

[54] **VENDING MACHINE ELECTRICAL OPERATING CONTROL CIRCUIT**

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[22] Filed: **Feb. 21, 1973**

[21] Appl. No.: **334,251**

[44] Published under the Trial Voluntary Protest Program on January 28, 1975 as document no. B 334,251.

[52] U.S. Cl. **194/10**

[51] Int. Cl.² **G07F 11/00**

[58] Field of Search 194/10, 9; 221/129, 125, 221/6, 14

[56] **References Cited**

UNITED STATES PATENTS

3,334,786 8/1967 Newberry 221/125 X

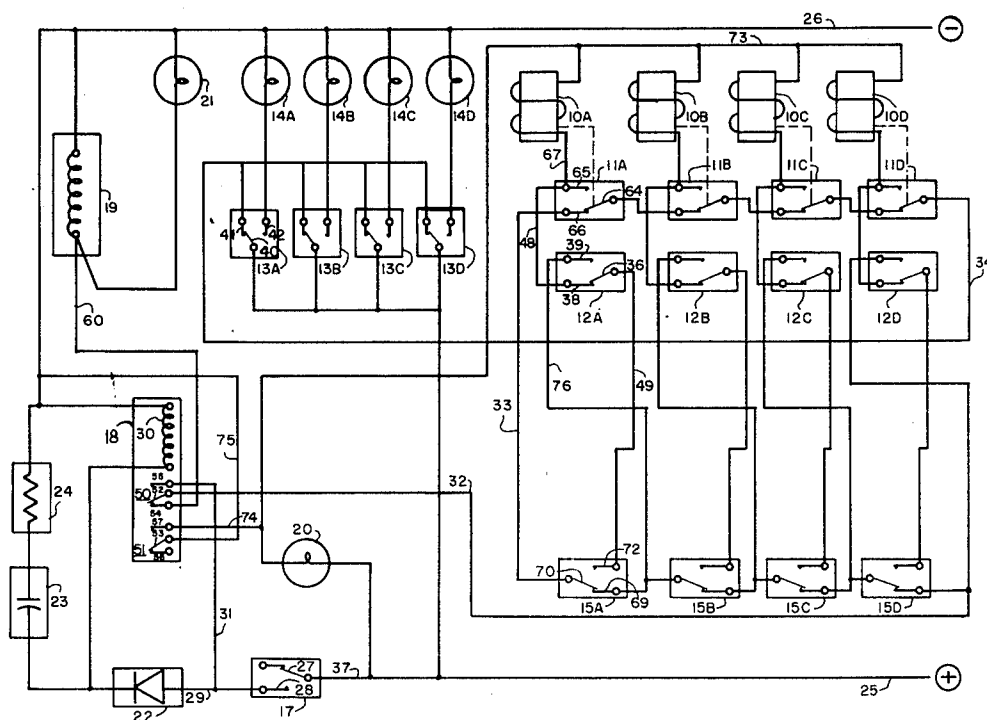
3,349,881 10/1967 Camp 194/10
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3,613,854 10/1971 Bowman 194/10

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Attorney, Agent, or Firm—Cameron, Kerkam, Sutton, Stowell & Stowell

[57] **ABSTRACT**

A coin operated multi-column vending machine electrical operating control circuit which eliminates the requirement for selection relays by providing vend actuators controlled by selector switches and which incorporates lock-out functions via circuit interconnections with the selector switches, solenoid switches and a vend relay incorporating a timing circuit across the energizing coil of the vend relay which removes established credit from the vending machine at the proper time to insure delivery of only one article per established credit.

