July 6, 1965 S. A. MAXWELL 3,193,072

COIN OPERATED VENDING MACHINES

Filed July 2, 1962 3 Sheets-Sheet 1

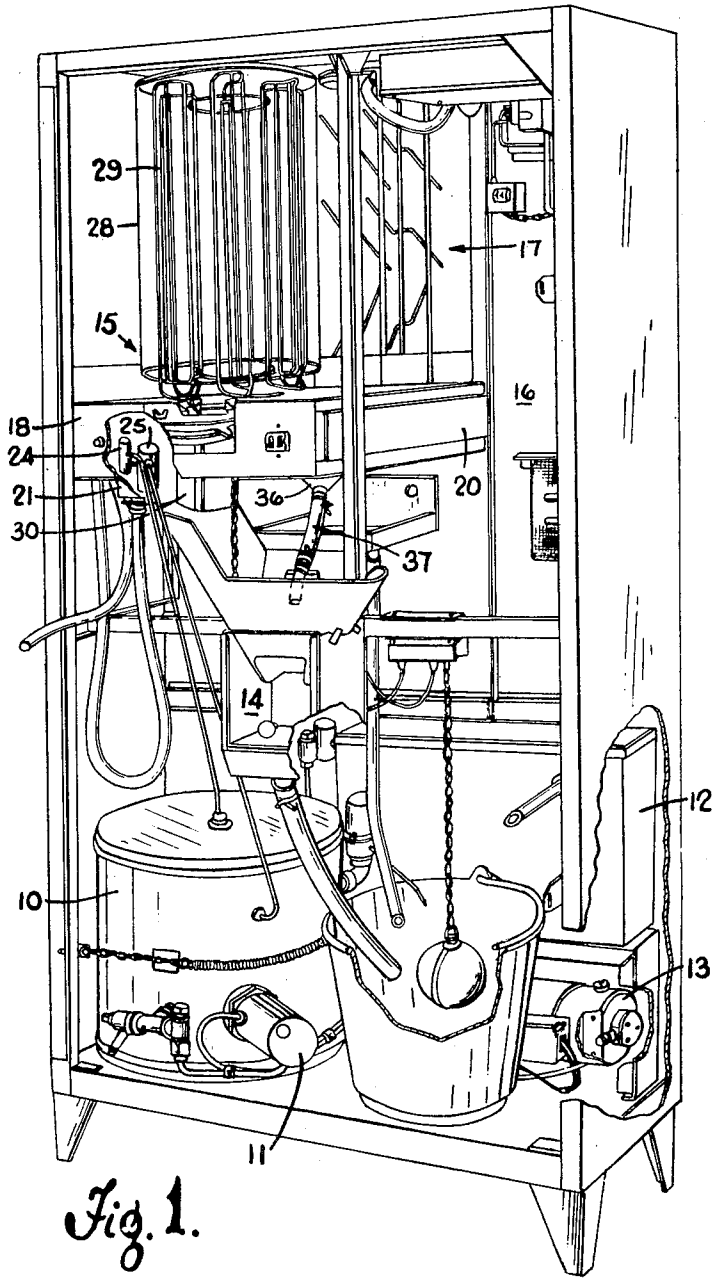


Fig. 1.

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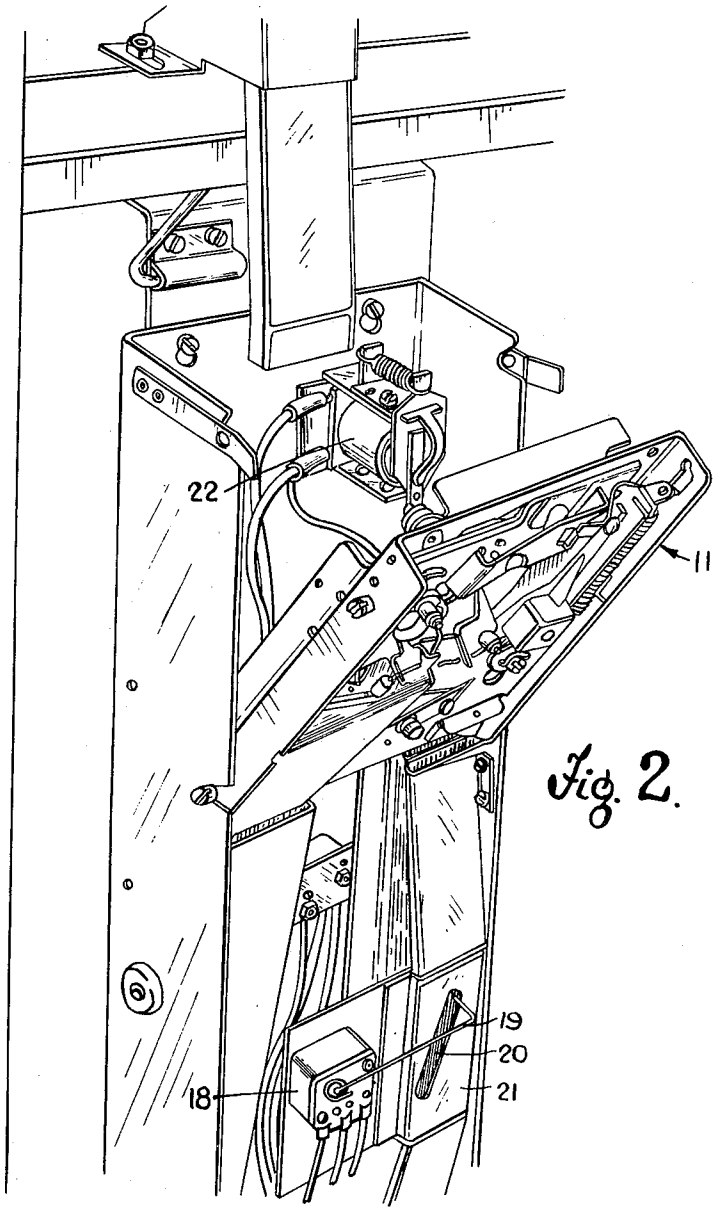


Fig. 2.

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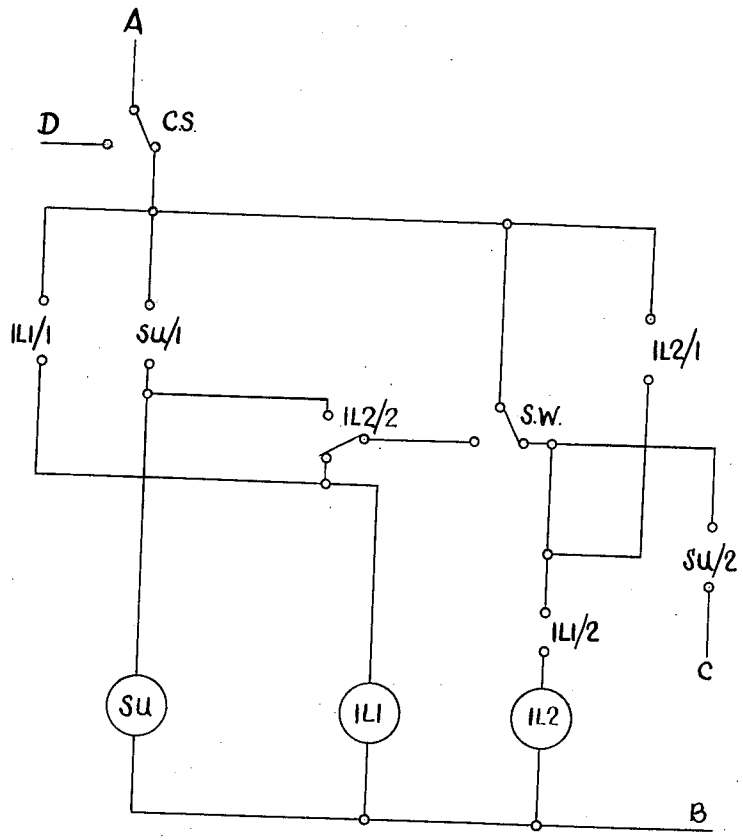


Fig. 3.

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COIN OPERATED VENDING MACHINES

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7 Claims. (Cl. 194—13)

This invention relates to coin operated vending machines of the kind (hereinafter referred to as the kind specified) in which the machine includes a "setting up" relay adapted to be closed in response to the insertion of the correct coinage into the machine, the machine being operated, after the "setting up" delay has been closed, by the actuation of an operating knob, handle or the like by the user, the machine returning automatically to its initial inoperative state at the end of its operating cycle.

