

June 19, 1934.

J. E. BJORKHOLM ET AL

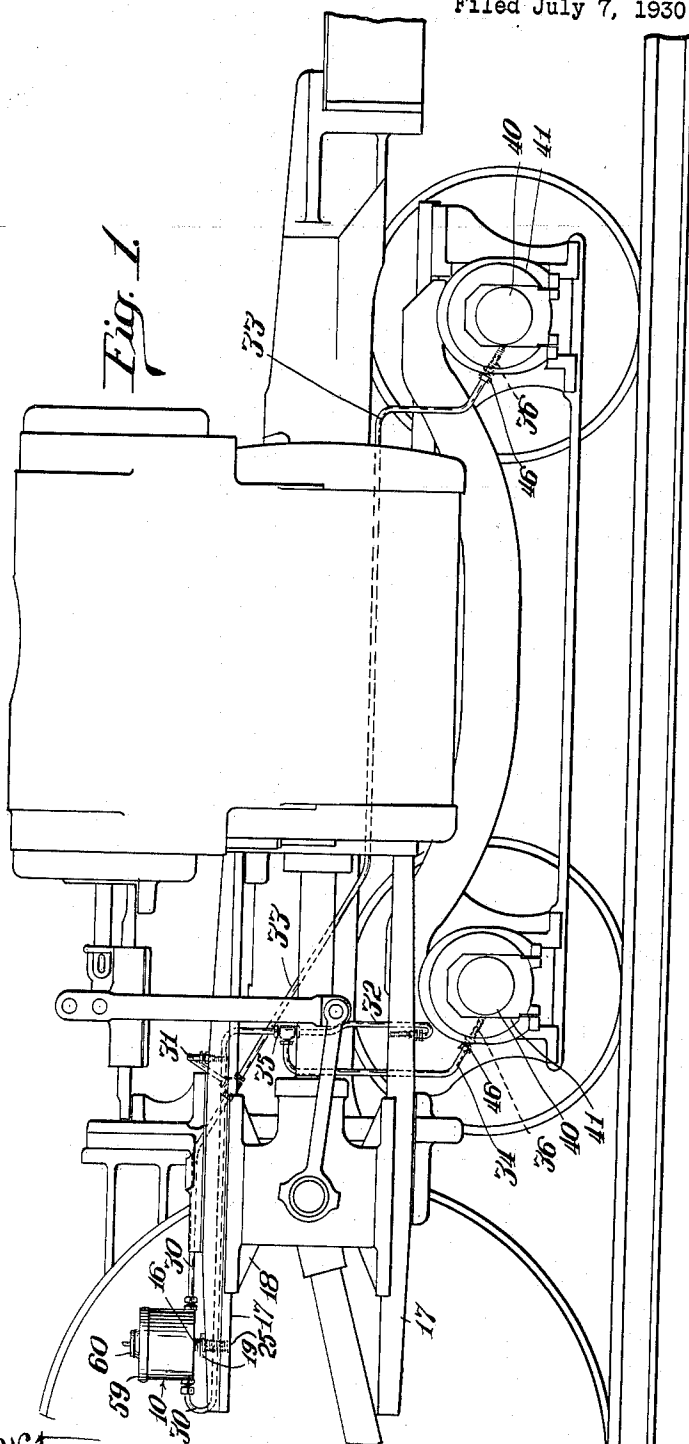
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AUTOMATIC LOCOMOTIVE LUBRICATOR

