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VENDING CONTROL APPARATUS

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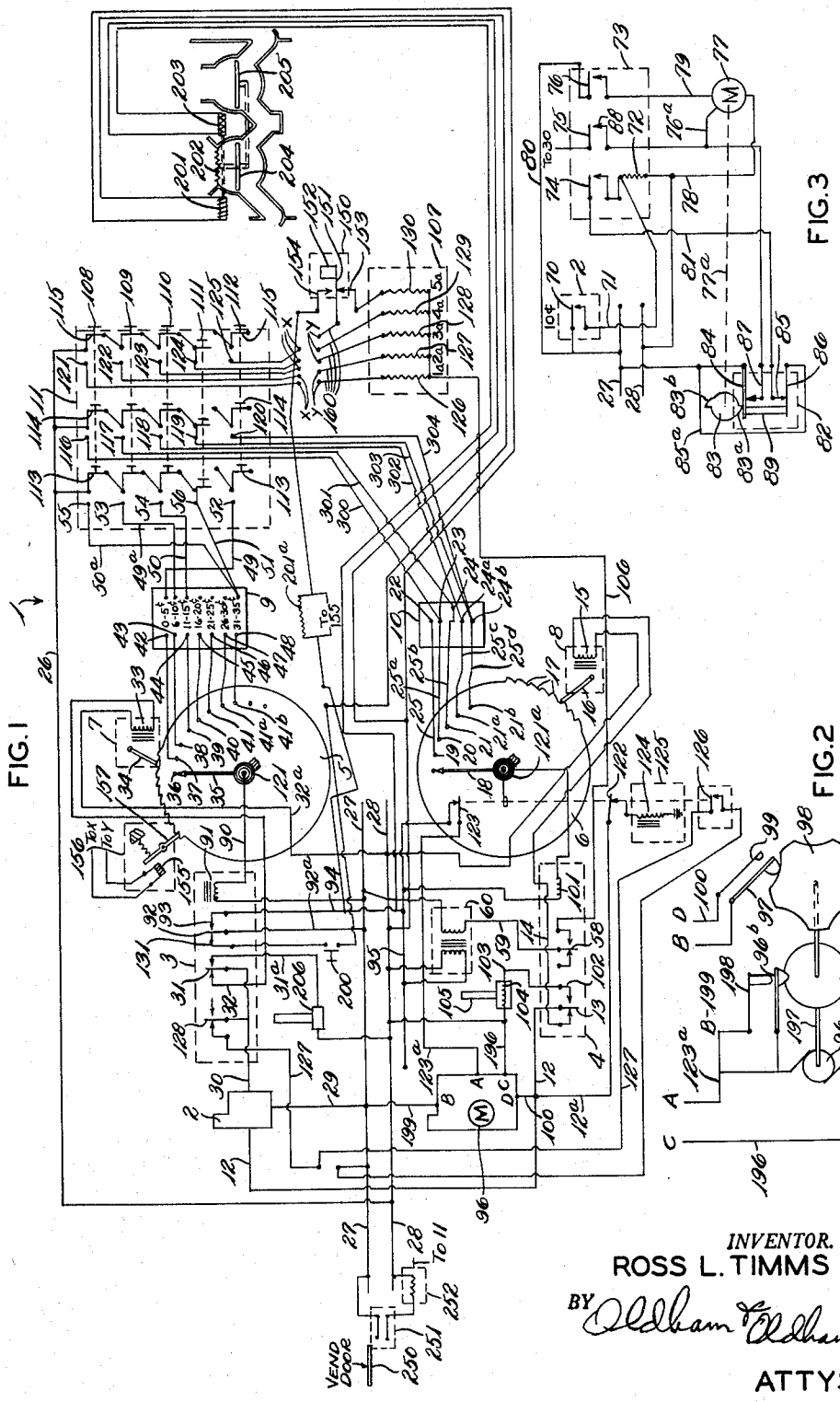


FIG. 1

FIG. 3

FIG. 2

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VENDING CONTROL APPARATUS

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The present invention relates to vending controls, and especially to money receiving, impulse generating means in vending apparatus to perform the actual money acceptance and article vending action.

Heretofore there have been different types of vending controls provided, but substantially all of such vending controls have been able to accept only the proper amount of money for a vending action. In some instances, change has been given for coins inserted into the apparatus by means of change packaged inside the vended article.

As vending machines are moving into wider and wider commercial acceptance and use today, there has been a need for a vending control that is readily adjustable to the vending of a plurality of different articles each of which may be sold for a different price and to accept money for such vending actions and return proper change where indicated.

The general object of the present invention is to provide a novel and improved vending control characterized by its ability to accept a variety of denominations of money therein and to vend an article and return both pennies and nickels change, as required.

Another object of the invention is to provide a vending control that is adapted for pre-select vending action on articles costing any price and which can be converted readily for use only with articles costing even nickel prices.

Another object of the invention is to provide a vending control of relatively uncomplicated construction made from a minimum number of parts but having a wide range of vending of different items at different prices.

A further object of the invention is to provide a pair of connection panels in association with stepping switches for registering deposit of different value coins in the apparatus so that the vending of a number of different items for different prices can readily be provided and set up in the vending control.

Another object of the invention is to provide a vending control substantially divided into two parts, one of which is a 5 cent impulse and registering circuit and with the other one being the penny control and registering circuit portion of the vending apparatus.

