

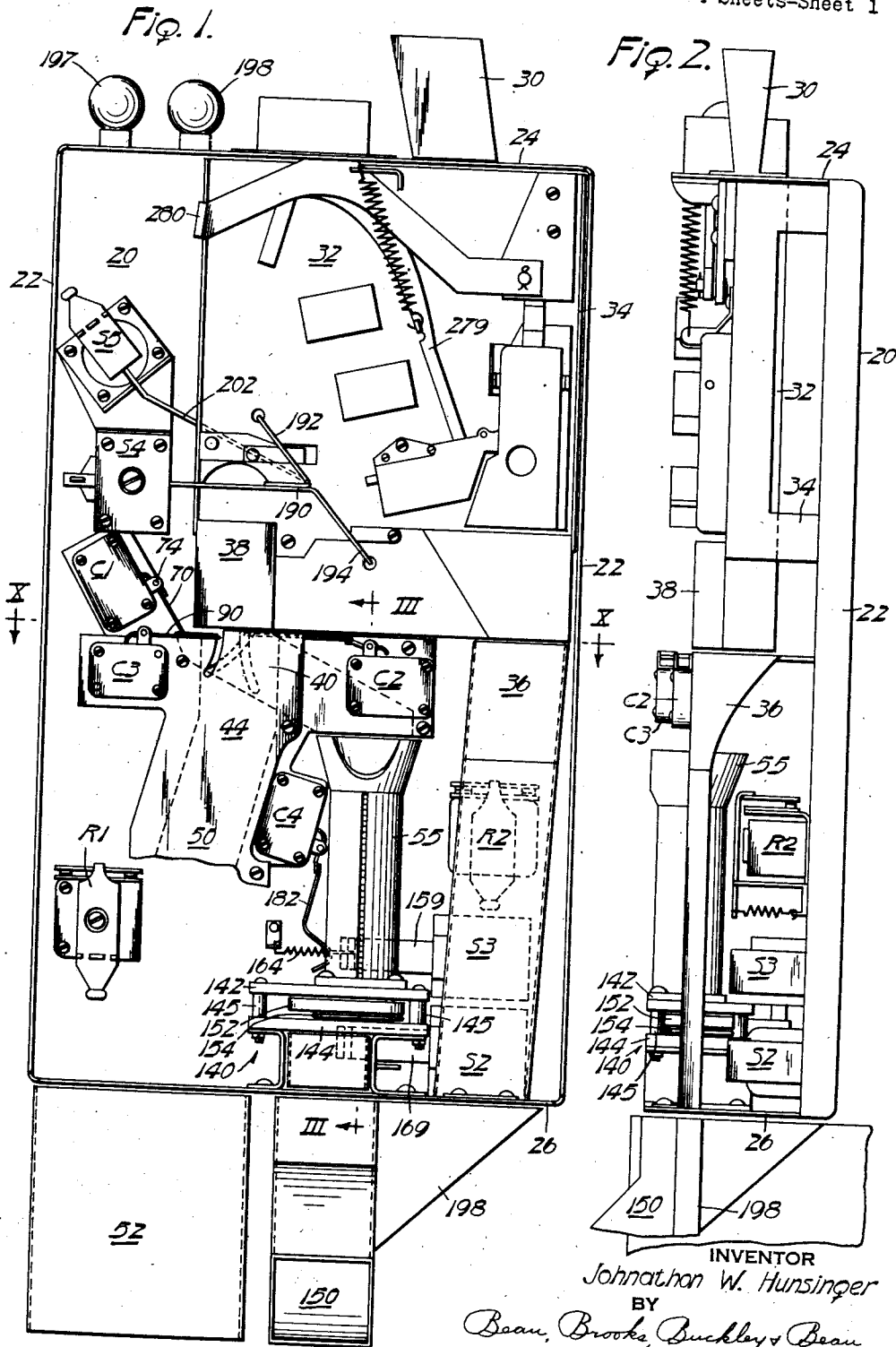
Feb. 16, 1954

J. W. HUNSINGER
COIN CONTROLLED MECHANISM

2,669,336

Filed Dec. 12, 1947

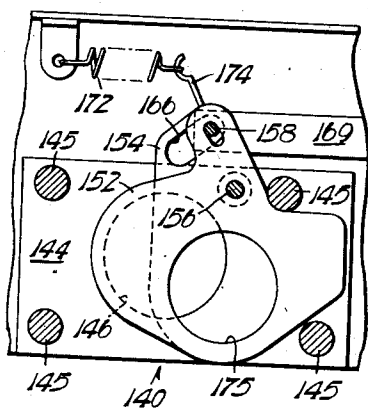
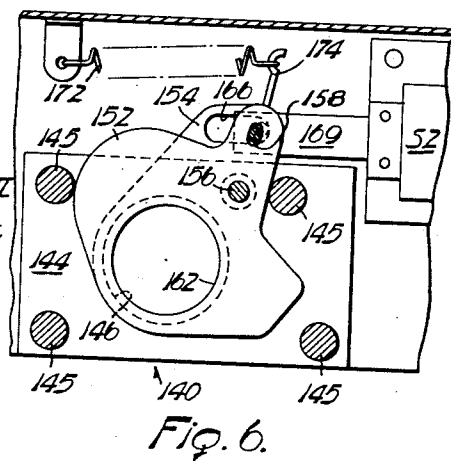