Filed July 7, 1930

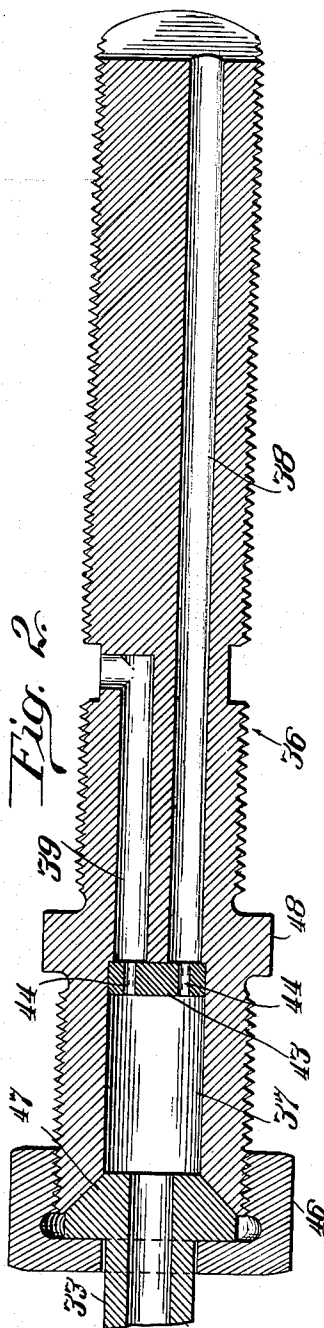
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Fig. 1



