United States Patent [19]

Brunone

[11] **3,737,017**

[45] **June 5, 1973**

[54] **FLUID DISPENSING APPARATUS PRESELECTOR SYSTEM**

[75] Inventor: **Peter P. Brunone,** Hartford, Conn.

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

[22] Filed: **May 20, 1971**

[21] Appl. No.: **145,398**

[52] **U.S. Cl.** **194/13**

[51] **Int. Cl.** **G07f 13/02**

[58] **Field of Search** 194/5, 13; 222/2

[56] **References Cited**

UNITED STATES PATENTS

3,285,381	11/1966	Robbins	194/5
3,478,856	11/1969	Bly	194/13
3,357,531	12/1967	Romanowski	194/13 X
3,221,860	12/1965	Klaffky	194/5
3,448,843	6/1969	Mesh	194/5

Primary Examiner—Stanley H. Tollberg

Attorney—Prutzman, Hayes, Kalb & Chilton

[57] **ABSTRACT**

Fuel dispensing apparatus having a coin operated preselector, a knob operated preselector, a mode selector with coin, knob and nonpreselector settings and a logic circuit for operating a two-stage shutoff valve for terminating the delivery of fuel after the preselected amount is dispensed.

5 Claims, 2 Drawing Figures

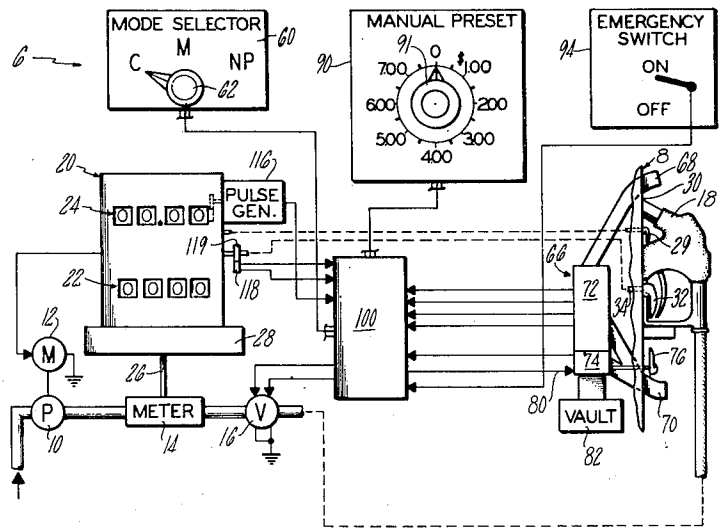
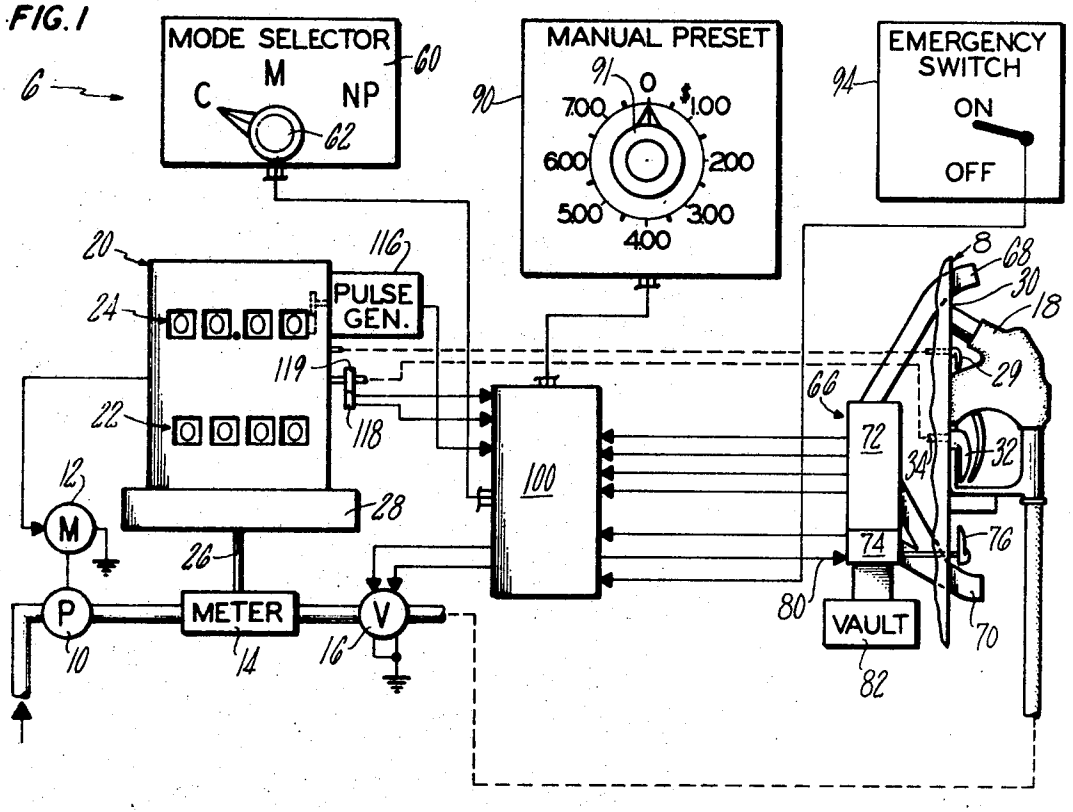
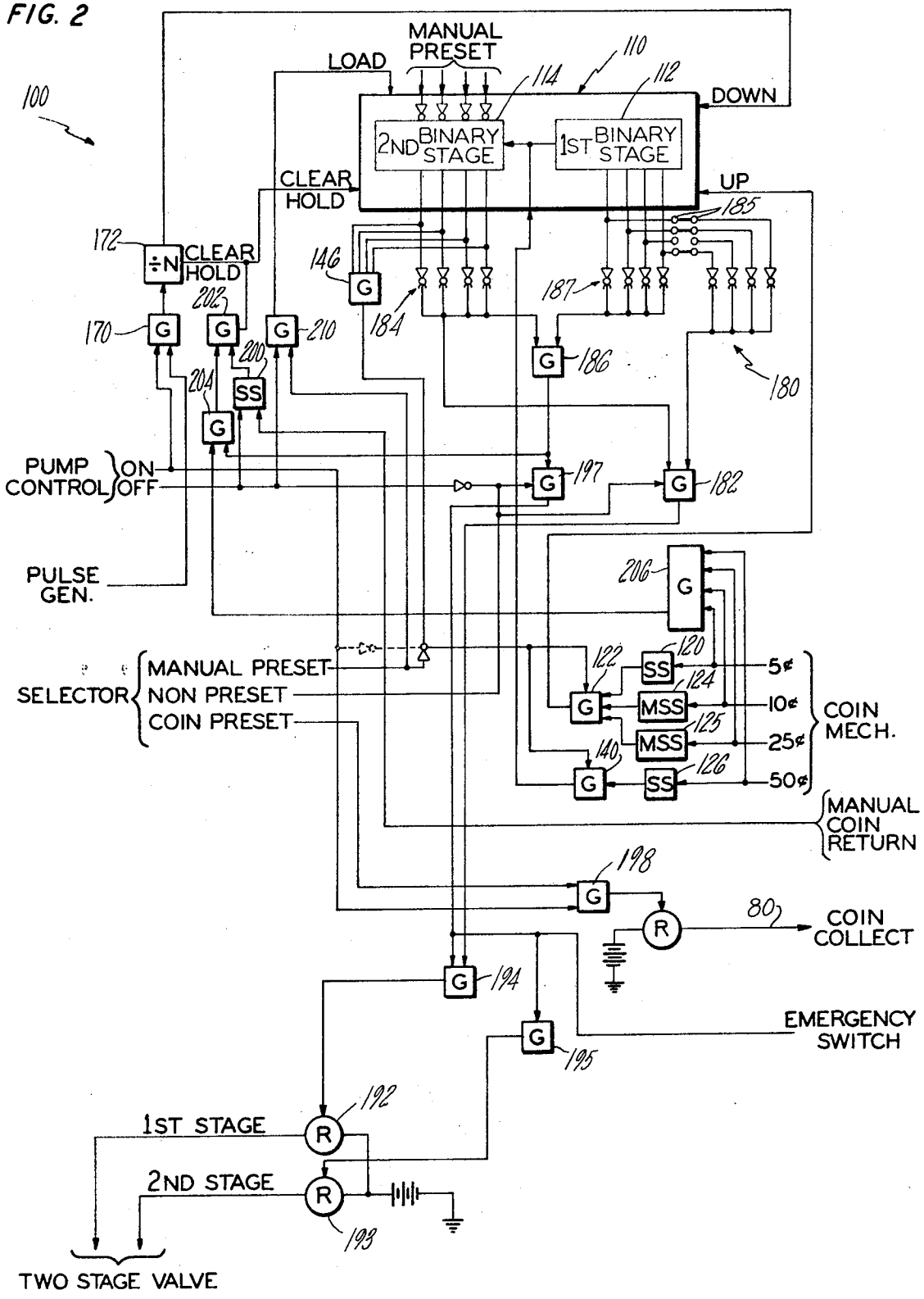


