June 4, 1929. S. T. VOLL 1,716,252

LUBRICATOR

Filed May 7, 1928 3 Sheets-Sheet 1

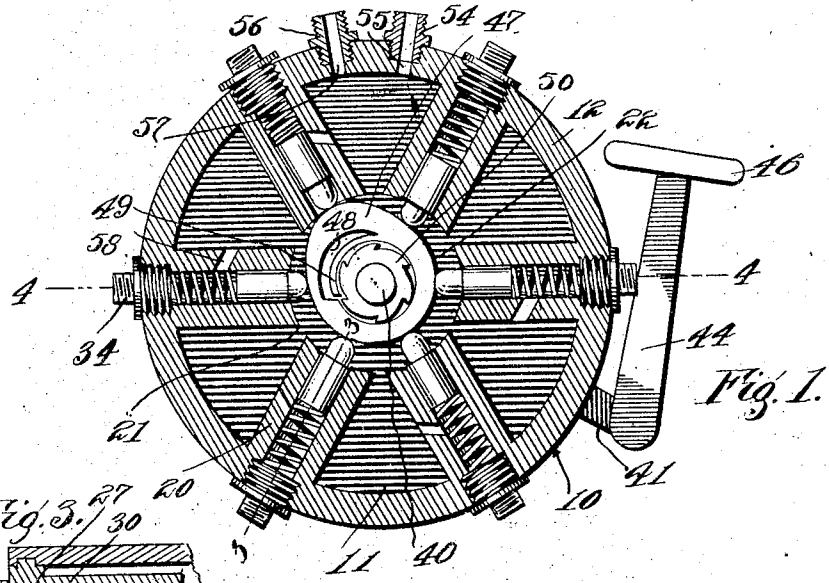
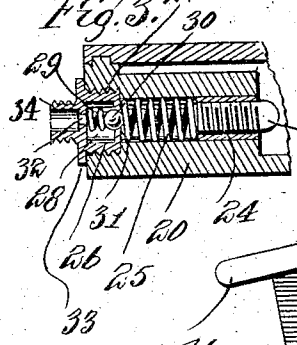


Fig. 1.

Fig. 3.



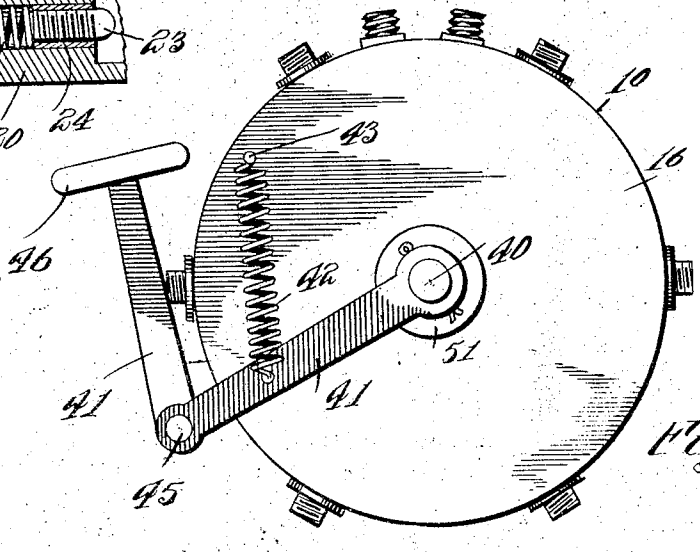
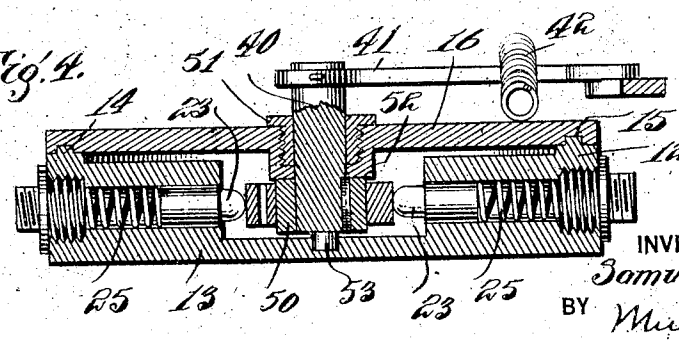


Fig. 5.