Another object of the invention is to provide special controls for operative motors in the vending control so that one impulse can be used to actuate control motors and drive them through one revolution so that five penny impulses, for example, can be provided from the 5 cent impulse portion of the vending apparatus for use in the penny registering or control portion of the apparatus.

Further objects of the invention are to provide a common control motor for registering deposit of a number of coins in the apparatus by individual control relays; to actuate both a nickel stepper switch and a penny stepper switch by the first penny deposited in the apparatus; to use a common five lobed cam in both the penny and quarter handling portions of the vend control means; and to use penny impulses in the apparatus for either article vending or penny change return action.

The foregoing and other objects and advantages of the invention will be made more apparent as the specification proceeds.

Attention now is particularly directed to the accompanying drawings, wherein:

FIG. 1 is an electrical diagram, somewhat schematic, showing the vend control circuit embodying the principles of the invention;

FIG. 2 is a detail of a portion of a motor control circuit shown more broadly in FIG. 1; and

FIG. 3 is a detail section of another portion of the circuit of FIG. 1 showing a control relay and control cam in the ten cent, quarter, and similar portions of the apparatus.

When referring to corresponding members shown in the drawings and referred to in the specification, corresponding numerals are used to facilitate comparison therebetween.

In the particular embodiment of the invention to be considered herein, it is described with reference to the vending of an item costing 35¢ as covered by one button in a multi-contact, push button, pre-select type of a vend control switch.

Vending Control—General Structure

The vending control apparatus of the invention is indicated as a whole by the numeral **1**. Such vending control has as its principle components, a money receiving unit, or money receiver **2**, which sends out impulses to the remainder of the control apparatus dependent upon the amount and denomination of money deposited. A pair of multiple-contact relays **3** and **4** are used in the control, as are a pair of stepping switches **5** and **6** that have control or stepper relays **7** and **8** provided therefor. Other main components of the vending control include a pair of connection panels or boards **9** and **10**, respectively, that are connected to and associated with the stepping switches **5** and **6**, respectively. A multiple button, multiple contact vending control switch **11** is yet a further main component of the vending control when the vended articles are pre-selected.

Money Input

The money receiver **2** has a plurality of sections or means provided therein, one for each different type of money to be accepted by the money receiver **2** for action in the vending control unit of the invention. For example, the money receiver **2** normally would have a section for receiving pennies therein and it also may, for example, have a section for receiving nickels, dimes, quarters and half dollars therein. When desired, the money receiver also can be provided with means for accepting either silver dollars or paper dollars, as desired, dependent upon the maximum cost of any vended article in the apparatus to which the vending control is connected.

When a penny is deposited in the money receiver **2**, it closes a contact (not shown) in the money receiver **2** and causes an impulse to be sent therefrom through a lead **12**. Such lead **12** connects to a normally closed switch **13** provided in the relay **4** and controlled thereby. Such switch **13** connects to a lead **14** that extends to the operating coil **15** for the relay **8** of the second stepping switch **6** which is in this apparatus the penny stepping switch. By actuation of this control relay **8**, the relay actuates a spring controlled detent **16** that engages notches **17** on some portion of the stepping switch **6** to move such stepping switch one step and a stationary pointer or contact arm **18** provided therein is thereby brought into engagement with a terminal button, or equivalent contact **19** provided on the stepping switch **6**. A plurality of these contacts **19**, **20**, **21**, etc. are provided on the stepping switch and each penny deposited into the money receiver **2** obviously steps or moves the stepping switch

6 one step further to bring the contact into engagement with another one of the contacts provided to register deposit of a penny in the apparatus. Normally only five of these terminals would be present on the penny stepper switch 6.

On the connection panel 10, a plurality of terminals 22, 23 and 24, etc. are provided to control vending circuits by the cents portion of the article price. Thus leads 25, 25*a*, 25*b*, etc. are shown to connect the penny stepper contact arm 18 to such terminals that are connected to contacts (hereinafter described) in the control switch 11 by leads 300 through 304, respectively. The contacts in the switch 11 normally connect to a power supply line by a lead 26.

Normally conventional 110 volts A.C. current is provided for operating the vending control 1 and power supply leads 27 and 28 are shown. The power lead 27 is shown connected to the money receiver 2 by a lead 29 to provide a power source for sending informational and control electrical impulses from such money receiver dependent upon the money deposited. The operating coil 15 for the stepper switch 6 connects to the power lead 28 to complete the penny impulse circuit.

Two contacts, or switches 122 and 123 are carried by the penny stepper switch or plate 6 and are closed at the zero position thereof. Switch 122 connects to an actuating coil 124 for a relay 125 that controls a normally open switch 126 in a lead 127. Lead 127 connects power lead 27 to a switch 128 controlled by the relay 3. The switch 122 connects to the lead 12 by a lead 12*a* so that an impulse is received by the relay 125 through the switch 122 and provides a power impulse in its circuit, when the penny stepper switch is at its zero position. Such impulse to the relay 125 actuates it and closes contact 126 to send an impulse to contact 128 and lead 30 to actuate the 5 cent stepper switch 5, as hereinafter described. After the penny stepper switch 6 has been moved a step or more, the contacts or switches 122 and 123 are opened. A switch 123 is connected to the stepper switch 6 to be closed when the stepper switch 6 is in its zero position. If sufficient money has been deposited in the money receiving member 2 as to actuate the stepper switch 5 until the contact arm 35 contacts the hot contact member 37, 38 or the like, and the switch 6 has not been actuated but the relay 3 has been actuated, then a special impulse will be sent through the contact 92 and terminal 93 through such closed switch 123 to the terminal A of the motor 96 whereby the motor will be caused to operate through one revolution, and the stepper switch 6 will in turn be given increments of movement through the switch 97 and contact 99 until such penny or lower money indicating switch 6 has been moved over to its hot contact 19, 20 and like for vend action, or coin return, as required.

