

July 2, 1968

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ELECTRICAL INTERLOCK CIRCUIT FOR MULTIPLE
CHOICE VENDING MACHINES

3,390,754

Filed Jan. 27, 1967

3 Sheets-Sheet 1

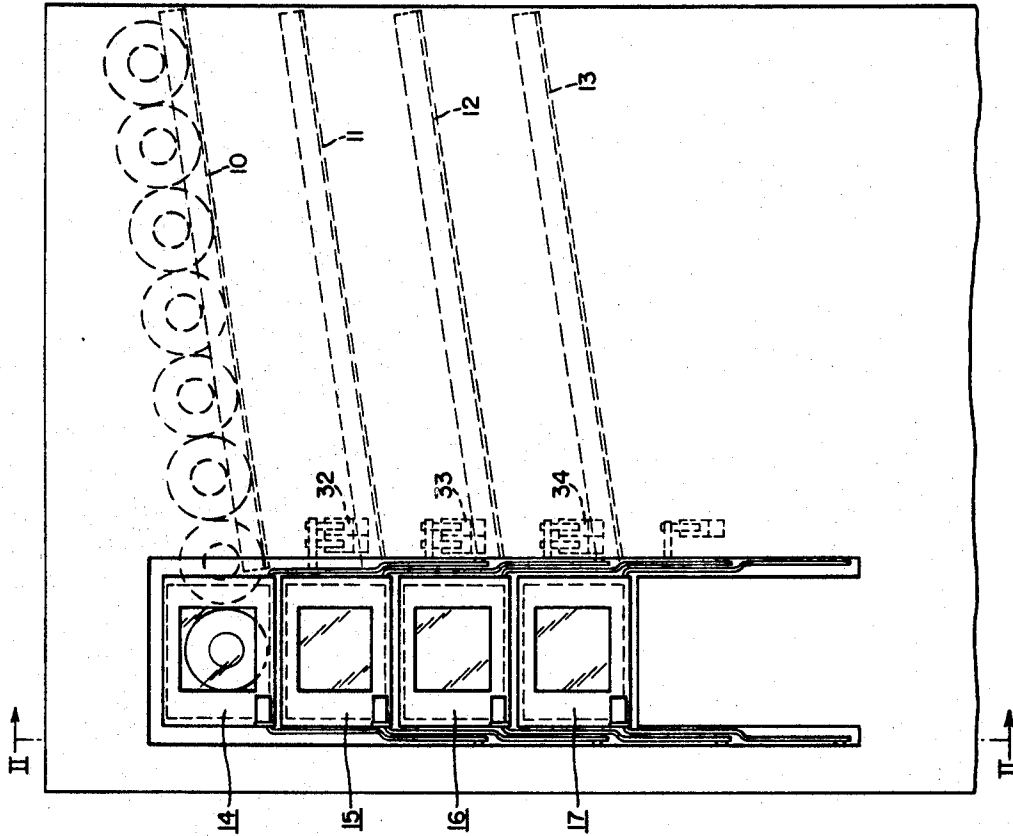


FIG. 1.

