

Dec. 12, 1967

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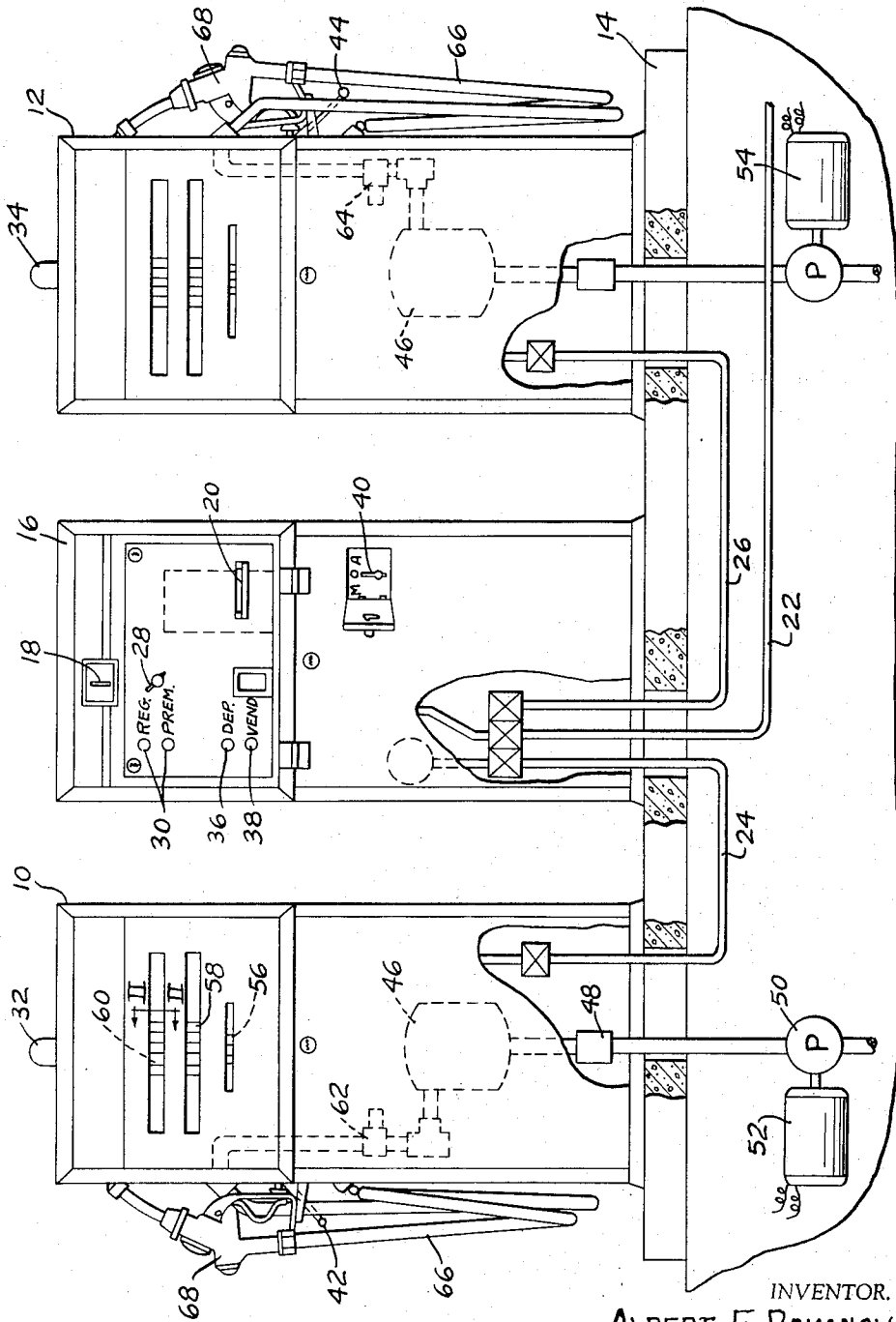
3,357,531

CURRENCY CONTROLLED ACCUMULATOR FOR FLUID DISPENSERS

Filed May 6, 1966

6 Sheets-Sheet 1

FIG-1



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6 Sheets-Sheet 2

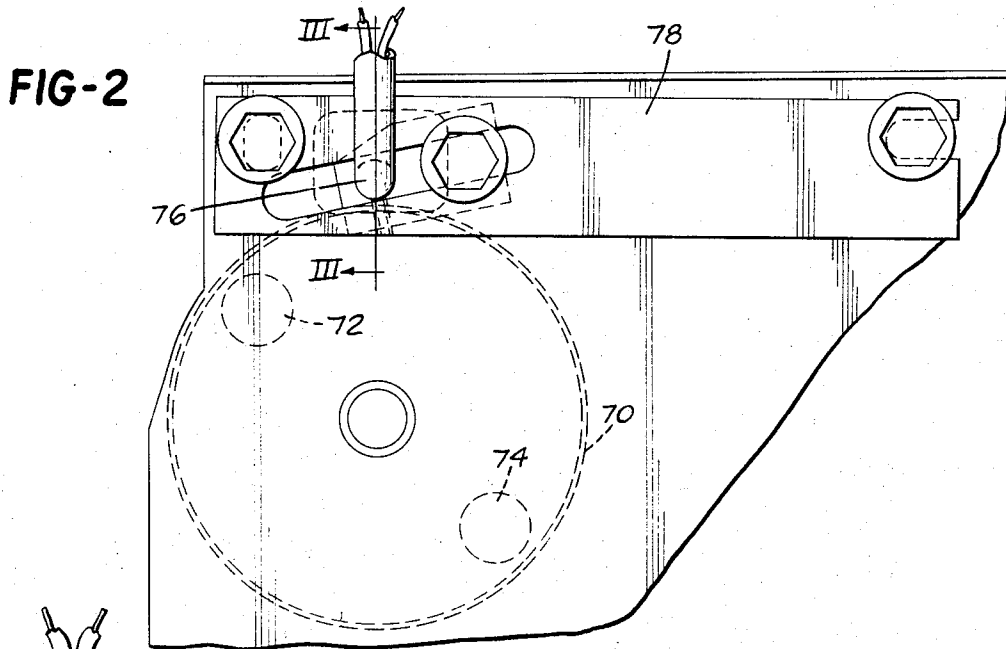
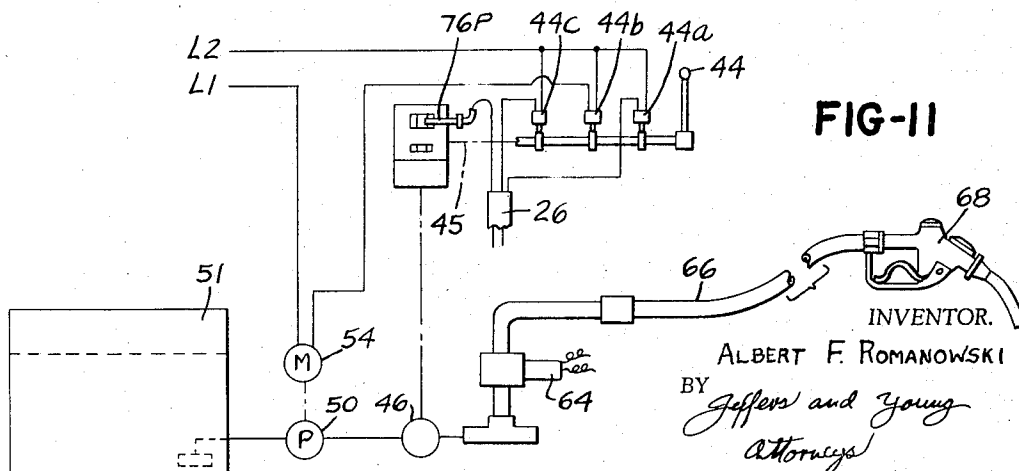
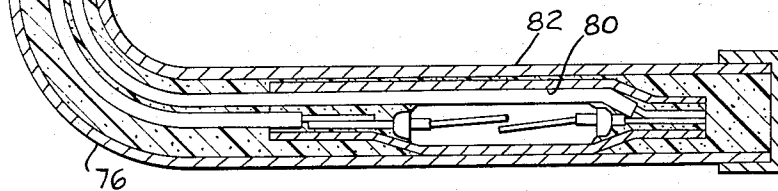


