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T. J. MESH

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FLUID DISPENSER HAVING MULTIPLE SIGNAL GENERATORS

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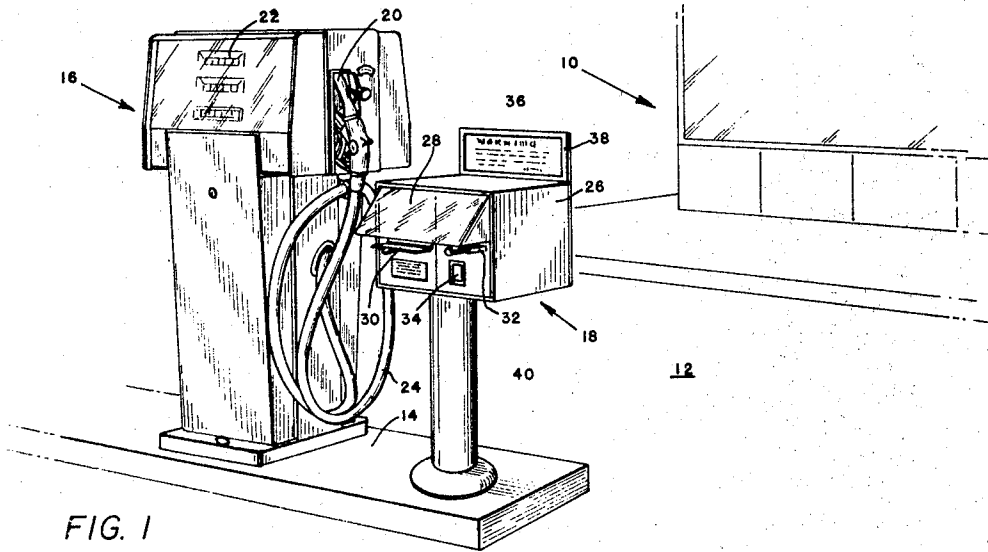


