

May 3, 1966

S. A. MAXWELL

3,249,196

COIN FREED VENDING MACHINES

Filed Sept. 24, 1964

7 Sheets-Sheet 1

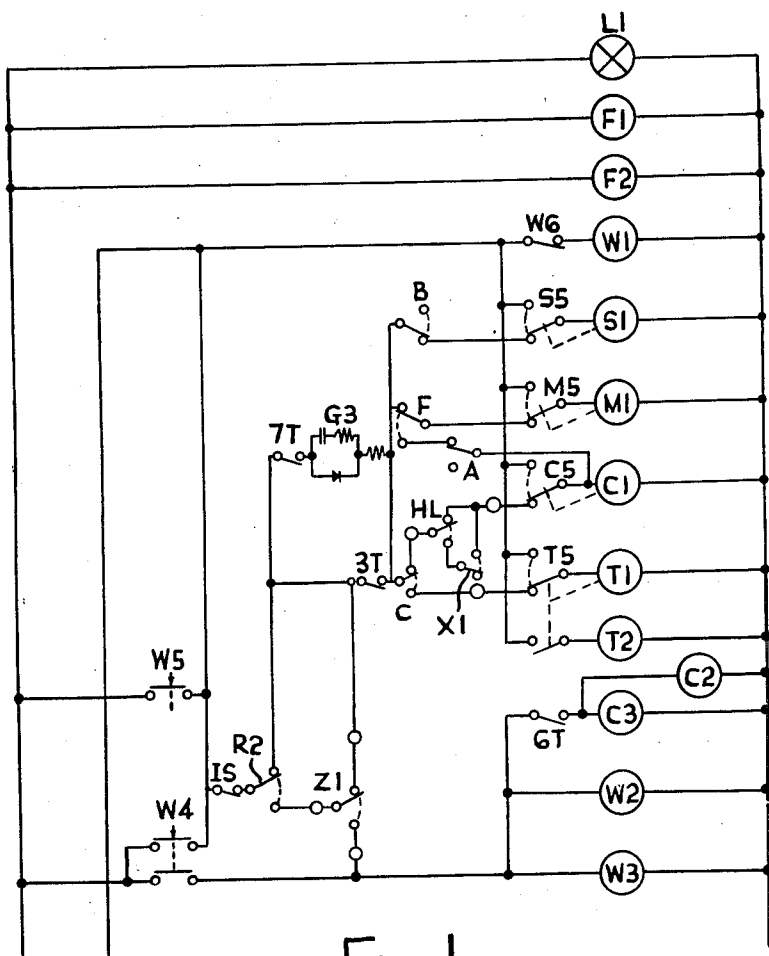


Fig. 1.

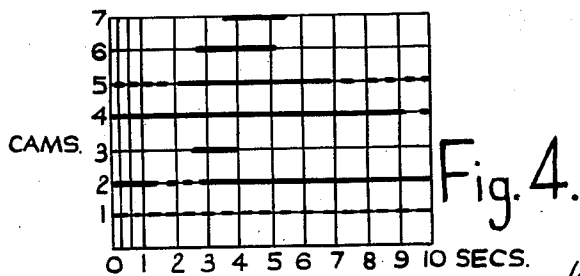


Fig. 4.

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May 3, 1966

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7 Sheets-Sheet 2

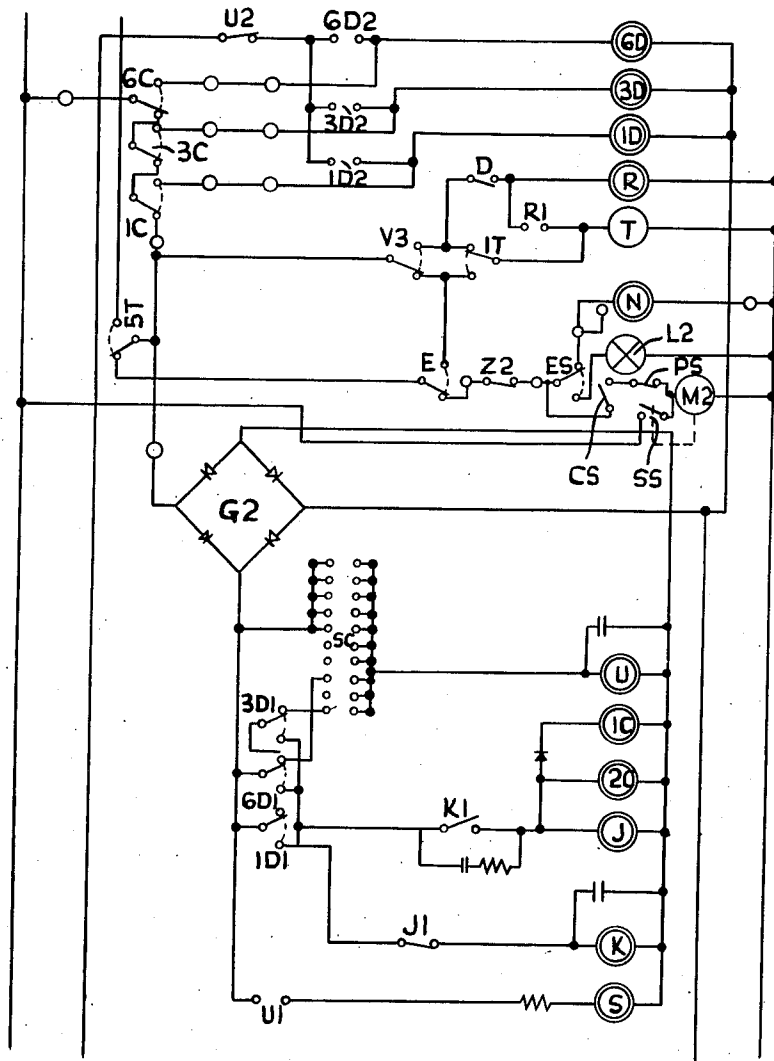


Fig. 2.