FIG-3



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6 Sheets-Sheet 3

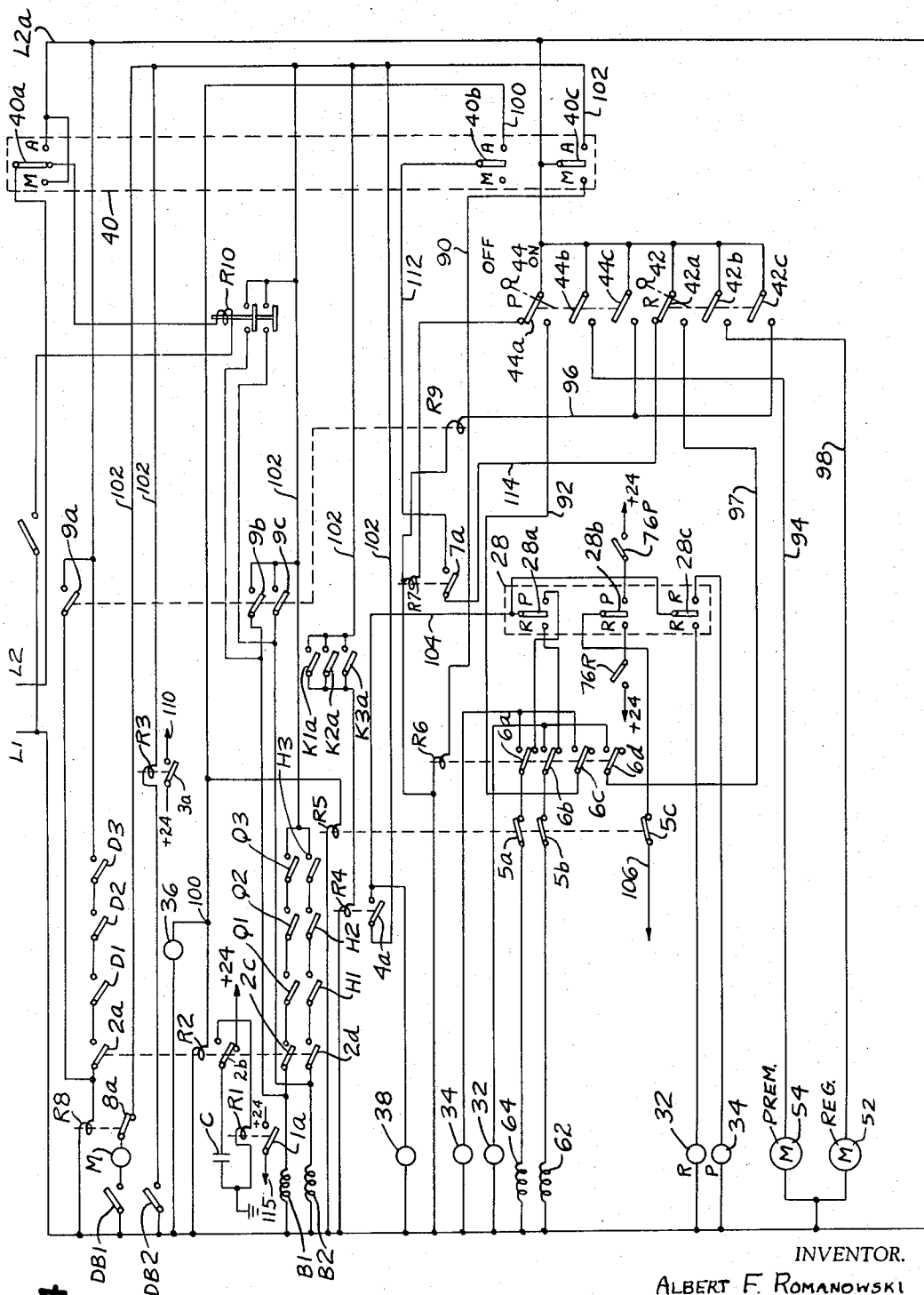


FIG-4

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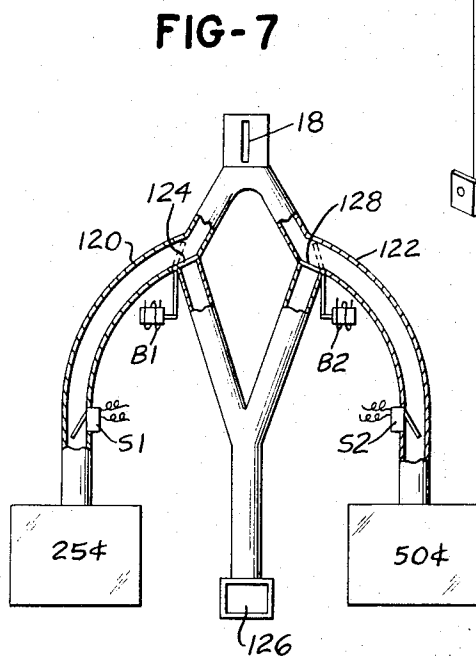
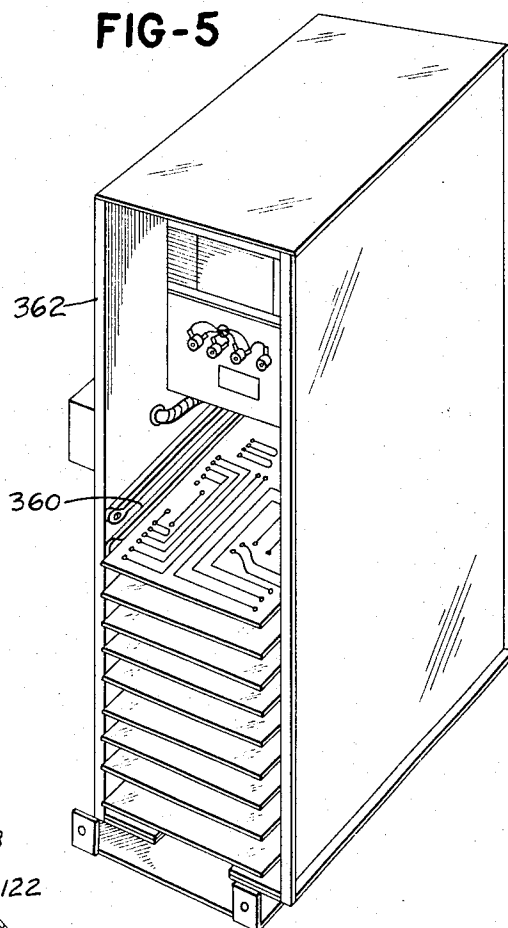
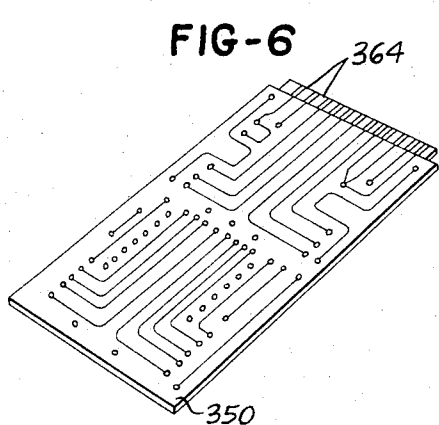
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CURRENCY CONTROLLED ACCUMULATOR FOR FLUID DISPENSERS

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6 Sheets-Sheet 4



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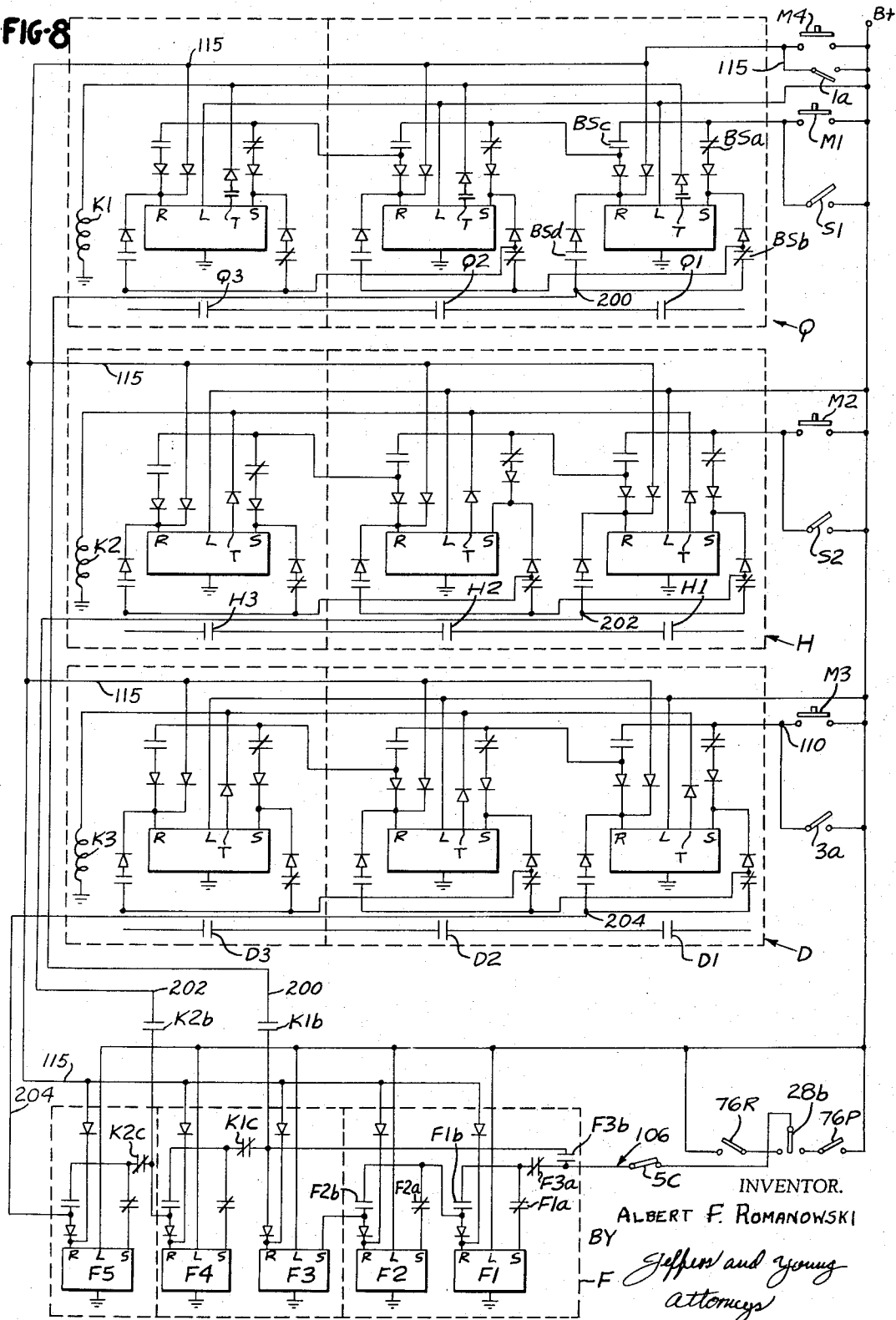
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CURRENCY CONTROLLED ACCUMULATOR FOR FLUID DISPENSERS

