

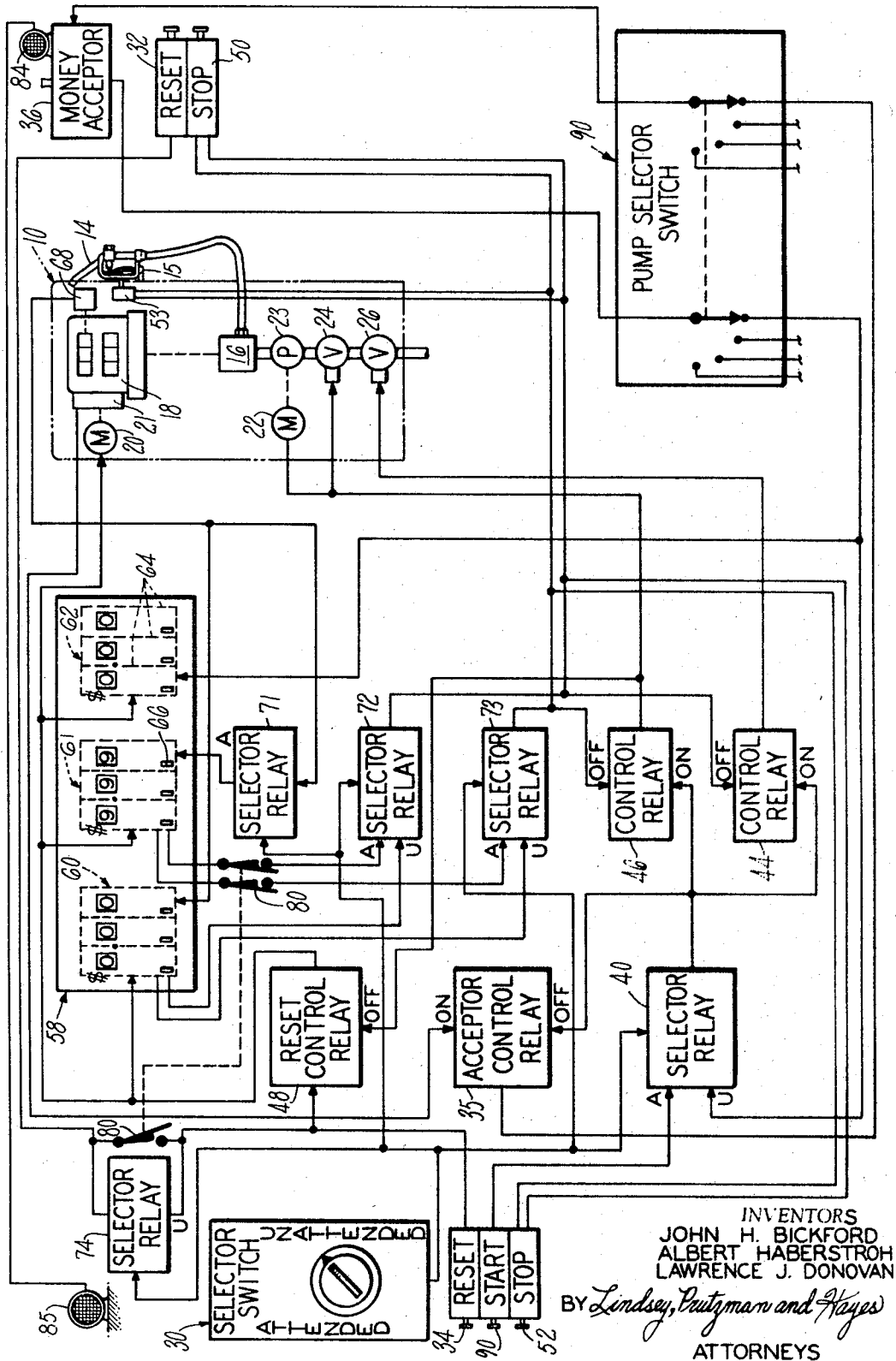
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SELF-SERVICE FLUID DISPENSING SYSTEM

