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Carbone

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[45] **Sept. 23, 1975**

[54] **CONTROL APPARATUS FOR GASOLINE DISPENSING PUMP**

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[73] Assignee: **Process Controls,** Clifton, N.J.

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Related U.S. Application Data

[63] Continuation of Ser. No. 291,782, Sept. 25, 1972, abandoned.

[52] **U.S. Cl.** ..... **222/16;** 235/92 FL

[51] **Int. Cl.** **B67d 5/10**

[58] **Field of Search** ..... 222/14–22; 73/206; 235/92 FL

[56] **References Cited**

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[57] **ABSTRACT**

A control apparatus adapted for use with a gasoline dispensing equipment is provided to automatically stop the flow of gasoline after a predetermined volume is dispensed. The apparatus electromechanically senses the position of a computer counter which registers the amount of gasoline dispensed and with the control provided by a plurality of electrical switches, interrupts the motor which drives the gasoline dispensing pump or closes the valve which controls the dispensing action when a specific amount of gasoline has been dispensed. The volume of gasoline to be dispensed may be measured in cost or volume units and may be predetermined by presetting a dollar or gallon amount on one of the switch mechanisms in the control apparatus. When the preset amount is dispensed by the gasoline pump, the dispensing cycle is interrupted. Automatic resetting means restores the control apparatus to a zero operational mode upon interruption of the cycle so that the control apparatus is prepared for the next dispensing cycle.

4 Claims, 7 Drawing Figures

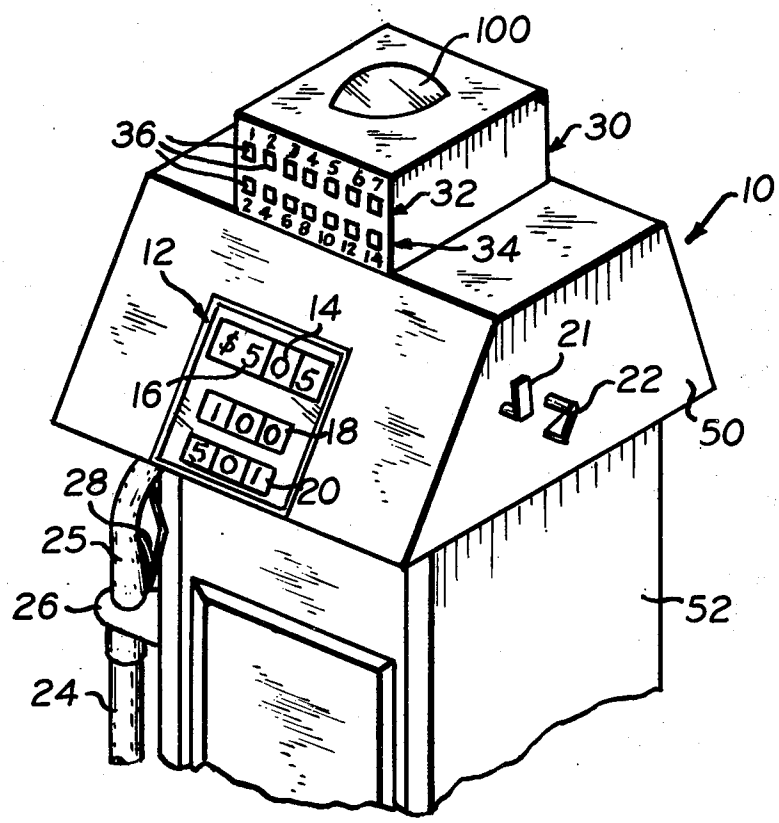


FIG. 1.

