SWITCH FOR MOTOR DRIVEN GREASE MACHINES

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Fig. 1

Fig. 2

Fig. 3

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This invention relates to devices for dispensing materials, and more particularly relates to a means for rendering the motor inoperative to prevent the same from operating the dispensing mechanism when the material level in a reservoir falls below a certain level. Grease pumps, particularly lubricators such as are used in and about oil and gasoline service stations, are at present constructed in such a manner that the mechanism is operable, regardless of the quantity of grease contained in the reservoir of the device. The result is, that often it is supposed that grease is being pumped into the transmission, differential or gear boxes of a vehicle or the like, when, as a matter of fact, the flow of material has stopped, although the pump continues its operation, because the reservoir is empty. It is therefore one of the objects of this invention to provide a means whereby the motor actuating the pumping mechanism of a grease pump is rendered inoperative when the material level in the storage reservoir recedes to a predetermined position.

Among other objects of the invention may be classed simplicity and economy of construction of the device, together with durability and strength.

Still other objects of the invention and the invention itself, will become more apparent from the following description of some embodiments thereof, which description is illustrated by the accompanying drawing, and forms a part of the specification.

Briefly, the invention is particularly adaptable for lubricant dispensing pumps which have a storage reservoir, in which the lubricant is contained, and a follower plate adapted to rest upon the lubricant, which plate recedes toward the bottom of the reservoir with the lubricant as the lubricant falls. The follower plate is adapted to actuate a circuit breaker to open the circuit to the motor operating motor to render the motor inactive when the plate nears the bottom of the reservoir, thus preventing operation of the mechanism when the reservoir is empty.

Referring to the drawing:

Fig. 1 is an elevation view of a pumping mechanism with a circuit breaker mounted thereon;

Fig. 2 is an enlarged fragmentary sectional view of a circuit breaker such as may be applied to the reservoir of the device of Fig. 1; and

Fig. 3 is a similar view of another type of circuit breaker which may be employed.

Referring more particularly to the figures of the drawing, throughout which like parts are designated by like reference characters, there is illustrated a lubricant dispensing mechanism mounted upon a mobile truck which comprises a platform 10, supported upon legs 11 with suitable castors 12 for rendering the same mobile.

The device may include a storage reservoir 13 having a follower plate 50, disposed therein and adapted to rest on the top of the lubricant. A screw conveyor or pump is disposed in the housing 14 at the bottom of the reservoir, which conveyor is adapted to be operated by a motor 15.

A screw conveyor and the parts ancillary to a pumping mechanism such as might be used are more fully described in the application of Kenneth S. Clapp for lubricator, Serial No. 301,063 filed August 21, 1928.

A cable 17, which is adapted to be connected to a local source of electric power supply, not shown, is connected to the device. One wire from the cable connects directly to the terminal 17 on the motor. The other wire is connected to one wire of an electric cable 18, which contains two wires. The other wire in the cable 18 is connected directly to the motor. The two wires in the cable extend, as shown in Fig. 1, along the dispensing conduit 22 to a control switch 20 which is disposed on the end of the dispensing
nozzle 19. Either one of the wires in the cable 18 may be interrupted by a circuit breaker 21 disposed adjacent the bottom of the reservoir 13. The circuit breaker 21 is normally in a closed position and the switch 20 is normally in an open position. It is also obvious that the circuit breaker 21 might be connected into the power line 17 ahead of the motor 15.

When the nozzle 19 upon the end of the dispensing hose 22 is secured to a greasing coupling or is inserted into an aperture such as a filler hole in a gear box or the like, the switch 20 on being closed completes the circuit from the power line to the motor setting the same into operation. The motor 15 continues to operate, with the electrical current controlled by the switch 20 at the will of the operator, until the level of the material falls to a predetermining point, whereupon the circuit is interrupted by the action of the circuit breaker 21.

The circuit breaker 21 is disposed on the side wall 30 of the storage reservoir 13 and in the plane of a predetermined minimum surface level of the material within the reservoir. The side wall of the reservoir is apertured at 31, and the operating lever arm 44 of the circuit breaker 21 may extend there-through.

