Nov. 15, 1966 E. A. ROBBINS 3,285,381

CURRENCY CONTROLLED GASOLINE DISPENSER

Filed Dec. 21, 1964 4 Sheets-Sheet 1

Fig. 1

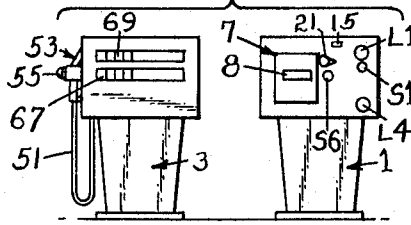


Fig. 3

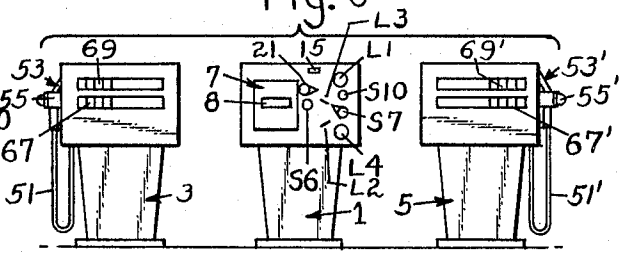
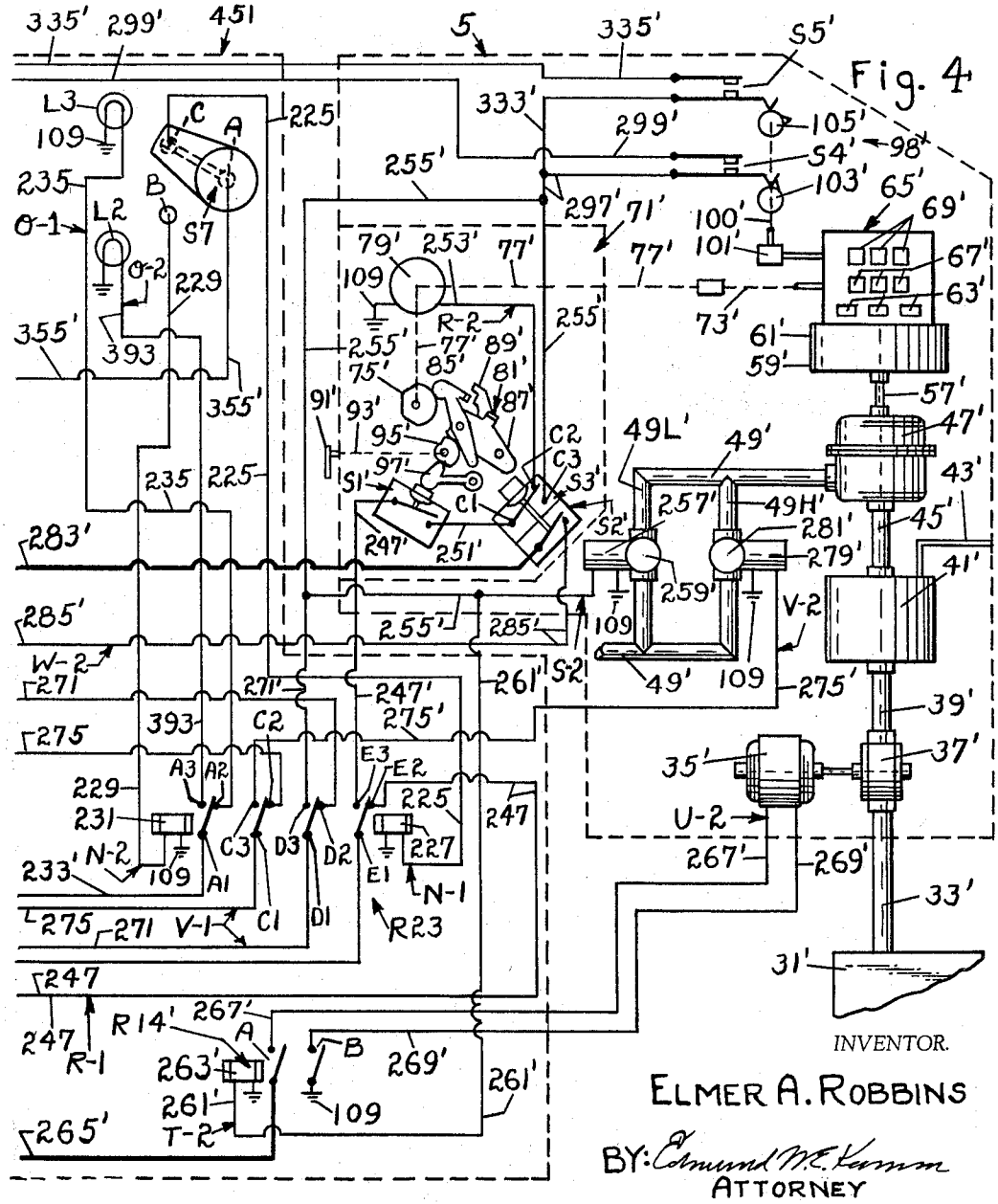


Fig. 4



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CURRENCY CONTROLLED GASOLINE DISPENSER

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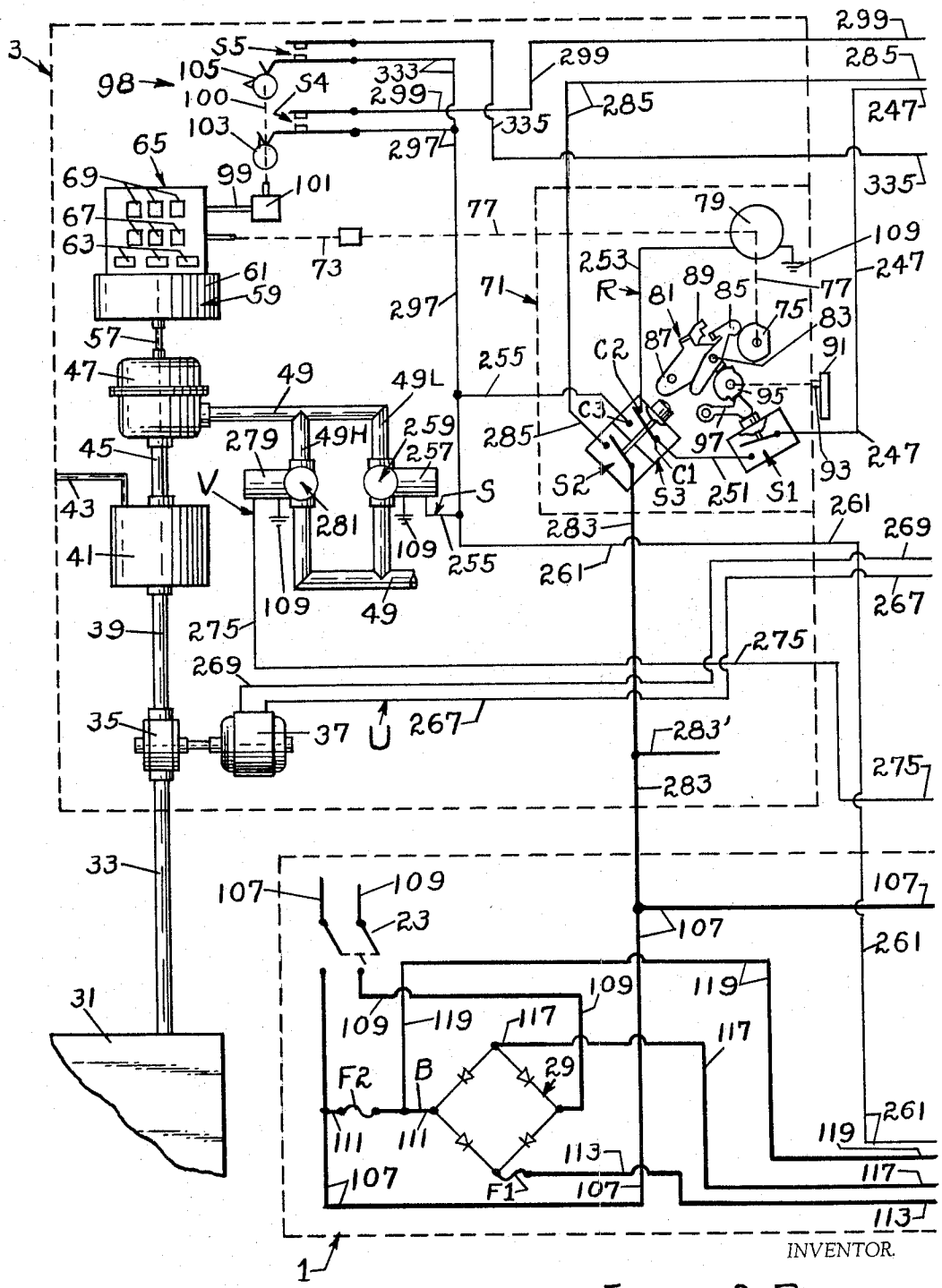


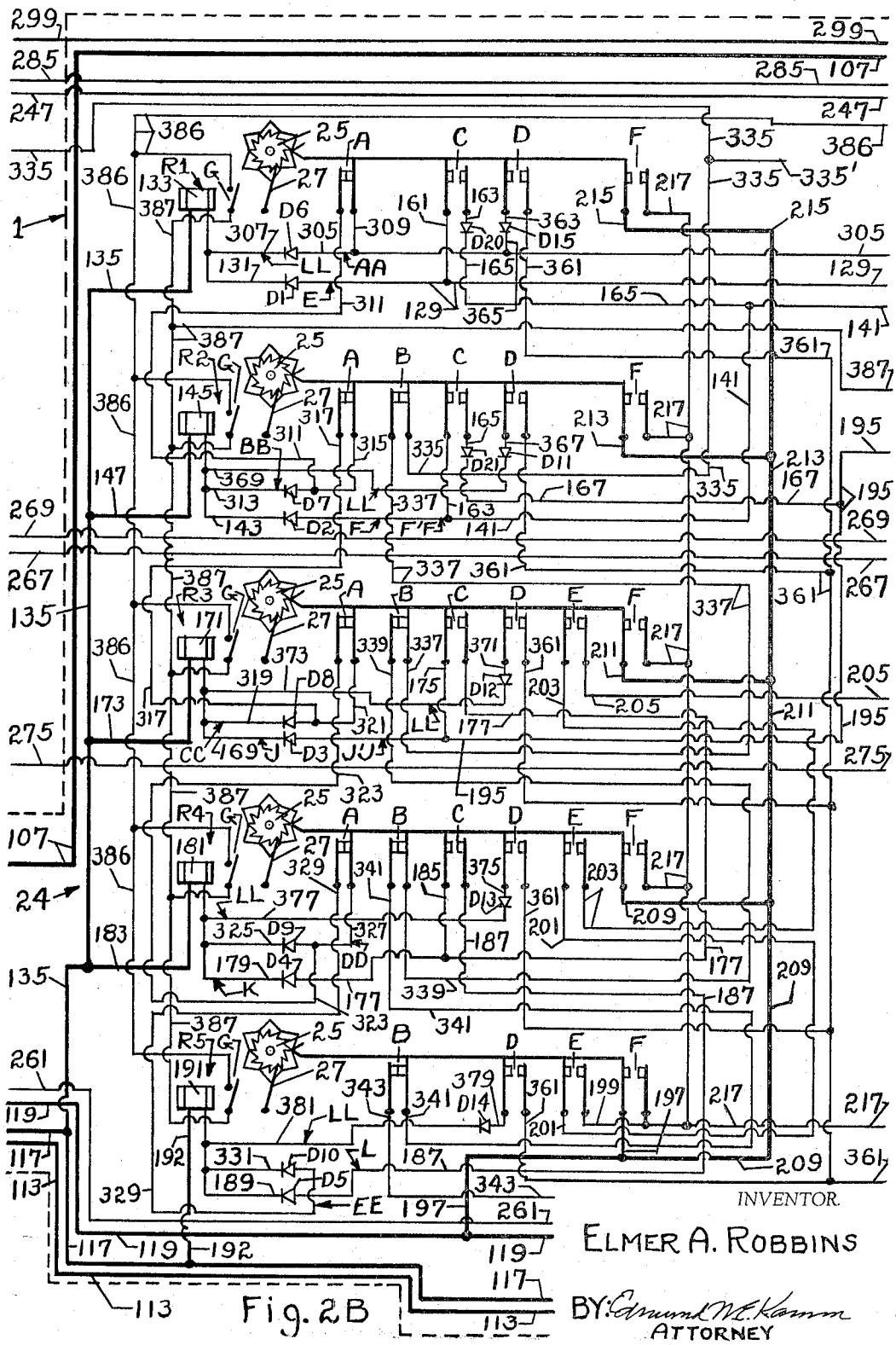
Fig. 2A

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CURRENCY CONTROLLED GASOLINE DISPENSER