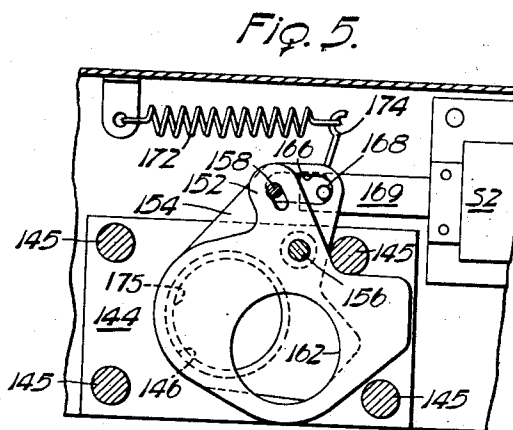
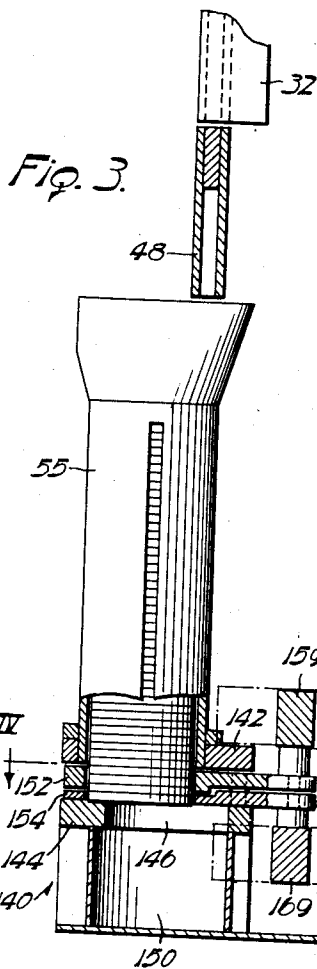
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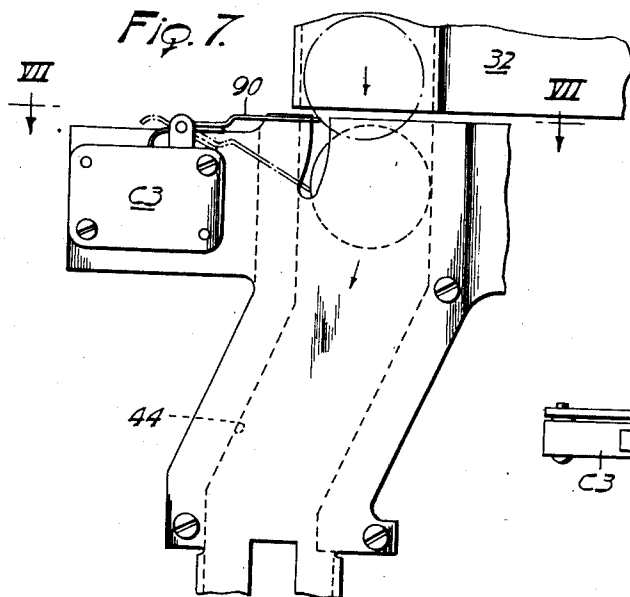


Fig. 8.