24 Claims, 1 Drawing Figure



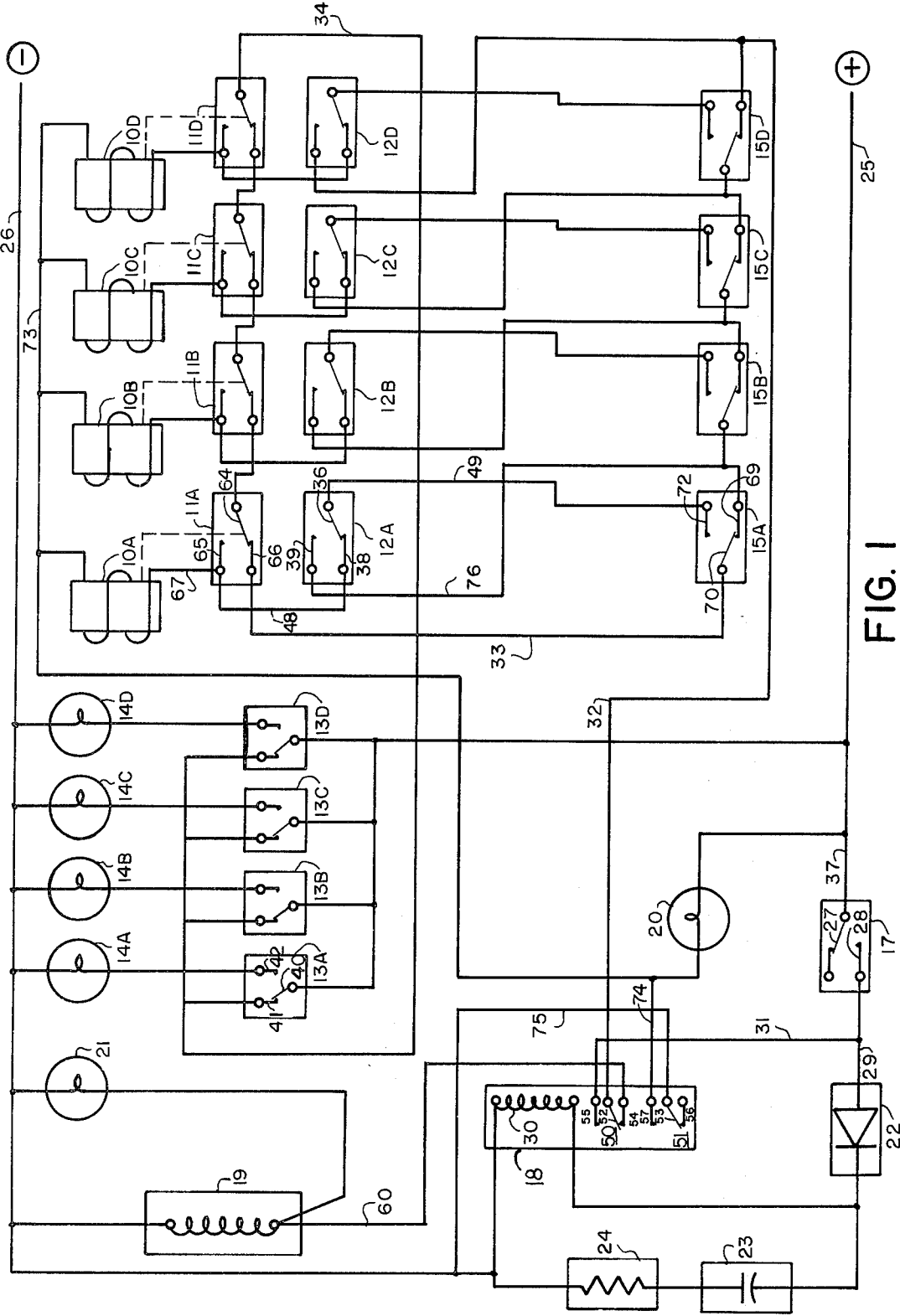


FIG. 1

VENDING MACHINE ELECTRICAL OPERATING CONTROL CIRCUIT

BACKGROUND OF THE INVENTION

The present invention relates to check controlled dispensing apparatus in that the energization of a dispensing solenoid is controlled by the deposit of a coin, but, more specifically, the invention relates to an electrical operating control circuit for a coin operated vending machine adapted to be operated to selectively dispense articles, one at a time, from a plurality of stacks or columns, each of which receives and stores a plurality of articles. The articles are preferably vertically stacked on a serpentine shelf and on straight run upper shelves for dispensing one at a time by a solenoid actuated release and retaining mechanism in the manner described, for example, in U.S. Pat. No. 3,507,419 granted to James. C. Lindsey on Apr. 21, 1970, and assigned to the assignee of the present invention. However, other forms of stacking arrangements may be utilized with equal efficiency and the circuit embodying the invention may readily be incorporated into various forms of vending machines adapted to dispense articles one at a time.