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SELF-SERVICE FLUID DISPENSING SYSTEM

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ABSTRACT OF THE DISCLOSURE

A self-service fuel dispensing system adapted for "Attended" and "Unattended" self-service operation as well as conventional operation by a service station attendant. The system includes a money acceptor adapted for collecting a predetermined deposit, for example one dollar, and a predeterminer for discontinuing the fuel delivery after a preselected amount of fluid has been delivered. The predeterminer includes two banks of conventional single wheel magnetic counters and in its "Unattended" condition one of the banks of single wheel counters which is indexed in the adding direction provides for terminating the fuel delivery by selectively de-energizing a first valve to reduce the rate of fuel flow and thereafter de-energize a second valve to discontinue the fuel delivery.

In its "Attended" position the second bank of single wheel counters which is indexed in the subtracting direction is employed for manually preselecting the amount of fuel to be delivered in accordance with the request of the customer or in accordance with the amount of money collected by the money acceptor, for which purpose a third counter is employed for indicating the amount of money so collected. The fuel pump is activated by depressing a start button and the second bank of single wheel counters provides for terminating the delivery after the amount preselected in the second bank of counters has been delivered.

In either its "Attended" or "Unattended" position a "Stop" switch may be manually operated to terminate the delivery and a "Reset" switch may be manually operated after the pump has been deactivated to reset the pump register and the predeterminer counters, with the adding bank of counters being reset to "000" and the subtracting bank of counters being reset to 999.

A manual selector switch is also provided for selecting the pump with which the money acceptor will be employed.

BRIEF SUMMARY OF THE INVENTION

The present invention generally relates to fluid dispensing system and more particularly to a fluid dispensing system having notable utility in providing self-service operation of the usual service station fuel delivery pump.

It is another aim of the present invention to provide a new and improved self-service dispensing system which is adapted to be conditioned for the delivery of a predetermined monetary amount of fuel upon the deposit of such amount in a money acceptor.

It is another aim of the present invention to provide a self-service fuel dispensing system which provides for self-service operation by the customer upon the deposit of a predetermined amount of money, for example one dollar, and which will also provide for "Attended" self-service delivery of any desired amount of fuel with prepayment either directly to the attendant or by deposit in the money acceptor or postpayment to the attendant.

It is a further aim of the present invention to provide a self-service fuel dispensing system of the type described which employs conventional single wheel magnetic counters for preselecting the amount of fuel to be delivered and for automatically discontinuing the delivery after the preselected amount is dispensed.

It is another aim of the present invention to provide a self-service fuel dispensing system which is adapted to be operated by a customer without an attendant; which is adapted to be operated by a customer with an attendant accounting for the amount of fuel delivered and with the attendant collecting for the delivery either before or after the delivery, and which is further adapted to be operated for attendant delivery of fuel in a conventional manner.

It is another aim of the present invention to provide a self-service fuel dispensing system of the type described which is of economic design and which is both easy to operate and easy to set for either attended, unattended or manual operation.

It is a still further aim of the present invention to provide a money operated self-service dispensing system which may be easily operated by the customer and which provides for accurately terminating the delivery of fuel after the preselected amount of fuel is delivered.

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

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

BRIEF DESCRIPTION OF THE DRAWING

The drawing shows a schematic representation partly broken away of a fuel dispensing system incorporating an embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing, a self-service fuel dispensing system incorporating an embodiment of the present invention is shown including a fuel pump 10 having the usual nozzle 14 for delivering fuel and a suitable storage receptacle 15 for storing the nozzle 14 between deliveries. A meter 16 in the fuel line provides in a conventional manner for driving a register 18 for registering the volume and cost of fuel delivered, and an electric motor 20 is employed for operating a suitable reset mechanism 21 for resetting the register.