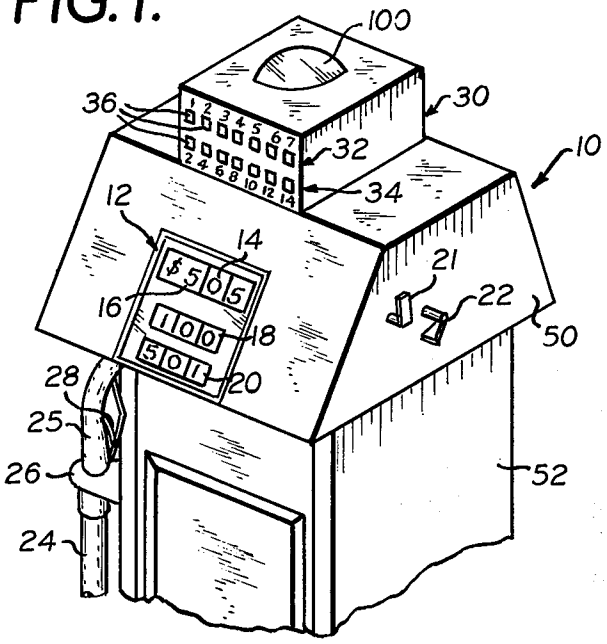


FIG. 2.

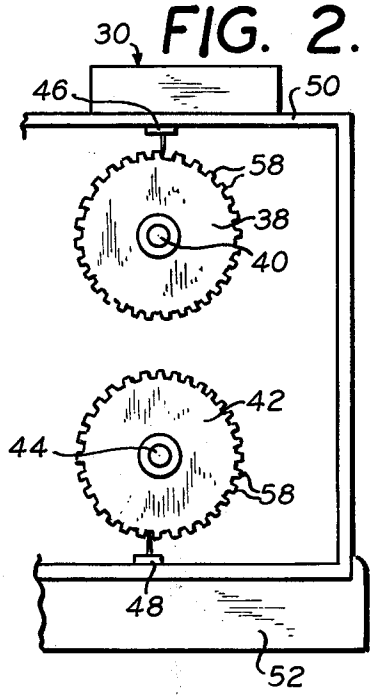


FIG. 3.

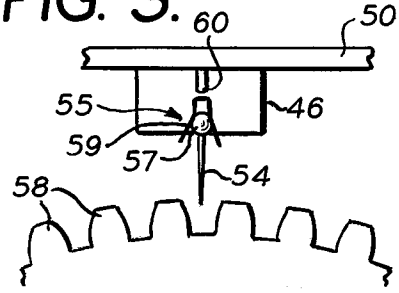


FIG. 4.

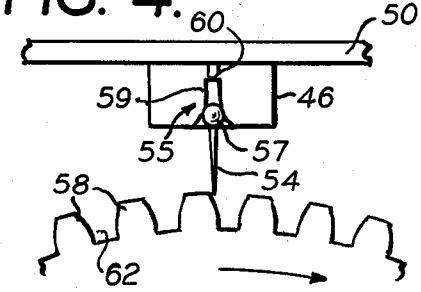


FIG. 5.

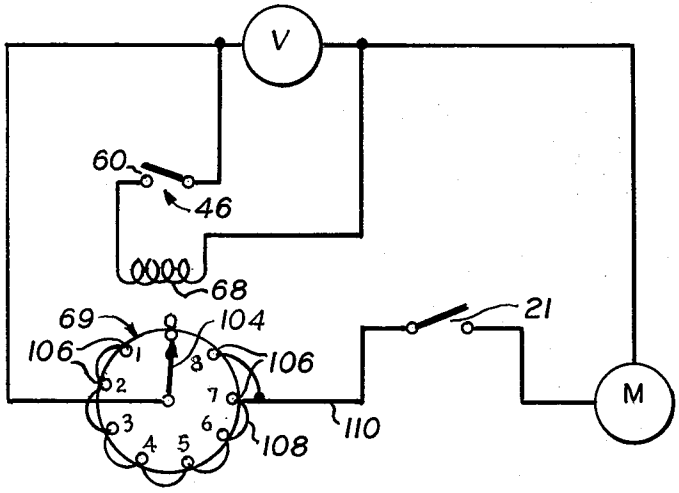


FIG. 7.

