or injury. The tank may be located on the inner side of rail 10 (to the right of the rail looking at Fig. 2), without change in the operating mechanism. The entire tank together with the shafts 150d and 116, and the mechanism 140 are merely moved to an opposite position or at 180 degrees from the position now shown in Fig. 2. The screw 141 will merely shift in slot 33 when such a change is made. The brake will, in such event come beneath the rail 10.

It will be noted that the walls 72 of the tank are parallel to the ties 14 and that the tank fits between the ties. By making the tank of oblong transverse cross-section, a relatively large lubricant content is obtained although the tank is sunk between the relatively close ties.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In combination with a rail and a pair of adjacent rail ties supporting said rail, a member fixed to said rail and having a chamber and a passage leading from said chamber to the head of the rail, a tank embedded in the ballast supporting the rail ties and located between said rail ties, conduit means connecting said tank and chamber, and means actuated by the wave of the rail and permitting longitudinal creeping of the rail relative to the tank, for forcing lubricant from said tank to said chamber.

2. A rail lubricating device comprising a member adapted to be attached to the rail and having a chamber and a passage leading from said chamber to the head of the rail, a tank disposed between a pair of adjacent ties supporting said rail, a vertical screw in said tank, a piston slidable in said tank having a threaded connection with said screw, conduit means connecting said tank with said chamber, a bearing on said tank, a horizontal shaft journaled in said bearing, a ratchet thereon, means cooperating with said screw and shaft for rotating the former upon rotation of the latter, a member mounted on said first member and having an adjustable, vertical lost motion connection therewith and carrying a pawl engaging said ratchet for intermittently rotating the same when trains pass over the rail.

3. A rail lubricating device comprising a clamp having portions engaging opposite edges of the base of the rail and being bolted together, one

of said portions having an arm formed with a slot parallel to the rail, a member fixed to said portion and having a chamber and a passage leading from said chamber to the head of the rail, a member carrying a pawl having a portion extending through said slot and being supported by said arm, a tank embedded in the road bed and between a pair of adjacent rail ties, a conduit connecting said tank and chamber, and means on said tank cooperating with said pawl, for forcing lubricant in said tank through said conduit to said chamber.

4. A rail lubricating device comprising a member adapted to be attached to the rail and having a chamber and a passage leading from said chamber to the head of the rail, a tank disposed between a pair of adjacent ties supporting said rail, a vertical screw in said tank, a piston slidable in said tank having a threaded connection with said screw, conduit means connecting said tank with said chamber, a bearing on said tank, a horizontal shaft journaled in said bearing, a ratchet thereon, means cooperating with said screw and shaft for rotating the former upon rotation of the latter, a member mounted on said first member and having an adjustable, vertical lost motion connection therewith and carrying a pawl engaging said ratchet for intermittently rotating the same when trains pass over the rail, and a friction brake on said tank engaging said shaft.

5. A rail lubricating device comprising a clamp adapted to be attached to a rail, a member fixed to said clamp having an elongated chamber and a passage leading from said chamber to the head of the rail, a tank adapted to be embedded within the road bed, a conduit interconnecting said tank with said member, an axial screw in said tank, a piston slidably mounted within said tank and having screw threaded engagement with said screw, a worm wheel on said screw above the tank, a bracket pivoted to said tank, a bearing on said tank, a shaft rotatably mounted within said bearing, a ratchet wheel on said shaft, a member mounted on said clamp and having a pawl adapted to rotate said ratchet as the rail moves up and down when trains pass over the rail, a second shaft mounted on said pivoted bracket and having a universal connection to said first shaft, and a worm on said second shaft meshing with said worm wheel.

6. A rail lubricating device comprising a clamp adapted to be attached to a rail, a member fixed to said clamp having an elongated chamber and a passage leading from said chamber to the head of the rail, a tank adapted to be embedded within the road bed, a conduit interconnecting said tank with said member, an axial screw in said tank, a piston slidably mounted within said tank and having screw threaded engagement with said screw, a worm wheel on said screw above the tank, a bracket pivoted to said tank, a bearing on said tank, a shaft rotatably mounted within said bearing, a ratchet wheel on said shaft, a member mounted on said clamp and having a pawl adapted to rotate said ratchet as the rail moves up and down when trains pass over the rail, a second shaft mounted on said pivoted bracket and having a universal connection to said first shaft, a worm on said second shaft meshing with said worm wheel, means for holding said worm in mesh with said worm wheel, and means for releasing said holding means when the piston reaches a predetermined position in said tank.

7. In combination with a rail, a device for lubricating the rail comprising means, adapted to be fixed to the rail, for depositing the lubricant on the rail head, a tank adapted to be embedded within the rail bed beneath the rail, a conduit interconnecting said tank with said means, a piston slidably movable within said tank, a screw within said tank having screw threaded engagement with said piston, a bearing on said tank, a shaft rotatably mounted within said bearing, a second shaft having a universal connection to the said first shaft, a worm and worm wheel connection between said second shaft and said screw, a ratchet on said first shaft, and a member mounted on said means for vertical reciprocation therewith and having a pawl in engagement with said ratchet.

8. A device for lubricating a rail comprising a member adapted to be attached to the rail and having a passage terminating adjacent the rail head, a tank adapted to be embedded within the rail bed and connected to said member by a conduit, a piston slidable within said tank, a vertical screw within said tank having screw threaded engagement with said piston, and means operated by the wave of the rail when a train passes over the rail for rotating said screw, said last means including means to permit creeping of the rail.