FIG. 1



INVENTOR
PETER P. BRUNONE
BY Brutzman, Hayes, Kalb and Chilton
ATTORNEYS

FIG. 2


100
LOAD
MANUAL PRESET
110
114
112
DOWN
2ND BINARY STAGE
1ST BINARY STAGE
CLEAR HOLD
UP
185
172
÷N
CLEAR HOLD
146
G
187
202
170
G
G
G
210
184
200
SS
204
G
G
186
180
PUMP CONTROL
ON
OFF
G
197
G
182
PULSE GEN.
206
G
SELECTOR
MANUAL PRESET
NON PRESET
COIN PRESET
122
120
SS
5¢
G
124
MSS
10¢
125
MSS
25¢
140
G
126
SS
50¢
COIN MECH.
MANUAL COIN RETURN
198
G
R
80
COIN COLLECT
G
194
G
195
EMERGENCY SWITCH
192
1ST STAGE
R
2ND STAGE
R
193
TWO STAGE VALVE

FLUID DISPENSING APPARATUS PRESELECTOR SYSTEM

BRIEF SUMMARY OF THE INVENTION

The present invention relates generally to fluid dispensing apparatus and more particularly to a new and improved preselector system for fluid dispensing apparatus for automatically terminating the delivery of fluid after a preselected amount is dispensed.

It is a principal aim of the present invention to provide a new and improved fluid dispensing apparatus preselector system having a coin preselector for preselecting the amount of fluid to be dispensed by the deposit of coins or other tokens.

It is another aim of the present invention to provide a new and improved preselector system which may be used with conventional fuel dispensing pumps without requiring modification of the pump.

It is a further aim of the present invention to provide a new and improved preselector system for fluid dispensing apparatus capable of providing manual preselection and/or coin preselection of the amount of fluid to be delivered.

It is another aim of the present invention to provide a new and improved preselector system for fuel dispensing apparatus for automatically terminating the delivery of fuel after a preselected amount is dispensed by the operation of a shutoff valve.

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

A better understanding of the invention will be obtained from the following detailed description and the accompanying drawings of an illustrative application of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a diagrammatic representation of a fuel dispensing pump employing a preselector system incorporating an embodiment of the present invention; and

FIG. **2** is a schematic representation of a logic control circuit of the preselector system.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail wherein like numerals represent like parts throughout the figures, a preselector system **6** incorporating an embodiment of the present invention is shown employed in a fuel dispensing pump **8** for controlling the delivery of fuel by the pump. In a conventional manner the fuel pump **8** incorporates a delivery pump **10** driven by a motor **12** for supplying fuel via a meter **14** and a two-stage shutoff valve **16** to a fuel dispensing nozzle **18.** The fuel pump **8** is shown employing a resettable register **20** having a visual volume counter **22** and a visual cost counter **24** for providing visual registrations of the volume and cost amounts of fuel delivered. The output shaft **26** of the meter **14** is rotated in proportion to the volume of fuel dispensed and drives the volume counter **22** and cost counter **24** of the register **20.** A variator **28** connected between the meter **14** and cost counter **24** is employed in a known manner for selectively setting the price per unit volume of fluid dispensed. The register **20** may for example be of the type shown and described in H. N. Bliss U.S. Pat. No. 2,814,444 dated Nov. 26, 1957 and entitled "Register"

and have a suitable reset mechanism operable by a lever **29** prior to the commencement of each fluid delivery for resetting the volume and cost counters **22, 24** to zero.