Filed Dec. 21, 1964 4 Sheets-Sheet 3



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CURRENCY CONTROLLED GASOLINE DISPENSER

Filed Dec. 21, 1964 4 Sheets-Sheet 4

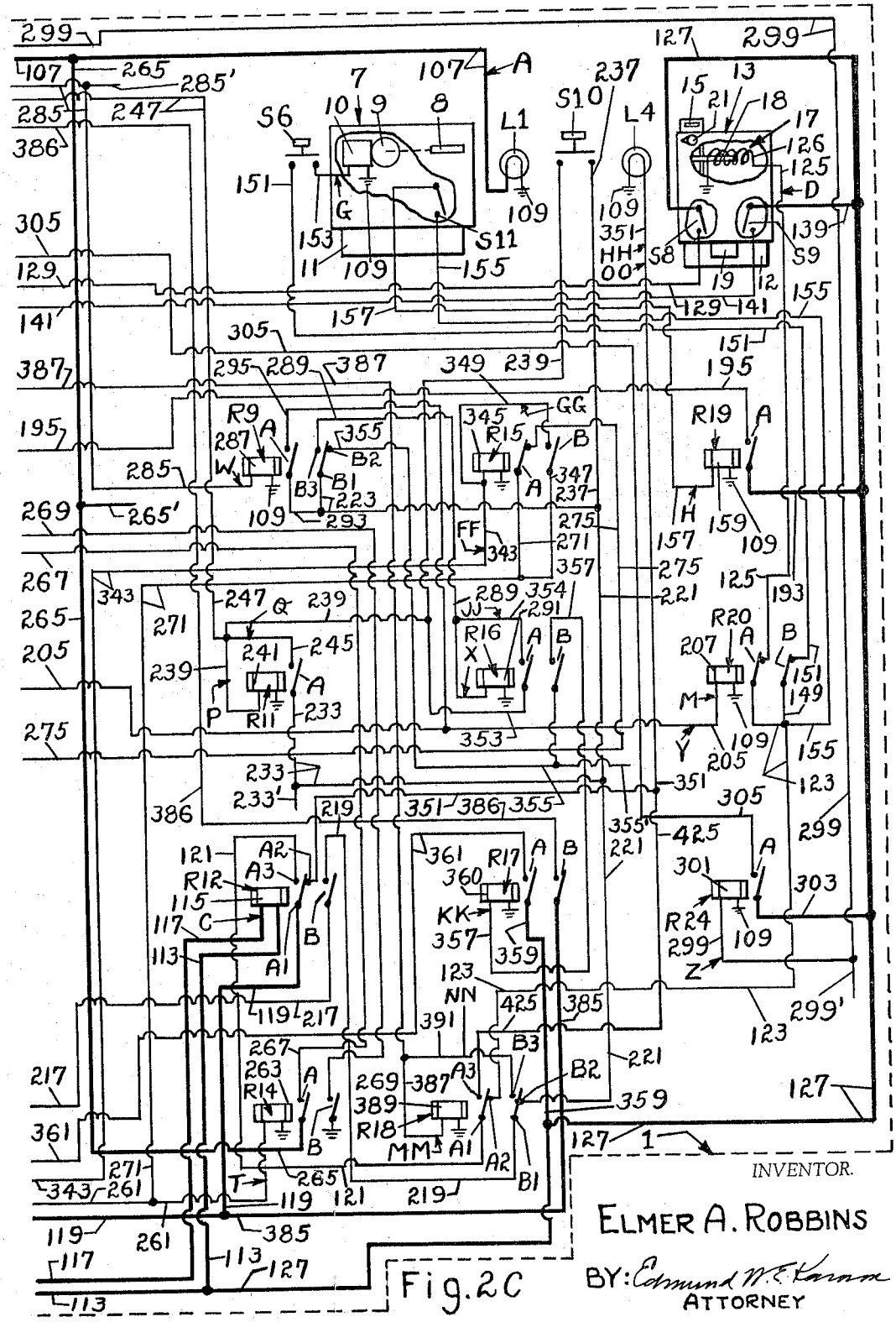


Fig. 2C

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United States Patent Office 3,285,381 Patented Nov. 15, 1966

3,285,381

CURRENCY CONTROLLED GASOLINE DISPENSER

Elmer A. Robbins, Fort Wayne, Ind., assignor to Tokheim Corporation, Fort Wayne, Ind., a corporation of Indiana

Filed Dec. 21, 1964, Ser. No. 419,931
28 Claims. (Cl. 194—5)

This invention, in its simplest form, relates to the combination of a currency acceptance unit provided with means for limiting the delivery of gasoline from a filling station type dispenser to the total value of the currency accepted by the unit.

A more economical arrangement is to add a product selector mechanism to the currency acceptance unit for controlling the delivery of gasoline from either of two dispensers.

It is, therefore, an object of this invention to provide a liquid vending system comprised of a currency acceptance unit and a dispensing unit.

It is another object of this invention to provide a liquid vending system comprised of a currency acceptance unit and a plurality of dispensing units.

These and other objects will become apparent from the study of this specification and the drawings which are attached hereto, made a part hereof, and in which:

FIGURE 1 is an elevation of a liquid vending system comprised of a currency acceptance unit and a dispenser.

FIGURES 2A, 2B, and 2C combined, is a schematic wiring diagram for the system shown in FIGURE 1.

FIGURE 3 is an elevation of a liquid vending system comprised of a currency acceptance unit and two dispensers.

FIGURE 4 is a schematic wiring diagram of the selector mechanism which is added to the wiring diagram shown in FIGURES 2A, 2B, and 2C for the vending system shown in FIGURE 3.

Referring to FIGURES 1 and 2 of the drawings, the numerals **1** and **3** respectively indicate a currency acceptance unit and a dispenser for gasoline.

The currency acceptance unit includes a machine **7** for determining the validity of $1.00 bills. The customer inserts a $1.00 bill into the machine at **8**, a switch **S6** is closed momentarily either by the customer or by the bill, closing a Circuit A to cycling mechanism **10** which includes a motor **9**. The mechanism **10** cycles the machine to determine the validity of the bill. Invalid or mutilated bill are detected by means within the machine which reverse the motor **9** to reject the bill. Valid bills pass through the machine into a security box **11** and momentarily close a switch **S11** to post a credit of $1.00 on the totalizing mechanism which will be disclosed hereinafter.

In addition to the $1.00 bill machine, the currency acceptance unit is provided with a unit **13** for determining the validity of 25¢ and 50¢ coins. Coins of both denominations are deposited in the slot **15**, pass through the machine in prescribed paths for test. A reject relay **17** is provided with an armature **18** which projects into the path of 25¢ and 50¢ coins when the relay is deenergized to return all coins to the customer at **19**. When the relay is energized the armature is withdrawn from the path, the accepted 25¢ coins momentarily close the switch **S8**, the accepted 50¢ coins momentarily close the switch **S9**, to respectively post a 25¢ and a 50¢ credit on the credit control mechanism **24**. All invalid or mutilated coins are returned to the customer at **19**, while all valid coins are deposited in the security box **12**. A lever **21** releases bent coins which are also deposited in the coin return **19**.

The currency acceptance unit **1** is also provided with a signal light **L1** for indicating that the main switch **23** is closed, an "Out of Order" signal light **L4**, and a switch **S10**.

Credit control mechanism

The credit control mechanism **24**, which controls the majority of the functions of the system, is housed in the currency acceptance unit. The mechanism is comprised of five relays, respectively indicated as **R1**, **R2**, **R3**, **R4**, and **R5**. Each relay has six sets of primary contacts of the sequencing type, which are respectively indicated by the letters A, B, C, D, E, and F, and a set of auxiliary contacts indicated by the letter G.

Not all the contacts are used in every relay and where not used have been deleted from the drawing but are available for service or expansion of the system.

Contacts A, which are normally closed, control credit removal and are used in the relays **R1**, **R2**, **R3**, and **R4**. Contacts B, which are normally closed, control the slow flow at approximately the last 8¢ of each delivery and are used in the relays **R1**, **R2**, **R3**, **R4**, and **R5**. Contacts C, which are normally open, control credit accumulation and are used in the relays **R1**, **R2**, **R3**, and **R4**. Contacts D, which are normally open, are used to control the erasing of unused credit and are used in the relays **R1**, **R2**, **R3**, **R4**, and **R5**. Contacts E, which are normally open, prevent the further acceptance of currency when $7.00 or more credit is accumulated on the mechanism and are used in the relays **R3**, **R4**, and **R5**. Contacts F, which are normally open, supply power to the selected dispenser and are used in the relays **R1**, **R2**, **R3**, **R4**, and **R5**. The secondary contacts G, which are normally open, are used in erasing credit.

The primary contacts A, B, C, D, E, and F are reversed by a ratchet and star-wheel assembly **25** which is rotated by an armature **27** upon deenergization of the respective coil of the relays **R1**, **R2**, **R3**, **R4**, and **R5**. Contacts G of the relays **R1**, **R2**, **R3**, **R4**, and **R5** are closed each time the respective coil is energized and released when the coil is deenergized, whereas contacts A, B, C, D, E, and F are reversed from their previous position, and, after the corresponding contact G is closed and reopened.

The currency acceptance unit also houses a bridge rectifier **29** to provide D.C. current and the following relays, all with single-pole contacts: **R9** having one set of normally open, single-throw contacts A and one set of double-throw contacts B which are normally closed to connect contacts **1** and **2** and movable to connect contacts **1** and **3**; **R11** having one set of normally open, single-throw contacts A; **R12** having one set of double-throw contacts A which are normally closed to connect contacts **1** and **2** and movable to connect contacts **1** and **3** and one set of normally open, single-throw contacts B; **R14** having two sets of normally open, single-throw contacts A and B; **R15** having one set of normally closed, single-throw contacts A and one set of normally open, single-throw contacts B; **R16** and **R17**, each having two sets of normally open, single-throw contacts A and B; **R18** having one set of double-throw contacts A, normally closed to connect contacts **1** and **2** and movable to connect contacts **1** and **3**, and a second set of double-throw contacts B, normally closed to connect contacts **1** and **2**, movable to momentarily connect contacts **1**, **2**, and **3** prior to disengaging contact **2**; **R19** having one set of normally open, single-throw contacts A; **R20** having two sets of normally closed, single-throw contacts A and B; and **R24** having one set of normally open single-throw contacts A.