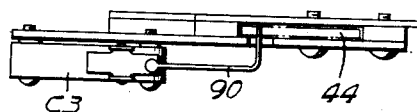
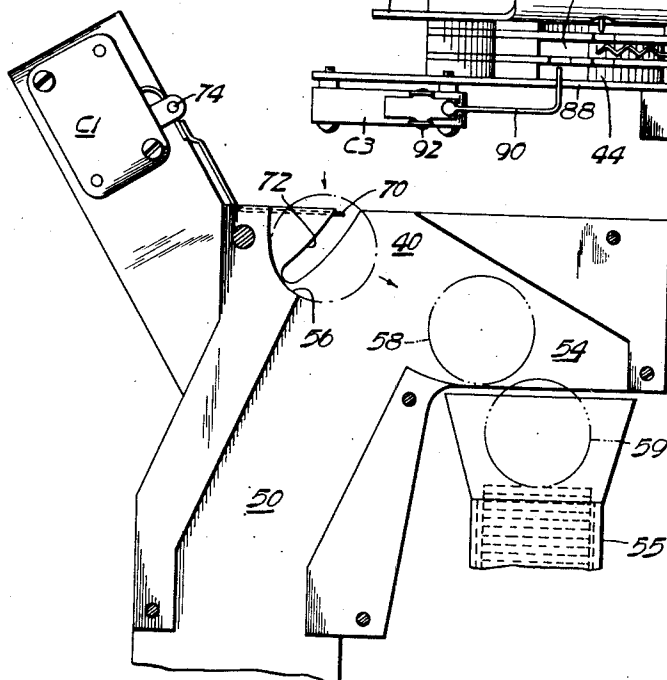
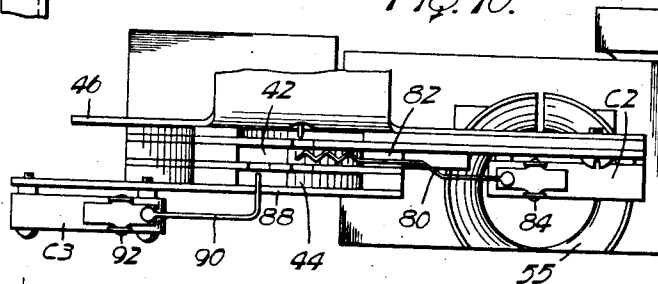


Fig. 10.



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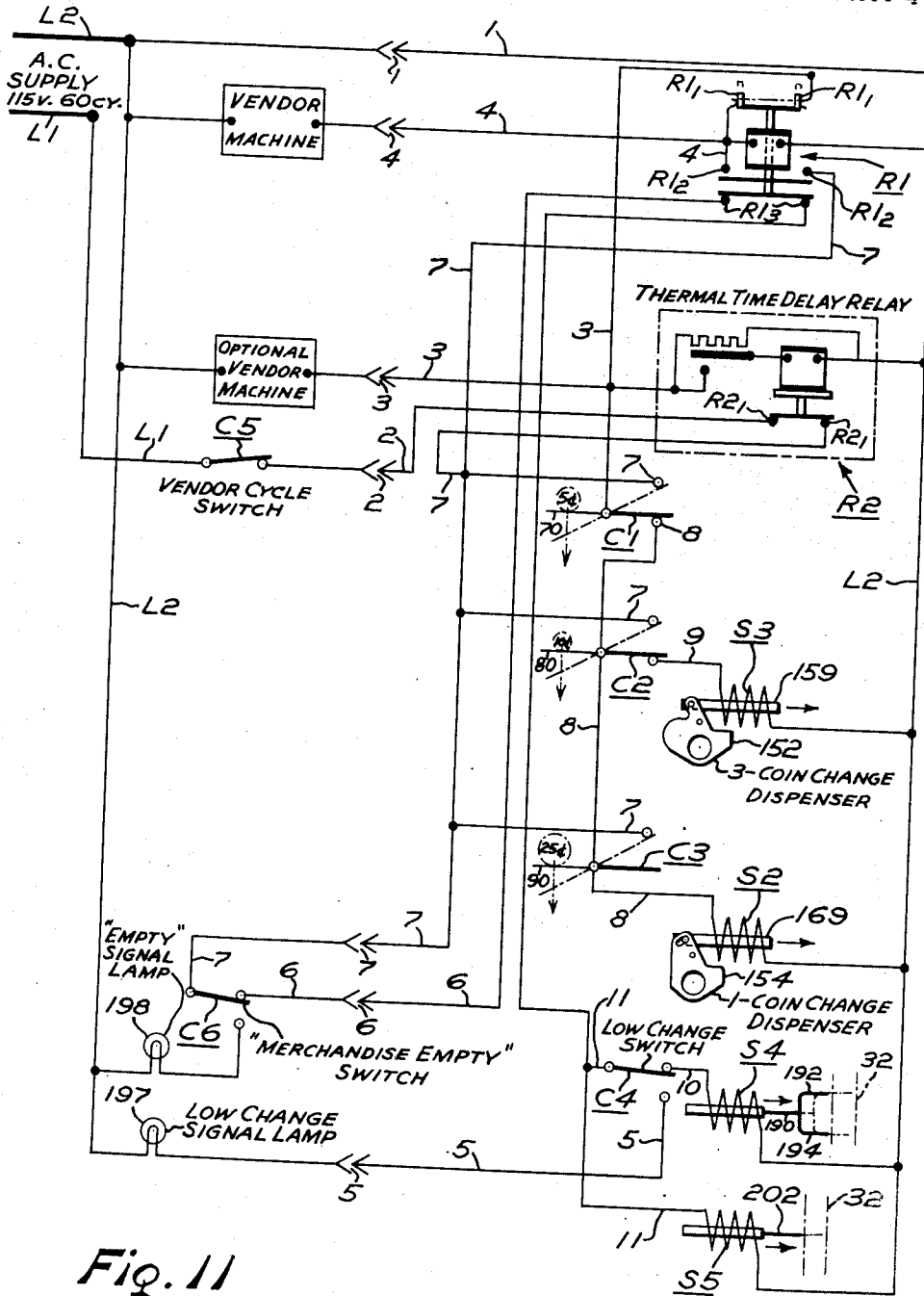