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7 Sheets-Sheet 3

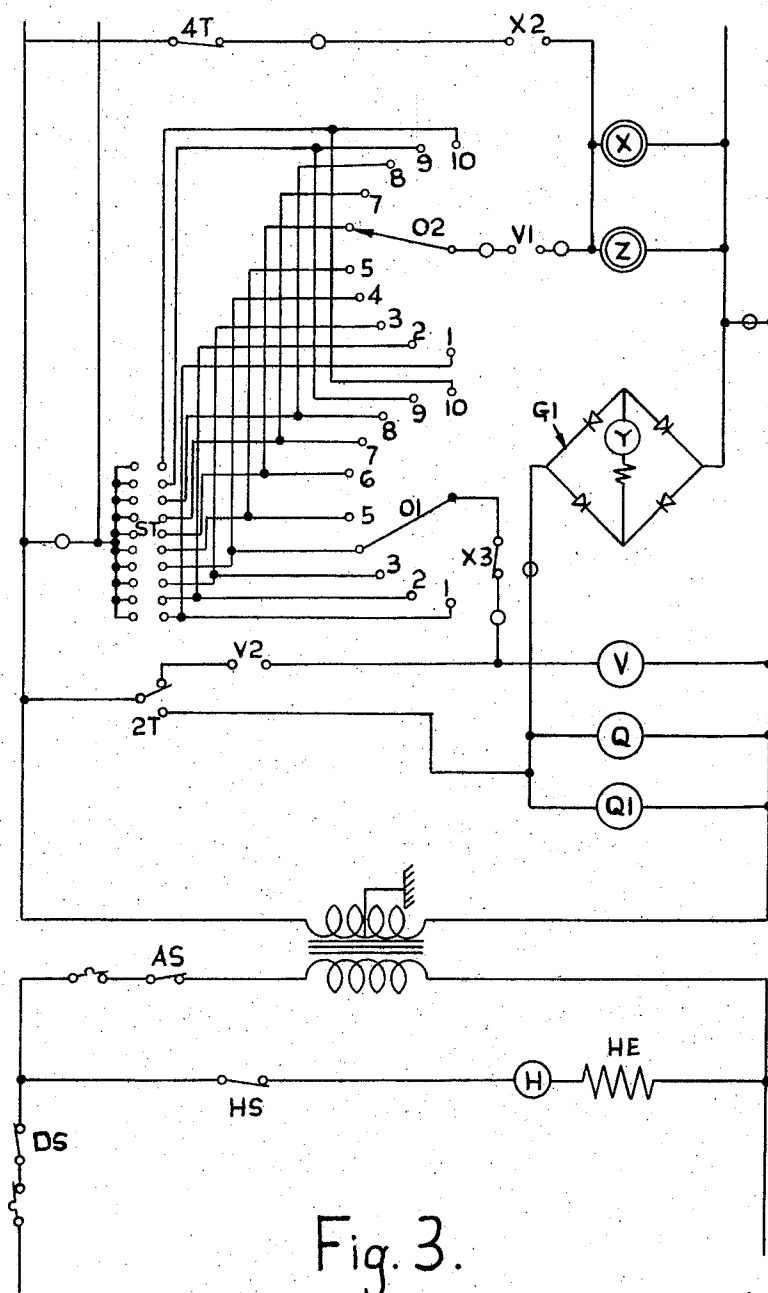


Fig. 3.

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7 Sheets-Sheet 4

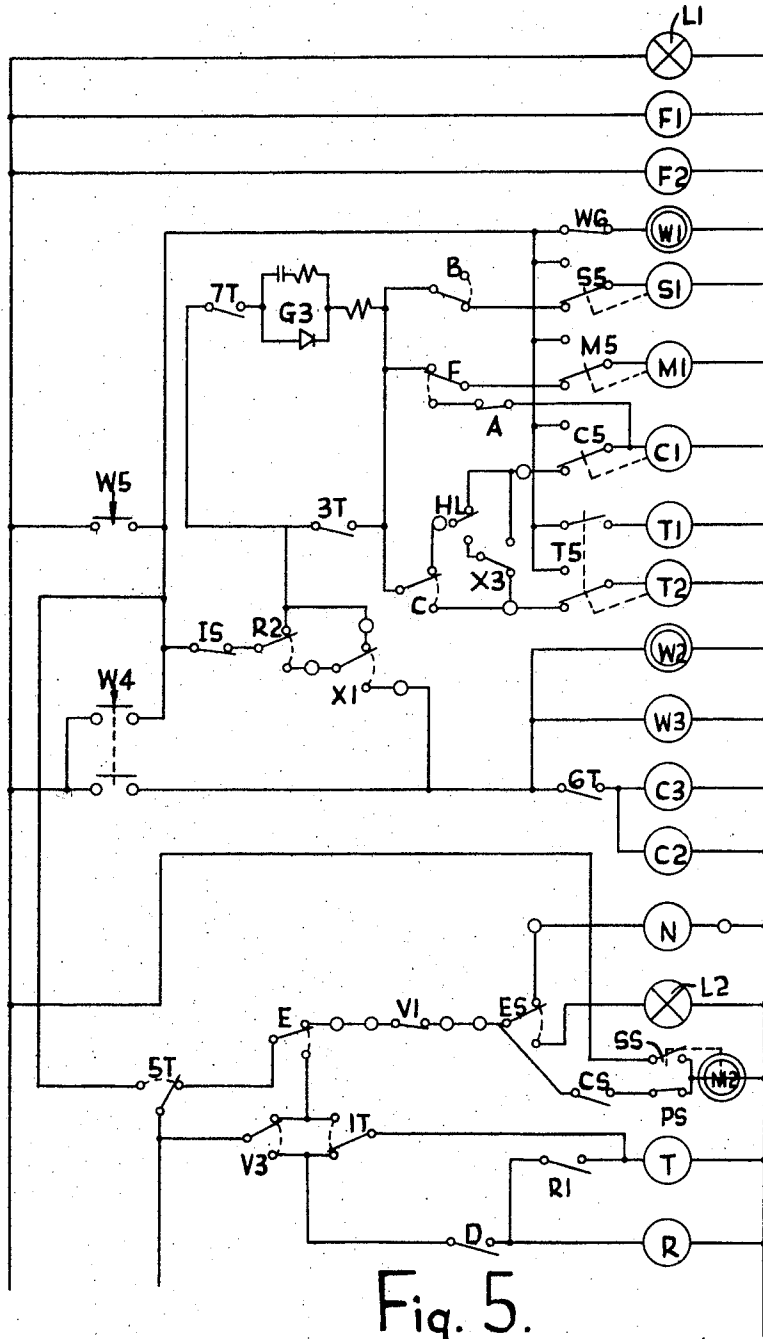


Fig. 5.