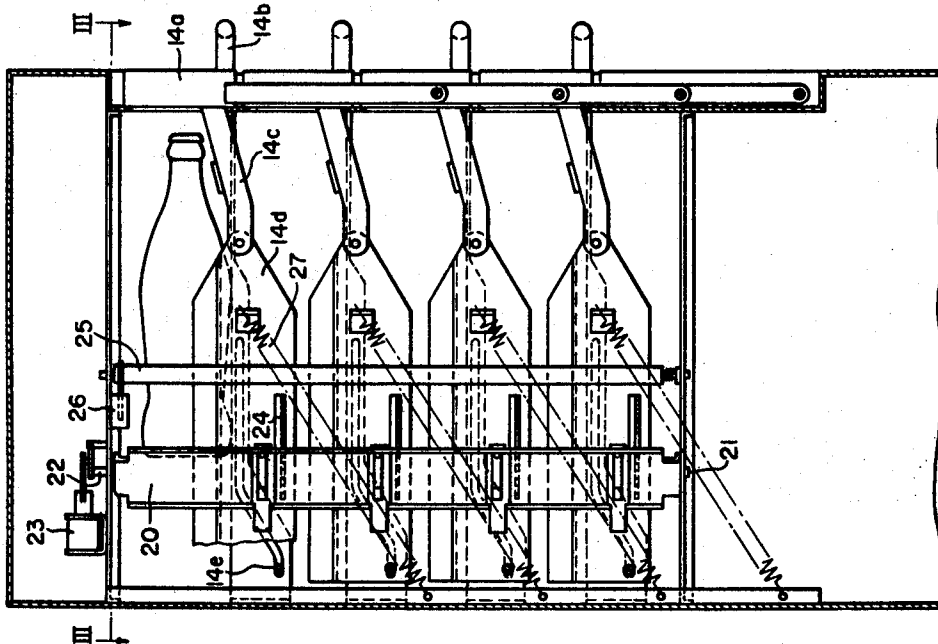


FIG. 2.

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3 Sheets-Sheet 3

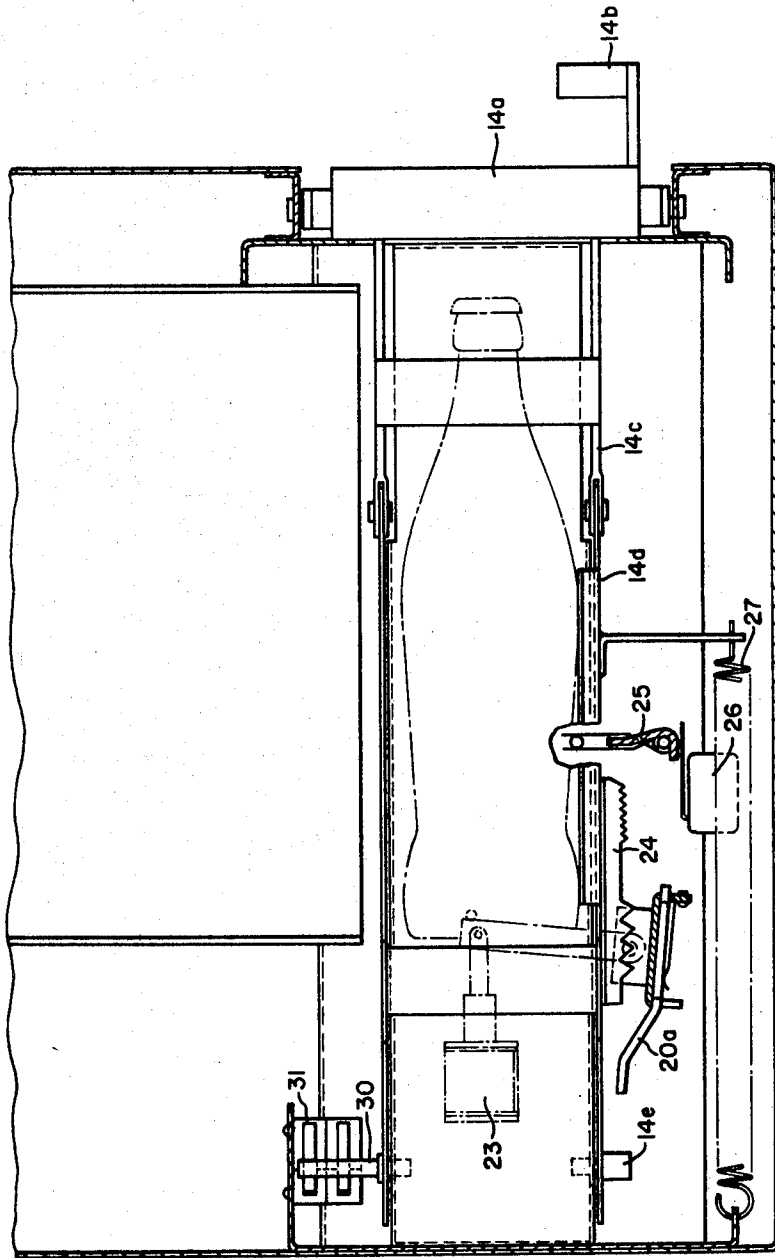


FIG. 3.