The fuel nozzle **18** is shown provided in a conventional manner with a storage receptacle **30** for storing the nozzle between fuel deliveries. A manual control handle or lever **32** is mounted adjacent the storage receptacle **30** such that the control handle **32** has to be manually rotated, clockwise as seen from the right in FIG. **1,** to its OFF or vertical position to permit the nozzle to be replaced in its storage receptacle and such that the nozzle has to be removed from its storage receptacle to permit the control handle **32** to be pivoted, approximately 90° in the opposite direction, to its ON or horizontal position. (Also, in a conventional manner the reset lever **29** and control handle **32** are suitably interlocked so that the reset lever **29** must be actuated to reset the counters **22, 24** to zero before the control handle **32** can be turned to its ON position.) The control handle **32** is connected via a control shaft **34** to the register **20** and such that when the control lever **32** is pivoted to its ON position the fuel pump **8** is activated for delivering fuel by energizing the pump motor **12.** When the control handle **32** is pivoted to its OFF or vertical position the pump motor **12** is thereby deenergized.

The preselector system **6** comprises a mode selector **60** with a three-position knob **62** having a "C" position for coin preselection of the monetary amount of fuel to be delivered, an "M" position for manual preselection of the monetary amount of fuel to be delivered, and an "NP" position for regular operation of the pump without preselection of the amount of fuel to be delivered. A coin preselector **66** having an input coin chute **68** and a coin return chute **70** is provided for coin operation of the pump with the selector in its "C" position. The coin preselector **66** has a conventional coin acceptor **72** operable for rejecting unacceptable coins, an escrow bank **74** for holding accepted coins, and a coin return lever **76** for permitting return of the deposit in escrow any time prior to the commencement of a fuel delivery (as determined by rotation of the control handle **32** to its ON position). Also, as hereinafter more fully explained the escrow bank **74** is adapted to be operated (via a control lead **80**) to "collect" the coins in escrow (by dropping them into a vault **82**) when the control handle **32** is turned to its ON position (with the selector knob **62** in its "C" or coin preselector position).

A manual preselector **90** shown having a fifteen position knob **91** is provided for manually preselecting the monetary amount of fuel to be delivered when the mode selector is in its "M" or manual preselector position. The preselector system **6** is also shown comprising an emergency switch **94** which is connected for closing the two-stage shutoff valve **16** for deactivating the pump **8.**

A logic control circuit for controlling the operation of the pump (by controlling the operation of the two-stage valve **16**) in accordance with the operation of the mode selector **60,** coin preselector **66,** manual preselector **90,** and switch **94** is designated by the numeral **100** and shown schematically in FIG. **2.** The logic control circuit **100** comprises a suitable bidirectional electronic counter or accumulator **110** shown having two binary counting stages **112, 114** of ascending order.

The counter 110 is loaded or preset in accordance with the setting of the manual preselector knob 91 or the operation of the coin preselector 66 (depending on the setting of the mode selector 60) and is connected to a pulse generator 116 to be indexed in the subtracting direction during the delivery of fuel.

A control switch 118 mounted to be operated by a cam 119 on the control shaft 34 is provided for sensing the position of the control handle 32 in its ON and OFF positions. With the control handle in its OFF position and the mode selector 60 in its "C" position, each coin deposited in the coin preselector 66 is operable to step and thereby load the counter 110 in accordance with the value of the coin deposited. For example, the coin preselector 66 may be adapted to accept and separate 5¢ , 10¢ , 25¢ and 50¢ coins for operating corresponding switches (not shown). The 5¢ switch lead is connected via a suitable single shot logic gate circuit 120 and logic gate circuit 122 to index the counter 110 one count for each 5¢ coin deposited. The 10¢ switch lead is connected via a suitable multiple single shot logic gate circuit 124 and the logic gate circuit 122 to index the counter 110 two counts for each 10¢ piece deposited. The 25¢ switch lead is connected via a suitable multiple single shot logic gate circuit 125 and the logic gate circuit 122 to index the counter 110 five counts for each 25¢ piece deposited. The lower order binary stage 112 of the counter 110 is thereupon adapted to be indexed in 5¢ increments for example up to ten times whereupon a transfer is generated to index the higher order binary stage 114 one count (equal to 50¢). The higher order binary stage 114 may for example be adapted to be indexed (in 50¢ increments) to store a count of up to $7.50.

The 50¢ switch lead is connected via a single shot logic gate circuit 126 and a logic gate circuit 140 for indexing the higher order binary stage 114 of the counter 110 one count (equal to 50¢) for each 50¢ coin deposited.

When the counter 110 reaches a maximum predetermined count or load, the logic gate circuits 122 and 140 are operated via a logic gate circuit 146 to disconnect the coin operated switches from the counter 110. In the shown embodiment the logic gate circuit 146 is operated by the four binary readout leads of the binary stage 114 such that the logic gate circuits 122, 140 are "closed" when the counter stage 114 reaches a full binary count representing $7.50.

After the counter 110 has been partly or completely loaded (as determined by the total value of coins deposited) the pump control handle 32 may be turned to its ON position for dispensing a corresponding monetary amount of fuel. For this purpose the pulse generator 116 is connected to be driven with the lowest order wheel of the cost counter 24 to generate a pulse for each predetermined incremental monetary amount of fuel delivered, for example, one pulse for each ½¢ of fuel delivered. Also, the pulse generator 116 is preferably connected to the cost counter number wheel such that the pulse generator is automatically reset with the cost counter when the register 20 is reset just prior to the commencement of a fuel delivery.

A logic gate circuit 170 is provided for connecting the pulse generator 116 for indexing the counter 110 in the subtracting direction when the pump control handle is in its ON position, and a suitable division logic gate circuit 172 is provided for indexing the counter 110 in accordance with the relative values of a pulse generated by the pulse generator 116 and a count of the counter 110. Thus, where ten pulses are generated by the pulse generator 116 for each 5¢ of fuel delivered, the division circuit 172 would provide one output pulse for indexing the counter 110 one count (or 5¢) in the subtracting direction for each ten pulses generated by the pulse generator 116 (or 5¢ of fuel delivered).

A counter readout section 180 is provided for operating the two-stage shutoff valve 116 for (*a*) closing the first valve stage for reducing the fuel flow rate shortly before the completion of the preselected amount and (*b*) closing the second valve stage for terminating the fuel delivery when the counter 110 reaches zero (and therefore upon completing the delivery of the preselected amount of fuel). A suitable logic gate circuit 182 (operable by the binary readout leads of both counter stages 112, 114 via collector OR'ing circuits 183, 184) provides for closing the first valve stage when the counter 110 reaches a predetermined count of for example 10¢ (which may be preset by selectively bridging the pairs of contacts 185 in the binary readout leads of the lower order binary stage 112). Another suitable logic gate circuit 186 (operable by all of the binary readout leads of both counter stages 112, 114 via collector OR'ing circuits 184, 187) provides for closing the second valve stage for terminating the fuel delivery when the counter 110 reaches zero. More particularly, the logic gate circuits 182, 186 provide for controlling the valve 16 via logic gate circuits 194, 195 and first and second valve relays 192, 193 respectively. The logic gate circuits 194, 195 are also connected to the emergency switch 94 to provide for selectively closing both valve stages with the switch 94. Also, the ON-OFF switch 118 is connected to the logic gate circuit 182 and to an additional logic gate circuit 197 to provide for maintaining the first and second valve stages open when the pump control handle 32 is in its OFF position. (Since the pump motor 12 is turned off when the control handle 32 is turned off, fuel cannot be delivered with the control handle in its OFF position even though the two-stage shutoff valve 16 is open). The shutoff valve 16 therefore remains open while the pump 8 is inactive to relieve any fuel pressure which would otherwise be maintained in the line if the valve were to remain closed.

The circuit 100 may permit loading the counter 110 with additional coins after a delivery has commenced (and with the handle 32 in its ON position). Alternatively the ON-OFF switch 118 may be connected as shown by the broken line in FIG. 2 for "closing" the logic gate circuits 122, 140 when the pump control handle 32 is turned to its ON position, in which event any coins thereafter deposited are ineffective to load the counter 110. Also, the coin collect lead 80 is energized via a suitable logic gate circuit 198 to collect the coins in the escrow bank 74 when the pump control handle 32 is turned to its ON position (and if the mode selector is in the "C" mode) such that the manual coin return lever 76 is only effective to return coins to the depositer before the pump control handle 32 is turned to its ON position.

The ON-OFF switch 118 and manual coin return lever 76 are connected via a suitable single shot logic gate circuit 200 and a logic gate circuit 202 to clear the division logic circuit 172 and counter 110 when the

control handle **32** is turned to its OFF position and (with the control handle **32** in its OFF position) when the manual coin return lever **76** is operated (to return coins from the escrow bank **74**). The division logic circuit **172** and counter **110** are then held in their clear or null position by the application of the "null" signal from the logic gate circuit **186** to a logic gate circuit **204.** The counter **110** and division circuit **172** are thereby held in their null conditions to prevent inadvertent loading by stray electrical signals. The coin switch leads are connected via a suitable logic gate circuit **206** to the logic gate circuit **204** to release the "null" hold when the first coin is deposited (i.e., the first coin deposited after the handle **32** is turned to its OFF position) and to thereby permit the counter **110** to be loaded by the deposited coins.

With the mode selector **60** in its "M" or manual preselector position, the logic gate circuits **122, 140** are "closed" to disconnect the coin preselector **66** from the counter **110.** Also, with the ON-OFF switch **118** in its OFF position and the mode selector **60** in its "M" position, a logic gate circuit **210** is operated for loading the counter **110** with the setting of the manual preselector **90.** The manual preselector knob **91** can be adjusted to preselect the desired monetary amount of fuel before the pump control handle **32** is turned to its ON position whereupon the logic gate circuit **210** is operated to "disconnect" the manual preselector **90** from the counter. Thereafter during the delivery of fuel the counter **110** is indexed in the subtracting direction by the pulse generator **116** and the two valve stages of the shutoff valve **16** are sequentially closed to terminate the delivery after the manually preselected amount is delivered.

When the mode selector **60** is placed in the "NP" or nonpreselector position, the counter **110** is disconnected from the two-stage shutoff valve **16** (by "closing" the logic gate circuits **182, 197**) and the valve **16** is thereby held open during the delivery of fuel to provide for the delivery of any desired monetary or volumetric amount of fuel.

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 fluid dispensing system having fluid delivery means, manually operable means for selectively activating and deactivating the fluid delivery means for dispensing fluid, fluid valve means operable for being closed for terminating the delivery of fluid, a money preselector mechanism for money preselection of the monetary amount of fluid to be dispensed by the deposit of money therein, and control means operable by the money preselector mechanism and connected for closing the valve means for terminating a fluid delivery after a monetary amount of fluid delivery corresponding to the value of money deposited in the money preselector mechanism is dispensed; the improvement wherein the control means comprises a bidirectional binary electronic counter connected to the money preselector mechanism for being preset by being electronically indexed in a first counting direction in accordance with the value of money deposited in the money preselector mechanism, pulse generator means connected for electronically indexing the electronic counter in the opposite counting direction during the delivery of fluid and in accordance with the monetary amount of fluid dispensed, binary electronic counter readout means for closing the valve means for terminating the delivery of fluid when the binary electronic counter reaches a predetermined electronic count; the binary electronic counter being connected to be reset to said predetermined electronic count when the fluid delivery means is deactivated by the manually operable means, and hold means connected to be operated by the binary electronic counter readout means to maintain the counter at said predetermined electronic count when it reaches said predetermined electronic count and until money is thereafter deposited in the money preselector mechanism.

2. The fluid dispensing system according to claim **1** wherein the money preselector mechanism comprises the escrow bank for holding the deposited money in escrow and selectively operable for selectively returning and collecting all of the deposited money and wherein the control means is connected for operating the escrow bank for collecting all of the money therein when the fluid delivery means is activated for dispensing fluid by the manually operable means.

3. The fluid dispensing system according to claim **2** wherein the binary counter is connected to be reset to said predetermined count when the escrow bank is operated for returning the money therein.

4. A fluid dispensing system according to claim **1** wherein the binary counter readout means is connected for disconnecting the money preselector mechanism from the binary counter when the binary counter reaches a predetermined maximum count.

5. In a fluid dispensing system having fluid delivery means, manually operable means for selectively activating and deactivating the fluid delivery means for dispensing fluid, fluid valve means operable for being closed for terminating the delivery of fluid, a money preselector mechanism operable for money preselection of the monetary amount of fluid to be dispensed by the deposit of money therein, and control means operable by the money preselector mechanism and connected for closing the valve means for terminating a delivery after a monetary amount of fluid corresponding to the value of money deposited in the money preselector mechanism is dispensed; the improvement wherein the control means comprises a bidirectional binary counter connected to the money preselector mechanism for being preset by being indexed in a first direction in accordance with the value of money deposited in the preselector mechanism, pulse generator means connected for indexing the binary counter in the opposite direction during the delivery of fluid and in accordance with the monetary amount of fluid dispensed, and binary counter readout means for closing the valve means for terminating the delivery of fluid when the counter reaches a predetermined minimum count and connected for disconnecting the money preselector mechanism from the binary counter when the binary counter reaches a predetermined maximum count.

* * * * *