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COIN FREED VENDING MACHINES

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7 Sheets-Sheet 5

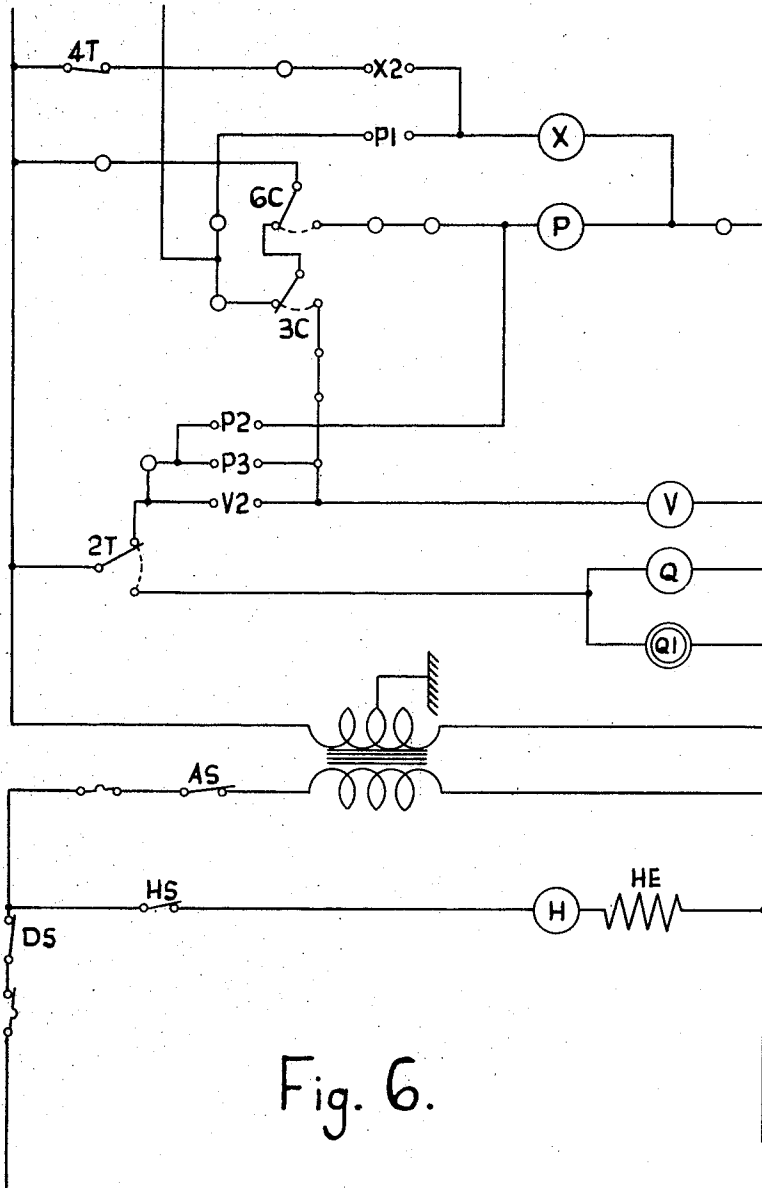


Fig. 6.

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COIN FREED VENDING MACHINES

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7 Sheets-Sheet 6

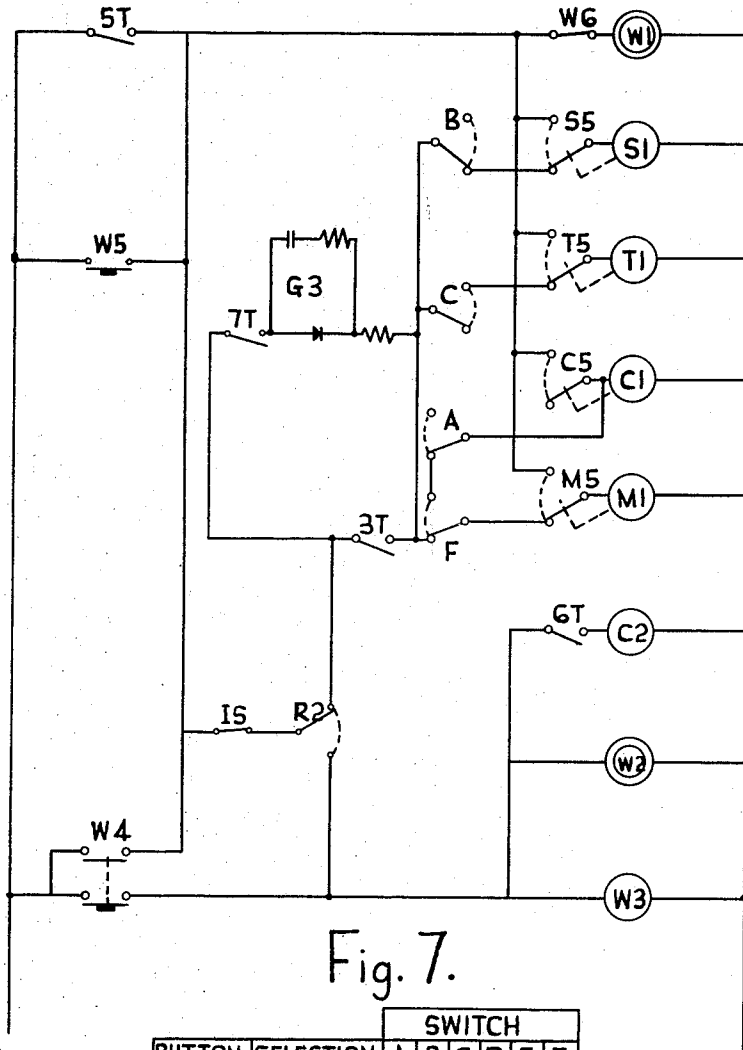


Fig. 7.

BUTTON	SELECTION	SWITCH					
		A	B	C	D	E	F
1	T+M		X	X		X	
2	T+M+S			X		X	
3	C+M		X			X	X
4	C+M+S					X	X
5	C+S	X				X	X
6	CHOC				X	X	

