United States Patent

Somers

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[45] **May 9, 1972**

[54] POST PAY CONTROL SYSTEM

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[73] Assignee: **Veeder Industries Inc.,** Hartford, Conn.

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[21] Appl. No.: **29,446**

[52] **U.S. Cl.** .....**235/92 FL,** 235/151.34, 235/94, 235/92 R, 222/26

[51] **Int. Cl.**.....**G01f 11/00**

[58] **Field of Search** .....235/144 D, 94, 151.34, 92 FL, 235/92 FP, 92 J; 222/26, 34, 35

[56] **References Cited**

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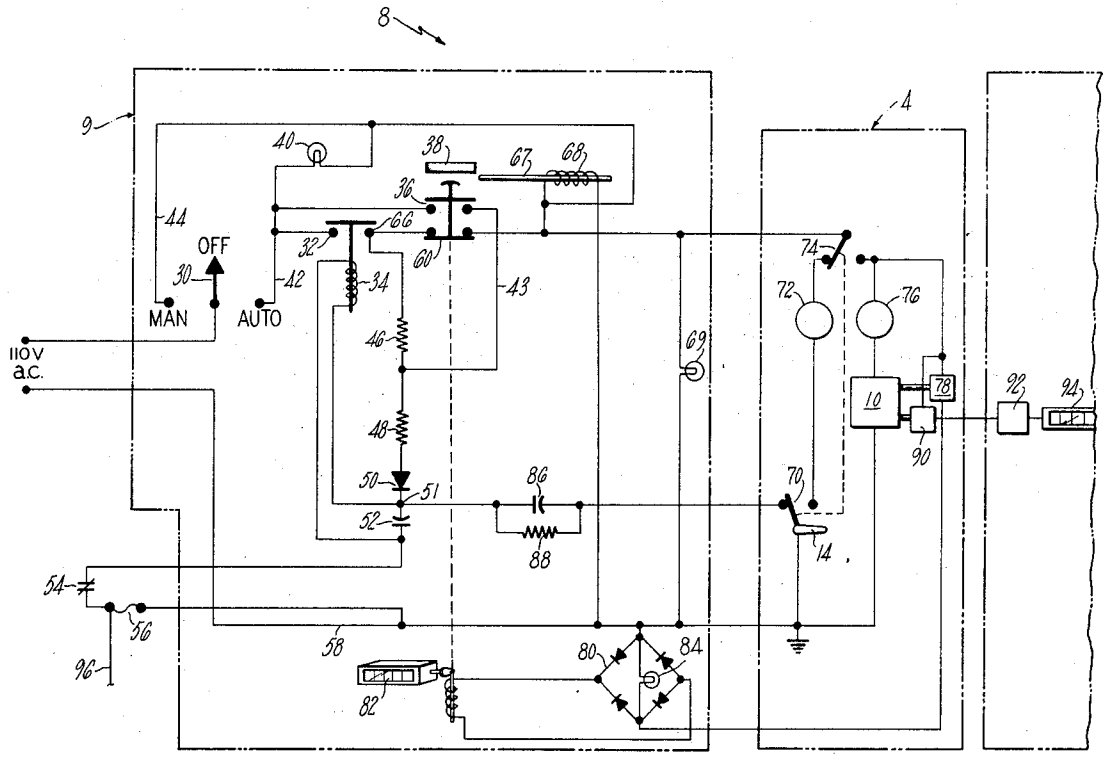
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Primary Examiner—Maynard R. Wilbur
Assistant Examiner—Joseph M. Thesz, Jr.
Attorney—Prutzman, Hayes, Kalb & Chilton

[57] **ABSTRACT**

A self-service automotive service station is provided with an electrical control system for controlling and recording the dispensing of fuel at a remote location including a momentary contact switch for energizing a remote relay which is latched in during each dispensing operation and a switch at the dispensing station which momentarily shunts the relay coil at the end of each dispensing operation through a capacitor to open the relay. The system includes interlocks for preventing the resetting of the remote register during operation and for assuring the complete resetting of the register prior to the energization of the coil. It may include a remote cumulative register which is not disabled during attendant operation.

