Oct. 11, 1966 G. M. GUARD 3,278,079

VENDING MACHINE INTERLOCK

Filed May 6, 1965 2 Sheets-Sheet 1

FIG.1.

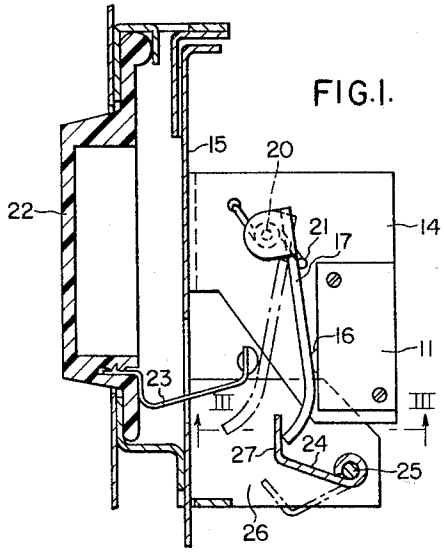


FIG.2.

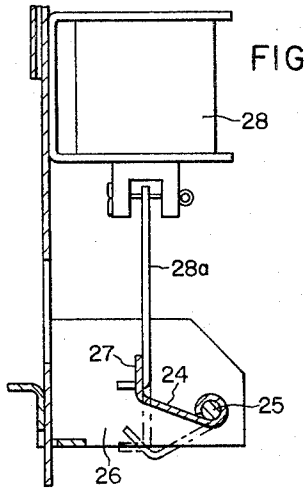


FIG.3.

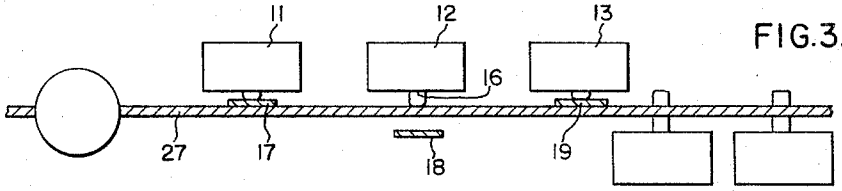
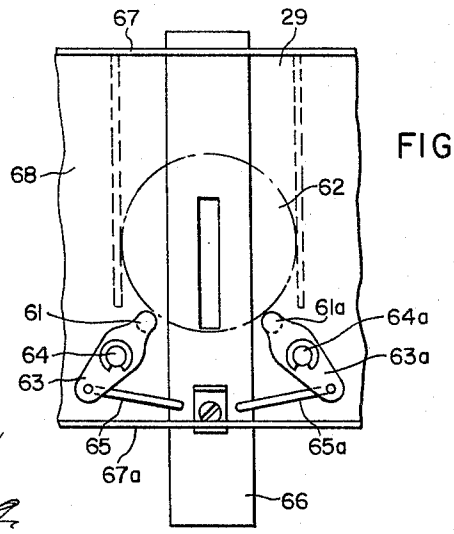


FIG.6.



WITNESSES

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FIG.4.

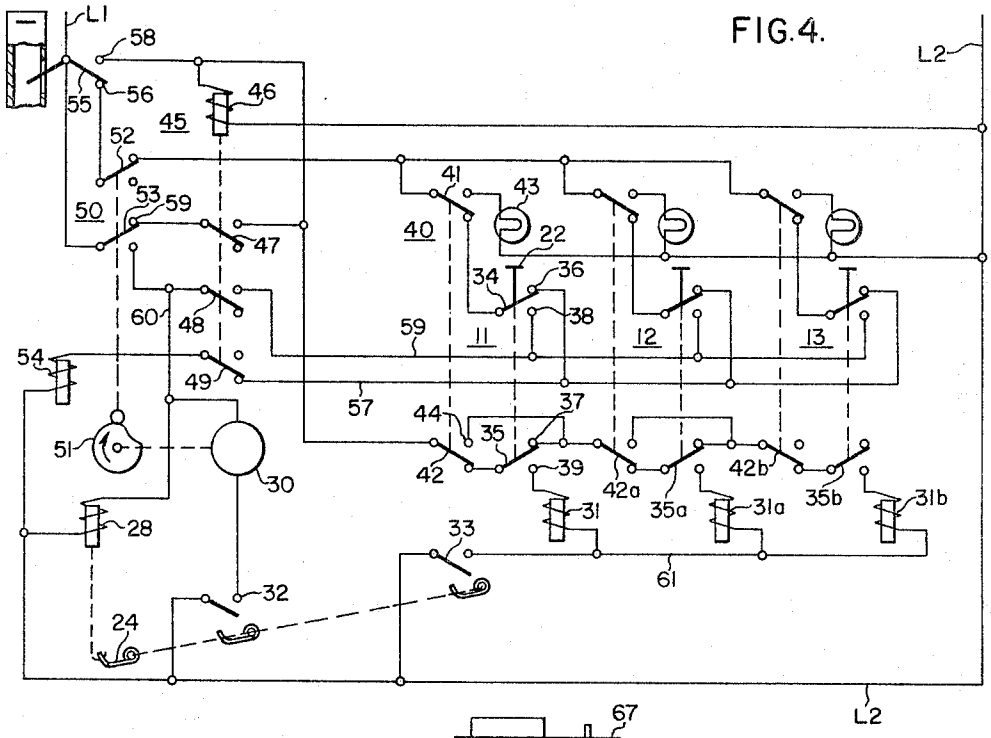
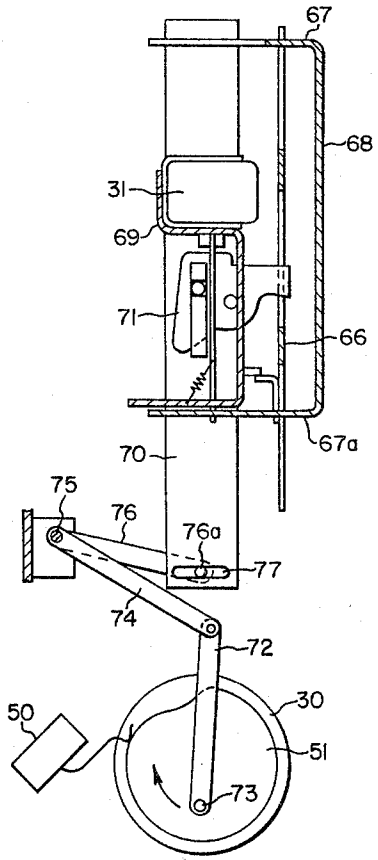


FIG.5.



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3,278,079

VENDING MACHINE INTERLOCK

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2 Claims. (Cl. 221—125)

This invention relates to a control for a vending machine adapted to vend a selected one of a number of different flavors or selections.

The object of the invention is to provide a control having interlock features to prevent the dispensing of more than one flavor or selection.

In accordance with the present invention, there are provided a plurality of selector switches for the different flavors of beverages for example, and there is provided a locking member to lock the actuated selector switch or switches in actuated position and to lock the unactuated switches in unactuated position. The locking member is actuated solely by a solenoid which is adapted to be energized by any selector switch upon energization thereof. One or more lock-in switches are provided to render the selector switches ineffective, other than to cause operation of the lock-in solenoid and the locking member, until the locking member is in locking position, so that momentary actuation of a selector switch cannot start or affect operation of the vending machine. It is only after the switches are locked in position to assure that there can be no further actuation of any selector switch, that operation of the machine can begin. The selector switches are connected in a series relation such that the actuated switch first in series opens the circuit to the selector switches later in series. If two selector switches are actuated simultaneously, both are locked in such position but the one later in the series circuit is open circuited and, therefore, ineffective.

FIGURE 1 is a vertical cross section of the switch assembly, showing one of the selector switches in actuated position and the locking member in locking position, and also showing the unactuated positions of the switch operating lever and the locking member (see attached sketch) in dotted lines;

FIG. 2 is a vertical cross section showing the lock-in solenoid and the locking member in the locking position, and also showing their unactuated position in dotted lines;

FIG. 3 is a diagrammatic partial bottom plan view of the switch assembly, as seen on the line III—III of FIG. 1;

FIG. 4 is a wiring diagram of the electrical circuitry;

FIG. 5 is a vertical section showing the common operating mechanism and one of the coupling devices; and

FIG. 6 is an elevational view showing one of the dispensing devices.

Referring to FIGS. 1, 2 and 3, the control includes selector switches 11, 12 and 13 mounted on suitable brackets 14 attached to a supporting frame structure 15. Each switch has a spring-returned push button such as the push button 16 for actuating the switch. The switches 11, 12 and 13 are provided with switch operating levers 17, 18 and 19, respectively, which levers may be mounted on a pintle 20 supported by the brackets 14, and biased, as by a tension spring such as the spring 21, to the off or unactuated position shown by the dotted lines of FIG. 1.

Each selector switch is provided with a manually actuated push buttton such as the push button 22, which may be hingedly mounted at its upper end on the frame structure 15 and which is provided with a spring arm 23 adapted to engage and move the associated switch operating lever such as the lever 17. The arm 23 is flexible and will yield in the event that the associated lever is moved against the locking member when it is in the locking position, thereby preventing damage to any parts.

A locking member in the form of an elongated angle member 24 is pivotally mounted on a shaft 25 suported at its ends on brackets 26 of the supporting frame structure 15. The locking member 24 has a flange 27 which, when the locking member is raised to the locking position, shown by solid lines of FIGS. 1 and 2 locks each switch operating lever in the position that it occupies at the moment that the locking member is raised to locking position whether the operating member 17 be in the dotted or solid line position. FIG. 3 shows, for example, the levers 17 and 19 and the switches 11 and 13 locked in the switch actuated position, as also shown in full lines in FIGS. 1 and 2, and the lever 18 and the switch 12 in the unactuated position, as shown in dotted lines in FIGS. 1 and 2. The locking member 24 is normally in its lower, non-locking position shown dotted in FIG. 1 in which it permits free movement of the switch operating levers. It is raised to its locking position by a solenoid 28, having an armature connected thereto by link 28*a* shown by solid lines in FIG. 2, when energized and dotted lines when deenergized.

The control of the present invention may be used, for example, as shown in FIGS. 5 and 6, with a bottle vending machine, having three side-by-side compartments such as the compartment 29, controlled by the selector switches 11, 12 and 13 respectively, for bottles of beverages of three different flavors. This machine includes a common operating mechanism motivated by an electric motor 30, and a dispensing mechanism for each compartment having a solenoid 31 for coupling the same to the common operating mechanism. Further details of the vending machine itself, which are necessary to an understanding of the present invention, will be considered later.

The control (see FIG. 4) includes one or more lock-in switches to render the selector switches ineffective to start or affect operation of the machine until the locking member is in locking position to prevent any further actuation or manipulation of the switches. The illustrated control comprises two such lock-in switches, a switch 32 to open the circuit of the motor 30 for the common operating mechanism, and a switch 33 to open a common circuit portion of the several selection circuits that determine the particular flavor or selection to be dispensed. These switches are closed by the locking member 24 when it is raised sufficiently to lock the switch operating levers against movement.

Referring again to FIG. 4, each of the selector switches 11, 12 and 13 is a two-pole switch, each comprising switch arms such as shown at 34 and 35 that engage upper contacts 36 and 37 respectively in the normal or unactuated position of the switch, and which engage lower contacts 38 and 39 respectively when the switch is actuated by means of the push button 22.

There is also associated with each bottle compartment, an empty switch 40 comprising switch arms 41 and 42 which are normally in the lower positions shown in FIG. 4 when the compartment is not empty, the arm 41 engaging a contact connected to the arm 34 of the associated selector switch, and the arm 42 engaging a contact connected to the arm 35 of the associated selector switch. When the compartment is empty, the switch arms are in their upper positions, the arm 41 engaging a contact connected to an empty signal light 43 and the arm 42 engaging a contact 44 connected to the switch arm 42 of the next serially connected empty switch, thereby by-passing and rendering ineffective the associated selector switch 11.

The control includes a relay 45 which may be referred to as a vend relay or delivery relay. The relay comprises a coil 46 and switches 47, 48 and 49. The control further includes a two-pole carrier switch 50 operated by a cam 51 that is rotated once in each dispensing opera-

tion by the motor **30** through a speed reduction unit built into the motor. The carrier switch **50** comprises switch arms **52** and **53**. Among other functions, the vend relay **45** initiates and maintains operation of the motor during the first portion of a dispensing operation, and the carrier switch **50** energizes the motor through the remaining portion of a dispensing operation and then terminates such operation.

A conventional coin reject coil **54** is normally energized in the rest or stand-by condition of the control and serves to render the coil receiving mechanism operative to receive coins. The circuit for this coil extends from line conductor **L1** through an arm **55** and a contact **56** of a coin operated switch, carrier switch arm **52**, the empty switch arm **41** and the lower contact thereof in the normal or non-empty position, the switch arm **34** and the upper contact **36** of the selector switch associated therewith, a conductor **57**, vend relay switch **49** and coin reject coil **54** to line conductor **L2**. The remaining portion of the control will be described and explained in the following description of the operation of the control.