Fig. 9

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May 3, 1966

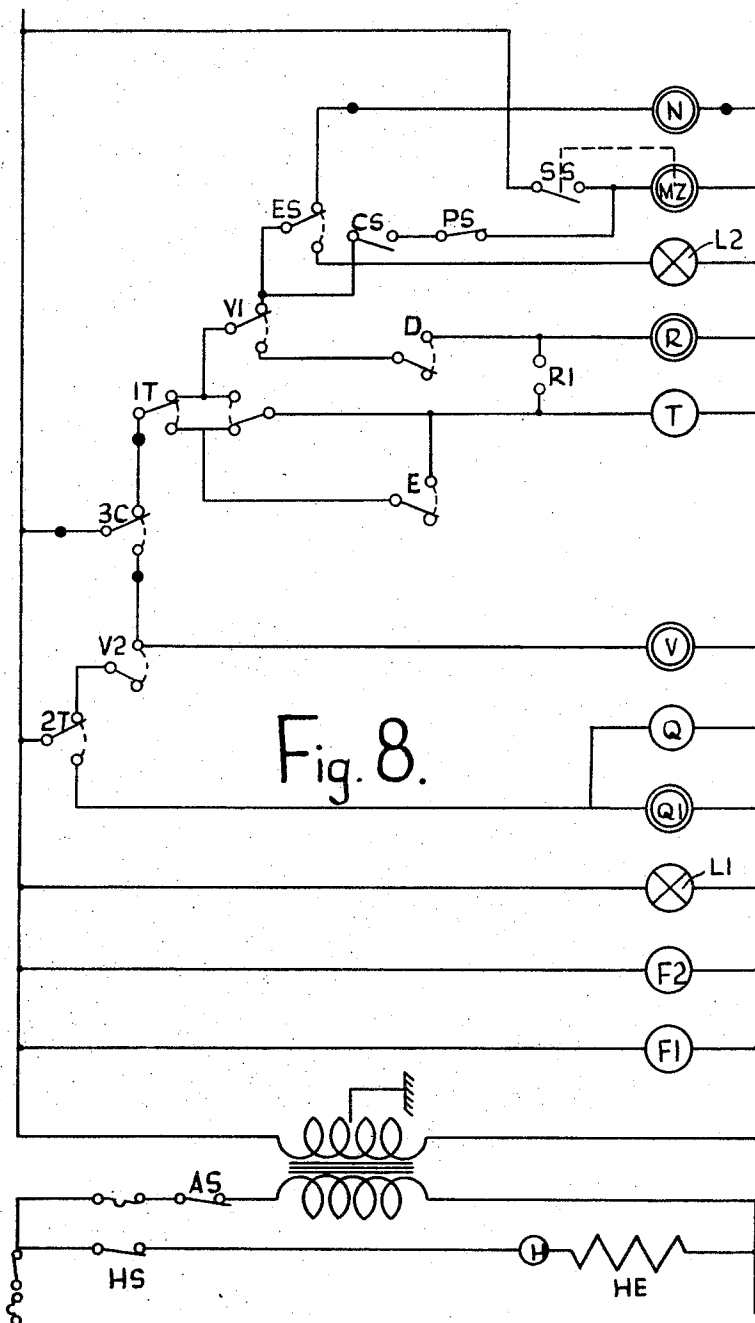
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COIN FREED VENDING MACHINES

Filed Sept. 24, 1964

7 Sheets-Sheet 7



INVENTOR.
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1

3,249,196

COIN FREED VENDING MACHINES

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Filed Sept. 24, 1964, Ser. No. 399,014

Claims priority, application Great Britain, Sept. 25, 1963, 37,679/63; Nov. 20, 1963, 45,753/63

10 Claims. (Cl. 194—13)

This invention relates to coin freed beverage dispensing machines of the kind which include a timer motor for controlling the sequence of operations effected during a vending cycle of the machine and a commodity selection mechanism for selecting the appropriate commodity to be dispensed.

It is an object of the present invention to provide a new or improved form of such a coin freed beverage dispensing machine.

According to one aspect of the present invention there is provided a coin freed beverage dispensing machine which includes a timer motor for controlling a vending cycle of operations of the machine, a commodity selection mechanism which includes a plurality of switches and means for operating said switches, primary means for causing the motor to operate through a part of a vending cycle of operations, said primary means being rendered effective upon the insertion of the appropriate value of coinage into the machine and the operation of coin switches by the inserted coinage, secondary means for causing the timer motor to operate through the remainder of a vending cycle of operations, said secondary means being rendered effective upon actuation of the commodity selection mechanism subsequent to operation of said primary means, beverage ingredient dispensing means disposed inside the machine, a cup holder having an electrically operated cup dispensing mechanism controlled by the timer motor, means whereby at least one beverage is vended at a higher price than another beverage, and switch means which are closed only upon the insertion of the value of coinage corresponding to said higher priced beverage, said switch means, when open, preventing the dispensing means associated with the higher priced beverage from being operated.

According to a further aspect of the present invention there is provided a coin freed beverage dispensing machine which includes a timer motor for controlling a vending cycle of operations of the machine, a commodity selection mechanism, primary means rendered effective upon the insertion of the appropriate value of coinage into the machine and secondary means rendered effective, upon actuation of the commodity selection mechanism, subsequent to operation of said primary means, for causing the timer motor to operate through a vending cycle, a plurality of dry beverage ingredient canisters disposed inside the machine, a motor for rotating each of said canisters to deliver a predetermined amount of a dry beverage ingredient to a mixing chamber, the time for which each canister motor is operated being controlled by the timer motor through a number of cam switches, a hot water dispensing valve controlled by said timer motor to provide hot water for mixing with the dry ingredients in the mixing chamber, a cup holder having an electrically operated cup dispensing mechanism controlled by the timer motor, switch means contained within said cup holder for operating a blocking relay to prevent the insertion of further coinage into the machine after the depletion of the cups in the cup holder to a predetermined extent, and means for dispensing two groups of beverages with one group at a higher price and one group at a lower price.

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The machine may include a coin selection and rejection mechanism which is adapted to receive more than one denomination of coinage, there being a different coin path for each denomination of coinage and at least one coin switch associated with each coin path. The coin switch operated by coins of the lowest denomination is adapted to deliver a single pulse to a rectifier assembly which operates a stepping relay. The coin switch or switches operated by coins of higher denominations are adapted to deliver a plurality of pulses to the rectifier assembly i.e. the number of pulses delivered to the rectifier assembly corresponds to the value of the coinage.

The machine may include a step counter and a total credit step counter, the step counter and the total credit step counter being operated as a result of the insertion of a coin into the machine by a number of steps corresponding to the value of the inserted coin and means being provided for resetting the step counter after it has been operated by the number of steps corresponding to the value of the inserted coin, the total credit step counter being operated during an operating cycle of the machine by a number of steps corresponding to the total value of coinage inserted during the operating cycle of the machine.

There is conveniently a relay associated with the step counter and a relay associated with the total credit step counter, each relay being adapted to receive a number of electrical pulses corresponding to the value of the coin inserted so as to operate both the step counter and the total credit step counter by the corresponding number of steps, no further pulses being delivered to either relay upon resetting of the step counter which preferably includes a plurality of armatures adapted to be operated sequentially, the operation of any one of the armatures preparing the subsequent armature for operation.

The total credit step counter conveniently also includes a plurality of like armatures and the arrangement is such that upon operation of a predetermined armature a setting-up relay is energised which operates said normally open switch in series with the timer motor.

A control relay is provided in series with selected step counter armature contacts, this relay when energised causes the de-energisation of the coin switch relay and the energisation of a step counter resetting mechanism.

The energisation of any one of the coin switch relays conveniently operates a holding switch and also causes the energisation of a pair of "hunting" relays which operate alternately to cause a number of pulses to be delivered from the rectifier assembly to the step counter relay and the total credit step counter relay.

The armature of the step counter which corresponds to the value of the highest denomination of coin accepted by the machine is conveniently in series with the rectifier assembly so that, when this armature is operated, the control relay is energised to energise the step counter resetting mechanism and prevent further operation of the pair of "hunting" relays so that no further pulses are delivered to either the step counter relay or the total credit step counter relay.