13 Claims, 5 Drawing Figures



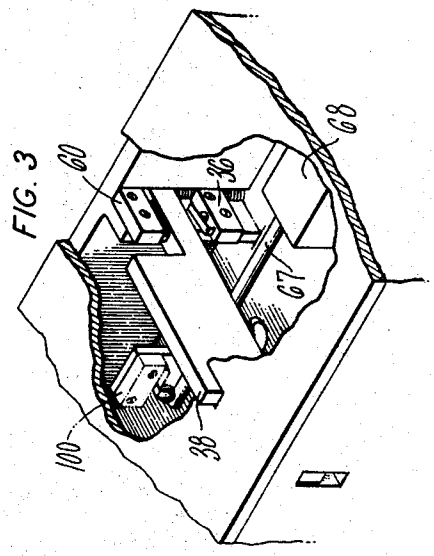


FIG. 3

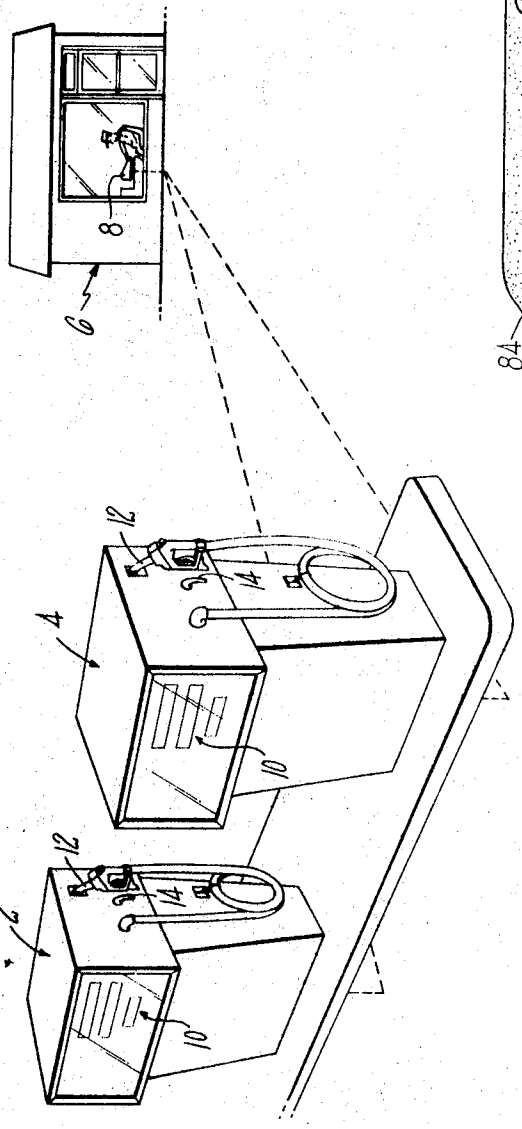


FIG. 1

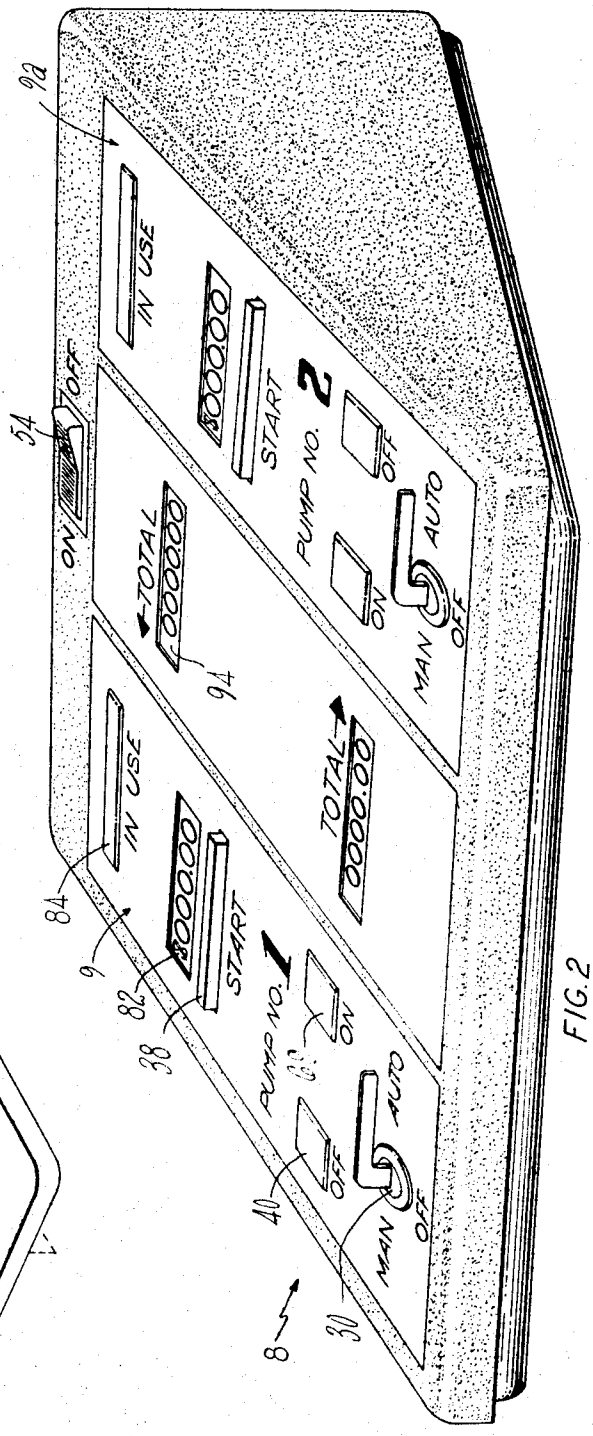