The pump 10 is adapted to be activated for delivering fuel by energizing a motor 22 for the fluid pump 23 and by energizing a pair of solenoid operated valves 24, 26 mounted in series in the fuel line to control the delivery of fuel. The valve 24 has open and closed positions and the valve 26 has open and throttled positions so that by de-energizing the valve 26 the rate of fuel delivery is adapted to be reduced or throttled and by subsequently de-energizing the valve 24 the fuel delivery is adapted to be terminated.

The disclosed system includes a selector switch 30 which is key operated to select "Attended" (A) and "Unattended" (U) positions. With the selector switch 30 in its "Unattended" position, a "Reset" switch 32 located at or adjacent the pump 10 (or an alternative "Reset" switch 34 located remotely from the pump 10 as for example at a kiosk which is manned for "Attended" operation) may be manually actuated to energize the reset motor 20 to reset the register 18, and at the end of the reset cycle the reset mechanism 21 actuates an acceptor control relay 35 to its "on" position to energize a money acceptor 36. The money acceptor 36 which is preferably

located at the usual pump "island" is adapted to provide for activating the pump 10 for delivering fuel after a predetermined deposit is collected by the acceptor. For example, the money acceptor 36 may be designed for collecting one dollar in coins or a single one-dollar bill before that amount is collected and a fuel delivery in that amount can be made.

The money acceptor 36 is connected (when the selector switch 30 is in the "Unattended" position) via the selector relay 40 to actuate a pair of control relays 44, 46 to their "on" positions and to thereby energize the pump motor 22 and the solenoid operated fuel valves 24, 26. At the same time, the acceptor control relay 35 is actuated to its "off" position to de-energize the money acceptor 36 and to thereby discontinue the operation of the acceptor 36 until the end of the succeeding reset cycle of the register 18. Also, a reset control relay 48 is actuated while the motor 22 and valve 24 are energized to prevent operation of the reset motor 20 during the delivery of fuel. However, if desired, a suitable manually operable "Stop" switch 50 provided at the pump may be operated (or an alternative "Stop" switch 52 at the kiosk may be operated) as for example if it is desired to terminate the fuel delivery before the amount of fuel paid for has been delivered. Also, the "Stop" switch 52 could be operable by a suitable timer (not shown) to deactivate the pump 10 after a given time interval and an additional "Stop" switch 53 is mounted on the pump adjacent the nozzle storage receptacle 15 to automatically deactivate the pump when the dispensing nozzle 14 is returned to its storage receptacle.

A predeterminer 58 is employed in the system for automatically actuating the control relays 44, 46 to their "off" position and for thereby timely discontinuing the delivery of fuel when the amount of fuel paid for has been delivered. The shown predeterminer 58 comprises a pair of predetermining counters 60, 61 and a third money counter 62, each of which preferably comprises a bank of conventional single wheel magnetic counters 64 of the type which are adapted to be electrically reset and which have readout sections which may be used as predeterminers for automatically deactivating the pump 10 when the amount of fuel paid for has been delivered.

The counter 62 provides for registering the amount of money deposited in the acceptor 36 and is accordingly connected to be appropriately indexed by the money acceptor each time the predetermined deposit is collected by the acceptor. Thus, with the system in its "Unattended" condition, the counter 62 is indexed to register the predetermined deposit, for example one dollar, at the same time the control relays 44, 46 are actuated to energize the motor 22 and valves 24, 26. Therefore, if for example the money acceptor 36 is designed to collect one dollar, the third or hundredths order single wheel counter 64 of the counter 62 will be indexed one step to provide a registration of 100, in which instance the two lower order single wheel counters 64 play no active part and can therefore be deleted if desired.

The counter 61 is provided for manually setting the monetary amount of the delivery when the kiosk is attended, and for this reason its single wheel counters are shown having suitable manually operable push buttons 66 for setting the single wheel counters. The counters 61 and 62 do not, however, perform any function when the selector switch 30 is in its "Unattended" position and the kiosk is unmanned. The counters 61 and 62 are, however, adapted to be reset with the counter 60 at the same time the reset motor 20 is energized to reset the register 18. In this regard the counters 60 and 62 are adding counters (i.e. adapted to be indexed in the adding direction) and are therefore reset to zero (000); whereas the counter 61 is preferably a subtracting counter (i.e. adapted to be indexed in the subtracting direction) and is therefore reset to its maximum count of 999.