Coin-operated vending machines for selectively dispensing articles, one at a time, from a plurality of stacks or columns are well known. Typical arrangements are exemplified by U.S. Pat. Nos. 2,280,323; 2,549,081; 2,686,583; 2,956,660; 3,348,733 and the aforementioned 3,507,419. Generally, with such arrangements, either a mechanical or an electrical system is provided to prevent delivery of more than one article at a time from a column or stack and prevent "jack-potting" of the machine. The development of an economical system which solves the problem of removing established credit at the proper time and insures delivery of only one article per established credit and which is characterized by minimum requirements of power of operation and minimum interference of elements, thereby allowing a flexibility in construction and operation which reduces cost of operations and maintenance has been a constant challenge to the vending industry.

Electrical operating control circuits have been found to be more desirable than mechanical systems. A typical electrical circuit arrangement is disclosed in U.S. Pat. No. 3,613,854, granted to Raymond D. Bowman on Oct. 19, 1971 and assigned to the assignee of the present invention. In that Bowman circuit arrangement, dispensing from each column is controlled by individual vend solenoids which are controlled by individual selector relays energized through contacts of a vend relay timing circuit which removes established credit from the vending machine at the proper time and insures delivery of only one article per established credit.

The above-described circuit has proved to be very effective but suffers from the disadvantage that after relatively long periods of continued use, particularly at outdoor installations of high humidity, the selector relays are subject to contact deterioration as a result of corrosion and/or oxidation which leads to arcing and pitting of the contact surfaces necessitating replacement at a frequency which is a function of the number of relays used. Additional disadvantages of existing electrical operating control circuits are manifested in their requirement for excessive electrical component duplication and associated circuitry such as the individ-

ual selector relays incorporated in prior devices for each dispensing column. The numerous components and associated circuitry increase the probability of failure and thus decreases reliability. Furthermore, they result in increased material and labor costs in the production of the devices.

SUMMARY OF THE INVENTION

The foregoing and other disadvantages of known prior art arrangements are overcome or minimized by the present invention which provides a novel vending machine electrical operating control circuit which eliminates the requirement for selection relays, thus reducing the complexity of the circuit, decreasing its production costs, increasing its reliability and decreasing its operating costs. This is accomplished by providing vend solenoids controlled by selector switches which incorporate interconnecting circuitry with selector switches, solenoid switches and a vend relay timing circuit which removes established credit from the control circuit at the proper time and insures delivery of only one article per established credit.

Other objects of the present invention will be apparent from the following description taken in connection with accompanying drawing. Although one specific form of the invention is illustrated, it is to be expressly understood that this drawing is for the purpose of illustration only and is not intended to represent the full scope of the invention defined by the appended claims which particularly point out and distinctly claim the subject matter of the invention.

BRIEF DESCRIPTION OF THE DRAWING

The accompanying drawing, FIG. 1, is a schematic diagram of the novel operating control circuit for a coinoperated vending machine. Since the inventive concept of the invention resides in the new improved circuit that is independent of the cabinet in which it is located or the means for delivery of the article that is dispensed, the invention will be hereinafter described with reference only to the schematic of the control circuit, its method of operation and control. As to a suitable cabinet and dispensing mechanism to which the circuit is adapted, reference may be made to U.S. Pat. Nos. 3,107,812; 3,107,813; 3,224,691; 3,300,084; 3,348,733; 3,498,497 and 3,507,419.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing, there is illustrated schematically the novel control circuit of the present invention for a coin-operated vending machine which includes a plurality of dispensing columns each containing stacks or columns of articles arranged to be selectively dispensed one at a time according to the choice of a customer. For convenience the circuit is illustrated in connection with a coin operated vending machine having 4 dispensing columns for 4 different articles; however, it will be apparent that more or less than 4 columns may be utilized and the operating sequence for dispensing an article from each column is the same. Accordingly, the operating sequence of only one dispensing column will be described.

The dispensing columns and associated stacks of articles are designated A-D and each component in the operating circuit of one stack that corresponds to a like component in another stack is designated with a like numerical reference character which is followed by the

alphabetical character corresponding to the particular stack with which the component is associated. For example, 10A refers to the vend solenoid for stack A, while 10D refers to the vend solenoid for stack D.

Each stack has associated therewith a vend solenoid 10, a solenoid switch 11, a pair of sold out switches 12 and 13, a sold out indicator light 14, and a selector switch 15. In addition to the components associated with a particular stack, a number of common control components are provided including a coin-operated vend switch 17, a vend relay 18, a coin reject electromagnet 19, a select indicator light 20, a correct change indicator light 21 and a timing circuit comprising diode 22, capacitor 23 and resistor 24.

Capacitor 23 and resistor 24 are connected in series, the series combination being connected in parallel with the coil 30 of the vend relay. Diode 22 serves to rectify the 115 volt, 60 Hertz input voltage applied through the input power conductors, which may be connected to a conventional alternating current supply source, to provide a pulsating DC. The pulsating DC is used to charge the capacitor and maintain the vend relay operating coil 30 energized for a fixed period after primary power is removed therefrom. Diode 22 also prevents capacitor 23 from becoming damaged from alternating current.

Capacitor 23 is charged upon the establishment of the energizing voltage across the operating coil 30 of the vend relay and discharges through the vend relay operating coil. The vend relay thus remains energized for a fixed time period after the original source of energization to operating coil 30 is removed. In this manner, capacitor 23 provides an auxiliary energizing source that supplements the primary source of energization. The time period is selectively controlled by pre-selecting the values of resistor 24 and capacitor 23 to provide an optimum timing cycle. However, since there is some inherent resistance in the circuit due to the ohmic resistance of the operating coil and line conductors, the resistor 24, in some applications, may be dispensed with.

Power to the control circuit is applied across a pair of supply conductors 25 and 26 connected to a conventional alternating current supply source. When the vend machine is in normal working order, credit is established upon energization of vend relay 18 which occurs upon insertion of a proper coin or coins into a conventional coin box (not shown) that provides means for actuation of the coin operated switch 17.

Vend switch 17 may be a conventional microswitch having a pair of fixed contacts 27 and 28 and a movable contact arm adapted to be momentarily displaced from a first position to a second position and returned to its first position upon insertion of the proper amount of coins into the vend machine coin box. The movable contact arm is connected to supply conductor 25 and upon displacement of the arm to its second position completes the energized circuit to vend relay 18 through contact 28 and conductor 29 connected to one end of energizing coil 30 of vend relay 18 through diode 22. The other end of the energizing coil 30 is connected to return supply conductor 26. Conductor 25 also forms a common power feed line for each of the sold out indicator light switches 13 and select indicator light 20.

Upon return of the movable contact arm to its first or original position, power to the operating coil 30 of the vend relay is maintained through a holding circuit. The

holding circuit may be traced from the lower end of coil 30, as viewed in the drawing, through diode 22, conductor 29, conductor 31, a set of contacts (52, 55) of the energized vend relay 18, conductor 32, the series arranged lower set of contacts (69, 70) of the select switches 15, conductor 33, the series arranged lower set of contacts (64, 66) of the solenoid switches 11, conductor 34, and at least one set of contacts (40, 41) of one or more of the sold out indicator light switches 13 to the supply conductor 25.

The sold out indicator light switches 13 are mechanically coupled to their associated vend stacks such that contacts 40 and 41 are closed when the associated stack contains at least one item and contacts 40 and 42 are closed when the associated stack is empty. Thus, as long as one stack contains merchandise, a path for vend relay holding current will be available. If all the stacks are empty, the vend relay holding circuit will be disabled and coins will be rejected by the action of coin reject electromagnet 19. Coin reject electromagnet 19 is normally energized via conductor 60 and through contacts 52 and 54 of the unenergized vend relay 18. In its energized condition, coin reject electromagnet 19 allows coins to be accepted. For a typical arrangement of a coin accepting and rejecting mechanism, reference may be made to U.S. Pat. Nos. 3,159,260; 3,193,075; 3,335,838 and 3,550,742.

Vend relay 18 comprises an energizing coil 30 and two sets of contacts 50 and 51, each having a movable contact arm 52 and 53, respectively, and a pair of corresponding fixed contacts 54, 55 and 56, 57. As hereinbefore noted, coil 30 is energized upon actuation of coin operated vend switch 17, causing movable contacts 53 and 52 to be displaced upwardly, as viewed in the drawing. The normally closed contacts 52, 54 of vend relay 18 permit power to be applied to the coin reject electromagnet 19 when the coil of vend relay 18 is deenergized. The circuit may be traced from the electromagnet 19 through conductor 60, contacts 52, 54, conductor 32, the normally closed contacts 69 and 70 of the series connected select switches 15, conductor 33, the normally closed contacts 64 and 65 of the series connected solenoid switches 11, conductor 34 and at least one set of contacts 40 and 41 of one or more of the sold out indicator light switches 13 to the supply conductor 25. Hence when all of the sold out indicator light switches are positioned such that contacts 40 and 41 are open and 40 and 42 are closed in response to all stacks being empty, the coin reject electromagnet 19 cannot be energized and all coins will be rejected.

Coin reject electromagnet 19 provides a conventional coin blocking function through operation of its armature (not shown). In its normally energized condition, the armature is actuated so as to permit a coin to be inserted for establishing credit; however, once the coin operated vend switch 17 is closed and vend relay 18 is energized, the coin reject electromagnet 19 is deenergized so as to operatively prevent the insertion of another coin. Correct change light 21 is connected across the energizing coil of the coin reject electromagnet 19 to provide a suitable indication, when lit, that the vend machine is ready to receive coins.

The energizing circuit for the coin reject electromagnet 19 is established through parallel connected sold out switches 13 as explained above. Each sold out switch 13 is disposed at a corresponding stack for monitoring the supply and is actuated in a conventional manner

from a first to a second position upon depletion of the supply of articles in that stack. Upon actuation to a second position, a corresponding sold out indicator light 14 is energized to indicate that the stack is empty.

A second group of sold out switches 12 is located in the energizing circuit of the vend solenoids 10 to prevent the energization of a corresponding vend solenoid when the supply of articles in the stack is depleted. Sold out switches 12 may be operated independently of sold out switches 13, but preferably they are ganged thereto for simultaneous operation to utilize the same sold out indicator light. In any event, sold out switches 12 are electrically connected in series with the corresponding column selector switches 15.

Each vend solenoid 10 of a column has associated therewith a corresponding solenoid switch 11 comprising a movable contact 64 and a pair of fixed contacts 65 and 66. Each switch 11 is adapted to be actuated between a first position and a second position. In the first position, the corresponding vend solenoid 10 is energized through conductors 67 and 48, connected together at contact 65, sold out switch 12, conductor 49, contacts 70 and 72 of an actuated selector switch 15, conductor 33, contacts 64 and 66 of the series connected solenoid switches 11, connector 34, and at least one set of contacts 40 and 41 of at least one of the sold out light switches 13 to the supply conductor 25. The other end of the solenoid coil is connected through conductors 73 and 74, contacts 53 and 57 of the energized vend relay 18, and conductor 75 to power conductor 26. Hence activating a selector switch 15 when the vend relay 18 is deenergized cannot complete a path of current through a vend solenoid 10 and, of course, deactivation of the vend relay breaks the current path to the vend solenoid.

Each solenoid switch 11 may be preferably a micro-switch having its movable contact biased in one position and adapted to be released to its second position by a linkage connected to the solenoid armature. A solenoid switch is operated or actuated when the associated solenoid for each corresponding selection is energized. Advantageously, the linkage is such that the switches are actuated before the solenoid armature moves far enough to cause the mechanism to vend, thus insuring only one vend per established credit since this opens the initial energizing circuit by opening contacts 64 and 66 of one of the series connected solenoid switches forming the mutually exclusive enabling energizing circuit described previously. When contacts 64 and 66 of a solenoid switch 11 open, the selector switches 15 are removed from the energizing circuit and the energization current path for a selected vend solenoid is transferred from conductor 48 to contacts 64 and 65 of solenoid switch 11. The path may be traced with respect to column A through closed switch contacts 64, 65, through any remaining unactivated solenoid switches via their contacts 64 and 66 to conductor 34 and then through sold out light switches 13 as previously explained.

As previously explained, sold out switches 12 are connected in series with their respective select switches 15 to prevent activating the solenoid of an empty stack and cancelling the credit without delivery of merchandise. When a stack is empty, contacts 36 and 38 of the respective sold out switch are open and contacts 36 and 39 are closed. Thus when contacts 70 and 72 of the respective select switch 15 are closed, a path for current is provided through conductor 49, contacts 36 and 39

and then through conductor 76 instead of 48 to bypass the open circuit in the series of selector switches created when contact arm 70 moves from 69 to 72. This bypass circuit functions to prevent cancellation of a credit if a select switch 15 of an empty stack is held depressed for a period of time greater than that provided by the discharge of capacitor 23.