FIG. 2

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ATTORNEYS

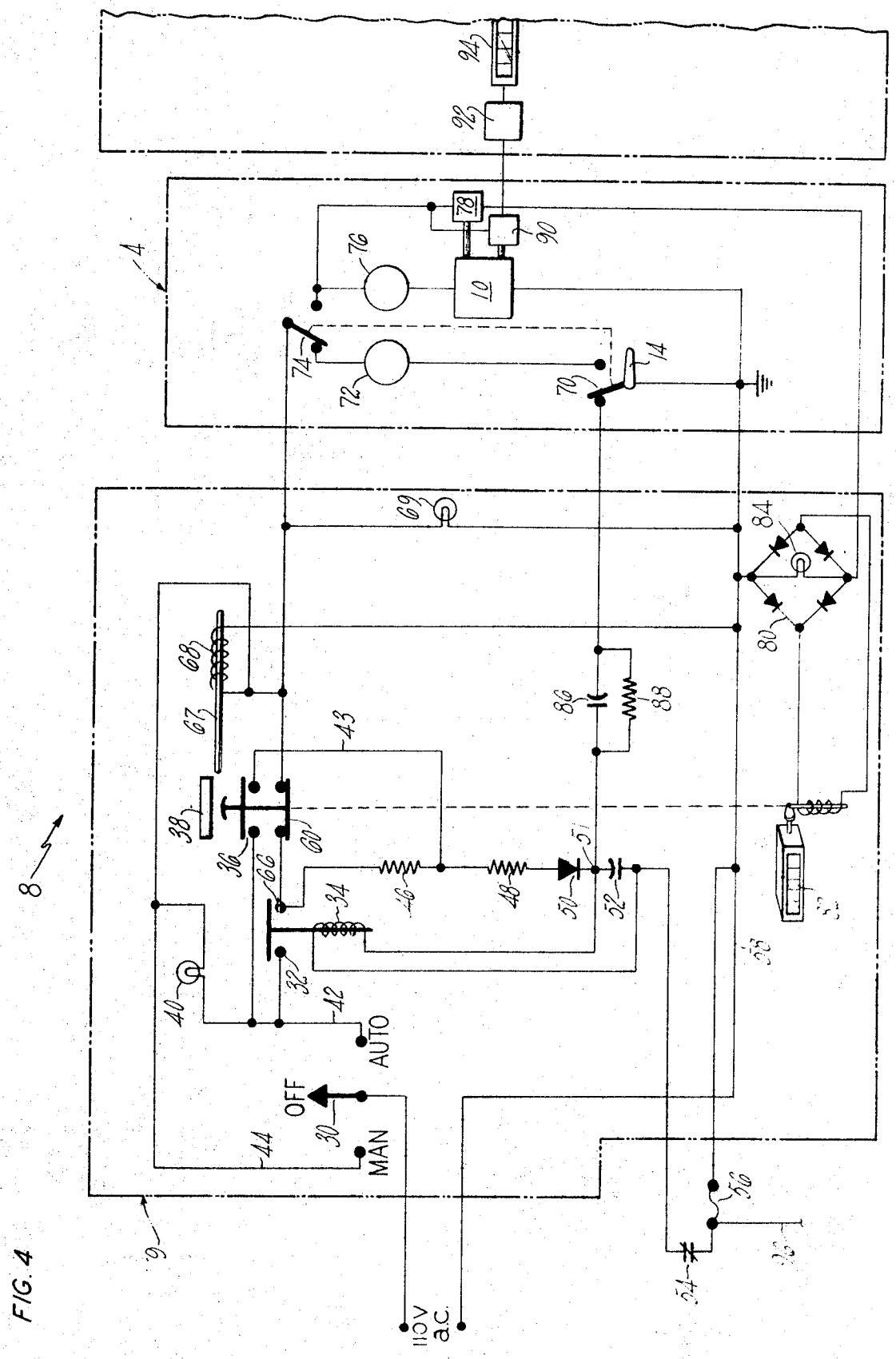

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110V a.c.