Fig. 11

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UNITED STATES PATENT OFFICE

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COIN CONTROLLED MECHANISM

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2 Claims. (Cl. 194—10)

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This invention relates to improvements in coin changing and/or coin-controlled mechanisms; and more particularly to improvements in electrical control systems in mechanisms of the type which are adapted to be attached to merchandise vending machines for automatically controlling dispensing operations thereof and for returning correct change whenever coins are inserted which are of greater value than the cost of the article dispensed. Also, the invention relates to improvements in devices such as may be employed simply for coin changing purposes, dispensing correctly counted smaller coins in return for a deposited coin of larger denomination.

More specifically, the present invention relates to improvements in electrical control systems in coin controlled mechanisms of the type disclosed in my co-pending patent application Serial No. 708,520, filed November 8, 1946, by me jointly with Frank D. Meredith, now Patent No. 2,571,596, issued October 16, 1951.

One of the more general objects of the invention is to provide a machine of the character referred to which is so improved compared to prior art arrangements as to provide failure-proof and over-all smoother operations as well as improved speeds of operation.

Another object of the invention is to provide a machine incorporating improved safeguards against malfunctioning of the mechanism.

Another object of the invention is to provide a mechanism of the character described which automatically operates in improved manner to maintain its change coin storage in ready condition.

Another object of the invention is to provide in a mechanism of the character described improvements in the coin handling elements thereof, whereby to facilitate accurate and uninterrupted operation of the mechanism.

Another object of the invention is to provide a simplified electrical control circuit in mechanism of the character described, so as to greatly reduce the amount of wiring and the number of control relay switches required to perform the control functions thereof.

Another object of the invention is to provide an improved electrical control system in mechanisms of the character described, whereby the problems of assembly and maintenance of such mechanisms are greatly reduced.

Another object of the invention is to provide an improved anti-jackpot protection arrangement in mechanisms of the character described, and to eliminate previous problems in control

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circuits of this type relating to critical solenoid switch adjustments.

Other objects and advantages of the invention will appear from the specification hereinafter.

In the drawings:

Fig. 1 is a front elevation of a vending mechanism of the invention, with the front cover plate thereof removed;

Fig. 2 is a side elevation thereof as viewed from the right of Fig. 1;

Fig. 3 is a fragmentary section, on a larger scale, taken along line III—III of Fig. 1;

Fig. 4 is a fragmentary section, taken along line IV—IV of Fig. 3 showing the change dispenser means in one position;

Figs. 5-6 are views similar to Fig. 4 showing the coin change dispensing mechanism in other positions;

Fig. 7 is a fragmentary front elevational view of a portion of Fig. 1 on a larger scale showing the 25 cent deposited coin chute and control elements of the mechanism;

Fig. 8 is a view taken along line VIII—VIII of Fig. 7;

Fig. 9 is a fragmentary front elevation of an alternative form of the 5 cent coin chute and change reservoir feed control means;

Fig. 10 is a fragmentary section, on a larger scale, along line X—X of Fig. 1; and

Fig. 11 is a wiring diagram of the electrical control system of the mechanism of Figs. 1-10.

The invention is illustrated in the drawing by way of example to comprise a mechanism which is assembled into extremely compact form, and housed within a casing including a back plate 20 which is flanged at each side for stiffening purposes as indicated at 22, and at its top and bottom as indicated at 24-26 respectively, to provide corresponding top and bottom sills. Thus, the back plate defines an open front box-like frame which is adapted to be bolted or otherwise mounted upon a side or wall portion of a vending machine or the like such as is to be controlled by the mechanism of the invention. Any suitable front cover plate may then be applied to enclose the mechanism.