Fig. 4.



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Fig. 7.

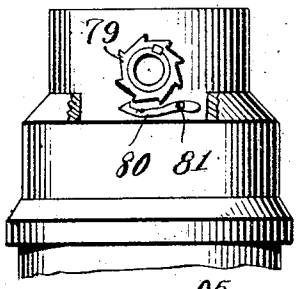


Fig. 5.

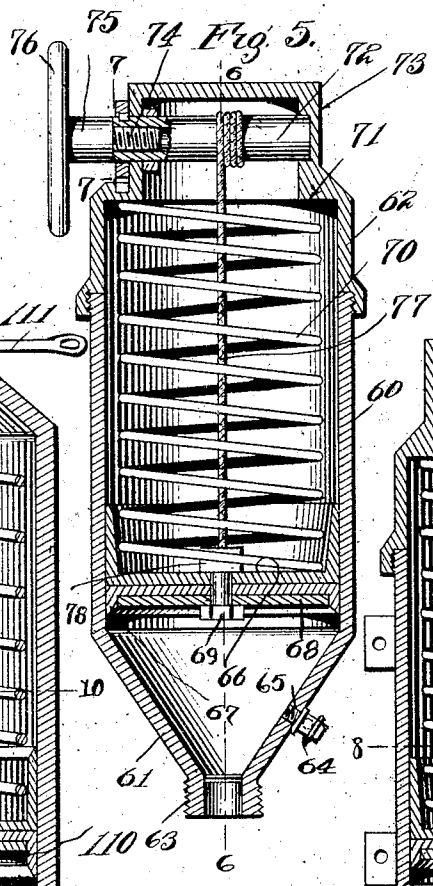


Fig. 6.

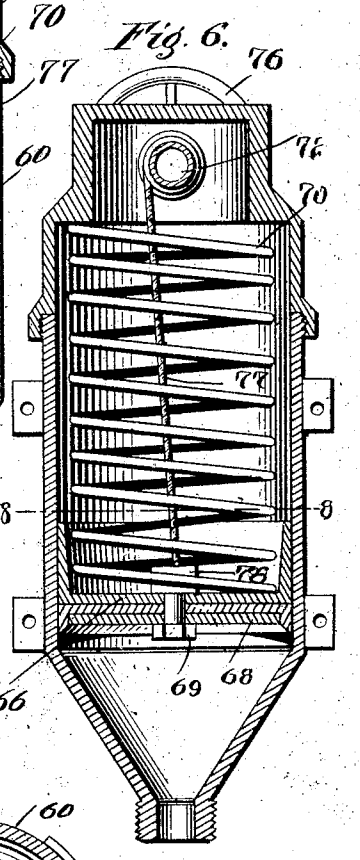


Fig. 9

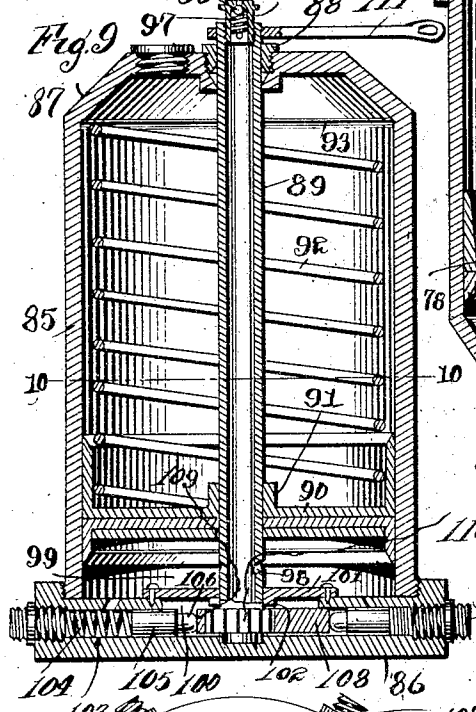


Fig. 8.

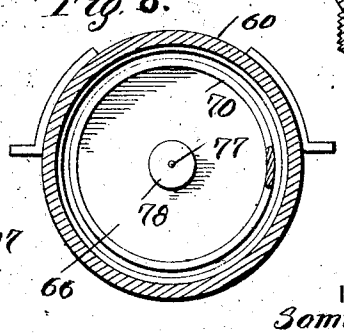
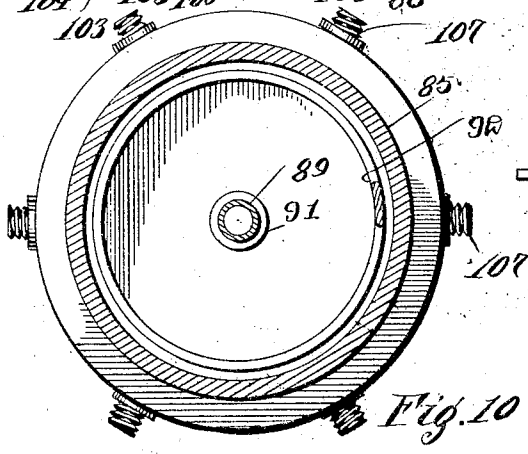


Fig. 10

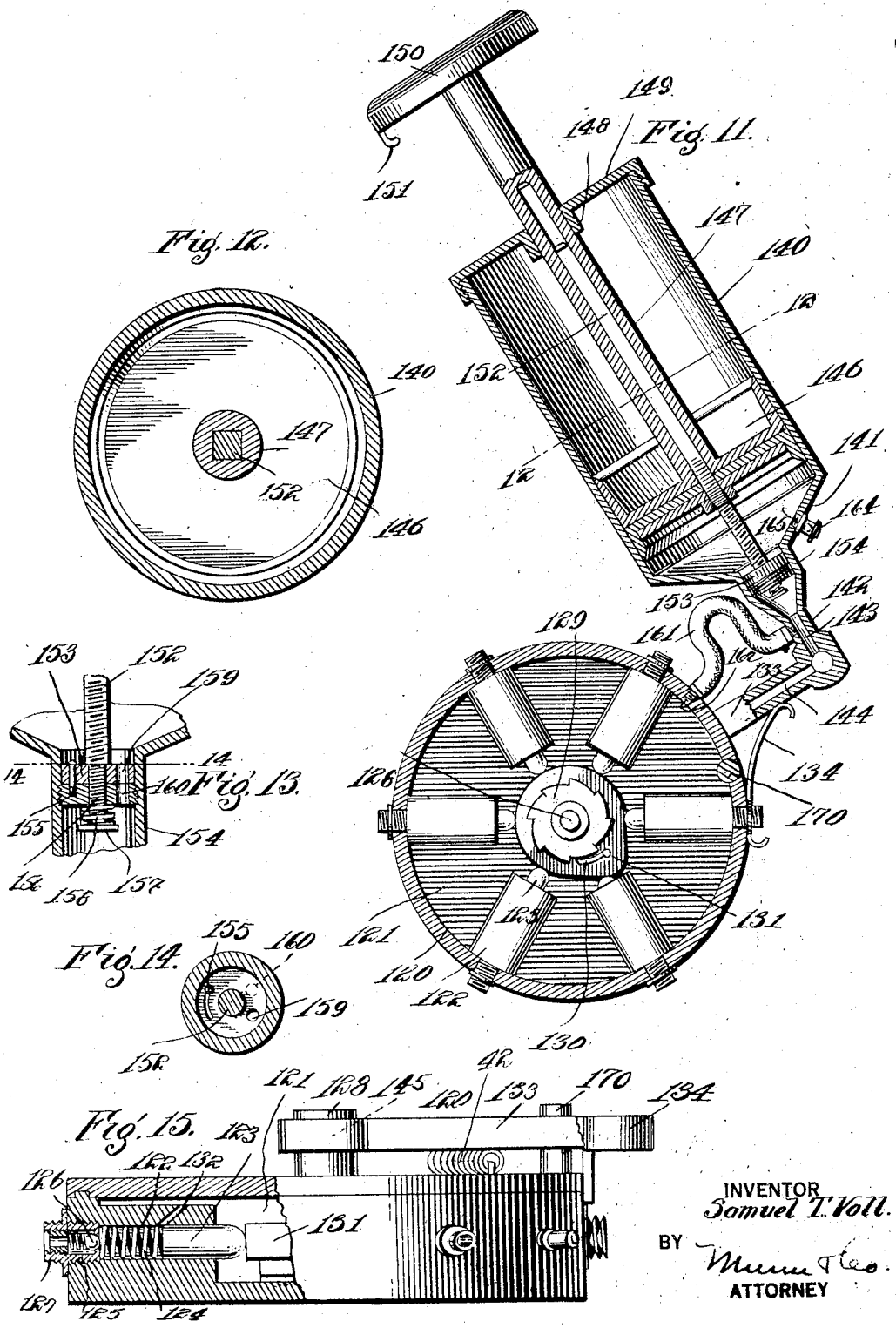


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Patented June 4, 1929. 1,716,252

UNITED STATES PATENT OFFICE.

SAMUEL T. VOLL, OF GREAT FALLS, MONTANA.

LUBRICATOR.

Application filed May 7, 1928. Serial No. 275,232.

This invention relates to lubricators.

An object of the invention is the provision of a manually operable lubricator for supplying lubricant to a plurality of moving parts, and in which the lubrication may be individually varied for the different parts whereby said parts will be supplied with the quantity of lubricant required for the purpose.

Another object of the invention is the provision of a lubricator having a plurality of pumps which are adapted to be successively operated for supplying lubricant to the various moving parts of an apparatus and in the proportions necessary to effect efficient lubrication, said lubricator being connected to a supply which may be maintained under pressure for maintaining the lubricator supplied with a sufficient quantity of lubricant at all times.

A further object of the invention is the provision of a storage container associated with a lubricator, the storage container being so constructed that it may be readily supplied with lubricant and provided with a piston normally acting to force the lubricant from the storage container to the distributor or lubricator.

This invention will be best understood from a consideration of the following detailed description, in connection with the accompanying drawings; nevertheless, it is to be understood that the invention is not confined to the disclosure being susceptible of such changes and modifications as shall define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:—

Figure 1 is a vertical section of a combined distributor and lubricator constructed according to the principles of my invention,

Figure 2 is a side view in elevation of the lubricator shown in Fig. 1,

Figure 3 is a section taken along the line 3—3 of Fig. 1,

Figure 4 is a horizontal section taken along the line 4—4 of Fig. 1,

Figure 5 is a vertical section of a storage container for supplying the lubricator shown in Fig. 1 with lubricating materials,

Figure 6 is a vertical section taken along the line 6—6 of Fig. 5,

Figure 7 is a fragmentary vertical section taken along the line 7—7 of Fig. 5,

Figure 8 is a horizontal section taken along the line 8—8 of Fig. 6,

Figure 9 is a vertical section of a modified form of the storage container,

Figure 10 is a horizontal section taken along the line 10—10 of Fig. 9,

Figure 11 is a vertical section of a further modified form of the combined storage container and distributor,

Figure 12 is a section taken along the line 12—12 of Fig. 11,

Figure 13 is a fragmentary enlarged vertical section of a valve employed in the storage container,

Figure 14 is a horizontal section taken along the line 14—14 of Fig. 13,

Figure 15 is a plan view of the distributor shown in Fig. 11, with parts in section.

Referring more particularly to the drawings, 10 designates a casing of cylindrical form, and provided with an internal chamber 11. The casing has a circular wall 12 formed integrally with a side wall 13. The circular wall has a rib 14 adapted to be received within a groove 15 formed in a closure plate 16. The closure plate is secured to the circular wall 12 in any approved manner.

A plurality of radially disposed cylinders 20 are formed integrally with the side wall 13 and the circular wall 12, and terminated adjacent the center of the casing. It will be noted that the inner ends of the cylinders, as shown at 21, are spaced from each other to permit the lubricant to pass between the cylinders and into the centrally disposed chamber 22 defined by the inner ends of the cylinders. A plunger 23 is threaded into a sleeve 24 which is slidably mounted in each cylinder 20. The threading of the plunger into the sleeve provides for adjusting the plunger relative to the sleeve in order to increase or shorten the stroke of said plunger. A spring 25 engages the outer end of the sleeve 24 and the inner end of a valve cage 26.