FIG. 1

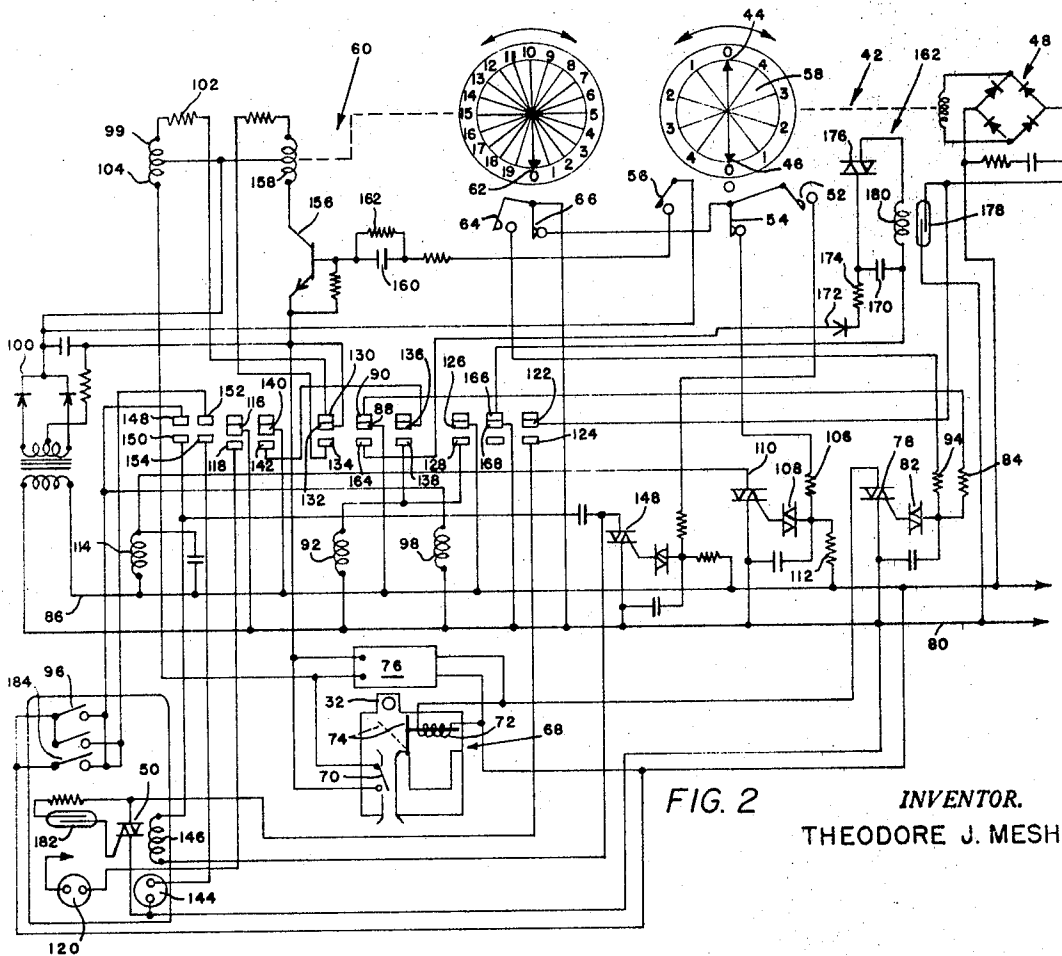


FIG. 2

INVENTOR.
THEODORE J. MESH

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FLUID DISPENSER HAVING MULTIPLE SIGNAL GENERATORS

Theodore J. Mesh, Greensboro, N.C., assignor to Gilbert & Barker Manufacturing Company, New York, N.Y., a corporation of Massachusetts

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12 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates to the dispensing of fluids and more particularly is directed to a money or token-operated dispensing system in which a quantity of fluid to be dispensed is pre-selected by the introduction of a pre-determined number of coins and/or bills, these providing signal indications which are stored by counter means until fluid dispensation is initiated. The counter means then counts down from the total information stored until the stored delivery signals, which are commensurate with the total quantity of fluid to be dispensed, have been delivered and the dispensing operation is terminated. Additionally, the present invention includes an accelerated pulsing device simulating fluid delivery to penalize one who tampers with the pump after fluid delivery has commenced as well as a circuit-initiated slow-down feature to avoid pump motor drift or overrun and thus insure proper computer price registration.

Background, brief summary and objectives of the invention

For many reasons, not the least of which is the ability to eliminate the expense of a number of attendants and provide self-service facilities, it is desirable to equip gasoline pumps so that they can be set to deliver a pre-selected volume of fuel which can then be obtained directly by the customer. The presetting of a plurality of pumps can thus be controlled from a remote location by a single operator who, after collecting the amount of money commensurate with the requested volume, could adjust a control panel so as to pre-set precisely the volume of fuel which a selected pump will deliver. Representative of such a system is my application Serial No. 625,897, filed Mar. 1, 1967, for a pre-set automatic dispensing system.

As an alternative, pumps may be equipped with associated apparatus which will accept and totalize currency and bills deposited therein which deposit will pre-set the pump to deliver an amount of fuel commensurate with money thus introduced. Such coin-operated systems are usually installed in station areas where no attendants are present, and thus station operation may be maintained around the clock.

While coin-operated systems have been generally accepted, a number of operational hazards are present due principally to vandalism where the coin boxes are destroyed and robbed or where a variety of schemes and techniques have been employed to milk the pump so that an unlimited amount of gasoline may be obtained for a nominal amount of money. The risks involved in maintaining coin-operated systems have in a great many instances precluded the provision of such installations and caused other initially installed systems to be abandoned.