For convenience, a typical sequence of operation of the vending cycle is set forth as follows:

A coin is inserted in the coin box which actuates the coin operated vend switch 17. Actuation of coin operated vend switch 17 breaks the initial energizing circuit to contact 27 and enables conductor 29 so that operating coil 30 is energized and capacitor 23 is charged. Upon energization of vend relay 18, the energizing circuit for the coin reject electromagnet 19 is broken, causing it to reject further coins. Simultaneously, a holding circuit is established through contacts 52, 55 to maintain the vend relay coil 30 energized when the vend switch 17 returns to normal. Closure of contacts 53, 57 enables the energizing circuit of the vend solenoids by connecting one side of the coils of the vend solenoids to the power return line.

The machine is now ready for a particular selection by the customer which is effected through operation of a selector switch. For example, if the selector switch 15A for the first stack is actuated, a circuit is established for initial energization of vend solenoid 10A and then for holding it energized through contacts 64, 65 of solenoid switch 11A, as previously explained. Energization of vend solenoid 10A opens contacts 64, 66 of solenoid switch 11A to prevent double vending by disabling the initial energization circuits of select switches 15. Opening of contacts 64, 66 of solenoid switch 11A also functions to open the holding circuit for the vend relay operating coil 30. At this point, however, the auxiliary power source provided by the timing circuit formed by capacitor 23 and resistor 34 maintains the operating coil 30 energized for a fixed period to enable completion of the selection. Upon discharge of capacitor 23, vend relay 18 is deenergized and contacts 53, 57 open to remove operating power from the vend solenoids. The energization coil of vend solenoid 10A remains energized until the vend relay is deenergized which occurs upon discharge of the capacitor. When vend relay 18 is returned to its normal standby position, the energizing circuit to the holding circuit is broken and the circuit for coin reject electromagnet 19 is energized.

While the vend machine operating circuit of the present invention has been described with reference to a particular preferred embodiment, changes in or modifications to the illustrated embodiment may now be suggested to those skilled in the art without departing from the present inventive concept. For example, the vend actuator may take the form of a vend motor adapted to be cycled for one revolution and actuate a dispensing mechanism upon actuation of a selector switch after credit has been established. Reference therefore should be had to the appended claims to determine the full scope of the invention.

I claim:

1. An electrical control circuit for a coin operated vending machine incorporating a plurality of dispensing columns each adapted to receive articles to be selectively dispensed, comprising: a coin responsive vend switch; a vend relay responsive to actuation of said vend switch; a plurality of selector switches, each said

selector switch being associated with an individual one of said columns; a plurality of dispensing actuators each being associated with an individual one of said columns and being responsive to actuation of one of said selector switches from a first to a second position and energization of said vend relay; and a plurality of control switching means each being associated with an individual one of said columns and being responsive to an individual one of said dispensing actuators, said switching means having a first position for mutually exclusively completing a first enabling circuit including each said selector switches for maintaining said vend relay energized when selector switches are all maintained in their first position and a second position for completing an energizing circuit to each one of said plurality of dispensing actuators for selectively dispensing a single article upon actuation of a selector switch to its second position.

2. The circuit as defined in claim 1 further including means for maintaining said vend relay energized a predetermined time upon actuation of one of said selector switches to its second position thereby interrupting said first enabling circuit.

3. The circuit as defined in claim 2 wherein said means for maintaining said vend relay energized comprises a timing capacitor for providing auxiliary energizing potential to said vend relay.

4. The circuit as defined in claim 1 including a plurality of first article sensing switches each associated with an individual one of said columns and responsive to the contents therein; each said first article sensing switches being electrically interposed in circuit between one of said selector switches and the associated solenoid for completing an electrical circuit therebetween when the associated column contains at least one article.

5. An electrical control circuit as set forth in claim 1 further including an auxiliary energizing source for said vend relay, said source including a capacitive element connected to be charged upon actuation of said coin switch and discharged through said vend relay upon energization of an actuator.

6. The circuit defined in claim 5 including a diode rectifier interposed between said coin responsive switch and said vend relay, said source including a storage capacitor connected in shunt with said vend relay and in series with said diode for providing a source of auxiliary voltage to maintain said vend relay energized a predetermined time after said coin responsive momentary switch returns to its initial position and after said energizing circuit to said energized actuator is interrupted.