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FIG-8



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CURRENCY CONTROLLED ACCUMULATOR FOR FLUID DISPENSERS

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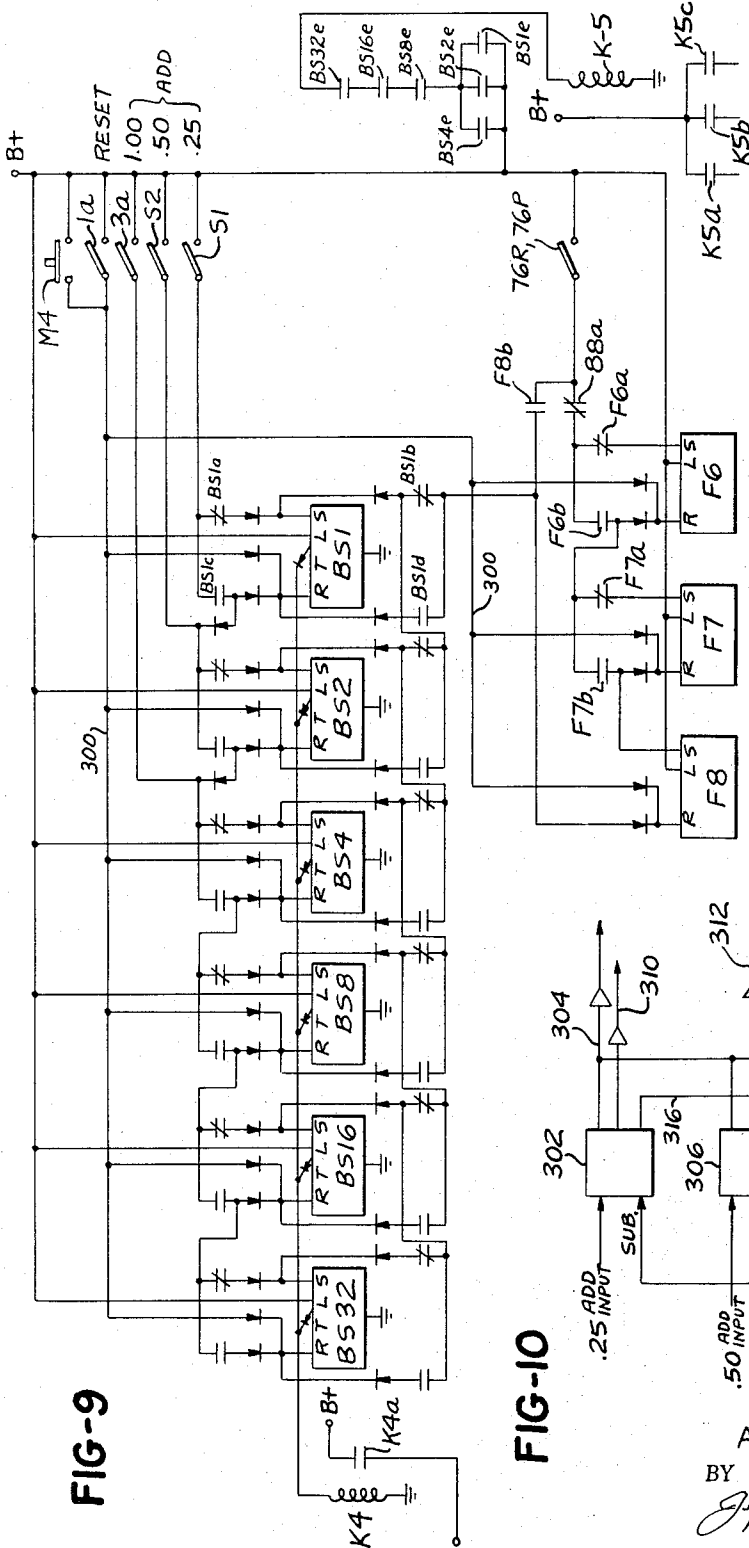
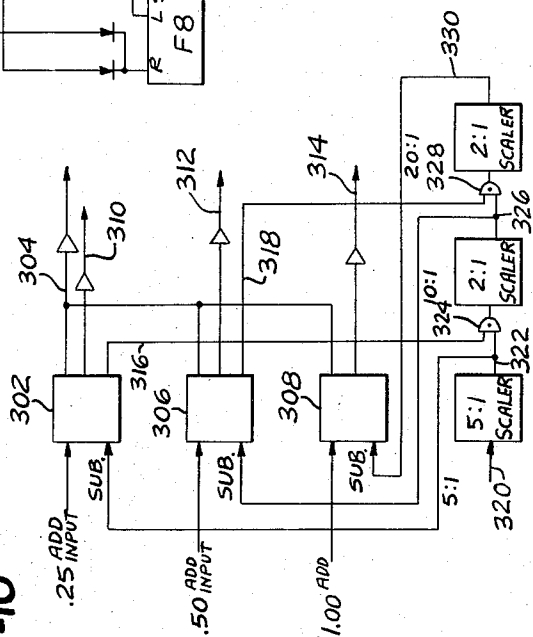


FIG-10



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3,357,531
**CURRENCY CONTROLLED ACCUMULATOR
FOR FLUID DISPENSERS**

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Filed May 6, 1966, Ser. No. 548,269
17 Claims. (Cl. 194—5)

ABSTRACT OF THE DISCLOSURE

An accumulator for fuel dispensers is provided with a currency receiver which counts the currency received and stores the count. As fuel is dispensed, pulses are produced which are applied to the accumulator to subtract from the stored count. When the count reaches zero, the accumulator stops the dispenser. The accumulator also permits the dispenser to be operated manually.

This invention relates to automatic currency operated dispensing systems, such as fuel dispensing systems, and is particularly concerned with a control system therefor including a novel accumulator arrangement in which the value of currency supplied to the system is recorded, or stored, or accumulated for controlling the quantity of material dispensed. This application is related to my copending application Ser. No. 540,033, filed Apr. 4, 1966, and in which is shown a currency controlled dispensing system of the nature with which the control system of the present invention is adapted for being associated.

Currency controlled dispensing systems, particularly for the dispensing of fuel to automotive vehicles and the like, have been constructed before but heretofore have never been entirely satisfactory. A system of this nature must be substantially absolutely certain in operation and reliable in all respects for it to be acceptable to the consumer and to the operator of the system and to meet all legal regulations.

The present invention is particularly concerned with the provision of such an automatic currency controlled arrangement in which substantially absolutely certain and fail proof operation of the system is had. An important element or component of a system of this nature is the means by which the currency units supplied to the system are detected and the value thereof stored or accumulated so that when the material is dispensed, exactly the right amount of material is dispensed as determined by the value of the currency supplied to the system. The present invention is thus concerned primarily with the component of the system in which the value of the currency supplied thereto is stored. This component, broadly, is referred to as an accumulator because it accumulates therein the value of the supplied currency up to a predetermined amount.

Another particular weakness in connection with currency controlled dispensing systems according to the prior art was to be found in the feed back of information from the dispensing unit or units to the accumulator for cancelling off the money value accumulated in the accumulator so that interruption of the dispensing operation would occur at exactly the right point during the dispensing operation. The present invention is further concerned, therefore, with the provision of an absolutely reliable arrangement for feeding information back from the dispensing section of the system to the accumulator section thereof whereby accurate and substantially positive cancelling of the money values stored in the accumulator is obtained.

With the foregoing in mind it will be evident that a primary object of the present invention is the provision

of a currency operated dispensing system for use in filling stations or the like, which is positive and, therefore, absolutely accurate in operation.

Another object of the present invention is the provision of a greatly improved accumulator system for a currency controlled dispensing arrangement in connection with which great certainty of operation is had.

Still another object of this invention is the provision of a currency operated fuel dispensing system for use in filling stations and the like in which the dispensing units themselves are substantially conventional in nature so that, with only minor modification of the dispensing units, the currency operated system of the present invention can be incorporated in existing dispensing units.

Still another object of this invention is the provision of a currency controlled dispensing system, especially for filling stations and the like, in which the dispensing units of the system can be operated manually in a conventional nature or in which the dispensing units can be selectively placed under the control of a currency receiving console forming a part of the installation.

Still another object of this invention is the provision of a currency controlled dispensing installation, particularly for filling stations and the like, in which a greatly improved accumulator system is embodied for storing the money value of currency supplied to the installation, and in which the accumulator is capable of construction in the form of printed circuit boards and the like thereby making for easy servicing and maintenance of the accumulator portion of the installation.

