United States Patent

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[54] **COIN-ACTUATED FLUID-DISPENSING SYSTEM**
15 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **194/13**
[51] **Int. Cl.** **G07f 13/00**
[50] **Field of Search** ..... 222/2, 19, 20, 23—39; 194/2, 3, 9, 10, 13, 102

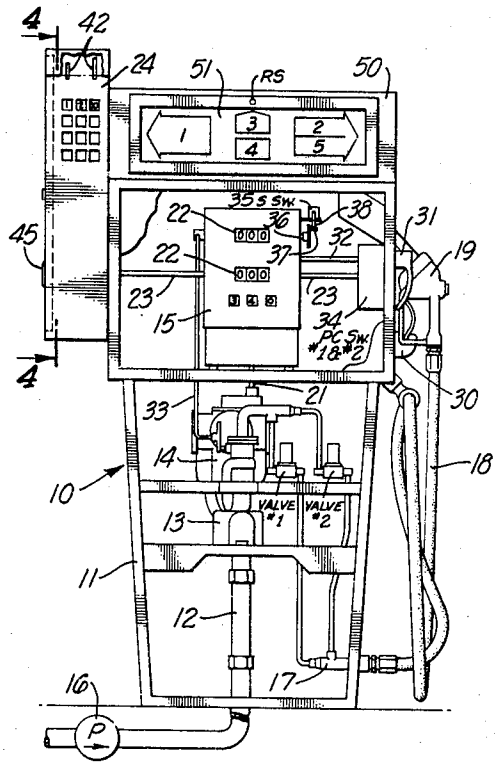
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ABSTRACT: A coin-operated system for dispensing gasoline which will receive and register a variety of coins or tokens, dispense the total amount purchased or portions thereof, and make refunds for remaining credits. A control system adapted for incorporation into conventional gasoline pumping units for coin-operated dispensing.



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SHEET 1 OF 3

FIG. 1.

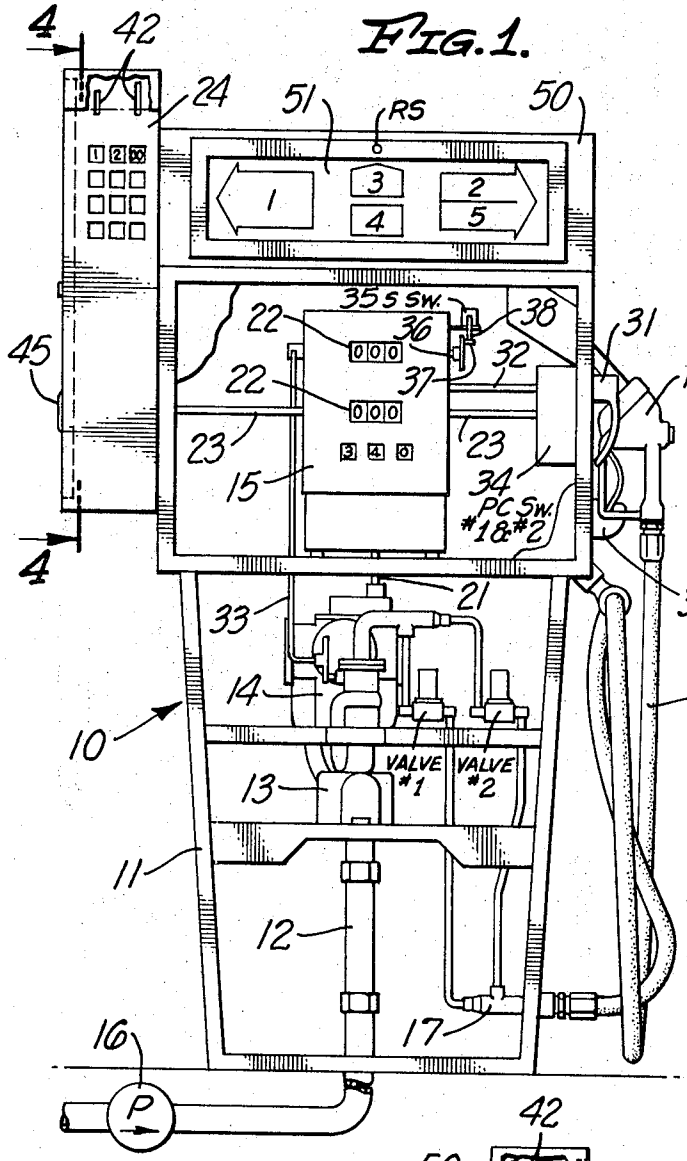


FIG. 2.

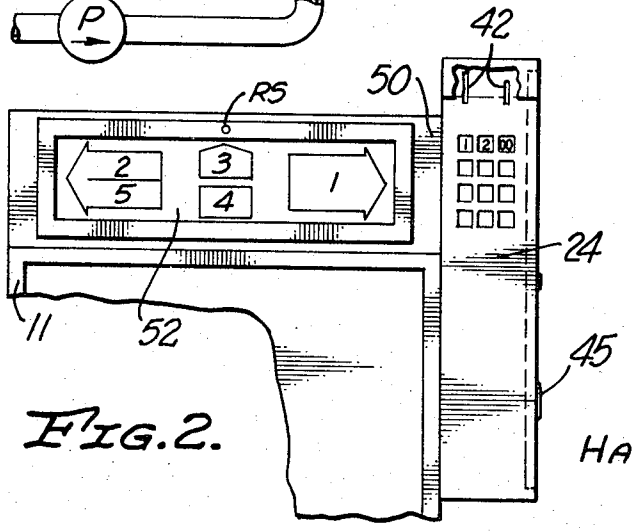


FIG. 3.