For example such a machine may be used for the dispensing of beverages and may be provided with a plurality of operating knobs whereby the user may select different beverages or different variations of the same beverage, e.g. tea with sugar, tea without sugar, and so on.

The object of the present invention is to provide an improved construction of coin operated vending machine of the kind specified which will operate only in response to the insertion of two or more coins.

The invention will now be more particularly described with reference to the accompanying drawings in which:

FIGURE 1 is a perspective view of a coffee and chocolate dispensing machine with the front removed,

FIGURE 2 is a perspective view of the coin selector mechanism and the associated parts and,

FIGURE 3 is a diagram of a setting up circuit designed for operation by two coins.

As shown in FIGURE 1 the machine is of generally rectangular form and is adapted to stand on a floor or like supporting surface with its major axis vertical. The front of the machine (not shown) is hinged along the left-hand side so that the machine can readily be opened for maintenance or for replenishment of the various commodity magazines 10 and the front of the machine has secured to the inside face thereof coin selector mechanism 11 which may be of any well known type and which may, for example, carry out a thickness, diameter and magnetic tests on the coin passing therethrough.

The main portion of the machine will include a hot water boiler 12, a pump 13 for maintaining the water used in the machine at a constant pressure, irrespective of the pressure that may be obtaining in the main water supply, a cup dispensing unit 14 and a "dry" commodity dispensing unit 9. In accordance with normal practice the dry commodity dispensing unit 9 includes four magazines 10 adapted to contain the different commodities, i.e. coffee, chocolate, sugar and powdered milk each magazine being adapted to be rotated when required to deliver a predetermined quantity of the commodity to a mixing vessel 15 to which hot water from the boiler is also admitted, the mixed beverage then passing to the dispensing station 16 to which a cup will have already been delivered by the cup dispensing unit 14.

In accordance with normal practice the machine includes a "setting up" relay which is normally deenergized but which will be energized as a result of the insertion of the correct coinage into the machine, this relay being mounted in the main body of the machine and, when energized, providing an electrical circuit to the motors, relays and like electrical apparatus associated with the dry commodity dipensing unit 9 with the cup dispensing unit 14 and with the hot water control valve 17 so that upon actuation of the appropriate selector button by the user the machine will commence its dispensing cycle.

The selector buttons (not shown) are mounted on the front of the machine and will be labeled in accordance with the variations which can be obtained from the machine and there may be five such buttons one of which will be labeled "black coffee," the second "white coffee," the third "black coffee with sugar," the fourth "white coffee with sugar" and the fifth "chocolate."

In order that such a machine will operate only in response to the insertion of two or more coins we provide, in the electrical circuit to the setting up relay, a pair of relays corresponding to each coin over and above one. Thus in the case of a machine which is to operate in response to the insertion of two coins a single pair of relays would be provided whereas in the case of machines adapted to operate only in response to the insertion of three coins two pairs of relays, in series, would be provided.

The operation of the relays in order to set up the machine for two-coin operation will now be described with reference to FIGURE 3 in which the setting up relay is designated SU and the other two normally de-energized relays are designated IL1 and IL2. The setting up relay has two pairs of contacts SU/1 and SU/2 which are normally open as are two pairs of contacts IL/1 and IL/2 on the relay IL1. Relay IL2 carries a pair of normally open contacts IL2/1 and a change-over switch IL2/2 in the position shown when the relay is de-energized.

Also included is a coin switch SW which is normally in the position shown. The coin switch is numbered 18 in FIGURE 2 and comprises a spring loaded trigger 19 projecting into an arcuate slot 20 in a chute 21 through which coins pass after acceptance by the coin selector mechanism 11. The weight of a coin momentarily depresses the trigger 19 which is pivotally mounted on the switch casing at the centre of curvature of the slot 20 and which therefore moves along the slot towards its lower end to allow the coin to fall past the trigger which is thereupon returned by the spring loading to its original position.

The circuit also includes a cam operated changeover switch CS normally in the position shown. Wires A and B are connected across the output terminals of the supply transformer and wire C is connected through the selector buttons to the electrical apparatus controlling the dispensing operation. The circuit is shown in the condition obtaining after completion of one dispensing cycle and before the insertion of any further coins, and it will be observed that there is no connection to any of the relays and contacts which are therefore open.

When the first coin is inserted the trigger 19 is depressed and the coin switch SW operates to make a connection therethrough and through switch IL2/2 to energize the relay IL1 and close the associated contacts IL1/1 and IL1/2. When the coin switch returns to its original position connection is made through the coin switch SW and through contacts IL1/2 (which have remained closed because of the continued energization of the relay through contacts IL1/1) and relay IL2 is energized with consequent closure of contact IL2/1 and operation of change-over switch IL2/2. Upon insertion of the second coin the coin switch SW operates to make connection through the change-over switch IL2/2, the position of which is maintained as a result of the continued energization of relay IL2 through its own contacts IL2/1, to energize the setting up relay SU. This closes contacts SU/1 to maintain energization of the relay when the coin switch returns to its former position and also closes contacts SU/2 to establish a connection through the coins switch between wires A and C.

The setting up relay also has another pair of contacts which are normally closed to energize a blocking relay when the setting up relay is de-energized. This blocking relay 22 is associated with the coin selector mechanism 11 (which in FIGURE 2 is hinged forwardly to show the

blocking relay) and when the setting up relay operates the blocking relay is de-energized to release the armature and present an obstruction in the coin path of the selector mechanism, thus preventing the acceptance of a further coin when two have already been accepted and have operated the setting up relay.

The user of the machine will now press the selector button of his choice which will initiate the train of operations for the dispensing and delivery of the selected beverage. At the end of the operating cycle the cam operated switch CS will operate to de-energize the setting up relay so that the machine switches itself off, the blocking relay 22 being energized again to remove the obstruction in the coin path of the selector mechanism so that the insertion of the next two coins will again set up the machine. If desired the setting up relay may itself constitute the blocking relay, the relay being so arranged and constructed that movement of its own armature obstructs the coin path.

Wire D leading from the cam-operated switch CS is connected to a counter so that when switch CS is operated to switch off the machine a pulse of current passes through the counter, the counter enabling the number of times the machine has operated to be readily ascertained.

In the case of a machine which is to operate in response to three coins the arrangement would be that the first coin would close the first pair of relays, the second coin would close the second pair of relays and the final coin would actuate the setting up relay.

In order that the machine may readily be adapted for operating with different numbers of coins the electrical circuit to the setting up relay may include a pair of multi-pin electrical connectors so that if it is desired to change the machine over from operating on say a single coin to operating on a pair of coins the electrical wiring between the two multi-pin connectors can be withdrawn and replaced by a further length of wiring which will have incorporated therein the pair of relays which are to be operated by the first coin.

What I claim then is:

1. A coin operated vending machine which is operated in response to the insertion of a pair of identical coins into the machine and which includes:
- (a) a setting-up relay which, when energized, provides an electrical circuit for a vending cycle of operations,
- (b) a single coin switch in the electrical circuit of the setting-up relay,
- (c) first and second non-series normally open relays in the electrical circuit of the setting-up relay,
- (d) means whereby said first normally open relay is closed upon the insertion of a first coin into the machine and the consequent operation of the coin switch,
- (e) means whereby said second normally open relay is closed subsequent to the closure of said first normally open relay upon the return of the coin switch to its original position, and
- (f) means whereby said setting-up relay is energized upon the insertion of a second coin into the machine and a second operation of the coin switch.

2. A vending machine operable upon the insertion of a plurality of coins into the machine which includes:
- (a) a setting-up relay which, when energized, provides an electrical circuit for a vending cycle of operations,
- (b) a spring loaded coin switch in the electrical circuit of the setting-up relay, and
- (c) a number of pairs of normally open relays in the electrical circuit of the machine, and in which
- (d) one relay only is operated upon each movement of the coin switch, and
- (e) the normally open relays are closed sequentially to provide an electrical circuit for energization of the setting-up relay upon insertion of the final coin.

3. A hot-beverage dispensing machine which is operated upon the acceptance of a pair of coins by the machine and which includes:
- (a) means for delivering dry beverage ingredients to a mixing vessel,
- (b) means for delivering hot water to said mixing vessel,
- (c) means for conveying the resultant beverage to a dispensing station,
- (d) means for delivering cups to the dispensing station,
- (e) a coin selection mechanism,
- (f) a setting-up relay which, when energized, prepares the machine for a vending cycle of operations,
- (g) a spring-loaded coin switch in the electrical circuit of the setting-up relay which is operated by each inserted coin after the coin has passed through the tests of the coin selection mechanism,
- (h) a first normally open relay in the electrical circuit of the setting-up relay,
- (i) means whereby said first normally open relay is closed upon movement of said coin switch as a result of the insertion of a first coin into the machine,
- (j) a second normally open relay in the electrical circuit of the setting-up relay,
- (k) means whereby said second normally open relay is closed upon return movement of said coin switch,
- (l) means whereby said setting-up relay is energized upon the insertion of a second coin into the machine,
- (m) means connecting said setting-up relay with said delivering and conveying means for transmitting electrical energy thereto, and
- (n) means for resetting said setting-up relay and said pair of normally open relays upon a dispensing operation of the machine.

4. A hot-beverage dispensing machine which is operated upon the acceptance of a pair of coins by the machine and which includes:
- (a) means for delivering dry beverage ingredients to a mixing vessel,
- (b) means for delivering hot water to said mixing vessel,
- (c) means for conveying the resultant beverage to a dispensing station,
- (d) means for delivering cups to the dispensing station,
- (e) a coin selection mechanism,
- (f) a setting-up relay which, when energized, prepares the machine for a vending cycle of operations,
- (g) a spring-loaded coin switch in the electrical circuit of the setting-up relay which is operated by each inserted coin after the coin has passed through the tests of the coin selection mechanism,
- (h) first and second normally open relays in the electrical circuit of the setting-up relay,
- (i) means whereby said first normally open relay is closed upon movement of the said coin switch as a result of the insertion of a first coin into the machine,
- (j) a holding contact controlled by said first normally open relay and in series therewith,
- (k) a contact controlled by said first normally open relay and in series with the second normally open relay,
- (l) means whereby said second normally open relay is closed upon return movement of said coin switch,
- (m) a holding contact controlled by said second normally open relay and in series therewith,
- (n) a change-over switch operated upon closure of said second normally open relay whereby a second operation of said coin switch upon the insertion of a second coin into the machine effects energization of said setting up relay, and
- (o) a holding contact controlled by said setting-up relay and in series therewith, and

(p) electrical means connecting said setting-up relay with said delivery and conveying means for transmitting electrical energy thereto.

5. A coin-operated vending machine which includes:

(a) a setting-up relay which, when energized, provides an electrical circuit for a vending cycle of operations upon the actuation of a selector mechanism,

(b) a spring loaded coin switch in the electrical circuit of the setting-up relay which is movable between normal and operated positions,

(c) first and second normally open relays in the electrical circuit of the setting-up relay,

(d) a holding contact controlled by each of said normally open relays and in series therewith,

(e) a contact controlled by said first normally open relay and in series with said second normally open relay, and

(f) a change-over switch controlled by said second normally open relay and movable between first and second positions, the change-over switch when in its first postion establishing an electrical connection between the coin switch when this is in its operated position and the first normally open relay and the change-over switch, when in its second position, establishing an electrical connection between the coin switch when this is in its operated position and the setting-up relay,

(g) the insertion of a first coin into the machine moving the coin switch from its normal to its operated position so as to close the first normally open relay and its associated contacts,

(h) the spring-loaded return of the coin switch to its original position closing the second normally open relay and its holding contact so that the change-over switch moves from its first to its second position, and

(i) the insertion of a second coin into the machine again moving the coin switch from its normal to its operated position and energizing the setting-up relay.

6. An electrical circuit for a coin-operated vending machine with includes:

(a) first, second and third normally open relays,

(b) switch means for closing said first normally open relay when a first coin is inserted into the machine,

(c) said switch means closing said second normally open relay subsequent to and dependent upon the closure of said first normally open relay to condition said third relay prior to the insertion of a second coin, and

(b) a holding contact controlled by said third relay, and the insertion of a second coin into the machine.

7. The structure of claim 6 which includes:

(a) a coin switch in said electrical circuit,

(b) a holding contact controlled by said third relay, and

(c) means for returning said relays to their normally open inoperative position during a vending cycle of operations of the machine.

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