Now when a nickel is deposited in the money receiver 2, an electrical impulse passes from the money receiver by a lead 30 that connects to a normally closed switch 31 provided in the relay 3. This impulse comes from a normally open switch (not shown) in the money receiver 2 and temporarily closed by deposit of a nickel. From the normally closed switch 31, the impulse is passed to a lead 32 that connects to an operating coil 33 for the control relay 7 that moves the stepping switch 5. Lead 32*a* connects the coil 33 to the opposite power lead 28 to complete the power supply circuit for five cent impulses. Switch 128 also connects to the lead 30 so that, before actuation of the control relay 3, the first impulse of the penny stepper switch 6 also provides an impulse to the five cent stepper switch 5. In this instance, the stepping switch 5 is a nickel indicating or registering switch and actuation of the control coil 33 of the control relay 7 causes a control finger or detent 34 to be actuated and index or move the stepping switch 5 one unit. Thus, a stationary contact arm 35 associated with the stepping switch 5 is brought from engaging a zero terminal or contact 36 over into engagement with a terminal 37 which is the zero to five cent indicating terminal for the vending control. Thus other terminals 38, 39, 40 and 41 are provided, with as many other of such terminals as are required to indicate the cost of the article to be vended and with such terminals all being provided in five cent increments to cover ranges of five cents in the vended article price. These terminals 37 through 41 are suitably connected to contacts or terminals 42 to 48 on the connection panel 9. A number of vending control leads 49, 49*a*, 50, 50*a* and 51 can be connected to any desired ones of the contacts 42 through 48 shown on the connection panel 9 and respectively extending to the contacts or terminals 37 through 41 on the stepping switch 5 to show deposit of up to 5¢, 10¢, 15¢, etc. into the apparatus. These leads 49 through 51 connect to individual contacts 52 through 56 provided in a vend control switch (hereinafter described) in the apparatus of the invention. Such contacts 52 through 56 can be connected to the lead 26 which extends to a power supply lead by the vend control switch 11.

As indicated, the money receiver 2 has a plurality of separate receiving compartments therein for the different coins to be accepted to actuate the vending control. Thus, FIG. 3 of the drawings shows a portion of one special impulse or actuation circuit associated with the dime receiving section of the money receiver 2. In this instance, the receipt of the dime in the money receiver 2 causes a normally open switch 70 therein to be temporarily closed. Temporary closing of the switch 70, FIG. 3, sends an impulse through a lead 71 to the operating coil 72 for a further control relay 73. The relay 73 controls a plurality of switches or contacts 74, 75 and 76, therein, all of which are normally open until the relay 73 is actuated, being simultaneously closed thereby. The closing of the relay 73 starts a motor 77. The motor 77 is connected to the power supply lead 28 by a lead 78, whereas a second power supply lead for the motor 77, lead 79, connects to the contactor switch 76. A lead 80, in turn, extends from such contact back to the power lead 27. Thus as long as the control relay 73 is actuated, power is furnished for the motor 77.

The holding in of the relay 73 is effected by the contact 74, closed by actuation of the relay, connecting through a lead 81 to a multiple contact switch indicated as a whole by the number 82 that is controlled by a two-lobed cam 83. This cam 83 is positioned on a drive shaft 77*a* of the motor 77 and rotates therewith. A pivotally positioned contact arm 84 is provided in the switch 82 to engage and be controlled by the cam 83. One lobe 83*a* on the cam 83 is slightly smaller than a second lobe 83*b* provided thereon. A contact 85 in the switch normally engages a second contact 86 which in turn is connected to the power lead 27 by a lead 85*a*. This completes energization of the coil 72 for one revolution of the motor 77 as described. As the cam 83 is rotated, the contact arm 84 is caused to engage a contact 87 once for each lobe of the cam, which contact 87 connects to a contact 88 in the relay 73. Contact 88 is in engagement with the contact 75 that connects to the lead 30 so that as the contact arm 84 is brought into engagement with the contact 87 twice for each rotation of the cam 83, two impulses are sent to the lead 30 for actuating the nickel stepper portion of the apparatus. The contact arm 84 carries an insulation spacer 89 thereon that is caused to engage the contact 86 when the larger cam lobe 83*b* engages the arm 84 and this breaks the contact between contacts 85 and 86 and opens relay 73 and the sets of contacts controlled thereby.

A lead 76*a* connects the motor 77 to the contact 87 to receive energy therefrom when the contact arm 84 engages such contact 87 by one of the cam lobes 83*a* or 83*b* forcing such arm 84 into engagement with the contact 87. Thus when the contact arm 84 and contact 87 are engaged, energy will flow from the power supply lead

27 to the motor to energize it through the leads 76*a* and 78 and produce continued motor operation even though the longer contact lobe 83*b* of the cam has caused the contacts 85 and 86 to be opened and the relay 73 to be opened. This prepares the circuit of FIG. 3 for a new cycle of operation. When the relay 73 is energized, the contact arm 76 also engages the lead 79 to maintain energization of the motor through the lead 80 that extends to the power lead 27.