Witnesses
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Fig. 2



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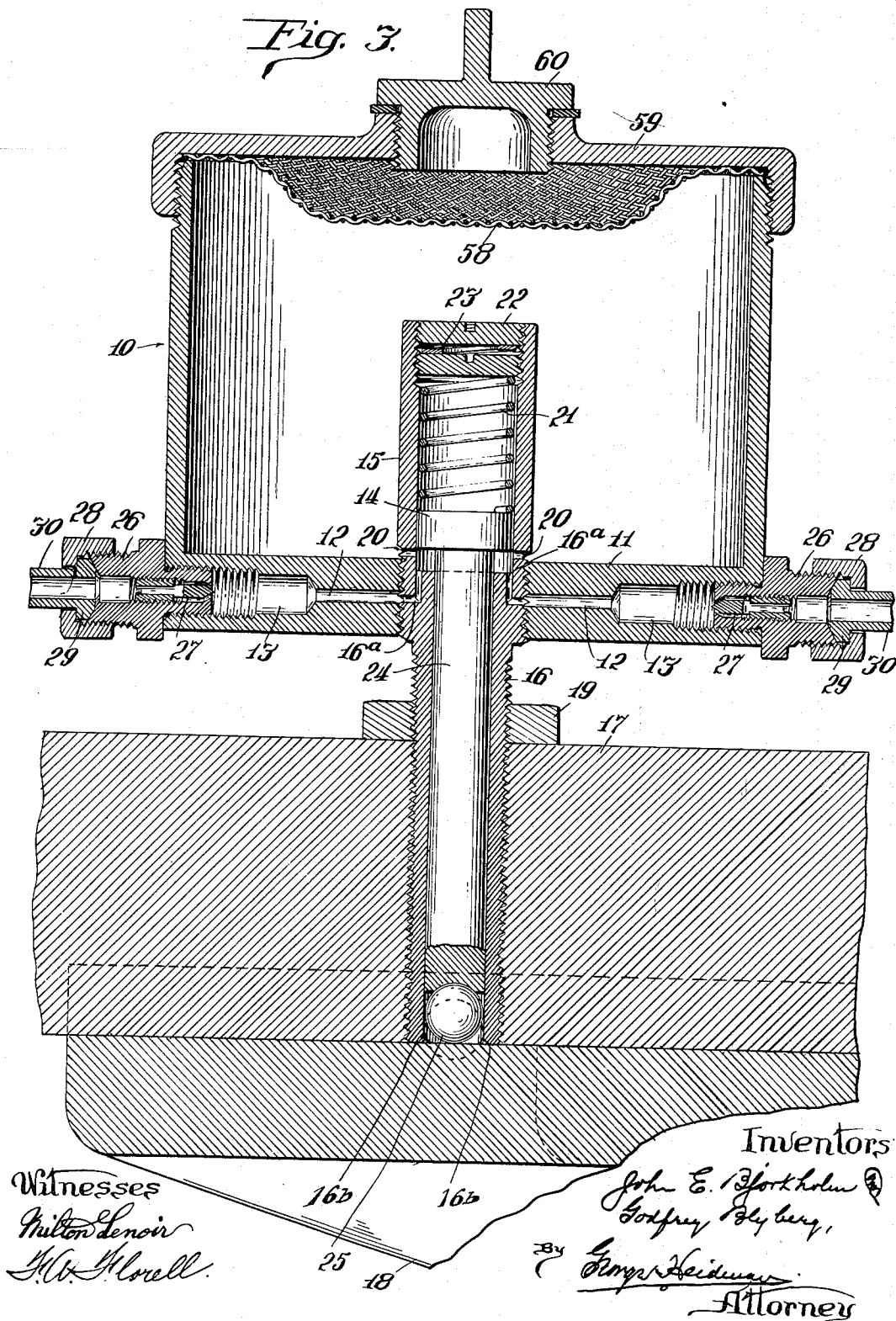
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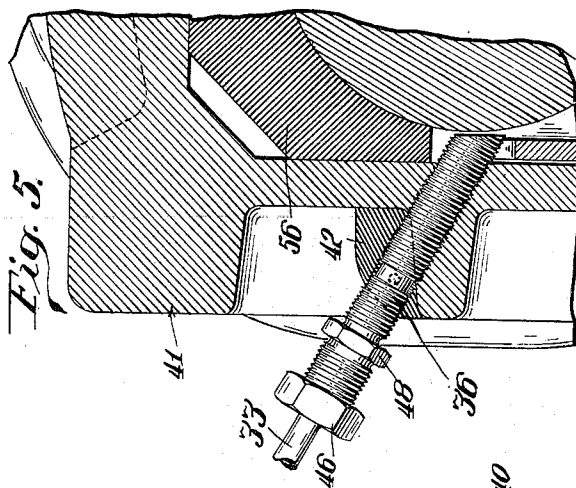
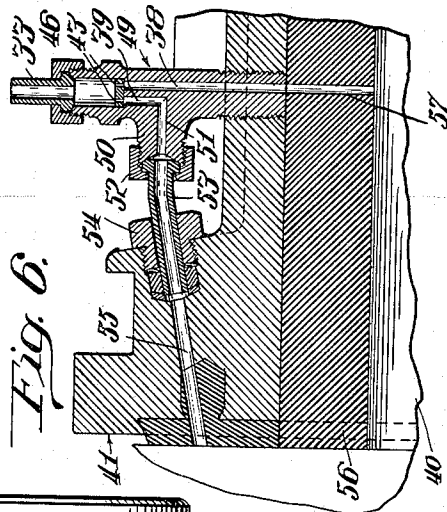
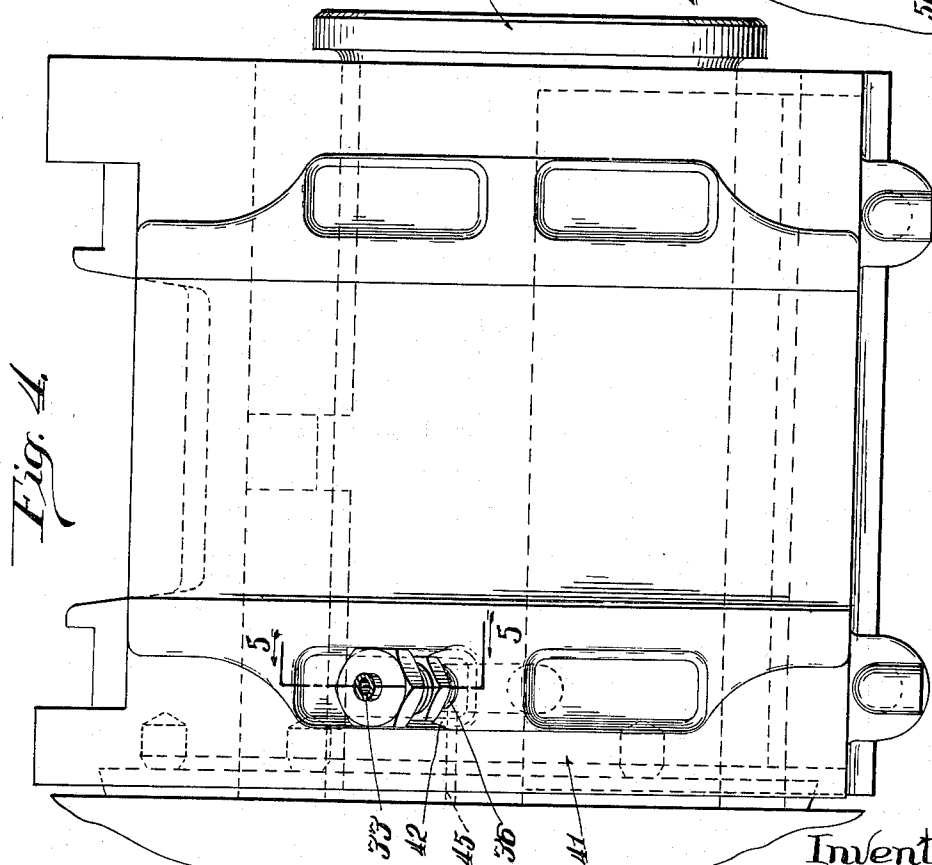
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AUTOMATIC LOCOMOTIVE LUBRICATOR