FIG. 4

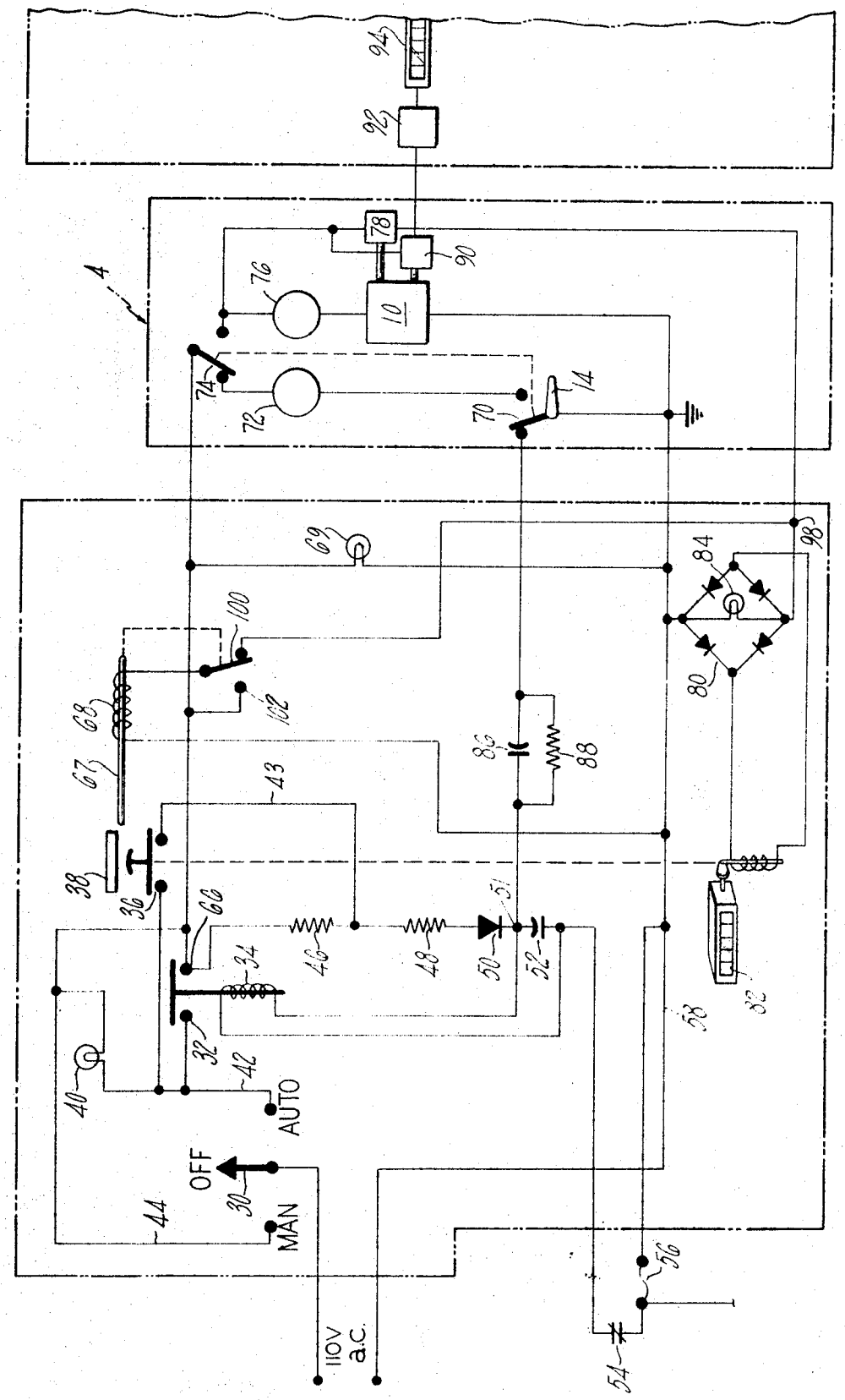

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FIG. 5

POST PAY CONTROL SYSTEM

The present invention relates generally to counting devices and has special utility in connection with self-service dispensing systems for automotive service stations wherein the service station attendant can control the dispensing of fuel by customers from a remote location.

It is an object of this invention to provide an improved self-service dispensing system wherein the attendant can remotely control a pump for customer dispensing. Included in this object is the provision of a remote console having controls for the resetting of the pump registers and the conditioning of the pump for delivery of fuel by the customer.

Another object of this invention is to provide an improved remote control of a self-service dispensing system wherein the attendant is provided with a remote register which is correlated with the register on the dispensing pump and which is reset by the attendant when the pump register is reset. Included in this object is the provision of interlocking means for preventing the resetting of the remote indicator during the delivery of fuel.

Still another object of this invention is to provide an improved remote control for conditioning a dispensing pump for the self-service dispensing of fuel by a customer wherein the complete resetting of the remote register and the pump register is assured before the pump is conditioned for self-service operation. Included in this object is the provision of means for assuring that the readings on the remote register and the pump register are the same at all times.

A still further object of this invention is to provide a remote control for a self-service dispensing system of the type referred to which is of simple design, and compact in size, has a minimum number of parts so that it is inexpensive to manufacture, and requires minimum maintenance.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth.

In the drawings:

FIG. 1 is a diagrammatic view of a retail fuel dispensing station having a remote control in accordance with this invention;

FIG. 2 is an enlarged perspective view of the remote control console of FIG. 1;