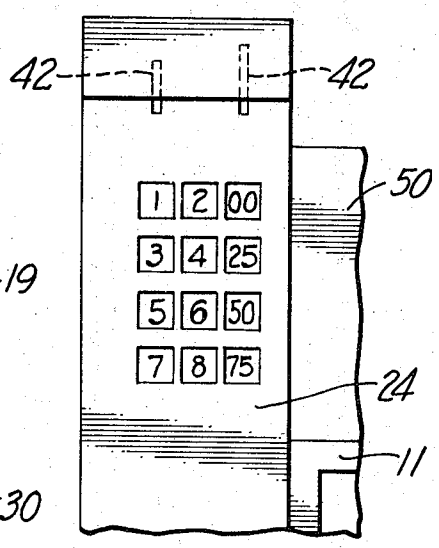
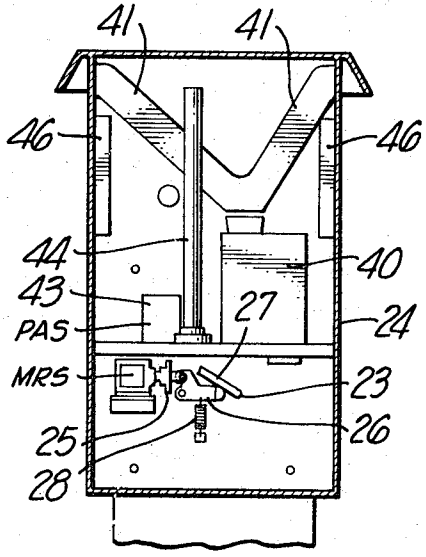


FIG. 4.



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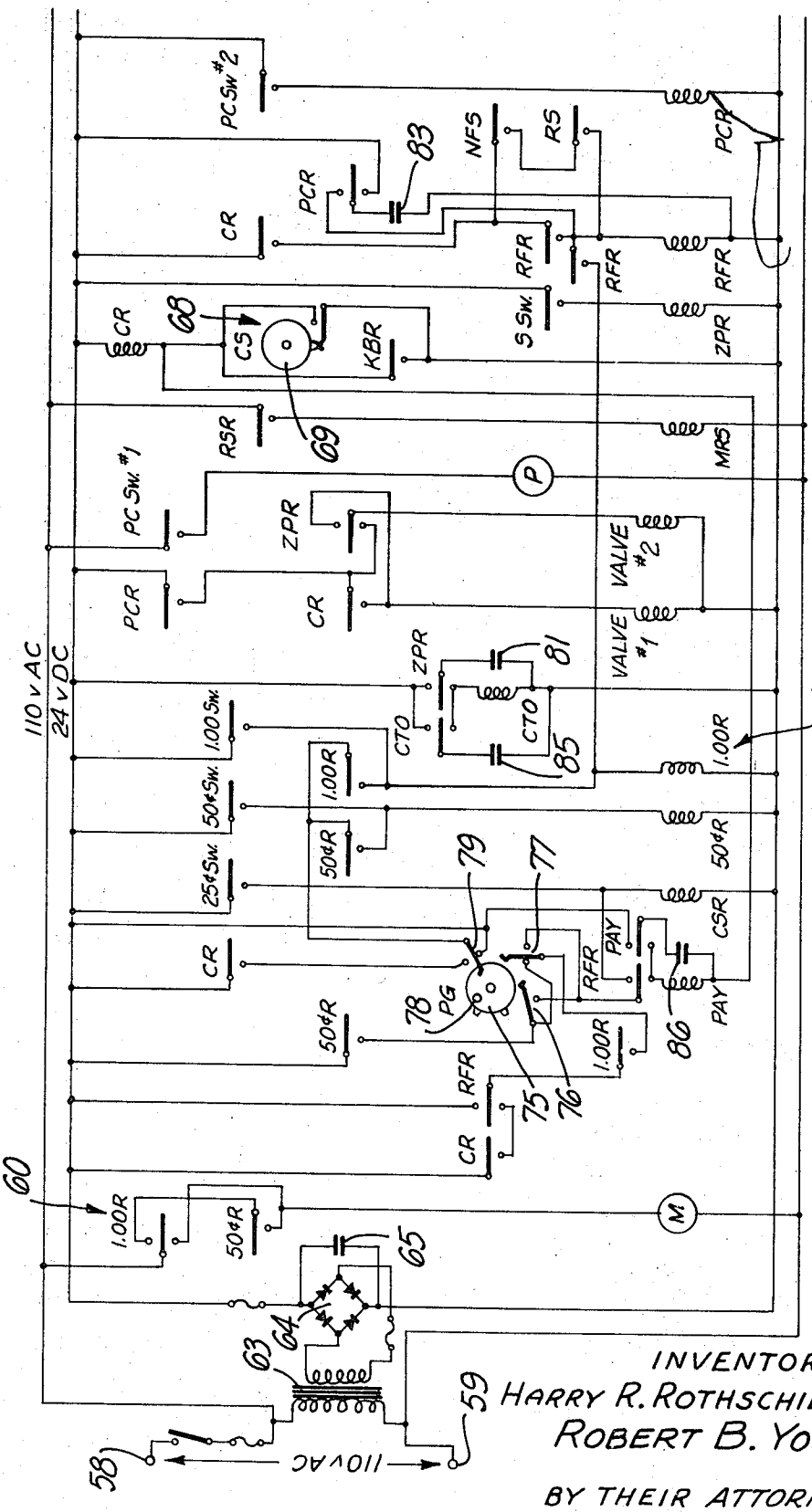


Fig. 5a.