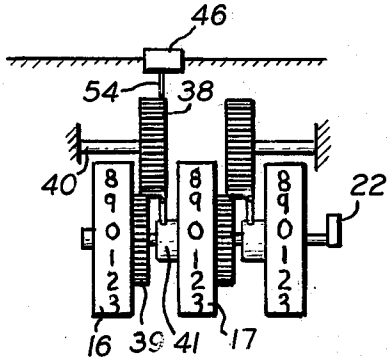
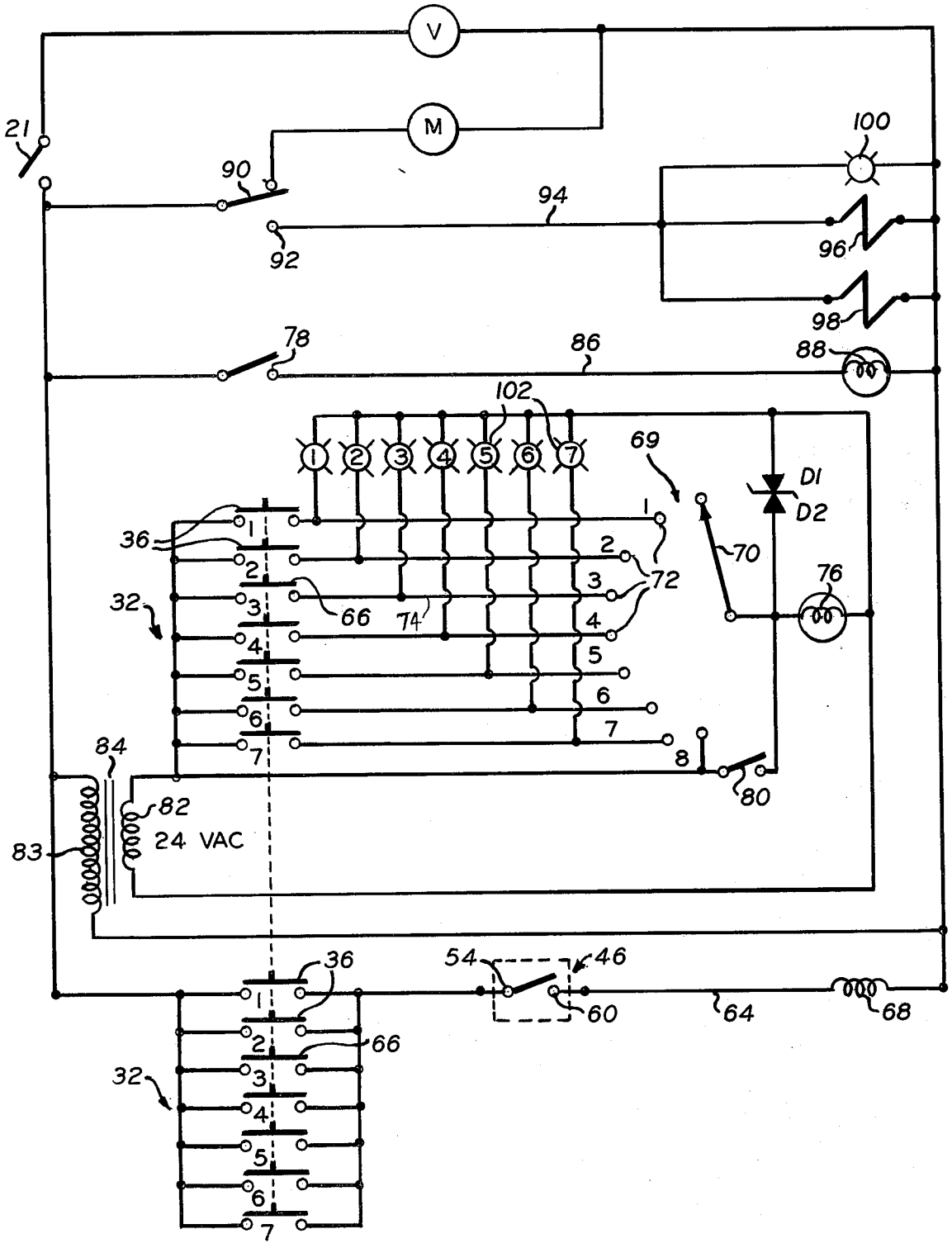


FIG. 6.


V
M
21
90
92
94
100
96
98
78
86
88
102
1
2
3
4
5
6
7
69
D1
D2
70
72
76
36
32
66
74
84
82
24 VAC
83
80
8
54
46
60
64
68

CONTROL APPARATUS FOR GASOLINE DISPENSING PUMP

This is a continuation of application Ser. No. 291,782, filed Sept. 25, 1972, now abandoned.