Likewise, a similar control relay to that relay 73 described for recording deposit of a dime in the apparatus of the invention is provided should the money receiver also be adapted to receive twenty-five cent pieces, fifty cent pieces, one dollar pieces, or dollar paper money, so that a plurality of impulses will be fed into the stepping switch circuit to actuate it a desired number of jumps, each indicating five cents received in the vending control 1.

When sufficient money has been fed into the vending control 1 that the stepping switch 5 has been moved over to have the contact arm 35 engage the terminal 41*b* to which the output wire 51 is connected, then current will flow through the contact arm 35 and associated lead 90 that connects to an operating coil 91 for the relay 3 which will then be actuated, as later described parts of the control switch 11 complete the power circuit. At such time, a switch 92 that normally connects to an escrow, or control portion of the relay 7 will be connected to a contact 93 which has a lead 94 extending therefrom. A power supply lead 92*a* connects to the switch 92 to supply power thereto so that its closing sends a power impulse to the penny control portion of the circuit by the lead 94 as next explained. Such lead 94 connects to a power impulse distribution lead 95 provided in the penny stepper and penny change portion of the circuit. An impulse from the five cent circuit, when no pennis have been deposited but where sufficient money for vending action has been deposited in the receiver 2, is sent to a power circuit for a motor 96 through the normally closed contact or switch 123 and a lead 123*a* extending therefrom to provide power to such motor for rotation thereof through one revolution. Lead 123*a* connects to contact A for the motor 96, the opposite terminal C of which connects to power lead 28 by lead 196. The details of the motor control circuit are shown in FIG. 2, and the motor 96 may be the same motor as that one referred to hereinbefore as the motor 77. A control cam 96*a* is on an output shaft 197 of the motor 96 and holds a switch 96*b* closed against a contact 198 once the motor 96 is started to rotate. The contact 198 (terminal B of the motor control) connects to the power lead 27 by lead 199 to maintain motor energization after a power impulse starts motor 96. The motor shaft 197 also has a suitable switch or contact arm 97 controlled thereby through a cam plate 98 on the motor shaft. Rotation of the cam plate 98 will actuate the contact arm 97 and move it to engage a contact 99 five times for one revolution of the motor 96. Contact 99 (control terminal D of the motor) connects to the penny impulse lead 12 by a lead 100, and contact arm 97 connects to control terminal B of the motor 96. Thus, each closing of the contact arm 97 and contact 99 sends an impulse to the output lead 100 in the penny handling portion of the vending control. Such lead 100 connects to the lead 12 extending from the penny input portion of the money receiver 2 to the switch 13 so that impulses controlled by the cam plate 98 pass to the switch 13. Such impulses pass to the lead 14 and actuating coil 15 to step the penny stepper switch 6 five times until its contact arm 18 engages the terminal, or contact to which the vending control, or power lead 25*d* is connected.

Bringing the contact arm 18 into engagement with the proper terminal 21*b* closes a power circuit from lead 92*a* and switch 92 through an operating coil 101 for the control relay 4 to switch 11 and power lead 28 and actuates such relay 4 to bring the switch 13 into engagement with a contact 102 attached to a lead 103. Lead 103 extends back to power lead 28 through an actuating coil 104 for a penny change unit, or return indicated by the numeral 105. Hence, after the penny stepper switch 6 has been placed in the proper position for article dispensing action, any extra impulses supplied by the motor 96 will be transmitted to the penny return 105 and return proper penny change to the person placing excess money in the vending machine. For the article costing 35¢, no penny change, of course, will be returned as all five impulses in the penny circuit are required to bring contact arm 18 into engagement with the terminal 21*b*.

Actuation of the control relay 4 also operates a switch 58 therein that engages a lead 59 that connects through a transformer 60 to the power supply lead 27 in the circuit. The switch 58 now will connect lead 59 to a lead 106 that extends to a vending control 107, that, for example, is relay operated and a power supply circuit is closed therethrough by means described hereinafter.

It should be noted that the apparatus of the invention is a pre-select type of a circuit so that the person using the apparatus 1 will select his desired item by pushing one of the plurality of control buttons 108, 109, 110, 111, or 112 of the multi-contact switch 11 prior to inserting money into the receiver 2. Specifically button 111 would be pushed in to select the 35¢ item as the article to be vended, and FIG. 1 shows the button in an actuated position. Each of the switches 108 through 112 is shown as controlling three different contacts 113, 114 and 115, one of which contacts is in the five cent stepper circuit, the penny stepper circuit, or the power circuit for the vending control 107, respectively. One side of each of the contacts 113, 114 and 115 of each control button is connected to the power supply lead 28 by the lead 26, and the other side of each of the contacts 113 and 114 connects, respectively, to a button or terminal on the five cent control panel board 9, or to a control contact, terminal, or button on the penny connection panel 110. FIG. 1 shows that the non-depressed control buttons have the contacts 113, 114 and 115 thereof in three closed series circuits. The switch 11 is of conventional construction and other equivalent means may be substituted therefor. The switch 11 includes terminals 116 through 120 controlled by the contacts 114 of the control buttons 108 through 112, respectively. In the example given, the terminal 119 connects to the lead 25*d* to close the penny control circuit for the desired vending action for the article controlled by control button 111. Additional terminals 121 through 125 in the switch 11 have circuits closed thereto by the contacts 115 of the individual push buttons 108 through 112. Such terminals 121 through 125 connect to operating coils 126 through 130 of the vend control relay 107 by conventional leads for article vending action for the different items, or vending actions, controlled by the push buttons 108 through 112, respectively.