Since increments of five cents are usually adequate for pulsing counters in coin-operated dispensing systems, a favorite defrauding trick used to draw unlimited quantities of gasoline after inserting a nominal amount of money sufficient to initiate gasoline delivery is to actuate the pump and deliver up to four cents worth of gasoline which

will not be sufficient to cause the counter to commence its pulsing operation. The pump will then be shut down, the computer re-cycled because of the shut-down, and the operation repeated whereby another four-cent delivery is withdrawn and the pump again deactivated. This technique can be continued until all gasoline available to the pump is withdrawn so long as the delivery never reaches the five-cent mark which would commence the operation of the counter.

To overcome this commonly used technique, the present invention incorporates circuitry which will result in cancellation of money at the rate of about a dollar in five seconds, which cancellation will continue so long as the pump handle is in the "Off" position. Since appreciable time is required for the electric re-set device to reclose the pump, once the switch is off, at least fifty cents will be lost. In the event the switch is left off for any appreciable time, complete cancellation of any money inserted in the pump results and no more money will be accepted after a delivery which does not use up all deposited money until complete cancellation is completed.

The present invention basically incorporates circuitry for dispensing automatically a pre-determined quantity of fluid according to the input of a selected amount of bills, currency and the like and specifically includes a coin and bill-operated pulse generator, the pulses from which are stored by one or more counters and according to the needs of a particular application so that when the pump is operated, second independently generated signals resulting from that pump operation cause the counter to count down from the total stored therein until a quantity of fluid commensurate with that total is dispensed. Circuitry is then provided to disable the pump and thus terminate delivery of fluid when the stored signals have been depleted.

Since the pump nozzle has a main solenoid-operated valve and a by-pass valve, a slow down feature incorporated allows a signal generated at a selected time prior to the delivery of all stored signals to close the main valve and allow fluid to pass through the by-pass valve at a much slower rate thus avoiding pump motor overrun and computer registration reflecting this overrun.

The vandal-proof circuitry contains a separate generating device which becomes substituted for the pump generating device upon abnormal pump operation and generates signals that simulate delivery of quantities of fluid to activate the counter and count down the stored information at a much greater rate than would be the case if fluid were being dispensed under normal conditions.

With the foregoing in mind, it is therefore an express object of the present invention to control fluid dispensing through a pre-set apparatus.

Another object of the present invention is to provide a coin-operated fluid dispensing apparatus which may be pre-set by the introduction of coins and/or bills to deliver a specified amount of fuel.

Still another object of the present invention is to provide a coin-operated fluid dispensing apparatus which may be programmed to shut off after the delivery of fluid of a predetermined value commensurate with the amount of money introduced.

Yet still another object of the present invention is to provide a coin-operated system of the type described which will prevent milking of the dispensing pump by various tricks and means and will penalize the vandal when such is attempted.

Yet still a further object of the present invention is to provide a coin-operated dispensing system of the type described which incorporates a slow down feature that will prevent motor drift or overrun and the registration of the computer responsive to that operation.

These and other objects of the present invention will become more apparent to those skilled in the art after consideration of the following detailed description taken in conjunction with the accompanying drawings wherein like characters of reference designate like elements in the various figures.

Figure description

FIG. 1 is a general perspective view of a pump island of a service station wherein a pump positioned thereon is controlled by a coin-operated automatic dispensing system such as disclosed herein.

FIG. 2 is a schematic diagram of the electrical circuit associated with the present invention showing the electrical control and operation of the coin-operated dispensing system in conjunction with the dispenser including the pump, solenoid valve and related elements.

Detailed description

Referring now to the drawings and particularly to FIG. 1, a service station area generally designated 10 includes at its front 12 a pump island 14 for sustaining a number of gasoline dispensing pumps, one of which generally indicated as 16 is illustrated in conjunction with a coin-operated automatic control device shown generally as 18 located adjacent thereto.

Dispenser 16 includes a delivery nozzle 20, a computer, the indicating portion of which is designated 22, a pump motor and a solenoid valve, neither of which is specifically shown in FIG. 1, all of which combine to provide fluid flow from a reservoir through a pump hose 24 and nozzle 20 into the customer's automobile gasoline tank. The automatic coin-operated dispensing system herein disclosed forms an independent device which interconnects with the operation of a conventional dispenser 16 to control the dispensing of a quantity of fluid by the customer upon the introduction of money or tokens totaling a specified amount.

A housing 26 encloses a coin and bill collection box along with the control unit and is constructed of fortified and weather-proof material suitable to withstand a variety of weather conditions and attacks by those intent on removing gasoline without payment or the contents of the collection box. A plexiglass shield 28 forms an awning over the bill-receiving tray 30 and coin-receiving slot 32 to prevent moisture accumulation and the collection of foreign matter. A coin return slot 34 returns money inserted when the system is in a "non-accept" condition, and bills will simply be returned within tray 30 when such condition is in effect. Instructions 36 are posted atop the housing 26 and are suitably protected from defacement by a supporting stand 38 and a glass or otherwise transparent covering. The entire housing 26 is preferably supported on a pedestal or stanchion 40 a suitable distance above the ground for customer convenience.

The specific operation of the system will now be explained by referring to the schematic diagram of FIG. 2 after which alternative operations will be particularly pointed out since they greatly enhance the total flexibility of the coin-operated device.

The present coin-operated system employs a first unidirectional step counter generally designated 42 which is, in this case, a commercial unit commonly referred to as a Heinemann stepper modified to carry two magnets 44 and 46, the stepper making one full revolution for ten pulses. By the incorporation of magnets 44 and 46, the stepper has a cycle of five pulses, which have been denominated in increments of five cents each, and a carry-over value of twenty-five cents. The Heinemann stepper 42 operates in conjunction with a full wave rectifier 48 on 60 cycle power under the control of a Triac 50, the operation of which will be described subsequently in greater detail. A number of reed switches 52, 54 and 56 are stationarily mounted in close proximity with the registering face 58 on which magnets 44 and 46 rotate

so that these switches will be closed upon close proximity of magnets 44 and 46 as will be described.

A second bidirectional step counter generally designated 60 carries a single magnet 62 selectively positionable with respect to two reed switches 64 and 66, and this magnet makes one revolution in twenty steps though in actuality, the magnet never completes a full revolution and is limited in capacity to nineteen steps since reed switch 64 closes at that location signaling maximum money within the coin-operated system. The step counter 60 is of conventional construction and is commonly referred to as a Haydon stepper which is rated at 27 volts DC but operates on a 48-volt DC supply. The Haydon stepper is bidirectional and is programmed to count up, in this instance, quarters (increments of twenty-five cents) which are inserted in the coin slot 32. The device counts down as delivery is made in response to carry-over signals from the Heinemann stepper, an operation which will be described subsequently in greater detail.

As will be seen from the total capacity of the two steppers involved, maximum money of four dollars and seventy-five cents may be placed in the coin-operated device though obviously additional counters may be cascaded to increase this amount or to accommodate differing monetary systems. Additionally, the dollar slide 30 makes possible to use of dollar bills to accumulate a total of four dollars after which three additional quarters may be inserted to reach the total capacity of the machine. It will be apparent that any number of denominations of coins and bills may be used in the system, and the twenty-five and five cent breakdown has been selected because of the resulting convenient total which would normally insure nearly a full tank of gasoline by U.S. standards.

A coin-receiving housing generally designated 68 adjoins coin-receiving slot 32 in a manner such that a deposited coin will fall directly onto a microswitch 70 to close momentarily a coin accept circuit and perform counting functions which will be described. So long as a coil 72 held within the housing 68 remains in an energized condition, an armature 74 will be withdrawn and will not in any way interfere with a coin dropping within slot 32. On the other hand, when the coil 72 is deenergized, armature 74 extends upwardly and in close proximity with slot 32 to form a deflecting chute so that coins fed into the mechanism through slot 32 will be returned through the reject slot 34 thus indicating that the system will not accept any money for one or more reasons which will be described subsequently. The money accept circuitry also includes a dollar bill acceptor 76 of conventional construction which will trigger the system in the same fashion as will coins except that four pulses are generated for each dollar inserted. A built-in reject feature will refuse acceptance of bills when coil 72 is de-energized for the same reasons as mentioned above concerning the coin depositing mechanism.

Note that a combination of dollar bills and quarters may be used to operate the present invention so that it is possible to deposit three quarters and then follow these coins by the deposit of four one dollar bills to accumulate a total of four dollars and seventy-five cents. As mentioned previously, the dollar bill acceptor will be arranged to generate four pulses per dollar so that a total pulsing arrangement of nineteen can be achieved by the use of four one dollar bills plus three quarters. Obviously, half dollars may be used with the present system, and these will cause the generation of two pulses in the present coin unit.

Coil 72 is energized through a Triac 78 positioned within the coil circuit grounded leg, and a trigger diode 82 for Triac 78 is biased so that the Triac will conduct through the use of 10,000 ohm resistor 84. A circuit is thus established from the high potential lead 86 through normally closed contacts 88 and 90 of relay 92 through resistor 84 to diode 82 so that the energized coil circuit

is established simply from high potential lead 86 through the coil 72, the Triac 78 and to the grounded lead 80. Money will be rejected if relay 92 closes since contacts 88 and 90 will open upon that energization, and money will also be rejected if the maximum money switch 64 closes and shorts the bias on diode 82 through 100 ohm resistor 94 to the grounded lead 80. The direct short resulting from the closure of switch 64 simply removes the Triac 78 conducting bias from the diode 82. Since it will be shown that relay 92 closes when the pump switch 96 is closed, it follows that money will be rejected when the pump switch is closed.

As relays 92 and 98 are open, and the upper additive coil 99 of stepper 60 is biased at 27 volts DC from the 48-volt supply 100 through a 200 ohm resistor 102. Deposit of a quarter into the coin slot 32 closes switch 70 momentarily, puts 48 volts DC momentarily on the lower additive coil 104 of stepper 60, and the result is to move the stepper 60 additively through eighteen degrees though the action actually takes place in two nine-degree steps, one when the 48-volt DC pulse is applied and another when that pulse is removed. Thus, the additive pulsing of stepper 60 is accomplished by the 48-volt pulse overriding the 27-volt bias on the top winding 98 and is equivalent to placing a positive voltage alternately on the top 99 and bottom 104 windings.

Depositing a quarter thus causes one additive step of stepper 60 and causes switch 66 to open since magnet 62 is moved away from the bottom of that switch because of the first pulsed step. The opening of switch 66 removes a short circuit to ground through 100 ohm resistor 106 from the gate 108 of Triac 110 thus biasing the gate 108 from the high potential source 86 through 10,000 ohm resistor 112. Triac 110 thus conducts and energizes relay 114, the circuit being from the potential source 86 through the coil 114 and through Triac 110 to the ground 80.

Relay 114 is always energized when any money remains in the system, and its energization closes contacts 116 and 118 which in turn activates the reset motor 120 so that the resetting operation, which will reset the pump computer back to zero, can take place. The reset operation actually commences when the pump switch handle (not shown) is moved to the "On" position, and, after a few seconds, pump switch 96 will close indicating the end of the reset cycle. It is important to note that switch 96 does not close immediately when the pump switch handle is moved to the "On" position since the reset operation takes several seconds to complete, but switch 96 will open immediately if the pump switch handle is moved to the "Off" position.

As the pump switch 96 is closed by the reset motor 120, relay 98 is energized directly from potential source 86 through switch 96 and through the coil of relay 98 back to ground 80. Contacts 122 and 124 are closed by energization of relay 98 and connect the pulser Triac 50 associated with the pump to counter 42.

Contacts 126 and 128 of relay 98 are closed upon energization of that relay and, in turn, energize relay 92. Relay 92 changes the condition of stepper 60 from additive to subtractive by opening contacts 130 and 132 and closing contacts 132 and 134. Contacts 136 and 138 also close to establish a self-holding circuit so that relay 92 remains energized through contacts 140 and 142 of relay 114 as long as money is present in the system.

As switch 96 closes, the pump motor 144 starts and the solenoid valve-controlling coil 146 is energized through Triac 148 thus opening the solenoid valve (not shown) within the nozzle 20. Triac 148 is biased similar to Triacs 78 and 110 which have been previously described so long as switch 52 of stepper 42 is open. Power to the motor 144 and solenoid valve relay 146 is through switch 96 and contacts 148, 150 and 152, 154 of relay 114.

Delivery may now proceed. Stepper 42 counts five cent pulses and removes twenty-five cents from stepper 60

through the circuit of transistor 156 each time the count on stepper 42 moves from zero to twenty cents. Transistor 156 pulses the lower substrate winding 158 of stepper 60, applying 48 volts DC only momentarily as capacitor 160 charges even though carry-over reed switch 56 may be closed for a considerable time. It is not permissible to leave 48 volts on this winding for more than a second or two. After switch 56 re-opens, capacitor 160 discharges through the shunting 68,000 ohm resistor 162.

When the last remaining five cents on stepper 42 is reached, switches 66 and 52 are both closed, and will short out the "On" bias of Triac 148 so that Triac will cease to conduct and will thus de-energize solenoid coil 146 causing solenoid valve to close. Delivery is thus slowed down so that gasoline is dispensed only through a small by-pass valve located in the pump nozzle 20 to avoid motor drift and overrun and the accompanying computer registration of more gasoline delivered than paid for.

At the zero point, switches 66 and 54 are both closed. The "On" bias of Triac 110 is shorted out, it ceases to conduct, relay 114 is de-energized, and the pump motor 144 stops. Opening of the pump switch 96 will de-energize relays 92 and 98 since contacts 140 and 142 of relay 114 are also open.

If the pump switch handle (not shown) is moved to stop the pump after delivery has begun, either because the customer cannot accept all he has paid for or an attempt is made to cheat the pump by withdrawing gasoline in four cent increments so that stepper 42 has not moved to its first initiating position, the remaining money in the system will be cancelled at a selective rate usually much faster than normal to penalize the user. The money having been deposited, closure of the pump switch 96 picks up relay 98 which in turn energizes relay 92. Relay 92 has a self-holding circuit through its own contacts 136 and 138 and contacts 140 and 142 of relay 114 as long as any money remains in the system. Re-opening the pump switch 96 with money present must be considered an abnormal operation and results in the de-energization of relay 98 while relay 92 remains in a closed or energized state. This abnormal combination, relay 98 is de-energized and relay 92 energized, is used to cause cancellation of money.

Under these conditions, AC power is supplied to the cancelled money circuit generally designated 162, the potential source coming from contacts 88 and 164 of relay 92 and the ground from contacts 166 and 168 of relay 98. No other combination of relays 92 and 98 will cause cancellation. The cancelled money circuit 162 uses a relaxation oscillator circuit of conventional configuration wherein a capacitor 170 is charged slowly through a diode 172 and a 22,000 ohm resistor 174. When the capacitor is charged to a value of about 30 volts, a breakdown diode 176 switches on and pulses reed switch 178 by the energization of coil 180. Capacitor 170 then discharges and, as current in the coil 180 drops below a given value, for example, about five milliamperes, diode 176 switches off again, and the capacitor begins to recharge. By proper selection of components, a pulsing rate of any value is achieved, the rate usually set at about four pulses per second though it may be increased up to approximately ten pulses per second if desired, the limitations of the pulsing rate being merely the time necessary to operate stepper 42.

Since relay 98 is open, pulser Triac 50 is out of the circuit because contacts 122 and 124 of that relay are open, so that in the event reed switch 182 happens to be closed, stepper 42 can still be operated. A direct connection of switch 178 between stepper 60 and the grounded lead 80 causes a series of pulses simulating the delivery of gasoline, and cancellation of money results at a rapid rate, the precise amount of which is determined by the pulsing rate of the cancelled money circuit 162. A pulsing

rate of four pulses per second would result in the cancellation of money at twenty cents per second. As zero money is reached, relay 114 drops out and the pump is shut down. Relay 92 and 98 still remaining in the closed or energized condition, no money will be accepted until the pump switch 96 is opened.

A timer-operated switch 184 is provided to shut the pump down after approximately ten minutes if by some chance it has been left running. Any remaining money in the system would thus be cancelled upon the closure of switch 184 according to the above description.

Thus in the broadest sense, the present invention includes means for storing information commensurate with the value of the fluid to be delivered, and the pump for actually dispensing the fluid has associated signal generator means to provide signals commensurate with incremental quantities of fluid as delivered. These delivery signals are applied to the storage means within the control apparatus, are totaled therein, and pre-selected signals are employed to cause the storage means to count down to zero. When the storage means has counted to zero, the fluid dispensing pump is automatically disabled, thus terminating delivery.

More particularly, the present device includes a coin and bill-operated pulse generator, a counter arrangement which includes at least one bi-directional step counter and one uni-directional step counter which act to store the information commensurate with the total quantity of fluid to be dispensed, a second signal generating Triac at the pump which is pulsed by virtue of a reed switch located near the magnet carrying money wheel of the pump computer that causes the counters to count down the information total stored, and associated circuitry which establish a control signal when the counter arrangement receives a signal from the pump generator indicating that all the information pulses stored have been depleted, and circuitry responsive to this generated signal which will disable the pump and terminate delivery of fluid.

The present invention further contains a third signal generator which is responsive to a de-activation of the pump prior to the complete countdown operation of the counters which will disengage the second signal generator at the pump and provide separate generating signals simulating delivery of fluid to cause the counter to count down at a rate according to the particular components of the cancelled money circuit.

The invention also contains a slow-down feature in the form of selectively operable switches triggered in conjunction with the counter for generating a control signal for the last five cents of delivery so that the main solenoid operated valve will close in response to that signal and fluid will then be dispensed at a slower rate through a by-pass valve in the nozzle until fluid delivery is terminated. This slow-down feature prevents motor drift and overrun and the accompanying over dispensation of gasoline.

The present system is, of course, used primarily for unattended pumps where an attendant at a station is normally not on duty. However, it is obvious that such a system could be used in conjunction with a manually pre-set system whereby an operator located at a remote location may pre-set the amount of fluid to be dispensed by the customer through a control console positioned at that remote location. The system can then be operated as a pre-set operator controlled system or as a coin-operated system without operator control, and such adaptation is contemplated.

Obviously, many modifications and variations may be made in the construction and arrangements of the steppers to adapt to large quantities of fluid dispensation or foreign monetary systems, the associated circuitry controlling the various functions of the system, as well as other phases of the present inventive concept in light of the above teachings without departing from the real spirit and purpose of this invention. Such modifications as well as the

use of equivalents to those herein illustrated and described are contemplated.

I claim:

1. In an apparatus for dispensing fluid from a reservoir, the apparatus including a delivery nozzle, a computer having a magnet carrying money wheel, a pump and a solenoid-operated valve providing an opening through which a selected quantity of fluid may flow from the reservoir to the nozzle, the improvement for dispensing automatically a predetermined quantity of fluid according to the input of a selected amount of money including bills, coins and tokens comprising: first signal generator means providing a signal indication of the total quantity of fluid to be dispensed commensurate with the input of a selected amount of money; counter means responsive to the output of said first signal generator means storing information commensurate with the total quantity of fluid to be dispensed; second signal generator means operatively connected to said pump generating signals commensurate with the delivery of fluid to said nozzle and applying said signals commensurate with delivery of fluid to said counter means to cause said counter means to count down from the information total stored therein; means associated with said counter means establishing a control signal when the counter means has received a number of delivery signals commensurate with the information total stored therein reflecting the total quantity of fluid to be dispensed; and means responsive to the established control signal disabling said pump and thereby terminating delivery of fluid.