This invention relates to a control apparatus which comprises a mechanism for association with the register of a liquid dispensing pump. More particularly, it relates to preselector mechanism for use with existing well-known types of gasoline dispensing apparatus which permits the operator to set the mechanism for delivery by the pump of a predetermined volume of liquid calculated either in units of volume, such as gallons, or monetary units, and is effective to terminate the dispensing operation upon completion of the delivery of the predetermined volume or monetary amount.

Notwithstanding the many excellent advantages of the presently-used gasoline dispensers, there are some serious limitations involved in their operation. For example, when a customer drives in for gasoline, it is customary for the station to provide him with a number of incidental services, such as cleaning the windshield, checking the oil, battery, water, putting air in the tires, etc. While the attendant is dispensing the gasoline he must pay close attention to the counter indicator, otherwise too much gasoline may be pumped (generally representing a loss to the station). Consequently, even though the attendant is doing essentially nothing except unproductively watching the counter indicator, he cannot during this interval satisfactorily perform any additional function, e.g. the above incidental services.

Gasoline dispensing pumps are equipped with a so-called "wet nozzle" which terminates the discharge of gasoline through the nozzle at any time the level of the gasoline reaches that end of the nozzle which is inserted into the tank. With that type of nozzle, the station attendant may perform the incidental services requested by the customer without danger of overflowing the tank. However, the wet nozzle satisfactorily performs the function of terminating the delivery of gasoline only when a customer specifies that the automobile tank be filled. In the even an amount less than that required to fill the tank is ordered, the wet nozzle type of dispensing apparatus cannot be used by the station attendant to preclude the possibility of delivering more gasoline than the amount ordered.

Another method of delivering gasoline to customers' automobilies employed by service station attendants is to manually set or lock the delivery nozzle at a slow rate of delivery so that the attendant can perform many of the incidental services while the gasoline is being delivered by the unattended nozzle to the tank at a relatively slow rate. This method is not altogether satisfactory in that the attendant must divide his attention between the pump indicator counter and his performance of the incidental services.

It is therefore highly desirable to provide gasoline dispensing pumps with a presettable control apparatus arranged to automatically stop the dispensing of gasoline after a preset quantity (measured either in volume or cost) of gasoline has been dispensed. The attempts thus far to provide such apparatus have been unavailing primarily because the apparatus developed are mechanically complicated requiring many moving parts. Such equipments may need frequent repair or replacement of parts. Furthermore such apparatus are designed to be included inside the pump which would require that all existing pumps be modified. In addition, the mechanical connection to the computer mechanism of the pump could cause errors in dispensing gasoline thus resulting in great inconvenience for customer and attendant alike. For these reasons, such control apparatus have not been commercially successful.

It is the primary object of this invention to provide a control apparatus which does not require any attachment to the computer mechanism of a gasoline dispensing pump and which controls the dispensing action primarily electrically instead of mechanically.

It is another object of this invention to provide a control apparatus which need not be positioned at the gasoline dispensing pump but may be remotely located therefrom.

It is still another object of this invention to provide a control apparatus which is economical to manufacture and simple to operate.

The objects of the invention are accomplished by a control apparatus for use with gasoline dispensing equipment which dispensing equipment includes a computer counter of the indicating type and in which at least one drive mechanism is rotated in synchronism with the flow of gasoline through the dispensing equipment. The control apparatus includes detection means for detecting the position of the drive mechanism and transmitting an electrical signal when the drive mechanism reaches a position equivalent to a discrete volume of dispensed gasoline as measured in cost or volume units. Thus, the detection means could be set to transmit a signal each time the computer counter registers a dollar as the gasoline is dispensed. Therefore, if a volume of gasoline equivalent to three dollars cost is dispensed, three sequential signals will be transmitted. In one preferred embodiment, the detection means comprises an electromechanical switch which has a movable shaft extending down into the large sprocket wheel connected to the computer counter. The shaft projects into the area between teeth of the wheel and each time the wheel is moved one increment (representing, for example, another dollar's worth of gasoline dispensed) the shaft is engaged by the turning wheel and moved. This movement closes an electrical circuit momentarily and a voltage signal provided by a source of voltage such as a normal AC voltage used to activate the pump motor is passed to another part of the circuit.