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,963,189

AUTOMATIC LOCOMOTIVE LUBRICATOR

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Application July 7, 1930, Serial No. 466,120

6 Claims. (Cl. 184—27)

Our invention relates to means for automatically lubricating the movable parts of a locomotive and particularly the cross-head guides, the valve-gear, as well as the journals of the engine truck, or any of the respective parts of a locomotive requiring lubrication while the locomotive is in operation.

Our invention, specifically stated, involves a suitable oil-holding reservoir or container provided with an automatically seating piston or pump plunger whereby predetermined quantities of oil or lubricant will be periodically discharged from the reservoir or container and forced into the various channels or lead lines whereby the oil or lubricant is conveyed to the respective movable parts of the locomotive which are to be lubricated.

The piston is arranged so that it will be operated by a reciprocating or oscillating part of the locomotive, such as the valve cross-head or the valve gear, or as disclosed in the present embodiment, devised for the practical application of our invention, the piston is actuated by the main cross-head of the locomotive or engine.

The invention has for its object the provision of means whereby constant lubrication of the respective movable parts of the locomotive, during operation of the locomotive, will be automatically provided by the periodical distribution of predetermined quantities of lubricant.

The objects and advantages of our invention will be readily comprehended from the detailed description of the accompanying drawings, wherein—

Figure 1 is a side elevation of a portion of a locomotive illustrating the application of our invention and the oil reservoir shown mounted on the main cross-head guide.

Figure 2 is an enlarged sectional view of the feed pipe or terminal connection to the truck-box as employed in Figure 1.

Figure 3 is a vertical sectional view of the oil reservoir or container with its piston and plurality of lead-out ducts as applied to the main cross-head guide, a portion of the latter being also shown in section.

Figure 4 is a side elevation of the engine truck-box showing the method of journal lubrication disclosed in Figure 1.

Figure 5 is a detail sectional view taken substantially on the line 5—5 of Figure 4 as viewed by the arrows.

Figure 6 is a detail sectional view illustrating a modified form of connection to the engine truck-box.

In the particular exemplification of the invention, the oil container or reservoir 10, which may be of any suitable capacity, is provided with a bottom 11 of thickness sufficient to permit the bottom to be provided with ducts 12 in number in keeping with the number of lead lines desired; namely in keeping with the number of reciprocating or oscillating parts of the locomotive it is intended to lubricate during operation of the locomotive. The outer ends of the ducts 12 are preferably enlarged, as shown at 13, in order to provide auxiliary reservoirs or chambers for the reception of the oil or lubricant discharged from the container 10 through the ducts 12 during the periodical reciprocation of the piston 14 which is reciprocatingly mounted in a cylinder 15. The lower end of the cylinder 15 may be externally threaded to screw into a tapped opening in the bottom 11 of the container 10; and the bottom of the cylinder is provided with an externally threaded stem 16 which is adapted to screw into a suitable tapped opening through the top member of the guide 17 of the reciprocating cross-head of which a portion is shown at 18. The position of the threaded stem 16 in the guide 17 is maintained by means of lock-nut 19, as shown in Figure 3.

The lower end of the cylinder 15 has ports 16^a extending down and through the sides to communicate with ducts 12; the number of ports 16^a being in keeping with the number of ducts 12.

The cylinder 15, at points adjacent to the bottom 11 of the container 10, is provided with a number of suitable ports 20 in order to permit the lubricant or oil to flow from container 10 into the lower end of the cylinder and therefore beneath the piston 14 while the latter is in its normal position as shown in Figure 3.