The counter 60 is used during "Unattended" operation

to automatically discontinue the fuel delivery after the amount of fuel paid for has been delivered. Since, therefore, the deposit which may be collected by the acceptor 36 is predetermined, the counter 60 is connected so as to deactivate the pump after that amount of fuel has been delivered. In the present embodiment the counter 60 is indexed in the adding direction during the delivery of fuel and for example if the predetermined deposit is one dollar, the counter 60 will provide for discontinuing the delivery as it is indexed to 100.

A pulse generator 68 driven by the cost counter 70 of the register 18 is connected to index the counter 60 in accordance with the amount of fuel delivered. Thus, if the predetermined deposit is one dollar, the pulse generator 68 will provide for indexing the counter 60 from "000" to "100" at which point the delivery of fuel will be terminated. For this purpose, the readout sections of the single wheel counters 64 of the counter 60 are connected so as to provide a first signal at "080" to actuate the control relay 44 via the selector relay 72 and to thereby de-energize the valve 26 to reduce the rate of fuel flow and a second signal at "100" to actuate the control relay 46 via the selector relay 73 and to thereby de-energize the motor 22 and valve 24 to terminate the delivery of fuel. Also, with conventional single wheel counters 64 designed to be indexed at the end of the pulse generated by the pulse generator 68, the pulse generator 68 is mounted so that the generated pulse ends at approximately when the amount delivered corresponds with the succeeding reading of the register.

The system may be switched to the "Attended" condition with the selector switch 30 to provide for attended self-service operation. In its "Attended" position the selector switch 30 provides for actuating the selector relays 40, 71, 72, 73, 74 to provide for (1) connecting the control relays 44, 46 for actuation to their "on" positions by a manually operable "Start" switch 90 instead of the acceptor 36 to their "off" positions by the predetermining counter 61 instead of the predetermining counter 60; (2) connecting the pulse generator 68 for indexing the counter 61 as well as the counter 60; and (3) disconnecting the "Reset" switch 32. The acceptor 36 may, however, be used during "Attended" operation, and the counter 62 will be indexed when the predetermined deposit is collected by the acceptor. And since the acceptor 36 is not de-energized until the "Start" button 90 is depressed, the counter 62 will be indexed each time the predetermined deposit is collected by the acceptor 36, and the counter 62 will indicate the total deposit collected by the acceptor. After such deposit, or if the money acceptor 36 is not used, as for example because the fuel is paid for directly to the attendant either before or after the delivery, the monetary amount of fuel to be delivered is manually set into the counter 61 by manual actuation of the counter push buttons 66. For this purpose, an intercom system with a speaker 84 at the pump and a speaker 85 at the kiosk is shown provided for assisting the customer in informing the attendant of the amount of fuel which he wishes to have if he does not use the money acceptor 36.

Thereafter the "Start" switch 90 is actuated by the attendant in the kiosk for activating the fuel pump 10 to enable the customer to deliver the desired amount of fuel. The pulse generator 68 will index the counter 61 in the subtracting direction during the delivery of fuel and when the preselected amount of fuel is delivered the pump 10 is deactivated to terminate the delivery of fuel. As with the counter 60, the counter 61 provides a first signal, as for example at "020," to actuate the control relay 44 for de-energizing the valve 26 and for thereby reducing the rate of flow of fuel and a second signal at "000" to actuate the control relay 46 to terminate the fuel delivery. And if the amount of fuel originally preset in the counter 61 is not delivered, as for example due to the customer's tank being full, the pump is adapted to be manually deactivated by the "Stop" switch

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50 or "Stop" switch 52 or to be automatically deactivated by the switch 53 when the nozzle is replaced in its storage receptacle 15. The attendant can then determine the refund due or amount owed, as the case may be, directly from the counter 61 for a refund or directly from the counter 60 for determining the cost of the fuel delivered.