The sequential signals are received by a sensing means which is operatively connected to the detection means. The sensing means is adapted to assume one or another operational mode corresponding to the amount of gasoline dispensed as measured by the position of the drive mechanism. Therefore, as each signal representing another dollar's worth of gasoline dispensed is transmitted, the sensing means assumes another operational mode. In effect, the sensing means, which may preferably be an electrical stepping switch, counts the volume of gasoline dispensed during the dispensing cycle and assumes an electrical position or mode representative of the increasing volume being dispensed. In one embodiment, when the stepping switch reaches a zero position setting, the pump motor is interrupted or the valve in the pump is closed thereby stopping the dispensing cycle.

In another embodiment, connected to the sensing means is a control means which is adapted to be preset to a specific amount of gasoline to be dispensed as measured in cost or volume units. If the cost unit is dollars, a total dollar amount would be preset on the control

means by the customer or service attendant in accordance with the amount of gasoline the customer desires. When the sensing means senses that the desired total amount has been dispensed, it electrically cooperates with the control means to close a portion of the electrical circuit leading to a switch connected either to the motor which drives the dispensing pump or in some dispensing pumps, to the valve which regulates whether or not gasoline flows. This switch is caused to open and thereby interrupt the movement of the motor or the flow of gasoline through the valve. In this manner, gasoline flow is automatically interrupted whenever the preset amount is achieved.

The control apparatus satisying the above specified objects is fully described with reference to the accompanying drawings, in which:

FIG. 1 is a pictorial view of a conventional gasoline dispensing device and the control apparatus of the invention positioned arbitrarily on top of the dispensing device;

FIG. 2 is a fragmented partial side view of the sprocket wheels associated with the dollar and gallon indicators of a conventional computer counter, each having a detection means positioned to cooperate with the teeth of the wheel;

FIGS. 3 and 4 are diagramatic views representative of the manner in which a detection means is actuated by the movement of a dollar wheel or gallon wheel;

FIG. 5 is an electrical schematic drawing of a simplified embodiment of the control apparatus of the invention;

FIG. 6 is an electrical schematic view of the control apparatus of FIG. 1; and

FIG. 7 is a partial front view of the computer counter mechanism directly associated with the dollar and cents indicators.

Referring to FIG. 1, there is shown a conventional gasoline dispensing device generally indicated by the numeral 10 which houses a computer counter, the various mechanical details of which are fully described in U.S. Pat. Nos. 2,203,109, 2,213,597 and 2,264,557. The numbered wheels of the counter are visible through a window area 12 in the front portion of the device 10. An upper set of wheels 14 indicate the volumes of gasoline dispensed in cost units of dollars and cents with the dollar wheel being indicated by the numeral 16. An intermediate set of wheels 18 indicate the quantity of gasoline dispensed in gallons and tenths of a gallon. The lowest set of wheels 20 indicate in cents and tenths of a cent the cost per gallon of gasoline dispensed.

In accordance with conventional dispensing devices, the illustrated device 10 is provided with a switch 21 which starts the pump motor, a reset arm 22 and a dispensing hose 24. The reset arm 22 is cranked at the end of a dispensing cycle and mechanically resets the wheels 14 and 18 to zero in a well known manner to prepare the dispensing device for its next dispensing cycle. The dispensing hose 24 and the trigger nozzle 25 are shown in a position of non-use held by support member 26. When the attendant pulls the trigger mechanism 28 on nozzle 25, a valve solenoid (not shown) is energized thereby opening a valve in series with the reservoir of gasoline and permitting the gasoline to flow. Present day nozzles include a lock mechanism for the trigger so that the nozzle may be left in the automobile while the attendant performs other tasks. Unlocking the trigger manually stops the flow of gasoline or in certain cases, when the automobile tank is filled, the nozzle reacts automatically to the fluid level and stops the flow of gasoline without the aid of the attendant. However, unless a full tank is experienced, the so called wet nozzle cannot react automatically to stop the gasoline flow.