The numeral **31** indicates a storage tank for gasoline, which tank is usually buried; and the numeral **33** designates a pipe, one end of which extends through the top of the tank to a point adjacent the bottom of the tank so that the end is submerged in gasoline. The other end of the pipe is connected to the suction side of a pump **35**. The pump is driven by an electric motor **37** to withdraw gasoline from the tank and discharge through a pipe **39**

into an air separator **41**. The air is discharged to the atmosphere through a tube **43**, and the liquid flows through pipe **45** into the inlet side of the meter **47**, to discharge through the pipe **49**, which branches into pipes **49H** and **49L**. Pipe **49L** has a normally closed, solenoid-operated valve **259** for "low" flow, and pipe **49H** has a normally closed solenoid-operated valve **281** which is used in conjunction with valve **259** for "high" flow. Pipes **49H** and **49L** join to reform pipe **49** which is connected to a delivery hose **51** which terminates in a nozzle **53** having a poppet-type valve **55**. The nozzle may be an automatic shutoff type.

The meter **47** is provided with an output shaft **57** connected to provide an input to a computer **59**. The computer is comprised of a cost variator **61** which includes means **63** for displaying the cost per gallon and a register portion **65** which includes a gallons' register **67** and a cost register **69**.

The gallons' register **67**, the cost register **69**, and a cam shaft assembly **98** are connected to power reset means **71** by a shaft **73**. The power reset means is fully disclosed in the U.S. application, "Motorized Reset Mechanism for Registers," S.N. 264,511, filed by George W. Wright, et al., on March 12, 1963, now Patent No. 3,137,945. The power reset has a cam **75** mounted for rotation on the output shaft **77** of a motor **79**. The output shaft **77** is also connected to the reset shaft **73**. A three-piece, broken-back pawl **81** is pivotally mounted on a stub shaft **83** with a cam follower portion thereof **85** in engagement with the cam, a portion **87** aligned for operating switches S2 and S3, and an intermediate portion **89** aligned for latching the portions **85** and **87** into an operatively connected pawl. A control lever **91** is mounted outside of the dispenser **3** on a shaft **93** which carries a rotary cam **95**. The cam **95** serves a dual purpose; when the lever **91** is rotated to the "on" position the cam **95** pivots a lever **97** to close the contacts of a switch S1 and also releases pressure upon the intermediate portion **89** of the broken-back pawl **81** permitting it to drop down into the path of the cam follower portion **85**, and when the control lever **91** is rotated to the "off" position it lifts the intermediate portion **89** to "break the back" of the pawl **81** thereby allowing switches S2 and S3 to return to their normal positions and also releases the pressure on the lever **97** whereupon the contacts of switch S1 open during the dispensing cycle. A shaft **99** is driven by the cost register **69**, at the rate of one revolution for each 10¢ of gasoline dispensed, and extends through a 2½:1 reduction gear train **101** to drive a shaft **100** and cams **103** and **105** at the rate of one revolution for each 25¢ of gasoline.

Cams **103** and **105** are single-lobe cams which are timed so that cam **103** closes the contacts of a switch S4 at each 25¢ and cam **105** closes the contacts of a switch S5 at each 17¢. Switch S4 erases credit from the credit control mechanism **24** in 25¢ increments and switch S5 is connected to the high-flow solenoid-operated valve **281**, but becomes effective only when approximately 17¢ of the last 25¢ credit has been dispensed.

Circuits

A pair of mains **107** and **109** provide a source of alternating current at the main switch **23**, which is located in the currency acceptance unit **1**. The switch **23** is a double-pole, double-throw switch, which when in closed position completes the following circuits:

Circuit A extends from one side of the switch **23** and the main **107** through the signal light **L1** to the ground main **109**.

Circuit B extends from one side of the switch **23** and the main **107** through a branch main **111**, containing a fuse **F2**, to one side of the bridge rectifier **29** and from the other side of the switch **23** and the ground main **109** to the other side of the bridge rectifier Circuit B completes.

Circuit C, which is a direct-current circuit, extending from one side of the bridge rectifier **29** through a fuse **F1**, wire **113**, to the coil **115** of the relay **R12** and from the other side of the bridge rectifier **29** through a wire **117** to the coil **115** of the relay **R12**, and

Circuit D which is an A.C. circuit branching from Circuit B at the wire **111** and extending through wire **119**, the **A1**, **A3** contacts of relay **R12**, wire **121**, the **A1**, **A2** contacts of the relay **R18**, wire **123**, the A contacts of the relay **R20**, wire **125**, and the coil **126** of the reject relay **17** to the ground main **109**.

The customer deposits currency in denominations of 25¢, 50¢, and $1.00 bills, in any order, to accumulate a total of $7.00 or $7.75, depending on the sequence in which the various denominations are deposited.

The credit control mechanism **24** is an adding and subtracting binary-type counter comprised of five relays, **R1**, **R2**, **R3**, **R4**, and **R5**, each having six sets of primary contacts designated as normally closed contacts A and B and normally open contacts C, D, E, and F and an auxiliary set of contacts G and an armature **27**. Each time the coil is energized and deenergized, the auxiliary contacts G close and reopen, and the armature **27** is pivoted toward the coil and released. On the return stroke the armature **27** ratchets the star wheel **25** to reverse the primary contacts. For example, the first and each odd numbered time a coil is energized and deenergized, the primary contacts are reversed from their normal positions, contacts A and B are now open, and contacts C, D, E, and F are now closed, thereby posting a credit.

A credit posted at the relays **R1**, **R2**, **R3**, **R4**, and **R5** respectively have values of 25¢, 50¢, $1.00, $2.00, and $4.00 which are cumulative for a total credit of $7.75.

Continuing with the example, when a coil is energized for the second time and each even numbered time, the armature **27** ratchets the star wheel **25** to again reverse the primary contacts so that contacts A and B are reclosed and contacts C, D, E, and F are reopened, thereby erasing the credit.

Only the relays **R3** and **R4** use all of the primary contacts, therefore, to simplify the structure, the following contacts are omitted at their respective relays: Contacts B and E at the relay **R1**, contact E at the relay **R2**, and contacts A and C at the relay **R5**.

Each quarter which is accepted by the slug rejector **13**, momentarily closes switch **S8** to complete and break

Circuit E, which is a D.C. circuit branching from Circuit C at the wire **113**, and extending through wire **127**, switch **S8**, wire **129**, a diode **D1**, wire **131**, the coil **133** of the relay **R1**, and wires **135** and **117** to the rectifier **29**.

Each 50¢ coin which is accepted by the slug rejector **13** momentarily closes switch **S9** to complete and break

Circuit F which is a D.C. circuit branching from Circuit C at the wire **113** and extending through wires **127**, **139**, the switch **S9**, wire **141**, a diode **D2**, wire **143**, the coil **145** of the relay **R2**, and wires **147**, **135**, and **117** to the rectifier **29**.

Each time a customer deposits a $1.00 bill, the switch **S6** is momentarily closed by the customer to cycle the bill machine (the cycling mechanism is not shown), thereby completing and breaking

Circuit G which is an A.C. circuit branching from Circuit B at the wire **111** and extending through the wire **119**, the **A1**, **A3** contacts of the relay **R12**, wire **121**, the **A1**, **A2** contacts of the relay **R18**, wires **123**, **149**, the B contacts of the relay **R20**, wire **151**, the switch **S6**, the wire **153**, and the control mechanism **10** for cycling the motor **9** to the ground main **109**.

Each $1.00 bill which is accepted by the bill machine **7** momentarily closes the switch **S11** to complete and break

Circuit H which is an A.C. circuit branching from Circuit D at the wire **123** and extending through wire **155**,

the switch S11, wire 157, and the coil 159 of the relay R19 to the ground main 109, thereby completing and breaking.

Circuit J which is a D.C. circuit branching from Circuit C at the wire 113 and extending through wires 127, 193, the A contacts of the relay R19, wire 195, diode D3, wire 169, the coil 171 of the relay R3, and wires 173, 135, 117 to the rectifier 29.

When a 25¢ credit is posted at the relay R1, at which time the A contacts are open and the C, D, and E contacts are closed, the acceptance of a quarter by the slug rejector momentarily closes the switch S8 to complete and break 13 and also completes and breaks Circuit E, thereby erasing the 25¢ credit at the relay R1.

Circuit F'F which is a D.C. circuit branching from Circuit E at wire 129 and extending through a wire 161, the C contacts of the relay R1, wire 163, a diode D20, wires 165, 141, the diode D2, the wire 143, the coil 145 of the relay R2, and wires 147, 135, 117 to the rectifier 29, thereby energizing and deenergizing the coil 145 to post a 50¢ credit at the relay R2.

When a 50¢ credit is posted at the relay R2, at which time the A and B contacts are open and the C, D, and F contacts are closed, the acceptance of a half dollar by the bill machine 13 momentarily closes the switch S9 to complete and break Circuit F, thereby erasing the 50¢ credit at the relay R2 and also completes and breaks

Circuit J'J which is a D.C. circuit branching from Circuit F at wire 141 and extending through a wire 163 the C contacts of the relay R2, wire 165, a diode D21, wires 167, 195, the diode D3, wire 169, the coil 171 of R3, and wires 173, 135, 117 to the rectifier 29, thereby reversing the primary contacts from the positions they occupy in the drawing to post a credit of $1.00 at R3.

When a $1.00 credit is posted at the relay R3, at which time the A and B contacts are open and the C, D, E, and F contacts are closed, the acceptance of a $1.00 bill momentarily closes the switch S11 to complete and break Circuit J, thereby erasing the $1.00 credit at the relay R3 and also completes and breaks

Circuit K which is a D.C. circuit branching from Circuit J at the wire 195 and extending through wire 175, the C contacts of the relay R3, wire 177, a diode D4, wire 179, the coil 181 of the relay R4, and wires 183, 135, 117 to the rectifier 29, thereby posting a $2.00 credit at the relay R4.

When a $1.00 credit is posted at the relay R3, and a $2.00 credit is posted at the relay R4, at which time the A and B contacts are open and the C, D, E, and F contacts are closed, the acceptance of a $1.00 bill momentarily closes the switch S11 to complete and break Circuits J and K to erase the $1.00 and the $2.00 credit at the relays R3 and R4 and also completes and breaks

Circuit L which is a D.C. circuit branching from Circuit K at the wire 177 and extending through a wire 185, the C contacts of the relay R4, wire 187, a diode D5, wire 189, the coil 191 of the relay R5, and the wires 192, 117 to the rectifier 29, thereby posting a $4.00 credit at the relay R5.

The accumulation of $7.00 reverses the contacts of R5, R4, and R3 and may also reverse the contacts of R2 and R1, to complete

Circuit M which is an A.C. circuit branching from Circuit B at the wire 111 and extending through wires 119, 197, the F contacts of the relay R5, wire 199, the E contacts of the relay R5, wire 201, the E contacts of R4, wire 203, the E contacts of R3, wire 205, and the coil 207 of the relay R20 to the ground main 109, thereby opening the A contacts of the relay R20 to break Circuit D to the reject relay 17 at the slug rejector 13 and also opening the B contacts of the relay R20 in Circuit G so that the customer switch S6 at the bill machine is inoperative. No more coins or bills will be accepted.

After acceptance of one or more pieces of money, which reverses the primary contacts of one or more of the relays R1, R2, R3, R4, and R5, an authorized attendant uses a key to momentarily close the switch S10 to complete and break

Circuit P which is an A.C. circuit branching from Circuit B at wire 111 and extending through wires 119, 197, and one or more of the wires 209, 211, 213, or 215, one or more of the F contacts of relay R1, R2, R3, R4, or R5, wire 217, the B contacts of the relay R12, wire 219, the B1, B2 contacts of the relay R18, wire 221, wire 237, the switch S10, wire 239, and the coil 241 of the relay R11 to the ground main 109, and completes

Circuit Q which is an A.C. circuit branching from Circuit P at the wire 221 and extends through the wire 233, the A contacts of the relay R11, wires 245, 239 and the coil 241 of the relay R11 to the ground 109, thereby holding the relay R11 energized when the switch S10 is released by the authorized attendant.

The customer then removes the nozzle 53 from its support and rotates the control lever 91 to the On position, thereby closing switch S1 through shaft 93, cam 95, and pawl 97 to complete

Circuit R which is an A.C. circuit branching from Circuit Q at the wire 245 and extending through wires 239, 247, switch S1, wire 251, contacts 1, 2 of switch S3, wire 253, and the reset motor 79 to the ground main 109.

The computer is reset to zero, switches S2 and S3 reverse to break Circuit R at the contacts 1, 2 of the switch S3 and completes the following circuits through the contacts 1, 3 of the switch S3.

Circuit S which is an A.C. circuit branching from Circuit R at contact 1 of the switch S3 and extending through contact 3 of the switch S3, wire 255, and the coil 257 of the low-flow valve 259 to the ground main 109, and

Circuit T which is an A.C. circuit branching from Circuit S at the wire 255 and extending through a wire 261, and the coil 263 of the relay R14 to the ground main 109, which completes

Circuit U which is an A.C. circuit branching from Circuit A at the wire 107 and extending through a wire 265, the A contacts of the relay R14, wire 267, the dispensing motor 37, wire 269, and the B contacts of the relay R14 to the ground main 109, and

Circuit V which is an A.C. circuit branching from Circuit T at the wire 261 and extending through a wire 271, the A contacts of the relay R15, wire 275, and the coil 279 of the high-flow solenoid-operated valve 281 to the ground main 109, and

Circuit W which is an A.C. circuit branching from Circuit A at the wire 107 and extending through a wire 283, the contacts of the switch S2, wire 285, and the coil 287 of the relay R9 to the ground main 109, thereby completing

Circuit X which is an A.C. circuit branching from the holding Circuit Q at the wire 221 and extending through a wire 223, the contacts B1, B3 of the relay R9, wire 289, and the coil 291 of the relay R16 to the ground main 109, and

Circuit Y is an A.C. circuit branching from the holding Circuit Q at the wire 221 and extending through wires 223, 293, the A contacts of the relay R9, wires 295, 205, and the coil 207 of the relay R20 to the ground main 109, thereby breaking Circuit D to the reject relay 17 of the slug rejector 13 and Circuit G to the customer's switch S6 for cycling the dollar bill machine 7. No more currency will be accepted.

As gasoline is dispensed, the shaft 100 and the cams 103 and 105 are driven by the cost register 69 to rotate cams 103 and 105 at the rate of one revolution for each 25¢ dispensed.

At approximately 17¢ and multiples thereof during the dispensing, the cam 105 momentarily closes the switch S5, but no circuit is completed when the posted credit is greater than 25¢, because at this time one or more of the series connected B contacts of the credit relays R2, R3, R4, and R5 are open.

Assuming that a credit is posted at one or more of the relays R1, R2, R3, R4, and R5, each time 25¢ worth of gasoline has been dispensed, the cam 103 momentarily closes the switch S4 to complete

Circuit Z which is an A.C. circuit branching from the Circuit Q at the wire 221 and extending through the wire 233, the A contacts of the relay R11, wires 245, 247, switch S1, wire 251, the contacts 1, 3 of the switch S3, wires 255, 297, switch S4, wire 299, and the coil 301 of the relay R24 to the ground main 109, thereby momentarily completing

Circuit AA which is a D.C. circuit branching from Cir-C at the wire 113 and extending through wires 127, 303, the A contacts of the relay R24, wire 305, a diode D6, wires 307, 131, the coil 133 of the relay R1 and wires 135, 117 to the rectifier 29, thereby momentarily energizing the coil 133 of the relay R1 and on the return stroke, the armature 27 ratchets the star wheel 25 to reverse the contacts A, C, D, and F.

For example, assuming a 25¢ credit is posted at the relay R1, when the switch S4 reopens to deenergize the coil 133 of the relay R1, the armature 27 ratchets the star wheel 25 to reclose contacts A and to reopen contacts C, D, and F, thereby erasing the 25¢ credit.

When a 50¢ credit is posted at the relay R2 and none at the relay R1, the A contacts of R1 are closed, and, in addition to energizing Circuit AA to post a 25¢ credit, Circuit Z simultaneously completes,

Circuit BB which is a D.C. circuit, branching from Circuit AA at the wire 305 and extending through the wire 309, the A contacts of the relay R1, the wire 311, a diode D7, wires 313, 143, the coil 145 of the relay R2, and wires 147, 135, 117 to the rectifier 29, thereby momentarily energizing the coil 145 of the relay R2 to return the contacts A and B to closed position and contacts C, D, and F to open position to cancel the 50¢ credit.

When a $1.00 credit is posted at the relay R3 and none at the relays R1 and R2, the A contacts of R1 and R2 are closed, and, in addition to energizing Circuits AA and BB to respectively post a 25¢ and a 50¢ credit at the relays R1 and R2, the Circuit Z simultaneously completes

Circuit CC which is a D.C. circuit branching from the Circuit BB at the wire 311 and extending through a wire 315, the A contacts of the relay R2, wire 317, a diode D8, wires 319, 169, the coil 171 of the relay R3, and wires 173, 135, 117 to the rectifier 29, thereby momentarily energizing the coil 171 to close the contacts A and B and to reopen the contacts C, D, E, and F to erase the $1.00 credit.

When a $2.00 credit is posted at the relay R4 and none at R1, R2, and R3, the A contact of R1, R2, and R3 are closed; and, in addition to energizing Circuits AA, BB, and CC to respectively post a 25¢, a 50¢, and a $1.00 credit at the relays R1, R2, and R3, the Circuit Z simultaneously completes

Circuit DD which is a D.C. circuit branching from the Circuit CC at the wire 317 and extending through a wire 321, the A contacts of the relay R3, wire 323, a diode D9, wires 325, 179, the coil 181 of the relay R4, and wires 183, 135, 117 to the rectifier 29, thereby momentarily energizing the coil 181 of the relay R4 to reclose contacts A and B and reopen contacts C, D, E, and F which erases the $2.00 credit.

When a $4.00 credit is posted at the relay R5 and none at R1, R2, R3, and R4, the A contacts of R1, R2, R3, and R4 are closed, and in addition to energizing Circuits AA, BB, CC, and DD to respectively post a 25¢, a 50¢, a $1.00, and a $2.00 credit at the relays R1, R2, R3, and R4, the Circuit Z simultaneously completes

Circuit EE which is a D.C. circuit branching from Circuit DD at the wire 323 and extending through a wire 327, the A contacts of the relay R4, wire 329, a diode D10, wires 331, 189, the coil 191 of the relay R5, and wires 192, 117 to the rectifier 29, thereby energizing the coil 191 of the relay R5 to reclose the A contacts and to reopen the D, E, and F contacts to erase the $1.00 credit.

Circuit M to the coil 207 of the relay R20 is broken at the series connected E contacts of the relays R3, R4, and R5 when the total credit drops below $7.00, but the coil 207 of the relay R20 is held energized by Circuit Y. No currency will be accepted.

When approximately 17¢ of the last 25¢ credit has been dispensed, the cam 105 momentarily closes the switch S5 to complete

Circuit FF which is an A.C. circuit branching from Circuit Q at wire 221 and extending through wire 233, the A contacts of the relay R11, wires 245, 247, switch S1, wire 251, the 1, 3 contacts of the switch S3, wires 255, 297, 333, the switch S5, wire 335, contacts B of the relay R2, wire 337, the B contacts of the relay R3, wire 339, the B contacts of the relay R4, wire 341, the B contacts of the relay R5, wire 343, and the coil 345 of the relay R15 to the ground main 109 which breaks Circuit V to the solenoid 279 of the high-flow valve 281 at the A contacts of the relay R15 and closing of the B contacts completes

Holding Circuit GG which is an A.C. circuit branching from Circuit T at the wire 261 and extending through the wires 271, 347, the B contacts of the relay R15, wires 349, 343, and the coil 345 of the relay R15 to the ground main 109.

The last 8¢ is dispensed through the low flow valve 259 at which time the cam 103 recloses the switch S4 to momentarily complete Circuits Z and AA. Circuit AA energizes the coil 133 of the relay R1 to reclose contact A and to reopen contacts C, D, and F, thereby breaking the following circuits: Q to the coil 241 of the relay R11, S to the solenoid 257 of the low flow valve 259, T to the coil 263 of the relay R14, U to the dispensing motor 37, X to the coil 291 of the relay R16, GG to the coil 345 of the relay R15, and Y to the coil 207 of the relay R20.

The A and B contacts of the relay R20 reclose to again complete Circuit D and to extend the main 109 to the switch S6 in Circuit G. Currency will again be accepted.

The customer rotates the lever 91 to the off position and hangs up the nozzle 53. Rotation of the lever 91 to the Off position relieves the pressure on switch S1 and also reopens and breaks the back of the pawl 81 to return switches S2 and S3 to their original positions. The opening of switch S2 interrupts Circuit W to coil 287 of the relay R9 and the apparatus is ready for another customer.

When the fuse F1 is burned out, Circuit C to the coil 115 of the relay R12 is broken at the fuse, the B contacts are opened, and the A contacts are closed across the contacts 1 and 2 thereby completing

Circuit HH which is an A.C. circuit branching from Circuit B at the wire 111 and extending through the wire 119, the A1, A2 contacts of the relay R12, wire 351, and the Out of Order lamp L4 to the ground main 109.

In the event the customer deposits money for a quantity of gasoline greater than the capacity of the vehicle fuel tank, credit will still be posted on the credit control mechanism 24, and the following circuits are still completed: A to the signal lamp L1; B to the bridge rectifier 29; C to the coil 115 of the relay R12; D to the reject relay 17 of the slug rejector 13 (if the credit is $6.75, or less); and Q to the coil 241 of the relay R11.

In addition, when circuit Z was completed, an auxiliary holding Circuit JJ was completed to the coil 291 of the relay R16 to hold this relay energized after the lever 91 is rotated to the Off position.

Circuit JJ is an A.C. circuit branching from Circuit Q at the wire 239 and extending through wires 245, 353, the A contacts of the relay R16, wires 354, 289, and the coil 291 of the relay R16 to the ground main 109, which completes

Circuit KK which is an A.C. circuit branching from the Circuit Q at the wire 221 and extending through the

wire 223, the B1, B2 contacts of the relay R9, wire 355, the B contacts of the relay R16, wire 357, and the coil 360 of the relay R17 to the ground main 109, which completes

Circuit LL which is a D.C. circuit extending from the rectifier 29 through the fuse F1, wires 113, 127, 359, the A contacts of the relay R17, wire 361 which branches to the D contacts of the relays R1, R2, R3, R4, and R5, and through the D contacts which are closed (indicating unused credit) by one or more of the following paths: the D contacts of the relay R1, wire 363, a diode D15, wires 365, 305, the diode D6, wires 307, 131, the coil 133 of the relay R1, and wires 135, 117 to the rectifier 29; the D contacts of the relay R2, wire 367, a diode D11, wires 369, 143, the coil 145 of the relay R2, and wires 147, 135, 117 to the rectifier 29; the D contacts of the relay R3, wire 371, a diode D12, wires 373, 169, the coil 171 of the relay R3 and wires 173, 135, 117 to the rectifier 29; the D contacts of the relay R4, wire 375, a diode D13, wires 377, 179, the coil 181 of the relay R4 and wires 183, 135, 117 to the rectifier 29; and/or the D contacts of the relay R5, wire 379, a diode D14, wires 381, 189, the coil 191 of the relay R5, and wires 192, 117 to the rectifier 29.