In order to have any vending action by the apparatus previously described, it will be seen that the operating coils 126 through 130 of the vend control relay 107 are supplied by power through the switch 58 in the control relay 4, which must be actuated from its normal position before a circuit is formed therethrough, whereas the opposite side of the power line for the vend control action comes through the lead 26. Such control relay 4 is only actuated when sufficient money has been registered on the two stepping switches provided for vend action. Thus, both stepping switches 5 and 6 must have been stepped around sufficiently to complete circuits therethrough for actuation of the relays 3 and 4 before any vend action can be obtained.

Assuming that the article costs 35¢ as set up for the push button control 111 in the example given herein, it will be seen that the relay or stepping switch 5 must be stepped over to the contact 41*b*, or that seven actuations of this 5¢ switch must be provided. Thus deposit of suffi-

cient pennies, nickels, dimes or quarters or other monies must be supplied to the apparatus as to provide such action on the stepping switch which will close a circuit through the actuating coil **91** for the control relay **3** so that power will be transmitted to the motor **96** to cause it to actuate the penny stepping switch or register **6**. Thus, inasmuch as the lead **25***d* connects to the 5¢ terminal of such stepping switch, the motor **96** will operate through one revolution and will move the penny stepper switch five steps to close the power supply circuit through the penny stepper portion of the apparatus. No actuation will be supplied to the 5¢ stepping switch **5** upon initial actuation of the penny stepper switch **6** by the last nickel deposited in the apparatus when sufficient silver has been deposited to cover the article purchase cost. That is, the control relay **3** will have been actuated when a power impulse is transmitted to the penny stepper switch by the last nickel deposited so that when the relay **125** closes the normally open contact **126** in the lead **127**, such actuation is merely transmitted to the open circuit provided at the switch **128**.

It will be realized that should the item cost an odd number of pennies and an additional or excess of amount of nickels or dimes have been placed in the apparatus, then after the penny stepper switch has reached the amount of pennies involved, such as two for the 32¢ item covered by the push button control **108**, the three additional impulses provided for actuation of the stepping switch **6** will be transmitted through the contact **13** to the penny return apparatus **105** to actuate it three times for return of three pennies change to the person purchasing the item at 32¢ after having deposited a 35¢ total.

As an important element of the present invention, in order to complete the operative structure disclosed, it should be noted that escrow control apparatus for the money deposited is connected to the contact **131**. This escrow apparatus is, for example, of the general type disclosed in my prior U.S. Patent No. 2,800,988, dated July 30, 1957, and wherein a push button control would be provided so that if the prospective purchaser decided not to buy an item after starting the deposit of money into the control apparatus **1**, such person could have his money returned from the escrow means provided by pushing such escrow button. This would return his money to him and would cause a resetting of the penny and nickel stepping switches in accordance with the usual release action and reset action for this apparatus. When the control relay **3** has been actuated by deposit of sufficient money into the apparatus for article vending action, the escrow apparatus is rendered inoperative by the switch **92** moving over into engagement with the contact **93**.

The escrow control contact **131** connects to a control push button **200** that would be manually depressed by the operator of the apparatus should be desire money returned. Closing such push button switch **200** connects power lead **27** to an armature operating coil **201**, that in turn connects back to the power supply lead **28** to actuate a solenoid **202** and return the money deposited. Should contact **92** be closed to lead or contact **93**, then the power supply from lead **27** is connected to a coil **203** of the solenoid **202** and moves it in the opposite direction. Hence, money accepting plates **204** and **205** are turned so that money is deposited therefrom into the coin receptacle within the apparatus of the invention.

The apparatus of the invention can be modified to provide post selection action for vending. Generally, the same control circuit would be used, but a special control motor would be provided for operating the nickel stepper switch **5**. Such control motor would be energized through the individual push button control of article selector switch **11** and would step the stepper switch **5** backwardly and control the contact arm **35** to permit such action. Thus, when the contact arm **35** would hit a hot lead or contact on the stepper switch, the relay **3** would be actuated and impulses would be transmitted to the penny control portion of the apparatus as in the other embodiment for article vending action and for penny change return. The motor would continue operation until the apparatus was returned to its original or zero condition, or other reset action could be effected. The money, as deposited, would register on the stepper switches in the usual manner, and the nickel change would be returned by the steps of the switch **5** required to reach article vend position.

When excess silver is deposited over the even nickel price of a vended article as registered on the nickel stepper switch **5**, actuation of the relay **3** closes contact **31** to lead **31***a*. Lead **31***a* connects to a nickel return unit **206** and then to power lead **28**. Hence, such excess nickel deposit impulses pass to the nickel return unit **206** and both pennies and nickels can be simultaneously returned by the apparatus.