The piston 14 is automatically forced downward through the action of a suitable spring 21 mounted in the cylinder or casing 15; the tension of the spring being controlled by means of the nuts 22 which screw into the upper threaded end of the casing 15; the nuts being maintained in their adjusted positions by a suitable lock washer, as at 23 in Figure 3.

The piston 14 is provided with a stem 24 slidably mounted in the outer stem 16, with the relation between the two stems being such that the lubricant or oil may find free passage therebetween. It is apparent that the amount of oil flow through stem 16 may be determined by the relation of the diameter of stem 24 relative to the inside diameter of stem 16; or in any other suitable manner whereby a sufficient amount of lubricant

cant will be discharged onto the guide 17 and main cross-head 18 during each reciprocatory stroke of the cross-head and therefore during each actuation of piston stem 24. The lower end of the piston-stem 24 is shown socketed to receive the spherical member or ball 25 of size to permit its free movement in the outer stem 16. The ball 25 is held from dropping out of stem 16, when the cross-head has moved beyond the lower end of the stem 16 by the internal annular flange or lip 16^b at the lower end of the stem. As the ball 25 is freely held in place, an antifriction contact with the cross-head is provided and wear is prevented as rotation of the ball constantly presents a different point of contact.

The cross-head guide 17 is provided with a threaded opening and this opening extends entirely through the upper member of the guide, preferably adjacent to one end but along the path of reciprocation of the cross-head 18.

In the drawings, Figure 3, the stem 16 is shown screwed into the guide 17 so as to have the bottom of the stem 16 flush with the bottom of the guide, thus providing for a maximum stroke or movement of the piston-stem 24, and therefore of piston 14, through the upward pressure exerted on the ball or antifriction element 25.

It is apparent from the construction that the bottom of the spherical member 25 extends into the reciprocatory path of the cross-head, with the result that during the cycle of reciprocation of the cross-head 18, the piston 14 will be raised against the action of its spring 21, thus placing the oil, which has entered the bottom of the cylinder 15 through ports 20, under pressure upon the downward stroke or movement of piston 14 (through spring 21), causing oil to flow through ducts 12 and also lengthwise of the piston-stem 24; the latter mentioned quantity of oil being discharged onto the guide 17 and hence causing the adjacent or guide engaging portions of the cross-head to be lubricated during its respective strokes.

The enlarged ends 13 of the respective ducts 12 (of which any desired number may be provided) are each shown provided with a connection member or coupling 26 shown threaded into the tapped end of the enlargement or auxiliary reservoir 13 of the ducts 12. The bore of the coupling 26 is threaded and adapted to receive a choke or orifice controlling needle valve 27, whereby the outward flow of the oil may be regulated through adjustment of the choke 27 relative to the inlet orifice of coupling 26.

The outer end of the coupling 26 is externally threaded to receive nut 28; the outer end of coupling 26 is shown dishd to receive the conical head 29 of the tubing 30; the nut 28 firmly clamping the head 29 in place against the end of the coupling 26, as clearly shown in Figure 3.

The tubing or lines 30 are intended to convey oil to any part of the locomotive that requires lubrication while the locomotive is in operation.

In the specific exemplification of the invention, we have the tubing or lines 30 provided with leads 31 and 32 extending to the upper and lower members of the guide 17, adjacent to what may be termed the inner ends of the stroke of the cross-head; while other leads 33 and 34 are shown extending to the front and rear truck boxes, respectively, see Figure 1, for conveying oil to the journals of the engine truck.

It is apparent that the respective leads may be provided with any number of suitable couplings, as at 35 (see Figure 1) in keeping with the number of branch leads desired or the num-

ber of movable parts to be lubricated automatically during locomotive operation.

As shown in Figure 1, the cross-head guide 17 is provided with ports extending through to the cross-head engaging side to permit the oil to flow onto the contacting surfaces of the guide and the cross-head.

The ends of the leads 33 and 34 are each preferably provided with a terminal connection 36, which is shown externally threaded and adapted to screw into a tapped opening in the respective truck-box, as shown in Figures 1 and 5. The terminal 36 is provided with an enlarged bore 37 at one end to provide an auxiliary oil holding reservoir or chamber.