9. In combination with a rail supported by ties, a member fixed to said rail and having a passage open at the top adjacent the head of the rail, a tank embedded within the road bed between a pair of adjacent ties, conduit means connecting said tank and passage, a vertical screw in said tank, a piston in said tank having a screw threaded engagement with said screw, a bearing on said tank, a shaft perpendicular to the rail journaled in said bearing, means connecting said shaft with said screw for rotating the latter upon rotation of the former, a friction brake on said tank engaging said shaft, a ratchet on said shaft and located between said bearing and said brake, and a member mounted on said first member carrying a pawl engaging said ratchet.

10. In combination with a rail supported by ties, a member fixed to said rail and having a passage open at the top adjacent the head of the rail, a tank embedded within the road bed between a pair of adjacent ties, conduit means connecting said tank and passage, a vertical screw in said tank, a piston in said tank having a screw threaded engagement with said screw, a bearing on said tank, a shaft perpendicular to the rail journaled in said bearing, means connecting said shaft with said screw for rotating the latter upon rotation of the former, a friction brake on said tank engaging said shaft, a ratchet on said shaft and located between said bearing and said brake, and a member mounted on said first member carrying a pawl engaging said ratchet, said last member having a pair of parallel slotted walls, the ratchet being disposed between said walls, said shaft extending through the slots in said walls, and blocks slidably mounted in said slots and having openings rotatably receiving said shaft.

11. In combination with a rail supported by ties, a member fixed to said rail and having a passage open at the top adjacent the head of the rail, a tank embedded within the road bed between a pair of adjacent ties, conduit means connecting said tank and passage, a vertical screw in said tank, a piston in said tank having a screw threaded engagement with said screw, a bearing on said tank, a shaft perpendicular to the rail

journalled in said bearing, means connecting said shaft with said screw for rotating the latter upon rotation of the former, a friction brake on said tank engaging said shaft, a ratchet on said shaft and located between said bearing and said brake, and a member mounted on said first member carrying a pawl engaging said ratchet, said last member having a pair of parallel slotted walls, the ratchet being disposed between said walls, said shaft extending through the slots in said walls, and blocks slidably mounted in said slots and having openings rotatably receiving said shaft, said last member having a vertical adjustable lost motion connection with said first member.

12. A device for lubricating a rail comprising a member attached to the rail and having a portion extending away from the web of the rail and formed with a top horizontal surface and a recess in said surface, and a vertical wall extending above said surface and terminating in a horizontal edge adjacent the head of the rail, a member fixed to the outwardly extending portion and resting on said horizontal surface and covering said recess, and a plate on the outer face of said vertical wall forming therewith a passage communicating with said recess.

13. A device for lubricating a rail comprising a member attached to the rail and having a portion extending away from the web of the rail and formed with a top horizontal surface and a recess in said surface constituting a chamber and a vertical wall extending above said surface and terminating in a horizontal edge adjacent the head of the rail, a member fixed to the outwardly extending portion and resting on said horizontal surface and covering said recess, a plate on the outer face of said vertical wall forming therewith a passage communicating with said chamber, a nipple on said outwardly extending portion of said member, said member being formed with a second passage communicating with said nipple and having communication with said chamber on opposite sides of said nipple.

14. In combination with a pair of rails, a pair of adjacent rail ties supporting said rails, a member fixed to one of said rails and having a passage leading to the head of said rail, a vertical tank embedded in the ballast supporting said rail ties,

an axial vertical screw within said tank, a piston within the tank engaging said screw, means to prevent rotation of said piston within said tank, conduit means connecting said tank with said passage, means actuated by the wave of one of said rail ties for rotating said screw, said means being arranged to permit longitudinal creeping of the rail relative to said tank, and means mounted at the top of the tank and controlled by said piston to render said first means inoperative.

15. In combination with a pair of rails, a clamp comprising a pair of members engaging opposite edges of the base of one of said rails, means for attaching said members together, a member mounted on one of said first members and having an opening adjacent the head of said rail, a vertical tank embedded within the ballast supporting said rails and having a vertical axial screw, a piston non-rotatably mounted within said tank and having threaded engagement with said screw, a conduit connecting said tank with the member mounted on the clamp, clutch means controlled by the wave of one of said rails for rotating said screw, a spring pressed member mounted on said tank and adapted to be raised by the piston, and means controlled by said spring pressed member to render said clutch means inoperative.

16. In combination with a pair of rails and a pair of adjacent ties supporting said rails, a rail lubricating device mounted adjacent one of said rails and having a single, elongated, thin slot disposed longitudinally of the rail and in a vertical plane substantially parallel to one side surface of the head of the rail and closely adjacent thereto, a vertical tank embedded within the ballast supporting said rails and between said rail ties, conduit means connecting said tank with said rail lubricating device, an axial screw within said tank, a piston non-rotatably mounted within said tank and having screw-threaded connection with said piston, means controlled by wave of one of said rails for rotating said screw, means on said tank controlled by said piston for rendering said first means inoperative, said last means comprising a member slidably mounted on the head of the tank, and a spring for lowering said member, and said piston being adapted to raise said member against the pressure of said spring.

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