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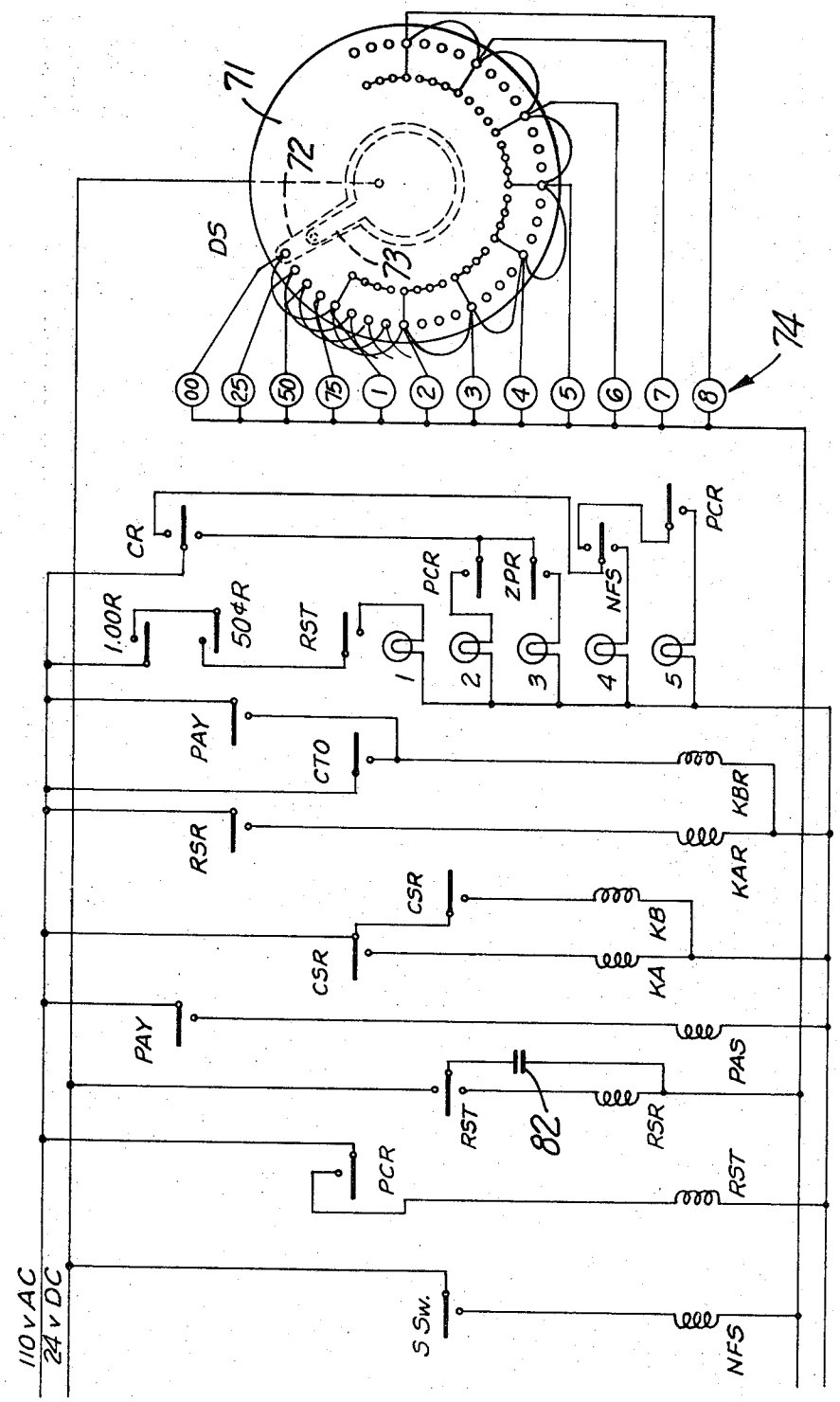


FIG. 5b.

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COIN-ACTUATED FLUID-DISPENSING SYSTEM

This invention relates to coin-operated fluid-dispensing systems and will be described herein as used in a gasoline pumping unit for an automobile service station. However, it will be readily recognized that the system of the invention can be utilized for dispensing other fluids in other environments.

Most of the companies which sell gasoline at retail desire to provide gasoline sales without requiring continuous attendance by an employee. Many motorists are capable of operating the hose nozzle and are willing to do this work in order to benefit by a lower selling price for the fuel. A wide variety of devices has been developed for dispensing gasoline but none has been particularly successful nor has received widespread acceptance in the industry. Accordingly, it is an object of the present invention to provide a new and improved coin-operated fluid-dispensing system which is simple and substantially foolproof in operation and which provides for the various operating functions which a customer encounters while making a purchase. A further object is to provide such a system which is reliable and inexpensive and which can utilize standard components and which is suitable for addition to a conventional pumping unit.

It is a particular object of the invention to provide a new and improved coin-operated fluid-dispensing system which will accept various coins or tokens representing a sales unit and multiples of sales units, with the system dispensing fluid in sales units. The particular apparatus described herein is designed to receive a 25-cent coin, a 50-cent coin and a $1-token, representing one, two and four sales units, respectively. Of course other monetary units may be utilized and other combinations of coins and tokens and sales units may be utilized. The work "coin" is used in the following specification and claims to indicate coins, tokens and other items of like nature.