In order to overcome this difficulty, a control apparatus designated generally by the numeral 30 in FIG. 1, is provided. This apparatus includes 2 rows of selector mechanisms 32 and 34 accessible to the customer or service attendant. Each row contains a plurality of depressible parts or buttons 36 which bear indicia representative of dollar amounts in row 32, and gallon amounts in row 34. If the customer orders five dollars worth of gasoline, for example, the button bearing the indicia "5" in row 32 is pressed and, due to a conventional locking mechanism, remains in a depressed position. This closes a portion of a circuit in the apparatus 30 as will be hereinafter more fully explained with reference to FIG. 6. Similarly, the customer may order a certain number of gallons of gasoline; in that event an appropriate button in row 34 is depressed. It will be appreciated that any number of buttons may be used to achieve any desired increment of volume of gasoline to be dispensed as measured in cost units (dollars) or volume units (gallons) and the number shown in FIG. 1 is merely for illustrative purposes. Furthermore, with the use of an appropriate units scale, only one row of buttons may be used.

The control apparatus 30 functions to interrupt the operation of the motor which drives the dispensing pump or to close the valve in the pump when a volume of gasoline corresponding to the amount indicated on the depressed button 36 has been dispensed. This is accomplished by the apparatus illustrated in FIG. 6 together with the detection means shown in operating positions in FIGS. 2, 3, 4 and 7. Referring now to FIGS. 2 and 7, a sprocket wheel 38 is rotatably mounted on a shaft 40 and is driven by the linkage mechanism in a conventional computer counter. As shown in FIG. 7, the wheel 38 meshes with hub gear 39 which is connected in the operating mode to dollar wheel 16. Tens wheel 17 is connected to hub on pin assembly 41. Each time tens wheel 17 is turned one complete revolution because a dollar of gasoline has been dispensed, pin 41 engages sprocket wheel 38 and moves it one increment. Dollar wheel 16 is then moved one increment through sprocket wheel 38 and hub gear 39.

Referring again to FIG. 2, a similar aprocket wheel 42 rotatably mounted on shaft 44 and is also driven by the same driving mechanism (not shown) that drives the computer counter generally. Wheel 42 is representative of the volume of gasoline dispensed in gallons. Detection means 46 and 48 are mounted on frame 50 in position above wheels 38 and 42 respectively. Frame 50 is supported on base 52, which is a part of the housing of the gasoline dispenser. Each detection means 46, 48 comprises a micro-switch having a member 54 and 56 extending into the area between teeth 58 on the wheels 38 and 42 as shown best in FIGS. 3 and 4.

Because sprocket wheel 38 is located immediately below the top of the housing 50, the micro-switch 46 may be mounted in the control apparatus 30 which is positioned on top of the dispensing pump 10. A small hole is drilled through the top of housing 50 through which the extended member 54 is passed so that it is

positioned between teeth **58** on wheel **38.** In this way, the movement of the dollar wheel may be sensed without any attachment to the internal computer counter.

Referring to FIGS. **3** and **4,** the member **54** is actually an extension of an actuating device **55** in the switch **46.** The device includes a ball **57** and cone shaped part **59** which cooperate to actuate switch **60,** as shown in FIG. **4,** when any tooth **58** moves into engagement with member **54.** This engagement occurs each time the dollar sprocket wheel **38** (or the gallon sprocket wheel **42**) is moved one increment due to the dispensing of another dollar's worth of gasoline. After the full movement of one tooth of wheel **38** occurs for a one dollar increment, the arm **54** then is positioned in the next space between teeth **58** such as space **62** in FIG. **4.** Device **55** is disengaged from switch **60** when member **54** is positioned in space **62,** thus again opening the momentarily closed electrical circuit until the next dollar amount is registered. In this manner, a closed circuit occurs only when a dollar amount (or gallon amount) is reached during the dispensing cycle and then only for a brief period. The same effect may be achieved by positioning the member **54** normally in contact with a tooth **58** as shown in FIG. **4** and releasing it into the space between teeth when a dollar amount is dispensed as shown in FIG. **3.** This effectively reverses the action of switch **60** which may be normally open and closed when disengaged from device **55.** It is understood that the operation of device **55** is highly illustrative and any suitable device may be employed.

The closing of the circuit accomplished by switch **46** or switch **48** is sufficient to transmit a signal through another portion of the circuitry of control apparatus **30** as best shown in FIG. **6** which is hereinafter described with reference to the dollar cost only. As there shown, lower branch **64** includes switch **46** and when that switch is closed, a voltage from source V across branch **64** sends a current through this branch. The current is able to flow through the row of buttons **32** because button **66** representing the three dollar amount has been preset on the control apparatus by the attendant and is maintained in a closed position after being depressed. The current through this branch **64** passes through coil **68** which is a part of switch **69** and which actuates stepping arm **70** to move to position **1** on contact points **72.** Thereafter each time another dollar amount is dispensed during a dispensing cycle, switch **46** closes and contact arm **70** steps another increment to the next contact point on switch **69.**

After the three dollar level has been reached in dispensing gasoline, arm **70** is connected to contact point **3** of contact points **72** and a closed circuit is achieved in branch **74** due to the closed position of button **66** in that branch. When arm **70** is connected to point **3,** branch **74** includes coil **76** which is part of a double pole switch including switches **78** and **80** which are normally open. When branch **74** is closed, a voltage is placed across this branch from the secondary winding **82** of transformer **84.** Voltage across the primary winding **83** of this transformer is present from the action of the voltage source V when switch **21** is closed. Switch **21** is the motor switch on the pump **10** and is closed when depressed by the service attendant. When current flows in branch **74** therefore, coil **76** is actuated and switches **78** and **80** are closed. Switch **78** therefore closes branch **86** and coil **88** is actuated by source V.

Coil **88** is part of a relay which includes arm **90.** Actuation of arm **90** causes it to move to point **92** and thereby open the circuit between source V and motor M. The movement of motor M is therefore interrupted and the gasoline dispensing cycle is stopped. Of course, instead of interrupting motor M, the circuit may be connected to a solenoid which opens and closes the valve between the primary pump and the dispensing mechanism. When arm **90** is moved to point **92,** the valve is closed thereby stopping the flow of gasoline from the dispensing pump.

Summarizing the operation of the control apparatus, a service attendant presets a desired quantity of gasoline to be dispensed by pressing a button **66** on the control apparatus **30** and thereby presets either a dollar amount or a volume amount measured in gallons. Switch **21** is closed thereby starting the motor M. Pressing trigger **28** on hose nozzle **25** opens a valve and permits gasoline to flow. Each time wobble switch **46** (FIG. **2**) is engaged by a tooth **58,** another dollar or gallon amount has been dispensed. Each time this occurs, a signal from source V is transmitted through switch **46** to coil **68** which in turn causes stepping arm **70** to move one position. When stepping arm **70** moves to a position corresponding to the preset position of button **66,** coils **76** and **88** are actuated and the movement of motor M is interrupted due to the repositioning of arm **90.**

The apparatus of the invention includes automatic resetting mechanisms for reestablishing the apparatus for the next dispensing cycle. For example, when contact arm **90** moves to contact point **92,** branch **94** is closed and solenoids **96** and **98** are activated. Solenoid **96** deactuates button **66** which had remained depressed and this causes branches **64** and **74** to again be opened. Solenoid **98** returns arm **70** on stepping switch **69** to its zero position and switch **21** is opened when the lever arm on the pump is turned by the attendant. This in turn deactuates coil **76** and opens arms **78** and **80.** Thus the entire circuit is restored to its zero operational mode and is ready for the next cycle. Either at the end of one cycle or at the beginning of the next, reset arm **22** is cranked so that the indicator wheels for dollars and gallons are returned to zero. This reset action does not affect sprocket wheel **38** since gears **39** and **41** (FIG. **7**) are disengaged from indicator wheels **16** and **17** during the reset cycle. Since sprocket wheel **38** is not moved, switch **46** and the rest of the control circuit are not affected.

When the cycle is complete, an indicator of some type may be used to signal the attendant. Light bulb **100** in FIG. **6** is also actuated when solenoids **96** and **98** are energized and flashes for the attendant. This light may be placed on top of the control apparatus as shown best in FIG. **1.** Other lights such as those designated by numeral **102** in FIG. **6** may be provided for night usage of the device.

It will be appreciated that many modifications may be made in the apparatus of the invention without departing from the scope of the invention. For example, transistorized components may be employed in place of the relays shown. Also, other remote detection means such as an electron sensing beam, may be used in place of the switch **46** provided that an electrical signal may be transmitted thereby at incremental changes in dispensed gasoline quantities and provided that no attachment to the computer counter is necessitated. Further-

more, the circuitry may be simplified somewhat as shown in FIG. **5.** Referring to FIG. **5,** stepping switch **69** is electrically connected between voltage source V and motor M through the switch **21.** The stepping switch **69** includes a presettable arm **104** and a plurality of indicia (numbered **0** through **8** in the illustration) indicative of a dollar amount or gallon amount of gasoline to be dispensed. Each contact point **106** at the indicia is connected to the next contact point by a short circuiting wire **108.** Wobble switch **46** is connected to a sprocket wheel in the same manner as described with reference to FIGS. **2–4.**

In the operation of the apparatus of FIG. **5,** an attendant moves arm **104** to a contact point representative of the amount of gasoline to be dispensed such as to the numeral "**3**" representing three dollars. When switch **21** is closed, there is a complete circuit in branch **110** and motor M drives the pump. Each time a dollar amount is dispensed, the wobble switch **46** closes as above described and coil **68** is energized from voltage source V. This in turn causes arm **104** to move one increment toward zero. Since the wires **106** connect each contact point (except the zero contact point) to branch **110** through arm **104,** branch **110** remains closed and dispensing continues until the zero point is reached. At this point, branch **110** is opened and the motor is stopped.

From the foregoing, it will be appreciated that an excellent control of a gasoline dispensing pump may be achieved with a very simple control apparatus without the necessity of any attachment to the internal mechanisms of the pump. No interference with or connection to the sensitive computer counter is required thereby rendering the remote sensing ability of the control apparatus quite valuable commercially to the consumer and gasoline station owner alike.

What is claimed is:

1. A control apparatus for use with gasoline dispensing equipment which equipment includes a computer counter of the indicating type rotatable in synchronism with the flow of gasoline through said equipment, said counter having at least one rotatable wheel with a plurality of projecting teeth positioned along the periphery thereof, said control apparatus consisting of a housing, an elongated finger projecting outwardly from said housing and being directly positioned in the area between two adjacent teeth on said rotatable wheel of said counter by passing through a small opening in the housing enclosing said counter and into said area between adjacent teeth and to engage sequentially and individually successive teeth of said plurality of teeth on said wheel when said counter moves to positions equivalent to predetermined volume levels of dispensed gasoline, said finger being unattached to said counter, and said control apparatus having no associated parts attached to said counter, said finger assuming a first position when said counter is not at said predetermined volume levels and being urged to a second position by said wheel when said counter is at said volume levels, a first electrical switch connected to said extended finger and actuated thereby to transmit an electrical signal when said finger is in said second position, sensing means operatively connected to said first electrical switch for receiving said electrical signal and assuming an operational mode corresponding to the amount of gasoline dispensed as measured by the position of said counter; control means for presetting a specific volume of gasoline to be dispensed and cooperating with said sensing means when said counter mechanism is moved to a position corresponding to the preset volume of gasoline; and second switch means operatively connected to said sensing means and effective to interrupt the flow of gasoline through said dispensing equipment when said sensing means and said control means cooperate thereby stopping the flow of gasoline from said pump at said preset value.

2. In the control apparatus of claim **1,** in which said sensing means comprises third switch means operatively connected to said first switch means to assume one of several operating modes corresponding to the position of said counter in response to the actuation of said first switch means; reset means operatively connected to said third switch means to reset said third switch means to an operating mode corresponding to a zero volume dispensing position of said counter when the flow of gasoline has been interrupted.

3. The control apparatus of claim **2,** in which said control means consists of fourth switch means comprising a group of individual parts to be manually actuated and to remain actuated during the movement of said counter, said parts bearing indicia representing total volume of gasoline to be dispensed, said parts altering electrically the electrical circuit of said control apparatus to which they are attached when actuated, and deactuated.

4. In the control apparatus of claim **3,** means for deactuating said actuated part when the flow of said gasoline has been interrupted.

* * * * *