Extending lengthwise of the terminal 36 and leading from the chamber 37 are a pair of ducts 38 and 39; the duct 38 extending to the end of the terminal 36 so as to convey the lubricant onto the journal (a portion whereof is shown at 40 in Figure 5) when the terminal has been screwed into the truck-box 41. In order to provide sufficient holding surface for the terminal 36, where the same is secured in the side of the truck-box as shown in Figures 1, 4 and 5, we prefer to provide a fill of metal welded onto the box as shown at 42 in Figure 5.

Where a terminal like terminal 36 is used, we prefer to provide the chamber 37 with a disc or plate 43 provided with holes 44 of suitable size to divide the oil stream more or less equally so that substantially equal quantities of oil will pass through both ducts 38 and 39; the oil from duct 38 discharging directly onto the journal as shown in Figure 5; while the oil from duct 39 (which terminates at the side of the terminal 36) may discharge into a passage in the box 41 shown in dotted lines at 45 in Figure 4, which leads to the wheel-hub side of the box, thereby lubricating the bearing face of the box and wheel.

The terminals 36 at the chambered end are shown externally threaded to receive the coupling-nut 46 whereby the conical head 47 of the lead 33, or 34, is firmly held onto the dishd end of the terminal as shown in Figure 2; while the terminal is also preferably shown provided with a wrench receiving surface at 48 to enable the screwing of the terminal into and out of place.

The terminals 36 as illustrated may or may not be installed in any of the leads or lines of tubing, depending on whether a line is used to supply lubrication to more than one bearing surface.

Instead of employing a terminal of the type shown in Figures 2 and 5, adapted to extend through the side wall of the truck-box as heretofore described, a terminal of the type shown in Figure 6 may be employed for introducing the oil through the top of the truck-box.

The terminal 49, shown in Figure 6, is substantially like that previously described, except that it is shown provided with a side extension 50 provided with a duct 51 which connects with duct 39. The outer end of extension 50 is threaded to receive nut 52 whereby the short tube 53 is clamped in place; the tube 53 extending into a hole formed in the top of the truck-box 41, which is also adapted to receive gland nut 54 whereby the tube is held in place. The truck-box in this instance is provided with a duct 55 which leads to the wheel-hub end of the box; while the top of the box 41 is provided with a tapped hole to receive the end of the terminal 49 as shown. Where the lubricant is introduced through the top of the box as here shown, it

will be understood that the brass 56 is provided with suitable ports, as shown at 57, to convey the oil to the journal 40.

By providing the chambers 13 and 37 in the distributing system and having the chokes and the plates with smaller holes than the size of the ducts or passages, auxiliary reservoirs are provided in which the pressure is built up while at the same time affording sufficient lubrication for bearings requiring more oil than other bearings which are supplied by the same system.

In order to take care of the vibration and relative movement between the various parts, as for example the relative movement between the locomotive proper and the engine truck, armored cables or tubing and flexible connections are preferably employed in the installation of our improved automatic locomotive lubricator.

The container 10 is preferably provided with a suitable screen or strainer 58 to prevent particles of foreign matter getting into the system; and this strainer may be secured in place in any suitable manner, as for example by the cover 59 which is shown as preferably screwing onto the container 10.

The cover 59 is shown provided with a removable plug 60 to permit the container to be filled with oil through the opening in which the plug 60 is shown threaded.

It is preferable to employ a separate lubricating system on each side of the locomotive, although it is apparent that a single container may be employed and located to supply oil to the various parts on both sides. Although the specific embodiment, which is believed to be the best adaptation, involves actuation by the main cross-head of the engine, the lubricator may be arranged so as to be operated by any reciprocating or oscillating part or element of the locomotive during operation of the locomotive.

We have described what we believe is the simplest and best physical embodiment of our invention, which we have described in terms employed merely for purposes of description and not as terms of limitation, as structural modifications are possible and may be made without, however, departing from the spirit of our invention.