A nonpredetermined delivery may be made by the attendant in a conventional manner merely by placing the selector switch 30 in its "Attended" position in which case a maximum of \$9.99 worth of fuel may be delivered before the pump 10 is deactivated. Additionally the counter 61 may be appropriately disconnected as with the switch 80 if for example a greater amount of fuel is to be delivered. The switch 80 is also shown adapted for connecting the "Reset" switch 32 directly to the reset control relay 48 and for thereby bypassing the selector relay 74 so that the operation of the pump will then be controllable with the manually operable reset switch 32 and the manually operable "Stop" switch 50 or switch 53. And the attendant may then reset the pump register 18 with the "Reset" switch 32, deliver the amount of fuel desired and after the completion of the delivery deactivate the pump with the switch 50 or switch 53.

A pump selector switch 90 for the acceptor 36 is shown provided for selectively employing the acceptor 36 in the self-service systems of two or more pumps. Thus, a customer may manually operate the pump selector switch 90 to select a given pump, as for example to select a particular grade of fuel, and then place the predetermined deposit in the acceptor 36 upon which occurrence the selected pump 10 will be conditioned for delivering fuel as previously described. A succeeding customer may then select and activate another pump (not shown) in the same way without having to wait for the completion of the delivery of the preceding customer.

As will be apparent to persons skilled in the art, various modifications and adaptations of the structure above described will become readily apparent without departure from the spirit and scope of the invention.

We claim:

1. In a fluid dispensing system having fluid delivery means, valve means with open and closed positions for controlling the delivery of fluid, predetermining means operable for closing the valve means for terminating a delivery after a predetermined amount of fluid has been dispensed, and control means adapted to be conditioned for opening the valve means for commencing a delivery; the improvement wherein the fluid dispensing system further comprises money acceptor means operable for collecting a fixed predetermined monetary amount and, upon collecting said fixed monetary amount, for conditioning the control means for opening the valve means, and wherein the predetermining means comprises a first resettable predetermining counter connected to be automatically reset to a fixed predetermined reset position between fluid deliveries and to be indexed from its reset position during a fluid delivery and in accordance with the amount of the fluid delivered and operable to close the valve means upon reaching a fixed predetermined count corresponding to said fixed predetermined monetary amount, a second manually settable predetermining counter connected to be indexed in accordance with the amount of the fluid delivered and operable to close the valve means upon reaching a fixed predetermined count, and selector means operable for selectively rendering at least the first predetermining counter inoperative and operative for closing the valve means whereby the system may be selectively conditioned with the selector means for an unattended delivery operable by collecting said fixed monetary amount with the money acceptor means to condition the control means for opening the valve means and terminated by the first predetermining counter and an attended delivery terminated by the second predetermining counter in accordance with its manual setting.

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2. The fluid dispensing system of claim 1 wherein the selector means conditions the control means for opening the valve means when operated for rendering the first predetermining counter inoperative for closing the valve means.

3. The fluid dispensing system of claim 1 wherein the predetermining means further comprises an electrical pulse generator for generating electrical pulses in accordance with the monetary amount of the fluid delivered, and wherein the first and second predetermining counters comprise first and second banks respectively of electromagnetically indexed single wheel counters connected to be indexed by the electrical pulses of the pulse generator.

4. The fluid dispensing system of claim 3 wherein the valve means comprises first and second solenoid operated valves, and wherein the first and second banks of electromagnetically indexed single wheel counters are electrically connected for sequentially operating the valves to terminate the fluid delivery upon reaching their said predetermined counts respectively.

5. The fluid dispensing system of claim 1 wherein the first predetermining counter is an adding counter connected to be reset to zero between deliveries and the second predetermining counter is a resettable subtracting counter connected to be reset to a predetermined count between deliveries and operable to close the valve means upon reaching a count of zero.

6. The fluid dispensing system of claim 5 wherein the second predetermining counter is connected to be reset between deliveries to a predetermined count greater than said predetermined monetary amount.

7. The fluid dispensing system of claim 1 wherein the predetermining means further comprises a third resettable counter connected to be reset to zero between deliveries and connected to be indexed in accordance with the amount collected by the money acceptor means, and wherein the selector means, when operated for rendering the first predetermining counter operative for closing the valve means, is operable for conditioning the money acceptor means for being automatically rendered inoperative upon the collection thereby of said fixed predetermined monetary amount, the selector means being operable for permitting the repeated collection of said fixed predetermined monetary amount by the acceptor means when operated to render the first predetermining counter inoperative for closing the valve means.

8. The fluid dispensing system of claim 7 wherein the first, second and third counters are located remotely of the fluid delivery means for remote attended operation when the selector means is operated for rendering the first predetermining counter inoperative for closing the valve means.

9. The fluid dispensing system of claim 1 wherein the control means comprises money acceptor controlling means operable for selectively rendering the money acceptor means operative and inoperative for collecting said predetermined monetary amount, and wherein the acceptor controlling means is operable by the acceptor means upon the collection of said predetermined monetary amount to render the money acceptor means inoperative.

10. In a fluid dispensing system having fluid delivery means, valve means with open and closed positions for controlling the delivery of fluid, predetermined means operable for closing the valve means after a predetermined amount of fluid has been delivered for terminating a delivery, and control means adapted to be conditioned for opening the valve means for commencing a delivery; the improvement wherein the fluid dispensing system further comprises money acceptor means operable for collecting a fixed predetermined monetary amount and, upon collecting said fixed predetermined monetary amount, for conditioning the control means for opening the valve means; and money acceptor controlling means for rendering the money acceptor means inoperative for a succeeding collection of said fixed predetermined monetary

amount after said fixed monetary amount has been collected and for subsequently rendering the money acceptor means operative for collecting said fixed monetary amount when the valve means is thereafter closed; and wherein the predetermining means comprises a predetermining counter resettable to zero between fluid deliveries and counter drive means for indexing the counter in accordance with the amount of fluid delivered, the counter being connected for closing the valve means when it reaches a fixed predetermined count corresponding to said fixed predetermined monetary amount.

11. In a fluid dispensing system adapted for customer operation with system operating means, having fluid delivery means, resettable register means for registering the amount of fluid delivered; valve means with open and closed positions for controlling the delivery of fluid, predetermining means operable for closing the valve means after a predetermined amount of fluid has been delivered, and control means adapted to be conditioned for resetting the register means and for opening the valve means; the improvement wherein the fluid dispensing system further comprises acceptor means adapted for accepting fixed system operating means and upon the acceptance of same, for conditioning the control means for resetting the register means and opening the valve means; and acceptor controlling means operable for selectively rendering the acceptor means operative and inoperative for conditioning the control means for resetting the register and opening the valve means, the acceptor controlling mean being operable by the acceptor means upon the acceptance of said fixed system operating means to render the acceptor means inoperative and being operable upon the subsequent closing of the valve means to render the acceptor

means operative; and wherein the predetermining means comprises a first resettable predetermining counter connected to be automatically reset to a fixed predetermined reset position between fluid deliveries and to be indexed from its reset position during a fluid delivery and in accordance with the amount of the fluid dispensed and operable to close the valve means upon reaching a fixed predetermined count; a second manually settable predetermining counter connected to be indexed in accordance with the amount of the fluid dispensed and operable to close the valve means upon reaching a fixed predetermined count; and selector means operable for selectively rendering at least the first predetermining counter inoperative for closing the valve means; whereby the system may be selectively conditioned with the selector means for an unattended delivery operable by the acceptance of the said fixed system operating means by the acceptor means to condition the control means for resetting the register means and opening the valve means and terminated by the first predetermining counter and an attended delivery terminated by the second predetermining counter in accordance with its manual setting.

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