7. An electrical control circuit for a coin controlled vending machine incorporating a plurality of dispensing columns each adapted to receive articles to be selectively dispensed, one at a time, comprising: a coin responsive switch; a vend relay responsive to actuation of said coin responsive switch; a plurality of selector switches adapted to be momentarily actuated from a first to a second position, each said selector switch being associated with one of said columns; a plurality of dispensing solenoids each being associated with one of said columns and adapted to be energized in response to actuation of one of said selector switches and said relay; and a plurality of solenoid actuated switching means each responsive to energization of an individual one of said dispensing solenoids, said solenoid switching means being arranged for mutually exclusively completing a first series circuit including said selector

switches for maintaining said vend relay energized when said selector switches are in the first position and a second circuit including one of said plurality of dispensing solenoids for energization thereof and dispensing of a single article upon actuation of a selector switch to its second position.

8. The circuit defined in claim 7 further including timing means for maintaining said vend relay energized a predetermined time upon actuation of a selector switch to its second position and interruption of said first series circuit, said means including a capacitor connected to be charged upon actuation of said coin responsive switch and maintained charged through said first series circuit to thereby provide auxiliary relay energizing potential for said vend relay.

9. The circuit defined in claim 8 including a diode rectifier interposed between said coin responsive switch and said vend relay, said capacitor being connected in shunt with said vend relay and in series with said diode for providing a source of auxiliary voltage to maintain said vend relay coil energized a predetermined time after said first series circuit is interrupted.

10. The circuit defined in claim 8 including a plurality of first article sensing switches, each being associated with an individual one of said columns and responsive to the contents therein; said first article sensing switches each being electrically interposed between an associated selector switch and an associated solenoid for completing an electrical circuit therebetween when said associated column contains at least one article.

11. The circuit defined in claim 10 including a plurality of second article sensing switches each being associated with an individual one of said columns ganged to the first article sensing switch associated with that stack and responsive to the contents therein; said plurality of second article sensing switches being electrically interposed in said second circuit for rendering the operating circuit for a particular column open when the articles in that column are depleted; and a plurality of indicator lamps each associated with an individual one of said second article sensing switches and responsive thereto to provide a sold out indication.

12. An electrical operating control circuit for a coin controlled vending machine incorporating a plurality of individual dispensing columns each containing articles adapted to be selectively dispensed one at a time, comprising: a coin responsive momentary operable switch; a vend relay including an energizing coil and first and second switch means; said vend relay being responsive to actuation of said coin responsive switch to cause said first and second switch means to be actuated from a first to a second position, a plurality of selector switches, each selector switch being associated with an individual one of said columns; means for completing a first series circuit including said first switch means when said selector switches are all in a first position and means for completing a second circuit upon activation of a selector switch to a second position; a plurality of dispensing solenoids, means for connecting each solenoid for energization through said vend relay second switch means and an individual one of said selector switches in its second position, a plurality of control switches each being responsive to energization of an individual one of said dispensing solenoids and having a first and a second position, said control switches in the first position being connected in said first series circuit when said associated dispensing solenoids are unenergized and in said second position in said second circuit

when said associated dispensing solenoid is energized; a vend relay holding circuit for maintaining said relay in an energized condition, said vend relay holding circuit including said first series circuit such that said holding circuit is broken upon actuation of a selector switch to its second position and energization of the associated solenoid.

13. The circuit as set forth in claim 12 wherein said second circuit comprises a holding circuit for each dispensing solenoid, each said holding circuit being established upon actuation of a selector switch to its second position and energization of the associated solenoid.

14. The circuit defined in claim 12 including: a diode rectifier interposed between said coin responsive switch and said vend relay energizing coil; and a storage capacitor connected in shunt with said relay coil and in series with said diode for providing a source of auxiliary voltage to maintain said relay coil energized a predetermined time after said responsive momentary on switch opens and after said relay holding circuit is broken.

15. The circuit defined in claim 13, including: a plurality of first article sensing switches each associated with an individual one of said columns and responsive to the contents therein, each said first article sensing switches being interposed between an associated selector switch and an associated dispensing solenoid for completing an electrical circuit therebetween so long as said associated column contains at least one article.

16. The circuit defined in claim 15 including: a plurality of second article sensing switches each associated with an individual one of said stacks and responsive to the contents therein; said plurality of second article sensing switches being electrically interposed in series in said vend relay holding circuit and in said dispensing solenoid holding circuits for preventing energization of said circuits when all of said columns are empty.

17. An electrical control circuit for a coin controlled vending machine incorporating a plurality of dispensing columns each adapted to receive articles to be selectively dispensed, one at a time, comprising: a coin responsive switch; a relay adapted to be energized in response to actuation of said coin responsive switch; a plurality of selector switches adapted to be actuated between a first to a second position, each said selector switch being associated with one of said columns; a plurality of dispensing solenoids each adapted to be energized in response to actuation of one of said selector switches and energization of said relay; and a plurality of solenoid actuated switching means each responsive to energization of an individual one of said dispensing solenoids, said solenoid switching means being arranged in a first position for mutually exclusively completing a first enabling circuit including each of said switching means in the first position and said selector switches in the first position for maintaining said vend relay energized and in a second position for completing an energizing circuit to one of said plurality of dispensing solenoids for energization thereof and thereby effect dispensing of a single article upon actuation of a selector switch to its second position.

18. The circuit defined in claim 17 further including timing means for maintaining said vend relay energized a predetermined time upon momentary actuation of a selector switch to its second position and energization of the associated dispensing solenoid thereby interrupting said enabling circuit.

19. The circuit as defined in claim 18 wherein said timing means includes a capacitor connected to be charged upon actuation of said coin responsive switch through said enabling circuit for providing relay energizing potential to said vend relay when said enabling circuit is interrupted.

20. The circuit defined in claim 18 including a plurality of first article sensing switches, each being associated with an individual one of said columns and responsive to the contents therein; said first article sensing switches each being electrically interposed in the second energizing circuit between an associated selector switch and an associated solenoid for completing the electrical circuit therebetween when said associated column contains at least one article and said associated selector switch is actuated to its second position.

21. The circuit defined in claim 20 including a plurality of article sensing switches each being associated with an individual one of said columns ganged to the first article sensing switch associated with that column and responsive to the contents therein; said plurality of second article sensing switches being electrically interposed in said enabling circuit and a plurality of indicator lamps each associated with an individual one of said second article sensing switches and responsive thereto to provide a sold out indication for a corresponding column.

22. An electrical operating control circuit for a coin controlled vending machine incorporating a plurality of individual dispensing columns each containing articles adapted to be selectively dispensed one at a time, comprising: a coin responsive switch momentarily operable between a first and a second position; a vend relay adapted to be energized upon actuation of said coin responsive switch from its first to its second positions, said vend relay including an energizing coil and first and second switch means; said vend relay being responsive to actuation of said coin responsive switch to cause said first and second switch means to be actuated from a first to a second position, a plurality of selector switches, each selector switch being associated with an individual one of said columns; means for completing a series holding circuit for said energizing coil including said first switch means when said selector switches are all in a first position and means for completing an auxiliary energizing circuit to said coil upon activation of a selector switch to a second position; a plurality of dispensing solenoids, means for connecting each solenoid for energization through said vend relay second switch means and an individual one of said selector switches in its second position, a plurality of control switches each being responsive to energization of an individual one of said dispensing solenoids, said control switches having a first position and being connected in said first position in said first series circuit when said associated dispensing solenoids are unenergized and a second position and being connected in said second position for completing a separate holding circuit to each associated dispensing solenoid for maintaining said solenoid energized, said auxiliary energizing circuit serving to maintain said coil energized for a fixed period when said vend relay series holding circuit is interrupted upon actuation of a selector switch to its second position and energization of the associated solenoid.

23. The circuit as set forth in claim 23 wherein said energizing circuit includes a capacitive element adapted to be charged upon actuation of said coin switch.

11

24. The circuit defined in claim 23 including: a diode rectifier interposed between said coin responsive switch and said vend relay energizing coil; said capacitive element being connected in shunt with said relay coil and in series with said diode for providing a source

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of auxiliary voltage to maintain said relay coil energized a predetermined time after said coin responsive momentary on switch opens and after said relay holding circuit is broken.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. 3,924,719
DATED December 9, 1975
INVENTOR(S) Raymond D. Bowman

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

Claim 14, line 19, column 9, after "said",
insert --coin--.

Claim 23, line 65, column 10, change "23"
to --22--.

Signed and Sealed this
twenty-third Day of March 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks