

Oct. 3 1933.

C. R. YIRAVA

1,929,231

LUBRICANT DISPENSING DEVICE

Filed Sept. 16, 1929

2 Sheets-Sheet 1

FIG. 1.

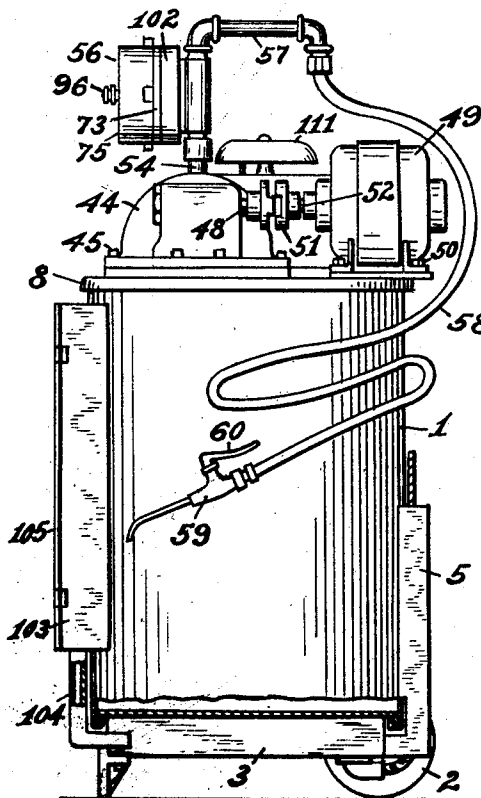


FIG. 2.

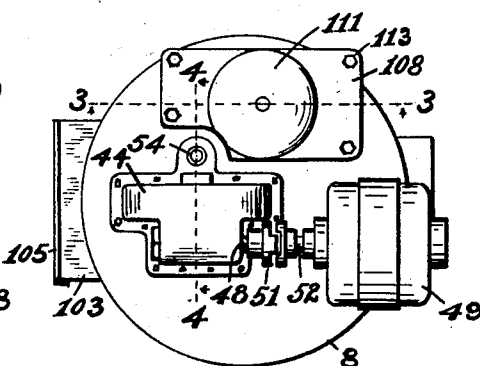


FIG. 3.

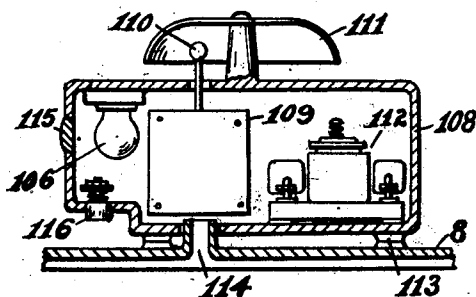
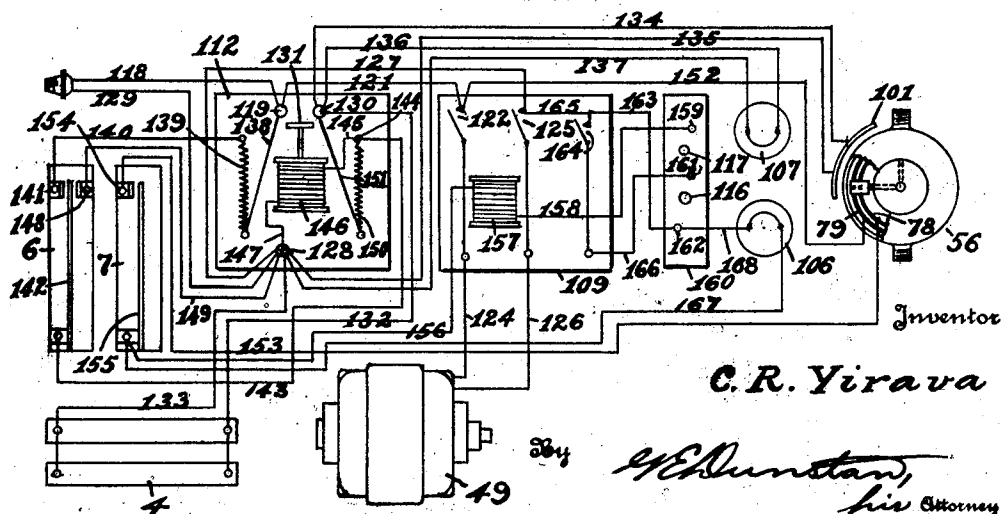


FIG. 10.