2. The apparatus of claim 1 further comprising: third signal generator means operative with said pump upon deactivation thereof prior to the complete countdown of the information total stored in said counter means disengaging said second signal generator means and generating signals simulating delivery of incremental quantities of fluid to cause said counter means to count down from the information total stored therein.

3. The apparatus of claim 1 further comprising: third signal generator means operative with said pump upon deactivation thereof prior to the complete countdown of the information total stored in said counter means disengaging said second signal generator means and generating signals simulating delivery of incremental quantities of fluid to cause said counter means to count down from the information total stored therein at a rate greater than the countdown rate of signals generated by said second generator means commensurate with the delivery of incremental quantities of fluid.

4. The apparatus of claim 1 wherein said nozzle has by-pass flow means and by-pass flow controls associated therewith, said apparatus further comprising: means operable with said counter means generating a control signal when the counter means has received a number of delivery signals approaching but less than the number commensurate with the total quantity to be dispensed; and valve control means closing the valve in response to said generated signals so that fluid is dispensed through the by-pass flow means to the nozzle at a reduced rate until the dispensing operation is terminated through the receipt of the established control signal by the pump disabling means.

5. The apparatus of claim 1 wherein said first signal generator means is a coin and bill-operated pulse generator.

6. The apparatus of claim 1 wherein said counter means includes a bi-directional step counter.

7. The apparatus of claim 1 wherein said counter means includes at least one bi-directional step counter and one uni-directional step counter.

8. The apparatus of claim 1 wherein the second signal generator means includes means operatively connected to the pump and computer responsive to signals generated by the magnet-carrying money wheel upon delivery of incremental quantities of fluid by the pump through the valve to the nozzle.

9. The apparatus of claim 2 wherein said third signal generating means includes a relaxation oscillator circuit generating signals at a rate of up to and including 10 signals per second, said signals causing said counter means to count down at the generated signal rate to simulate rapid delivery of fluid upon deactivation of the pump prior to the complete countdown of the information total stored in the counter means.

10. The apparatus of claim 3 wherein said valve control means includes a solenoid responsive to said counter connected signaling means operable to close the solenoid-operated valve so that fluid is dispensed through the by-pass flow means.

11. The apparatus of claim 3 wherein said nozzle has by-pass flow means and by-pass flow controls associated therewith, said improvement further comprising: means operable with said counter means generating a control signal when the counter means has received a number of delivery signals approaching but less than the number commensurate with the total quantity to be dispensed; and valve control means closing the valve in response to said generated signal so that fluid is dispensed through the by-pass flow means to the nozzle at a reduced rate until the dispensing operation is terminated through the receipt of the established control signal by the pump disabling means.

12. The apparatus of claim 11 wherein said first signal generator means is a coin and bill-operated pulse genera-

tor, said counter means includes at least one bi-directional step counter and one unidirectional step counter, the second signal generator means includes means operatively connected to the pump and computer responsive to signals generated by the magnet-carrying money wheel upon delivery of incremental quantities of fluid by the pump through the valve to the nozzle, said third signal generating means includes a relaxation of oscillator circuit generating signals at a rate of up to and including ten signals per second, said signals causing said counter means to count down at the generated signal rate to simulate rapid delivery of fluid upon deactivation of the pump prior to the complete countdown of the information total stored in the counter means, and said valve control means includes a solenoid responsive to said counter-connected signaling means operable to close the solenoid-operated valve so that fluid is dispensed through the by-pass flow means.

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