The foregoing objects as well as still other objects and advantages of the present invention will become more apparent upon reference to the following detailed specification taken in connection with accompanying drawings in which:

FIGURE 1 is a somewhat schematic elevational view of a typical installation according to the present invention, partly broken away to show operative components of the installation;

FIGURE 2 is a somewhat schematic view indicated by line II—II on FIGURE 1 and showing a feed back switch arrangement pertaining to one of the rotatable wheels of the cost indicator pertaining to one of the dispensing units;

FIGURE 3 is a sectional view indicated by line III—III on FIGURE 2 showing more in detail the construction of the feed back switch of FIGURE 2;

FIGURE 4 is a schematic showing of the entire electrical system of the installation with the exception of the accumulator portion of the device;

FIGURE 5 is a perspective view showing a cabinet adapted for receiving printed circuit boards making up the accumulator portion of the electrical control system and certain other portions thereof such as interlock relays;

FIGURE 6 is a perspective view showing a typical printed circuit board;

FIGURE 7 is a diagrammatic view showing the portion of the console of the installation to which coins are supplied;

FIGURE 8 is a schematic representation of one form which the accumulator portion of the installation can take including in the circuit the portion thereof by means of which the feed back switches cancel out the values stored in the accumulator;

FIGURE 9 is a view like FIGURE 8 but shows a different accumulator arrangement;

FIGURE 10 is a schematic view showing still another arrangement of the accumulator portion of the installation according to the present invention; and,

FIGURE 11 is a schematic view showing components of one dispensing unit.

Referring to the drawings somewhat more in detail, in FIGURE 1 there is shown an installation comprising dispensing units 10 and 12 which, according to conventional practices, may be mounted on an island 14 in a filling station or the like so that vehicles to be fueled from the dispensing units can be driven adjacent thereto.

In the particular installation illustrated, there is disposed between the dispensing units 10 and 12, a console 16 which is the central controlling station for the entire installation. The console unit 16 is adapted for receiving coins in the form of 25 cent and 50 cent pieces by way of a coin slot 18 and is adapted for receiving one dollar bills via a slot 20. Both the coin receiving unit and the dollar bill receiving unit are substantially conventional in nature. The console unit is electrically operable and receives power via a conduit 22 and is connected with dispensing units 10 and 12 via conduits 24 and 26, respectively.

Dispensing unit 10 may dispense regular grade fuel and dispensing unit 12 may dispense premium fuel. A selection as to which dispenser is to operate can be made at the console unit by way of selector lever 28 which can be positioned in either of two positions. When the lever is adjusted to either of its two positions, a pertaining signal light 30 on the console becomes illuminated and also one or the other of the signal lights 32 and 34 on the regular and premium dispensing units is also illuminated, thereby indicating which dispensing units is to be utilized for dispensing the fuel.

The console unit also embodies a signal light 36 which is illuminated when the console unit is prepared for receiving currency. A second signal light 38 on the console unit becomes illuminated whenever there is any money value stored in the accumulator portion thereof thereby indicating that fuel can be dispensed from either of the dispensing units. The console unit also embodies a main selector switch 40 under the control of the operator of the filling station and which is adjustable into MANUAL position for manual operation of the dispensing units in a conventional manner, or into OFF position to cut off the entire installation, or into AUTOMATIC position where the dispensing units can be operated only under the control of console unit 16.

Switch 40 is, of course, contained within a locked compartment in the console unit so as to be available only to authorized personnel.

Each dispensing unit includes a main control lever or switch, 42 on the regulator dispenser 10, and 44 on the premium dispenser 12, which must be moved into an ON position before the pertaining dispenser will operate and which must be moved into an OFF position before the dispensing nozzle of the pertaining unit can be returned to the supporting hook therefor provided on the pertaining dispenser unit housing.

Within each dispenser unit is a meter 46 to which fuel is supplied via a flow control valve 48 and a pump 50 from the pertaining underground storage tank. A motor 52 drives the regular dispenser unit pump and a motor 54 drives the pump for the premium dispenser unit.

The meters 46 are connected, in a conventional manner, with the computer heads of the respective dispensing units. Each computer head comprises a totalizing dial 56 which shows the total quantity dispensed from the pertaining unit over any particular period of time, say 8, 12 or 24 hours. Each computer head also comprises numbered wheels at 58 which indicate the quantity of fuel dispensed in a particular dispensing operation. Each computer head also comprises numbered wheels 60 which indicate the money value of the fuel dispensed in each dispensing operation. The construction and arrangement of such computer heads is well known, and per se, form no part of the present invention. The wheels 58 and 60 of each computer are automatically set to zero when the pertaining one of the main control levers or switches 42,

44 is moved to its ON position to initiate a dispensing operation.

The discharge of fuel from each of the meters passes through a pertaining solenoid control valve, 62 for the regular dispensing unit, and 64 for the premium dispensing unit, to a pertaining flexible hose 66 which terminates in a nozzle 68 which may be of any conventional type but which is, preferably, of the automatic trip type which is well known in the art. The aforementioned solenoid valves 62 and 64 are normally closed to prevent delivery of fuel from the respective dispensing units. These valves are opened at the initiation of a dispensing operation by energization of their pertaining solenoids and automatically close at the end of a dispensing operation. When the dispensing units are under the control of the console unit, adjustment of lever 28 will determine which one of the solenoid valves will open and the opening of the selected solenoid valve will be accomplished by movement of the pertaining main lever 42, 44, at the initiation of a dispensing operation. When all of the money value stored in the accumulator in the console unit has been cancelled off, the solenoid valve of the dispenser in operation will close and thereby interrupt the dispensing operation.

When the dispensing units are under manual control, the solenoid valve of either dispensing unit can be opened by movement of the main control lever of the pertaining dispenser to ON position and the valve will remain open until the said control lever is moved back to its OFF position. Under manual control, either or both of the dispensing units can be operated at will, as is the case with conventional fuel dispensing installation.

In FIGURE 2, the cents wheel 70 of the computer head of one of the dispensing units is illustrated. Mounted within this wheel are two magnets 72 and 74. The cents wheel is graduated from zero through nine and thus in one rotation will indicate the dispensing of ten cents worth of fuel. With two magnets in the wheel disposed at diametrically opposite locations, each time a magnet passes a predetermined point it will indicate that five cents worth of fuel has been dispensed. Mounted adjacent the periphery of wheel 70 is a magnetically operable switch 76 which is normally open but which will close in response to the movement of one of magnets 72 and 74 in the vicinity thereof. The switch will thus close each time five cents worth of fuel has been dispensed from the pertaining dispensing unit. Switch 76 is mounted on bracket means 78 that permits radial and circumferential adjustment of the switch relative to the wheel so that the exact moment that the switch closes due to the movement of a magnet in the vicinity thereof can be closely adjusted.

As will be seen in FIGURE 3, switch 76 may be in the form of an encapsulated switch structure 80 sealed within a tube 82 so that absolutely no possibility exists of sparking which might create a hazardous condition.

Turning now to FIGURE 4, the entire electrical control circuit except for the accumulator is illustrated. In this figure the main power lines are indicated at L1 and L2. Line L2 leads to one blade 40a of the aforementioned master switch 40 on the console unit, the said switch also comprising blades 40b and 40c. All of the blades are interconnected to move as a unit and have a centered OFF position where the entire installation is shut down and the blades make contact with no parts of the electrical circuit. When the blades are moved toward the left to MANUAL the system is under manual control and when the blades are moved toward the right to AUTOMATIC, the system is under automatic control. In either position of switch 40a, power line L2 is connected to line L2a so that the system is live in the region beyond blade 40a.

The system comprises a plurality of relays numbered from R1 to R9 and each embodying one or more blades which cooperate in controlling the operation of the dispensing unit.

MANUAL operation

Considering first, when the switch 40 is adjusted for MANUAL operation, it will be observed that blade 40b when in its manual position closes on an unconnected contact and is thus without effect in the system. Blade 40c, on the other hand, closes a contact connected by a wire 90 with one side of the coil of relay R6, the other side of which is connected with line L1. Relay R6 is thus energized whenever switch 40 is adjusted into manual position and is de-energized at all other times. Relay R6 has blades 6a, 6b, 6c and 6d thereon which move from their lower position to an upper position when relay R6 is energized. Blade 6a is connected through blade 5a of relay R5 with the valve solenoid 64 of the premium dispensing unit while 6b is connected through blade 5b with valve solenoid 62 of the regular dispensing unit. Blades 5a and 5b, together with a blade 5c, are blades of relay R5 which are closed when relay R5 is deenergized and which open when the said relay is energized. Blade 6a, together with blade 6c, completes a circuit from valve solenoid 64 to wire 92 leading to contact on which blade 44a of the main control switch 44 of the premium dispensing unit closes when the main switch lever is moved to its ON position. This main switch lever also operates blades 44b and 44c when adjusted between its ON and OFF positions. Each of blades 44a, 44b and 44c are connected directly with line L2a which leads to blade 40a of main control switch 40 and are thus live whenever switch 40 is in either its manual or its automatic position.

Blade 44b of the main switch 44 of the premium dispenser closes on a contact connected by wire 94 with motor 54 which drives the pump of the premium dispensing unit. Blade 44c closes on a contact connected by wire 96 with one side of the coil of relay R9, the other side of which is connected with line L1.

Main switch 42 of the regular dispensing unit is similarly provided with blades 42a, 42b and 42c. Blade 42a closes on a contact when the switch is moved to its ON position and which contact is connected by wire 97 to blade 6d which, in cooperation with blade 6b completes a circuit through blade 5b to the valve solenoid 62 of the regular dispensing unit. Blade 42b when the main switch is moved to its ON position, closes on a contact connected by wire 98 with motor 52 of the regular dispensing unit. Blade 42c closes on a contact which is connected to wire 96 leading to the coil of relay R9.

From the foregoing it will be evident that when the console mounted main switch 40 is adjusted to its MANUAL position, the movement of either of the dispensing unit mounted main control levers 42, 44 to its ON position, will energize the pertaining valve solenoid and will also energize the pertaining pump drive motor. Either or both of the dispensing units can thus be operated in a conventional manner when switch 40 is adjusted to its manual position.

The relay R9, as will be explained hereinafter, is provided as an interlock to prevent the placing of currency in the console unit whenever either of the dispensing units is in operation.

AUTOMATIC operations

Turning now to the operation of the electrical system when it is adjusted for automatic operation, adjustment of switch 40 to its AUTOMATIC position will, as before, connect line L2 with line L2a but at this time blade 40b closes on a contact connected to a wire 100 and blade 40c closes on a contact connected to a wire 102. The blades of the switches 44 and 42 are still connected to power line L2a and upon the movement of either of these switches to its ON position, the pertaining pump motor will be energized but the valve solenoid pertaining thereto will not be energized because relay R6 is now de-energized and no circuits for the valve solenoids, as above described, are set up.

The circuits for the valve solenoids 64 and 62, with relay R6 de-energized, are, instead, established through blades 5a and 5b, respectively, and then through blades 6a and 6b, respectively, to a pair of contacts located on opposite sides of blade 28a of selector switch 28 on the console unit. Movement of the selector switch in one direction will close blade 28a on one of the aforementioned contacts and movement of blade 28a in the opposite direction will close the blade on the other of the aforementioned contacts. It will be apparent that only one of the valve solenoid circuits can be established when switch 40 is in automatic position. Blade 28a is connected by wire 104 with a contact on which blade 4a of relay R4 is adapted to close when the relay is energized. Blade 4a, in turn, is connected to wire 102 which, through blade 40c is connected to line L2a when switch 40 is adjusted to its AUTOMATIC position. Wire 104 is also connected to one side of vend light 38 on the console unit so that this light is only illuminated when blade 4a is closed. Wire 104 is also connected to blade 28c of selector switch 28 which will close on one or the other of the contacts leading to the lights 32 and 34 on the regular and premium dispensing units. It will be evident that only one of these two lights will be illuminated in each setting of switch 28.

Switch 28 has a third blade 28b thereon which will close on one or the other of a pair of contacts leading to the feed back switches 76R for the regular dispenser and 76P for the premium dispenser. It will be evident that only one or the other of the feed back switches can be made effective in each setting of switch 28. Blade 28b is further connected through blade 5c of relay R5 to a wire 106 which leads to the subtract input of the accumulator as will become more apparent hereinafter.

The other side of each of switches 76R and 76P is connected with a source of voltage so that upon the closing of either of the switches a voltage impulse will be delivered to wire 106 serving as a count down pulse for the accumulator system.

The coil of relay R4 is connected between line L1 and wire 102 in series with the parallel connected blades K1a, K2a and K3a. Blade K1a pertains to the twenty-five cent portion of the accumulator and is closed whenever there is any storage in the twenty-five cent portion of the accumulator. Similarly, blades K2a and K3a pertain to the fifty cent and dollar bill portions respectively of the accumulator and are closed whenever any value is stored in those portions. The coil of relay R4 is thus energized whenever there is any storage in the accumulator and the system is adjusted for automatic operation, and is de-energized whenever the system is set on manual operation or whenever there is no storage in any part of the accumulator. Opening of blade 4a of relay R4 will, of course, interrupt the energizing circuit to the valve solenoids 64 and 62 so that no dispensing from either unit can take place unless there is storage in the accumulator and, similarly, upon the removal from the accumulator of all accumulated values therein, the valve solenoids will be de-energized and will immediately close and interrupt the dispensing operation then in progress.

The circuit of FIGURE 4 also shows the manner in which the maximum amount of currency that can be supplied to the currency receiving portions of the console unit can be controlled. The dollar bill validator unit comprises a switch DB1 which is closed when a dollar bill is placed in a unit. Closing of switch DB1 will energize a motor M by way of blade 8a of relay R8 when the latter is de-energized. When this motor runs and a dollar bill is validated and accepted, a second switch DB2 is closed which is in circuit with the coil of relay R3 so that this relay will be energized and close its blade 3a and thus connect a source of voltage to a wire 110 which leads to the dollar bill storage portion of the accumulator and supply an input pulse thereto to be stored therein.

If relay R8 is energized blade 8a thereof is opened and the dollar bill validating unit is disabled and will

receive no dollar bills. Relay R8 is adapted for being energized whenever either of the dispensing units is in operation. Relay R8 is also adapted for being energized upon the closing of blade 2a of relay R2 and the three blades D1, D2 and D3 which are connected in series. These three blades pertain to the dollar bill portion of the accumulator and are all closed when the maximum number of dollar bills has been fed into the dollar bill validator.

The aforementioned blade 2a is one of the blades of relay R2, the coil of which is connected with wire 100, as is the coil of the aforementioned relay R5. Wire 100, when switch 40 is adjusted to AUTOMATIC position, is connected to wire 112 which leads to a contact on which blade 7a of relay R7 closes when the coil of relay R7 is energized. The coil of relay R7 is connected on one side to line L1 and on its other side to a contact on which blade 44a of switch 44 closes when the switch is in its OFF position. When switch 44 is in its OFF position, the coil of relay R7 is energized and its blade 7a is closed. Blade 7a is connected by a wire 114 with a contact on which blade 42a of switch 42 closes when switch 42 is in its OFF position. It will be evident from the foregoing that the coils of relays R2 and R5 will be energized only when switch 40 is adjusted to its automatic position and both of the main control switches 44 and 42 of the regular and premium dispensers are adjusted to their OFF positions.

Relay R2 has another blade 2c which closes when relay R2 is energized. Blade 2c is connected in circuit with a solenoid B1 which, when energized, prevents the supply of twenty-five cent pieces to the coin receiving portion of the console unit. Switch 2c is in series with the three normally open and serially arranged switches Q1, Q2 and Q3 which pertain to the twenty-five cent section of the accumulator and all of which are closed only when a maximum number of twenty-five cent pieces have been fed into the coin receiving portion of the console unit. Blocking solenoid B1 will thus be energized whenever relay R2 is energized and all of switches Q1, Q2 and Q3 are closed. Solenoid B1 can also be energized by closing of blade 9b of relay R9 which is energized whenever either dispensing unit is put into operation.

Still another blade 2d of relay R2 is similarly arranged in circuit with the second blocking solenoid B2 pertaining to the fifty cent portion of the accumulator and operable to prevent the feeding of fifty cent pieces into the coin receiving unit. Blade 2d is in series with the three normally opened and serially arranged switches H1, H2 and H3, all of which close only when the accumulator has stored therein the maximum number of pulses pertaining to fifty cent pieces. A third blade 9c of relay R9 is also operable, when closed, to energize solenoid B2.

Still another blade 2b of relay R2 is arranged so that when relay R2 is de-energized blade 2b connects a source of voltage to one side of a condenser C, the other side of which is grounded. When relay R2 is energized, blade 2b connects condenser C across the coil of relay R1 and the discharge of the condenser through the coil of relay R1 will momentarily close its blade 1a. This blade connects a source of voltage to a wire 115 which leads to the accumulator and effects the mass resetting of the entire accumulator to zero preparatory to a currency depositing operation.

It is also possible, to prevent the placing of currency in the console unit when the entire system is shut down, to provide a further relay R10 having blades thereon which, when closed, energize blocking solenoids B1 and B2. Relay R10 could be arranged to be energized when blade 40a of switch 40 is adjusted into its center or OFF position. The provision of this additional control relay is, of course, optional, because the placing of currency in the console unit is supported to be carried out only when vend light 38 is illuminated indicating that the system is in operation and is adjusted for automatic operation.

Turning now to FIGURE 7, the coin receiving slot 18 of the console unit is shown connected by a tube 120 to a receiver for twenty-five cent pieces, and by a tube 122 to a receiver for fifty cent pieces. The division of the coins between the two tubes is made automatically according to practices well known in the art. In tube 120 is a deflecting blade 124 which is moved into position to deflect coins to a return pocket 126 upon energization of blocking solenoid B1, above described. Similarly, associated with tube 122 is a deflector blade 128 which will deflect coins to the return pocket 126 whenever blocking solenoid B2 is energized.

Tube 120 has therein a switch S1 that closes each time a coin passes down the tube and the closing of which switch will provide an input pulse to the twenty-five cent portion of the accumulator. Similarly, a switch S2 is associated with tube 122 and is closed each time a fifty cent piece passes down the tube and the closing of which switch provides an input pulse to the fifty cent portion of the accumulator. Switches S1 and S2 thus carry out the same function as blade 3a of relay R3 described in connection with FIGURE 4.

Accumulator

Turning now to FIGURE 8, there is shown therein schematically, the entire accumulator and feed back system. In FIGURE 8 the line marked B+ represents the source of voltage which is connected to one side of each of switch blades 1a, 3a, 76R and 76P and to one side of each of switches S1 and S2. The accumulator is divided into three sections, the one indicated at Q being arranged for storing pulses pertaining to twenty-five cent pieces, the section indicated at H being arranged for storing impulses pertaining to fifty cent pieces, and the section at D being arranged for storing impulses pertaining to dollar bills. A fourth section at F is the arrangement for feeding back count down pulses from switches 76R and 76P for cancelling the input pulses stored in the accumulator sections.

Each of the three sections of the accumulator comprises a group of three bi-stable relays and each section is adapted for storing therein seven input pulses. Each bi-stable relay is of a substantially conventional nature and upon receiving of a first pulse will flip to one condition and upon receiving a subsequent pulse will flip back to the original position. These positions can, in general, be referred to as "set" and "reset" positions. Each bi-stable relay is normally in a "reset" position and upon receiving of a first pulse will go into a "set" position and upon receiving the next following pulse will go into a "reset" position, and so on for as long as pulses are sent thereto.

Each bi-stable relay has a set terminal marked S, a reset terminal marked R and a latch terminal marked L. Each bi-stable relay also has blades BSa and BSb which are closed whenever the relay is in "reset" condition and which are open whenever the relay is in "set" condition. Each bi-stable relay also has blades BSc and BSd which are open when the relay is in "reset" condition and which are closed whenever the relay is in "set" position. Each of the bi-stable relays of the Q section of the accumulator has associated therewith one of the blades Q1, Q2 and Q3 and each one of the said blades is closed when the pertaining bi-stable relay is in "set" condition so that all three of the blades are closed only when all the bi-stable relays are in their "set" condition.

Each bi-stable relay, furthermore, has a terminal marked T which is energized whenever the pertaining bi-stable relay is in "set" condition. The last mentioned terminals T are connected through respective diodes with one side of a pertaining relay coil K1 for section Q, K2 for section H, and K3 for section D. The relay coils K are thus in an energized condition whenever any of the pertaining bi-stable relays are in "set" condition and

become de-energized only when all of the pertaining bi-stable relays are in "reset" condition.

Referring now to switch S1 which is closed each time a quarter is fed into the coin slot of the console unit; upon closing of switch S1 a pulse is supplied from B+ through blade BSa to the S terminal of the first bi-stable relay in the Q section and this relay flips over to its "set" condition. When this relay flips to its "set" condition, relay coil K1 is energized and blade Q1 closes, blades BSa and BSb open, and blades BSc and BSd close. The next time that switch S1 closes the pulse from wire B+ is conveyed simultaneously to terminal R of the first bi-stable relay and to terminal S of the second bi-stable relay so that the first bi-stable relay flips back to its "reset" condition and the second bi-stable relay flips to its "set" condition. Relay K1 remains energized, blade Q1 opens, and blade Q2 closes. The third time switch S1 closes, the first bi-stable relay of the Q section will go over to its "set" condition, opening its blades BSa and BSb and closing its blades BSc and BSd and also closing its blade Q1. The fourth time switch S1 closes, both the first and second bi-stable relays will flip back to their "reset" condition while simultaneously the third bi-stable relay will flip over to its "set" condition. The coil of relay K1 is still energized, blade Q3 is closed while blades Q2 and Q1 are open. The fifth time switch S1 closes the first bi-stable relay will flip over to its "set" condition. The sixth time the blade of switch S1 closes the first bi-stable relay will go back to its "reset" condition and the second one will go to its "set" condition while the third bi-stable relay remains in its "set" condition. The seventh time that switch S1 closes the first bi-stable relay will go to its "set" condition.

At this time, after the input of seven pulses by seven closings of switch S1, all of the bi-stable relays of section Q of the accumulator will be in their set condition. The coil of relay K1 is still energized and all of blades Q1, Q2 and Q3 are now closed. Reference back to FIGURE 4 will show that when all of blades Q1, Q2 and Q3 are closed and the blade 2c of relay R2 is closed, solenoid B1 will be energized and any further twenty-five cent pieces delivered to the coin slot will be diverted to the return cup. All of the value that can be stored in the Q section of the accumulator is now stored therein.

The same type of operation, leading to the storage therein of a maximum of seven input pulses, pertains for the H section of the accumulator as brought about by successive closings of switch S2. Similarly, successive closing of the switch 3a will provide for storage of up to seven input pulses in section D of the accumulator. The total amount that can be stored in the accumulator is thus the sum of seven quarters, seven half dollars, and seven dollars, or a maximum amount of twelve dollars and twenty-five cents.

At any time during the supplying of money units to the console, the feeding of money units into the console can be interrupted and a dispensing operation carried out. During a dispensing operation, due to the interlock provided by relay R9, no further units of currency can be supplied to the console.

Assuming that currency has been supplied to the console and a dispensing operation has been initiated, the counting down of the pulses stored in the accumulator is carried out in the following manner. Blade 28b of selector switch 28 is positioned in one of its two positions so that one or the other of switches 76R and 76P is effective for supplying countdown or subtract pulses from wire B+ through blade 28b and relay blade 5c to input wire 106 pertaining to feed back section F of the accumulator.

The feed back section F consists of a group of five bi-stable relays F1, F2, F3, F4 and F5, each of which is a bistable relay similar to those associated with the aforementioned sections Q, H, and D of the accumulator. Each bi-stable relay of the feed back section controls

only two blades, one which is closed when the relay is in "reset" condition and another which is closed when the relay is in "set" condition. The blade pertaining to each relay which is closed when the relay is in "reset" condition bears the number of the relay with the suffix *a* and the one which is closed when the relay is in "set" condition bears the number of the relay with the suffix *b*. It will be noted that the blades of the relays are all adjacent thereto except the blades pertaining to relay F3 which are located ahead of the first relay F1.

As to the operation of the feed back portion F, upon a first closing one of the feed back switches 76R, 76P, a pulse will be supplied to relay F1 and flip it to its "set" condition. A second pulse supplied via wire 106 will return relay F1 to its "reset" condition and will "set" relay F2. A third pulse will again set relay F1. A fourth pulse will then set relay F3 while simultaneously resetting relays F1 and F2. Upon the setting of relay F3, its blade F3a will open and its blade F3b will close. Upon a fifth impulse being supplied via wire 106, the said pulse will then pass through blade F3b and will be effective for resetting relay F3 while simultaneously a pulse will be supplied through blades K1b to wire 200 which leads to blades BSb and BSd of the first relay of section Q of the accumulator. The aforementioned blades K1b pertain to relay K1 of section Q which relay, as previously mentioned, is closed only when there is storage in the section Q.

Assuming that section Q is completely filled, in which case all of the bi-stable relays therein are in their "set" condition, the first pulse delivered by wire 200 thereto will reset the first bi-stable relay of that portion but will not effect the others. The second pulse will reset the second bi-stable relay and simultaneously set the first bi-stable relay. The third pulse will reset the first bi-stable relay and the fourth pulse will reset the third bi-stable relay and simultaneously set the first and second bi-stable relays. This will continue until seven pulses delivered to section Q of the accumulator and, at the seventh pulse, all of the bi-stable relays therein will be in their reset condition. When all of the bi-stable relays of section Q have been reset, the coil of relay K1 will be de-energized whereupon blades K1b thereof will open and blades K1c thereof in the feed back section F will close. From the foregoing it will be evident that for every five pulses fed into feed back section F, a single pulse will be delivered to wire 200 to count down pulses stored in section Q. The number of pulses necessary to supply the section Q to count it down will, of course, correspond to the number of pulses stored therein.

After section Q of the accumulator is completely counted down and blades K1b open no further count down pulses can be supplied thereto. Instead, every fifth impulse delivered to wire 106 will be conveyed through closed blades K1c to bi-stable relay F4. Every alternate pulse delivered to bi-stable relay F4 will be conveyed through blades K2b and wire 202 to section H of the accumulator and serve as a count down pulse for that section. It will be evident that every tenth pulse supplied to input wire 106, after section Q has been counted down, will supply a count down pulse to section H.

When section H is completely counted down, its relay K2 will be de-energized and blades K2b are opened while simultaneously blades K2c thereof will close. Thereafter, for every ten pulses supplied to wire 106, there will be a pulse delivered to bi-stable relay F5. For every two pulses delivered to relay F5, a count down pulse will be delivered via wire 204 to the D section of the accumulator. It will be apparent, at this point, that for every 20 pulses supplied to wire 106, when sections Q and H of the accumulator are counted down, there will be a count down pulse supplied to section D.

When section Q was completely counted down its blades K1a in FIGURE 4 opened and when section H was completely counted down its blades K2a in FIGURE

4 opened, and when section D is completely counted down its blades K3a in FIGURE 4 will open. When all three of these blades are opened, the coil of relay R4 will be de-energized and blade 4a will drop open and this will interrupt the energizing circuit to the valve solenoids of the dispensing units and the dispensing operation then in progress will immediately come to a halt.

The vend light 38 on the console will also become extinguished and, when the nozzle of the dispensing unit in operation is returned to its hook and the pertaining main switch at the dispenser is moved back to its OFF position, the deposit light 36 on the console will become illuminated indicating that the console is again prepared for receiving currency.

It has been mentioned that the count down switches 76R and 76P close for each five cents worth of fuel dispensed so that for counting down the Q section of the accumulator a single count down pulse is delivered thereto for each five closings of the count down switch of the dispensing unit in operation whereas, for section H, ten pulses from the count down switch are required to provide one count down pulse, and for section D, twenty pulses from the count down switch are required to supply a single count down pulse.

In FIGURE 8 manual switches M1, M2 and M3 may be provided whereby input pulses can be put into the individual storage sections of the accumulator, if so desired.

Also, a further manual switch M4 is provided which, when closed, energizes wire 115 to effect resetting of the entire accumulator, including the feed back section, at one time. This switch is connected in parallel with blade 1a of relay R1 which is also operable, when closed, to reset the entire accumulator storage and feed back to zero.

It will further be noted in FIGURE 4 that the input pulses for setting the accumulator sections and the count down pulses for counting down the stored pulses therein are isolated by diodes suitably located in the lines leading to the terminals of the bi-stable relays.

FIGURE 9 shows another accumulator and count down arrangement which will perform the same functions that have already been described in connection with the FIG. 8 modification. The principal difference between FIGURE 9 and FIGURE 8 is that in FIGURE 9 a plurality of bi-stable relays marked BS1, BS2, BS4, BS8, BS16 and BS32 are serially arranged instead of being collected in groups of three as in the FIGURE 8 arrangement.

The input switches to supply pulses for the storage of money values to the accumulator are numbered the same as in FIGURE 8 and consist of switch S1 for feeding in twenty-five cent values, switch S2 for feeding in fifty cent values, and switch 3a for feeding in dollar values. A reset switch 1a and a manual reset switch M4 are also provided. The bi-stable relay arrangement of the accumulator in FIGURE 9 is capable of storing therein a total of sixty-three pulses which would correspond to fifteen dollars and seventy-five cents, but, in practice, the system is arranged to store only fifty-seven pulses corresponding to a money value of fourteen dollars and twenty-five cents.

The accumulator in FIGURE 9 includes a relay coil K4 which, it will be seen, is energized whenever any of the bi-stable relays of the accumulator are in their set condition. This relay controls a blade K4a which, in FIGURE 4, corresponds to the grouped blades K1a, K2a and K3a. Whenever any storage is present in any of the bi-stable relays of FIGURE 9, blade K4a is closed and this would correspond to the closing of any one of blades K1a, K2a or K3a of FIGURE 4 which would, of course, place the automatic system in operative condition.

Each of the bi-stable relays referred to has blades which are closed when the pertaining relay is in "reset" condition and which blades are identified by the number of the relay with the addition of subscripts a and b respectively; and has blades which are closed when the relay is in "set" condition and which are identified by the relay

number with the addition of suffixes c and d respectively. The relays have a fifth blade identified by the relay number with a suffix e and which last mentioned blades close when the pertaining relay is in its "set" condition. As will be seen in FIGURE 9, these last mentioned blades are connected in circuit with the coil of a relay K5 which controls blades K5a, K5b and K5c. These blades are provided for the purpose of locking the console against receiving further money units and correspond to the blades identified at Q1, Q2, Q3, H1, H2, H3, D1, D2 and D3 in FIGURE 4. Whenever the coil of relay K5 is energized and its blades K5a, K5b and K5c are thereby closed the console is disabled from receiving any further currency units.

As to feed back or count down portion of the accumulator system of FIGURE 9, this comprises three bi-stable relays marked F6, F7 and F8 and which are supplied with pulses from the count down switches of the respective dispensing units and which, in FIGURE 9 are indicated as a single switch blade for the purpose of convenience. Each of the relays F6, F7 and F8 has a blade which is closed when the pertaining relay is in "reset" condition and which is identified by the number of the relay with a subscript a and another blade which closed when the relay is in "set" condition and which is identified by the number of the relay with a suffix b.

All of the count down pulses from the feed back section of the accumulator are delivered to a wire 300 in FIGURE 9 instead of being introduced into the accumulator at different points, as in the modification of FIGURE 8. This becomes possible because of the serial arrangement of the bi-stable relays of the accumulator section.

In operation, for each five cents of fuel delivered, the feed back switch of the dispensing unit in operation will close and a count down pulse will be delivered to the feed back section. The first pulse will set relay F6 and the second will set relay F7 and reset F6. The third pulse will again set relay F6. The fourth pulse will set relay F8 and reset relays F6 and F7. Upon relay F8 being set, its blades F8a will open and its blades F8b will close. The next following pulse, which is the fifth pulse, will then by-pass relays F6 and F7 and will, instead, reset relay F8 and simultaneously supply a reset pulse to wire 300. All of the relays of the feed back section are now reset and a single count down pulse has been supplied to the accumulator section.

As has been described before, the accumulator is gradually counted down until no storage remains therein at which time relay K4 is de-energized and permits its blade K4a to open which will bring about de-energization of the valve solenoid of the dispenser unit then in operation to interrupt the dispensing operation. Upon moving the main switch of the dispenser in operation back to its OFF position, the accumulator and the count down or feed back section will be reset to zero by closing the blade 1a of relay R1 and the system will then again be ready to receive currency units.

A still further accumulator arrangement is shown in FIGURE 10 wherein the accumulator section is again divided into three groups of relays, one for receiving input pulses corresponding to twenty-five cent coins, another for receiving input pulses corresponding to fifty cent coins, and a third for receiving input pulses corresponding to dollar bills. The first mentioned section indicated at 302 in FIGURE 10 has a first output terminal connected to a wire 304 and which first terminal is energized as soon as there is any storage in section 302. This wire leads to the coil of relay 4 in FIGURE 4 and is operable for energizing the relay as soon as wire 304 is energized. Each of the other sections 306 and 308 of the accumulator also has an output terminal connected to wire 304 and each is also characterized in that, as soon as there is any storage in the pertaining section, a voltage is supplied to wire 304.

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Each of the said sections has a second output terminal connected to a wire leading to the block for preventing further coins of that pertaining denomination from being supplied to the console. In the case of section 302, the wire is indicated at 310 and this leads to the solenoid B1 which will block off any further twenty-five cent pieces. For section 306, the wire is indicated at 312 and it leads to solenoid B2 whereas, for section 308, the wire is indicated at 314 and it leads to the coil of relay R8. Each of the last mentioned terminals becomes energized only when the pertaining section has stored therein the maximum number of input pulses.

A third output terminal is provided on section 302 which is connected to a wire 316 and a signal is supplied to this wire only when the pertaining section is completely counted down. Section 306 has a similar output terminal connected to wire 318 so that a signal is supplied to wire 318 only when section 306 is completely counted down.

The count down pulses are delivered by a wire 320 to a five-to-one scaler, which may correspond, for example, to the feed back section of FIGURE 9. For every five pulses supplied to wire 320 a single pulse is supplied to wire 322. This single pulse is supplied to section 302 of the accumulator to count it down. Wire 322 is also connected to one of the input terminals of an AND gate 324, the other terminal of which is connected to wire 316.

When section 302 is completely counted down gate 324 will be opened and further output pulses from the five-to-one scaler will be supplied to a two-to-one scaler and which for each two pulses supplied thereto, will deliver a single pulse to output wire 326. Wire 326 leads to the subtract terminal of section 306 so that for every ten input pulses supplied to wire 320, after section 302 is completely counted down, there will be a single count down pulse supplied to section 306.

Wire 326 is also connected to one input terminal of another AND gate 328, the other input terminal of which is connected to wire 318. AND gate 328 thus opens whenever section 306 is completely counted down. When AND gate 328 opens, the pulses from wire 326 will be conveyed to the input terminal of a still further two-to-one scaler, the output terminal of which is connected by wire 330 with the count down terminal of the dollar bill section 308. For every twenty pulses supplied via wire 320, when sections 302 and 306 are completely counted down, there will be a single pulse supplied by wire 330 to section 308. When section 308 is completely counted down and sections 302 and 306 are also completely counted down, the voltage supplied to wire 304 will be interrupted and thus will interrupt the dispensing operation being carried out as aforementioned.

The circuitry according to the present invention can conveniently be arranged on printed circuit boards and compactly housed as shown in FIGURES 5 and 6. FIGURE 6 shows at 350 a printed circuit board which may contain bi-stable relays and the like. For example, in FIGURE 8 the sections Q, H, D and F are enclosed by dotted lines and within those dotted lines the circuitry can be accommodated to one or more printed circuit boards. The printed circuit boards are inserted in guideways 360 in a housing 362 and each board has terminals 364 at the back which connect with socket-like terminal strips arranged at the back ends of the said guideways. In this manner the circuitry becomes quite compact and, furthermore, servicing and repair thereof becomes extremely simple and can be accomplished quite rapidly.

FIGURE 11 shows schematically the several components of the premium dispensing unit. It will be noted that pump 50 is connected to draw from container 51 and to discharge through meter 46 and solenoid operated valve 64 through hose 66 to nozzle 68. It will also be seen that the main control lever 44 is connected in controlling relation to blades 44a, 44b and 44c and that, furthermore, the main control lever is connected at 45

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so as to reset the numbered wheels of the computer head that is connected to be driven by meter 46. Switch 44b may be connected within the dispensing unit to drive motor 54 whereas switches 44a and 44c are connected via conduit 26 with the console, not shown in FIGURE 11.

What is claimed is:

1. A system for storing values corresponding to units of currency and for cancelling out the stored money values, comprising: bistable relay means having first and second operative conditions and being sensitive to pulses supplied thereto to change from one operative condition to the other; first means for supplying input pulses corresponding to units of currency to said relay means to be stored therein by change of condition of said relay means; second means operable by said relay means in response to the storage of a predetermined number of input pulses in said relay means to prevent the supply of any further input pulses by said first means; third means for supplying countdown pulses corresponding to units of currency to said relay means to countdown the input pulses stored therein; and fourth means operable by said relay means in response to the complete countdown of all said input pulses stored therein to prevent the supply of any further countdown pulses by said third means; said bistable relay means being in groups of serially arranged relays, each group of relays having a said first means individual to the group for supplying input pulses thereto and each group of relays having said second means individual to the group for controlling the respective first means, said third means being common to said groups, said fourth means comprising means pertaining to each group, said means pertaining to each group except the last group being operable upon the pertaining group being counted down to connect said third means with the next following group, said means pertaining to said last group being operable upon the last group being counted down to prevent the supply of any further countdown pulses by said third means.

2. A system according to claim 1 in which said first means of each said groups supplies an input pulse to the pertaining group for a predetermined respective unit of currency, said respective units of currency being multiples of a smaller unit of currency, said third means comprising means for receiving and counting pulses corresponding to said smaller unit of currency and for supplying single countdown pulses to said groups of relays in conformity with the money value of the input pulses stored therein.

3. A system according to claim 1 in which said second means comprises electrically operated means associated with said receiver means energizable for preventing money units from being accepted by said receiver means, circuit means in which said electrically operated means is disposed, and blades in said circuit means for completing the circuit means when closed and under the control of said bistable relay means.

4. A system according to claim 1 in which said third means includes a normally open switch, dispenser means for dispensing material, and means operated by the dispenser means for closing said normally open switch for each quantity of the material dispensed which represents a predetermined money value.

5. A system according to claim 4 in which said fourth means comprises electrically operated control means having a first condition of energization to permit dispensing of material from said dispensing means and a second condition of energization which prevents said dispensing, an energizing circuit for said control means, and blades in said energizing circuit in controlling relation thereto and under the control of said bistable relay means.

6. A system according to claim 1 in which said third means comprises bistable relay elements each having first and second condition and each having first and second terminals and being sensitive to pulses supplied to said terminals to change conditions, each relay element having

first blades closed when the relay element is in its first condition and second blades closed when the relay element is in its second condition, the first blades of all of said relay elements except the last thereof being connected on one side to the first terminal of the respective relay element, the second blades of all of said relay elements except the last thereof being connected to one side to the second terminal of the respective relay element, the other sides of the blades of each relay element except the last thereof having a connection extending therebetween, a switch for supplying said countdown pulses connected to said connection of the first of said relay elements, each said connection of the following relay elements except the last thereof being connected to the second terminal of the preceding relay element, the first terminal of the last relay element being connected to the second terminal of the preceding relay element, the second terminal of the last relay element being connected to said bistable relays, the first blades of said last relay being connected between said switch and the said connection of said first relay, and the second blades of said relay being connected between said switch and the connection leading from the second terminal of the last relay element to said bistable relays.

7. A system according to claim 1 in which said bistable relay means are arranged in three groups, each group having a respective first means for supplying input pulses thereto and a respective second means in the form of a first output terminal which is energized when the respective group has maximum storage therein, each group except the last thereof having a second output terminal which is energized whenever the pertaining group is empty of storage and each group having a third output terminal which is energized whenever there is any storage in the pertaining group, said third output terminals being interconnected and forming a part of said fourth means, each group of relays having a subtract input terminal to which countdown pulses are supplied, said third means comprising a first scaler having an input terminal connected to the source of countdown pulses and an output terminal connected to the subtract input terminal of a first of said groups of relays, a second scaler having an input terminal and having an output terminal connected to the subtract input of a second of said groups of relays, an AND gate having an output terminal connected to the input terminal of said second scaler and having its input terminals connected to the output terminal of said first scaler and to the said second terminal of said first group of relays respectively, a third scaler having an output terminal connected to the subtract input terminal of a third of said group of relays and having an input terminal, and a second AND gate having an output terminal connected to the input terminal of the last mentioned scaler and having its input terminals connected to the output terminal of said second scaler and the said second terminal of said second group of relays respectively.

8. A system according to claim 7 in which said first group of relays stores input pulses corresponding to a first unit of currency and said second and third groups of relays store input pulses which correspond to units of currency which are respective multiples of the first mentioned unit of currency, the countdown pulses corresponding to a money value which is a whole fraction of the value of said first mentioned unit of currency, said first scaler having a ratio between input and output pulses the same as the ratio of said money value as to said first mentioned unit of currency, said second scaler having a ratio between its input and output pulses the same as the ratio between said first mentioned unit of currency and that pertaining to said second group of relays, and said third scaler having a ratio between input and output pulses which is the same as the ratio between the units of currency pertaining to said second and third groups of relays respectively.

9. A system for storing values corresponding to units of currency and for cancelling out the stored money

values, comprising: bistable relay means having first and second operative conditions and being sensitive to pulses supplied thereto to change from one operative condition to the other; first means for supplying input pulses corresponding to units of currency to said relay means to be stored therein by change of condition of said relay means; second means operable by said relay means in response to the storage of a predetermined number of input pulses in said relay means to prevent the supply of any further input pulses by said first means; third means for supplying countdown pulses corresponding to units of currency to said relay means to countdown the input pulses stored therein; and fourth means operable by said relay means in response to the complete countdown of all said input pulses stored therein to prevent the supply of any further countdown pulses by said third means; said bistable relay means comprising three groups of three bistable relays each, the relays in each group being arranged in cascade so that the first relay of each group is sensitive to each input pulse delivered to the group while the second relay is sensitive to every second input pulse and the third relay is sensitive to every fourth input pulse whereby each group of three relays can store therein a maximum of seven input pulses, each group of relays having a said first means and a said second means pertaining thereto, said third means being common to all said groups, said fourth means comprising an auxiliary relay pertaining to each of said groups, the auxiliary relay of a first of said groups connecting said third means thereto when any storage is present in said first group and connecting the third means to a second group when the first group is completely counted down, the auxiliary relay of said second group connecting said third means thereto when any storage is present in said second group and the first group is counted down and connecting the third means to a third group when the second group is completely counted down, the auxiliary relay of said third group connecting said third means thereto when there is any storage in said third group and said first and second groups are counted down and preventing the supply of any countdown pulses by said third means when said third group is completely counted down.

10. A system for storing values corresponding to units of currency and for cancelling out the stored money values, comprising: bistable relay means having first and second operative conditions and being sensitive to pulses supplied thereto to change from one operative condition to the other; first means for supplying input pulses corresponding to units of currency to said relay means to be stored therein by change of condition of said relay means; second means operable by said relay means in response to the storage of a predetermined number of input pulses in said relay means to prevent the supply of any further input pulses by said first means; third means for supplying countdown pulses corresponding to units of currency to said relay means to countdown the input pulses stored therein; and fourth means operable by said relay means in response to the complete countdown of all said input pulses stored therein to prevent the supply of any further countdown pulses by said third means; said bistable relay means comprising a plurality of bistable relays each having first and second terminals for receiving pulses, each relay having first and second blades connected on one side to said first terminal and third and fourth blades connected on one side to said second terminal, said first and second blades being closed in said first condition of said relay and said third and fourth blades being closed in said second condition of said relay, a first connection interconnecting said first and third blades on the side thereof opposite said terminals, a second connection interconnecting said second and fourth blades on the side thereof opposite said terminals, said first means being connected to said first connection of a first of said relays, said third means being connected to said second connection of said first relay, each relay following said first relay having its said first

connection connected to the second terminal of the preceding relay and its second connection connected to the first terminal of the preceding relay, and diodes connected between each terminal and its pertaining blades and isolating the said blades from each other.

11. A system according to claim 10 in which each relay has a fifth blade which is closed when the relay is in its second condition, said second means comprising electrically operated means, and an energizing circuit for said electrically operated means including said fifth blades in series therein whereby all of said relays must be in their said second condition to effect energization of said electrically operated means.

12. A system according to claim 10 in which said fourth means includes auxiliary relay means operable when deenergized to interrupt the supply of countdown pulses by said fourth means, each said relay including means connected to said auxiliary relay means to supply energizing current thereto when the relay is in its second condition whereby said auxiliary relay means is energized when any of said relays is in its said second condition.

13. A system according to claim 12 which includes fluid dispensing means, normally closed solenoid valve means in said dispensing means, means operated upon the initiation of a dispensing operation to establish a circuit for said solenoid valve means, said circuit including normally open blades under the control of said auxiliary relay means whereby the solenoid valve means can be energized to permit dispensing only when said auxiliary relay means is energized, said third means including a switch in the dispensing means which closes for each quantity of fluid dispensed equal to a predetermined money value thereby to supply countdown pulses when the dispensing means is operating.

14. A system according to claim 13 in which said first means includes a money receiver for receiving money units, a switch in the receiver for each money unit operable into closed position when a pertaining money unit is received in the receiver, and said second means comprising solenoid operating blocking means in the receiver energizable to prevent the placing of money units in the receiver and in circuit with said fifth blades of said bistable relays.

15. A system according to claim 13 which includes resetting means for resetting all of said bistable relays at

one time to their first conditions, said resetting means including a diode having its output side connected to each of said second terminal, a common connection interconnecting the input side of said diodes, switch means operable for supplying a pulse to said common connection, a main switch for said fluid dispensing means having an OFF position to which it is moved following a dispensing operation, said switch means including a switch element operated by said main switch when moved to its said OFF position.

16. A system according to claim 10 in which said bistable relays are arranged in groups with each group having a first relay with its first connection connected to a respective first means, a fifth blade on each relay closed when the relay is in its second condition and said fifth blades of the relays of each group being serially connected in controlling relation to a respective said second means, an auxiliary relay for each group, each relay having means connected to the pertaining auxiliary relay for supplying energizing current thereto when the relay is in its second condition, said third means comprising a single source of countdown pulses, the auxiliary relay of each group except the last group being operable when energized for connecting said source with the said second connection of the first relay of the pertaining group while disconnecting the source from the following group of relays, the auxiliary relay of said group of relays being operable when all thereof are deenergized to actuate said fourth means to interrupt the supply of countdown pulses.

17. A system according to claim 10 which includes resetting means for resetting all of said bistable relays at one time to their first condition, said resetting means including a diode having its output side connected to each of said second terminal, a common connection interconnecting the input sides of said diodes, and switch means operable for supplying a pulse to said common connection.

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