The armature of the step counter which corresponds to the value of an other denomination of coinage than the highest denomination of coinage is conveniently in series with a normally closed switch which is opened upon energisation of the coin switch relay corresponding to coinage of the next higher denomination, this normally closed switch is itself in series with other normally closed switches which are opened upon energisation of the coin switch relay corresponding to coinage of further higher denominations, if any, and with the rectifier assembly so that, when this armature is operated the step

counter is returned to a reset condition by operation of the control relay.

There are conveniently two credit totalising units associated with the total credit step counter, one unit, when energised as a result of the delivery of a predetermined number of pulses to the rectifier assembly closes the normally open switch in series with the control switch and the timer motor which then effects the actuation of the locking mechanism of the push button assembly and the other unit when energized, as a result of the delivery of a predetermined greater number of pulses to the rectifier assembly closes the switches which permit the motors associated with the higher priced group of beverages to be operated.

The timer motor, at the end of each vending cycle of operations, operates a cam switch which causes a second rectifier assembly to reset the total credit step counter to prepare it for a further vending cycle.

In an arrangement in which both the higher and lower priced beverages are vended at prices corresponding to single coins, for example, at 6d and 3d, the coin selection mechanism is adapted to receive a higher and lower denomination of coinage and there are two coin paths in the coin selection mechanism and a coin switch in each coin path. Operation of the coin switch in the lower denomination of coin path operates the locking mechanism of the push button assembly and closes the normally open switch in series with the control switch and the timer motor. Operation of the coin switch in the higher denomination coin path has the same effect as operation of the other coin switch and also closes the switches which permit the motors associated with the higher priced groups of commodities to be operated.

Dried milk is conveniently dispensed both with tea and with coffee and it has been found that customers prefer to have approximately twice as much milk in their coffee as in their tea and, therefore, in a machine which dispenses both tea and coffee the dried milk motor is adapted to be operated twice when coffee is desired, once through the coffee motor switch and once through the milk motor switch.

The invention will now be described by way of example with reference to the accompanying drawings in which:

FIGURES 1, 2 and 3 illustrate the electrical circuit of a machine which is adapted to dispense tea, coffee or chocolate, which is adapted to receive pennies, three-penny pieces, and six-penny pieces and in which the tea and/or coffee is dispensed at a different price to the chocolate,

FIGURE 4 illustrates a cam timing chart,

FIGURES 5 and 6 illustrate a machine which is adapted to dispense tea, coffee or chocolate and in which the machine is adapted to accept three-penny pieces and six-penny pieces and in which the price of the tea is threepence, the price of the chocolate is sixpence and the price of the coffee in either threepence or sixpence,

FIGURES 7 and 8 illustrate the electrical circuit of a machine which is adapted to dispense tea, coffee or chocolate at one price which is equal to the value of a single coin, and

FIGURE 9 illustrates the switch selection combination showing the effect of pressing a particular push button on the door of the machine.

In each of the embodiments there is a choice of six beverages, i.e. tea with milk, tea with milk and sugar, black coffee with sugar, white coffee, white coffee with sugar and chocolate with milk and sugar.

There is a coin insertion slot (not shown), accessible from the front of the machine which is adapted to receive, in the case of the embodiment shown in FIGURES 1, 2 and 3, pennies, three-penny pieces and six-penny pieces. The machine includes a coin selection mechanism (not shown) and there is a separate coin path for each denomination of coinage.

The beverage dispensing machine includes a rectangular cabinet having a hinged front door and the coin insertion

slot is provided in the door and the coin selection mechanism on the inside of the door in such a manner as is shown, for example, in co-pending application No. 206,615, now Patent No. 3,193,072.

Also mounted on the inside of the door is a cup holder which may be constructed as described in co-pending application No. 391,659 which is a continuation-in-part of application No. 295,553, now abandoned. The cup holder is adapted to deliver a cup to a delivery station accessible from the front of the machine upon each vending operation and means are provided for ensuring that when the cups in the cup holder have been depleted to a predetermined extent then no further coinage will be accepted by the machine.

Inside the body of the machine there are five dry commodity canisters, four of which are mounted in close relationship so that their lower ends contact a funnel-shaped chute. The chute is provided with a cover in which four circular openings are formed, each opening is disposed directly beneath the mouth of one of the canisters and for cleaning purposes the canisters are removed from the top of the chute and the chute removed from its seating. The dry commodity canisters may be mounted on a removable shelf in the manner described in co-pending application No. 206,588, now abandoned. Upon rotation of any one of the canisters during a vending operation of the machine a predetermined amount of the dry ingredients passes via the chute into a mixing chamber which is conveniently made of heat resisting glass. The motor control system of the motors of these four dry commodity canisters is preferably as described in co-pending application No. 295,401.

The mixing chamber is mounted on runners and can be pulled out for cleaning purposes. The water supply is so connected that operation of a water cleansing push button supplies water for cleaning the mixing chamber. Hot water is mixed with the dry ingredients in the mixing chamber and this hot water is provided from a liquid storage vessel which is conveniently constructed as described in co-pending application No. 295,552, now U.S. Patent No. 3,189,225.

A steam extractor fan is mounted inside the body of the machine which draws air over the top of the mixing chamber to prevent condensation of steam in or on the ingredient canisters. These four dry ingredient canisters contain the sugar, dried milk, coffee and tea to be dispensed. After the dry ingredients is mixed with the hot water in the mixing chamber it passes along a pipe into a cup which has previously been delivered to the delivery station. The chocolate canister is mounted separately and contains powdered chocolate, dried milk and sugar. The chocolate canister motor is operated by the same control system as the other canister motors and delivers the dry ingredients to a chamber into which hot water is delivered. An electrically operated whisk is mounted in this chamber so that the chocolate is stirred rapidly and made frothy before it is delivered to a cup in the delivery station.

Mounted on the front of the door of the machine there are six push buttons 1, 2, 3, 4, 5 and 6. The push buttons can be pressed in prior to insertion of coinage into the machine but are not locked in position until the appropriate coinage has been inserted. The push button assembly is such that only one button can be pressed at any one time. The push button assembly also includes six single-pole double-throw switches A, B, C, D, E and F which are operated by the push buttons in the manner shown in FIGURE 9.

As can be seen from FIGURE 9 the pressing of any one of the push buttons operates switch E which is a control switch and which controls operation of a timer motor T which in turn controls the times at which other motors in the machine are operated and also the time for which the hot water dispensing mechanism is operated

and the time at which the cup delivery mechanism is operated.

Referring now to FIGURES 1, 2, 3 and 4 of the drawings. The insertion of a penny operates a coin switch 1C and operation of coin switch 1C operates a relay 1D which causes a holding contact 1D2 to close to hold the relay 1D in an energised state. The relay 1D also operates a switch 1D2 which moves to a closed position so as to energise a relay K through a normally closed switch J1. Operation of contact K1 energises a step counter coil 2C so as to operate the first armature of the step counter SC and to energise a control relay U, a contact U2 of which opens so as to de-energise relay 1D so that switch 1D1 returns to its original position. At the same time that contact U2 is opening contact U1 which is normally open closes so as to energise the step counter reset coil S. At the same time that contact K1 energises the step counter coil 2C it energises a further relay J which opens the contact J1 in the electrical path of relay K so as to de-energise relay K and open contact K1. At the same time that relay J was energised via contact K1 a total credit step counter coil 1C was energised to cause the first armature of a total credit step counter ST to operate. When the step counter reset coil S is energised the armature of the step counter SC which has been operated is opened so as to return the step counter SC to its original position, the operated armature of the total credit step counter ST, however, remains in its operated position.

The step counter coil 2C and the step counter reset coil S are conveniently wound upon the same bobbin in opposed directions and the total credit step counter coil 1C and a total credit step counter reset coil Y are likewise wound in opposed directions on another bobbin.

Associated with the total credit step counter ST are two switch units each of which has a dial indicator member O1 and O2 which can be turned so as to establish an electrical connection with any one of the armatures of the total credit step counter ST. In the drawings the indicator member O1 has been set to operate its associated setting-up relay V when fourpence has been inserted into the machine and the indicator member O2 has been set to operate a pair of setting-up relays X and Z when sixpence has been inserted.

Operation of a coin switch 3C upon the insertion of a three-penny piece causes a relay 3D to be energised which closes a holding contact 3D2 to maintain relay 3D in an energised state and moves a switch 3D1 from the position shown in the drawings. Movement of switch 3D1 causes the relay K again to be energised via contact J1. The step counter coil 2C and the total credit step counter coil 1C are also operated. Closure of contact K1 of relay K operates relay J. Relays J and K are "hunting" relays. Energisation of relay J opens contact J1 so as to de-energise relay K and open contact K1 so as to de-energise relay J and the coils 2C and 1C. Upon de-energisation of relay J contact J1 closes again so as to re-energise relay K and close contact K1 to re-energise relay J and the coils 1C and 2C. Relays J and K continue to be operated alternately until three pulses have been delivered to the step counter coil 2C and the total credit step counter coil 1C. The third armature of the step counter SC is then operated and this armature is in series with a contact 6D1 which is normally in the closed position. When this third armature of the step counter SC is operated the control relay U is again energised so as to operate the step counter reset coil S and de-energise relay 3D to move contact 3D1 back to its original position and prevent further operation of relays J and K and the coils 1C and 2C. The step counter SC is reset but the total credit step counter ST remains in its operative state with its third armature closed.

Operation of coin switch 6C upon the insertion of a sixpence energises a relay 6D so as to close a holding contact 6D2 and move a switch 6D1 from the position

in the drawings. Relays J and K, coils 1C and 2C and the step counters SC and ST then operate with relays J and K "hunting" each other until the sixth armature of the step counter SC has been operated. The sixth armature of the step counter SC is directly in series with a rectifier assembly G2 so that when this sixth armature is operated the control relay U is energised, operation of which is as before. The step counter SC is thus reset whereas the sixth armature of the total credit step counter ST remains operated.

If a penny is inserted the total credit step counter ST operates by one step and remains in its operated position whereas the step counter SC operates through one step and is then reset. If a three-penny piece is then inserted the step counter SC operates through three steps and is then reset whereas the total credit step counter ST operates through a further three steps i.e. a total of four steps and remains in an operated state.

As shown in FIGURE 3 there are two switch units in series with the total credit step counter ST but if desired there could be either one switch unit or more than two switch units depending upon the number of price ranges of beverages which are to be dispensed.

Let us now assume that fourpence has been inserted into the machine either as four pennies or as one penny and one three-penny piece; the fourth armature of the total credit step counter ST will have been operated and with the indicator member O1 in the position shown the setting-up relay V will be energised. Energisation of relay V closes a holding contact V2 which is in series with one of the cam switches 2T operation of which is controlled by the timer motor T. Energisation of relay V also closes a contact V1 which is in series with the indicator member O2 and the setting-up relays X and Z operated by the second switch unit. It is convenient to employ two setting-up relays associated with the second switch unit as it is desired in the present instance to operate five contacts or switches upon operation of the setting-up relays of the second switch unit. If less than four contacts or switches were to be operated only one setting-up relay would be employed. Contact V1 when open prevents operation of relays X and Z until after relay V has been operated to close contact V1.

Energisation of relay V also moves a switch V3 from the position shown in the drawings so as to energise the timer motor T through one of the cam switches 1T controlled by the timer motor T. The motor T then operates so as to move cam switch 1T from the position shown in the drawings so as to switch off the motor but also to prepare it for operation when a commodity selection button is pressed so as to operate switch E.

If sixpence has been inserted into the machine either as six pennies, two three-penny pieces, three pennies and a three-penny piece or as one sixpence the sixth armature of the total credit step counter ST is operated so as to energise the relays X and Z. Energisation of relay X operates a holding contact X2 for the two relays and this holding switch X2 is in series with a cam switch 4T operation of which is controlled by the motor T. At a predetermined time in the vending cycle the motor T causes a further cam switch 2T to move from the position shown in FIGURE 3 so as to deenergise relay V and operate the cup drop mechanism Q1 and a counter Q which records the number of times the machine has been operated.

Movement of the cam switch 2T also operates a total credit step counter reset coil Y which forms part of a rectifier assembly G1 so as to return the total credit step counter ST to a reset position. At a later time during the vending cycle the cam switch 4T is opened so as to de-energise relays X and Z. Relay X also controls operations of a contact X3 disposed between the indicator member O1 and relay V so as to provide "feed-back" prevention means when both switch units are set at the

same price and also to allow relay V to be de-energised when switch 2T is operated.

When relay Z is operated it opens a normally closed contact Z2 so as to de-energise a blocking relay N the armature of which is then projected into the coin path so as to prevent the acceptance of any further coinage by the machine. The blocking relay N is also de-energised when the cup holder is empty, in this case an "empty" switch ES is operated to de-energise the blocking relay.

If a potential customer wished to obtain a beverage vended at fourpence he can, if he does not have the correct change, insert sixpence as the relay V is operated as soon as the fourth armature of the total credit step counter ST is operated regardless of whether any further armatures of the total credit step counter ST are operated.

There are a plurality of motors inside the machine, a whisk motor W3, the whisk of which is mounted inside the chocolate mixing chamber, the chocolate canister motor C3, the dried milk canister motor M1, the sugar canister motor S1, the coffee canister motor C1 and the tea canister motor T1. Operation of these motors is controlled through the six switches, A, B, C, D, E and F operation of which are controlled by the push buttons 1, 2, 3, 4, 5 and 6 as shown in FIGURE 9.

The effect of pressing any one of the push buttons will now be described assuming that sufficient coinage has been inserted into the machine for the timer motor T to be operated:

- (a) Push button 1 is pressed and switches B, C and E are moved from the position shown in the drawings. If only fourpence has been inserted into the machine switch X1 remains in the position shown. As soon as switch E is operated cam switch 1T which has been moved from the position shown in the drawings upon operation of switch V3 supplies current to the timer motor T. This timer motor controls the times at which the other motors are operated via cam switches 5T, 3T, 6T and 7T.

Movement of switch B, which is normally closed, from the position shown in the drawings prevents the motor S1 being operated. Switch F remains in the position shown and, therefore, motor M1 is operated. Switch C moves from the position shown and, therefore, motor T1 is operated. The motors are driven by their associated switches M5 and T5 moving from the position shown in the drawings and current is supplied through cam switch 5T through the coin switches 1C, 3C and 6C, which by now will have returned to their original positions. Current is also supplied through cam switch 5T for operating the valve W1 which supplies hot water to the mixing chamber. Simultaneously with operation of motor T1 a counter T2 is operated for recording the number of times that tea is dispensed. The tea is then delivered to a delivery station to which a cup has been delivered by the cup solenoid Q1 which is operated through cam switch 2T with consequent operation of a total counter Q. Switches A and D remain in the positions shown and the coffee and chocolate motors are not operated. If sixpence instead had been inserted into the machine switch X1 would have been moved from the position shown and even though sixpence had been inserted the operation of switch C would still enable tea to be dispensed even though sufficient coinage had been inserted to obtain a higher priced beverage. Tea with milk and without sugar is thus dispensed.

- (b) The pressing of push button 2 causes switches C and E to be operated. Switch E controls the timer motor T as described above and switch C operates the tea motor and tea counter T1 and T2. Switch B is not operated so that the sugar canister motor S1 is also operated through switch S5. The water dispensing valve W1 is again operated and tea with milk and sugar is thus dispensed.
- (c) The pressing of push button 3 causes switches B, E and F to be operated. Operation of switch B pre-

vents the sugar canister motor S1 from being operated. If the machine has been set to vend coffee at the lower price i.e. at fourpence the "high-low" switch HL will have been moved to the position shown in the drawings. If the coffee is to be vended at sixpence the "high-low" switch HL will have been moved from the position in the drawings so that in order to obtain coffee when the machine has been set to vend coffee at sixpence the switch X1 controlled by setting-up relay X must have been operated. If the appropriate coinage has been inserted the coffee canister motor C1 will be operated. Switch F moves from the position shown so that motor M1 is operated via the coffee motor switch C5 and through switches A and F. The milk motor switch M5 then moves so that the milk canister motor M1 is again operated. Twice the amount of powdered milk is thus dispensed as was dispensed with the tea. Switch B moves from the position shown to prevent the sugar canister motor S1 from being operated so that coffee with milk is dispensed.

- (d) The pressing of push button 4 operates switches E and F but does not operate switch B so that coffee with milk and sugar is dispensed.
- (e) The pressing of push button 5 operates switches A, E and F so that the milk canister motor M1 cannot be energised via the coffee motor switch C5 nor can it be operated by switches A and F as switch F has been moved from the position shown. Black coffee with sugar is thus dispensed.
- (f) The pressing of push button 6 causes switches D and E to be operated. Switch D closes to provide a circuit for operation of relay R. Relay R has two switches R1 which is a holding switch and switch R2 which enables the chocolate canister motor C3 to be operated. Switch R1 is in parallel with the timer motor T so that relay R remains energised until the timer motor T is itself switched off at the end of a cycle. On operation of switch R2 the chocolate motor C3 is operated via switch Z1 which is controlled by setting-up relay Z and cam switch 6T. Simultaneously with closing of switch R2 the whisk motor W3 is operated and a change-over valve W2 for supplying water to the chocolate mixing chamber is operated. The time for which the chocolate motor C3 is operated is controlled by cam switch 6T and the time for which the whisk motor W3 and the valve W2 are operated is controlled through cam switch 5T. At the same time that the chocolate motor C3 is operated a counter C2 is operated for recording the number of times that chocolate is dispensed. The coffee and tea delivery circuitry are isolated by movement of the switch R2 so that the tea, coffee, sugar and milk canisters cannot be operated so that only chocolate is dispensed.

The motors T1, C1, M1 and S1 are A.C. operated and direct current is supplied for braking the motors from a rectifier assembly G3 when the motor switches T5, C5, M5 and S5 return to their original positions after the motors have been driven for a selected period of time.

The other components of the electrical circuit shown in FIGURES 1, 2 and 3 which have not previously been described include a pair of fan motors F1 and F2 for the fans which respectively direct a stream of air over the mixing chamber for the chocolate and over the main mixing chamber. An isolating switch D3 is provided, which is opened upon opening the door of the machine and a pair of lamps L1 and L2 are included in the circuit. L1 is a cup station light and also serves as an indicator lamp for showing that the machine is operative and L2 is a "sold out" lamp which is lit when the "empty" switch ES is operated.

The cup holder of the machine which is mounted on the door thereof includes a delivery compartment and a pair of storage compartments. A stack of nested cups

is originally placed in the delivery compartment and in each storage compartment. When the stack of cups in the delivery compartment is depleted to a predetermined extent a motor operating switch CS is closed to establish an electrical connection with a motor M2. Switch CS is closed before the "empty" switch ES is operated. Each storage compartment includes a pivotable platform, the platforms being supported on ledge formations on a reciprocable actuator bar which is moved by motor M2 which drives a cam engaging the end of the actuator bar. As soon as the cam is moved from its stationary position a motor holding switch SS is closed. When a stack of cups has been transferred to the delivery compartment switch CS is opened to prevent further operation of the motor M2.

The hot water for mixing with the dry beverage ingredients is supplied from a heater which has a thermostat H and a heater switch HS controlled by the thermostat. The water which is used for flushing purposes passes to a cistern which contains an anti-flood switch AS which opens when the cistern is full to prevent further operation of the machine.

When testing the machine it is desirable to be able to check that the correct amount of water and beverage ingredients have been dispensed and, therefore, an ingredient control switch LS and a water control switch W6 are included in the circuit of the machine.

A pair of push button switches W4 and W5 are provided, one, when operated delivers hot water to the chocolate mixing chamber and the other delivers hot water to the tea and coffee mixing chamber.

The electrical circuits shown in FIGURES 5 and 6 and FIGURES 7 and 8 are basically similar to that shown in FIGURES 1, 2 and 3 apart from the different totalising systems which have been employed. Like reference numerals have been employed throughout to indicate like components of the circuit.

The only major difference between the commodity selection part of the circuit shown in FIGURES 5 and 6 from that shown in FIGURES 1, 2 and 3 is that the switch V1 disposed between switch E and the "empty" switch ES which controls operation of the blocking relay N is controlled by the setting-up relay V associated with the low priced beverage. The coffee can be dispensed at either threepence or sixpence depending upon the setting of the "high-low" switch HL.

When threepence is inserted the coin switch 3C is operated to operate the setting-up relay V which closes a holding contact V2, operates the switch V3 which causes the motor T to commence to operate and opens the switch V1. When a sixpenny piece is inserted coin switch 6C is operated so as to energise an operating relay P which operates a holding contact P2, a contact P3 in series with setting-up relay V so as to operate relay V and closes a contact P1 in series with the other setting-up relay X so as to operate relay X. Operation of relay X closes a holding contact X2, operates a switch X1 so as to permit operation of the chocolate dispensing mechanism and also operates a switch X3 so as to permit coffee to be dispensed when the "high-low" switch HL has been set so that coffee is dispensed for a price of sixpence. It is to be noted that if threepence has been inserted and the "high-low" switch set to vend coffee at sixpence but coffee is selected as the beverage desired then tea is dispensed.

In the electrical circuit shown in FIGURES 7 and 8 tea, coffee and chocolate are all vended at threepence and a single coin switch 3C is included. Operation of coin switch 3C energises relay V so as to operate a holding switch V2, to operate the switch V3 in series with the timer motor and also to operate a switch V1 so as to operate the blocking relay and also to permit operation of the chocolate dispensing mechanism. It is to be noted that cam switch 4T has in this case been omitted as there is now only one setting-up relay.

What I claim is:

1. A coin freed beverage dispensing machine which includes a timer motor for controlling a vending cycle of operations of the machine, a commodity selection mechanism which includes a plurality of switches and means for operating said switches, primary means for causing the motor to operate through a part of a vending cycle of operations, said primary means being rendered effective upon the insertion of the appropriate value of coinage into the machine and the operation of coin switches by the inserted coinage, secondary means for causing the timer motor to operate through the remainder of a vending cycle of operations, said secondary means being rendered effective upon actuation of the commodity selection mechanism subsequent to operation of said primary means, beverage ingredient dispensing means disposed inside the machine, a cup holder having an electrically operated cup dispensing mechanism controlled by the timer motor, means whereby at least one beverage is vended at a higher price than another beverage, and switch means which are closed only upon the insertion of the value of coinage corresponding to said higher priced beverage, said switch means, when open, preventing the dispensing means associated with the higher priced beverage from being operated.

2. A coin freed beverage dispensing machine which includes a timer motor for controlling a vending cycle of operations of the machine, a commodity selection mechanism, primary means rendered effective upon the insertion of the appropriate value of coinage into the machine and secondary means rendered effective, upon actuation of the commodity selection mechanism, subsequent to operation of said primary means, for causing the timer motor to operate through a vending cycle, a plurality of dry beverage ingredient canisters disposed inside the machine, a motor for rotating each of said canisters to deliver a predetermined amount of a dry beverage ingredient to a mixing chamber, the time for which each canister motor is operated being controlled by the timer motor through a number of cam switches, a hot water dispensing valve controlled by said timer motor to provide hot water for mixing with the dry ingredients in the mixing chamber, a cup holder having an electrically operated cup dispensing mechanism controlled by the timer motor, switch means contained within said cup holder for operating a blocking relay to prevent the insertion of further coinage into the machine after the depletion of the cups in the cup holder to a predetermined extent, and means for dispensing two groups of beverages with one group at a higher price and one group at a lower price.

3. A dispensing machine according to claim 1 which includes a step counter and a total credit step counter, the step counter and the total credit step counter being operated upon the insertion of a coin into the machine by a number of steps corresponding to the value of the inserted coin and means being provided for resetting the step counter after it has been operated by said number of steps, the total credit step counter being operated during an operating cycle of the machine by a number of steps corresponding to the total value of coinage accepted during the cycle.

4. A dispensing machine according to claim 3 which includes a relay associated with the step counter and a relay associated with the total credit step counter each relay being adapted to receive a number of electrical pulses corresponding to the value of an inserted coin so as to operate both the step counter and the total credit step counter by the corresponding number of steps, no further pulses being delivered to either relay upon resetting of the step counter.

5. A dispensing machine according to claim 4 in which the step counter and the total credit step counter each includes a plurality of armatures each adapted to be operated sequentially, the operation of any one of the armatures preparing the subsequent armature for

operation, a control relay being provided in series with selected armature contacts of the step counter, this relay when energised causing the de-energisation of switch relays associated with each coin switch of the machine and the energisation of the step counter resetting mechanism.

6. A dispensing machine according to claim 5 in which means are provided whereby the energisation of any one of the relays associated with the coin switches operates a holding switch and causes the operation of a pair of "hunting" relays which operate alternately to cause a number of pulses to be delivered from a rectifier assembly to the step counter relay and the total credit step counter relay.

7. A dispensing machine according to claim 6 in which the armature of the step counter which corresponds to the value of the highest denomination of coinage accepted by the machine is in series with the rectifier assembly, so that when this armature is operated, the control relay is energised to operate the step counter resetting mechanism and prevent further operation of the pair of "hunting" relays.

8. A dispensing machine according to claim 7 in which the armature of the step counter which corresponds to the value of any other denomination of coinage than the highest denomination of coinage is in series with a normally closed switch which opens upon energisation of the coin switch relay corresponding to coinage of the next higher denomination.

9. A dispensing machine according to claim 3 in which one of the switches of the commodity selection mechanism is a control switch operated upon operation of any one of the switch operating means, said control switch being

normally open and in series with the timer motor and the machine including a pair of credit totalising units associated with the total credit step counter, one unit, when energised as a result of operation of the total credit step counter by a predetermined number of steps, effecting closure of a normally open switch in series with the control switch and the timer motor and the other unit, when energised as a result of operation of the total credit step counter by a predetermined greater number of steps causing the switch means which permit the motors associated with the higher priced group of beverages to be operated.

10. A dispensing machine according to claim 9 in which means are provided whereby both the higher and the lower priced beverages are vended at prices which correspond to the value of a single coin and in which operation of a coin switch disposed in the lower denomination coin path, effects closure of the normally open switch in series with the control switch and the timer motor and operation of a coin switch disposed in the higher denomination coin path closes said normally open switch and also closes the switch means which permit the motors associated with the higher priced group of beverages to be operated.

References Cited by the Examiner

UNITED STATES PATENTS

2,712,887	7/1955	King	222—132
2,828,889	4/1958	Joschko	222—70
2,980,224	4/1961	Bookout et al.	194—13

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