It is to be understood that mechanisms embodying the present invention may be constructed so as to handle any coin or combination of coins of various denominations and to withhold any coin or combination of coins in exchange for a deposited coin and/or dispensing of one or more articles to be vended. However, for the purposes of illustration herein the mechanism of the drawing is shown and described as being

designed to receive nickels, dimes and quarters and to operate in response thereto so as to actuate an accessory dispenser control device permitting delivery of one five cent article while simultaneously returning correct change in the form of either nickels or dimes according to the denomination of the deposited coin.

The coin deposit chute is shown as a funnel-shaped coin receptacle 30 fixed to extend upwardly from the top wall plate 24. The bottom end of the coin receptacle 30 is in registry with a coin slot through the top wall 24, and thus a deposited coin is guided to fall by gravity edgewise therethrough and into the coin receiver portion of a multiple coin segregating and counterfeit coin rejecting apparatus such as may be separately assembled as a unit designated generally at 32 (Figs. 1-2) independently of the mechanism of the present invention. The device 32 may be called a coin-slug segregator unit and constitutes no part of the present invention, and is shown to be fastened in position against the back plate 20 by means of a bracket 34 for initially screening deposited slugs and coins prior to their delivery to the vending and change making control mechanism of the present invention.

Numerous mechanisms as referred to hereinabove for segregating various coins and rejecting counterfeit coins have been previously developed; and one such mechanism, for example, is currently being manufactured by National Slug Rejectors, Inc., and is described in detail in U. S. Patent 2,292,628. As illustrated in Fig. 14 of this patent, the mechanism thereof includes an arrangement involving a coin chute for discharging spurious coins and separate chutes for discharging good nickels; good dimes; and good quarters. Thus, in the present patent application the drawing herein illustrates the coin segregating and slug rejecting mechanism 32 to similarly include a slug rejection port 35 and a triple compartmented chute 38 which is arranged to discharge in parallel paths, nickels, dimes and quarters which have been tested and passed by the mechanisms interiorly of the unit 32.

The mechanism of the present invention as illustrated herein includes separate chutes 40-42-44 for receiving good nickels, dimes, and quarters, respectively (Figs. 3-7); the inlet ends of the chutes being disposed in registry with the corresponding coin discharge ports of the coin segregator 32. As the coins slide down in response to the forces of gravity through their respective chutes they push against and depress electric circuit control arms thereby energizing the accessory vending machine dispensing circuit as well as appropriate circuits for initiating dispensing of proper change.

For example, in the arrangement illustrated and described hereinafter whenever a 5 cent coin is deposited only one 5 cent article will be delivered by the accessory dispenser and no change returned. When a 10 cent coin is deposited one 5 cent article will be delivered and a nickel will be returned. If a 25 cent coin is deposited one article will be delivered and four 5 cent coins returned. Arrangement is made whereby whenever the coin device and the vending machine have been energized by deposit of a proper coin and are in the process of an operative cycle any newly deposited coins reaching the coin segregating unit while the said cycle of operation is still in continuance will be "slugged" and re-

turned directly to the customer. A more detailed description of the operative mechanisms and of the electrical control apparatus will now be furnished.

To accommodate 5 cent coin deposits the chute 40 is constructed to comprise back and front plates 46-48 which are supported in parallel spaced relationship by means of edge spacers 49-49. The chute structure is shown to be of bifurcated form; that is, with one leg directed downwardly as indicated at 50 (Fig. 9) for delivery of deposited nickels into the main storage coin box as indicated at 52 (Fig. 1); the second leg of the coin chute 40 being divergent laterally as indicated at 54 for delivery of deposited nickels into the upper end of a coin change supply column 55, out of the bottom of which correct change is automatically dispensed as required in connection with deposits of 25 cent and 10 cent coins, as will be explained hereinafter.

The chute device 40 includes a curved baffle surface 56 which functions as an anvil against which incoming coins fall and are deflected thereby to bounce over into the lateral leg portion 54 so as to fall into the upper end of the change column 55. The leg portion 54 is vertically dimensioned so as to accommodate only two coins while in edgewise position, such as is indicated at 58-59 (Fig. 9) whereby it will be understood that whenever the change column 55 is fully loaded with nickels in flatwise stacked relation the next two coins deflected from the anvil portion 54 will be blocked by the stack of coins in the column 55 and will simply remain in edgewise position as indicated at 58-59. This blocks the leg portion 54 of the chute device whereby the next coin deflected from the anvil 56 will strike against the coin at 58 and be thereby deflected again and downwardly into the chute portion 50 for direct delivery to the coin box 52.

