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APPARATUS FOR RELEASABLY LOCKING A GASOLINE PUMP OR  
THE LIKE AFTER EACH OPERATION THEREOF  
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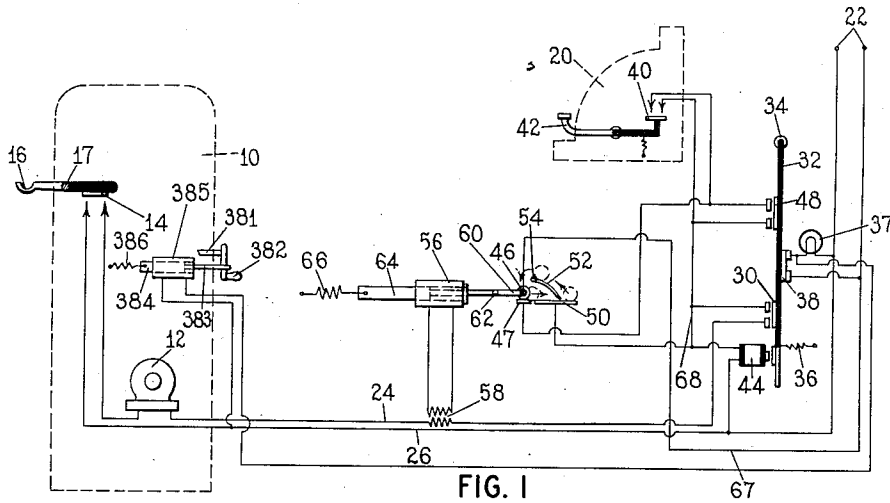


FIG. 1

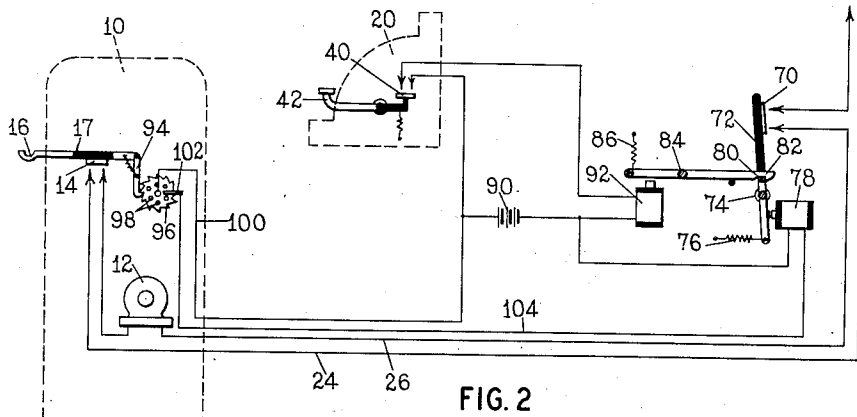


FIG. 2

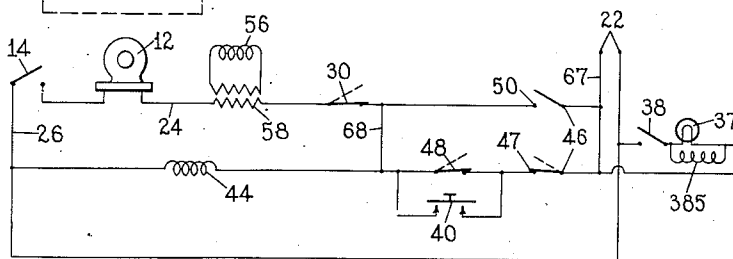


FIG. 3

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APPARATUS FOR RELEASABLY LOCKING  
A GASOLINE PUMP OR THE LIKE AFTER  
EACH OPERATION THEREOFBernard J. Patten, Norwood, Mass., assignor of  
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This invention relates to apparatus for automatically providing a break in the circuit of an electric motor, such as a motor for a gasoline pump or the like, after each operation thereof, the break remaining open until closed by the momentary closing of an electric switch which may conveniently be operated by a key of a cash register.

It is a common experience of operators of gasoline filling stations to dispense a quantity of gasoline to a customer and then, in the confusion of attending to other matters at the moment, to forget to collect for and/or record the gasoline dispensed. This results in a shortage which is usually not discovered until at the end of the day the total quantity of gasoline sold is checked against the total cash received or charged. By that time it is usually too late to remember the sale or sales for which the charge was overlooked. It is an object of the present invention to reduce such losses by apparatus which automatically opens a safety switch in the pump motor circuit when the hose-operated control switch at the pump is opened by hanging the nozzle on the hook in the customary manner. The pump motor circuit cannot then be closed until the safety switch is first closed by apparatus controlled by a manually operated switch such as may be arranged to be closed by a cash register key. In this manner, if a sale of gasoline is not rung up on the cash register, the omission is brought to the attention of the operator when the next attempt is made to dispense gasoline from the pump. Ordinarily it will then be easy to recall the circumstances of the previous operation of the pump.

For a more complete understanding of the invention, reference may be had to the following description of certain embodiments thereof, and to the drawing, of which:

Figure 1 is a diagrammatic view of the apparatus embodying the invention;

Figure 2 is a diagrammatic view of a modified form of apparatus embodying the invention; and

Figure 3 is a simplified diagram of the circuits shown in Figure 1.

A gasoline dispensing pump housing of a conventional type is indicated in outline at 10, the housing containing a motor 12 controlled by a switch 14 which is operated by a hook 16 adapted to support the hose nozzle when the delivery hose is not in use. As is customary, the hook 16 is pivotally mounted as at 17, and when the weight of the nozzle and hose is thereon, the switch 14 is open. When the nozzle is removed from the

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hook 16, the switch 14 closes so as to start the motor 12 if the remainder of the circuit is closed.

Figure 1 shows the apparatus as it is after a quantity of gasoline has been dispensed and the delivery nozzle has been hung on the hook 16 but the sale has not been run up on the cash register which is indicated in outline at 20. The power for operating the motor 12 may be derived from any suitable source such as power connections 22. The motor 12 and switch 14 are connected in a circuit including two wires 24 and 26 which lead from the pump housing to a recording station where the cash register or other recording device 20 is kept. The power circuit through the motor 12 includes not only the switch 14 but a relay switch 30 consisting of two contact points which are connectable by a bridging conductor mounted on an arm 32 pivoted at 34. It is to be understood that the various switches and other pieces of apparatus indicated on the drawing are conventionally shown, and that in most cases the physical appearance of the apparatus actually used is radically different from the forms shown on the drawing. A spring 36 is connected to the arm 32 and tends to swing it to a position in which the switch 30 is open, as shown in Figure 1. Since the wire 24 extends only to a point of the switch 30, this switch is a safety switch which must be closed before the motor 12 can operate.

A suitable tell-tale signal may be employed to indicate when the safety switch is open. This signal may be visible, audible or otherwise, and may be located in any convenient or conspicuous place where it will be most useful. In Figure 1 is indicated a signal lamp 37 which is in series with a switch 38. The latter may conveniently be operated by the arm 32 to close when the switch 30 is opened, and to open as the switch 30 is being closed.

The switch 38 may also be employed to control a device for preventing the operation of the customary mechanism (not shown) in the pump housing for setting the quantity indicator back to zero after gasoline has been dispensed. Such mechanism is usually operated by a shaft 381 carrying a hand crank 382 outside the housing. As indicated in Figure 1, a stop element 383 may be projected into the path of the hand crank to prevent operation thereof as long as the tell-tale signal 37 is lighted. For this purpose the stop element 383 may be projected by the plunger 384 of a solenoid 385 in the pump housing when the solenoid is energized, and retracted by a spring 386 when the solenoid is deenergized, the solenoid being in a shunt circuit around the signal

37 so that both are simultaneously controlled by the switch 38.

In order to close the switch 30 so that a closing of the switch 14 will start the motor 12, a switch 40 is mounted in the cash register 20, the movable bridging conductor of the switch being carried by a special key lever 42. When this key is depressed so as to close the switch 40, a circuit is closed through a relay coil 44, this circuit including a closed relay switch 43, 47, as shown in Figure 1. The energization of the coil 44 rocks the arm 32 so as to close the switch 30 and also to close a relay switch 48, the bridging conductor of which is carried by the arm 32. The manual switch 40 is shunted around the relay switch 48 so that the latter maintains a closed circuit through the relay coil 44 after the switch 40 has been opened, a momentary closing of the switch 40 being all that is required. The system is then ready for another sale of gasoline from the pump since the switch 30 has been closed and has been held in its closed position by the relay coil 44. Thus, when the delivery nozzle is lifted from the hook 16, the switch 14 closes and the motor 12 operates. The flow of current through the motor circuit is utilized to open the switch 46, 47 immediately after closing another switch 46, 50. This successive operation of the two switches may be brought about by any suitable apparatus, one such means being conventionally shown in Figure 1. As illustrated, the movable switch member 46 may be a metal roll which is in contact with the fixed switch member 47 and which is movable therefrom into contact with an adjacent switch member 50. As the roll 46 moves from the member 47 to the member 50, it touches the latter before losing contact with the former. Thus for an instant both switches are closed for a purpose hereinafter explained. However, when the roll 46 is returned to its initial position, it is necessary that it lose contact with the switch member 50 before making contact with the switch member 47, both switches being open at the same time for a brief interval. This may be done by a hinged cam 52 which is pivotally mounted as at 54 and is swung up by the roll 46 to let the roll pass when it moves to the right. On the reverse stroke to the left the roll 46 rides up over the cam 52 and thus loses contact with the switch member 50 before engaging again the switch member 47.

Actuation of the roll 46 may be brought about by the use of a relay coil or solenoid 56 which is inductively connected in the motor circuit by means of a suitable transformer 58. The roll 46 is connected to the end of a rod 60 which is articulated at 62 and is an extension of the armature 64 of the solenoid. Energization of the solenoid 56 moves the roll 46 toward the right. The return stroke may be brought about, when the solenoid is deenergized, by a suitable tension spring 66.

The closing of the switch 46, 50 provides a circuit through the coil 44 which bypasses the switch 48. The immediate opening of the switch 46, 47 breaks the circuit containing the switch 48. While the motor 12 is operating, therefore, the switches 14 and 30 in the motor circuit are closed, and the coil 44 is energized by a circuit containing the switch 46, 50.

After the gasoline has been dispensed, the nozzle is hung on the hook 16 thus opening the switch 14. This results in the deenergization of the solenoid 56 which results in the opening of the switch 46, 50, followed by the closing of the

switch 46, 47. The opening of the switch 46, 50 breaks the circuit through the coil 44 and permits the spring 36 to swing the arm 32 so as to open the switches 30 and 48. This restores the apparatus to the condition illustrated in Figure 1, wherein the switch 30 is open and the switch 38 is closed, this condition of the system being visually indicated by the lighting of the tell-tale lamp 37. The energization of the solenoid 385 projects the stop element 383 to prevent the indicator from being set back to zero until the system is cleared by operation of the cash register key 42. Furthermore the motor circuit cannot be closed until the system is cleared, since that circuit includes the safety switch 39. A momentary depression of the key 42 restores the system to the normal condition indicated in Figure 3.

The apparatus thus far described and illustrated in Figure 1 comprises essentially two parallel circuits as may be more readily seen in Figure 3, which latter figure shows the system in its normal condition after a sale has been duly recorded. A common wire 67 extends from one of the power connections 22 to the switch element 46. Here the parallel circuits branch, the main circuit extending through the switch 46, 50, the safety switch 30, the relay transformer 58, the motor 12, the manual switch 14, and back to the other power connection. The auxiliary circuit extends through the switch 46, 47, the switch 48, the relay coil 44, and back to said other power connection. These two circuits are also connected to each other by a connection 68 at a point on the main circuit between the two switches (46, 50 and 30) therein and at a point in the auxiliary circuit between the relay coil 44 and the nearest relay switch in the auxiliary circuit.

A modified form of the apparatus is shown in Figure 2, this apparatus requiring the extensions of control wires in addition to the power wires from the recording station to the pump housing. In series with the motor 12 is a switch 70, the movable conductor of which is mounted on an arm 72 pivoted at 74 and urged toward its closed position by a spring 76. A relay coil 78 is arranged to rock the arm 72 so as to open the switch 70 when the solenoid is energized. In order to maintain the switch 70 in its open position when the coil is thereafter deenergized, a pin 80 on the arm 72 is engaged by a latch hook 82 at the end of an arm which is pivoted as at 84, the latch being rocked by a spring 86 to maintain it releasably in engagement with the pin 80. The drawing shows the apparatus in the condition it is in after gasoline has been dispensed and the nozzle has been hung on the hook 16 so as to open the switch 14, but before the sale has been rung up or otherwise recorded in the cash register 20.

The switch 70 is open so that no further operation of the motor 12 can be had until after the cash register key has been depressed to close the switch 40. The momentary closing of the switch 40 closes a circuit which may be energized by a suitable battery 90 so as to energize a magnet coil 92. This magnet is arranged to rock the latch arm so as to release the pin 80 and permit the spring 76 to rock the arm 72 so as to close the switch 70. The power circuit is now ready for the operation of the motor 12 in response to a closing of the switch 14. The arm carrying the hook 16 is provided with a pawl 94 which catches on successive teeth of a ratchet wheel 96. This wheel is of insulating material but carries a series of contact points 98 which are connected to each other and to a wire 100 leading to the cash register switch

40. A stationary switch contact 102 is pressed against the wheel 96 and is connected by a wire 104 to the coil 78, a circuit through this coil being completed through the battery 90 and the switch 40. When the dispensing nozzle has been hung on the hook 16, the lever arm of which the hook is a part is rocked, thus raising the pawl 94 and rotating the wheel 96 through a predetermined angle so that one of the contact points 98 brushes past the stationary contact 102, momentarily energizes the relay coil 78. The energization of the coil 78 rocks the arm 72 so that the switch 70 is opened and the pin 80 moves to the left where it is caught by the latch hook 82. Thus, when the coil 78 is thereupon deenergized, the switch 70 remains open until the magnet coil 92 is energized to rock the latch 82 so as to release the pin 80, as hereinbefore described.

I claim:

1. An electric circuit having in series therein a motor, a manually operable control switch and a safety switch, means operating simultaneously with the opening of said control switch to open automatically said safety switch, an auxiliary circuit having a manually operable control switch therein, and means responsive to a momentary closing of the control switch in the auxiliary circuit when the first said control switch is open to close said safety switch.

2. An electric circuit having in series therein a motor, a manually operable control switch, and a safety switch, means responsive to the opening of said control switch to open said safety switch, an auxiliary circuit having a manually operable control switch therein, and means responsive to a momentary closing of the control switch in the auxiliary circuit when the first said control switch is open to close said safety switch.

3. In combination with an electric motor for driving a liquid-dispensing pump and a normally open control switch, a power circuit including said motor, said control switch, and a safety switch, means simultaneously opening said safety switch when the control switch is opened, a normally open manually operable switch, and means responsive to a momentary closing of the last mentioned switch when said control switch is open to close said safety switch.

4. Electrically operated control apparatus comprising power input terminals, and a main circuit and an auxiliary circuit connected in parallel to said terminals, said main circuit having connected therein in series a normally open relay switch, a normally closed relay switch, a relay coil, a motor and a manually operable normally open control switch, said auxiliary circuit having connected therein in series two normally closed relay switches and a relay coil, said circuits being also connected to each other at a point in the main circuit between the two relay switches therein and at a point in the auxiliary circuit between the relay coil therein and the nearest relay switch

therein, the main circuit relay coil being arranged to open, when energized, one of the normally closed relay switches in the auxiliary circuit and to close the normally open relay switch in the main circuit, the relay coil in the auxiliary circuit being normally energized and arranged while so energized to hold closed the normally closed relay switch in the main circuit and the other relay switch in the auxiliary circuit, and a normally open manual control switch shunted around the last mentioned switch.

5. In combination with a motor for driving a gasoline dispensing pump, a manually operated control switch at the pump, and a power circuit having said motor and switch connected therein; a safety switch in said circuit, means responsive to the opening of said control switch to open said safety switch, a normally open remote switch, and means responsive to a momentary closing of said remote switch when said control switch is open to close said safety switch.

6. In combination with a motor for driving a gasoline dispensing pump, a manually operated control switch at the pump, and a power circuit having said motor and switch connected therein; a safety switch in said circuit, means responsive to the opening of said control switch to open said safety switch, a normally open remote switch, means responsive to a momentary closing of said remote switch when said control switch is open to close said safety switch, and an automatic tell-tale signal indicating when the safety switch is open.

7. In combination with a motor for driving a gasoline dispensing pump and quantity indicator, a manually operated control switch at the pump, a hand-crank mounted near the pump and operable to reset the indicator, and a power circuit having said motor and switch connected therein; a safety switch in said circuit, means responsive to the opening of said control switch to open said safety switch, a stop element movable into the path of said handcrank to prevent operation thereof, electromagnetic means energizable to move said stop element into said path, means automatically energizing said electromagnetic means when said safety switch is open, a normally open remote switch, and means responsive to a momentary closing of the remote switch when said control switch is open to close the safety switch and thereby cause the deenergization of the electromagnetic means.

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