What we claim is:

1. A lubricator of the character described comprising, in combination with a movable element of an engine, a lubricant holding receptacle; a lubricant receiving cylinder mounted in the bottom of said receptacle and provided with ports communicating with said receptacle; lubricant conveying passages leading from the bottom of the cylinder; a piston in said cylinder for normally closing said ports and for forcing the lubricant through said passages; and means intermediate of the piston and a movable element of the engine whereby the piston is actuated by the movement of said element.

2. In a lubricator of the character described the combination of the cross-head of a locomotive engine, lubricant receiving cylinder provided with lubricant receiving and discharging ports at the bottom of the cylinder with the receiving ports arranged above the discharging ports; lubricant conveying means extending from the discharge ports to the parts of the locomotive to be lubricated; a lubricant supply communicating with the receiving ports of the cylinder; a piston in said cylinder for normally closing the receiving ports; a spring mounted in the cylinder above said piston for forcing the latter to port closing position; means in the

upper end of the cylinder for regulating the spring pressure; and automatically rotatable means intermediate of the piston and the path of said cross-head whereby the piston is actuated during reciprocation of the cross-head.

3. A lubricator of the character described comprising, in combination with a movable element of a locomotive engine, a lubricant receiving cylinder provided with inlet and outlet ports; a distributing system communicating with the outlet port and communicating with the movable parts of the locomotive to be lubricated; said system involving terminal elements adapted to be secured in the engine truck-boxes, said terminal elements having an enlarged lubricant receiving end for providing an auxiliary reservoir with restricted outlets from said reservoir whereby the lubricant is placed under pressure and distributed in separate streams to different parts of the truck-box; a piston in said cylinder; and means intermediate of the piston and a movable element of the locomotive engine whereby the piston is actuated through movement of said element and the lubricant forced from said cylinder.

4. A lubricator of the character described comprising, in combination with the cross-head of a locomotive engine, a lubricant holding receptacle, the bottom whereof is provided with an opening and with laterally disposed ducts communicating with said opening; a cylinder whose lower end is mounted in said opening and provided with inlet ports communicating with the receptacle and having an outlet communicating with said ducts; lubricant conveying tubes communicating with said ducts and extending from the bottom of the cylinder through the cross-head guide; means located in the laterally disposed ducts adapted to build up an auxiliary oil pressure supply in the ducts; a spring-controlled piston in said cylinder normally adapted to close the inlet ports in the cylinder and to admit lubricant into the cylinder when moved from its normal position; and an anti-friction means intermediate of the piston and the path of the cross-head adapted to be engaged by the cross-head during its reciprocation whereby the piston is moved upwardly to permit inflow of lubricant to the cylinder through the inlet ports and the lubricant discharged from the cylinder through said outlet when the cross-head moves away from said means and the piston is lowered by its spring.

5. A lubricator of the character described comprising, in combination with a movable element of a locomotive, a lubricant container provided with an opening in its bottom, a cylinder arranged in the container with its lower end secured in said opening and provided with inlet ports above the bottom of the cylinder, lubricant conveying passages in the bottom of the container, a supporting stem secured in the opening in the bottom of the container and having passages communicating with the bottom of the cylinder and with the lubricant conveying passages in the bottom of the container, a piston reciprocally mounted in the cylinder and provided with a depending stem extending to the exterior of the cylinder and through said supporting stem, said piston adapted to be moved upwardly by a movable element of the locomotive thereby uncovering the inlet ports and permitting lubricant to flow into the cylinder beneath the piston, and means whereby the piston is forced toward the bottom of the cylinder when said movable element is out of operative relation with said piston stem, thereby closing the

inlet ports and causing the lubricant to be forced through said passages in the supporting stem and in the bottom of the container.

6. A lubricator of the character described comprising, in combination with a movable element of an engine, a lubricant holding receptacle provided with an opening in its bottom, a cylinder mounted in said opening in the receptacle bottom and provided above its bottom with ports communicating with the receptacle and having lubricant conveying passages leading from the bottom of the cylinder, a piston

reciprocally mounted in said cylinder, means adapted to raise the piston upon movement of said movable element and thereby uncover said ports to admit lubricant from said receptacle to the cylinder and a spring for forcing the piston to its lowered position after the movable element is moved out of contact with the piston raising means thereby closing said ports and forcing lubricant from the cylinder through said passages.

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55	120
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