Upon completion of Circuit LL to one or more of the relays R1, R2, R3, R4, and/or R5; contacts G are closed to complete

Circuit MM which is an A.C. circuit branching from Circuit B at the wire 111 and extending through wires 119, 385, the B contacts of the relay R17, wire 386, the G contacts of the relays R1, R2, R3, R4, and/or R5, wire 387, and the coil 389 of the relay R18 to the ground main 109, thereby erasing the unused credit remaining at any of the relays R1, R2, R3, R4, and/or R5 and interrupting Circuits Q, JJ, KK, and LL. Circuit MM is broken at the contacts G in Circuit LL. The system is now in its original condition and ready to serve another customer.

If, however, for some reason, the credit at one of the relays R1, R2, R3, R4, or R5 is not erased, Circuits Q, JJ, KK, LL, and MM will not be broken and Circuit NN is completed to the relay R18, thereby cutting the power to the dispensers.

Circuit NN is an A.C. circuit branching from Circuit B at the wire 111 and extending through one of five paths: wires 119, 197, 209, 211, 213, 215, and the F contacts of the relay R1; wires 119, 197, 209, 211, 213, and the F contacts of the relay R2, wires 119, 197, 209, 211, and the F contacts of the relay R3; wires 119, 197, 209, and the F contacts of the relay R4; wires 119, 197, and the F contacts of the relay R5, through wire 217, the B contacts of the relay R12, wire 219, the B1, B3 contacts of the relay R18, wires 391, 387, and the coil 389 of the relay R18 to the ground main 109, and also completes

Circuit OO which branches from Circuit B at the wire 111 and extends through wire 119, the A1, A2 contacts of the relay R12, wire 121, the A1, A3 contacts of the relay R18, wires 425, 351, and the Out of Order lamp L4 to the ground 109.

When this occurs the apparatus requires service.

Modified form

By adding a selector mechanism 451, the currency acceptance unit 1 will control the dispensing from either of two dispensers; for example, one for a "Premium" grade of gasoline and one for a "Regular" grade of gasoline. The dispensers are respectively indicated by the numerals 3 and 5. The additional dispenser 5 is a duplicate of the dispenser 3, described above, and the components of the dispenser 5 are identified by adding a prime to the numeral assigned to the corresponding parts of the dispenser 3.

The selector mechanism includes a selector switch S7 which is movable to connect contacts A and C for Premium and to connect contacts A and B for Regular; a pair of signal lamps, L3 for Premium and L2 for Regular; a relay R23 having a pair of coils, 227 for Premium and 231 for Regular; and four sets of single-pole, double-throw, latch-type contacts A, C, D, and E, which are connected across contacts 1 and 2 for Premium and across contacts 1 and 3 for Regular; a relay R14' having a coil 263' and two sets of normally open contacts A and B and connecting wires.

The elements comprising the selector mechanism 451, shown in FIGURE 4, are connected into the circuitry shown in FIGURE 2, as follows:

The common contact A of the selector switch S7 is connected to the wire 355 by a branch wire 355';

The A1 contact of the relay R23 is connected to the wire 233 by a branch wire 233';

The C1 contact of the relay R23 is connected in the wire 275 to provide alternate circuits for operating either the Premium dispenser 3 or the Regular dispenser 5; the D1 contact of the relay R23 is connected in the wire 271 to provide alternate circuits for operating either the Premium dispenser 3 or the Regular dispenser 5.

The E1 contact of the relay R23 is connected in the wire 247 to provide alternate circuits for operating either the Premium dispenser 3 or the Regular dispenser 5;

The contact A1 of the relay R14' is connected to the branch main 265 by a wire 265';

The contacts 1 and 2 of the switch S2' are respectively connected to the branch main 283 by a wire 283' and to the wire 285 by a wire 285';

The contact 2 of the switch S5' is connected by a wire 335' to the wire 335.

The contact 2 of the switch S4' is connected by a wire 299' to the wire 299.

With the selector switch S7 set for Premium the Circuits A through M, P, Q, U, W through Y, AA through EE, HH and KK through NN remain unchanged. However, when the first piece of money is accepted, Circuits N–1 and O–1 are completed.

Circuit N–1 which is an A.C. circuit branching from Circuit B at the wire 111 and extending through the wire 119, and at least one of five parallel paths; wires 197, 209, 211, 213, 215, and the F contacts of the relay R1; wires 197, 209, 211, 213, and the F contacts of the relay R2; wires 197, 209, 211, and the F contacts of the relay R3; wires 197, 209, and the F contacts of the relay R4; and/or wire 197 and the F contacts of the relay R5, wire 217, the B contacts of the relay R12, wire 219, the B1, B2 contacts of the relay R18, wires 221, 223, the B1, B2 contacts of the relay R9, wires 355, 355', the A and C contacts of the selector switch S7, wire 225, and the Premium coil 227 of the relay R23 to the ground main 109. The contacts of the relay R23 are latched to connect contacts A1 with A2, C1 with C2, D1 with D2, and E1 with E3, which completes

Circuit O–1 which is an A.C. circuit branching from Circuit N at the wire 221 and extending through the wires 233, 233', the A1, A2 contacts of the relay R23, wire 235, and the Premium signal lamp L3 to the ground main 109.

An authorized attendant "approves" the sale by momentarily closing the switch S10 to complete the Circuits P and Q to energize and hold the coil 241 of the relay R11 energized.

The customer then approaches the dispenser 3, removes the nozzle 53 from its support, and rotates the lever 91 to the On position, as disclosed previously to complete Circuit R–1 which is Circuit R modified to extend through the E contacts of the relay R23.

Circuit R–1 is an A.C. circuit branching from Circuit Q at the wire 245 and extends through wire 247, contacts E1, E2 of the relay R23, wire 247, switch S1 of the dispenser 3, wire 251, contacts 1, 2 of the switch S3, wire 253, and the reset motor 79 to the ground main 109, thereby resetting the register 65 to zero, closing switch S2, and reversing the contacts of the switch

S3 to break Circuit R at the contacts 1, 2 and to engage contacts 1, 3 to complete.

Circuit S–1 which is an A.C. circuit branching from Circuit R–1 at the contact 1 of the switch S3 and extending through contact 3 of the switch S3, wire 255, and the coil 257 of the low flow valve 259 to the ground main 109, and

Circuit T–1 which is an A.C. circuit branching from Circuit S–1 at the wire 255 and extending through a wire 261 and the coil 263 of the relay R14 to the ground main 109, which completes,

Circuit U to the dispensing motor 37, as disclosed above, and

Circuit V–1 which is an A.C. circuit branching from Circuit T–1 at the wire 261 and extending through a wire 271, the D2, D1 contacts of the relay 23, wire 271, the A contacts of the relay R15, wire 275, the C1, C2 contacts of the relay R23, wire 275, and the coil 279 of the high-flow valve 281 to the ground main 109, and

Circuit W to the coil 287 of the relay R9, Circuit X to the coil 291 of the relay R16, and Circuit V to the coil 207 of the relay R20. No more currency will be accepted.

During the dispensing operation, described above, the cam 103 closes switch S4 at each 25c dispensed to complete

Circuit Z–1 which is an A.C. circuit branching from Circuit Q at the wire 221 and extending through the wire 233, the A contacts of the relay R11, wires 245, 247, the E1, E2 contacts of the relay R23, wire 247, switch S1, wire 251, the contacts 1, 3 of the switch S3, wires 255, 297, switch S4, wire 299, and the coil 301 of the relay R24 to the ground main 109, thereby momentarily completing one or more of the countdown Circuits AA, BB, CC, DD, and/or EE, in the manner disclosed above.

When the credit is reduced to 25¢ and approximately 17¢ of that credit has been dispensed, the cam 105 momentarily closes the switch S5 to complete

Circuit FF–1 which is an A.C. circuit branching from the Circuit Q at the wire 221 and extending through the wire 233, the A contacts of the relay R11, wires 245, 247, the E2, E1 contacts of the relay R23, wire 247, the switch S1, wire 251, the contacts 1, 3 of the switch S3, wires 255, 297, 333, the switch S5, wire 335, the B contacts of the relay R2, wire 337, the B contacts of the relay R3, wire 339, the B contacts of the relay R5, wire 343, and the coil 345 of the relay R15 to the ground main 109, which breaks Circuit V–1 to the high-flow valve 281 at the A contacts of the relay R15 and closing of the B contacts completes

Circuit GG–1 which is an A.C. circuit branching from Circuit T–1 at the wire 261 and extending through wire 271, the D2, D1 contacts of the relay R23, wires 271, 347, the B contacts of the relay R15, wires 349, 343 and the coil 345 of the relay R15 to the ground main.

The last 8¢ is dispensed through the low flow valve 259 and the dispensing is halted when the cam 103 momentarily closes the switch S4 to complete and break Circuits Z–1 and AA, thereby erasing the final 25¢ credit at the relay R–1.

The transaction is completed when the operator rotates the lever 91 to the Off position and hangs the nozzle 53 on its support, thereby restoring the apparatus to its original condition.

Circuits HH and NN are respectively completed when the fuse F1 is blown and the credit control mechanism 24 malfunctions, as described above.

When Circuit Z–1 is completed, Circuit JJ is also completed to hold the coil 291 of the relay R16 energized, if credit remains after the lever 91 is rotated to the Off position, thereby completing

Circuits KK, LL, and MM to erase any unused credit in the manner disclosed above.

When the selector switch S7 is set for Regular the Circuits A through M, P, Q, X, V, AA through EE, and HH through NN remain unchanged. When the first piece of money is accepted, the primary contacts of the corresponding relay, either R1, R2, R3, R4, or R5 are reversed to complete

Circuit N–2 which is an A.C. circuit branching from Circuit N–1 at the A contact of the selector switch S7 and extending through the contact B of the switch S7, a wire 229, and the coil 231 of the relay R23 to the ground main 109, thereby connecting contacts A1 with A3, C1 with C3, D1 with D3, and E1 with E3. The contacts are latched in this position until the Premium coil 227 is energized. Closing of the contacts completes

Circuit O–2 which is an A.C. circuit branching from the Circuit O–1 at the A1 contact of the relay R23 and extending through the A3 contact of the relay R23, a wire 393, and the Regular signal lamp L2 to the ground main 109.

The attendant momentarily closes the switch S10 to complete Circuits P and Q to respectively energize and hold the coil 241 of the relay R11 energized.

The customer moves to the Regular dispenser 5, removes the nozzle 53′ from its support and rotates the lever 91′ to the On position, thereby closing switch S1′ to complete

Circuit R–2 which is an A.C. circuit branching from Circuit R–1 at the E1 contact of the relay R23 and extending through the contact E3 of the relay R23, wire 247′, switch S1′, wire 251′, contacts 1, 2 of the switch S3, wire 253′ and the reset motor 79′ to the ground main 109, thereby resetting the register for the Regular dispenser 5 to zero, closing the contacts of the switch S2′, and reversing the contacts of the switch S3′ to break circuit R′ at the contacts 1, 2 and to engage contacts 1, 3 to complete

Circuit S–2 which is an A.C. circuit branching from Circuit R–2 at contact 1 of the switch S3′ and extending through contact 3 of the switch S3′, wire 255′, and the coil 257′ of the low-flow valve 259′ to the ground main 109′, and

Circuit T–2 which is an A.C. circuit branching from Circuit S–1 at the wire 255′ and extending through a wire 261′, and the coil 263′ of the relay R14′ to the ground main 109′, which completes

Circuit U–2 which is an A.C. circuit branching from Circuit A at the wire 107 and extending through the wire 265, a branch wire 265′, the A contacts of the relay R14′, wire 267′, the dispensing motor 37′, wire 269′, and the B contacts of the Relay R14′ to the ground main 109′.