WITNESSES

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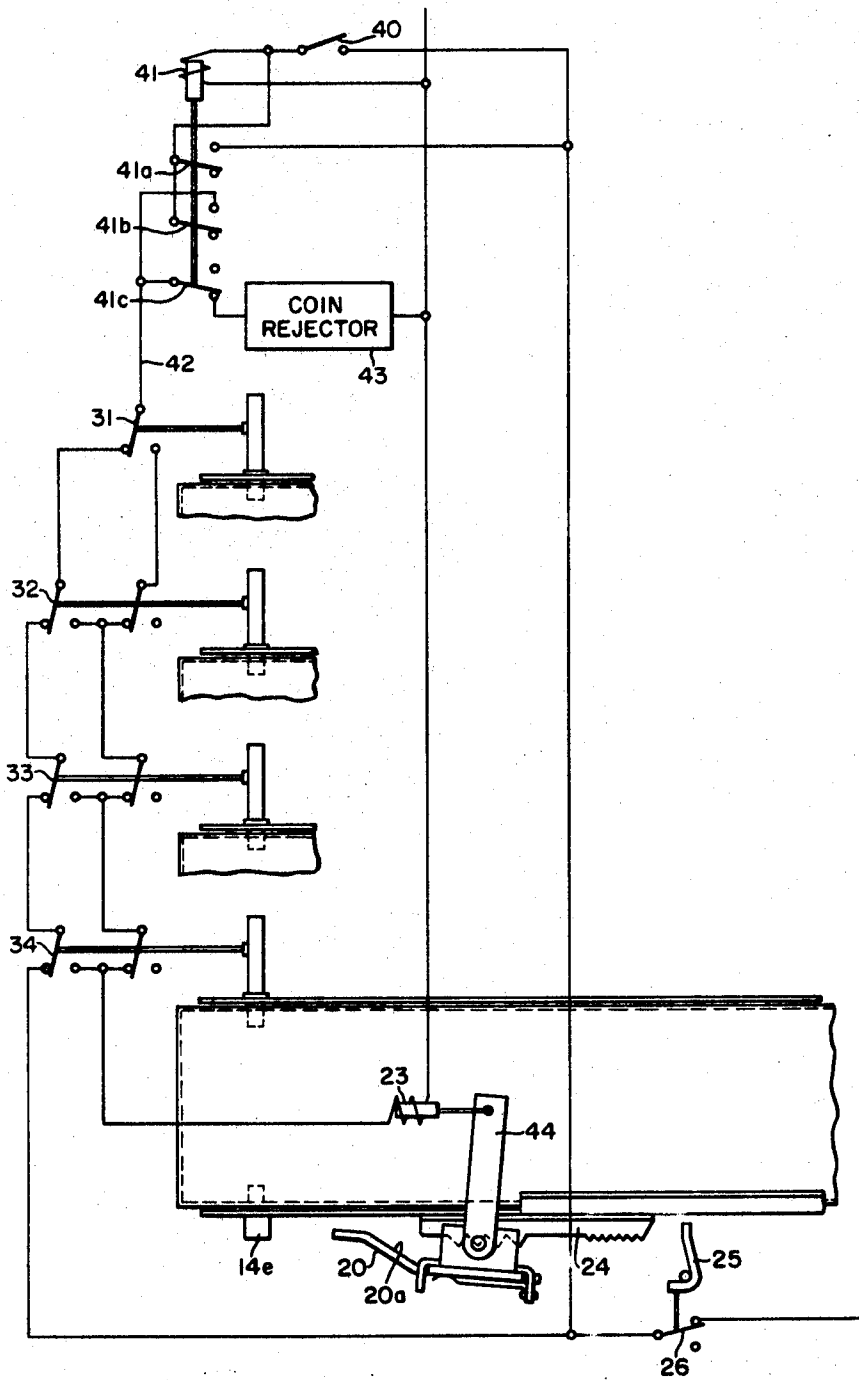


FIG. 4.

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ELECTRICAL INTERLOCK CIRCUIT FOR MULTIPLE CHOICE VENDING MACHINES

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4 Claims. (Cl. 194—10)

ABSTRACT OF THE DISCLOSURE

A multiple choice vending machine is provided with a plurality of vending gates each movable from a closed position to a vending position. An electrically controlled common locking member normally prevents movement of any gate beyond a preliminary movement position and individual switches for each gate are connected in an interlock circuit to operate the locking member to an unlocked position by the movement of only one of the gates to the preliminary movement position thus permitting continued movement of the one gate to the vending position. If more than one gate is moved to the preliminary position, the interlock circuit prevents movement of the locking member to the unlocked position and any further movement of all gates.

Cross references to related applications

As far as is known at this time, the invention is not related to any copending patent applications.

Background of the invention

Multiple choice vending machines having interlock mechanisms and circuits to prevent the vending of more than one article for each coin deposit are generally well known and are classifiable in class 194, Check Controlled Apparatus, subclass 10, Check Operated Switch, Article Delivery, and in class 221, Article Dispensing, subclasses 151 and 152, With Means for Blocking or Disabling Ejector or Releaser by Engagement with Slot, Notch or Protuberance, and Electrical Control.

Of the prior art known to applicants, the U.S. patent to Wilsey, 2,359,183, issued Sept. 26, 1944, is considered to be pertinent. As disclosed by that patent, a multiple choice, multiple gate, vending machine having a plurality of selection buttons is provided with an electrical interlock circuit such that when more than one selection button is operated, none of the vending gates are unlocked, but when only a single selection button is operated, the associated electrical locking member for a particular gate is unlocked. The arrangement of the patent requires individual electrically controlled locking members for each selection gate to be controlled by the series connected interlock pushbutton switches. The present invention is considerably simplified in that it requires only a single or common electrically controlled unlocking member for all of the individual selection gates, and the gate member for each desired selection is associated with an interlock circuit such that the gate member can be unlocked only when a single such gate member is sought to be operated by the customer.

Summary

The vending machine interlock control circuit of the invention is for use in a multiple gate, multiple choice machine, such as a so-called slant shelf machine in which cans or bottles are supported on superposed inclined shelves to roll by gravity to superposed delivery stations arranged in vertical alignment with each other. Each delivery station has a vending gate that is normally locked in a closed position. Upon deposit of requisite coinage,

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all gates are conditioned to be unlocked, but the interlock mechanism of the invention prevents the opening of more than one gate. Although the electrical interlock control circuit of the invention is particularly intended for use with the slant shelf type of vending machine, it should be understood that the invention may be used with any type of multiple choice vending machines having a plurality of vending gates, only one of which should be unlocked for each vending operation.

According to this invention a common locking member having a normal locking position which is movable by an electrical solenoid to an unlocking position is provided for all of the plural number of vending gates. Each gate is movable by the customer for the normal locked position to a preliminary movement position. The gate may not be moved further to the vending position unless the unlocking member has been moved to the unlocked position. Each gate mechanism is provided with a respective interlock switch whose contacts are wired in a series interlock circuit that is completed when one and only one gate is moved to the preliminary position. A coin collect circuit is responsive to the deposit of requisite coinage to energize the series interlock circuit, which when only one gate is moved to the preliminary position is completed and connected to operate the solenoid of the unlocking member, thus permitting a single gate to be moved to vending position. After the single gate is moved past the preliminary position and is unlocked to be moved to the vending position, a full travel ratchet switch is engaged and operated to break the circuit to the unlocking member solenoid and move the locking member back to the locking position, thus assuring that no other gate may be moved past the preliminary position to the vending position.

Brief description of the drawings

Further features and advantages of the invention will be apparent with reference to the following specification and drawings, in which:

FIGURE 1 is a fragmentary front elevational view of a slant shelf vending machine for which the interlock control circuit of the invention may be used.

FIG. 2 is a side elevational end view partly in section taken on the line II—II of FIG. 1.

FIG. 3 is a fragmentary plan view taken on the line III—III of FIG. 2 and

FIG. 4 is a schematic of the control circuit of the invention with certain of the associated operational parts of the vending machine included for clarity of understanding.

Description of the preferred embodiment

Referring to FIGS. 1-3 of the drawings, a brief description of a slant shelf vending machine having a plurality of vending gates to be controlled by the electrical interlock control circuit and mechanical arrangement of the invention will be described. As seen by the front view of FIG. 1, the vending machine includes a plurality of superposed slant shelves such as the shelves 10-13. Articles such as bottles or cans are stored on each of the slant shelves and will roll by gravity to vending positions behind the plurality of superposed vertically aligned vending gates, such as the gates 14-17. Each vending gate such as the gate 14 includes an access door, such as the door 14a, provided with an operating handle 14b which the customer may operate to pivot the access door 14a downwardly. The link 14c is connected to an article ejecting tray 14d on which the bottle to be vended is resting. As the access door 14a is pivoted downward the link 14c pulls the tray 14d forwardly of the vending cabinet to move the bottle to be vended into a position to be grasped by the customer and removed. The extreme for-

ward position of the vending tray 14d may be termed the vending position for the gate mechanism while the normal position of the gate as shown by the drawings may be termed the locked position of the gate.

A rear side edge portion of the vending tray 14d is provided with a pin or protuberance 14e which moves forwardly toward the front of the machine as the vending tray 14d is moved from the normal locked position towards the vending position. A preliminary movement of the vending tray 14d is permitted while the machine is locked until the protuberance 14e engages the common locking member or bar 20 which, as shown by the solid lines of FIG. 3 of the drawings, is in a normal locking position limiting the movement of all vending gate trays such as the tray 14d to the preliminary movement position.

As shown by FIG. 2 of the drawings, the common locking bar 20 extends vertically along the side of the vending machine and is pivotal about the pivot points 21 and 22 to be moved by the electrical solenoid 23 to an unlocking position which will permit the passage of the protuberance such as the locking protuberance 14e for the vending tray 14d beyond the preliminary movement position to the vending position. After any one of the vending trays, such as the vending tray 14d, is moved beyond the preliminary position towards the vending position, assuming that the unlocking bar member 20 has been pivoted to the unlocking position as shown by the dotted lines in FIG. 3, the ratchet teeth 24 carried by each tray, such as the tray 14d, will engage the pivotal ratchet switch operating member 25 to operate the ratchet switch 26 to be later referred to in more detail. The engagement of the ratchet switch operating member 25 with the teeth of the ratchet 24 provides a full travel action that will prevent the return movement of the vending tray 14d until it has been moved all the way out to the front of the machine to the vending position at which point the ratchet teeth are disengaged from the ratchet switch operating member 25 which thereupon can pivot in the opposite direction to allow the return of the vending tray in response to the urging of the return spring 27.

On the opposite side of each vending tray such as the vending tray 14d at a rearward position thereof is an operating pin such as the pin 30 adapted to engage respective interlock switches such as the interlock switch 31. Each vending tray for each of the gates 14-17 is provided with a respective interlock switch operating pin such as the pin 30. Additional ones of the respective interlock switches are shown at 32-34 of FIG. 1 of the drawings and are also shown on the wiring diagram of FIG. 4. The arrangement of the interlock switches and the operating pins for each of the gate mechanisms as connected to the associated vending tray such as the tray 14d is such that during the movement of any one of the vending gates 14-17 to the preliminary movement position, the associated switch such as the switch 31 will be operated.

Referring now to FIG. 4 of the drawings, a more detailed description of the electrical interlock control circuit of the invention will be made. A coin switch 40 of conventional arrangement is momentarily closed upon receipt of the requisite coinage to energize the vend relay 41 which is then locked up by the holding circuit provided through its operated contacts 41a. The operation of the vend relay 41 further prepares through its operated contacts 41b an energizing circuit through line 42 to the first of the electric interlock control switches 31. The operation of vending relay contact 41c opens the circuit to the coin rejector 43 so that while the machine is conditioned to vend, any further coin deposited will be returned to the customer as is conventional. Each of the interlock control switches 31, 32, 33 and 34 is wired in a series chain such that the operation of one and only one of the vending gates to the preliminary vending position will move the contact arm of the electrical interlock

switch associated therewith to a position to complete a series circuit for energizing the unlocking solenoid 23. The energization of the unlocking solenoid 23 will pivot the arm 44 to the left of the drawing as shown in FIG. 4 and will move the common unlocking member or bar 20 to an unlocking position shown by the dotted lines of FIG. 3 permitting the passage of the pin or protuberance such as the pin 14e beyond the preliminary movement position to the vending position.

If more than one vending gate is moved to the preliminary position, more than one of the interlock switches 31-34 will be moved to an operated position and it will be seen that a series circuit is not thereby established to energize the unlocking solenoid 23 since the series circuit commenced by one of the interlocking switches such as the switch 32, for example, would be broken by the operation of the series circuit sought to be established by a subsequent interlocking switch such as the switch 33 or any other of the interlocking switches in the series chain. Thus the movement of only one vending gate towards the preliminary movement position will be effective to energize the unlocking coil 23 and move the unlocking member 20 to the unlocked position. Assuming that the unlocking member 20 has been moved to the unlocking position upon the energization of the unlocking coil 23, a single vending gate tray, such as the tray 14d, which has been moved to the preliminary movement position may be moved further towards the vending position and as soon as such tray moves beyond the preliminary movement position towards the vending position, the full travel ratchet switch operating member 25 will be engaged by the ratchet teeth 24 to move the full travel ratchet switch 26 from the normally closed position shown to an open position. The movement of the full travel ratchet switch 26 to the open position upon movement of one of the vending trays to the vending position opens the holding circuit for the vend relay 41 which thereupon deenergizes to thereby break the series circuit to the unlocking solenoid 23 which is accordingly deenergized and the locking bar 20 moves back to the locking position as shown by the solid line of the drawing. The aforementioned deenergization of the vend relay 41 also recloses contacts 41c to reenergize the coin rejector 43 in a manner to permit acceptance of additional coins for a subsequent vending operation. However, the full travel ratchet 24 will prevent the return of the vending drawer such as the vending tray 14d until it has been moved all the way to the vending position making the article available to the customer for delivery. Should the customer not remove the bottle immediately the vending tray can still not return, since the article is at that time extending through the opening at the front of the machine and is pressed upwardly against the upper side edge of the vending opening, thus jamming the tray in the open position. As soon as the customer removes the article, the tray will return in response to the return spring such as the spring 27 to the normal locked position and in so doing the pin or protuberance 14e rides under the inclined surface of pivotal member 20a of the locking member 20 to momentarily pivot such member 20a of the locking member 20 sufficiently to permit passage of the locking protuberance 14e with the vending tray 14d back to the normal locked position. At the same time, the equivalents of member 20a for the other trays remain in the locked position.

It should be readily apparent to those skilled in the art that the electrical interlock control circuit of the invention providing for a preliminary movement of any one of the vending gates to a vending position and upon deposit of coinage permitting the continued movement of only one of the gates to a vending position is a unique concept that may be applied to various types of vending machines of the multiple choice type and is not limited to its application to a slant shelf type of vending machine such as has been described in some detail herein. Various

modifications may be made within the spirit of the invention.

What is claimed is:

1. An interlock control circuit for a multiple choice vending machine comprising, a plurality of normally closed vending gates each adapted to be moved to a vending position to provide access to selected merchandise, a coin switch, a common electrically controlled locking member having a normal position permitting movement of any of said gates to a preliminary movement position but preventing the operation of any of said gates beyond the preliminary movement position to the vending position, a respective interlock switch associated with a respective one of each of said gates, each of said interlock switches having a normal position and being movable to an operated position by a movement of the associated gate to the preliminary movement position from the normally closed position towards the vending position, and a series interlock circuit inter-controlled locking member in an arrangement to complete a circuit to operate said locking member from the normal locking position to an unlocking position enabling the movement of a single gate beyond the preliminary movement position to the vending position when said coin switch is closed upon receipt of requisite coinage, the series circuit including each of said interlock switches being so arranged that the movement of more than one of said gates from the normally closed position to the preliminary movement position is effective to open the series circuit to the locking member and prevent the operation of the locking member to an unlocking position thus preventing the complete movement of any of said gates beyond the preliminary movement position to a vending position when more than one gate is moved to the preliminary movement position.

2. The invention of claim 1 in which there is provided a full travel ratchet mechanism switch having a normal first contact position and operable to a second contact position by the movement of any of said gates from their closed positions beyond the preliminary movement

position towards the vending position, said ratchet switch contacts being connected in the series interlock circuit to said locking member to open the circuit to the locking member and cause said locking member to be returned to the normal locking position for locking the remaining gates in their closed position while an operated one of said gates is movable beyond its preliminary movement position towards a vending position.

3. The invention of claim 1 in which there is provided a vend relay connected to be energized upon closure of said coin switch, contacts of said vend relay being connected in a holding circuit to maintain the vend relay energized after deposit of requisite coinage, said holding circuit including interrupt contacts to break the holding circuit and deenergize the vend relay upon movement of any one of the vending gates beyond the preliminary movement position, said vend relay having contacts to be closed when the vend relay is energized to connect an energizing power circuit to said series interlock circuit.

4. The invention of claim 2 in which there is provided a vend relay connected to be energized upon closure of said coin switch, contacts of said vend relay being connected in a holding circuit to maintain the vend relay energized after deposit of requisite coinage, said holding circuit including interrupt contacts of said ratchet switch to break the holding circuit and deenergize the vend relay upon movement of any one of the vending gates beyond the preliminary movement position, said vend relay having contacts to be closed when the vend relay is energized to connect an energizing power circuit to said series interlock circuit.

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345,189 4/1960 Switzerland.

WALTER SOBIN, *Primary Examiner.*