FIG. 3 is an enlarged fragmentary perspective schematic illustration of certain interlocking features of the reset bar of the remote control console of FIG. 2;

FIG. 4 is a schematic circuit diagram showing the circuitry for one of the remote control pumps of FIG. 1; and

FIG. 5 is a schematic circuit diagram similar to FIG. 4 and showing a modified form of the control circuit of this invention.

Referring to the drawings and particularly to FIG. 1, a fuel dispensing service station is shown as generally including a pair of pumps 2 and 4 mounted in side by side relation on the island at the service station and in spaced relation relative to the attendant's station 6 where a remote control console 8 is located. The pumps 2 and 4 are similarly constructed and generally include the usual computer 10 which is driven in accordance with the flow of fuel through the pump nozzle 12 and is provided with the customary registers which are responsive to a flow meter to visually display the quantity and cost of the fuel dispensed from a storage tank (not shown).

Each of the pumps 2 and 4 is provided with a manually operable crank or handle 14 which is adapted to actuate a switch for resetting the computer 10 and then operating the usual motor driven pump (or solenoid valve) as is disclosed, for example in U.S. Pat. Nos. 3,142,442—Wild and 3,216,659—Ambler et al., both of which are assigned to the assignee of the present invention.

In electrically actuated mechanical reset mechanisms of the type disclosed in these patents, the movable element of switch 70 is fixed to rotate with the handle 14 while the movable element of switch 74 is so connected to the reset mechanism that it rotates to the right (as viewed in FIG. 4) by a cam powered by the reset motor 72 but shifts to the left, along with the movable element of switch 70, when the handle 14 is moved to its "off" position following the dispensing of fuel. These reset mechanisms also shift the movable element of switch 74 to the right to deliver power to the pump motor 76 after the computer 10 is reset so that the readings on the quantity and cost registers of the computer are erased before each delivery is commenced.

Refer now primarily to FIGS. 2 and 4 for a detailed description of the remote control of this invention. As shown, the console 8 is provided with a module 9 for controlling pump 4. Module 9 is provided with a removable three-position key which operates a switch 30 having off, manual and automatic (or remote control) positions. When the key is turned for automatic operation, one side of the 110 V AC power is applied to terminal 32 of an AC power control relay 34 and to a switch 36. Power is applied to signal light 40 through conductors 42, 44 to indicate that the control is available for the remote control of the delivery, the circuit to signal light 40 being completed through switch 60, resistors 46, 48, diode 50, capacitor 52, emergency switch 54, and fuse 56 to the other side 58 of the power line. The switch 54 is normally closed but may be opened to cut off power to the pump 4.

When the attendant wishes to authorize the self-service delivery of fuel at pump 4, he depresses manual reset bar 38 to reset the remote register 82 in a known manner such as through the mechanical reset mechanism of U.S. Pat. No. 3,244,368 issued Apr. 5, 1966 and assigned to the assignee of this application. This also opens the switch 60 and then closes the switch 36.

The closing of switch 36 connects conductor 42 to conductor 43 to complete the circuit through resistor 48, diode 50, capacitor 52, switch 54 and fuse 56. This connection bypasses dropping resistor 46 and as the voltage across the capacitor 52 builds up, the relay 34 is energized to close the relay contacts 32, 66. This provides a shunt across signal light 40, which is turned off. As the manual reset bar 38 is released to open switch 36, the capacitor 52 provides a time delay to maintain the relay 34 in its energized state until the switch 60 is closed.

The opening of switch 36 interrupts power to conductor 43. However, since relay 34 is closed, voltage is applied across relay 34 through the dropping resistor 46. Resistor 46 has a value so selected as to provide a voltage across relay 34 at a level just above its dropout level. Thus, the relay 34 is latched in and power is available at switch 74 of pump 4 for the dispensing of fuel.

The light 69 is turned on to indicate that power is available at the pump 4.

A diode 50 is provided to pass only a half cycle of the applied AC voltage to reduce the effective voltage applied across the relay 34. This also permits the use of electrolytic capacitors and reduces the heat dissipation capacity required of series resistor 48 to approximately one-quarter of what would be required if diode 50 were not used. As a result, resistor 48 may be an inexpensive carbon resistor having an inadequate capacity for dissipating the heat that would otherwise be generated if the attendant should hold the reset bar 38 down for a long period during reset.

According to one aspect of this invention, interlock means are provided to ensure that the attendant completely resets the counter 82 before a subsequent use of the pump 4. As shown in FIG. 3, the switch 36 which energizes the relay 34 is positioned so that it closes at the bottommost position of the reset bar 38. Moreover, because of the time delay provided by the capacitor 52, the reset bar 38 must be held in its depressed position for a brief period, say two seconds, before relay 34 picks up. This delay provides assurance that the counter wheels of the counter are fully reset to zero readings and come to a complete halt so that the counter wheels remain at zero positions as their drive pinions re-engage the wheels following reset of register 82.

Another feature of this invention is the provision of means to prevent the resetting of the remote register **82** during the dispensing of fuel.

As shown, an interlock solenoid **68** is also energized when reset bar **38** is released and switch **60** recloses so that its armature **67** is moved to the left into the path of travel of reset bar **38** to prevent it from being depressed until solenoid **68** (and relay **34**) is de-energized.

With power available at switch **74**, the customer may dispense fuel by removing the dispensing nozzle **12** from its support bracket on the pump **4**, turning the reset handle **14** "on" to close switch **70** and apply power across reset motor **72** which operates automatically to reset the quantity and cost registers of the computer **10** of the pump. With reset mechanisms of the type described in the aforesaid Wild and Ambler et al. patents, the reset motor **72**, at the end of the reset operation, shifts its switch **74** to the right so that power is delivered to the motor pump **76** and the customer may dispense fuel by opening the manual valve of the discharge nozzle **12**. The quantity and cost of the fuel dispensed are recorded on the registers of the computer **10** in the usual manner.

For providing an indication of the price of the fuel dispensed on a remote register **82** of the control console **8**, a pulse transmitter, such as a magnetically operated reed switch, **78** is geared to the computer cents wheel and is connected in series with a full-wave rectifier bridge **80** between the switch **74** and the power line **58**. As fuel is delivered, the closing of the reed switch **78** produces pulses corresponding to the number of cents of fuel being dispensed and the full wave rectifier bridge **80** produces pulses in the solenoid coil of counter **82** which causes the counter to register the cost of the fuel being delivered. A flasher light **84** connected across the bridge rectifier **80** flashes on and off at a speed corresponding to the operation of reed switch **78** to give a visual indication of the functioning of the remote recording system.

After the desired quantity of fuel has been dispensed, the customer moves the pump handle **14** to its "off" position. With the reset mechanisms of the type disclosed by the aforesaid Wild and Ambler et al. patents, this causes the movable element of switch **74** to move to the left so that power cannot be transmitted to the motor pump **76** and also rotates the movable element of switch **70** to the left.

In accordance with an important aspect of this invention, means are provided for interrupting power to the pump when the customer returns the handle **14** to its "off" position. As shown in FIG. **4**, switch **70**, when in its left position connects terminal **51** to ground through capacitor **86**. When so connected, capacitor **86**, which is of sufficient size to overpower capacitor **52**, say 10 times as large, provides a transient short circuit between the terminal **51** and ground to apply a zero voltage across relay **34**. This causes relay **34** to drop out and interrupt the power to pump **4**, and the customer may no longer dispense fuel from pump **4**. Resistor **88** serves to dissipate any charge stored in capacitor **86**.

When the attendant desires to make the pump available for a subsequent self-service delivery of fuel, he again depresses the reset bar **38** which resets the remote register **82**.

As stated above, as soon as power is available at switch **74** and handle **14** is rotated to shift switch **70** to its "on" position, the reset motor **72** is energized to reset computer **10**.

Pulser **78** is mounted on a reset shaft of computer **10** which rotates during reset. However, the operation of pulser **78** during reset does not produce pulses counted by the register **82** since switch **74** delivers no power to pulser **78** during reset. Thus, the resetting of the computer **10** by the reset motor **72** does not change the reading on the remote counter **82** from its zero setting. In this connection, by mounting the pulser **78** on the reset shaft which is always returned to the same zero position as a result of the resetting of the computer **10**, the pulser **78** may be adjusted to an open position at the zero reset position. This assures that a chance pulse will not be recorded on the counter **82** when power is applied to switch **74** at the end of the resetting of the computer **10** but before the delivery of fuel.

If desired, a second pulser **90** may be mounted to be driven by a nonresettable shaft of computer **10**. Where pulser **90** is mounted on such a shaft associated with the quantity of fuel delivered, it will provide a signal which may be used to actuate a quantity register **94** to provide the total quantity of fuel dispensed by a given pump in any period of time. The signals produced by such a pulser may be passed to register **94** through a bridge circuit **92** similar to bridge circuit **80**.

A second control module **9a** having a control circuit the same as that shown for module **9** in FIG. **4**, may be provided in remote control console **8** to control the operation of pump **2**. Such a module may be connected to AC power by conductor **96** so that emergency switch **54** controls the power to both pump **2** and pump **4**. If desired, further control modules for controlling the pumps may be similarly provided.

The remote control system of this invention accommodates conventional service station operation where the attendant rather than the customer dispenses the fuel. Where such operation is desired, the key operated switch **30** may be shifted to its manual position. This bypasses the relay **34** and delivers power directly to the pump mounted reset switch **74** for conventional operation. With such operation, the remote register **82** will indicate the total dollar amount of the fuel dispensed and the remote indicator **94** will provide an indication of the total quantity of the fuel dispensed.

Referring now to FIG. **5** in which like numerals refer to like parts of FIG. **4**, there is shown the schematic diagram circuit for a modified form of the present invention. In this modified form, the remote reset bar **38** actuates a switch **36** which energizes relay **34** in the same manner as in the embodiment illustrated in FIG. **4**. In this design, however, the switch **60** is eliminated so that power is immediately available at the switch **74** of the pump **4**. Moreover, the interlock solenoid **68** is not energized upon the release of the reset bar **38** but rather is connected at **98** to the output circuit for the pulser **78** so that the first "pulse" produced by the pulser **78** energizes solenoid **68** and moves its armature **67** to the left into the path of reset bar **38** to lock the reset bar against reset. As the armature **67** is moved to the left, it also moves the movable switch element of switch **100** to the left (shown in phantom in FIG. **3**) to complete a circuit with contact **102** to self-latch the solenoid **68** in its energized stated. With this design, the reset bar may be depressed at any time until the customer begins to dispense fuel, otherwise this embodiment is identical to that illustrated in FIG. **4**.

From the foregoing, it will be apparent that this invention provides a remote control suitable for either self-service or conventional attendant service. This control is of simple design and reliable in performance and provides interlocking features which assure that the remote attendant has full control of the dispensing of fuel under all circumstances, that the readings on the pump and the remote register are identical to safeguard the interests of both the customer and the station operator and further provides an arrangement for maintaining an accurate inventory of the fuel dispensed through either conventional or self-service operation.

As will be apparent to persons skilled in the art, various modifications, adaptations and variations of the foregoing specific disclosure can be made without departing from the teachings of the present invention.

I claim:

1. In a dispensing apparatus disposed at a fuel dispensing stand and having a dispensing conduit, supply means for delivering fuel under pressure to said conduit, a meter in said conduit for measuring the fuel flowing therethrough, and an outlet nozzle for the conduit, the improvement comprising electric control means including a relay located remotely from said dispensing stand for controlling the delivery of power to said supply means, a momentary contact switch for energizing said relay to a first level sufficient to actuate the same, an impedance, electric circuit means for connecting the impedance in circuit relation with the coil of said relay after the momentary contact switch is actuated to energize the coil at a second level just above its dropout voltage to latch the relay in its

closed position, and a switch controlled by the operating of the apparatus at said dispensing stand for deenergizing the relay coil to open the relay.

2. A device as recited in claim 1 wherein said last mentioned switch connects a capacitor in shunt across the relay coil.

3. A device as recited in claim 1 wherein a remote register is provided to give a reading indicative of the amount of fuel dispensed through said nozzle, switching means driven in response to the operation of said meter generates signals for actuating said register, and said remote register includes a reset mechanism actuated simultaneously with said momentary contact switch.

4. A device as recited in claim 3 including a capacitor connected in shunt with said relay coil to delay the energization of said coil to ensure the complete resetting of said remote register prior to the closing of said relay.

5. A device as recited in claim 3 wherein a single operator actuates said reset mechanism and closes said momentary contact switch, said momentary contact switch being closed at the end of the stroke of said operator to ensure the complete resetting of said remote register.

6. A device as recited in claim 5 including a solenoid which is energized after the release of said operator, said solenoid having a plunger which latches the operator against subsequent operation until after said relay coil is de-energized.

7. A device as recited in claim 6 wherein said solenoid is energized in response to the first signal generated by said signal generating switching means during each dispensing operation.

8. A device as recited in claim 1 wherein a diode is connected in series with said relay coil.

9. A device as recited in claim 3 wherein said dispensing apparatus includes computing register means disposed at said dispensing stand and driven in response to the operation of said meter, said computing register means having an electrically driven reset mechanism for resetting said computing register means prior to the availability of power to said supply means for each dispensing operation, said signal generating switching means being actuated in response to the operation of a reset shaft of said dispensing apparatus, and means are provided for preventing said switching means from delivering a signal to the remote register during reset of said computing register means.

10. A device as recited in claim 9 wherein said switching means comprises a switch adjusted to its open position when said computing register means is reset to its zero position.

11. A device as recited in claim 3 including a non-resettable remote register actuated in response to the operation of said meter to provide a cumulative reading indicative of the total fuel dispensed by said apparatus.

12. A device as recited in claim 3 including a master control switch for conditioning the apparatus for manual use, said control means being ineffective to disable said remote register.

13. A device as recited in claim 1 wherein the impedance is a resistor connected in series with the coil of said relay.

* * * * *