Circuit V–2 which is an A.C. circuit branching from Circuit T–2 at the wire 261′ and extending through a wire 271′, the contacts D3, D1 of the relay R23, wire 271, the A contacts of the relay R15, wire 275, the C1, C3 contacts of the relay R23, wire 275′, and the coil 279′ of the high-flow valve 281′ to the ground main 109′, and

Circuit W–2 which is an A.C. circuit branching from Circuit A at the wire 107 and extending through the wires 283, 283′, the contacts of the switch S2′, wire 285′, and the coil 287 of the relay R9 to the ground main 109, thereby completing Circuit X to the coil 291 of the relay R16, which completes Circuit Y to the coil 207 of the relay R20, breaking Circuit D to the reject relay 17 of the slug rejector 13 and Circuit G to the customer's switch S6 for cycling the dollar bill machine 7. No more currency will be accepted.

As previously disclosed, the cam 103′ closes the switch S4′ at each 25¢ during the dispensing to complete

Circuit Z–2 which is an A.C. circuit branching from the Circuit Q at the wire 221 and extending through the wire 233, the A contacts of the relay R11, wires 245, 247, the E1, E3 contacts of the relay R23, wire 247′, the switch S1′, wire 251′, the contacts 1, 3 of the switch S3′, wires 255′, 297′, the switch S4′, wires 299′, 299, and the coil 301 of the relay R24 to the ground main 109, thereby

momentarily completing the countdown Circuits AA, BB, CC, DD, and EE in the manner disclosed above.

When only 25¢ credit remains, the series connected B contacts of the relays R2 through R5 are closed and when 17¢ of the last 25¢ has been dispensed, the cam 105' momentarily closes the switch S5' to momentarily complete

Circuit FF–2 which is an A.C. circuit branching from Circuit O at the wire 221 and extending through wire 233, the A contacts of the relay R11, wires 245, 247, contacts E1, E3 of the relay R23, wire 247', the switch S1', wire 251', the 1, 3 contacts of the switch S3', wires 255', 297', 333', the switch S5', wires 335', 335, the B contacts of the relay R2, wire 337, the B contacts of the relay R3, wire 339, the B contacts of the relay R4, wire 341, the B contacts of the relay R5, wire 343, and the coil 345 of the relay R15 to the ground main 109 which breaks Circuit V–2 to the high-flow valve 281', and completes

Circuit GG–2 which is an A.C. circuit branching from Circuit T–2 at the wire 261' and extending through wire 271', the D3, D1 contacts of the relay R23, wires 271, 347, the B contacts of the relay R15, wires 349, 343, and the coil 345 of the relay R15 to the ground main 109.

The last 8¢ is dispensed through the slow-flow valve 259' and the dispensing is stopped when the cam 103' momentarily closes the switch S4' to momentarily complete circuits 22 and AA, thereby erasing the 25¢ credit at the relay R1.

The transaction is completed when the operator rotates the lever 91' to the Off position and hangs nozzle 53' on its support. The apparatus is in its original condition.

Circuits HH and NN are respectively completed when the fuse F1 is blown and the credit control mechanism 24 malfunctions, as described above.

When Circuit Z–2 is completed, Circuit JJ is also completed to hold the coil 291 of the relay R16 energized if credit remains after the lever 91' is rotated to the Off position, thereby completing Circuits KK, LL, and MM to erase any unused credit in the manner disclosed above.

Operation—single dispenser

When the main switch 23 occupies its closed position, the following circuits are completed:

Circuit A to the signal lamp L1.

Circuit B to the input side of the bridge rectifier 29.

Circuit C from the output side of the bridge rectifier 29 to the coil 115 of the relay R12, thereby connecting contacts A1 with A3 and contacts B1 with B2, thereby extending the main 109 through the contacts A1, A3 of the relay R12 to the customer switch S6, the dollar bill acceptance switch S11 and completes

Circuit D to the coil 126 of the coin reject relay 17 of the slug rejector mechanism 13, thereby withdrawing the armature of the reject relay 17 from the coin chute.

The customer then deposits 25¢ and/or 50¢ pieces into the slot 15 of the slug rejector and $1.00 bills into the slot 8 of the bill machine 7.

Invalid coins are rejected by the slug rejector 13 and returned to the customer at the return cup 19. Oversize slugs and mutilated coins are held by the slug rejector 13 and released into the return cup 19 upon operation of the lever 21.

Each time a dollar bill is deposited into the bill machine 7, the customer momentarily closes the switch S6, thereby cycling the bill machine 7. Invalid bills are returned to the customer at the slot 8.

Valid 25¢ coins, momentarily close the switch S8 to complete Circuit E to energize and deenergize the coil 133 of the relay R1, thereby reversing the primary contacts A through F. Valid 50¢ coins, momentarily close the switch S9 to complete Circuit F to energize and deenergize the coil 145 of the relay R2, thereby reversing the primary contacts A through F. Valid $1.00 bills, momentarily close the switch S11 to complete Circuit J to energize and deenergize the coil 171 of the relay R3, thereby reversing the primary contacts A through F.

Referring to FIGURE 2 of the drawings, when the primary contacts of the credit relays R1 through R5 are in the positions shown; namely, A and B closed and C, D, E, and F open, no credit is posted. However, when the primary contacts are reversed from the positions shown; namely, A and B are open and C, D, E, and F are closed, a credit is posted. A credit posted at the relays R1, R2, R3 R4, and R5, respectively have values of 25¢, 50¢ $1.00, $2.00, and $4.00, and the individual credits are cumulative in any combination.

The first and each odd numbered times the primary contacts of a credit relay, R1 through R5, are reversed, a credit, corresponding to the monetary value assigned to that particular relay, is posted. The second and each even numbered times the primary contacts of a credit relay, R1 through R5, are reversed, the credit posted at that relay is erased.

Therefore, assuming that a 25¢ credit is posted at the relay R1 and a second quarter is accepted to momentarily close switch S8, Circuit E will be completed to energize the coil 133 of the relay R1 and simultaneously therewith Circuit F'F will also be completed through the closed C contacts of the Relay R1 to energize the coil 145 of the relay R2. When the switch S8 reopens, Circuits E and F'F are broken, the armatures 27 ratchet the star wheels 25 of the relays R1 and R2 to reverse their primary contacts, thereby erasing the 25¢ credit at the relay R1 and posting a 50¢ credit at the relay R2.

When a 50¢ credit is posted at the relay R2, upon acceptance of a 50¢ piece, the switch S9 is momentarily closed to complete Circuit F, thereby energizing the coil 145 of the relay R2 and simultaneously completing Circuit J'J through the closed C contacts of the relay R2 to energize the coil 171 of the relay R3. When switch S8 reopens, Circuits F and J'J are broken, the armatures 27 ratchet the star wheels 25 of the relays R2 and R3 to reverse their primary contacts, thereby erasing the 50¢ credit at the relay R3 and posting a $1.00 credit at the relay R3.

When a $1.00 credit is posted at the relay R3, upon acceptance of a dollar bill, the switch S11 is momentarily closed to complete Circuit H to the coil 159 of the relay R19; Circuit J, through the closed contacts of the relay R19, to energize the coil 171 of the relay R3; and, simultaneously completes Circuit K through the closed C contacts of the relay R3 to energize the coil 181 of the relay R4. When the switch S11 reopens Circuits H, J, and K are broken, the armatures 27 ratchet the star wheels 25 of the relays R3 and R4 to reverse their primary contacts, thereby erasing the $1.00 credit at the relay R3 and posting a $2.00 credit at the relay R4.

When a $2.00 credit is posted at the relay R4, upon acceptance of a dollar bill, the switch S11 is momentarily closed to complete Circuit H to the coil 159 of the relay R19 and Circuit J, through the closed contacts of the relay R19, to energize the coil 171 of the relay R3. When the switch S11 reopens Circuits H and J are broken and the armature 27 ratchets the star wheel 25 of the relay R3 to reverse the primary contacts, thereby posting a $1.00 credit at the relay R3.

When a $1.00 and a $2.00 credit are respectively posted at the relays R3 and R4, upon acceptance of a dollar bill, switch S11 momentarily closes to complete Circuit H to energize the coil 159 of the relay R19; Circuit J, through the closed contacts of the relay R19, to energize the coil 171 of the relay R3; Circuit K, through the closed C contacts of the relay R3, to energize the coil 181 of the relay R4; and Circuit L, through the closed C contacts of the relay R4, to energize the coil 191 of the relay R5. When the switch S11 reopens, Circuits H, J, K, and L are broken, and the armatures 27 ratchet the star wheels 25 to reverse the primary contacts of the relays R3, R4, and R5, thereby erasing the $1.00 and

$2.00 credits at the relays R3 and R4 and posting a $4.00 credit at the relay R5.

Additional currency may be deposited up to an accumulated credit of $7.00, at which time the F contacts of the relay R5 and the series connected E contacts of the relays R3, R4, and R5 are closed to complete Circuit M, thereby energizing the coil 207 of the relay R20, which opens the A and B sets of contacts to break Circuit D to the reject relay 17 of the slug rejector 13 and also breaks Circuit G to the customer switch S6. No more currency will be accepted.

An authorized attendant "approves" the sale by momentarily closing the switch S10 to complete Circuits P and Q, which respectively energize the coil 241 of the relay R11 and to hold the coil energized when the switch S10 reopens.

The main 109 is now extended through the F contacts of one or more of the credit relays R1, through R5, the B contacts of the relay R12, the B1, B2 contacts of R18, and the contacts of R11 to the switch S1 of the dispenser 3.

In areas which permit unattended operation, the switch S10 is omitted.

The customer then removes the nozzle 53 from its support and rotates the control lever 91 to the On position, thereby rotating shaft 93, cam 95, and pawl 97 to close the contacts of the switch S1, which completes Circuit R to the reset motor 79. The gallons' register 63 and the cost register 69 are reset to zero, and the cost register 69 resets the cams 103 and 105 to their initial or starting positions.

At the end of the reset cycle the pawl 81 closes the contacts of the switch S2 and reverses the contacts of the switch S3 to open contacts 1 and 2 in Circuit R and to close contacts 1 and 3.

Upon reversal of the switch S3 to connect contacts 1 and 3, the following circuits are completed:

Circuit S, which opens the low flow valve 259;

Circuit T, which energizes the coil 263 of the relay R14, thereby closing the A and B sets of contacts;

Circuit U, which extends through the closed contacts A and B of the relay R14, to energize the dispensing motor 37;

Circuit V, which extends through the normally closed A contacts of the relay R15, to open the high-flow valve 281;

Circuit W, which extends through the switch S2, to energize the coil of the relay R9, thereby connecting the A contacts and B1, B3 contacts;

Circuit X, which extends through the closed B1, B3 contacts of the relay R9, to energize the coil 291 of the relay R16, thereby closing its A and B contacts; and

Circuit Y which energizes the coil 207 of the relay R20 to break Circuit D to the reject relay 17 of the slug rejector 13 at the A contacts and also breaks Circuit G to the cycling mechanism 10 of the bill machine 7 at the B contacts. No more currency will be accepted.

Each time 25¢ worth of gasoline is dispensed, the cam 103 momentarily closes the switch S4 to complete circuit Z which energizes the coil 301 of the relay R24, thereby completing one of the following combinations of circuits to erase 25¢ of the posted credit.

When a 25¢ credit is posted at the relay R1, Circuit AA is completed and broken to reverse the primary contacts, thereby erasing the 25¢ credit.

When no credit is posted at the relay R1 and 50¢ credit is posted at the relay R2, Circuit AA is completed and broken to reverse the primary contact; thereby posting a 25¢ credit and Circuit BB is completed through the closed A contacts of the relay R1 and broken to reverse the primary contacts of the relay R2, thereby erasing the 50¢ credit.

When no credit is posted at the relays R1 and R2 and a $1.00 credit is posted at the relay R3, Circuits AA and BB are completed and broken to reverse the primary contacts, thereby respectively posting a 25¢ credit at the relay R1 and a 50¢ credit at the relay R2, and Circuit CC is completed and broken to reverse the primary contacts of the relay R3, thereby erasing the $1.00 credit.

When no credit is posted at the relays R1, R2, and R3, and a $2.00 credit is posted at the relay R4, Circuits AA, BB, and CC are completed and broken to respectively post a credit of 25¢, 50¢, and $1.00 at the relays R1, R2, and R3, and Circuit DD is completed and broken to erase the $2.00 credit at the relay R4.

When no credit is posted at the relays R1, R2, R3, and R4, and a $4.00 credit is posted at the relay R5, Circuits AA, BB, CC, and DD are completed and broken to respectively post a credit of 25¢, 50¢, $1.00, and $2.00 at the relays R1, R2, R3, and R4, and the Circuit EE is completed and broken to erase the $4.00 credit at the relay R5.

As previously disclosed, when the total credit is $7.00 or more, Circuit M is completed to energize the coil 207 of the relay R20, thereby breaking Circuits D and G to the coil 126 of the coin reject relay 17 and to the cycling mechanism 10 of the bill machine 7. However, when the credit drops below $7.00, Circuit M is broken at the series connected E contacts of the relays R3, R4, and R5, but the coil 207 of the relay R20 is held energized by Circuit Y and no coins or bills will be accepted.

At each 17¢ interval in the dispensing operation cam 105 closes the switch S5, but the closing of the switch is ineffective until only 25¢ credit remains, at which time the series connected B contacts of R2, R3, R4, and R5 are all closed. The cam 105 then recloses the switch S5 to complete Circuit FF thereby energizing the coil 345 of the relay R15, which opens the set of contacts A and closes the B set of contacts to respectively break Circuit V to the high-flow valve 281 and complete Circuit GG to hold the coil 345 of the relay R15 energized.

The remaining 8¢ worth of gasoline is dispensed through the low-flow valve. The cam 103 then momentarily recloses the switch S4 to complete Circuit AA and erase the 25¢ credit.

No credit is posted at the relays R1 through R5, therefore the F contacts thereof are open and the following circuits are broken: Q to the coil 241 of the relay R11; S to the solenoid 257 of the low-flow valve 259; T to the coil 263 of the relay R14; U to the dispensing motor 37; X to the coil 291 of the relay R16; GG to the coil 345 of the relay R15; and Y to the coil 207 of the relay R20.

When Circuit Y is broken, the A and B contacts of the relay R20 reclose to complete Circuit D and extend the main 109 to the switch S6 in Circuit G. Valid currency will again be accepted.

The customer completes the sale by rotating the lever 91 to the off position and hangs the nozzle 53 on its support. Rotation of the lever to the Off position, relieves the pressure on the switch S1, which reopens and also breaks the back of the pawl 81 to release the pressure on the switches S2 and S3. The switch S3 returns to its initial position wherein the contacts 1 and 2 are connected. The contacts of the switch S2 open to break Circuit W, which deenergizes the coil 287 of the relay R9, thereby opening the A contacts and connecting contact B1 with contact B2.

The apparatus is now restored to its original condition and is ready to serve another customer.

Out of order

When the direct current fuse F1 is burned out, Circuit C is not completed and Circuit HH to the Out of Order lamp L4 is completed through the contacts A1, A2 of the relay R12.

Cancellation of Unused credit

In the event the customer deposits money for a quantity of gasoline greater than the capacity of the vehicle fuel tank, credit will remain posted on the control mech-

anism 24 and the following circuits are still completed: A to the signal lamp L1, B to the bridge rectifier 29; C to the coil 115 of the relay R12; D to the reject relay 17 of the slug rejector 13 (If the credit is $6.75, or less); and Q to the coil 241 of the relay R11.

In addition, when Circuit Z was completed, an auxiliary Circuit JJ was completed to the coil 291 of the relay R16, thereby holding this relay energized after the lever 91 is rotated by the customer to the Off position.

Circuit JJ completes Circuit KK to energize the coil 360 of the relay R17 and close the A and B sets of contacts.

When all the credit is not used, the D contacts of one or more of the credit relays R1 through R5 are closed and upon closing of the A contacts of the relay R17 Circuit LL is completed to energize the coils of the corresponding credit relays, thereby closing the G contacts and pivoting the armatures 27 toward the respective coils.

The closing of one or more of the G contacts, completes Circuit MM which energizes the coil 389 of the relay R18, thereby breaking Circuits Q, JJ, KK, and LL, and when Circuit LL is broken, the G contacts reopen to break the Circuit MM.

The apparatus is now restored to its original condition and is ready to serve another customer.

Malfunction after cancellation of unused credit

If after cancellation of unused credit one or more of the credit relays R1 through R5 remains in credit posted position, Circuit NN is completed through the closed F contacts of the malfunctioning credit relays, the B contacts of the relay R12, and the B1, B3 of the relay R18 to hold the coil 389 of the relay R18 energized. When this occurs, the apparatus is inoperative and requires servicing.

Operation—modified form—two dispensers

With the addition of a product selector mechanism 451 to the currency acceptance unit 1 and a second dispenser 5, as shown in FIGURES 3 and 4, to the apparatus shown in FIGURES 1 and 2, one currency acceptance unit 1 controls the delivery of gasoline from either the Premium dispenser 3 or from the Regular dispenser 5.

Referring to FIGURES 3 and 4, when the main switch 23 is closed Circuits A, B, C, and D are completed as disclosed above.

The customer selects the product by rotating the switch S7, connecting the common contact A with the contact B for Regular and with the contact C for Premium.

The customer deposits currency in the manner disclosed above to complete one or more of the Circuits E, F, G, H, J, F'F, J'J, K, L to accumulate a credit at the control mechanism 24. If $7.00 or more, is accepted and accumulated, Circuit M is completed to the coil 207 of the relay R20, thereby disabling the cycling mechanism 10 for the dollar bill machine 7 and deenergizing the reject relay 17 of the slug rejector 13. No more currency will be accepted.

When the customer selection is for Premium gasoline, the switch S7 is connected across the contacts A and C and upon acceptance of the first piece of money, Circuits N–1 and O–1 are completed.

Circuit N–1 energizes the Premium coil 227 of the relay R23 to connect contacts A1 with A2, C1 with C2, D1 with D2, and E1 with E2.

Circuit O–1 extends through A1, A2 contacts of the relay R23 to the Premium signal lamp L3.

The attendant then approves the sale by momentarily closing the switch S10 to complete Circuit P, which energizes the coil 241 of the relay R11, and the Circuit Q, which holds the coil 241 energized after the switch S10 reopens.

The customer approaches the Premium dispenser 3, removes the nozzle 53 from its support, and rotates the lever 91 to the On position, thereby closing the contacts of the switch S1 and completing Circuit R–1 to energize the reset motor 79.

At the end of the reset cycle the contacts of the switch S2 are closed and the contacts of the switch S3 are reversed to open contacts 1 and 2 thereby breaking Circuit R–1 and to close contacts 1 and 3 thereby completing the following circuits.

Circuit S, which opens the low-flow valve 259;

Circuit T, which energizes the coil of R14, thereby closing contacts A and B;

Circuit U, which starts the dispensing motor 37;

Circuit V–1, which opens the high-flow valve 281;

Circuit W, which energizes the coil 287 of the relay R9, thereby closing the A contacts, breaking contacts B1, B2 and connecting contacts B1, B3;

Circuit X, which extends through the B1, B3 contacts of the relay R9, and energizes the coil 291 of the relay R16; and

Circuit Y which extends through the A contacts of the relay R9 to energize the coil 207 of the relay R20 thereby breaking;

Circuit D at the opened A contacts of the relay R20 and Circuit G at the opened B contacts of the relay R20. No more currency will be dispensed.

As gasoline is dispensed, the shaft 100 and the cams 103 and 105 are driven by the cost register 69 to rotate at the rate of one revolution for each 25¢ worth of gasoline dispensed. Cam 105 closes the switch S5 at each multiple of 17¢, but becomes effective only for the final 25¢ of each delivery, at which time the series connected B contacts of the relays R2 through R5 are closed. Cam 103 closes the switch S4 at each multiple of 25¢ to complete and break

Circuit Z thereby energizing and deenergizing the coil 301 of the relay R24 to complete and break the countdown Circuits AA, BB, CC, DD, and EE, singly or in the combinations disclosed above.

When the total credit drops below $7.00, Circuit M is broken at the series connected E contacts of the relays R3, R4, and R5, but the coil 207 of the relay R20 is held energized by the Circuit Y. No currency will be accepted.

When the credit is reduced to 25¢ and the cam 105 momentarily closes the switch S5, the B contacts of the relays R2 through R5 are closed and Circuit FF–1 is completed, which energizes the coil 345 of the relay R15, thereby opening the A contacts which breaks Circuit V–1 and the high-flow valve 281 closes and also closes contacts B to complete the Circuit GG–1, which holds the coil 345 of the relay R15 energized.

The final 8¢ of gasoline is delivered through the low-flow valve 259, and cam 103 recloses the switch S4 to momentarily complete Circuits Z–1 and AA to erase the 25¢ credit at the relay R1. Circuit Q to the coil 241 of the relay R11, Circuit S–1 to the solenoid 257 of the low-flow valve 259, Circuit T–1 to the coil 263 of the relay R14, Circuit U to the dispensing motor 37, Circuit X to the coil 291 of the relay R16, Circuit GG–1 to the coil 345 of the relay R15, and Circuit Y to the coil 207 of the relay R20 are broken.

The A and B contacts of the relay R20 reclose to complete Circuit D and to extend the main 109 to the switch S6 in Circuit G. Currency will again be accepted.

The customer rotates the lever 91 to the Off position and hangs the nozzle 53 on its support, thereby opening switches S1 and S2 and connecting contact 1 of the switch S3 with contact 2, Circuit W to the coil 287 of the relay R9 is broken at switch S2, and the apparatus is restored to its original condition.

Circuits HH, JJ, KK, LL, MM, and NN remain unchanged and operate in the manner disclosed.

When the customer selects Regular by rotating the switch S7 to connect the contacts A and B, and deposits currency, one or more of the Circuits E, F, G, H, J, F'F,

J'J, K and/or L are completed to accumulate a credit at the control mechanism **24**.

If $7.00 or more is accepted, Circuit M is completed and no more currency will be accepted.

The first piece of money accepted completes the following circuits:

Circuit N–2, which energizes the Regular coil **231** of the relay R23, thereby connecting contacts A1 with A3, C1 with C3, D1 with D3, and E1 with E3, and

Circuit O–2 which energizes the Regular signal lamp L2.

The attendant "approves" the sale by momentarily closing the switch S10 to complete Circuit P, which energizes the coil **241** of the relay R11, and the Circuit Q, which holds the coil **241** energized after the switch S10 reopens.

The customer approaches the Regular dispenser **5**, removes the nozzle **53'** from its support, and rotates the lever **91'** to the On position, thereby closing the switch S1' to complete;

Circuit R–2 to energize the reset motor **79'**.

Upon completion of the reset, Circuit R–2 is broken at the switch S3', as disclosed above, and the following circuits are completed:

Circuit S–2 which opens the low-flow valve **259'**;

Circuit T–2 which energizes the coil **263'** of the relay R14', thereby closing the A and B sets of contacts;

Circuit U–2 which starts the dispensing motor **37'**;

Circuit V–2 which opens the high-flow valve **281'**;

Circuit W–2 which energizes the coil **287** of the relay R9, thereby closing the A set of contacts and disconnecting B1 from B2 and connecting B1 with B3, completing

Circuit X to the coil **291** of the relay R16 through the contacts B1, B3 of the relay R9, and

Circuit Y to the coil **207** of the relay R20 through the A contacts of the relay R9, thereby breaking Circuits D and G so that no more money will be accepted.

As gasoline is dispensed, the cams **103'** and **105'** are driven by the cost register **69'** to rotate at the rate of one revolution for each 25¢ of gasoline dispensed. Cam **105'** momentarily closes the switch S5' at each multiple of 17¢ but becomes effective only for the final 25¢ of each delivery. Cam **103** momentarily closes the switch S4' at each multiple of 25¢ to complete and break Circuit Z–2, thereby energizing and deenergizing the coil **301** of the relay R24 to complete and break the countdown Circuits AA, BB, CC, DD, and EE, either singly or in the combinations disclosed above.

When the accumulated credit drops below $7.00, Circuit M is broken at the series connected E contacts of the relays R3, R4, and R5; but the coil **207** of the relay R20 is held energized by the Circuit Y. No currency will be accepted.

When credit is reduced to 25¢ and the cam **105'** momentarily closes the switch S5', the B contacts of the credit relays R2 through R5 are closed and Circuit FF–2 is completed, which energizes the coil **345** of the relay R15, whereupon the A contacts open to break Circuit V–2 to the high-flow valve **281'** and also closes the B contacts to complete Circuit GG–2, which holds the coil **345** of the relay **15** energized.

The final 8¢ of gasoline is delivered through the low-flow valve **259'**, and cam **103'** recloses the switch S4' to momentarily complete Circuits Z–2 and AA to erase the 25¢ credit at the relay R1.

Circuit Q to the coil **241** of the relay R11, Circuit S–2 to the solenoid **257** of the low-flow valve **259**, Circuit T–2 to the coil **263'** of the relay R14', Circuit U–2 to the dispensing motor **37'**, Circuit X to the coil **291** of the relay R16, Circuit GG–2 to the coil **345** of the relay R15, and Circuit Y to the coil **207** of the relay R20 are broken.

The A and B sets of contacts of the relay R20 reclose to complete Circuit D and to extend the main **109** to the switch S6 in Circuit G. Currency will again be accepted.

The customer completes the sale by rotating the lever **91'** to the Off position and hangs the nozzle **53'** on its support, thereby opening switches S1' and S2' and connecting contact **1** of the switch S3' with contact **2**. Circuit W–2 to the coil **287** of the relay R9 is broken at the switch S2' and the apparatus is restored to its original condition.

Circuits HH, JJ, KK, LL, MM, and NN remain unchanged and function in the manner disclosed.

I claim:

1. In a liquid vending system, the combination of

(1) a credit posting mechanism comprising a plurality of individually operated credit input devices, each adapted to produce a separate, different value pulse upon each operation thereof,

(2) a binary credit accumulator, comprising a plurality of binary order mechanisms, adjacent ones of which represent successive binary values and each of which has a zero and a credit posted condition,

(a) transfer means connecting adjacent order mechanisms,

(3) means connecting each input device to feed its value pulses directly to the covalent binary order mechanism,

(a) said binary order mechanisms and transfer means serving to totalize the value of said pulses as they occur,

(4) dispensing means having a liquid line,

(a) a meter in said line,

(5) registering means driven by said meter,

(6) a control device movable between on and off positions,

(a) means responsive to both said control device when in the on position and a second device conditioned by said credit accumulator when a credit is established thereon, for resetting said registering means to zero,

(7) other means operable by said resetting means, when said registering means is reset to zero, for activating said dispensing means,

(8) a pulse generator operated by said registering means,

(9) means connecting said pulse generator to actuate said credit accumulator to reduce the total credit thereon by one, lowest order, binary value increment for each pulse, and

(10) means operative when the credit is reduced to zero for deactivating said dispensing means.

2. The structure defined by claim **1** which includes a third, manually conditioned authorization device for rendering effective the means responsive to said control device when it is in its on position, and said second device, when it is conditioned.

3. The structure defined by claim **2** wherein said authorization device comprises a key controlled means.

4. The apparatus defined by claim **1** which includes means responsive to the movement of said control device to its off position for removing all remaining credit from said credit accumulator.

5. The structure defined by claim **4** wherein each binary order mechanism includes a control element having on and off conditions corresponding respectively to the credit posted and zero credit conditions of said mechanism, said element being operable to said conditions by said mechanism,

(a) means responsive to the movement of said control device to its off position and conditioned by the control elements which are in their on conditions, for restoring the binary credit accumulator to its zero credit condition.

6. The structure defined by claim **5** which includes additional means, responsive to the continuation of a binary order mechanism in a credit posted condition after the return of the control device to its off position, for preventing the posting of credit on the credit accumulator.

7. The structure defined by claim 6 wherein the credit posting preventing means comprises means for preventing the effective operation of the individually operated devices.

8. The structure defined by claim 6 which includes a signal and means for activating said signal substantially simultaneously with the response of the credit posting preventing means.

9. In a liquid vending system, the combination of

(1) currency accepting means having a plurality of individually operated credit input devices each adapted to produce a separate, different value pulse for each denomination of currency accepted, the values of said pulses comprising at least one unit value of currency and at least two successive binary multiples thereof,

(2) a binary credit accumulator, comprising a plurality of binary order mechanisms, adjacent ones of which represent successive binary values and each of which has a zero and a credit posted condition,

(a) transfer means connecting adjacent order mechanisms,

(3) means connecting each input device to feed its value pulses directly to the covalent binary order mechanism,

(a) said binary order mechanisms and transfer means serving to accumulate the total value of the pulses, each time a pulse occurs,

(4) dispensing means having a liquid line,

(a) a meter in said line,

(5) cost registering means driven by said meter,

(6) a control device movable between on and off positions,

(7) means responsive to said control device, when it is in the on position and a second device conditioned by the credit accumulator when credit is accumulated thereon for resetting said registering means to zero,

(8) means operable by said resetting means, when said registering means is reset to zero, for activating said dispensing means,

(9) a pulse generator operated by said registering means, so as to produce one pulse per unit value of liquid dispensed,

(10) means connecting said pulse generator to actuate said credit accumulator to reduce the total credit on said credit accumulator by one, lowest order, binary unit value for each pulse, and

(11) means operable when the credit is reduced to zero for deactivating said dispensing means.

10. The apparatus as defined in claim 9 wherein said currency accepting means includes means for rejecting spurious and mutilated currency.

11. The apparatus defined by claim 9 which includes means responsive to movement of said control device to off position for removing all unused credit from said accumulator.

12. The apparatus as defined in claim 11 which includes additional means responsive to the continuation of a binary order mechanism in a credit posted condition after the return to said control device to its off position for disabling said system.

13. The apparatus defined in claim 9 which includes means responsive to the movement of the control device to its on position for preventing the increase of credit on the accumulator.

14. The structure defined by claim 9 which includes a valve in the liquid line, means conditioned by a binary order mechanism which is in a credit posted condition and responsive to activation of said dispensing means, for opening said valve and responsive to the exhaustion of the credit on the accumulator for closing said valve.

15. The structure defined by claim 14 which includes a second valve in said dispensing line in parallel with said first valve,

(1) means for opening said second valve substantially simultaneously with said first valve,

(2) means responsive to the reduction of credit on the credit accumulator to one unit value of currency for causing said second valve to close.

16. The structure defined by claim 9 wherein

(1) a first binary order mechanism includes

(a) a first stepping relay having zero credit and credit posted conditions, and a coil for reversing the condition of the relay in response to successive pulses,

(b) input circuitry for feeding a unit value pulse to said relay coil to cause it to actuate the relay,

(c) said relay in its actuated condition serving to post one unit of credit on the accumulator,

(2) a second binary order mechanism includes

(a) a second stepping relay having zero credit and credit posted conditions and a coil for reversing the condition of the relay in response to successive pulses,

(b) input circuitry for feeding a first multiple unit value pulse directly to said second relay coil,

(c) said second relay, in its credit posting condition serving to post two units of credit on the accumulator,

(3) means conditioned by said first relay when it is in a credit posted condition for transmitting a transfer pulse to the coil of the second relay when the coil of the first relay receives the next pulse, said first relay being returned to zero credit condition by said next pulse.

17. The structure defined by claim 16 wherein said stepping relays change condition upon cessation of the pulse to the coils thereof.

18. The structure defined by claim 16 which includes a third binary order mechanism having a third stepping relay and coil, input circuitry for feeding a second multiple unit value pulse to its coil, said second relay including means conditioned by it when it is in credit posted condition for transmitting a transfer pulse to the coil of the third relay, whereby when the first and second relays occupy their credit posted conditions, a next pulse to the coil of either of said first and second relays will cause a change in the condition of the third relay.

19. The structure defined by claim 9 wherein each binary order mechanism includes a

(1) stepping relay having

(a) zero credit and credit posted conditions,

(b) a coil for reversing the condition of the relay in response to a pulse,

(c) a circuit for feeding a pulse from the covalent credit input device to said coil,

(d) means conditioned by the relay of each inferior order relay, when it is in credit posted condition for transmitting a transfer pulse to the coil of the next superior order relay, upon receipt of a pulse by the coil of the inferior order relay, whereby said credit on said accumulator is equal to the total value of all credit pulses received from said credit input devices.

20. The structure defined by claim 19 wherein the credit input devices include 25¢, 50¢, and $1.00 bill devices.

21. The structure defined by claim 19 wherein the relay of the binary order mechanism receiving pulses from the highest denomination credit input device and the relays of all of the binary order mechanisms superior thereto each have a credit limit switch which is closed when the mechanism is in credit posted condition,

(1) means for disabling said credit input devices, and means for connecting said switches to render said disabling means effective when all of said switches are closed.

22. The structure defined by claim **19** wherein the relay of each binary order mechanism includes a zero credit switch which is closed when the relay is in credit posted condition,

(1) means responsive to the return of the control device to its off condition for energizing the coil of each zero credit posted relay under the control of its closed reset switch, to restore the relay to its zero credit condition.

23. The structure defined by claim **22** which includes means responsive to the holding of one of the zero credit switches in the closed condition after the return of said control device to its off position for disabling the dispensing apparatus for further delivery.

24. The structure defined by claim **19** wherein each stepping relay includes a posted credit switch which is closed when the relay is in credit posted condition,

(1) means, including any closed posted credit switch, for conditioning said resetting means for operation when said control device is moved to its on position.

25. The structure defined by claim **24** wherein said conditioning means includes an approval switch which is normally open, which is in series with all of said credit switches, and manually operable means to cause said approval switch to condition said resetting means.

26. The structure defined by claim **24** which includes means responsive to the completion of register resetting for disabling said credit input devices.

27. The structure defined by claim **19** which includes a fast flow and a slow flow valve connected in parallel in the liquid line,

(1) means operable on completion of resetting of the registering means for opening both valves,

(2) each binary mechanism relay except that of the lowest order mechanism including a slow down switch which is closed when the relay is in zero credit condition,

(a) said switches being connected in series,

(3) a normally open pulse switch adapted to be closed by the registering once during the dispensing of a unit value of liquid,

(a) said pulse switch being connected in circuit with said slow down switches,

(b) said circuit serving, when said pulse switch and all of said latter switches are closed to cause said fast flow valve to close.

28. The structure defined by claim **19**, wherein said pulse generator produces a single pulse during each delivery of a unit value of liquid; and which includes

(1) means responsive to each pulse for pulsing the coil of the lowest order stepping relay to reverse the condition of said relay and, by means of transfer pulses to the coils of higher order relays actuate such of them as may be required to attain a unit value of reduction of the credit existing on the accumulator.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,285,381 November 15, 1966

Elmer A. Robbins

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 48, for "bill" read -- bills --; column 3, line 25, for "3,137,945" read -- 3,187,945 --; column 6, line 58, after "Y" insert -- which --; column 7, lines 12 and 13, for "Cir-C" read -- Circuit C --; column 11, line 2, for "complete." read -- complete --; column 21, line 62, for "to", first occurrence, read -- of --.

Signed and sealed this 12th day of September 1967.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents