June 20, 1961 R. T. COZART 2,989,165

VENDING MACHINE

Filed July 12, 1956 5 Sheets-Sheet 1

FIG. 1.

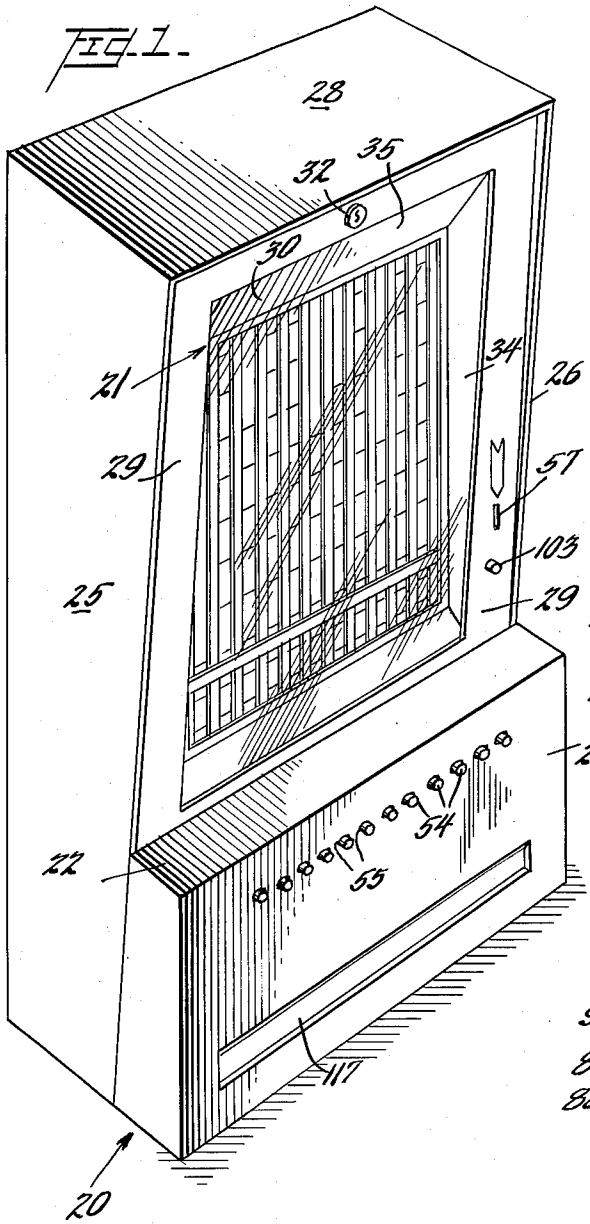
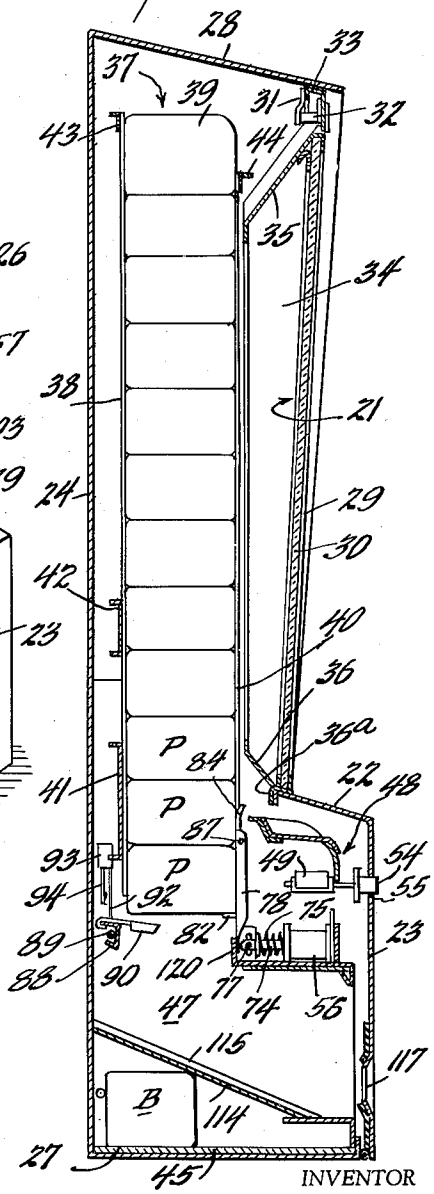


FIG. 2.



INVENTOR

Robert T. Cozart,

BY Parker and Walsh.

ATTORNEYS

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VENDING MACHINE

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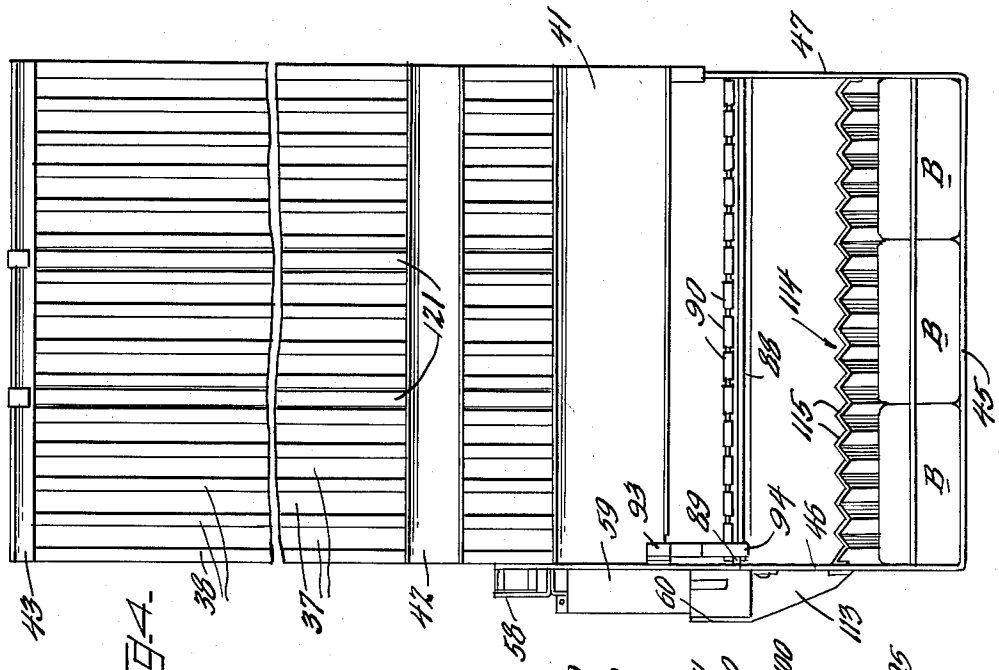


FIG. 4.

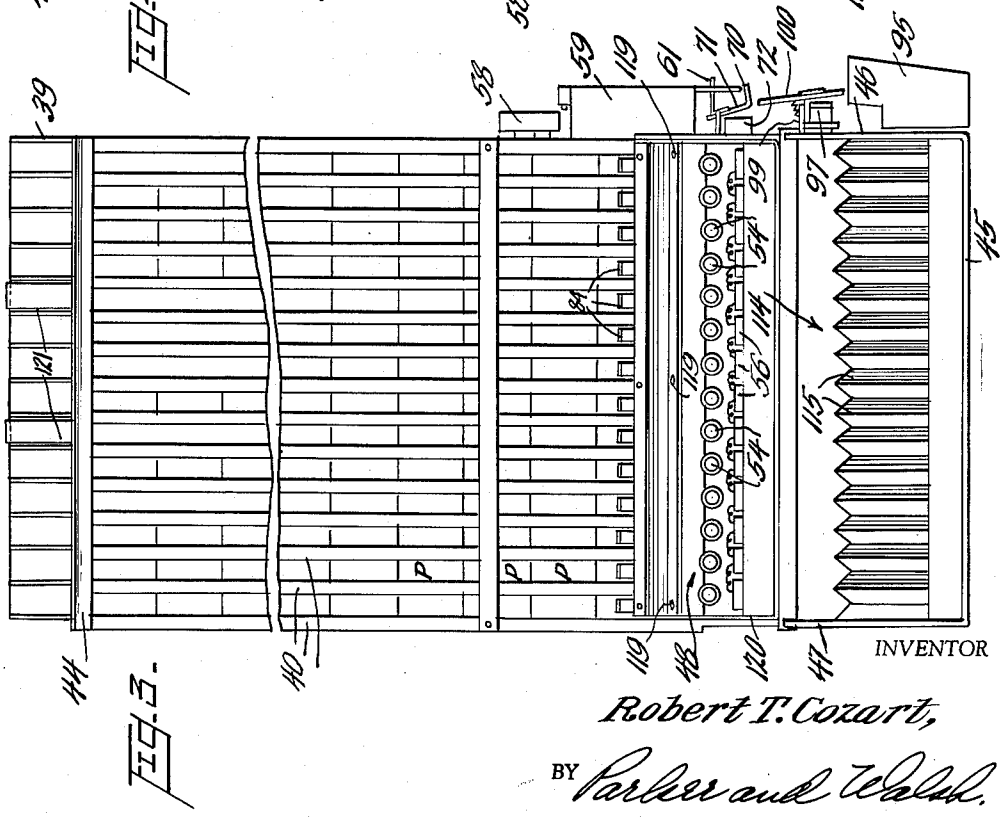


FIG. 3.

INVENTOR

Robert T. Cozart,

BY Parker and Walsh.

ATTORNEYS

June 20, 1961 R. T. COZART 2,989,165

VENDING MACHINE

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FIG. 5.

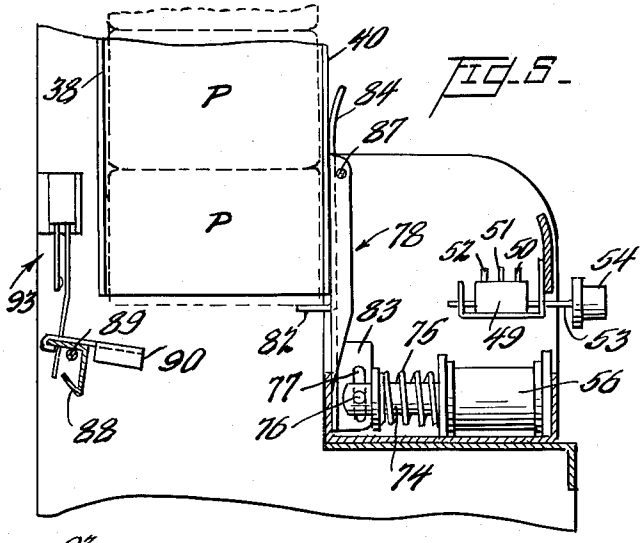


FIG. 7.

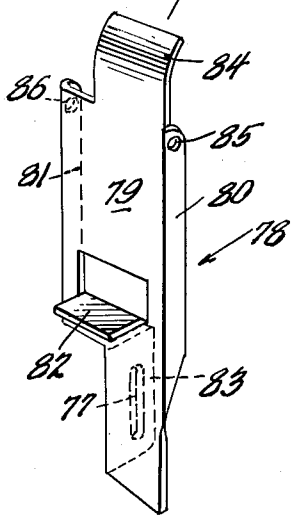


FIG. 6.

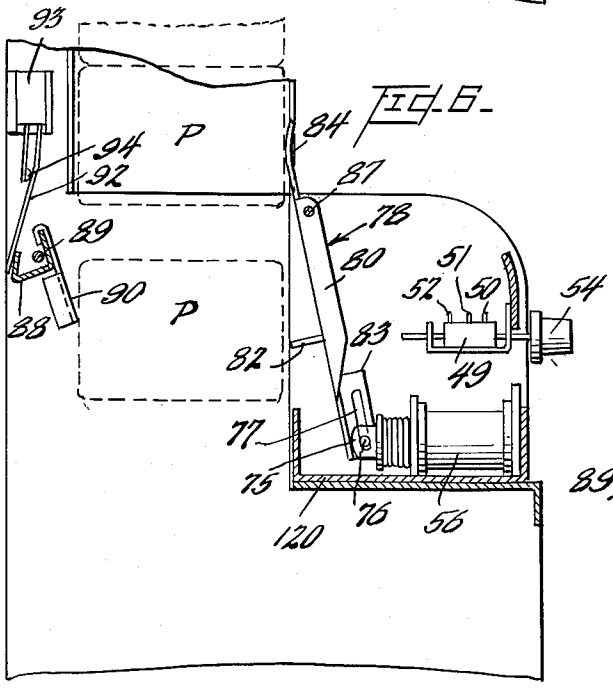
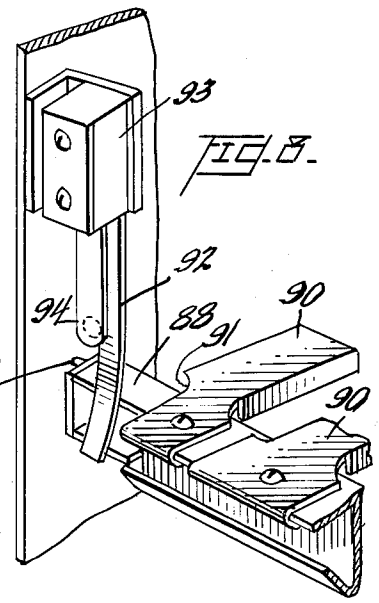


FIG. 8.



INVENTOR

Robert T. Cozart,

BY Parker and Wald.

ATTORNEYS

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VENDING MACHINE

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FIG. 9.

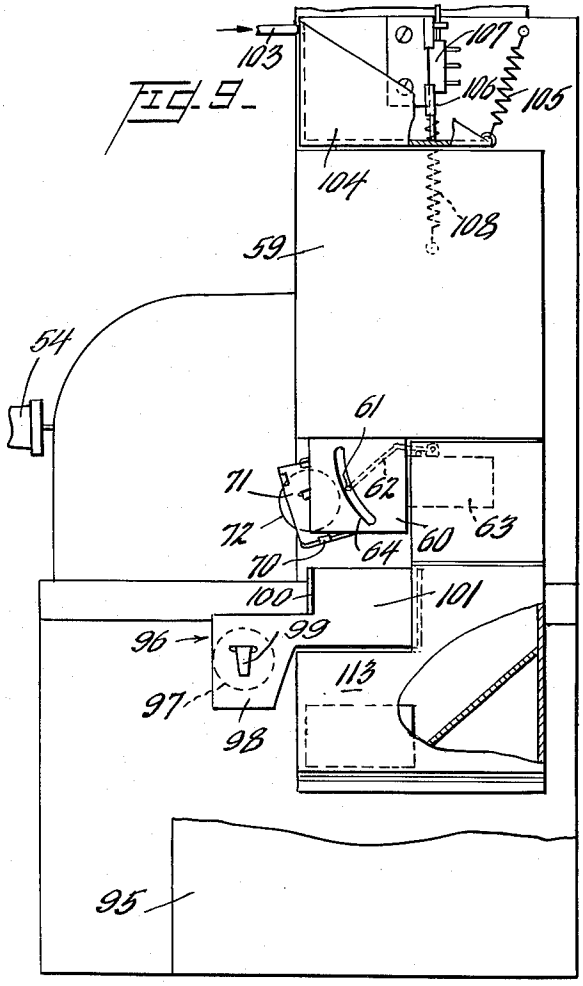


FIG. 11.

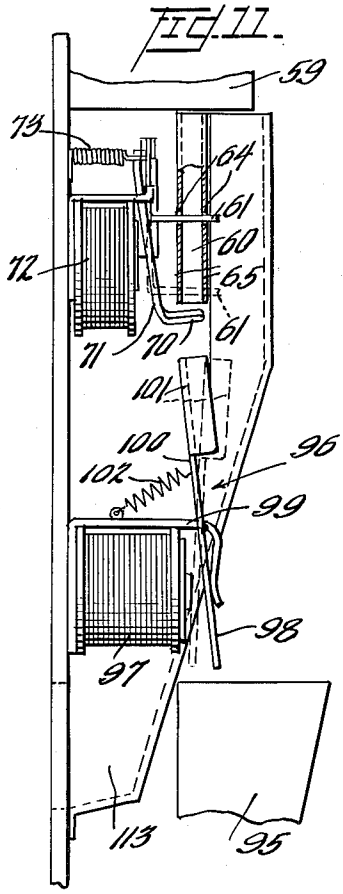
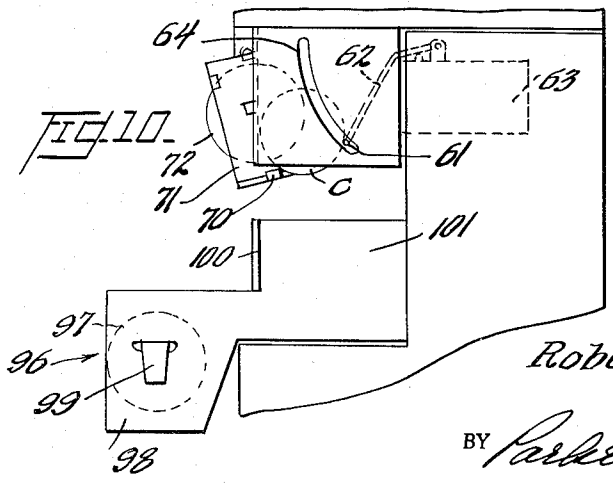


FIG. 10.



INVENTOR

Robert T. Cozart,

BY Parker and Tebbold.

ATTORNEYS

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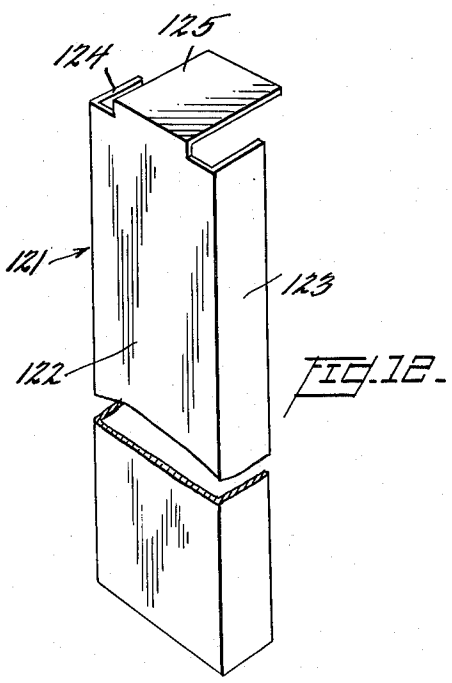


FIG. 12.

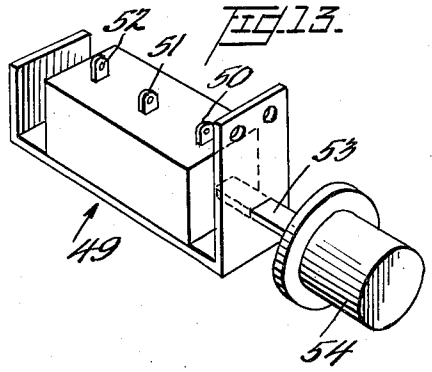
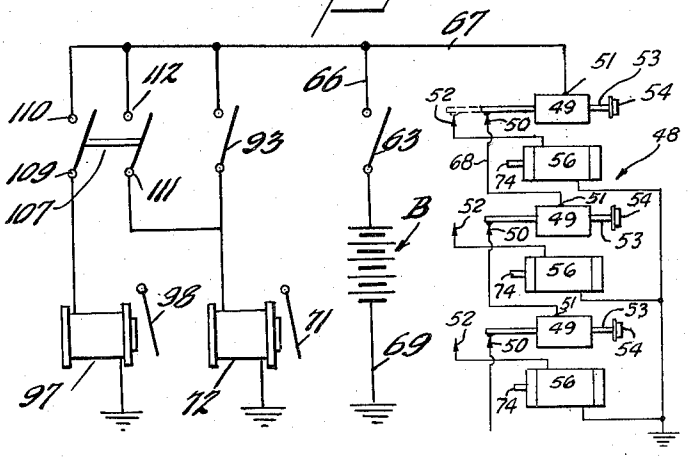


FIG. 13.

FIG. 14.



INVENTOR

Robert T. Cozart,

BY Parker and Walsh.

ATTORNEYS

United States Patent Office 2,989,165 Patented June 20, 1961

2,989,165
VENDING MACHINE

Robert T. Cozart, 107–09 S. Willow Ave., Tampa, Fla.

Filed July 12, 1956, Ser. No. 597,548
11 Claims. (Cl. 194—10)

The present invention relates generally to a vending machine of the type used for dispensing packaged articles and is more particularly directed to a machine for dispensing cigarette packs.

An important object of this invention is to provide a cigarette vending machine which effects a more economical use of space.

Another object of this invention is to provide a cigarette vending machine with edgewise storing of the cigarette packs.

A further object of this invention is the provision of a self contained, electrically operated, coin controlled vending machine.

An additional object of this invention is the provision of a cigarette vending machine having a unitary means for releasing the lowermost pack and restraining the stack.

Another object of this invention is the provision of a novel gate device for directing a coin to the coin box or to the return chute.

Another object of this invention is to provide an electrical interlock to prevent delivery of more than one pack of cigarettes.

Another object of this invention is the provision of switch means in the path of the dispensed pack for operating the coin release to direct the coin into the coin box.

An additional object of this invention is the provision of plunger operated, electric switch means for operating the dispensing means.

The foregoing together with other and further objects and advantages of the invention will appear in connection with the following specification taken with the accompanying drawings wherein like characters of reference indicate the same parts throughout the several views.

In the drawings:

FIGURE 1 is a perspective view of a cigarette vending machine according to this invention;

FIGURE 2 is a left end view of the machine of FIGURE 1 just inside the end plate and partly in cross-section;

FIGURE 3 is a front view of the machine, with the casing removed;

FIGURE 4 is a rear view of the machine, with the casing removed;

FIGURE 5 is a fragmentary view, partly in section, of the dispensing means, with the pack releasing means in nondispensing position;

FIGURE 6 is a similar view to FIGURE 5 but showing the relative positions of the parts after operation of the pack releasing means;

FIGURE 7 is a perspective view of the flipper plate or pack releasing means constituting an important feature of the present invention;

FIGURE 8 is a fragmentary perspective view of the pack operated switch;

FIGURE 9 is a fragmentary right end view, partly in section, showing the coin trapping and gate means, no coin being present;

FIGURE 10 shows a portion of the mechanism shown in FIGURE 9, after receiving a coin;

FIGURE 11 is a fragmentary front view of the coin trapping and gate means illustrating the operation thereof;

FIGURE 12 is a fragmentary view of a filler piece constituting a feature of the invention;

FIGURE 13 is a perspective view of one of the plunger switches used in accordance with the invention; and

FIGURE 14 is a schematic wiring diagram illustrating

a preferred form of electrical circuit in accordance with the present invention.

Referring now in somewhat greater detail to the drawings and in particular to FIGURE 1, a vending machine 20 is shown as having a housing comprising an upper transparent front wall 21, a shelf 22, a lower front wall 23, a rear wall 24, a left end wall 25, a right end wall 26, a bottom wall 27, and a downwardly and forwardly sloping roof 28. The lower front wall 23, the bottom wall 27, the rear wall 24, the roof 28 and the end walls 25 and 26 may be of metal and formed into an integral casing in any suitable manner. It is preferred that the casing be moisture or rain tight, so that the machine may be used in exposed locations.

The upper front wall panel 21 is removable, and comprises a frame 29 and a glass or other transparent panel 30. The panel 21 slopes downwardly and rearwardly as shown in FIGURE 2 and is held in position by means of a lever 31 carried by a lock cylinder 32. The lever 31 engages an angle piece 33 suitably attached in any convenient manner to the roof 28. The frame 29 includes end pieces 34, one being shown in FIGURE 1, a top piece 35 and a bottom piece 36 arranged to effectively close the space between the stack of cigarette packs and the front of the machine. The roof 28 and the shelf 22 are sloped downwardly and forwardly. The lower edge of the bottom piece 36 is preferably formed as an angle in cross-section (designated by reference numeral 36*a*) to provide a locking lip engageable with the inner edge of shelf 22 to hold the front wall 21 in place when the lever 31 is locked in position.

Within the casing there is a storage rack or magazine comprising a series of channels 37 arranged adjacent each other and each comprising a back wall 38, sides 39 and front guides 40. The backs 38 of the channels are suitably fastened in any convenient manner to bracing or framing members 41, 42 and 43 and the member 44 entends across the front of the channels 37 to tie them together as a unit. The whole assembly is supported on a substantial U-shaped frame comprising a base 45 and upright portions 46, 47.

The operating mechanism includes a bank 48 of identical switches 49 (FIGURES 2, 13 and 14). Each switch 49 has a plurality of contacts 50, 51 and 52 . The internal construction of the switches is conventional and needs no further description except to note that they are two position, single pole, sliding switches with spring return. The switches have plungers 53 operating the internal contacts and knobs 54 which project through openings 55 in the lower part 23 of the front panel. Each switch 49 is associated with a solenoid 56 as will be explained later.

On the front of the panel 21 there is a coin slot 57 registering with the coin chute 58 (FIGURE 3). A coin entering the chute 58 drops into a passage in the coin reject mechanism 59. This latter mechanism is a well known and widely used device obtainable from National Rejectors, Inc., St. Louis, Missouri, or A.B.T., Chicago, Illinois, and, since it does not per se constitute a feature of the present invention, it will not be further described except to say that it is so designed as to prevent slugs or improper coins from reaching the operating mechanism of the machine. From the coin reject mechanism 59 a good coin drops into the coin trap 60. In passing into the coin trap 60, the coin (designated by reference character C in FIGURE 10) engages the end 61 of the lever 62 of a micro switch 63. The end 61 of the lever 62 rides in arcuate slots 64 in the side walls 65 of the trap 60. When the end 61 is struck by a coin it moves to the dotted line position of FIGURE 11 (or full lines in FIGURE 10) and closes the switch 63 to energize the bank 48 of switches 49.

The battery B is connected by the switch 63 and wires 66 and 67 to the center contact 51 on the first of the series of switches 49 in the bank 48. In the normal position of the switch plunger 53, contacts 50 and 51 are electrically connected, so that current from the battery B goes through switch 63, wires 66 and 67 to the contact 51 on the first switch 49 and thence to a contact 51 on the next switch 49 through a wire 68. Each of the switches 49 in the bank 48, except the last one, is thus wired, as shown in FIGURE 14, where three switches of the series are shown. It will be apparent, therefore, that when any of the switches 49 is moved, such movement immediately breaks the continuous circuit just described so that all of the switches 49 beyond the one which is moved will be without a source of electrical potential and will thus be ineffective.

In passing the end 61 of the lever 62, as shown in FIGURE 10, the coin C reaches the bottom of the coin trap 60 and rests on the end 70 of the coin releases 71 in which position the switch 63 is held closed to energize the circuit described above. The coin release is formed as the armature of an electromagnet or relay 72, and is normally held in the position as shown in FIGURE 11 by a spring 73. Movement of a pack selector switch 49 as mentioned above breaks the circuit through the other switches 49 and closes a circuit through contacts 51 and 52 to a solenoid 56 corresponding to the switch 49 which has been operated.

Each of the solenoids 56 is provided with a plunger 74, urged outwardly, or to the left as shown in FIGURE 5, by a spring 75. Each solenoid plunger 74 is provided with a pin 76 engaging a slot 77 in the flipper plate 78. The flipper plate 78, as best shown in FIGURE 7, is substantially channel shaped having a back 79 and sides 80 and 81. A shelf 82 is formed from a portion of the back 79, and a portion of the back is bent outwardly to form a lug 83 in which is provided the slot 77 for connection with the plunger 74 as above explained. The upper end of the plate 78 is forwardly curved as at 84 for a purpose later to appear. A pair of pivot openings 85, 86 are provided in the sides 80, 81 respectively to pivot the flipper plate on a bar 87 extending across the front of the frame of the machine and securely attached in any convenient manner to the latter.

At the back of the machine there is a bar 88 pivoted to the frame by means of pins 89, only one being shown. The bar 88 is provided with a plurality of light metal or plastic fingers 90 securely attached thereto in any convenient manner. The endmost finger 90 is cut away as at 91 to clear the switch arm 92 of a micro switch 93. One of the fingers 90 is placed under the rear portion of each channel 37 in the path of a pack being dispensed therefrom. The bar 88 is normally biased in any suitable manner so as to be in the position shown in FIGURES 2, 5 and 8. Arm 92, as mentioned above, is arranged to operate the contacts of switch 93. Closing the contacts of switch 93 completes a circuit through electromagnet 72 thereby moving the coin release 71 to allow the coin C to fall into the coin box 95. This is permitted by the coin gate mechanism 96 (FIGURE 11) which comprises an electromagnet or relay 97 having an armature 98 pivoted on a bracket 99. An arm 100 extends above the pivot point and is provided with a coin gate 101. Arm 100 is normally held in the full line position of FIGURE 11 by a spring 102. It is moved to the dotted line position by relay 97 under circumstances later to be noted.

If the purchaser should change his mind after depositing a coin in the machine or if there is no merchandise in the selected channel 37, there will be no tripping of a finger 90 and the bar 88 will not close the switch 93 to release the coin from the trap 60 into the coin box 95. Release of the coin may, however, be accomplished manually by pushing the button 103 on the front of the machine. Button 103 operates a slide 104 (FIGURE 9) which is controlled by a spring 105. Slide 104 moves the plunger 106 of a switch 107 against the tension of a spring 108 to close the switch 107. The switch 107 first bridges contacts 109 and 110 (FIGURE 14) to complete a circuit through the relay 97 to move the armature 98 and the coin gate 101 to the dotted line position of FIGURE 11; further movement of the slide 104 closes the contacts 111 and 112 to complete a circuit through the relay 72 to release the coin C in the coin trap 60. The coin C thus released, is directed by the gate 101 away from the coin box 95, and drops into the chute 113 to be returned to the customer.

In the bottom of the outer casing of the machine is a downwardly and forwardly sloping shelf 114 for receiving and turning the delivered packs. The shelf 114 is formed with V-shaped corrugations 115 which are positioned to turn a pack over on its side. The shelf 114 terminates at its lower end in a substantially horizontal portion just below the lower edge of the opening 117 in the front panel through which the dispensed merchandise or returned coin may be picked up by the purchaser.

The channels 37 are arranged side by side across the width of the machine and are of a width to suitably accommodate the merchandise to be dispensed. In the preferred form of my invention, I make the channels of a width equal to the thickness of a pack of cigarettes, allowing clearance for free movement. The cigarette packs P are thus stacked edgewise in the channels 37. This enables several columns of rapid sellers to be used to one column of a slow seller. There is a consequent saving of space, and a possibility of having full channels, when loading, without likelihood of deterioration of the merchandise. There is also an additional economy of space in the present machine as the ratio of volume of goods to cabinet space is about 1:3 whereas a majority of the machines now in use have a ratio of no better than 1:15. The machine can be built at low cost in comparison to other machines now in use and it is to be particularly noted that the machine is self contained, requiring no outside source of power.

This machine is designed to accommodate either king size or regular packs in all channels. For use with regular packs, a filler piece 121 (FIGURE 12) is inserted at the back of the channel. The filler piece 121 is generally channel shaped comprising a back 122, sides 123 and 124 and a top 125. The filler piece 121 is inserted in the channel 37 with its back 122 going forward in the machine and the top 125 overlying the upper end of the back 38 of the channel 37.

Having now described my machine and some of its advantages, I shall describe below a cycle of operation.

The machine is first loaded with packs P of cigarettes arranged edge up, for gravitational discharge, in the channels 37. The lowermost pack P in each channel 37 will rest on a shelf 82 of its associated flipper plate 78. A coin is inserted in the slot 57 and passes through the reject mechanism 59. Assuming a good coin of the correct denomination has been inserted, it reaches the coin trap 60 and moves the switch arm 62 to close switch 63 and energize the circuit through the switch bank 48. A selected switch 49 is now operated by an appropriate knob 54 to break the circuit to all subsequent switches 49 and close a circuit through the associated solenoid 56 causing the plunger 74 to move to the right in FIGURES 5 and 6. This movement withdraws the shelf from beneath the lowermost pack P by pivoting the flipper plate 78 about the rod 87 thus permitting the lowermost pack to fall by gravity. This movement also brings the curved portion 84 of the flipper plate 78 against the pack P next above the one just released thereby pressing against the latter and holding it and the packs above it in position. The lowermost or descending pack P engages an appropriate finger 90 to rotate the bar 88 and close switch 93. This operation releases the coin C from the coin trap 60 and the normal operation of the switch

means **101** causes the coin to enter the coin box **95**. The pack will drop onto the shelf **114** and will be turned on its side by the corrugations **115** so that it may be withdrawn through the slot **117** by the purchaser.

Another important feature of this invention is the facility with which the bank of switches **48** can be removed by relatively unskilled personnel. By removing three screws **119** (FIGURE 3), and disconnecting wire **67** (FIGURE 14), the U-shaped frame **120** can be removed with the switches **49** and the solenoids **56** as a unit. Furthermore, although not specifically described in detail, it will be understood that gaskets may be used around the panel in the customary manner to keep out moisture and the sloping roof **28** will shed water when the machine is in a location exposed to the elements.

It should be apparent that I have devised a simple, self contained, rugged vending machine which is adapted to be used in various locations, and which requires no electrical connections to outside sources of power for its operation.

While a specific embodiment has been described, it is to be understood that various changes may be made within the scope of the appended claims.

I claim:

1. In a vending machine for dispensing uniformly shaped, generally rectangular objects from a magazine wherein the objects are stacked face to face, the magazine comprising a series of adjacent vertical channels for holding said objects for gravitational discharge into the space directly below the magazine, retaining means for supporting the lowermost object, said retaining means comprising, for each channel, a lever pivoted intermediate its ends on a single horizontal shaft parallel to one of the longer, lower edges of the magazine and extending across the front, from one outermost channel to the other, an object-supporting shelf projecting from the lever, beneath the channel and below the pivot shaft, a spring urged plunger pivoted to the lower end of the lever, normally urging the shelf toward object-supporting position, an electromagnet adjacent said lever, said plunger comprising the core of said electromagnet, a wall in the lower part of each of said vertical channels opposite the horizontal shaft and an upward extension on each of said levers having an object-engaging face, said face being thrust into object-engaging relation with the next-to-lowermost object by movement of the lever about its supporting shaft while the lower portion of the lever moves to withdraw its attached shelf from object-supporting position, a source of current for said electromagnets and a switch in circuit with each of said electromagnets, the closing of one of said switches serving to energize its corresponding electromagnet to move its plunger to actuate its lever to release the lowermost object while holding the next-to-lowermost object.

2. The structure according to claim 1 wherein the upward lever extension engages the object next above the lowermost object only.

3. The structure according to claim 2 wherein the length of the upward extension is less than the height of the object stacked.

4. The structure according to claim 2 wherein the shelf is located a distance below the pivot substantially equal to the height of one of the objects stacked.

5. The structure according to claim 1 wherein the lever comprises an elongated, vertically arranged channel-shaped member having side members and a bottom, a shelf struck rearwardly from the bottom intermediate the ends thereof, pivot openings in the side members, and an outwardly extending lug at the lower end of the lever having a slot therein pivotally engaging the plunger.

6. In a vending machine for dispensing packs of cigarettes, a magazine comprising a series of adjacent channels each arranged to store cigarette packs on edge for gravitational discharge into the space directly below the magazine, retaining means engaging the lowermost packing each channel for supporting a stack of packs, a plurality of first electromagnetic means, one associated with each channel for operating the retaining means to effect delivery of said lowermost pack therefrom by withdrawal of the retaining means, a first switch for each of said first electromagnetic means, said switch being operable by the customer to effect selection of a channel, a coin handling channel system, a coin trap therein, a coin holder in the coin trap releasably holding a coin, a second electromagnetic means for operating said coin holder, a coin receptable and a coin return chute, a gate in said system for controlling the movement of a coin to the receptacle or the chute, said gate being biased normally to direct a coin to the receptacle, a third electromagnetic means for operating the gate, a second, coin return switch operable by the customer for operating the third electromagnetic means, to overcome the bias of said gate; a third switch ganged with the second switch for energizing the second electromagnetic means to release the coin from the trap, through the gate held against its bias to the coin return chute; a fourth switch, a probe in the path of the dispensed pack for operating the fourth switch, connections between said fourth switch and said second electromagnetic means to release the coin from the trap, through the biased gate to the receptacle; a fifth switch having an operating member positioned in the path of the coin in the coin channel adjacent the coin trap, to be closed while the coin is trapped, a source of electric energy connected to one side of said switch, a circuit connecting the second side of said switch to the non-operative side of the second, third and fourth switches to energize the respective controlled devices, a circuit connecting the nonenergized side of the fifth switch to each of said first switches and circuit means connecting the open ends of each of said first, second and third electromagnetic means back to the energy source.

7. The structure according to claim 6 wherein each of the series of first switches, except the last, functions as a single pole, double throw switch, the first of the series being connected from the fifth switch optionally to its corresponding electromagnetic means or to the second of the series of first switches, the second and each succeeding first switch being connected optionally to its corresponding electromagnetic means or to the succeeding switch, said last of the series of first switches functions as a single pole, single throw switch being optionally connected to its corresponding electromagnetic means or open.

8. The structure according to claim 6 wherein each said first switch functions as a single pole, double throw switch, the pole in each switch being normally biased toward one of the two contacts of said each first switch to maintain a circuit from said fifth switch to the first in the series of first switches and to each of the other first switches in succession, means in each said first switch for breaking the normal bias to connect the pole to the second contact of said each first switch to complete the circuit from the fifth switch, through the associated electromagnetic means back to the energy source.

9. The structure according to claim 6 wherein the means in the path of a discharged pack comprises a plurality of fingers, one for each channel, a bar pivoted on a longitudinal axis, said fingers being mounted in spaced relation on said bar, means on said bar to engage the fourth switch.

10. The structure according to claim 6 wherein the second and third switches are so ganged that the second switch is closed before the third.

11. In a vending machine for dispensing rectangular articles from a bank of identical magazines which articles have a wide dimension materially wider than a second, narrow dimension wherein said articles are stacked vertically, with the narrow dimensions of each parallel to the face of the machine, on said narrow dimension for discharge from said stack, means for dispensing said articles

one-at-a-time, a downwardly and forwardly sloping plate below said stack for guiding discharged articles from the discharge point to a customer delivery point, said plate having corrugations parallel to the direction of delivery, the depth and width of the corrugations being selected to prevent support of the narrow dimension across two adjacent corrugation crests, whereby the article is caused to tip from its position supported on its narrow dimension to a position supported on its wide dimension as it slides to the customer delivery point, down the corrugated plate.

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