Whenever a nickel is received at the upper entrance of the coin chute 40, and regardless of whichever leg of the chute 40 the coin will later follow, the coin will first press against a pivotal finger 70 (Fig. 9) which extends at its free end through a slotted portion 72 of the chute plate 46. The finger 70 is pivoted at 74 to actuate the contacts of a switch C1; the arm 70 being arranged to actuate the contacts of the switch C1 whenever a nickel drops into the upper end of the chute 40 and thereby depresses the arm 70, regardless of whether the nickel is then permitted to drop directly into the coin box or is diverted by the anvil to roll into the coin changer column 55. As will be explained more fully hereinafter in connection with the wiring diagram portion of the drawing, such actuation of the switch C1 will energize the circuit which controls operation of the accessory dispensing machine so that the latter will deliver one 5 cent article to the customer.

As explained hereinabove, whenever a good 10 cent coin passes through the slug rejector mechanism 32 it issues therefrom to fall into the upper end portion 42 of a coin chute which generally parallels the downwardly directed leg 50 of the 5 cent coin chute. An arm 80 extends at its free end through a slotted portion 32 of the 10 cent coin chute structure so as to engage 10 cent coins as they fall downwardly through the chute 42. At its other end the arm 80 is pivotally mounted as at 84 and connected to a switch C2; the arm 80 being so arranged as to close the

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contacts of the switch C2 whenever a 10 cent coin falls through the chute 42 and thereby depresses the arm 80. As will also be explained more fully hereinafter in connection with the wiring diagram portion of the drawing, such actuation of the switch C2 will simultaneously energize the article vending control circuit so that one 5 cent article will be delivered to the customer, and at the same time the change dispensing mechanism which will be described hereinafter will be energized so that a 5 cent coin will be returned to the customer.

The 25 cent coin chute 44 also parallels the course of the main leg of the chute 40 and of the 10 cent chute 42, and as shown in Fig. 7 a side wall portion of the 25 cent chute is slotted as indicated at 88 to accommodate the free end of a control finger 90; the finger 90 being pivotally mounted as at 92 and connected for operation of a switch C3. Thus, whenever a 25 cent coin goes downwardly into the chute 44 it depresses the arm 90 and causes the contacts of the switch C3 to be closed; thereby simultaneously energizing the dispensing machine control mechanism and the coin change dispenser mechanism, as will be explained hereinafter, so that one 5 cent article and four nickels will be ejected from the coin change dispenser.

The coin changing dispensing unit of the mechanism is indicated generally at 140 and is disposed directly under the coin change column 55 and includes a pair of vertically spaced horizontal plates 142-144 which are interconnected by posts 145. The upper plate 142 is apertured in registry with the bottom end of the coin column 55 so as to permit successive settling of nickels from within the coin column through the plate at 142. The bottom plate 144 is also apertured as indicated at 146 so as to permit nickels to fall flatwise therethrough and downwardly into a change dispensing chute 150; the aperture 146 being laterally offset out of vertical alignment with the column of coins stored in the coin column 55. Thus, to be dispensed through the aperture 146 and into the chute 150, coins from within the column 55 must be laterally displaced into the opening of the aperture 146.

To accomplish such displacement, a pair of apertured plates 152-154 are independently pivotally mounted upon a pin 156 extending between the upper and lower plates 142-144. The plate 152 is pivotally connected as at 158 to one end of the armature 159 of a solenoid S3, and the plate 152 is apertured as indicated at 162 and is adapted to lie either in registry with the vertical axis of the coin column 55 or with the coin change dispensing aperture 146, in response to pivoting of the plate 152 upon the pin 156. The solenoid S3 is arranged to pull the apertured plate 152 to the right as viewed in Figs. 4-5-6 so as to dispose the coin carrying aperture 162 thereof in registry with the change dispensing aperture 146, and a tension spring 164 (Fig. 1) is provided to normally bias the coin control plate 152 back into registry with the coin column 55.

The coin control plate 154 is slotted as indicated at 166 to accommodate pivotal connection 168 with the armature 169 of a solenoid S2. A tension spring 172 connects at one end to the machine frame and at its other end to a finger 174 extending integrally from the coin control plate 154; the plate 154 being apertured as indicated at 175 and so positioned that when the

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spring 172 pulls the control plate 154 to the left as viewed in Figs. 4-5-6 the coin passage aperture 175 in the plate 154 is in registry with the vertical axis of the coin column 55. However, when the solenoid S2 pulls the plate to the right as viewed in Figs. 4-6, the coin aperture in the plate 154 is disposed in registry with the change dispensing aperture 146 in the bottom plate 144.