Should it be desired to vend articles at only even 5¢ figures, the penny stepper switch **6** and all means generally associated therewith would be eliminated. The lead **94** would connect to the lead **106** and close the article vend circuit on actuation of the control relay **3**. The 1¢ portions or contacts in the switch **11** also would be eliminated.

Deposit of a penny, after say, for example, of 25¢, would actuate the penny stepper switch **6** one notch and would move the stepper switch **5** one notch. Hence items costing 26¢ to 30¢ could be vended by deposit of proper change in the apparatus.

In order to aid in resetting the apparatus and to provide for deposit of money received in the escrow portion of the apparatus into a storage box in the apparatus, any suitable means can be provided. Thus preferably each one of the leads **160** connecting one of the contacts **121** through **125** to the operating coils of the vend relay **107** could, for example, have a micro-switch **150** provided therein. In the switch **150**, a contact arm **151** thereof is positioned to be engaged by an article **152** to be vended from the machine so that the contact **151** normally would engage another contact **153** to close the vend circuit should the article be on the arm **151** to hold it in proper engagement. Naturally the article **152** will suitably be ejected from the apparatus. Should no article be present for vending action, then the contact arm **151** is normally up in engagement with a second contact **154** provided in the switch **150**. Such contact **154** extends over to the escrow position of the apparatus to actuate the coil **201** of such escrow means and return the money to the person using the machine through the money return chute. Also, each of the leads **160** has an operating coil **155** of a relay **156** that is the hold member provided for retaining the stepping switches **5** and **6** in a given position connected therein. Actuation of the relay **156** releases a lock finger **157** for each stepping switch so that springs **121** and **121***a* will automatically return such switches to their normal zero position and the apparatus will be ready for further use.

It should be realized that the vend control action can be controlled by a solenoid, by a time delay relay, by a magnetic switch, or by any suitable means.

Note that the types of contacts or terminals provided on the control panels **9** and **10** are of the type that can be removably stacked on top of each other so that a plurality of leads from the different control buttons for vend action can be stacked on top of each other for connecting a plurality of leads to the one terminal on the vend control panel.

It will be understood that the control circuits provided for the 25¢ and 50¢ registering portions of the apparatus would be the same as that disclosed for the 10¢ control apparatus in FIG. 3 but that 5 or 10 five cent impulses would be provided thereby by five or ten lobed cams.

If desired, the stepper switch **5** could be used to record any other denominations of money such as 10¢ or quarters therein, and that the stepper switch **6** then could be used to record the deposit of a lower amount of money, such as a penny or a nickel therein. Suitable adjustment would be made in the contacts and terminal means provided dependent on whether the articles vended would be

vended at even price figures such as 5¢, 10¢, 15¢, or whether penny change would also be involved. If odd figures are involved, then obviously the penny stepper switch would have to be provided with more contacts so that 8¢ change, for example, could be provided.

It is possible to provide two sets of differently spaced contacts on one stepping switch and to connect two control circuits thereto for vending control and/or action. Also rather than such circuits being in series connection, they may be in parallel if the circuit for the larger denomination coins has a relay coil, or other element therein to be actuated when sufficient money of such larger denomination has been deposited into the apparatus for operation of the control relay **3**, as shown. Such relay coil or other element would be used to close a contact in the lower denomination circuit from which vend action would be finally controlled.

By use of the apparatus of the invention, one added relay, control relay **4**, can change the control from single coin operation to multiple coin operation and to multiple coin change action.

The control can send an impulse to a remote point, such as a washing machine, and can close a timer circuit therefor for washing machine action, the length of which would be determined by the amount of money deposited. Hence one push button **108** might require 25¢ deposit for machine operation for 15 minutes and button **109** could require 50¢ deposit for operation of a controlled machine for 40 minutes, for example. Or the apparatus could even vend a quantity of soap or detergent and also control a washing machine operative period.

For simplification in the drawings, only one microswitch **150** is shown in one lead **160**, but each such lead has a similar switch connected therein.

The reset relay **156** is shown at switch **5**, but a similar relay, or a lock finger (not shown) controlled thereby is also provided for the switch **6**. In other words, a unitary reset means is provided for the two switches **5** and **6**.

The reset action can be controlled directly by the vend flap, or door **250** in the apparatus. Normally a microswitch **251** is closed by vend movement of the door **250** and it completes a power circuit to a reset relay **252** which controls an arm **253** connecting to the control switch **11** to reset it for further action.

From the foregoing it is seen that a novel, effective vend control has been provided and that the objects of the invention have been achieved.

While one complete embodiment of the invention has been disclosed herein, it will be appreciated that modification of this particular embodiment of the invention may be resorted to without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

1. In a vending control, a stepper switch to indicate increments of money of one denomination deposited therein, a second stepper switch to indicate increments of money of lower denomination deposited therein, money receiving means to provide electrical pulses determined by the amount and type of money received therein, means connecting said money receiving means directly to at least one of said stepper switches to indicate money deposit thereon, a circuit means for each of said stepper switches connected thereto and controlled thereby, and vending control means connected in series through both said circuit means for vending action when said circuit means are in predetermined operative positions dependent upon the said stepper switches therein.