It is an object of the invention to provide a coin-operated fluid-dispensing system which provides for dispensing the amount of fluid paid for and which provides for refunding coins if the amount paid for is not used. A further object is to provide such a system incorporating an instruction panel which is coordinated with the state of operation of the overall system. A specific object is to provide a new and improved control system and components thereof for use in a coin-operated dispensing system.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. The drawings merely show and the description merely describes a preferred embodiment of the present invention which is given by way of illustration or example.

In the drawings:

FIG. 1 is a side view of a gasoline pumping unit incorporating a preferred embodiment of the present invention, with some of the side panels of the housing removed;

FIG. 2 is a partial view of the unit of FIG. 1 from the opposite side;

FIG. 3 is an enlarged partial view of the unit of FIG. 1 illustrating the coin display section;

FIG. 4 is a partial sectional view taken along the line 4–4 of FIG. 1; and

FIGS. 5*a* and 5*b* comprise an electrical schematic of the unit of FIG. 1.

The structure of FIG. 1 includes a conventional gasoline delivery unit **10** with a number of modifications which will be described. The side panels have been removed from the housing **11** to show an inlet pipe **12**, and air separator **13**, a fluid flow meter **14** and a meter display unit **15**. There is a pump **16** in the inlet pipe line **12**, with the pump usually being positioned remote from the delivery unit. An additional flow control is inserted in the gasoline flow line, typically between the flow meter **14** and the pipe **17** which in turn is connected to the hose **18** and outlet nozzle **19**. In the embodiment illustrated, the additional flow control comprises two solenoid-operated off-on valves, indicated as No. 1 and No. 2, with the valves connected in parallel between the flow meter **14** and the pipe **17**. All of the components in the gasoline flow path are conventional except for the two valves No. 1 and No. 1. When both valves are open, the system operates at a full flow rate; when one valve is open, the system operates at a low flow rate; and when both valves are closed, there is no gasoline delivery. Other valving arrangements for achieving full flow and low flow are readily apparent, such as a single valve having a fully open and a partly open position. In a simplified form of the system, a single valve providing only for full flow can be utilized.

The flow meter **14** is connected to the meter display unit **15** by a shaft **21**, with the amount of gasoline dispensed being displayed in gallons and in dollars at windows **22**. The meter display unit **15** is reset to the zero position by rotating a shaft **23**. In conventional delivery units, a lever projects from the side of the housing for manual rotation of the shaft **23** to accomplish the resetting. In the embodiment illustrated, the shaft **23** is rotated by a meter reset solenoid MRS mounted in a box **24** carried on the side of the housing **11**, with the shaft **23** projecting into the box **24**. Referring to FIG. **4**, energization of the solenoid MRS moves the armature **25** to the left and rotates the lever **26** counterclockwise, producing clockwise rotation of the shaft **23** by engagement of the lever **26** with lever **27** at the end of the shaft. A spring **28** returns the lever **26** to the position illustrated, when the solenoid is deenergized.

The pump **16** is energized in the conventional manner. After the nozzle **19** is removed from the cradle **30** on the side of the housing **11**, lever **31** may be rotated manually from the vertical position illustrated to a horizontal position, if the meter display unit has been reset to the zero position. The lever **31** rotates a shaft **32** which passes through the display unit **15** and operates a push rod **33** to open a valve in the flow meter **14**. The conventional interlock mechanism within the display unit **15** prevents rotation of the shaft **32** unless the display unit is in zero position. Rotation of the shaft **31** to the horizontal position also closes two switches mounted in switch box **34**, which switches are identified as PC Sw No. **1** and PC Sw No. **2**. The electrical circuitry for these switches is shown in FIG. **5** and will be discussed in detail later. One of the switches actuated by the lever **31** acts to apply power to the motor for the pump **16**.

A switch, referred to as the meter sensor switch S Sw, is mounted in a box **35** and is actuated by the meter display unit **15** to open the switch at the zero sales unit position. A shaft **36** is driven by the meter display unit **15** to rotate one revolution per sales unit, i.e., for the embodiment disclosed, one revolution for each 25 cents worth of gasoline delivered. A pin **37** is carried on a wheel on the end of the shaft **36** and engages a lever **38** for closing the S switch as the meter passes the zero position, i.e., when the display unit is reset, when a 25-cent sale is indicated, when a 50-cent sale is indicated, when a 75-cent sale is indicated, etc. Typically, the shaft **36** may be the output shaft of a gear reduction unit added to the conventional display unit, with the input of the reduction unit driven by the display unit.

The box **24** also contains a conventional coin acceptance unit **40** and coin chutes **41** leading from coin slots **42** positioned on both sides of the box **24**. In the particular embodiment illustrated, the smaller coin slot receives 25-cent coins and 50-cent coins and the larger slot receives $1-tokens. The coin box **40** includes three switches, referred to as the **25¢** Sw, the **50¢** Sw and the $1.00 Sw. The coin-receiving mechanism functions in the conventional manner to close the **25¢** switch momentarily when a 25-cent coin is received, to close the **50¢** switch momentarily when a 50-cent coin is received, and to close the **$1.00** switch momentarily when a $1-token is received.

A refund unit **43** actuated by a payout solenoid PAS is mounted in the box **24** adjacent a coin storage tube **44** and functions to dispense coins from the storage tube to an outlet receptacle **45**, in a manner to be described.

A monetary display unit **46** is mounted on each side of the box **24** to provide a visual display of the amount of money or

equivalent received at the coin box. A typical monetary display unit comprises 12 panels with the symbols $1 through $8, $0.00, $0.25, $0.50, and $0.75 thereon, and a light bulb behind each panel to provide a visual indication in dollars and cents when particular lamps are energized. The appearance of the display unit with all lamps energized is shown in FIG. 3.