The change control plate 152, at the coin aperture portion thereof is formed to a vertical thickness dimension substantially equal to the width of three nickels when in vertically stacked relation; and the lower change control plate 154 is provided at its coin aperture portion to be of a vertical thickness substantially equal to that of a single nickel. Therefore, it will be understood that upon actuation of the solenoid S2 only the lower change control plate 154 will be pivoted so as to displace one nickel away from the bottom of the stack of change coins into the dispensing chute 150, whereas whenever the solenoid S3 is energized it pulls upon the coin change control plate 152 so as to cause displacement of three nickels into registry with the change dispensing chute 150.

To prevent loss by the customer of higher denominational coins whenever the change column 55 becomes depleted of change, such as may be due to a continuous run of 10 cent or 25 cent coin deposits without sufficient replacements of 5 cent coins, the column 55 is slotted as indicated at 180 (Fig. 3) to receive the lower end of an actuating arm 182 which is connected to a "low change" switch C4. In this instance the switch and arm devices are so arranged that as long as approximately seven coins or more repose in the column 55 the arm 182 will be held by such coins in switch-open position; but if the coin supply in the column 55 becomes less than something in the neighborhood of seven coins the arm 182 is released thereby to move inwardly of the slotted portion of the column 55 and thereby closes the switch C4. The switch C4 is connected in series with a solenoid S4 (Fig. 1) which is normally connected through the switch C4 in series with the product dispensing control circuit (as will be explained more fully hereinafter) so as to be normally energized thereby.

The armature of the solenoid S4 carries an arm 190 which is so arranged that when the solenoid is de-energized the arm 190 will be thereby moved so that a pair of fingers 192-194 thereon will be moved through apertures in the side plate portion of the coin-slug segregator unit 32 so as to project into the normal pathways therein of newly deposited 10 cent and 25 cent coins. Thus, if insufficient change is in the column 55 normal passage of newly deposited 10 and 25 cent coins through the segregator unit 32 will be interrupted and such coins will be diverted into the slug rejection chute portion 36 of the unit for delivery through supplemental chutes 196-198 and then out of the coin delivery chute 150, for immediate return to the depositor. Also, as will be explained more fully hereinafter, a lamp circuit will be automatically energized upon closing of the switch C4 so that a warning signal plate reading "deposit nickels only" will be illuminated by a lamp 197 (Fig. 1) so as to signal prospective customers that only 5 cent coins will be acceptable to the machine. Upon building up a supply of nickels within the column 55 the switch C4 will again be opened so that the coin reject control arm 190 will be retracted so as to permit 10

cent and 25 cent coins to be received, and the warning light will be de-energized.

Another switch 199 (Fig. 11) which may be called the "merchandise empty" switch is preferably mounted in conjunction with the machine control circuits and arranged to be controlled by any suitable means extending into contact with merchandise stored within the vending machine to which the hereinabove described coin changer is an accessory. Thus, the "empty" switch will be arranged so that its contacts are closed as long as there is merchandise available in the vending machine and in position to be dispensed; but whenever the machine becomes emptied the switch will automatically open, thereby de-energizing the entire dispensing and change making equipment and permitting any deposited coins to be simply diverted from their normal paths by the arm 190, so as to be returned to the depositor. To this end a second coin rejector solenoid S5 (Fig. 1) is also arranged to have its armature connected to an arm 202 extending into the normal pathway of deposited five cent coins when the circuits are de-energized; the solenoid S5 causing the arm 202 to be retracted away from interference with deposited 5 cent coins when the vending machine is loaded with merchandise to be dispensed.

Referring now to the wiring diagram of Fig. 11, and to the mechanism of the drawing, the operation of the machine when a five cent coin is deposited may be traced as follows: The movable contact of switch C1 is shifted from contact 8 to contact 7 by the coin actuating the lever arm 70 as it passes through the coin chute 40, thus closing contact 7 with contact 3 to complete an impulse circuit causing R1 relay to be energized through its normally closed contacts (R11). Contacts R11 and R12 of the relay R1 are of the "make-before-break" type, therefore the normally open contacts R12 close, locking R1 relay in with bus #1 before R1 contacts open, preventing a feed-back to a time delay relay R2.

Also upon closing, contacts R12 energize the locked-in circuit to the vendor machine, including conductors L1, 2, 7, 4. An optional vendor energizing circuit is provided from lead 3 only while the C1 switch contacts (#3 and 7) are held closed by the coin. As long as R1 relay is energized R13 contacts remain open, thereby de-energizing S4 and S5 solenoids, causing rejection of any coin inserted into the changer by deflecting the coin into the slug chute 36 and returning it to the customer. After the coin passes by the actuating arm 70 of C1 switch, the switch returns to its normally closed position. Just before the end of each vending machine cycle, the cycle switch C5 is opened by some mechanical means on the vending machine thereby de-energizing R1 relay. It is then permitted to reclose.