2. In a vending control, a motor, a money receiver, a contact device in said money receiver and temporarily closed when money is deposited therein, power supply circuit means including a relay connecting said money receiver means and said contact device to said motor to supply a power impulse thereto through said relay on money deposit, an output shaft secured to said motor, a control cam on said output shaft, contact means operatively associated with said control cam to be closed upon the start of rotation of said output shaft and to remain closed for one rotation of said output shaft, power circuit means for said motor connected thereto and to said contact means to energize said motor for one rotation thereof upon temporary closure of said contact device, a second cam carried by said output shaft, contact means operatively engaged with said second cam to be closed a predetermined number of times for each rotation of such cam, and power supply and circuit means connected to said second contact means to receive impulses therefrom dependent upon the money deposited in said money receiver.

3. In a vending control, a motor, a money receiver, a contact device in said money receiver and temporarily closed when money is deposited therein, a multi-contact control relay, power supply circuit means connecting said money receiver means and said contact device to said motor through said control relay to supply a power impulse thereto through said control relay on money deposit, an output shaft secured to said motor, a control cam on said output shaft, contact means operatively engaged with said control cam to be closed upon the start of rotation of said output shaft and to remain closed for one rotation of said output shaft, said contact means and power circuit means for said motor being connected through said control relay to said circuit means to energize said motor for one rotation thereof upon temporary closure of said contact device, second contact means operatively engaging said control cam to be closed a predetermined number of times for each rotation of said control cam, and other circuit means connected to said second contact means through a contact of said control relay to receive actuational impulses therefrom by closure of such contact means.

4. In a vending control, a stepper switch to indicate five cent increments of money deposit in the control, a second stepper switch to indicate penny increments of money deposit in the control, electrical circuit means connecting said stepper switches together, separate money receiving means for pennies and for nickels connected to said circuit means to provide electrical pulses determined by the amount and type of money received therein, means connecting said money receiving means directly to the corresponding one of said stepper switches to indicate money deposit thereon, a vend control circuit including a normally open contact, and a relay having an actuating coil to close said contact when actuated, said stepper switches being connected in series through said circuit means and said relay actuating coil to provide for vending action when said stepper switches are in predetermined operative positions.

5. In a vending control, money receiver means for different denominations of money, power supply means connecting to said money receiver means to provide power impulses therefrom upon money deposit, a stepper switch to indicate five cent increments of money deposit in said money receiver means, electrical circuit means connecting said stepper switch to said money receiving means to provide electrical pulses determined by the amount and type of money received in said money receiving means, said electric circuit means including pulse generating means therein with the number of pulses being provided being dependent upon the denomination of money deposited, said stepper switch indicating total money deposited into said money receiver means, and operative means connected to said stepper switch for energization when said stepper switch is in a predetermined position.

6. In a vending control, money receiver means with separate sections therein for receiving different denominations of money, power supply means connecting to said money receiver means to provide power impulses therefrom upon money deposit, a stepper switch to indicate increments of money deposit in said money receiver means, electrical circuit means connecting said stepper

switch to said money receiving means, said electric circuit means including a motor, a cam driven by said motor and a pulse switch controlled by said cam including pulse generating means to create pulses in said electric circuit means with the number of pulses being provided being dependent upon the denomination of money deposited, said stepper switch indicating the total increments of money of any acceptable denomination deposited into said money receiver means, and operative means connected to said stepper switch for energization when said stepper switch is in a predetermined position.

7. In vending apparatus having electrical control means therein, a stepping switch to indicate increments of money deposited, a series of contact means on said stepping switch to indicate the sum of the money deposited, power supply means, money receiving means connected to said power supply means and to said stepping switch to move it increments of movement for each article of money deposited, circuit means connecting said power supply means to said stepping switch and to a contact means thereon after money deposit, a stationary control panel with a plurality of terminals thereon, individual lead means permanently connecting said contact means individually to different ones of said terminals, a plurality of vend select switches, and lead means removably connecting a said vend select switch to a desired one of said terminals to control the vend price of a selected item.

8. In vending apparatus for accepting several denominations of money, a pre-select vend switch controlling at least three sets of contacts, power supply means connecting to one side of each of said contacts, a pair of different circuit means connected to two different ones of said contacts on the opposite side thereof to close power circuits therethrough when the proper money for vend action has been deposited; said circuit means each including a stepping switch requiring money deposit of a predetermined amount to close a circuit from said power supply means therethrough, electrically operated vend control means, and circuit means connecting the opposite side of said third contact to said power supply means through said vend control means when said circuit means are closed through said first and second contacts.

9. In a vending control, a stepper switch to record increments of money of one denomination deposited therein, a second stepper switch to record increments of money of lower denomination deposited therein, money receiving means to provide electrical pulses determined by the amount and type of money received therein, means connecting said money receiving means directly to at least one of said stepper switches to record money deposit thereon, a circuit means for each of said stepper switches connected thereto and controlled thereby and being made conductive in one position of its said stepper switch, relay means connected in said circuit means for said second stepper switch and actuated by the initial deposit of money of lower denomination in said money receiving means if said icrcuit means of said first stepper switch is not conductive, switch means connected in said circuit means for said first stepper switch to supply an operative impulse to said second named means when said relay means are actuated, and vending control means connected in series through said circuit means for vending action when said circuit means are in predetermined operative positions dependent upon the said stepper switches therein.

10. A vending control as in claim 4 where means are provided to send five pulses to said second stepper switch by deposit of a nickel in the nickel money receiving means after said first stepper switch has been moved to an operative position by money deposit.