The circuit breaker 21 may include a base plate 32 adapted to be secured to the side wall 30 of the reservoir, a cylindrical or cup shaped metal housing 35, which may be constructed by stamping or other suitable means is secured to the base plate 32 and reservoir wall 30 by bolts 51. A pair of contact arms 36 and 40 are secured to the circuit breaker housing 35, by means of bolts 39 and 42, being suitably insulated from the housing wall and each other by insulating strips 53. The bolts which secure the arms to the housing wall extend therethrough and serve as terminal binding posts for connecting the switch into the circuit. A pair of contact points 37 and 41 are carried by the arms 36 and 40.

The contact arm 36 may be of resilient metal and has a portion 35 extending beyond the end of the arm 40 which extension is suitably insulated by an insulating strip 54. An operating arm 44 is adapted to press against the insulating portion 54. The arm 44 is an extension of a cylindrical or a spherical segment bearing 53 with its convex surface seat ed in a like curved portion 33 of the base plate 32.

The curved portion 33 of the base plate is slotted or apertured at 43 and an operating pin 44, which is rigidly affixed to the bearing 53, extends through the slot into the reservoir 13. The pin 44 is disposed in the downward path of the follower plate 50. A boss or pin 45 projects from the inner surface of the bearing portion 53 of the breaker arm and one end of a relatively stiff helical spring 46 is disposed about the pin and the other end of the spring is disposed around a pin 47 adjustably supported by the housing 38. The pin 47 is an extension of an adjusting screw 48 which is threaded into an aperture in the housing 38 in alignment with the boss 45 and is locked in an adjusted position for any tension desirable upon the spring, by a lock nut 49. The spring 46 provides a means to firmly maintain the bearing portion of the breaker arm 54 in contact with the seat portion 33 of the base plate 32 and also permits pivotal movement of the breaker arm 54 and the operating pin 44, and returns the breaker arm to a normal position as illustrated.

Operation of the device is as follows:

As previously stated, the storage reservoir 13 is filled with a supply of lubricating material or the like which it is desired to dispense. In dispensing the same the nozzle 19 on the end of the hose 18 may be inserted into a filler hole or the like of a gear box. The desired amount of lubricant is pumped into the gear box by closing the switch 20. Closing the switch 20 completes the circuit to the motor 15 causing the motor to operate the pumping mechanism. Opening of the circuit by the switch 20 causes the motor and pump to cease operating.

As the material in the reservoir is removed by the action of the pump the surface level of the remaining material recedes allowing the follower plate 50 to drop. When the level of the lubricant recedes to a point adjacent the circuit breaker, the edge of the follower plate 50 will strike the projecting arm 44 of the circuit breaker 21, as shown in Figure 2, and on further recession of the level of the lubricant the follower plate will pivot the breaker arm in its curved seat and this will cause the projecting end thereof to raise the end of contact arm 36 thus separating the contact points 37 and 41 and interrupting the flow of current in the circuit. It will then be impossible to complete the circuit by closing the switch 20 and the operator will then know that the supply of lubricant in the reservoir has become exhausted. He may then withdraw the follower plate and refill the reservoir. On withdrawal of the follower plate the spring 46 will permit pivoting the breaker arm back to its normal position withdrawing the arm 54 from contact with the extension 35 and the contact points 37 and 41 will again be brought together by virtue of the inherent resiliency of the contact arm 36 closing the circuit at that point.

Another form of the device is shown in Figure 3. It is particularly adapted to be disposed in the base of a reservoir. An aperture 60 is provided in the bottom of the reservoir 13 and the circuit breaker is disposed under this aperture and secured to the
bottom of the reservoir together with the housing 61 by means of bolts 62. The circuit breaker may comprise a plate 63 provided with a centrally bored externally screw threaded boss 64 which functions as a packing gland.

A plunger 67 is disposed through the boss and has an enlarged head 68 the shoulder of which is normally maintained against the end face of the packing nut by means of the helical spring 69 which encircles the inner end of the plunger 67 and is interposed between the inner face of the plate 63 and a washer 70 which is held on the plunger 67 by means of a laterally projecting pin 71. The outer end of the head 68 is normally disposed against the insulated extended end 72 of a resilient contact arm 73 which arm is similar to the arm 26 in the modification shown in Figure 2. Co-operating with arm 73 is another contact arm 74 and these contact arms are secured to the circuit breaker housing 61 in a manner similar to that in which arms 36 and 40 are secured to housing 38. The circuit breaker is connected into the circuit in the same manner as the other embodiment previously described.

When the level of the lubricant in the reservoir 13 recedes to a point closely adjacent the bottom thereof, the follower plate 50 will bear down on the plunger 67 which will in turn break the contact between the contact arms 36 and 40 and thereby opening the circuit preventing further pumping of lubricant. On lifting of the follower plate to refill the reservoir the plunger will be restored to its normal position as shown in Figure 2 thus bringing the contact points together and allowing the motor to deliver lubricant from the reservoir.

Although the foregoing description is necessarily detailed to fully set forth the precise operation of the device it is to be understood that variations and modifications may be resorted to without departing from the spirit of the invention as defined by the following claims.

I claim:

1. In a pressure lubricating device, a lubricant reservoir, a follower plate in said reservoir, a motor driven pump for delivering lubricant from said reservoir, a circuit breaker in the power line leading to said motor adapted to be actuated by the follower plate when the level of the lubricant in the reservoir and hence the follower plate recedes to a predetermined level and means for restoring said circuit breaker to normal position to permit flow of current therethrough when the level of the lubricant is raised above said predetermined level.

2. In a dispensing device, a reservoir, a follower plate in said reservoir adapted to follow the liquid level in the same, a motor driven pump for delivering liquid from the same, a circuit breaking mechanism in the power line leading to the pump, said mechanism comprising a housing mounted on said reservoir on the side thereof, a pair of contact elements in said housing and mounted within said housing adapted upon opening to open the circuit leading to said pump, an arm mounted for pivotal movement on the side of the reservoir and projecting into said reservoir into the path of said follower plate, a lever secured to said arm and adapted upon pivotal movement of said arm to engage one of said contacts and cause opening of said pair of contacts, and means preventing liquid in said reservoir from entering said housing whereby said contacts are maintained free from foreign material.

3. In a dispensing device, a reservoir, a follower plate in said reservoir adapted to follow the liquid level in the same, a motor driven pump for delivering liquid in the reservoir from the same, a circuit breaking mechanism in the power line leading to the pump, said mechanism comprising a housing mounted on said reservoir on the side thereof, a pair of contact elements in said power line and mounted within said housing adapted upon opening to open the circuit leading to said pump, there being an opening in the bottom thereof communicating the interior of said reservoir with said housing, said opening comprising a seat, a closure member for said seat having limited pivotal movement with respect thereto, an arm on said closure member projecting into the path of said follower plate, a pair of contacts in the power line leading to said pump adapted upon opening to break the power line circuit, and a lever secured to said closure member and adapted to engage one of said contacts to open the pair of contacts.

4. In a dispensing device, a reservoir, a follower plate in said reservoir adapted to follow the liquid level in the same, a motor driven pump for delivering liquid in the reservoir from the same, a circuit breaking mechanism in the power line leading to the pump, said mechanism comprising a housing mounted on said reservoir on the side thereof, a pair of contact elements in said power line and mounted within said housing adapted upon opening to open the circuit leading to said pump, there being an opening in the seat of said reservoir adjacent to the bottom thereof communicating the interior of said reservoir with said housing, said opening comprising a seat, a closure member for said seat having limited pivotal movement with respect thereto, spring means normally urging said closure member against said seat while permitting such pivotal movement of the closure member, a pair of contacts in the power line leading to said pump adapt-
ed upon opening to break the power line circuit, an arm on said closure member projecting into the path of said follower plate, and a lever secured to said closure member and adapted to engage one of said contacts to open the pair of contacts.

In testimony whereof I hereunto affix my signature this 13 day of September, 1930.

KENNETH S. CLAPP.