When a ten cent coin is deposited the cycle of operation set up by the coin is the same as for the five-cent coin except that when C2 switch is activated thereby closing bus 7 with bus 8, S2 solenoid is also thereby energized, causing a five-cent coin to be ejected from the change column. When a twenty-five cent coin is deposited the cycle is also the same as the five cent cycle of operation except that when C3 switch is closed by passage of a coin, S2 solenoid is thereby energized through bus 7 to bus 8, and S3 solenoid is then also energized by bus 7 with bus 3 through the normally closed contacts of C2 switch with bus 9. With both solenoids en-

energized, twenty cents (4 five-cent coins) will be ejected from the change column.

If the change becomes low in the change column C4 contacts open bus 10 and close bus 11 with bus 5, de-energizing S4 solenoid and thereby causing subsequently deposited ten-cent and twenty-five cent coins to be deflected into the slug chute for return to the customer; and also lighting the low change warning lamp 197 mounted upon the vending machine cabinet.

As long as the machine contains a supply of vendable merchandise the contacts of a merchandise empty switch C6 are adjusted to close bus 7 and bus 6, energizing S4 and S5 solenoids through the normally closed contacts of R13. However, if the machine becomes empty of merchandise the switch C6 opens bus 7 and bus 6, thereby de-energizing S4 and S5 solenoids thereby causing deflection of any subsequently deposited coin into the slug chute 36, also causing the merchandise empty lamp 198 to light.

A thermal time delay relay R2 is arranged in the system as shown in Fig. 11 to be energized by the aforesaid impulse circuit, so that if any of the coin switches C1, C2, or C3 should stick, or if a coin becomes wedged against any of the switch arms thereof so that the normally open contacts thereof remain closed for say more than three seconds (or any other predetermined length of time as regulated by the setting of the time delay relay R2), the thermal element of the time delay relay R2 will operate to cause the contacts thereof to close; thereby energizing R2 relay. When R2 relay is energized, the normally closed contacts of R21 are thereby pulled open, thus opening line L1 from bus 7; and R21 contacts are held open by a mechanical latch until the blocked condition of the switch mechanism (that would otherwise cause the vending and change dispensing devices to continuously operate) has been relieved and the relay R2 has been reset manually. All coins newly deposited in the machine while the above described blocked condition exists will be returned to the customer.

What is claimed is:

1. In a coin controlled, electrically operated vending machine: a commodity reservoir; a commodity dispensing means; a coin deposit chute; first switch means located adjacent said chute and having a lever arm extending into said chute, whereby passage of a coin through said chute will momentarily depress said lever arm to actuate said first switch means; electric circuit means connecting said first switch means and said dispensing means to a source of electric power; said electric circuit means including an impulse circuit controlled by said first switch means and a locked-in circuit energized by said impulse circuit, whereby actuation of said switch means will initiate a commodity dispensing operation from said reservoir; second switch means in said electric circuit means and adapted to cut off the supply of electric power to said circuit means; and time delay thermal switch means in said impulse circuit and apart from said locked-in circuit and operatively connected to said second switch means; said thermal switch means being operably responsive to continued energization of said impulse circuit as a result of said first switch means being blocked by said lever arm remaining depressed, to operate automatically subsequent to a predetermined delay period to open said second switch means and consequently said circuit means so as to prevent continuous dispensing of commodities from said reservoir.

2. In a coin controlled, electrically operated vending machine: a commodity reservoir; a commodity dispensing means; a coin change reservoir; a coin change delivery chute; a plurality of solenoid operated selective release means interposed between said coin change reservoir and said coin change delivery chute; a plurality of coin deposit chutes; switch means located adjacent said coin deposit chutes; a plurality of lever arms pivoted to said switch means and extending into each of said coin deposit chutes; electric circuit means connecting said commodity dispensing means, said solenoid operated selective release means and said switch means to each other and to a source of electric power, whereby deposit of a coin in one of said coin deposit chutes will momentarily depress the corresponding lever arm to actuate said switch means and initiate a commodity dispensing and coin change delivery operation; said electric circuit means including an impulse circuit energized during closure of said switch means and a locked-in circuit energized by said impulse circuit; and a time delay, thermal relay means in said impulse circuit and apart from said locked-in circuit and operably responsive to predetermined continued energization of said impulse circuit by reason of said switch

means being blocked in closed position by continued depression of a lever arm to automatically open said circuit means and prevent a subsequent dispensing and delivery operation.

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