Upon depositing the required coin or coins in the coin mechanism, the coin switch arm **55** momentarily engages a contact **58** to complete a circuit for the vend relay coil **46**, which thereupon raises its three switches, the switch **47** thereof completing a holding circuit for the coil **46** which extends through carrier switch arm **53**, the upper contact **59** and the switch **47** to the upper terminal of the coil **46**. The switch **47** also extends a circuit from line conductor **L1** through the several empty switch arms **42**, **42***a*, **42***b*, selector switch arms **35**, **35***a* and **35***b* in series as shown in FIG. 4. The opening of the switch **49** deenergizes the coin reject coil **54**, thereby preventing any further acceptance of coins. The closing of the vend relay switch **48** prepares the circuit for the solenoid **28** and the common drive motor **30** for action by any one of the selector switches **11**, **12** or **13**.

If, now, any one of the selector switches, for example, switch **11**, is actuated, a circuit from line conductor **L1** is completed by the arm **34** of the actuated selector switch through its contact **38**, a conductor **59**, vend relay switch **48** to a conductor **60**, which is connected to one terminal of the solenoid **28** and one terminal of the motor **30**. The circuit for the motor **30** is still open at the lock-in switch **32**, but when the circuit is completed through the solenoid **28** to the line conductor **L2**, the locking member **24** mechanically closes the lock-in switch **32**, thereby completing the circuit through the motor **30** to line conductor **L2**.

The actuation of the selector switch, again switch **11** for example, also actuates its switch arm **35** to extend a circuit to its selection circuit which, in the illustrated embodiment, is the associated solenoid **31**. This circuit extends from line conductor **L1** through carrier switch arm **53**, its upper contact **59**, vend relay switch **47**, the arm **42** and the lower contact of the empty switch, the arm **35** and the contact **39** of the selector switch, the solenoid **31** and a conductor **61** connected to the lower terminals of the several solenoids **31**, **31***a*, **31***b*. Initially, this circuit is maintained open by the lock-in switch **33** between the conductor **61** and the line conductor **L2**.

If the actuation of the selector switch **11** is effected by a rapid light tapping of the switch of insufficient duration to energize the solenoid **28** long enough to bring the locking member **24** to locking position, the lock-in switches **32** and **33** are not closed and no operation of the vending machine results and the switch operating levers are not locked in position. However, if the selector switch **11** is actuated in a normal manner, sufficiently to raise the locking member to locking position, and this is still a very short period of time, the locking member locks the several switch operating levers in their presently assumed positions to assure that there will be no further change in position of any selector switch, and then it closes the lock-in switches **32** and **33** to complete circuits to the common operating motor **30** and the selected solenoid **31** to begin a vending operation.

After a predetermined portion of the vending operation is completed, the cam **51** permits the switch arms of the carrier switch **50** to drop. The switch arm **53** opens the holding circuit to the vend relay coil **46** and to the selection solenoid **31**, which are thereupon deenergized. At the same time the switch arm **53** extends a circuit from line conductor **L1** to the conductor **60**, to maintain energization of the lock-in solenoid **28** and of the motor **30** for the remainder of the operation, at the end of which the cam **51** again raises the carrier switch arms **52** and **53**. The latter opens the circuit to the motor **30** and the solenoid **28** to terminate the operation.

The solenoid **28** allows the locking member **24** to drop, causing the lock-in switches **32** and **33** to reopen and releasing the operating levers of the selector switches so that they may be returned by their springs to the unactuated positions. The raising of the carrier switch arm **52** recloses the circuit to the coin reject coil **54** to set the coin mechanism for acceptance of coins for another operation.

The control is now in rest or stand-by condition, ready for another dispensing operation as has been described.

In the event that one of the compartments becomes empty, for example, the first compartment associated with the selector switch **11**, the empty switch arms **41** and **42** are actuated, in a manner well-known in the art, to their upper positions, thereby opening the circuits to the two switch arms **34** and **35** of the associated selector switch. The arm **41** closes the circuit to the empty signal light **43** to indicate that this particular compartment is empty. The switch arm **42** opens the circuit to the switch arm **35** to prevent energization of the associated solenoid **31**, and it engages instead its upper contact **44** to extend the selector switch circuit to the empty switch arm **42***a* of the next compartment. Thus, if one of the empty switches later in series **42***a* or **42***b* is in the lower position, its selector switch is adapted, upon actuation, to energize the associated solenoid **31***a* or **31***b*.

In the event that a customer actuates two switches simultaneously, for example, the switches **11** and **13**, both of these switches will be locked in the actuated position, as shown in FIG. 3. However, not more than one solenoid **31** or **31***a* will be energized so that no more than one article will be dispensed. Assuming that the first compartment is not empty, the movement of the switch arm **35** of the selector switch **11** opens the circuit to the selector switches later in series, i.e. the switches **12** and **13**. Thus, the solenoids **31***a* and **31***b* for the second and third compartments are not energized. On the other hand, if the first compartment is empty, then its empty switch arm **42** opens the circuit to the switch arm **35** of the switch **11** and instead engages the contact **44** to extend the circuit to the empty switch arm **42***a* of the second compartment and through the non-operated arm **35***a* and to the arm **35***b* of the selector switch **13**. Thus, the customer is assured of obtaining one and only one article. Should both the first and third compartments be empty, then nothing will happen upon simultaneously actuating switches **11** and **13** as both switches will be rendered ineffective by their associated empty switches **42** and **42***b*.

Referring now to the bottle vending machine shown in FIGS. 5 and 6, this is of the type covered in Patent 3,118,567 of M. W. Newberry. The dispensing mechanism for each compartment comprises two rods **61**, **61***a* extending lengthwise of the bottles **62** and mounted on the upper ends of levers **63**, **63***a* which are pivoted intermediate their ends as indicated at **64**, **64***a*. The lower ends of the levers are connected by links **65**, **65***a* to an operating plate **66**, which is vertically slidable through slots in the horizontal flanges **67**, **67***a* of a channel member **68**. As will be apparent from FIG. 6, as the plate **66**

is moved upwardly, the lower ends of the levers **63**, **63***a* are drawn toward each other by the links **65**, **65***a* thereby rotating the levers to move the rods **61**, **61***a* away from each other to permit the bottle **62** to drop therebetween.

The common operating mechanism for raising and lowering the operating plate **66** of the selected compartment is shown in FIG. 5 and comprises a horizontally extending channel member **69** mounted on plates **70** which are vertically slidable through other slots in the mentioned flanges **67**, **67***a*. There is pivoted on the channel member **69** for the dispensing mechanism of each compartment, a pivoted lever or lifter **71**, which is adapted to be actuated by the associated solenoid **31** also mounted on the channel member **69**, into connective engagement with the associated plate **66**.

The plates **70** are raised and lowered once in each dispensing operation by a mechanism that includes a link **71** pivoted at its lower end to a crank pin **73** mounted on the cam plate **51** and at its upper end to a lever **74** pivoted at **75** and fixed to lever **76**. The lever **76** has a pin **76***a* extending through horizontal slots **77** formed in the lower ends of the plates **70**.

I claim as my invention:

1. In a machine for vending any one of a plurality of selections, the combination of

a plurality of electrically energized mechanisms for selectively dispensing any one of a pluraiity of selections,

a plurality of manually actuated selector switches movable from a non-operated position to an operated position for controlling said mechanisms respectively,

a solenoid,

a locking member actuated by said solenoid, when energized from a non-locking position to a locking position in which it locks each selector switch in either the non-operated or operated position,

means responsive to movement of any one of said selector switches to the operated position for energizing said solenoid,

switch means controlled by said locking member and operable to open the circuit to said electrically energized mechanisms when the locking member is not in its locking position, and

a circuit extending in series through said selector switches, each selector switch being adapted when moved to the operated position to open the circuit to the selector switches later in series and to connect said circuit to its associated mechanism.

2. A vending machine as set forth in claim **1** wherein said switch means controlled by the locking member is also operable to open said circuit extending in series through the selector switches until said locking member is in its locking position.

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SAMUEL F. COLEMAN, *Primary Examiner.*

Dedication

3,278,079.—*Gilbert M. Guard*, Chicopee Falls, Mass. VENDING MACHINE INTERLOCK. Patent dated Oct. 11, 1966. Dedication filed Oct. 7, 1974, by the assignee, *The Vendo Company*.

Hereby dedicates to the Public the entire remaining term of said patent. [*Official Gazette May 6, 1975.*]