Another box 50 is mounted on top of the housing 11 and contains the remaining electrical circuitry. Display panels 51, 52 are mounted on opposing sides of the box 50. Each display panel is provided with five legends identified by the numerals 1 through 5, and with lamps for selectively illuminating the legends. The preferred language for each of the legends is set out in table II. Legend 1 may be presented in a cutout having the form of an arrow pointing toward the coin slots 42. Legends 2 and 5 may be provided in a cutout having the form of an arrow pointing toward the nozzle 19 and lever 31, with the lever 31 being painted red. Legend 3 may be positioned in a cutout having the form of an arrow pointing toward pushbutton switches RS, which function as refund switches for initiating the refund operation.

The electrical circuitry for the delivery unit is illustrated in FIGS. *5a* and *5b*, and the various components are identified in table I.

TABLE I

Code:	Unit
CR	Credit relay.
CS	Credit stepper.
CSR	Coin stepper relay.
CTO	Credit take off relay.
DS	Display stepper.
KA	Display stepper advance solenoid.
KAR	Display stepper reset solenoid.
KB	Credit stepper add solenoid.
KBR	Credit stepper subtract solenoid.
M	Pulse generator motor.
MRS	Meter reset solenoid.
NFS	No flow sensing timer relay.
P	Pump motor.
PAS	Payout solenoid.
PAY	Payout relay.
PCR	Pump control relay.
PC Sw #1	Pump control Switch #1.
PC Sw #2	Pump control Switch #2.
PG	Pulse generator.
RFR	Refund relay.
RS	Refund push button switch.
RSR	Reset relay.
RST	Reset timer.
S Sw	Meter sensor switch.
Valve #1	Full flow valve solenoid.
Valve #2	Slow flow valve solenoid.
ZPR	Zero position relay.
50¢ R	50¢ relay.
1.00 R	$1 relay.
25¢ Sw	25¢ switch in coin box.
50¢ Sw	50¢ switch in coin box.
1.00 Sw	$1 switch in coin box.

TABLE II

Step:	Legend
1	Deposit Coins
2	Remove Nozzle and Turn Red Handle
3	Push For Refund
4	You Have More Gas Coming
5	Return Nozzle

Most of the components are switches, relay coils, relay contacts and solenoid coils and are conventional in construction and operation. By way of example, reference numeral 60 indicates a set of contacts of the 1.00 R relay and reference numeral 60 indicates a set of contacts of the 1.00 R relay. The moving arm of the contact set 60 engages the upper fixed contact when the coil is unenergized and engages the lower fixed contact when the coil is energized. The coil for the $1.00 relay 1.00 R is energized when the $1.00 switch 1.00 Sw of the coin box is closed.

The system is powered from a 110 volt AC source connected at terminals 58, 59. A voltage stepdown transformer 63, a full wave rectifier 64 and a filter capacitor 65 provide a 24 volt DC power source for some of the components.

The system includes a counter, typically a stepping switch 68, referred to as a credit stepper CS. The credit stepper 68 includes a wheel 69 carrying a cam which opens a contact set, as illustrated in FIG. *5a*. The credit stepper also includes two solenoids, the credit stepper add solenoid KB and the credit stepper subtract solenoid KBR. Each time the solenoid KB is energized, the wheel 69 is advanced one step or sales unit, and each time the solenoid KBR is energized, the wheel 69 is moved in the opposite direction one step or sales unit. At the reset or zero sales unit position, the CS switch is open. When the credit stepper is advanced to any position from the zero position, the CS switch is closed and the coil of the credit relay CR is energized. The credit stepper may be a conventional component.

The system includes another counter, typically a stepper switch for energizing the lamps of the monetary display units 46, referred to as the display stepper DS. The display stepper may be a conventional rotary stepping switch 71 with two banks of contacts connected to the lamps 74 of the display units 46, as indicated in FIG. *5b*.

For purposes of clarity, all interconnections of the outer ring of contacts of DS are not shown. The 1st, 5th, 9th, 13th, 17th, 21st, 25th, 29th and 33rd contacts are interconnected as shown (progressing counterclockwise). The 2nd, 6th, 10th, etc. contacts are similarly interconnected, as are the 3rd, 7th, etc. and 4th, 8th, etc. Moving arms 72, 73 of the display stepper are advanced a step at the time as the display stepper advance solenoid KA is energized. The display stepper is reset to the zero position as indicated in FIG. *5b* when the display stepper reset solenoid KAR is energized. One side of the DC source is connected to the moving arms 72, 73, which are advanced in synchronism by the advance solenoid KA. While individual lamps and display elements have been utilized in the display units 46, any of the various display devices available on the market can be utilized, two widely different examples being the Nixie tube and the rotating wheel. Other conventional counter units, such as relay or transistor types, may be used for either or both of CS and DS if desired.

The system includes a pulse generator PG which provides for actuating the credit stepper relay CSR and the payout relay PAY. The pulse generator includes a wheel 75 driven by the pulse generator motor M. The wheel 75 of the pulse generator includes two radially extending cams which engage the moving arms of contact sets 76 and 77, and a laterally projecting pin 78 which engages the moving arm of contact set 79. The functions of the remaining components of the system will readily be apparent from the description of operation which follows.