Each valve cage is threaded, as shown at 27, into a recess in the outer end of each cylinder 20, and is provided with a chamber 28 which is adapted to receive a spring 29 for forcing a valve 30 into engagement with a seat 31 formed at the inner end of the valve cage and for closing the passage between the cylinder and a port 32. The valve cage is provided with a shoulder 33

engaging the outer face of the wall 12 for limiting the inward movement of said valve cage. The cage has an externally threaded nipple 34 which is adapted to receive a union of a flexible tubing, not shown. This tubing as is well known, is adapted to be extended and connected with the usual nipple carried by a bearing.

A shaft 40 is mounted for rotation axially of the casing 10 and has one end projecting beyond the cover 16 of the casing to which is secured a lever 41. A spring 42 has one end connected with the lever 41, and the other end to a pin 43 secured to the cover 16. An arm 44 is connected at 45 to the free end of the lever 41 and has a treadle 46 adapted to be engaged by the foot of the operator for displacing the same and operating the lever 41 against the tension of the spring 42.

The cam member 47 is loose on the shaft 40 and is located within the chamber 22 of the casing 10, and is adapted to be revolved in the casing successively as will be presently explained. The cam portion is adapted to be moved in engagement with the inner curved ends 21 of the cylinders 20. The cam member, has a cut away portion 48 to provide a pawl 49, adapted to be engaged by the teeth of a ratchet wheel 50 which is keyed to the shaft 40. A packing gland 51 is threaded into a hollow box 52 formed on the inner face of the cover 16, and is adapted to receive the shaft 40. The inner end of the box abuts the ratchet 50. An end of the shaft 53 is reduced and received within a bearing in the side wall 13 of the casing 10.

A nipple 54 is threaded into the circular wall 12 and is in open communication with a port 55 which connects the hollow nipple with the internal chamber 11 of the casing 10. A second hollow nipple 56 is threaded into the wall 12 and is in open communication with a port 57 which connects the hollow nipple with the interior of the chamber. The device shown in Figs. 1 to 4 inclusive is adapted to be employed with a machine which has a forced feed lubricant supply so that the inlet of the force feed is attached to the threaded nipple 54, while the outlet is attached to the threaded nipple 56 for maintaining a constant supply of lubricant to the internal chamber 11.

Each one of the cylinders 20 is provided with a passage 58 for placing the chamber 11 in communication with the cylinders above the plunger 23 and the sleeve 24.

The operation of the device shown in Figs. 1 to 4 inclusive, is as follows:

After the nipples 54 and 55 have been connected to the proper leads of an inlet and exhaust of a lubricant supply, the device is ready for operation. It will be necessary to depress the treadle 46, thereby actuating the lever 41 against the spring 42, whereby the shaft 40 will be rotated. The ratchet 50 will engage the spring pawl 49 and cause rotation of the cam member 47 which acts on the rounded ends of the plungers 23 successively causing the plungers to be moved inwardly and thus forcing the lubricant in the cylinder 20 through the discharge nipples 34 and through the tubing to the various parts to be lubricated. It will be noted that the lever 41 has a limited movement so that it will be necessary to depress said lever periodically and successively actuate the plungers 23 so that all of the plungers will be brought into action for forcing the lubricant from the various cylinders through the nipples to the various parts to be lubricated.

Figures 5 to 7 inclusive, disclose a form of container for storing lubricant and for forcing the lubricant under pressure, to the device shown in Figs. 1 to 4 inclusive. The storage container includes a cylinder 60 having a tapering discharge end 61 and a cap 62 threaded onto the upper end of the cylinder. The reduced portion of the tapered end 61 is provided with a threaded nipple 63 which is adapted to be connected by means of a flexible hose to the nipple 54 which is in communication with the inlet port 55. In this case the threaded nipple 56 is removed, and a plug is substituted which will close the discharge port 57. The gland 65 is threaded into a passage in the tapered portion 61. A valve cage 64 is carried by the gland to permit the filling of the container by the usual hose connection at a filling station when applied to the valve cage.

A piston 66 is mounted in the cylinder 60 and has a packing 67 secured to the outer face with a disk 68 adapted to support the packing. A bolt 69 connects the disk 68 and packing 67 to the piston 66. A spring 70 has one end in engagement with the piston 66, and its other end engaging a shoulder 71 formed on the cap or closure 62.

The shaft 72 is rotatably mounted in the reduced portion 73 of the cap 62, and has one end internally threaded to receive the threaded end 74 of a stub shaft 75 rigid with a wall 76. A cable 77 has one end secured to a nut 78 which is threaded onto the bolt 69. The other end of the rope is secured to the shaft 72 and coiled on the same.

A ratchet 79 is secured to the shaft 72 and a pawl 80 pivoted at 81 is adapted to engage the teeth of the ratchet 79 and maintain the shaft against rotation.

The operation of the device shown in Figs. 5 to 7 inclusive, is as follows:

When it is desired to fill the cylinder 60 the usual connection of a hose is placed in engagement with the valve cage 64. Since the lubricant at a filling station is usually under pressure, lubricant will fill the tapered portion 61 of the cylinder, and force the piston 66 upwardly against the tension of the spring, the cylinder being filled as the

piston is moved outwardly. When the cylinder has been filled, the pawl 80 is moved into engagement with the teeth of the ratchet 79, thereby preventing the spring 70 from tending to move the piston in the opposite direction and thus relieving pressure on the lubricant in the container. When this container is attached to the distributor shown in Figs. 1 to 4, inclusive, the pawl 80 is released for permitting the spring 70 to act upon the liquid in said container and exercise a predetermined pressure on the same, thereby forcing the lubricant through the nipple 63, through the hose connection, not shown, and into the chamber 11 of the casing 10 of the distributor shown in Fig. 1. When the treadle 46 is depressed the shaft 40 will be revolved, causing rotation of the cam member 47 and thereby successively operating the various plungers.

Figures 9 and 10 disclose a combined unit of a storage container and a distributing unit. A cylinder 85 is threaded at its open end onto a block 86 in which the distributing unit is mounted and closes the lower end of the cylinder. The opposite end of the cylinder is closed, as shown at 87, and has a threaded opening in which is mounted a gland 88 which seals the upper end of the hollow shaft 89, the shaft being located axially of the cylinder 85.

The piston 90 is slidably mounted in the cylinder 85 and has a boss 91 embracing the hollow shaft 89 for aiding in maintaining the piston in proper alinement when said piston slides on the shaft 89. A spring 92 has one end in engagement with the piston 90 and the other end engaging a shoulder 93 formed on the inner wall of the cylinder 85 for maintaining the piston at the bottom of the cylinder.

The outer end of the shaft 89 is provided with a valve cage 94 having an inlet port 95 normally closed by a valve 96 which is maintained in engagement with the port and held in position by means of a spring 97. The lower end of the hollow shaft 89 is provided with a plurality of ports 98 for placing the hollow shaft in communication with a chamber 99 in the cylinder which is located between the piston 90 and the block 86.

The block 86 has an internal chamber 100 which is in open communication with the lower end of the hollow shaft 89. The inner face of the block is provided with an opening which is closed by a plate 101 having a journal 102 for the lower end of the shaft 89.

The block is provided with a plurality of radially disposed cylinders 103 in which are mounted a spring 104, a sleeve 105 forced inwardly by the spring, and a plunger 106 threaded into the sleeve so that the sleeve and the plunger forms a unit. The plunger 106 is threaded into the sleeve 105 in the same manner as has been previously described, and is illustrated more particularly in Fig. 3 of the drawings, so that the length of the stroke of the plunger may be varied for controlling the supply of lubricant to a moving part. A nipple 107 is threaded into the outer end of each cylinder to which is adapted to be connected a flexible hose which connects a cylinder with a nipple of a bearing or other part which it is adapted to lubricate.

A cam 108 is secured to the shaft 89 and is provided with a resilient pawl 109 adapted to engage the teeth of the ratchet 110, so that when the shaft is revolved the ratchet and likewise the cam member will be revolved for causing the cam member to move the plungers 106 outwardly for forcing lubricant from the cylinders. A lever 111 is secured to the outer end of the hollow shaft 89 and is adapted when rocked, to rock the shaft 89 whereby the cam member 108 operates the plungers.

Lubricant is supplied to the port 95 in any approved manner and under pressure so that as the lubricant is dicharged through the ports 98, the piston 90 will be moved to the opposite end of the cylinder against the action of the spring 92. After the cylinder 85 has been filled, the device is now ready for operation, and the lubricant in said cylinder is under pressure so that when the lever 111 is rocked it will operate the plungers 106 and cause the fluid to be successively forced to the various parts to be lubricated.

Referring more particularly to Figs. 12 to 15 inclusive, it will be seen that a distributor and storage container are combined as a single unit, and present a modified form of the construction shown in Figs. 9 and 10. In this instance, the construction of the distributor is similar to that shown in Figs. 1 to 4, inclusive, and consists of a casing 120 having an internal chamber 121 in which are located a plurality of radially disposed cylinders 122. A piston 123 is slidably mounted in each cylinder and is forced radially inwardly by means of a spring 124. A valve cage 125 is screwed into the outer end of each cylinder and carries a spring pressed check valve 126. The outer end of the cage is threaded at 127 to provide a nipple for connecting the same by means of a hose to the nipple of a bearing.

A shaft 128 is mounted axially of the casing 120 to which is secured a ratchet 129 adapted to engage a pawl 130 secured to a cam member 131 which when revolved forces the plungers 123 outwardly. A port 132 places the internal chamber 121 in communication with a cylinder 122. A lever 133 is secured to the outer projecting end of a shaft 128 and is adapted to be oscillated for rocking the shaft 128 and operating succes-

sively the plungers 123. A spring 134 is secured to the casing 120 and is adapted to engage the lever 133 for resisting operative movement of the lever. The spring 134 is adjustable so that its tension may be varied according to the resistance desired against the movement of the arm 133.

A storage container 140 has a tapered portion 141 which is connected by means of a hollow stem 142 to the outer end of the lever 133. The stem has a passage 148 which is in open communication with the passage 144 in the lever 133 for a purpose which will be presently explained.

The shaft 128 has a passage 145 which places the passage 144 in communication with the chamber 121. The piston 146 is slidably mounted in the cylinder 140 and a hollow rod 147 extends through the hollow boss 148 in the cover 149 and is connected to a treadle 150. A lug 151 is provided on the treadle 150 which is adapted to be engaged by the operator for causing rotation of the treadle, and likewise the rod 147.

A valve stem 152 is located within the hollow rod 147 and has a valve 153 connected to the lower end which is located within the reduced portion 154 of the tapered end 141 of the cylinder 140. The valve rests normally upon a disk 155 which is threaded into the member 154. A stem 152 is reduced and threaded into the valve 153 for securing said valve to the stem whereby rotation of said stem will cause rotation of the valve. The threaded portion 156 passes through the disk 155 and is provided with a head 157 engaged by a spring 158, which maintains the valve 153 in snug engagement with the disk 155. The valve is provided with a port 159 adapted to be alined with a port 160, whereby lubricant from the cylinder 140 will pass through the ports and into the passage 143.

A flexible hose 161 connects an inlet port 162 of the casing 120 with the passage 143. A gland 165 is threaded into an opening in the tapered portion 141, and a valve cage 164 is carried by the gland. This cage provides means for applying the usual hose connection of a lubricant supply under pressure at a filling station so that the lubricant may be forced into the container, under pressure, and move the piston 146 to the outer end of the cylinder. The valve (not shown) in the cage presents lubricant from being discharged from cylinder 140. Valve cage 164 is similar to the valve cages 64 and 94.

The operation of my device is as follows:

When the cylinder 140 is filled with lubricant, the treadle 150 is depressed forcing the piston 146 inwardly and causing lubricant, under pressure, to flow to the chamber 121, through the tube 161. As the treadle is depressed the cylinder 140 is moved inwardly causing actuation of the lever 133 which engages the spring 134, slightly before said lever contacts with the stop 170. The shaft 128 is thus revolved, causing the cam member 131 to actuate the plunger 123 which successively forced lubricant from their respective cylinders to the parts of the machine adapted to be lubricated. Lubricant is forced into the distributor 121 from the cylinder 140 by the piston 146 about the time that lever 133 engages the spring 134.

A stop 170 is provided which will be engaged by the lever 133 to limit the movement of said lever. A coil spring 42 is connected between the lever 133 and a side wall of the casing 120 for aiding in returning the parts to their normal inoperative position.

I claim:—

1. A forced feed distributor for lubricant comprising a casing, a plurality of radially arranged and open ended cylinders in the casing, a plunger projecting from the open end of each cylinder, means for maintaining the end of the plunger projected from a cylinder, each cylinder having a port for placing said cylinder in communication with the casing, a cam member adapted to successively engage the projected ends of the plunger for causing reciprocation of the same, a lever connected with the cam and adapted to be oscillated for rotating said cam, means for supplying the casing with lubricant and connected to the lever whereby when the means is actuated for supplying lubricant to the casing, said lever will be actuated.

2. A forced feed distributor for lubricant comprising a casing, a plurality of radially arranged and open ended cylinders in the casing, a plunger projecting from the open end of each cylinder, means for maintaining the end of the plunger projected from a cylinder, each cylinder having a port for placing said cylinder in communication with the casing, a cam member adapted to successively engage the projected ends of the plunger for causing reciprocation of the same, a lever connected with the cam and adapted to be oscillated for rotating said cam, the storage tank being connected with the outer end of the lever, means for forcing lubricant from the container and when actuated adapted to oscillate the lever and a conduit connecting the container with the casing.

3. A forced feed distributor for lubricant comprising a casing, a plurality of radially arranged and open ended cylinders in the casing, a plunger projecting from the open end of each cylinder, means for maintaining the end of the plunger projected from a cylinder, each cylinder having a port for placing said cylinder in communication with the casing, a cam member adapted to successively engage the projected ends of the plunger for causing reciprocation of the same, a lever connected with the cam and

adapted to be oscillated for rotating said cam, a shaft carried by the casing, the lever being rigid with the shank, means adapted to connect the shaft with the cam.

4. A forced feed distributor for lubricant comprising a casing, a plurality of radially arranged and open ended cylinders in the casing, a plunger projecting from the open end of each cylinder, means for maintaining the end of the plunger projected from a cylinder, each cylinder having a port for placing said cylinder in communication with the casing, a cam member adapted to successively engage the projected ends of the plunger for causing reciprocation of the same, a lever connected with the cam and adapted to be oscillated for rotating said cam, a shaft in the casing, a ratchet being rigidly onnected with the shaft, the ratchet wheel secured to the shaft adjacent the cam, a pawl projecting from the cam and adapted to be engaged by the ratchet wheel.

5. A forced feed distributor for lubricant comprising a casing, a plurality of radially arranged and open ended cylinders in the casing, a plunger projecting from the open end of each cylinder, means for maintaining the end of the plunger projected from a cylinder, each cylinder having a port for placing said cylinder in communication with the casing, a cam member adapted to successively engage the projected ends of the plunger for causing reciprocation of the same, a lever connected with the cam and adapted to be oscillated for rotating said cam, a shaft in the casing, a ratchet being rigidly connected with the shaft, the ratchet wheel secured to the shaft adjacent the cam, a pawl projecting from the cam and adapted to be engaged by the ratchet wheel, means for supplying the casing with lubricant and connected to the lever whereby when said means is actuated for supplying lubricant to the casing, said ever will be actuated.

6. A forced reed distributor for lubricant comprising a casing, a plurality of radially arranged and open ended cylinders in the casing, a plunger projecting from the open end of each cylinder, means for maintaining the end of the plunger projected from a cylinder, each cylinder having a port for placing said cylinder in communication with the casing, a cam member adapted to successively engage the projected ends of the plunger for causing reciprocation of the same, a lever connected with the cam and adapted to be oscillated for rotating said cam, a shaft in the casing, a ratchet being rigidly connected with the shaft, the ratchet wheel secured to the shaft adjacent the cam, a pawl projecting from the cam and adapted to be engaged by the ratchet wheel, means for supplying the casing with lubricant and connected to the lever whereby when said means is actuated for supplying lubricant to the casing, said lever will be actuated, said lever and shaft having a passage for connecting the container with the interior of the casing.

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