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FIG. 4.

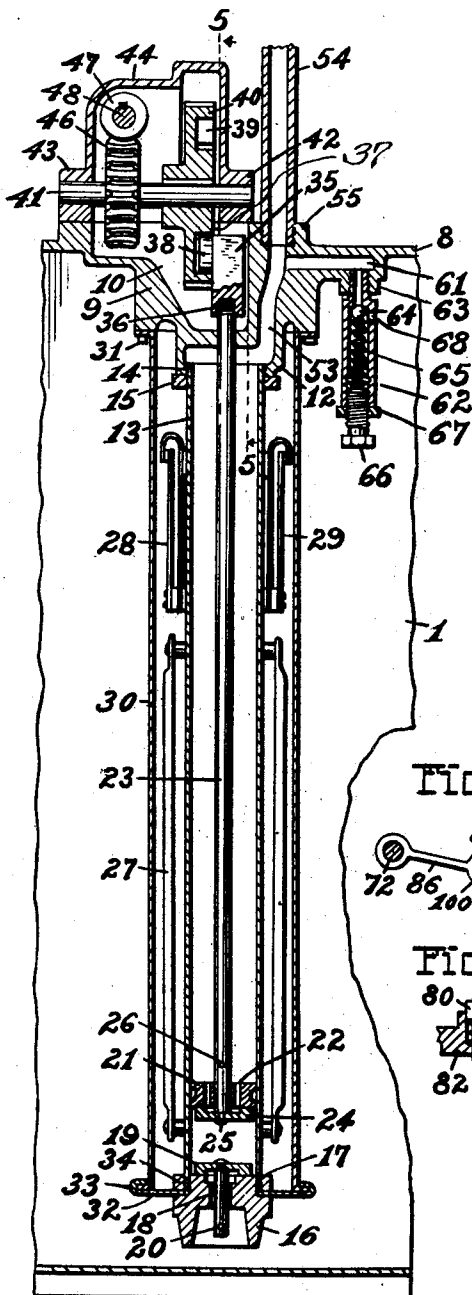


FIG. 5.

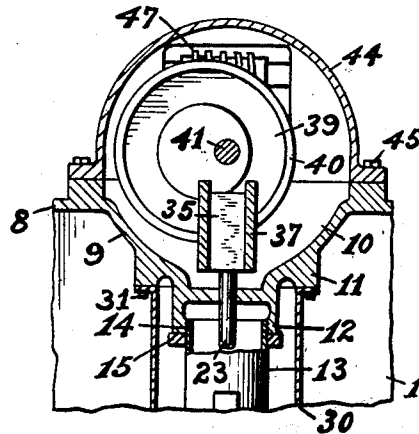


FIG. 6.

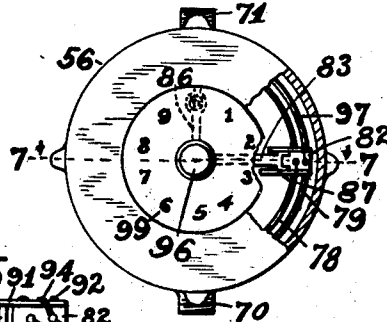


FIG. 7.



FIG. 8.

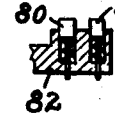
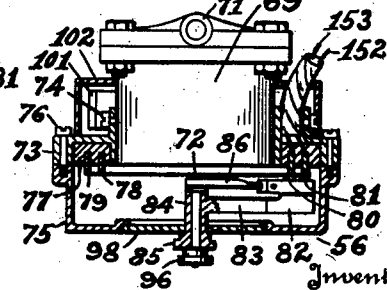


FIG. 9.



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UNITED STATES PATENT OFFICE

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LUBRICANT DISPENSING DEVICE

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Serial No. 392,962

8 Claims. (Cl. 221-101)

This invention relates to lubricant dispensing devices, and more particularly to a lubricant dispensing device consisting of a unit which is applied to a barrel or tank for conveniently dispensing lubricating grease or other lubricant therefrom even when solidified in cold weather.

The main object of the invention is to provide a lubricant dispensing device which is electrically operated, and in which when the current is turned on for operating the motor for driving the pump, the lubricant if solidified as in cold weather will be sufficiently heated so that said lubricant may be easily pumped from the container.

Another object of the invention is to provide a lubricant dispensing device which will pump a predetermined quantity of lubricant and automatically stop and indicate to the operator by a gong of the stopping.

A further object of the invention is to provide a lubricant dispensing device of the above character, in which a light signal indicates when the heating element is operating and the lubricant is sufficiently heated for pumping.

For a clear understanding of the invention, the same will be hereinafter fully described as illustrated in the accompanying drawings, and the novel features thereof will be distinctly pointed out in the appended claims.

In the drawings, similar characters of reference indicate corresponding parts.

Figure 1 is a side elevation of a lubricant dispensing device constructed in accordance with my invention,

Fig. 2 is a plan view of Fig. 1, the meter being omitted,

Fig. 3 is a sectional elevation, on an enlarged scale, of the motor relay box, taken on line 3-3 of Fig. 2,

Fig. 4 is a cross sectional elevation, on an enlarged scale, taken on line 4-4 of Fig. 2, but showing a modification of the heating element for the barrel or tank and the thermostat therefor,

Fig. 5 is a cross sectional elevation of the upper part of Fig. 4, taken on line 5-5,

Fig. 6 is a face view of the meter, part of the casing being omitted to better show the construction,

Fig. 7 is a cross sectional view, taken on line 7-7 of Fig. 6, the meter hand having turned a quarter of a revolution,

Fig. 8 illustrates the spring pressed contacts carried by the meter arm, and

Fig. 9 illustrates the meter hand breaking the circuit.

Fig. 10 is a diagram showing the electrical connections between the different elements in the dispensing device.

Referring to the drawings, 1 represents an ordinary metallic barrel or tank for lubricating grease or other lubricants. This invention consists of a truck 2 having a hollow base 3 for supporting said barrel or tank and enclosing a suitable electric heating element indicated by 4. At the rear of and supported by the hollow base 3 is a vertical box 5 for enclosing a heat control thermostat 6 for the heating element 4 and a motor control thermostat 7. For pumping the lubricant from the barrel or tank 1, a unit consisting of a cover 8 adapted to rest upon the top or chime of said barrel or tank and supporting the other parts will now be described.

The center portion of the cover 8 is depressed at 9 to provide a well 10, which is surrounded by a boss 11 terminating in a smaller boss 12. A tube 13 serving as a pump cylinder depends from and is fixed into the boss 12 by means of threads at 14 and a lock-nut 15, and is of sufficient length to extend almost to the bottom of the barrel or tank. The lower end of the tube 13 is closed by an inlet member 16, which is fixed therein by threads at 17. The inlet member 16 is provided with a central opening 18. A check-valve 19 in and resting upon the inlet member 16 is adapted to permit entrance of the lubricant from the barrel or tank to the tube 13 but prevents same being forced out of the lower end of said tube. A stop pin 20 limits the upward movement of the check-valve 19. Slidably mounted in the tube 13 is a plunger 21 having inlet opening there-through as at 22. The plunger 21 is slidably mounted upon the lower end of a rod 23, and a plate valve 24, which is fixed at 25 to said rod, is adapted to cover the inlet openings 22 of said plunger when the plate is traveling upwardly. A cross pin 26 fixed in the plunger rod limits the movement of the plunger 21 relative to the plate valve 24.

Instead of heating the lubricant in the barrel or tank by arranging the heating element in the hollow base 3 and the thermostat controls for same and for the motor in the box 5 as already described, the heating elements, indicated by 27, and the heat and motor thermostat controls 28 and 29 are fixed to the outer side of the tube 13, and enclosing same is a tubular casing 30. Said casing is fixed at 31 to the boss 11, and its lower end is closed by a plate 32, which is fixed thereto at 33 and to the inlet member 16 by a lock-nut 34. For actuating the plunger rod 23, a head 35 is

fixed to the upper end thereof at 36, and is adapted to slide vertically in a guide 37 of the cover 8. The head 35, on its forward face, supports a roller 38 which travels in and is adapted to be engaged by the sides of an eccentric cam-groove 39 formed in the rear face of a cam-wheel 40. Said cam-wheel is keyed to a horizontal shaft 41 and rotatably supported in bearings 42 and 43 of a housing 44 bolted as indicated at 45 to the cover 8 and enclosing the well 10 thereof. To the shaft 41 is keyed a worm-wheel 46, which is driven by a worm 47 keyed to a stub-shaft 48 at a right angle to the shaft 41 and rotatably supported in the housing 44. The stub-shaft 48 is driven by an electric motor 49 bolted at 50 to the cover 8, and a suitable flexible coupling 51 is arranged between said stub-shaft and the shaft 52 of said motor.