When the system is reset and ready to accept coins, the display stepper is at the zero position energizing the .00 lamp and legend lamp 1 is energized from the 110 volt AC line through closed contact RST. A customer approaches and drops a 25-cent coin into the coin slot. The 25¢ switch is closed and energizes the coin stepper relay CSR which in turn energizes KA and KB solenoids to advance the credit stepper and the display stepper one sales unit. Each additional 25-cent piece deposited will advance each stepper another sales unit. The customer may deposit a 50-cent piece which closes the 50¢ switch and energizes the 50¢ relay. This causes the pulse generator motor M to rotate the pulse generator wheel 75 one revolution providing two operations of CSR and advancing each of the steppers two sales units. CSR is energized from the DC line through a 50¢ R contact set, the pulse generator contact set 76 and a RFR contact set, with the refund relay

RFR being unenergized. Operation of the motor M stops at the end of one revolution when the pin 78 engages the moving arm of the contact 79 to open the holding circuit for the 50¢ relay. The steppers are advanced four sales units when a dollar taken is deposited and the $1.00 switch is closed to energize the $1.00 relay, with the pulse generator rotating one revolution and providing stepper pulses from both contact sets 76 and 77.

A 1.00 R contact set and a 50¢ R contact set may be connected in series with legend lamp 1 to deenergize lamp 1 when the pulse generator is running.

When the credit stepper CS is advanced from the zero position, the credit relay CR is energized and legend lamp 2 is energized through a contact set CR and a contact set of the unenergized pump control relay PCR. After the customer stops depositing coins, he may remove the nozzle 19 from the cradle 30 and position it in the fuel tank. The customer then turns the lever 31 to the horizontal position thereby closing pump control switches No. 1 and No. 2. PC switch No. 1 applies power to the pump motor P. PC switch No. 2 applies power to the pump control relay PCR which removes power from the reset timer RST and from legend lamps 1 and 2. Power is supplied to the solenoids of valve No. 1 and valve No. 2 and the system is ready to dispense gasoline when the customer operates the manual valve at the nozzle 19.

Gasoline is delivered at the full flow rate and the S switch is momentarily opened each time the meter display unit goes past the zero position. The S switch energizes the zero position relay ZPR and the no-flow sensing timer relay NFS. When ZPR is unenergized, a capacitor 81 is charged from the DC line. When ZPR is energized, the capacitor 81 is connected across the credit takeoff relay CTO and momentarily energizes CTO. KBR is energized when CTO is energized and backs up the credit stepper one sales unit each time the S switch is opened. Another capacitor 85 may be charged from the DC line when CTO is unenergized. When CTO is energized, the capacitor 85 is connected across the coil of CTO for the purpose of maintaining CTO energized for a longer period of time and improving operating stability.

When the last sales unit is subtracted from the credit stepper, the customer is entitled to one more sales unit of gasoline. CR is deenergized and valve No. 1 is deenergized, reducing the rate of flow of fuel. Legend lamp 2 is deenergized and legend lamp 4 is energized. Valve No. 2 is energized through a closed contact of ZPR. When the S switch is opened at the end of the last sales unit, ZPR is deenergized and valve No. 2 is deenergized, cutting off fluid flow. The no-flow sensing timer relay NFS is a delay-type relay which does not actuate its contacts until a predetermined time after the coil is deenergized, typically about 8 seconds. The S switch remains open when fluid flow stops and after expiration of this predetermined time, the NFS contact sets are moved to the open or up position. This deenergizes legend lamp 4 and energizes legend lamp 5. The customer must now turn the lever 39 to the vertical position in order to replace the nozzle in the cradle. This opens pump control switches Nos. 1 and 2 which shuts off the pump motor P and deenergizes PCR which in turn deenergizes legend lamp 5. The reset timer RST is energized and at a predetermined time thereafter, typically about 10 seconds, the RST contact sets are moved to the down or closed condition. A capacitor 82 is charged from the DC line and, when the reset timer contacts are actuated, the capacitor is discharged into the reset relay RSR to momentarily energize it. RSR actuates KAR to reset the display stepper to the zero position. RSR also actuates the meter reset solenoid MRS to reset the meter display unit 15 to the zero position. RST remains energized, energizing legend lamp 1 and indicating that the system is ready for a new customer. The 10-second delay in RST provides time for the customer to compare the amount deposited, as displayed by the display stepper, and the amount of fuel delivered, as displayed by the meter display unit 15.

The operation described above covers the situation where a customer utilizes any combination of a plurality of coins, follows the instructions presented by the legends, and receives the full amount of fuel which he paid for, with the fuel being dispensed in multiples of sales units.

The system also provides for interrupting fuel delivery and refunding any over payment. The interruption may be produced by the customer who operates the manual valve in the nozzle, or by automatic operation of the manual valve when the tank is full.

Consider the situation where gasoline is being delivered at the full flow rate and is then interrupted either by the customer or by the full tank operation of the nozzle valve. The S switch is closed and remains closed, energizing NFS. After the predetermined period of time elapses without opening of the S switch, the NFS contacts are moved to the energized or down position. ZPR is energized and legend lamp 3 is energized. The customer then pushes the refund switch closing contact set RS energizing the refund relay RFR. The $1.00 relay is energized, the motor M for the pulse generator is energized to turn the wheel 75 and energize the payout relay PAY which in turn actuates the payout solenoid PAS and the credit stepper subtract solenoid KBR. Each actuation of PAY produces payout of a 25-cent coin and subtracts a sales unit from the credit stepper. The pulse generator continues to operate until the credit stepper arrives at the zero sales unit position. When the credit stepper arrives at the zero sales unit position, CR is deenergized, terminating the refunding operation. A KBR contact set may be connected in parallel with the credit stepper contact set CS to insure energization of CR during the payout operation, particularly for the last coin payout. Legend lamp 3 is deenergized and legend lamp 4 is energized, indicating that the customer has the remaining portion of a sales unit of gasoline available. The customer may open the valve at the nozzle and deliver the remaining quantity of fuel, with the system functioning to terminate delivery when the meter display unit 15 arrives at the zero position, as described previously. The S switch is opened and NFS is deenergized, deenergizing legend lamp 4 and energizing legend lamp 5. The customer turns the lever 31 to the vertical position and returns the nozzle to the cradle and the system resets, ready for the next customer.