11. A vending control as in claim 10 where penny return means are provided, and circuit means connect to said second stepper switch and to said penny return means to return penny change when said second stepper switch is moved to an operative circuit closing condition by less than five of said pulses.

12. In a vending control, a stepper switch to indicate increments of money of one denomination deposited therein, a second stepper switch to indicate increments of money of lower denomination deposited therein, money receiving means to provide electrical pulses determined by the amount and type of money received therein, means connecting said money receiving means directly to at least one of said stepper switches to indicate money deposit thereon, a circuit means for each of said stepper switches connected thereto and controlled thereby, and vending control means connected through both said circuit means for vending action when both said circuit means are in predetermined operative positions dependent upon the said stepper switches therein.

13. In a vending control, a plurality of stepper switches to indicate increments of money of different denomination deposited therein, money receiving means to provide electrical pulses determined by the amount and type of money received therein, means connecting said money receiving means directly to at least one of said stepper switches to indicate money deposit thereon, a circuit means for each of said stepper switches connected thereto and controlled thereby and being made operative when its said stepper switch is in a selected position, and vending control means connected through all of said circuit means for vending action when all of said circuit means are in predetermined operative positions dependent upon the said stepper switches therein.

14. In a vending control, a motor, a rotatable cam means operatively connected to said motor to be driven thereby, one normally open and one normally closed contact members operatively engaged with different peripheral portions of said cam means with said one normally open contact means being moved to contact closing position thereby a predetermined number of times upon a complete rotation of said cam means and with said normally closed contact member to be opened once on rotation of said cam means, a money indicating circuit means connected to said normally open contact member to be controlled thereby, a money receiving means, and a power circuit means connecting said money receiving means to said motor and to said normally closed contact member for motor operation through one revolution upon deposit of money in said money receiving means, said money indicating circuit means receiving a predetermined number of impulses upon motor operation.

15. In a pre-select vending control, a stepper switch to indicate increments of money of one denomination deposited therein, a second stepper switch to indicate increments of money of lower denomination deposited therein, money receiving means to provide electrical pulses determined by the amount and type of money received therein, means connecting said money receiving means to said stepper switches to indicate money deposit thereon by incremental movement of said stepper switches, a circuit means for each of said stepper switches connected thereto and controlled thereby, a different relay means connected in each of said circuit means for said stepper switches but being connected in series with each other and actuated by the deposit of sufficient money in said money receiving means for vending of the selected item, change return means connected to each of said relay means to be actuated for return of change for any excess money deposited in said money receiving means after actuation of at least one of said relay means, and vending control means connected through both said circuit means for vending action when both said circuit means are in predetermined operative positions dependent upon the said stepper switches therein.

16. In a pre-select vending control, a stepper switch to indicate increments of money of one denomination deposited therein, a second stepper switch to indicate increments of money of lower denomination deposited therein, money receiving means to provide electrical pulses

determined by the amount and type of money received therein, means connecting said money receiving means to said stepper switches to indicate money deposit thereon by incremental movement of said stepper switches, a circuit means for each of said stepper switches connected thereto and controlled thereby, a different relay means connected in each of said circuit means for said stepper switches and actuated by the deposit of sufficient money of the different denominations in said money receiving means for vending of the selected item when both of said relays have been actuated, and change return means connected to each of said relay means to be actuated for return of change after at least one of said stepper switches has been moved to a preselected position.

17. In a pre-select vending control, a stepper switch to indicate increments of money of one denomination deposited therein, a second stepper switch to indicate increments of money of lower denomination deposited therein, money receiving means to provide electrical pulses determined by the amount and type of money received therein, means connecting said money receiving means to said stepper switches to indicate money deposit thereon by incremental movement of said stepper switches, a circuit means for each of said stepper switches connected thereto and controlled thereby to be made conductive for one position of its said stepper switch, a different relay means connected in each of said circuit means for said stepper switches and actuated by the deposit of sufficient money in said money receiving means for vending of the selected item, a second relay operatively associated with said lower denomination money circuit means and connected to said first stepper switch circuit means to supply an impulse thereto when actuated, a pair of switches operatively controlled by said second stepper switch to be closed when said stepper switch is at its zero position, one of said pair of switches being connected to said second relay to actuate it upon initial deposit of money of lower denomination and supply an impulse to said second-named means if said first stepper switch circuit means is not conductive, said second of said pair of switches being connected between said circuits of said stepper switches to provides a special impulse to said second stepper switch circuit when said circuit means of said first stepper switch is conductive and said relay means thereof is actuated, and vending control means connected through both said circuit means for vending action when both said circuit means are in predetermined operative positions dependent upon the said stepper switches therein.

18. In a vending control, a stepper switch to indicate increments of money of one denomination deposited in the control, a second stepper switch to indicate increments of money of a lower denomination deposited in the control, electrical circuit means connecting said stepper switches together, separate money receiving means for monies of the different denominations connected to said circuit means to provide electrical pulses determined by the amount and type of money received therein, means connecting said money receiving means directly to the corresponding one of said stepper switches to record money deposit thereon, a vend control circuit including a normally open contact, and a relay having an actuating coil to close said contact when actuated, said stepper swiches being connected in series through said circuit means and said relay actuating coil to provide for vending action when said stepper switches are in predetermined operative positions.

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