Assuming that the plunger 21 is at the lower limit of its travel and the check-valve 19 is closed. Upon upward movement of the rod 23, the plunger 21 is carried upwardly, the check-valve 19 rises off its seat, and the lubricant from the barrel or tank enters at 18 the lower end of the tube 13. When the plunger rod 23 is forced downwardly, the plate valve 24 carried thereby is forced out of engagement with the plate 21 thereby leaving the inlet openings 22 thereof uncovered, and the lubricant will pass therethrough into the tube 13 above said plunger. The plate 21 is forced downwardly because of the cross pin 26, and during the downward stroke of said plunger, the check-valve 19 is forced against its seat thereby closing the inlet opening 18. Upon upward movement of the plate 21, the lubricant in the tube above the plunger, is forced through a passage 53 of the boss 9 of the cover 8, and into a vertical outlet pipe 54, which is fixed in a boss 55 of said cover. At the same time that the lubricant is being forced from the upper end of the tube 13 through the outlet pipe 54, a new supply is entering at 18 into the lower end of said tube.

In order to pump a predetermined amount of lubricant through the outlet pipe 54, and then automatically stop the motor, a meter 56 is connected thereto, and connected to said meter is an extension 57, to which is connected a hose 58 having a suitable nozzle 59 at its free end. Said nozzle is preferably of the type which is normally and automatically closed and manually opened by pressing upon the hand lever 60. To release the pressure in the hose in event the motor 49 is operating the plunger 21 and the operator has not opened the nozzle 59, a by-pass 61 extending from the passage 53 is provided, and a relief valve 62 in connection with said by-pass is fixed in a boss 63 depending from the cover 8. The ball valve 64 thereof is held against its seat at proper tension by means of a coiled spring 65 which is adjusted to the proper tension by a set screw 66. A lock-nut 67 holds said set screw in its adjusted position. When the pump is in operation and before the operator has opened the outlet nozzle 59, the pressure of the lubricant will force the ball valve 64 from its seat thereby permitting the lubricant to pass out of the outlet opening 68 of the relief valve 62 and back against into the barrel or tank.

The meter 56 consists of a body 69 having an inlet 70 and an outlet 71 and its shaft 72 is rotated by the lubricant passing through the meter, all of which is ordinary construction. For the automatic breaking of a circuit by the meter after a predetermined quantity of lubricant has been pumped therethrough in order to stop the

motor 49 and therefore the pumping of the lubricant, the following described mechanism has been added to said meter. The meter shaft 72 is extended and a casing 73 is fixed to the body 69 by screws as at 74 and a hollow cover 75 is secured to said casing by screws 76. Supported in insulating material 77 of the cover 75 are concentric contact rings 78 and 79 which are slidably engaged by spring pressed contacts 80 and 81 carried by a block of insulation 82 fixed to the free end of an arm 83. Said arm is supported by an elongated boss 84 which is rotatably mounted upon the meter shaft 72, and said arm is adapted to be rotated to a set position by means of a knob 85 at the outer end of said boss. Fixed to the meter shaft 72 is a hand 86, which is adapted to be carried around thereby for engaging and flexing a flat spring 87 fixed at 88 to the block of insulation 82. The flat spring 87 carries a contact 89, which is normally in engagement with a contact 90 supported by a plate 91 fixed to the insulation 82 by screws at 92. Wires 93 and 94 which are attached to the flat spring 87 and the plate 91 lead to and are attached to the contacts 80 and 81 respectively. A piece of insulating material 95 carried by the flat spring 87 prevents engagement of the hand 86 therewith to avoid a short circuit. The hand 86 is reset by means of a button 96 fixed to the outer end of the meter shaft 72. The contact rings 80 and 81 are notched at equally divided points, as indicated at 97, to receive the spring pressed contacts 80 and 81 for holding the arm 83 in its set position for the breaking of the circuit at 89—90 by the hand 86 after a predetermined amount of lubricant has been pumped. A glass dial 98 is fixed in the casing cover 75 to permit observation of markings as shown at 99 arranged at regular intervals to correspond with the spacing of the notches 97 and designate the amount of lubricant to be pumped before the breaking of said circuit. An opening 100 in the hand 86 permits the seeing of the markings 99.

The lubricant in the meter 56 is heated by means of a heating element 101 enclosed in a shell 102 surrounding the body 69 of the meter, or arranged in any other suitable manner. It is desirable in cold weather to also keep the nozzle 59 and the hose 58 warm, and for this purpose, a storage compartment 103 is provided. The hose storage compartment 103 is supported by a conduit 104 extending from the hollow base 3, and heated air from said hollow base enters said compartment. A suitable door 105 is provided for said hose storage compartment.

For indicating to the operator when the current is heating the heating element 4 and the heating element 1, a red light is visible, and when the lubricant is heated sufficiently for being pumped a green light is visible, and when the motor 49 has automatically stopped after the proper quantity of lubricant has been pumped, a gong sounds that the operator may release the hand lever 60 for closing of the outlet nozzle 59. This is accomplished by means of a red signal lamp 106 and a green signal lamp 107 enclosed in a box 108, which also encloses a magnetic motor relay 109 for operating a striker 110 for a gong 111, and a heat unit relay 112. The box 108 is fixed at 113 to the cover 8 which is provided with a tubular opening 114 extending into said box for admitting the circuit wires thereto, and the gong 111 is supported by said box. Windows indicated by 115 are fixed in the side of the box 108 opposite the red and green lights 106 and 107, and push buttons indicated by 116 and 117 for starting

and stopping the motor 49 are arranged in the bottom of said box.

The electric circuit for the operating of the device as shown and described is illustrated diagrammatically and consists of a supply wire 118 leading to a contact 119 of the heat unit relay 112, and a wire 121 extending from said contact to a contact 122 of the motor relay 109. From the contact 122 extends a wire 124 to the motor 49, and leading from said motor to a contact 125 is a wire 126, and from said contact 125 extends a wire 127 to a binding post 128 of the heat unit relay 112, and from said binding post extends the other supply wire 129. Said supply wire may be connected to a plug for convenient connection to an electric current supply.

Arranged near the contact 119 of the heat unit relay 112 is a contact 130, which contacts are adapted to be engaged by the movable bar 131 operated by the magnetic coil of said relay. From the contact 130 extends a wire 132 to the heating element 4, and leading therefrom is a wire 133 which is connected to the binding post 128. Extending from the contact 130 is a wire 134 leading to the meter heating element 101 and a wire 135 extends therefrom to the binding post 128. Also extending from the contact 130 to the red signal lamp 107 is a wire 136, and from said lamp extends a wire 137 to the binding post 128.

A wire 138 connects the contact 119 to the resistance coil 139, from which extends a wire 140 to a contact 141 of the heat control thermostat 6, and the bimetal contact arm 142 thereof is connected by a wire 143 to a binding screw 144. One end 145 of a magnetic coil 146 for operating the movable bar 131 is connected to the binding screw 144 and its other end 147 to the binding post 128, and said binding post is connected with a contact 148 by a wire 149. To the binding screw 144 is connected a resistance coil 150, and from same extends a wire 151 to the contact 130.

From the contact 122 extends a wire 152 to the meter contact ring 79, and leading from the other contact ring 78 thereof is a wire 153 to a contact 154 of the motor thermostat 7. The contact 154 is adapted to be engaged by a bimetal arm 155 and leading therefrom is a wire 156 to the magnetic coil 157 of the motor relay 109, and leading from said coil is a wire 158 to the contact 159 of the start-and-stop switch 160. Arranged near the contact 159 is a contact 161, and near the latter contact another contact 162. The push button 117 of the start-and-stop switch 160 normally engages the contacts 159 and 161, and the push button 116 thereof when depressed engages the contacts 161 and 162. From the contact 162 is a wire 163 extending to a contact 164 of the motor relay 109, and said contact is connected by a wire 165 to the contact 125 of said motor relay. The contact 161 is connected to a contact 164 of the motor relay 109 by a wire 166. The bimetal contact arm 155 of the thermostat 7 is connected by a wire 167 to the green signal lamp 106, and said lamp to the contact 162 by a wire 168.

Operation.—Assuming that it is cold weather and the lubricant contained in and to be pumped from the barrel or tank 1 is solidified as a result thereof, also that the meter arm 83 has been set in accordance with the markings 99 to a designated quantity of lubricant to be pumped and the hand 86 set at 0, and all other parts are in their normal positions as shown and described, and the wires 118-129 have been plugged into an electric current supply.

The heating element 4 is first energized and the lubricant in the barrel or tank heated thereby due to the bimetal contact arm 142 normally engaging the contact 141, the current passes through 118, 119, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147 and 129, and the magnetic coil 146 causes the movable bar 131 to engage the contacts 119 and 130, and current thus passes through 132, 4 and 133.

At the same time, the lubricant in the meter 56 is heated by the heating element 101, the current passing from 130 through 134, 101 and 135 to 128. As soon as the supply wires 118-129 are plugged in, the red signal lamp 107 operates by the current passing from 130 through 136, 107, 137 to 128, indicating that the heating elements 4 and 101 are operating, and when said heating elements have become a predetermined temperature the bimetal arm 155 of the thermostat 7 engages the contact 154 whereby the current passes from 128 through 154, 155, 167, 168, 162, 163, 164, 165, 127 to 128 causing the operating of the green signal lamp 106, thereby indicating to the operator that the lubricant in the barrel or tank 1 is heated sufficiently to be pumped. Upon the engaging of the bimetal arm 155 with the contact 154, the stop-and-start switch 160 is placed in circuit through 156, 157, 158, 159, 117 and 161, whereby the initial pressing of the starting button 116 will complete said circuit through 162, 163, 164, 165, 127 and 128, thereby energizing the coil 157 of the motor relay 109 and causing the closing of the contacts 122, 125 and 164 which automatically causes the operating of the motor 49. The starting button 116 may then be released and the motor will continue operating due to the contact at 164. When the coil 139 is shorted out of circuit by the arm 142 engaging the contact 143, the resistance coil 150 holds back the current thereby preventing damage.

The operating of the motor causes the lubricant in the barrel or tank 1 to be pumped through the passage 53 and the by-pass 61 against the ball valve 64 and through the outlet opening 68 into said barrel or tank. The operator pressing upon the lever 60 of the outlet nozzle 59, releases the pressure upon the ball valve 64, thereby causing the lubricant to be forced through the outlet pipe 54, the meter 56, the pipe 57, the hose 58 and said outlet nozzle. As the lubricant passes through the meter 56, the hand 86 rotates from naught to the amount determined by the arm 83, and as said hand engages and flexes the spring 87, it thereby breaks the motor circuit 122, 152, 81, 91, 90, 89, 87, 80, 153, 154, 155, 156, 157, 158, 159, 117, 161, 166, 164, 165 at contacts 89-90, which de-energizes the coil 157 and causes the contacts 122, 125 and 164 to open thereby automatically stopping the motor 49. At the moment said motor circuit is broken at 89-90 by the contact arm 83, it causes the striker 110 to fall and strike the gong 111 denoting to the operator that the predetermined quantity of lubricant has been pumped, and he then releases the lever 60 of the outlet nozzle 59 thus closing said nozzle. The operator may permanently stop the motor 49 at any time by pressing upon the stop button 117.

From the drawings and description it is seen that this lubricant dispensing device is a unit adapted for use with an ordinary metallic barrel, that the lubricant in the barrel during cold weather may be heated by electric current sufficiently for being pumped, that the motor for operating the pump will be automatically started when the lubricant has been heated to a prede-

terminated temperature, that the operator will know by means of red and green signal lamps when the heater is operating and the lubricant is heated sufficiently for being pumped, that a predetermined quantity of lubricant will be pumped and the operator notified of same by a gong, and that the motor will be automatically stopped when said amount of lubricant has been pumped, also that the lubricant in the barrel may be maintained at all times at proper temperature for being pumped.

Although the construction described is well adapted for accomplishing the purpose for which designed, it will be understood that slight changes in the details of construction may be made within the scope of the claims.

Having fully described my invention, what I claim is:

1. In a lubricant dispensing device, the combination of a barrel for holding lubricant, a pump, an electric motor for actuating the pump, an electric heating element for heating the barrel, said motor and said heating element being connected in circuit, and means in said circuit for automatically starting said motor when said heating element has heated the lubricant in said barrel to a predetermined temperature.

2. In a lubricant dispensing device, the combination of a barrel for holding lubricant, a cover for the barrel, a tube depending from the cover and extending within the barrel, a plunger slidably mounted in the tube, a rod fixed to the plunger, the upper end of said tube being closed by said cover, the upper end of said rod extending through said cover, said cover serving as a guide for said rod, a head fixed to the upper end of said rod, a roller pivoted to the head, a cam having an eccentric groove, the cam being adapted to rotate vertically, said roller being engaged by said cam groove, said cam being supported by said cover, a motor for actuating said cam, the motor being supported by said cover, a passage extending from the upper end of said tube and through said cover, a hose leading from said passage, and a nozzle at the outlet end of said hose.

3. In a lubricant dispensing device, the combination of a barrel for holding lubricant, a pump, an electric motor for actuating the pump, an electric heating element for heating the barrel, said motor and said heating element being connected in circuit, and means in said circuit for automatically breaking same for stopping said motor after a predetermined quantity of lubricant has been pumped.

4. In a lubricant dispensing device, the combination of a barrel for holding lubricant, a pump, an electric motor for actuating the pump, an electric heating element for heating the barrel, said motor and said heating element being connected in circuit, means in said circuit for automatically breaking same for stopping said motor after a predetermined quantity of lubricant has been pumped, and means in said circuit for producing a signalling sound upon the stopping of said motor.

5. In a lubricant dispensing device, the combination of a barrel for holding lubricant, a pump, an electric motor for actuating the pump, a motor relay, an electric heating element for heating the barrel, a heat unit relay, a thermostat, said motor connected in circuit to said motor relay, said motor relay connected in circuit to said heat relay, said heat relay connected in circuit to

said heater and to said thermostat, and means in said circuit whereby said motor will be automatically started when said lubricant in said barrel is heated to a predetermined temperature and stopped after a predetermined quantity of lubricant has been pumped.

6. In a lubricant dispensing device, the combination of a barrel for holding lubricant, a pump, an electric motor for actuating the pump, a motor relay, an electric heating element for heating the barrel, a heat unit relay, a thermostat, a signal for indicating said lubricant has been heated to a predetermined temperature, said motor connected in circuit to said motor relay, said motor relay to said heat relay, said heat relay to said heater and to said thermostat, said signal to said heat relay and to said motor control thermostat, and means in said circuit whereby said motor will be automatically started and said signal operated when said lubricant in said barrel is heated to a predetermined temperature and said motor stopped after a predetermined quantity of lubricant has been pumped.

7. In a lubricant dispensing device, the combination of a barrel for holding lubricant, a pump, an electric motor for actuating the pump, a motor relay, a motor control thermostat, an electric heating element for heating the barrel, a heat unit relay, a heat control thermostat, a signal for indicating said lubricant has been heated to a predetermined temperature, a gong for producing a signalling sound upon the stopping of said motor, said motor being connected in circuit to said motor relay, said motor relay to said heat relay, said heat relay to said heater and to said heat control thermostat, said gong to said heat relay and to said heat control thermostat and to said motor control thermostat, and means in said circuit whereby said motor will be automatically started when said lubricant in said barrel is heated to a predetermined temperature and said signal operated and said motor stopped and said gong operated after a predetermined quantity of lubricant has been pumped.

8. In a lubricant dispensing device, the combination of a barrel for holding lubricant, a pump, an electric motor for actuating the pump, a motor relay, a motor control thermostat, an electric heating element for heating the barrel, a heat unit relay, a heat control thermostat, a signal for indicating said lubricant has been heated to a predetermined temperature, a gong for producing a signalling sound upon the stopping of said motor, a meter for indicating a predetermined quantity of lubricant has been pumped, said motor being connected in circuit to said motor relay, said motor relay to said heat relay, said heat relay to said heater and to said heat control thermostat, said signal to said heat relay and to said motor control thermostat, said gong to said heat relay and to said heat control thermostat and to said motor control thermostat, said meter to said motor relay and to said heat relay and to said motor control thermostat, and means in said circuit whereby said motor will be automatically started when said lubricant in said barrel is heated to a predetermined temperature and said signal operated and said motor stopped by the action of said meter and said gong operated after a predetermined quantity of lubricant has been pumped.

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