A capacitor 86 may be charged from the DC line when PAY in unenergized. When PAY is energized, the capacitor 86 is connected across the coil of PAY for the purpose of maintaining PAY energized for a longer period of time and improving operating stability. If the customer returns the nozzle to the cradle without pushing the refund switch RS, the system will automatically pay out any refund coming in multiples of sales units. When the lever 31 is turned to the vertical position, PC switch No. 2 is opened and PCR is deenergized. Capacitor 83 has been charged from the DC line and is discharged into RFR when PCR is deenergized, to initiate the refund operation if a refund is due, i.e., if CR is energized. The refund operation proceeds as previously described.

The system of the invention provides for delivering the amount of fuel purchased by the customer and provides for delivery of less than this amount, with a manual and an automatic refunding operation. The system utilizes a minimum of special components and provides for registering of purchased sales units and for payout with a single pulse generator. The system utilizes the conventional fuel delivery equipment with special instructions for the customer thereby requiring the minimum amount of customer education.

Although an exemplary embodiment of the invention has been disclosed and discussed, it will be understood that other applications of the invention are possible and that the embodiment disclosed may be subjected to various changes, modifications and substitutions without necessarily departing from the spirit of the invention.

We claim:

1. In a coin operated fluid dispensing system including pump, flow meter and outlet nozzle, the combination of:

register means for registering sales units;

means for receiving a plurality of coins of various values denoting sales units and advancing said register means a number of sales units corresponding to the coins received;

valve means for controlling flow from the pump through the meter to the outlet nozzle;

means for opening said valve means for dispensing fluid;

means for subtracting sales units from said register means one at a time as fluid is dispensed by the system, with said subtraction occurring at the start of dispensing of a sales unit;

means for reducing the rate of flow through said valve means when said register means registers zero sales units;

means for closing said valve means at the completion of dispensing of a sales unit when said register means registers zero sales units;

a coin storage;

means for generating a refund signal; and

means for dispensing coins from said storage as a function of registered sales units in response to a refund signal.

2. A system as defined in claim **1** including:

switch means driven by the flow meter to provide a signal at the start and completion of dispensing of a sales unit; and

circuit means for coupling said signal in actuating relation to said means for subtracting and means for closing.

3. A system as defined in claim **1** in which said means for dispensing coins includes:

payout means for continuously paying out coins in sales units one at a time;

refund means for actuating said payout means to initiate coin payout;

means for coupling said payout means to said means for subtracting sales units from said register means as a function of coin payout; and

means for blocking operation of said payout means when said register means registers zero sales units.

4. In a fluid dispensing system including pump, flow meter and outlet nozzle, the combination of:

coin means for receiving a plurality of coins of various values denoting sales units and producing coin signals corresponding to the particular coins received;

a first counter including means for advancing and backing up the counter by sales units and having a switch providing a signal when the counter is advanced from the zero position;

a second counter including means for advancing the counter by sales units and means for resetting the counter to the zero position;

display means having display elements corresponding to a sales unit and multiples of sales units;

first circuit means connecting said second counter to said display means for actuating a display element corresponding to the count position of said second counter; and

counter advance means for generating advance signals for each of said counters for advancing the counters a sales unit at a time, and including a pulse generator for generating pluralities of advance signals corresponding to the pluralities of sales units denoted by the coin signals.

5. A system as defined in claim **4** in which said pulse generator comprises a motor driven cam, cam switches actuated by said cam, and means for selectively energizing said cam switches as a function of the coin signals, with actuation of an energized cam switch producing an advance signal, and means for energizing the cam motor as a function of the coin signals.

6. A system as defined in claim **4** including:

valve means for controlling flow from the pump through the meter to the outlet nozzle;

second circuit means having said first counter signal as an input for opening said valve means for dispensing fluid when said first counter is advanced from the zero position;

manually operable switch means having OFF and ON positions, with said manual switch means in the OFF position blocking opening of said valve means, whereby fluid may be dispensed by the system when said manual switch means is turned to the ON position; and

meter means for generating backup signals for backing up said first counter a sales unit at a time, and including a meter switch providing a backup signal each time the meter measures a sales unit.

7. A system as defined in claim **6** in which:

said valve means includes a full flow rate condition and an intermediate flow rate condition, with said valve means being in said full flow rate condition when opened by said second circuit means when said first counter is advanced from the zero position; and

including third circuit means for opening said valve means to said intermediate flow rate condition when said first counter is at the zero position and said meter means is in the process of measuring a sales unit.

8. A system as defined in claim **7** in which said valve means comprises two valves connected in a parallel flow condition, with both valves open when in the full flow rate condition, and with one valve open and one valve closed when in the intermediate flow rate condition.

9. In a coin-operated fluid-dispensing system including pump, flow meter and outlet nozzle, the combination of:

register means for registering sales units;

means for receiving a plurality of coins of various values denoting sales units and advancing said register means a number of sales units corresponding to the coins received;

valve means for controlling flow from the pump through the meter to the outlet nozzle;

means for opening said valve means for dispensing fluid;

means for subtracting sales units from said register means one at a time as fluid is dispensed by the system, with said subtraction occurring at the start of dispensing of a sales unit;

means for reducing the rate of flow through said valve means when said register means registers zero sales units;

means for closing said valve means at the completion of dispensing of a sales unit when said register means registers zero sales units;

a coin storage;

means for generating a refund signal;

means for dispensing coins from said storage as a function of registered sales units in response to a refund signal and including payout means for paying out coins in sales units;

refund means for actuating said payout means;

means for coupling said payout means to said means for subtracting sales units from said register means as a function of coin payout; and

means for blocking operation of said payout means when said register means registers zero sales units, with said refund means including means for sensing fluid flow through the meter and blocking operation of said refund means for a predetermined time after flow ceases.

10. In a fluid dispensing system including pump, flow meter and outlet nozzle, the combination of:

coin means for receiving a plurality of coins of various values denoting sales units and producing coin signals corresponding to the particular coins received;

a first counter including means for advancing and backing up the counter by sales units and having a switch providing a signal when the counter is advanced from the zero position;

a second counter including means for advancing the counter by sales units and means for resetting the counter to the zero position;

display means having display elements corresponding to a sales unit and multiples of sales units;

first circuit means connecting said second counter to said display means for actuating a display element corresponding to the count position of said second counter;

counter advance means for generating advance signals for each of said counters for advancing the counters a sales unit at a time, and including a pulse generator for generating pluralities of advance signals corresponding to the pluralities of sales units denoted by the coin signals;

valve means for controlling flow from the pump through the meter to the outlet nozzle;

second circuit means having said first counter signal as an input for opening said valve means for dispensing fluid when said first counter is advanced from the zero position;

said valve means including a full flow rate condition and an intermediate flow rate condition, with said valve means being in said full flow rate condition when opened by said second circuit means when said first counter is advanced from the zero position;

manually operable switch means having OFF and ON positions, with said manual switch means in the OFF position blocking opening of said valve means, whereby fluid may be dispensed by the system when said manual switch means is turned to the ON position;

meter means for generating backup signals for backing up said first counter a sales unit at a time, and including a meter switch providing a backup signal each time the meter measures a sales unit;

third circuit means for opening said valve means to said intermediate flow rate condition when said first counter is at the zero position and said meter means is in the process of measuring a sales unit; and

fourth circuit means coupled to said manual switch means for actuating said means for resetting said second counter a predetermined time after said manual switch means is turned to the OFF position.

11. A system as defined in claim **10** in which said flow meter includes an indicator unit which advances from a zero position as the meter measures fluid flow, said system including a meter reset mechanism for resetting said indicator to the zero position, with said fourth circuit means also actuating said meter reset mechanism.

12. In a fluid dispensing system including pump, flow meter and outlet nozzle, the combination of:

coin means for receiving a plurality of coins of various values denoting sales units and producing coin signals corresponding to the particular coins received;

a first counter including means for advancing and backing up the counter by sales units and having a switch providing a signal when the counter is advanced from the zero position;

a second counter including means for advancing the counter by sales units and means for resetting the counter to the zero position;

display means having display elements corresponding to a sales unit and multiples of sales units;

first circuit means connecting said second counter to said display means for actuating a display element corresponding to the count position of said second counter;

counter advance means for generating advance signals for each of said counters for advancing the counters a sales unit at a time, and including a pulse generator for generating pluralities of advance signals corresponding to the pluralities of sales units denoted by the coin signals;

valve means for controlling flow from the pump through the meter to the outlet nozzle;

second circuit means having said first counter signal as an input for opening said valve means for dispensing fluid when said first counter is advanced from the zero position;

manually operable switch means having OFF and ON position, with said manual switch means in the OFF position blocking opening of said valve means, whereby fluid may be dispensed by the system when said manual switch means is turned to the ON position;

meter means for generating backup signals for backing up said first counter a sales unit at a time, and including a meter switch providing a backup signal each time the meter measures a sales unit;

payout means for paying out coins in sales units and generating backup signals for said first counter;

refund means for actuating said payout means;

means for blocking operation of said payout and refund means when said first counter is at the zero position; and

flow means for sensing when there is fluid flow through the system and including means for blocking operation of said payout and refund means during fluid flow.

13. A system as defined in claim **12** in which said refund means includes a pulse generator for generating refund signals, with each refund signal coupled to said payout means providing a sales unit payout and a backup signal, and a manually operated refund switch initiating operation of said pulse generator.

14. A system as defined in claim **13** in which said counter advance means and said refund means incorporate the same pulse generator.

15. A system as defined in claim **13** in which said pulse generator comprises a motor driven cam, at least one cam switch actuated by said cam, and means for energizing said cam switch when said manually operated switch is actuated to initiate operation of the pulse generator, with actuation of an energized cam switch producing a refund signal, and means for energizing the cam motor while said first counter is advanced from the zero position.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,550,743 Dated December 29, 1970

Inventor(s) Harry R. ROTHSCHILD and Robert B. YOUNG

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1: Line 33, "work" should read --word--;
Line 66, "and" should read --an--.
Column 2: Line 2, "No. 1" (second occurrence) should read --No. 2--.
Column 3: Line 75, "60 indicates a set of contacts" should read --61 indicates the coil--.
Column 5: Line 5, "taken" should read --token--.
Column 6: Line 26, "arrives at" should read --is backed up tc
Claim 2: Line 1, the colon after "including" should be delet
Line 4, the semicolon after "unit" should be a comm
Claim 12: Lines 17 and 18, "position" should read --positions

Signed and sealed this 20th day of April 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents