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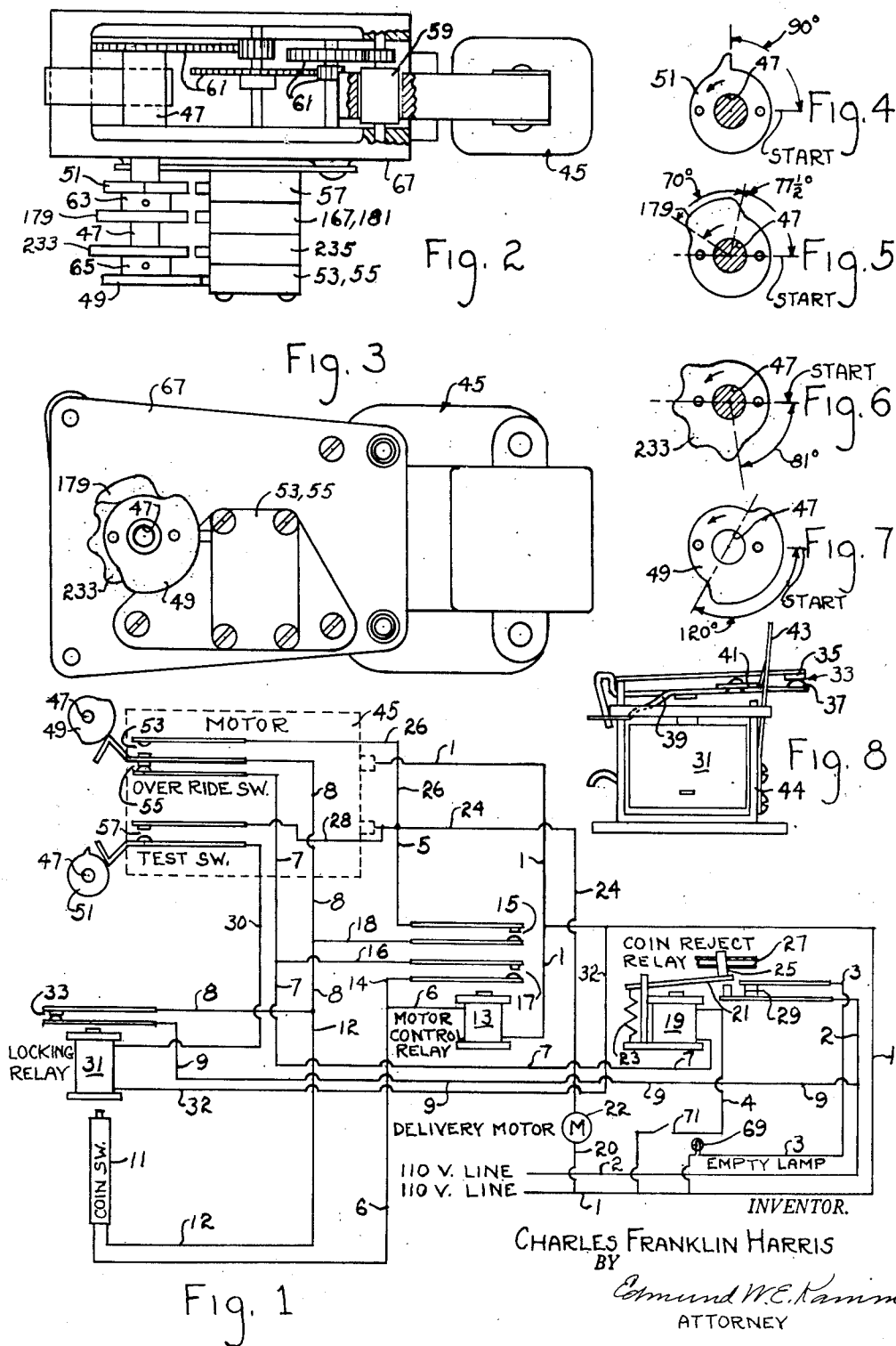
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ANTI-JACKPOTTING DEVICE FOR CHECK OPERATED VENDING MACHINES

Filed Dec. 12, 1946

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

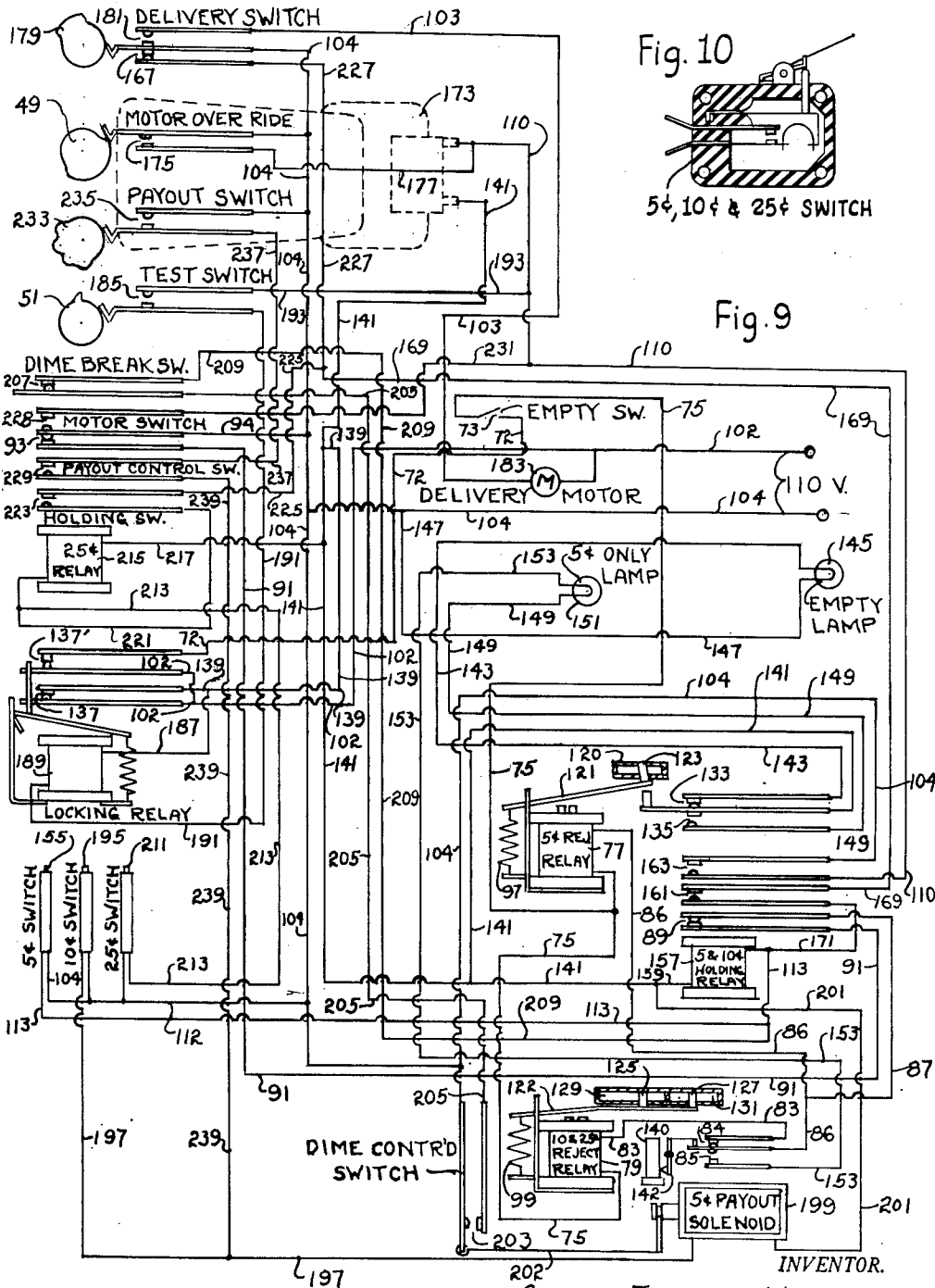


Fig. 10

5¢, 10¢ & 25¢ SWITCH

Fig. 9

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ANTI-JACKPOTTING DEVICE FOR CHECK
OPERATED VENDING MACHINES

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27 Claims. (Cl. 194-10)

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This invention relates to an anti-jackpotting device for check operated vending machines. More specifically, it relates to a device for preventing the dispensing of more than one article or portion even if the coin actuated impulse switch is held closed.

A great many check or coin operated vending machines operate on the principle that the passage of an accepted check past an impulse type of switch creates an electrical impulse in a starting circuit to start a cycle of the machine which terminates in the delivery of one article or portion of a commodity.

These machines are subject to the defect that if the impulse switch is held closed, either due to the sticking of the switch points, the jamming of the coin or for any other reason, the machine continues to cycle and dispenses the entire contents without collecting the sale price. Frequently, as in the case of a nonpackaged commodity such as a cup drink, the drink will continue to flow; and since there are usually no drain connections to such units, the fluid may run onto the floor and be lost or cause considerable damage to rugs, etc.

To prevent such occurrences, which are usually termed "jackpotting," I have devised a mechanism which will, near the end of each delivery, automatically test a switch which will be closed if a multiple delivery is impending and if the switch is held closed, a mechanism will shut down the machine automatically. No further checks will be accepted and no product will be vended until the switch and the shut down mechanism have been manually cleared. This insures that no products will be dispensed without payment or will escape to create damage.

It is also an object of the invention to provide a simple, inexpensive mechanism which can be applied to any switch operated vending machine.

Still another object of the invention is to provide a mechanism of the type described for a multiple coin operated vending machine.

Yet another object of the invention is to provide a test circuit for controlling an anti-jackpotting or locking relay.

Yet another object of the invention is to provide an anti-jackpotting relay which is electrically moved to the machine disabling position and mechanically held in said position, together with a testing circuit for operating it in accordance with the condition of a check operated switch.

These and other objects will become apparent

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from a study of this specification and the drawings which are attached hereto and made a part hereof, and in which:

Figure 1 is a circuit diagram of a single coin switch device.

Figure 2 is a plan view of the cam actuating motor.

Figure 3 is an elevation of the motor of Figure 2.

Figure 4 is an elevation of the anti-jackpot or test switch cam.

Figure 5 is an elevation of the delivery switch cam.

Figure 6 is an elevation of the payout switch cam.

Figure 7 is an elevation of the motor over-ride switch cam.

Figure 8 is an elevation of the anti-jackpot or locking relay.

Figure 9 is a circuit diagram of a multiple coin machine which returns coins in change and which embodies the testing and operation stopping mechanism.

Figure 10 is an elevation of a coin operated switch with parts broken away to show the internal structure.

Referring first to the wiring diagram shown in Figure 1, the numeral 11 indicates the coin switch, which is preferably arranged so that it will be closed by the passage of a check and will reopen as soon as the check passes so as to create a single, momentary impulse for each check. The word check is used in the generic sense and includes coins, tokens, etc., it being understood that the machines may be operable by tokens, coins or any other actuator which will close a switch to effect a sale.

Numeral 13 refers to a motor control relay which operates switches 15 and 17, both of which are normally open and are closed by the relay when it is energized.

A check reject relay 19 is provided with an armature 21 which is normally held away from the core of the relay by spring 23. A pin 25 fixed to the armature is adapted to enter the check chute 27 so as to reject any checks inserted. However, when the relay is energized the pin is withdrawn so that a check will be accepted and passed to check operated switch 11.

The armature is also adapted to open the normally closed switch 29 when the relay is energized.

The anti-jackpot or locking relay 31 is provided with a single, normally closed switch 33. It will be seen from Figure 8 that the switch

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33 comprises a set of stationary points 35 and a set of movable points 37 which are mounted on spring member 39 so as to be urged toward points 35. A latch bar 41 is mounted on member 39 and a latch pawl 43 is mounted on the frame 44 of the relay so that when the relay is energized, the member 39 will yield and the points 35—37 will separate. The pawl 43 will engage the latch bar 41 and hold the switch 33 open until the pawl 43 is tripped manually, whereupon the switch will again close.

A motor 45 operates a shaft 47 on which are mounted certain control cams. It will be seen from Figure 1 that two cams are used; namely, the motor over-ride switch cam 49 (Fig. 7) and the anti-jackpot or test switch cam 51 (Fig. 4). The former operates two switches, 53 which is normally open and 55 which is normally closed, while the latter operates a normally open test switch 57.

It will be seen from Figures 2 and 3 that the motor comprises an armature 59 which is connected by a reducing gear train 61 to the shaft 47. The cams are mounted in pairs on the hubs 63 and 65 in alignment with their corresponding switches which are mounted on the frame 67 of the motor.

As is shown in the diagram (Fig. 1), one power main is indicated by the numeral 1 and the other by 2. A circuit "A" through an empty lamp 69 runs from the main 1 through the lamp, line 3, switch 29, to the main 2. Thus the empty lamp will be lighted whenever the switch 29 is closed; that is, when relay 19 is not energized.

Circuit "B" through the check reject relay is from main 1 through empty switch 71, line 4, relay winding 19, line 7, to normally closed switch 55, through line 8, normally closed switch 33 of the anti-jackpot relay, and to the main 2 through line 9.

The switch 71 is disposed in the vending machine and is held closed so long as there is a vendable product in the machine but opens during the delivery cycle which causes the product to be exhausted.

Circuit "C" comprises from main 1 to the winding of the motor control relay 13, through line 6 to the coin switch 11, through line 12 to line 8, anti-jackpot relay switch 33 and by way of line 9 to the other main 2. Energization of relay 13 closes switches 15 and 17. The switch 11 is normally held only a moment so that this circuit is broken quickly.

Circuit "D" which is established by switch 17 is a holding circuit which runs from line 1 through winding of 13, line 6, line 14, through switch 17, through lines 16, 7 and thence through switch 55, line 8, anti-jackpot switch 33 and line 9 to main 2.

Circuit "E," the cam driving motor circuit, is established upon closure of the switch 15 of the motor control relay. This circuit is from main 1 to motor 45, through line 5, switch 15, line 18, line 8, anti-jackpot relay switch 33 and line 9 to main 2. Energization of this circuit starts the motor 45 and rotates shaft 47. Cam 49 thus rotates to close switch 53 and to open switch 55.

Circuit "F," which is the delivery circuit, is closed by switch 53. Thus from line 1, line 20 through the delivery motor 22, line 24, line 26, switch 53, line 8, anti-jackpot relay switch 33 and line 9 to main 2. This motor circuit is normally held long enough under control of cam 49 to enable the delivery motor 22 to begin its cycle; thereafter, certain other mechanisms usually hold

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the motor 22 in operation until an article is dispensed, and this event usually deenergizes the motor.

Circuit "G," which is the cam motor holding circuit, is arranged so that even though the circuit through the switch 55 is broken, which breaks the holding circuit through relay 13 to reopen switches 15 and 17, the motor 45 will continue to run because of the circuit from main 1 through motor 45, line 26, switch 53, line 8, switch 33, line 9 to main 2. When the cam follower of switches 53—55 ride off the cam lobe, the motor will be stopped. Before the motor 45 stops, the switch 57 is closed and reopened by its cam 51. The purpose of this is to test the condition of the coin switch 11; actually, however, by testing the normally open switch 15 which starts motor 45.

If the check switch 11 is held closed for any reason, the switches 15 and 17 will be held closed because starting circuit "C" will be closed. Also, the switch 15 may stick even though the starting circuit is open.

Circuit "H," which is the testing circuit, will therefore be closed by anti-jackpot switch 57 from main 1, line 32, anti-jackpot or locking relay 31, line 30, test switch 57, lines 28, 5, switch 15, lines 18, 8, anti-jackpot relay switch 33, line 9, to the other main 2. Energization of relay 31 opens contacts 33 and the latch 43 will hold them open.

THE CAMS (FIGURES 4 AND 7)

The relation of the switch operating cams determines the operation of the motor controlled switches 53, 55 and 57. These relations are shown in Fig. 4. Only two of the cams, namely, those shown in Figs. 4 and 7, are used in the first form of the machine.

It will be seen from Fig. 4 that the follower of cam 49 will be resting on the high land of the cam in the starting position. The relative positions of cam and follower usually obtain although there may be some variation due to the distance through which the motor coasts under various conditions.

In this position, switch 55 is closed and switch 53 is opened. When the follower rides down on the lower land, then switch 55 is opened and 53 is closed. Each land extends for substantially 180 degrees.

The switch 57 is closed only when its cam follower rides to the point of the cam and is broken quickly when the point of the cam passes.

The shaft 47 and cams 49, 51 are shown in the normal starting position in Figs. 4 and 7.

OPERATION

Assuming that the dispensing machine is empty, the switch 71 will be open. Circuit B and the check reject relay will be deenergized and the pin 25 will enter the check chute 27 to reject any checks which may be inserted in the machine.

The switch 29 will be closed so that circuit A will be energized to light the "Empty" lamp 69.

When the vending machine is refilled, circuit B will be energized by the closure of switch 71 to energize reject relay 19 which will attract the armature 21. This will withdraw pin 25 from the check chute so that the checks will be accepted and will open switch 29 to deenergize circuit A and lamp 69.

Deposit of a check in the chute momentarily closes switch 11 and energizes circuit C to energize the winding of the motor control relay 13 which closes switches 15 and 17.

Closure of switch 17 establishes holding cir-

circuit D through the winding of the relay, holding the switches 15 and 17 closed.

Closure of switch 15 establishes the circuit E through the cam driving motor 45.

Since the holding circuit D includes the motor override switch 55, this circuit is broken when the follower of cam 49 rides off the high land and opens switch 55, causing switches 15 and 17 to reopen. The cam simultaneously closes motor over-ride switch 53 to establish circuit G which keeps the motor 45 energized. Since circuit B is also through switch 55, the coin reject relay will be deenergized and the pin will enter the coin chute as soon as switch 55 opens to reject further coins.

Closure of switch 53 also energizes circuit F which energizes the cycling circuits (not shown) of the delivery motor 22 and procures the delivery of an article or serving from the vending machine, after which the motor 22 stops. Switch 53 would have to be opened and reclosed to start a new delivery. Both circuit F and circuit G are broken when the cam follower rides off the cam 49 and switch 53 is opened, while switch 55 is remade. Since the holding circuit D has normally been broken by open switch 55 as described above and has deenergized motor control relay 13, this would normally terminate the cycle. However, if the check operated switch is held closed for any reason, if circuit D is held energized, or if the contacts of switch 15 should stick, the reclosing of switch 55 would start another cycle.

To prevent this, the test switch 57 is closed, preferably after the opening of switch 53 and reclosing of switch 55. If either circuit C or D is energized, switch 57 will close circuit H and energize the locking relay 31 to open the anti-jackpot switch 33 and hold it open. The same will be true if the points of switch 15 stick.

Since circuits C, D, E, F, G and H are all put through switch 33, all of these circuits will be deenergized and the machine will be shut down until the trouble is cleared and the relay 31 is reset manually.

Of course, if circuit C is not energized when the test switch is closed, or if switch 15 is not sticking, circuit H will not be energized since it depends on switch 15 being closed, which is not the case when circuit C or circuit D is open. In such case the coin reject relay 19 will again be energized when the switch 55 closes so that coins may again be deposited.

MODIFICATION

In the modified wiring diagram shown in Fig. 9, three check operated switches are utilized instead of one and some parts are used in addition to those used in the first described form. For purposes of clarity, they will be referred to as nickel, dime and quarter switches, etc., although it is obvious that tokens may be used for various values. Two additional cams are used on the motor 45 and some additional switches and relays are required. Also, the locking relay 189 is provided with two switches 137 and 137' which are opened by the magnet and held open by the latch.

GENERAL CIRCUITS

It will be seen that an empty switch circuit J is utilized from main 102 through the points 137' of the locking relay, through line 72, empty switch 73, line 75, winding of the 5¢ reject relay 77, and the winding of the 10¢ and 25¢ reject relay 79. These are paralleled and 77 is connected by line 86 to line 87 while relay 79 is connected by

line 83, normally closed switch 84 and line 86 to line 87, thence by way of line 87 through normally closed switch 89 of the 5¢ and 10¢ holding relay 157, line 91 to the motor switch 93 and thence by line 94 to main 104. When this circuit is deenergized, as when the supply of the commodity is exhausted and switch 73 is opened, or if the locking relay becomes energized, the 5¢ and the 10¢ and 25¢ reject relays 77 and 79 will be deenergized, permitting the springs 97, 99 to pull the armatures 121, 122 out to set the pins 123, 125, 127 respectively in the nickel chute 120 and the dime and quarter chutes 129, 131 so as to reject any coins inserted therein. Energizing relay 77 opens normally closed switch 133 and closes normally open switch 135.

Circuit K is controlled by switch 133 to operate the "Empty Lamp". This circuit is from main 102, normally closed locking relay switch 137, lines 139, 141, switch 133, line 143, empty lamp 145, line 147 to main 104.

Circuit L is conditioned by the closure of switch 135 for operation in the event the supply of nickels in the payout magazine falls below a certain minimum. The circuit is from main 102, locking relay switch 137, lines 139, 141, switch 135, line 143, lamp 151 which illuminates a legend "Nickels only," line 153, normally open nickels only switch 85 which is controlled by the height of the nickels in the payout magazine 140, through a seeker 142 which enters the magazine when a predetermined minimum number of nickels are contained therein and closes the switch, thereafter by way of lines 86, 87, normally closed switch 89, line 91, normally closed switch 93, line 94 to main 104. Thus, whenever the switch 85 is closed by a minimum supply of nickels, the lamp 151 is lighted.

It will also be noted that the switch 85 is a double pole switch and when it is closed to the lines 86—153 to lamp 151 by the lack of nickels, it opens the lines 86—83. Consequently, the 10¢ and 25¢ reject relay is deenergized and its pins 125, 127 will enter the coin chutes and cause dimes and quarters to be rejected.

NICKEL CIRCUITS

Circuit M is established upon the deposit of the coin of lowest value, shown here as a nickel, upon closure of the normally open impulse switch 155, which is held only momentarily during the passage of a coin. The circuit is from main 104 through line 112, nickel switch 155, line 113, the 5¢ and 10¢ holding relay 157, then by way of lines 159, 141, 139, switch 137 to main 102. This energizes the relay 157, closes switches 161, 163 and opens 89. Opening of 89 opens the circuits J and L, whichever is energized, and deenergizes both reject relays 77 and 79.

Circuit N is established by switch 161 and is a holding circuit through the holding relay 157 as follows: main 104 to normally closed delivery cam switch 167, lines 227, 169, holding relay switch 161, line 171, winding of relay 157, lines 159, 141, 139, locking relay switch 137 to main 102. Thus relay 157 is held closed even though the coin switch is reopened.

Circuit O is established by holding relay switch 163 to start the motor 173, which is the same as motor 45 previously described. This circuit is from main 104, switch 163, line 110, motor 173, lines 141, 139, switch 137 to main 102. The motor 173 therefore starts.

The switch 175 is held open by the high land of cam 49 in the rest or normal position (Fig. 7),

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but as the motor turns the follower will ride down to the low land on cam 49 and this closes the motor over-ride switch 175 and circuit P to hold the motor energized. The circuit is as follows: main 104, switch 175, line 177, motor 173, lines 141, 139, switch 137, main 102.

Circuit Q is thereafter set up by delivery cam 179 which opens the switch 167 to deenergize holding relay 157 and, consequently, both the holding circuit N and the motor starting circuit O, and closes delivery switch 181. This circuit is from main 104, switch 181, line 103, through delivery motor 183 to main 102. The circuit is held long enough by cam 179 to enable the cycling circuits (not shown) which control motor 183 to start the delivery cycle which then goes to completion regardless of switch 181. This switch must be opened and reclosed to start another cycle of the delivery motor.

Preferably, but not necessarily, shortly before the switch 181 is opened, the projection or lobe on the test cam 51 closes test switch 185 to condition the test circuit R as follows: line 102, locking relay switch 137, lines 139, 187 to the winding of locking relay 189, lines 191, test switch 185, line 193, line 110 to switch 163 (which should be open but if it is closed) to main 104.

This energizes the relay 189 and opens switches 137 and 137' to break all of the circuits J, K, L, M, N, O, P and R which pass through it and disables the machine. This relay, being the same as relay 31 disclosed above, except that it has two switches both of which lock open, operates in the same way to lock the circuits open until the trouble is cleared and the relay is manually reset.

Of course, if the relay 157 is not energized due to a sticking coin, coin switch, holding circuit switch 161, or if switch 163 itself does not stick, then switch 163 will be open and the test circuit R will not close.

Since circuit Q does not pass through the switch 137, the delivery motor will continue to run until its cycle is completed. When cam 49 opens switch 175 it breaks the circuit through the motor 173.

The testing event occurs after the switch 181 is opened and switch 167 is reclosed so that the delivery cycle will be completed but the machine will be disabled before a second cycle can be initiated in case trouble exists. Even though switches 137 and 137' be opened, the motor 173 will coast far enough to open switches 175 and 185.

DIME CIRCUITS

The dime or higher value check must secure the delivery of a product and return a unit, in this case a nickel, in change.

Circuit R is set up by coin switch 195 from main 104, line 112, switch 195, line 197 to nickel payout solenoid 199, lines 201, 141, 139, switch 137 to main 102. Actuation of the solenoid, which is connected as by link 202 to normally open switch 203, closes this switch momentarily to set up circuit S through the 5¢ and 10¢ holding relay as follows: from main 104, switch 203, line 205, dime break switch 207 which is normally closed, lines 209, 113, winding of relay 157, lines 159, 141, 139, switch 137 to main 102.

QUARTER CIRCUITS

The quarter or highest value check must deliver a product and four units or nickels in change in response to the deposit of a coin. Circuit T is from main 104, line 112, through coin switch 211 which is momentarily closed, line 213, winding of 25¢ holding relay 215, lines 217, 141, 139, switch

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137 to main 102. Energization of relay 215 closes a holding circuit through itself, which is designated circuit U as follows: main 102, switch 137, lines 139, 141, 217, relay 215, line 221, switch 223, lines 225, 227, switch 167 to main 104.

Energization and holding of relay 215 opens switches 207 and 93 and closes motor and payout switches 228 and 229 respectively.

Circuit V is closed by switch 228 from main 102 switch 137, lines 139, 141, motor 173, lines 110, 231, switch 228, line 94 to main 104.

This starts motor 103 which is kept in operation by the motor over-ride switch 175 as explained above.

Rotation of the motor actuates the cam 233 which has four distinct rises formed on it and which operates the normally open payout switch 235. The latter is rendered effective by the closure of payout control switch 229 (described above).

Circuit W is closed successively four times for each cycle of the motor and comprises main 104, switch 235, line 237, control switch 229, lines 239, 197, payout solenoid 199, lines 201, 141, 139, switch 137 to main 102.

Test circuit X, when it is closed by cam 51, is conditioned by test switch 185 as follows: main 102, switch 137, lines 139, 187, winding of locking relay 189, line 191, test switch 185, lines 193, 110, 231, motor switch 227, which should be open, but if it is closed due to sticking of a coin switch or the relay 215, or the switch 227 itself, then by way of line 94 to main 104.

THE CAMS (FIGURES 4 TO 7)

The positions of the cams relative to each other and their timings are shown in Figures 4 to 7 inclusive.

Cams 49 and 51 are the same in form and relative position as previously explained. Two other cams are shown, 179 to control the delivery cycle and 233 to control the coin payout mechanism.

It will be seen that since the 25¢ relay 215 is deenergized when the cam 179 opens switch 167, and since the payout switch 229 controlled by the relay is closed only when the relay is energized, it is necessary to eject the change before the delivery of the article is started.

Accordingly, the last lobe on the payout cam 233 is disposed so that it will complete the closure of its switch 235 for the fourth time before cam 179 is effective to open switch 167.

Prior to this time the motor over-ride cam 49 has closed its switch 175 and the delivery cam 179 may open switch 167 and close 181 to start the cycle of the delivery motor to make one delivery.

The lobes on cams 179 and 51 are so disposed that cam 179 preferably returns its switches to normal before the test circuit is closed by the cam 51. Thereafter, if the test relay is not energized the motor will complete its cycle under control of switch 175. If the test relay is energized the motor will be deenergized at once but will coast far enough so that motor switch 175 and test switch 185 will open.

OPERATION

Nickel deposit

Assuming that the vending machine is filled and that there are sufficient coins in the payout magazine to return change for the check of maximum value acceptable by the mechanism, it will be seen that circuit J will be energized so that nickels, dimes and quarters will be accepted

because the 5¢ and the 10¢ and 25¢ reject relays 77, 79 will be energized to withdraw the deflector pins 123, 125, 127 from the coin chutes.

Circuit K is open and empty lamp is dark because switch 133 is held open by 5¢ reject relay 77.

Circuit L is open because switch 85 is held open by the supply of nickels. The circuit is conditioned for operation by switch 85, however, because switch 135 is held closed by the relay 77.

Circuit M is now closed momentarily by the deposit of a nickel, the minimum value coin. This circuit energizes the 5¢ and 10¢ holding relay 157 which performs several functions as follows:

1. Sets up a holding circuit N through relay 157 and switch 161.

2. Starts motor 173 by closing switch 163 to establish circuit O.

3. Opens switch 89 to disable circuit J and thus deenergize the reject relays so that any coins will be rejected if they are inserted during the cycle.

Motor 173 now assumes control of the cycle and performs several functions as follows:

1. Closes the motor over-ride switch 175 to set up circuit P to hold itself energized.

2. Operates the payout switch 235 which is ineffective because 25¢ relay 215 is not energized and control switch 229 is open.

3. Opens switch 167 to break holding circuit N through relay 157 and restore its switches to normal.

4. Closes switch 181 to set up delivery circuit Q to start the delivery mechanism so as to eject the article.

5. Optionally, cam 179 may cause switch 181 to open and 167 to close at this stage.

6. Actuates the test switch 185 to condition the test circuit R for energization and if switch 163 is closed, as it will be if a coin switch is closed, or if relay 77 has failed to deenergize when switch 163 was opened, then the test circuit will be closed and the locking relay will open switch 137 to break all the circuits except circuit Q which is not effective to procure another delivery until switch 181 is opened and again closed, hence it need not be opened. If the circuit R is closed, the motor will coast far enough to open switches 175 and 185.

If switch 163 is open, as it should be, then locking relay 189 will not be energized and motor 173 will continue to run until it:

7. Opens motor over-ride switch to stop itself by breaking circuit P.

Thus the apparatus has been restored to normal condition.

Dime deposit

Upon deposit of a dime, the machine must return one coin in change and dispense one article or portion. Passage of the coin past switch 195 energizes circuit R which actuates the payout solenoid once to eject one coin and, at the same time, closes switch 203 to close circuit S through the 5¢ and 10¢ holding relay.

Thereafter, the machine functions to deliver an article the same as if circuit M had been closed as described. In other words, the circuits N, O, J, P, Q and R are made and broken as outlined in connection with the nickel delivery.

Quarter deposit

Upon the deposit of a quarter dollar or the highest value coin, the switch 211 is closed momentarily and closes circuit T to energize the

25¢ holding relay 215. This, in turn, performs the following functions:

1. Closes holding circuit U to maintain relay 215 energized.

2. Opens switch 207 to prevent closure of circuit S operated by switch 203 and the payout solenoid.

3. Opens switch 93 to deenergize the reject relays so that all coins inserted will be rejected.

4. Closes switch 229 to condition circuit W for subsequent energization by the payout switch 235.

5. Closes switch 227 to close circuit V and start motor 173.

When the motor has started the following events occur:

1. The cam 49 will close motor over-ride switch 175 to establish circuit P to hold the motor in operation.

2. Cam 233 closes switch 235 to energize circuit W four times and cause the payout solenoid to eject four nickels in change.

3. Thereafter, cam 179 closes switch 181 to energize circuit Q to start delivery.

4. Cam 179 opens switch 167 to break the holding circuit V through relay 215 which is neutralized and its switches are reset to normal. The coin payout has already been fully effected.

5. Near the point that the over-ride switch 175 is to open and after delivery switch 181 has opened, cam 51 closes test switch 185 to condition test circuit X.

If this circuit is closed due to motor switch 228 being closed, as when the coin switch 211 or relay 215 sticks, then the anti-jackpot relay 189 will be energized to break all circuits except circuit Q (for reasons set forth above) and no new cycle can be started until the trouble is cleared.

Nickel only

In the event the nickels in the coin magazine fall below a predetermined level, the seeker will enter the tube and close switch 81—153 to energize circuit L to illuminate lamp 151 to display the "Use Nickels Only" sign. Switch 81—83 is simultaneously opened to deenergize the 10¢ and 25¢ relay so that dimes and quarters will be rejected.

Empty

If the machine is empty, switch 73 will be opened to open circuit J which will deenergize both reject relays to reject all coins.

Switch 133 controlled by the 5¢ reject relay will close circuit K to energize lamp 145 to illuminate the "Empty" sign.

It is obvious that various changes may be made in the form, structure and arrangement of parts without departing from the spirit of the invention. Accordingly, applicant does not desire to be limited to the specific embodiment disclosed herein primarily for purposes of illustration; but instead, he desires protection falling fairly within the scope of the appended claims.

What I claim to be new and desire to protect by Letters Patent of the United States is:

1. In a vending machine, the combination of a starting circuit including a starting switch, means for closing said switch, said means thereafter releasing said switch for opening said circuit, a delivery circuit, means including a control switch responsive to closure of said starting circuit for energizing and holding said delivery circuit for one delivery, a test circuit comprising a normally open test switch and said

control switch, means for closing said test switch after said starting switch is released, and means energized by said test circuit when both said test and control switches are closed for preventing a subsequent energization of said delivery circuit.

2. In a vending machine, the combination of a starting circuit including a starting switch, means for closing said switch, said means thereafter releasing said switch for opening, a delivery circuit, means including a control switch responsive to closure of said starting circuit for energizing and holding said delivery circuit for one delivery, a test circuit comprising a normally open test switch and said control switch, means for closing said test switch after said starting switch is released, and manually resettable means energized by said test circuit when both said test and control switches are closed for preventing a subsequent energization of said delivery circuit until said means is reset.

3. In a vending machine, the combination of a starting circuit including a starting switch, coin accepting means for closing said switch, said means thereafter releasing said switch for opening, a delivery circuit, a control switch, means responsive to closure of said starting circuit for closing the control switch and for energizing and holding said delivery circuit for one delivery, a test circuit comprising a normally open test switch and said control switch, means for closing said test switch after said starting switch is released, check rejecting means having inoperative and check rejecting positions, means for energizing said check rejecting means to hold it in inoperative position, means responsive to said starting circuit for deenergizing said check rejecting means, and means energized by said test circuit when both said test and control switches are closed for preventing a subsequent energization of said delivery circuit and said check rejecting means.

4. In a vending machine, the combination of a circuit, including a starting switch, adapted to be closed and released to open, and a relay, a delivery circuit, including means for effecting the delivery of a product, means, adapted to be energized by said relay, for energizing and holding said delivery circuit energized for a predetermined cycle, a test circuit, including a control switch, adapted for closure by said relay when it is energized, a test switch in series with the control switch and a locking relay, means controlled by said delivery circuit holding means for momentarily closing said test switch after said starting switch is released so that said locking relay will be energized if said control switch is closed, and means operated by said locking relay for preventing a second energization of said delivery circuit.

5. In a vending machine, the combination of a circuit, including a starting switch, adapted to be closed and released to open, and a relay, a delivery circuit, including means for effecting the delivery of a product, a cycling motor adapted to be energized by said relay, means operated by said motor for energizing and holding said delivery circuit energized for a predetermined cycle, a test circuit including a control switch adapted for closure by said relay when it is energized, a test switch in series with the control switch and a locking relay, means operable by said motor during a cycle for momentarily closing said test switch after said starting switch is released so that said locking relay will be energized if said

control switch is closed, and means operated by said locking relay for preventing a second energization of said delivery circuit.

6. In a vending machine, the combination of a starting circuit, means for closing said circuit and thereafter breaking it, a secondary circuit, means, including a device in said starting circuit and responsive to the energization thereof, for energizing said secondary circuit, a holding circuit including additional means for holding said device energized, a motor in said secondary circuit adapted to be energized thereby, a delivery circuit, means including said motor for closing and opening said delivery circuit, said additional means being operated by said motor for deenergizing said holding circuit at a predetermined point in the cycle, a test circuit including means operated to effective position by said motor after said additional means have been operated and further means operated to effective position by said device when it is energized, both said last named means cooperating to energize the test circuit when they are in effective positions, and means in said test circuit for preventing a subsequent operation of said motor after said test circuit has been energized.

7. In a vending machine, the combination of a starting circuit, means for closing said circuit and thereafter breaking it, a secondary circuit, means, including a device in said starting circuit and responsive to the energization thereof, for energizing said secondary circuit, a holding circuit including additional means for holding said device energized, a motor in said secondary circuit adapted to be energized thereby, means for holding said motor energized for a cycle, a delivery circuit, means including said motor for closing and opening said delivery circuit, said additional means being operated by said motor for deenergizing said holding circuit at a predetermined point in the cycle, a test circuit including means operated to effective position by said motor after said additional means have been operated and cooperating with further means operated to effective position by said device when it is energized, both said last named means cooperating to energize the test circuit when they are in effective positions, and means in said test circuit for preventing a subsequent operation of said motor when said test circuit is energized.

8. In a vending machine, the combination of a starting circuit, means for closing said circuit and thereafter breaking it, a secondary circuit, means, including a relay in said starting circuit and responsive to the energization thereof, for energizing said secondary circuit, a circuit including additional means for holding said relay energized, a motor in said secondary circuit adapted to be energized thereby, means actuated by said motor for holding said motor energized for a cycle, a delivery circuit, means including said motor for closing and opening said delivery circuit, said additional means being operated by said motor for deenergizing said relay holding circuit after said motor holding means is energized, a test circuit including means operated to effective position by said motor prior to opening of said delivery circuit and additional means operated to effective position by said relay when it is energized, both said last named means cooperating to energize the test circuit when they are in effective positions, and means in said test circuit for preventing a subsequent operation of said motor when said test circuit is energized.

9. In a vending machine, the combination of a

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check operated switch, a payout solenoid operable by said switch, a coin payout magazine, means operated by said solenoid for ejecting a coin from said magazine, a starting circuit including a starting switch adapted to be operated by said solenoid, means for closing said switch, means for thereafter releasing said switch for opening, a delivery circuit, means responsive to closure of said starting circuit for energizing and holding said delivery circuit for one delivery, a test circuit comprising a test switch and a control switch adapted to be closed by said starting circuit, means for closing said test switch after said starting switch is released, and means energized by said test circuit when both said test and control switches are closed for preventing a subsequent energization of said delivery circuit.

10. In a vending machine, the combination of a check operated switch, a payout solenoid operable by said switch, a coin payout magazine, means operated by said solenoid for ejecting coins from said magazine, a starting circuit including a starting switch adapted to be closed and thereafter opened by said solenoid, a delivery circuit, means responsive to closure of said starting circuit for energizing and holding said delivery circuit for one delivery, a second starting circuit including a second starting switch, means for closing said switch and thereafter releasing it for opening, means responsive to the closure of said second starting circuit for energizing and holding said delivery circuit for one delivery, means operable upon energization of said second starting circuit for rendering said first starting circuit inoperative, a test circuit comprising a test switch and a control switch, said control switch being adapted to be closed by either starting circuit, means for closing said test switch after the operative starting switch is released, and means energized by said test circuit when both said test and control switches are closed for preventing a subsequent energization of said delivery circuit.

11. In a vending machine, the combination of a check operated switch, a payout solenoid operable by said switch, a coin payout magazine, means operated by said solenoid for ejecting coins from said magazine, a starting circuit including a starting switch adapted to be closed and thereafter opened by said solenoid, a delivery circuit, means responsive to closure of said starting circuit for energizing and holding said delivery circuit for one delivery, a second starting circuit including a second starting switch, means for closing said switch and thereafter releasing it for opening, means responsive to the closure of said second starting circuit for energizing and holding said delivery circuit for one delivery, additional means responsive to said second starting circuit for energizing the solenoid a predetermined number of times, means operable upon energization of said second starting circuit for rendering said first starting circuit inoperative, a test circuit comprising a test switch and a control switch, said control switch being adapted to be closed by either starting circuit, means for closing said test switch after the operative starting switch is released, and means energized by said test circuit when both said test and control switches are closed for preventing a subsequent energization of said delivery circuit.

12. In a vending machine, the combination of a check operated switch, a payout solenoid operable by said switch, a coin payout magazine, 75

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means operated by said solenoid for ejecting coins from said magazine, a starting circuit including a switch actuated by said solenoid, a secondary circuit, means, including a relay in said starting circuit and responsive to the energization thereof for energizing said secondary circuit, a circuit including additional means for holding said relay energized, a motor in said secondary circuit adapted to be energized thereby, means actuated by said motor for holding said motor energized for a cycle, a delivery circuit, means including said motor for closing and opening said delivery circuit, said additional means being operated by said motor for deenergizing said relay holding circuit after said motor holding means is energized, a test circuit including means operated to effective position by said motor prior to opening of said delivery circuit and additional means operated to effective position by said relay when it is energized, both said last named means cooperating to energize the test circuit when they are in effective positions, and means in said test circuit for preventing a subsequent operation of said motor when said test circuit is energized.

13. In a vending machine, the combination of a check operated switch, a payout solenoid operable by said switch, a coin payout magazine, means operated by said solenoid for ejecting coins from said magazine, a starting circuit including a switch actuated by said solenoid, a secondary circuit, means, including a relay in said starting circuit and responsive to the energization thereof, for energizing said secondary circuit, a circuit including additional means for holding said relay energized, a second starting circuit including a second relay, a tertiary circuit adapted to be energized by said second relay, a circuit including said additional means for holding said second relay energized, means operable by one starting circuit for preventing operation of the other while the first is operative, a motor in said secondary and tertiary circuits adapted to be energized thereby, means actuated by said motor for holding said motor energized for a cycle, a delivery circuit, means including said motor for closing and opening said delivery circuit, said additional means being operated by said motor for deenergizing the operative relay holding circuits after said motor holding means is energized, a test circuit including means operated to effective position by said motor after the opening of the operative holding circuit and additional means operated to effective position by the operative relay when it is energized, both said last named means cooperating to energize the test circuit when they are in effective positions, and means in said test circuit for preventing a subsequent operation of said motor when said test circuit is energized.

14. In a vending machine, the combination of a check operated switch, a payout solenoid operable by said switch, a coin payout magazine, means operated by said solenoid for ejecting coins from said magazine, a starting circuit including a switch actuated by said solenoid, a secondary circuit, means, including a relay in said starting circuit and responsive to the energization thereof, for energizing said secondary circuit, a circuit including additional means for holding said relay energized, a second starting circuit including a second relay, a tertiary circuit adapted to be energized by said second relay, a circuit including said additional means for holding said second relay energized, means operable

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by one starting circuit for preventing operation of the other while the first is operative, a motor in said secondary and tertiary circuits adapted to be energized thereby, means actuated by said motor for holding said motor energized for a cycle, a delivery circuit, means including said motor for closing and opening said delivery circuit, said additional means being operated by said motor for deenergizing the operative relay holding circuits after said motor holding means is energized, a test circuit including means operated to effective position by said motor after the opening of the operative holding circuit and additional means operated to effective position by the operative relay when it is energized, both said last named means cooperating to energize the test circuit when they are in effective positions, and means in said test circuit for preventing a subsequent operation of said motor when said test circuit is energized, a payout circuit adapted to be closed by energization of said second relay, and including a switch operated by said motor and controlling said solenoid, whereby said solenoid will be energized to pay out a number of coins under control of said motor.

15. In a coin receiving vending machine, the combination of a starting circuit, including a switch which is adapted to be closed upon deposit of a coin and to be later opened to energize and deenergize the circuit respectively, a delivery mechanism operable through a cycle, means responsive to energization of said starting circuit for causing said mechanism to cycle, a test circuit including two normally ineffective control means, means, responsive to said starting circuit only while it is energized, for rendering one of said control means effective, means, operable during the cycle of said mechanism after the time for opening the coin switch, for rendering said second control means effective, said control means, when they are both in their effective positions, serving to energize said test circuit, and means controlled by said test circuit when it is energized for preventing a subsequent delivery.

16. In a coin receiving vending machine, the combination of a starting circuit, including a switch which is adapted to be closed upon deposit of a coin and to be later opened to energize and deenergize the circuit respectively, a delivery mechanism operable through a cycle, means responsive to energization of said starting circuit for causing said mechanism to cycle, a test circuit including two normally ineffective control means, means, responsive to said starting circuit only while it is energized, for rendering one of said control means effective, means, operable during the cycle of said mechanism, for rendering said second control means effective, said control means, when they are both in their effective positions, serving to energize said test circuit, and means controlled by said test circuit when it is energized for preventing a subsequent delivery, said preventing means comprising an electro magnet in the test circuit and a switch operated by said magnet for deenergizing the machine.

17. In a coin receiving vending machine, the combination of a starting circuit, including a switch which is adapted to be closed upon deposit of a coin and to be later opened to energize and deenergize the circuit respectively, a delivery mechanism operable through a cycle, means responsive to energization of said starting circuit for causing said mechanism to cycle, a test circuit including two normally ineffective control

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means, means, responsive to said starting circuit only while it is energized, for rendering one of said control means effective, means, operable during the cycle of said mechanism, for rendering said second control means effective, said control means, when they are both in their effective positions, serving to energize said test circuit, means controlled by said test circuit when it is energized for preventing a subsequent delivery, said preventing means comprising an electro magnet in the test circuit and a switch operated by said magnet for deenergizing the machine, and manually releasable means for holding said switch operated.

18. In a vending machine, the combination of a mechanism operable through a cycle to deliver a product, means movable to effective position to start a cycle, means operable at a predetermined time in said cycle for normally restoring said means to ineffective position, a testing means having normal and test positions, means operable at least once during each cycle, after said restoring means, for moving the testing means to test position and means movable to a position for preventing a subsequent cycle of the mechanism, said preventing means being positioned by a circuit which includes it, the testing means when in test position and the cycle starting means when in the effective position.

19. In a vending machine, the combination of a mechanism operable through a cycle to deliver a product, means movable to effective position to start a cycle, means for normally restoring said means to ineffective position, a testing means having normal and test positions, means operable at least once during each cycle, after said restoring means normally operates and prior to the completion of the cycle, for moving the testing means to test position, and means movable to a position for preventing a subsequent cycle of the mechanism, said preventing means being positioned by a circuit which includes it, the testing means when in test position and the cycle starting means when in the effective position.

20. In a vending machine, the combination of a mechanism operable through a cycle to deliver a product, means, including a check controlled, momentary contact switch for starting a cycle, a testing means having normal and test positions, means operable after said switch for moving the testing means to test position, means movable to a position for preventing a subsequent cycle of the mechanism and means responsive to the testing means when in test position and the switch when closed, for moving the preventing means to preventing position.

21. In a power operated vending machine, the combination of a power supply, a mechanism operable from said power supply, through a cycle to deliver a product, a momentary contact, check operated switch, means operable upon operation of the switch to start a cycle of said mechanism, a normally open test switch, means operable after said coin switch for closing the test switch, a relay having a normally closed switch connected to control said power supply and means, responsive to said test switch and the coin operated switch when both are closed, to actuate said relay to open said normally closed switch.

22. In a control device, the combination of a starting circuit including a normally open, coin closed switch, a cycling mechanism, means responsive to the closure of the switch for starting and completing a cycle of the mechanism, means for reopening said switch before the completion

of a cycle, normally ineffective testing means rendered effective by the cycling mechanism after the time for operation of the reopening means and at least once during each cycle, means having an effective condition for preventing a subsequent cycle of said mechanism and means, under joint control of said coin switch when it remains closed and said testing means when it is rendered effective, for rendering said preventing means effective.

23. In a coin actuated machine having a power supply, the combination of a starting circuit including a coin closed switch, a mechanism, means operated from said power supply for operating said mechanism through a cycle in response to closure of the switch, means for opening said switch, means for preventing a subsequent cycle of the mechanism comprising a relay having a magnet, a normally closed switch connected to control the power supply and means for latching the switch open, means for actuating the magnet including the coin switch when it fails to open and means actuated by the mechanism near the end of a cycle.

24. In a control device, the combination of a starting switch having effective and ineffective positions, a motor, means responsive to said switch, when it occupies its effective position, for starting the motor, means for thereafter restoring the switch to ineffective position, means for holding the motor energized for a cycle and for thereafter stopping it, a test switch having an effective and an ineffective position, means operable after said restoring means for moving said test switch to effective position and means, under joint control of said starting and test switches when both are in their effective positions, for preventing restarting of the motor.

25. In a vending machine, the combination of a delivery mechanism operable through a cycle to deliver a product, starting means having an effective and an ineffective position, means controlled by the starting means, when they are in the effective position, for starting a cycle of said mechanism, means for normally restoring said starting means immediately to ineffective position, a testing means having normal and test positions, means operable after the time for operation of the restoring means for moving the test means to the test position, means movable to a position for preventing a subsequent cycle of the

mechanism and means, including said testing and starting means, for moving said preventing means to preventing position when the testing means are in the test position and the starting means is in the effective position.

26. In a vending machine, the combination of a circuit, including a starting switch adapted to be closed and released to open, a delivery circuit, including means for effecting the delivery of a product, means energized by said starting switch for energizing and holding said delivery circuit energized for a predetermined cycle, a test circuit including a locking relay, a normally open test switch and means to complete the test circuit when both said test switch and starting switch are closed, means controlled by said delivery circuit holding means for momentarily closing said test switch after the starting switch is released so that the locking relay will be energized if the starting switch remains closed and means operated by said locking relay for preventing a second energization of the delivery circuit.

27. In a control device, the combination of a circuit including a starting switch adapted to be closed and released to open, a motor, a circuit therefor, a payout mechanism, means controlled by the motor for actuating said payout mechanism, means energized by said starting switch for energizing and holding said motor circuit energized for a predetermined cycle, a test circuit including a locking relay, a normally open test switch and means to complete the test circuit when both said test switch and starting switch are closed, means controlled by said motor for closing said test switch after the starting switch is released so that the relay will be energized if the starting switch remains closed and means operated by said locking relay for preventing another energization of said motor and further actuation of said payout mechanism.

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