Sept. 16, 1969 G. W. VAUGHAN ETAL 3,467,275

CONTAINER DISPENSER HAVING AN ESCAPEMENT ASSEMBLY

Filed Dec. 26, 1967 5 Sheets-Sheet 1

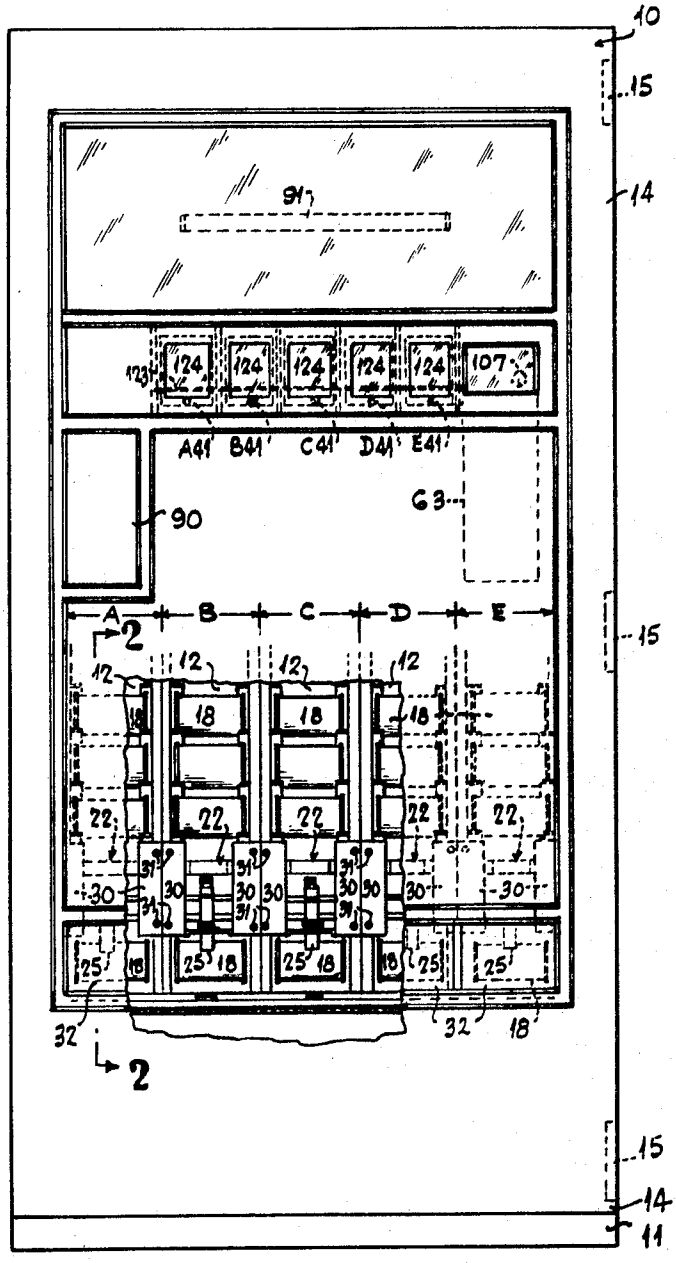


Fig. 1

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CONTAINER DISPENSER HAVING AN ESCAPEMENT ASSEMBLY

Filed Dec. 26, 1967 5 Sheets-Sheet 2

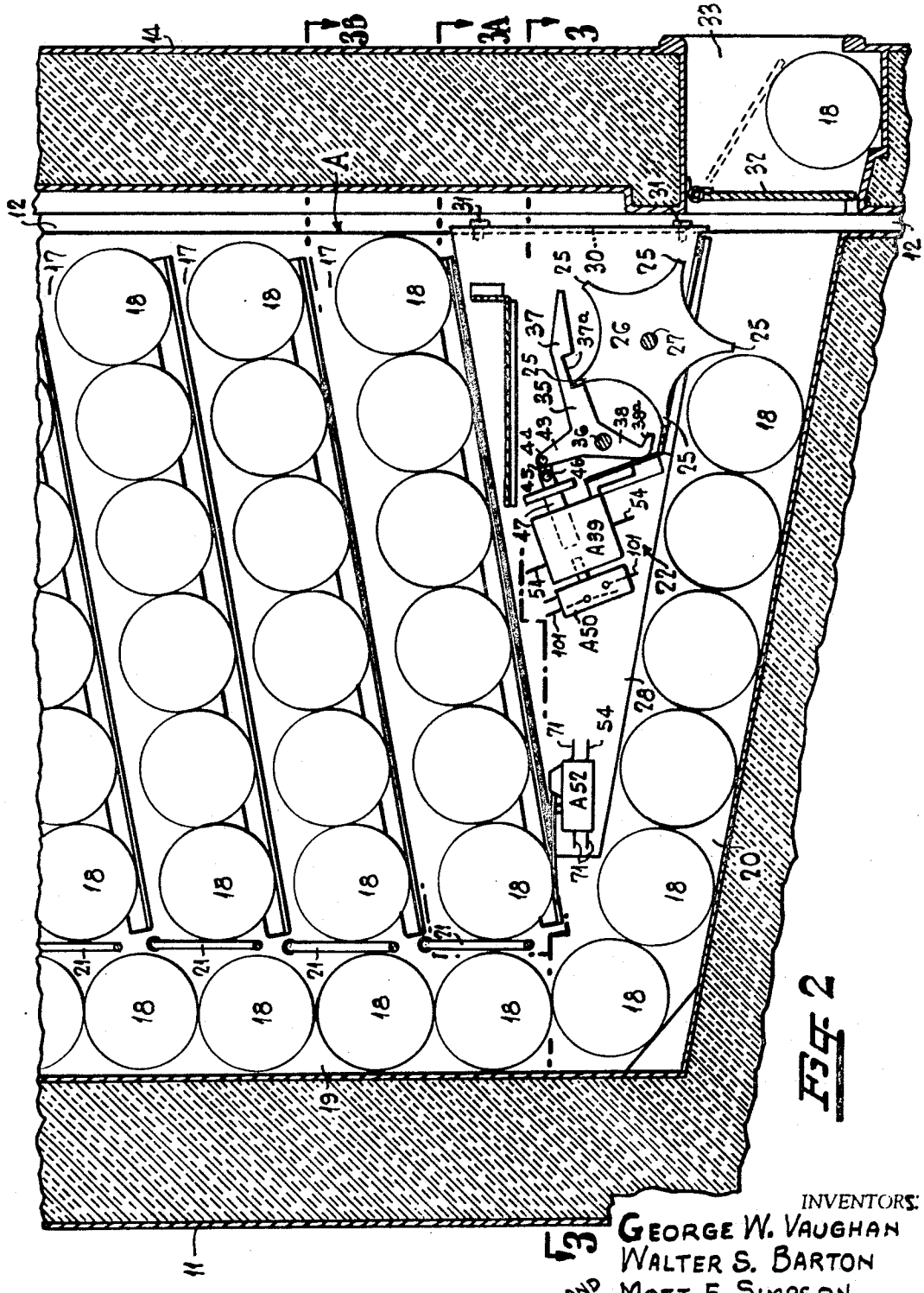


FIG 2

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CONTAINER DISPENSER HAVING AN ESCAPEMENT ASSEMBLY

Filed Dec. 26, 1967 5 Sheets-Sheet 3

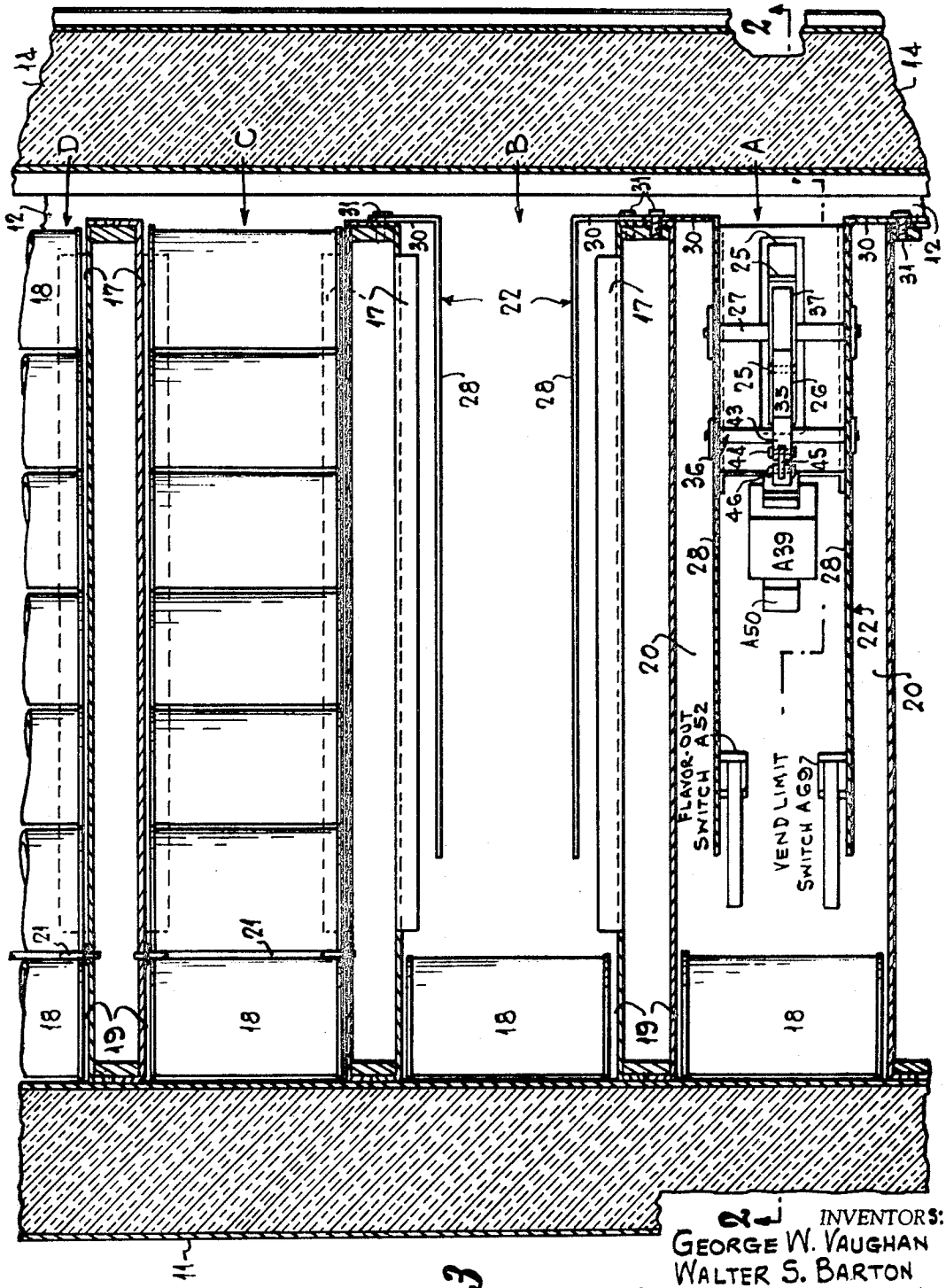


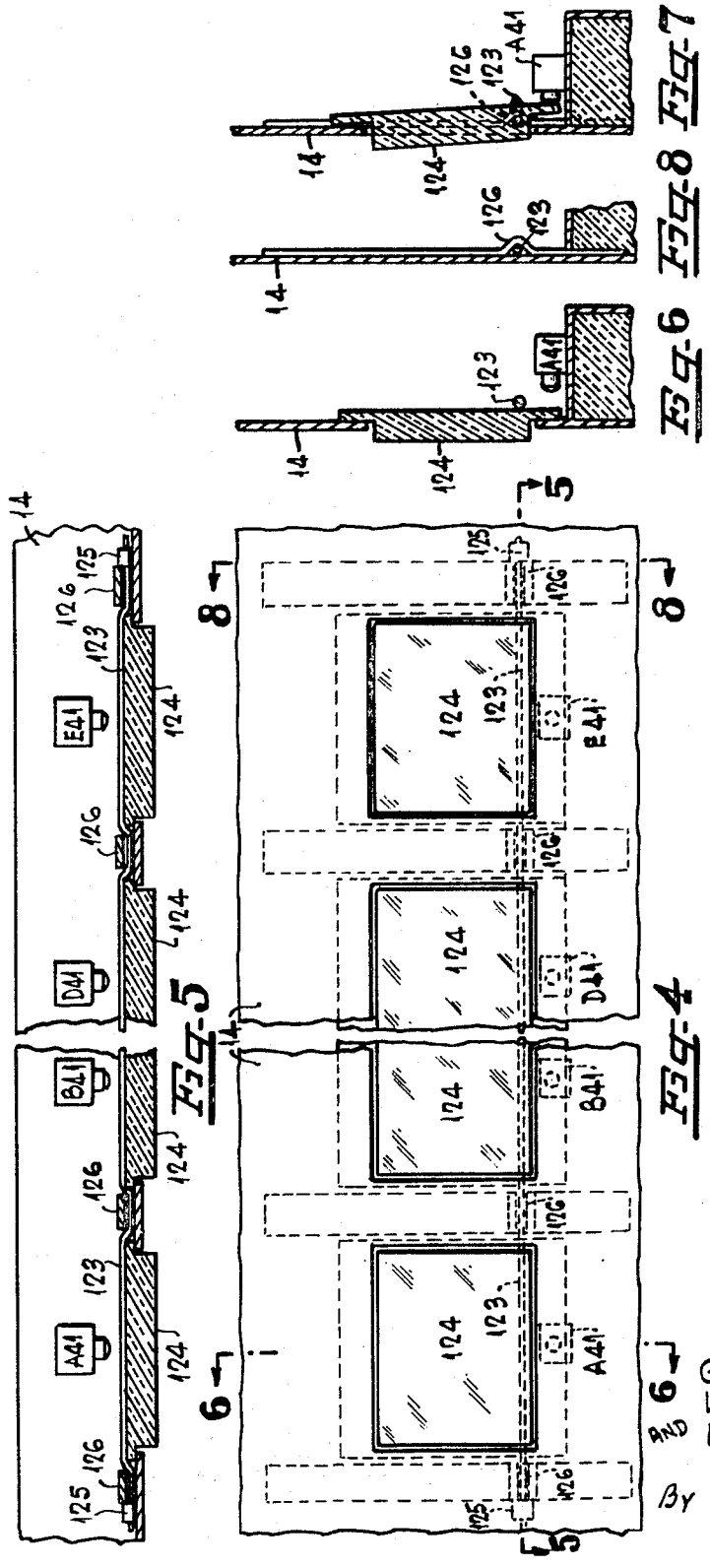
FIG-3

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CONTAINER DISPENSER HAVING AN ESCAPEMENT ASSEMBLY

Filed Dec. 26, 1967 5 Sheets-Sheet 4



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CONTAINER DISPENSER HAVING AN ESCAPEMENT ASSEMBLY

Filed Dec. 26, 1967 5 Sheets-Sheet 5

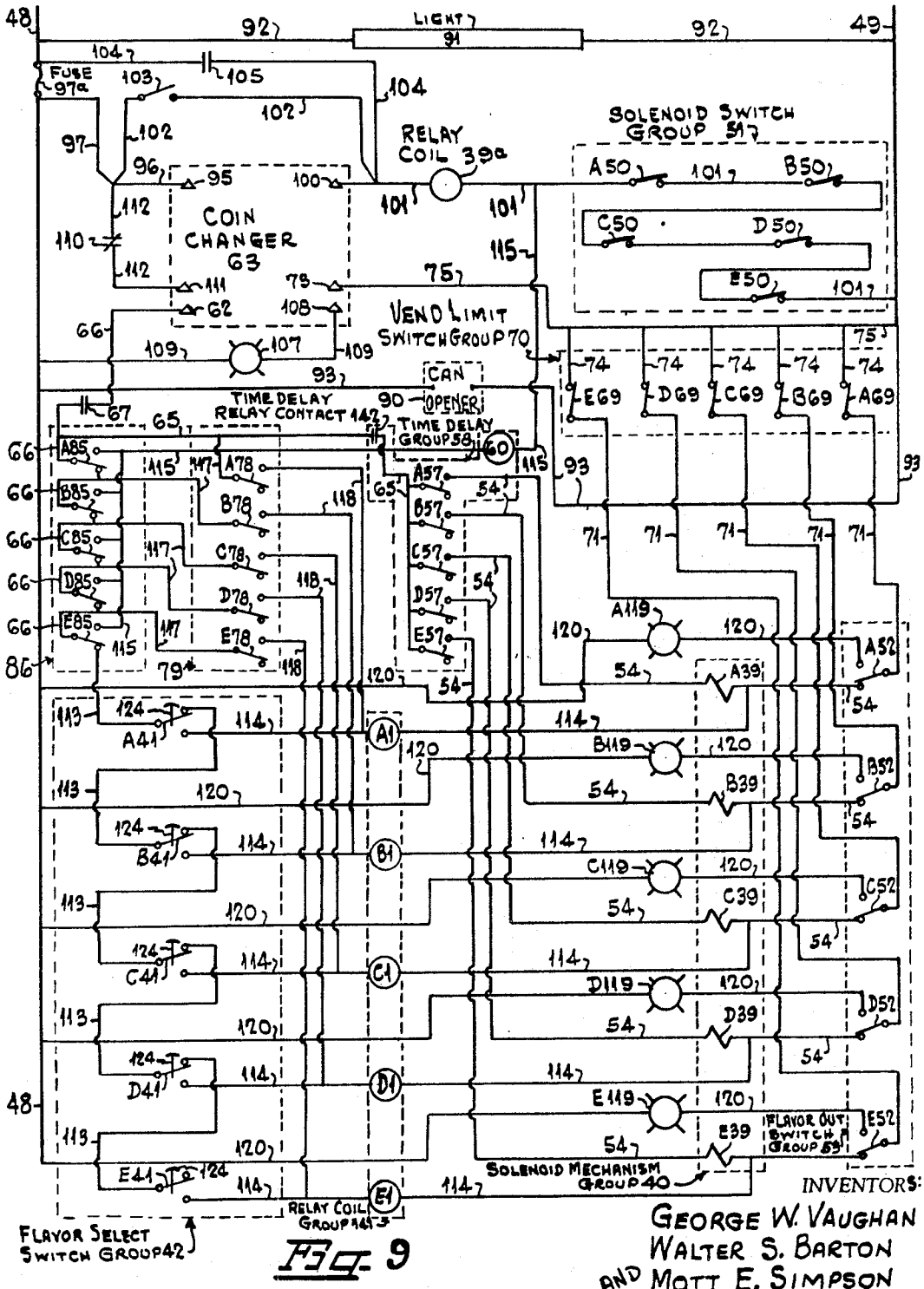


FIG. 9

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3,467,275

CONTAINER DISPENSER HAVING AN ESCAPEMENT ASSEMBLY

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Int. Cl. B65h 1/00; G07f 11/00
U.S. Cl. 221—197 4 Claims

ABSTRACT OF THE DISCLOSURE

An apparatus for selectively dispensing different classes of containerized merchandise wherein a gravity actuated and electromagnetically controlled star wheel unit dispenses containers from each class in response to a customer's selection. The apparatus is specifically characterized by: front loading and front dispensing container chutes; a removably mounted dispensing unit for receiving containers from the front end of each dispensing chute; mechanism for obstructing simultaneous selection of two or more classes of merchandise for delivery; and mechanism automatically operable at the end of a vending cycle for preventing unauthorized delivery of a container through reverse rotation of the star wheel.

This invention relates to vending apparatus for containerized goods such as foodstuffs, beverages and other packaged commodities, and more particularly to a series of selectively operable assemblies for dispensing various grades and types of commodities in response to a customer's selection.

It is an object of this invention to provide a vending apparatus of the type described having the essential parts thereof arranged to conserve space; and positioned for ready access from a front opening common to all of such parts. In particular, the invention is featured by the ease of obtaining ready access from the front opening to the areas most frequently used and serviced including the entrances to the container supply chutes and the interior of the dispensing units.

It is another object of invention to provide a vending apparatus having a plurality of individually operable and electromagnetically controlled units for dispensing containerized goods, in combination with a lockout mechanism responsive to the operation of one of the units for blocking operation of the remaining units. This result is obtained by extending a flexible cable transversely across the paths of movement of the normally retracted press buttons which actuate the selector switches, and further, by providing only enough slack in the cable (that is, longitudinal and transverse cable movement) to permit a selected press button to move the distance to close its associated switch. Thus when a selected button is pressed to switch closing position, the entire cable slack will be absorbed while the remaining unslackened portion will block the movement of the other buttons. If two or more press buttons should be pressed simultaneously, only a fractional portion of the cable slack would be available for each button thereby preventing both from moving to switch closing positions.

It is a further object of invention to provide a coin operated vending apparatus having an inclined chute for supporting containers to be dispensed, in combination with an electromagnetically controlled star wheel, said wheel being rotatable a partial revolution to deliver each lowermost container from the chute to the customer, and then automatically lockable against rotation in either direction to complete a delivery cycle. The alternate rotation and locking of the wheel is effected by an oscillatable escapement pawl having the opposite ends thereof alternately engageable with the star wheel prongs.

Some of the objects of invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which,

FIGURE 1 is a front elevation of a vending apparatus with portions thereof broken away and in section to illustrate the invention;

FIGURE 2 is a vertical sectional view taken along line 2—2 in FIGURES 1 and 3;

FIGURE 3 is a sectional plan view taken along lines 3—3, 3—3A and 3—3B in FIGURE 2;

FIGURE 4 is an enlarged elevational view of the opposite ends of the selector press button panel shown on a smaller scale in FIGURE 1;

FIGURE 5 is a selectional plan view taken along line 5—5 in FIGURE 4;

FIGURE 6 is a transverse vertical sectional view taken along line 6—6 in FIGURE 5, showing a selector press button in its normally retracted position;

FIGURE 7 is a view similar to FIGURE 6, but showing the press button moved to switch closing position;

FIGURE 8 is a transverse vertical sectional view taken along line 8—8 in FIGURE 4; and

FIGURE 9 is an electrical wiring diagram, showing the circuitry and associated controlled elements in schematic form.

Referring more particularly to the drawings, the numeral 10 broadly denotes a vending apparatus comprising a box 11 having a vertically disposed front opening 12 therein adapted to be closed by a door 14 hingedly secured to the box as at 15.

The interior of box 10 has vertically disposed identical vending assemblies A, B, C, D and E therein (FIGURES 1–3). The assembly A will be described below as typical; however, the cooperative relationship of the five assemblies includes additional elements.

The assembly A consists of at least one rearwardly inclined gravity feeding chute 17 for supporting a reserve supply of containers 18, a forwardly inclined gravity feeding chute 20 disposed beneath chute 17, and a dispensing unit 22 for releasing the lowermost container 18 in chute 20 for delivery to the customer at the front opening 12 of the apparatus. A vertical chute 19 connects the rear lower end of chutes 17 to the rear upper end of chute 20. In order to insure that containers 18 will always feed from the uppermost chute 17, a pivoted U-shaped divider 21 is mounted at the junction of vertical chute 19 and each chute 17.

It will be noted from FIGURE 2 that the upper forward end of each chute 17 branches from and forms a continuation of the front opening 12 of the box, thereby rendering the chute inlets easily accessible for replenishment with containers. When chutes 17, 19 and 20 are filled, a column of contiguous containers tend to move by gravity from the upper levels toward the front end of the lowermost chute 20. Movement of the containers from chute 20 is controlled by a star wheel 26 which intermittently rotates in response to a customer's selection to deliver the lowermost container in a manner hereinafter described.

Star wheel 26 is mounted for rotation about a shaft 27 and has radially extending prongs which successively engage the lowermost containers in the chute 20 therebelow and prevent delivery except during a regular delivery cycle. During operation, the wheel is caused to rotate through an angle between the lowermost and next adjacent radial prong 25 to deliver a container, and then stop in locked position at the end of a cycle.

Star wheel shaft 27 is rotatably mounted between spaced side plates 28, 28 of the dispensing unit 22 (FIGURE 3) and these plates are, in turn, positioned between and spaced

from the inner opposed surfaces of chute **20**. The front ends of plates **28**, **28** have flanges **30**, **30** integral therewith which are detachably secured to the front end of chute **20** by means such as screws **31**, thereby supporting the dispensing unit by means readily accessible from the front opening **12** of the box.

The star wheel **26** of dispensing unit **22** is alternately released for rotation and locked against rotation by escapement pawl **35** oscillatably mounted as at **36** between the walls **28**, **28** of the unit (FIGURES 2 and 5). The pawl and star wheel occupy the relative positions shown in FIGURE 2 at the end of a delivery cycle and until a new cycle has begun. Leg **37** of the pawl **35** is provided with an inverted U-shaped notch **37***a* which is adapted to be engaged by the uppermost star wheel prong **25** to lock the wheel against further counterclockwise rotation after a delivery cycle is completed. Notch **37***a* also prevents substantial clockwise rotation after completion of a cycle which, if permitted, would make possible an unauthorized delivery from the delivery opening **33** by opening the closure **32** and exerting rearward pressure upon the lowermost star wheel prong **25** (FIGURE 2).

Pawl **35** also has an oppositely extending leg **38** with an end hook **38***a* adapted to be positioned out of the path of movement of all of the wheel prongs **25** when the notch **37***a* is engaged by the lowermost prong as shown in FIGURE 2. When, however, the pawl is rotated in a counterclockwise direction to release the uppermost prong **25** from notch **37***a*, the hook **38***a* will move into the path of the released prong and, after wheel **26** completes one-fifth revolution, will block further rotation. Concurrently with the blocking action by hook **38***a*, the pawl will be rotated in a clockwise direction to cause notch **37***a* to become engaged with the succeeding prong **25** adjacent the one previously released (FIGURE 2). Containers **18** may be dispensed from any one of the assemblies A through E in response to the deposit of a coin in the changer **63**. The electrical circuitry for controlling the selective container delivery is illustrated in FIGURE 9 and described below.

Electrical controls

In describing the elements common to assemblies A through E and substantially identical in function, the same numeral will be used in association with a prefix denoting the assembly. For example, the switch **41** of assembly A is designated as **A41**; for assembly B as **B41**; for assembly C as **C41** and so on.

Briefly stated, the typical assembly A is provided with a number of important switches for controlling the delivery of the corresponding lowermost container **18** therefrom, namely, solenoid switch **A39** of group **40**; flavor selecting switch **A41** of group **42**; flavor-out switch **A52** of group **53**; time delay switch **A57** of group **58**; vend limit switch **A69** of group **70**; auxiliary switch **A78** of group **79**; and auxiliary switch **A85** of group **86**.

Certain elements or switches are common to all of the assemblies A through E, namely, coin changer **63**, container opener **90**, display light **91** and signal light **107**, said elements being connected as later described.

Light **91** is installed in a conduit **93** connected between current supply conduits **48** and **49**. Changer **63** has a terminal **95** connected to the supply conduit **48** by means of conduits **96** and **97**, said changer also having terminals **73** and **100** respectively connected to the other supply conduit **49** by means of conduits **75** and **101**. The conduit **101** includes solenoid switches **A50** through **E50**.

Another conduit **104** bypasses changer **63** and connects and has contact **105** therein, said conduit connecting the conduits **48** and **101**. Signal light **107** is disposed in conduit **109** which connects conduit **48** with changer terminal **108**. Finally, a normally closed switch **110** is disposed in conduit **112** which connects changer terminal **111** to the junction of conduits **96**, **97** and **102**.

Referring again to the circuitry for typical assembly A, it will be observed from FIGURES 2 and 9 that the oscillation of pawl **35** and the resulting alternate release and locking of star wheel **26** is actuated by the solenoid **A39** which, in turn, is controlled by press button switch **A41** of flavor-select switch group **42**. Pawl **35** has a third leg **43**, the upper free end of which is pivotally connected as at **44** to link **45**, said link having its opposite end pivotally connected as at **46** to solenoid core **47** of the mechanism **A39**.

The mechanisms **A39** through **E39** are respectively connected to press button switches **A41** through **E41** by the detailed circuitry shown in FIGURE 9. Referring specifically to the circuitry of typical assembly A, the mechanism **A39** in conduit **54** is provided with switch **A50** of group **51**, one end of conduit **54** being connected to flavor-out switch **A52** of group **53** and the other end to time delay switch **A57** of group **58**. Switch **A57** is also connected to terminal **62** of changer **63** by means of conduits **65** and **66**, the conduit **66** having contact **67** therein.

The above-mentioned switch **A52** is also connected to one side of the vend limit switch **A69** of group **70** by means of conduit **71**, the other side of switch **A69** being connected to changer terminal **73** by conduits **74** and **75**.

The flavor-select switches **A41** through **E41** are serially connected with changer **63** through the intermediate elements consisting of conduit **66**, contact **67**, double contact switches **A85** through **E85**, and conduits **113**. Switches **A85** through **E85** are also connected to double contact switches **A78** through **E78** of group **79** and with double contact switches **A57** through **E57** of group **58** by conduits **65** and **66**.

One of the contacts of each of switches **A85** through **E85** is connected to time delay relay coil **60** by conduit **115**, the other side of said coil being connected to conduit **49** and to changer terminal **100** by an intermediate group of elements consisting of conduits **101** and **115** and solenoid switches **A50** through **E50**. The other contact of each of the switches **A85** through **D85** is connected to one side of switches **B78** through **E78** respectively by wire **117**, said last-named switches being respectively connected to wires **114** by means of wires **118**. Wires **114** contain relay coils **A1** through **E1** respectively, said wires cooperating with wires **54** to connect flavor-select switches **A41** through **E41** to flavor-out switches **A52** through **E52**. Each of the switches **A57** through **E57** is connected to a flavor-out switch of group **53** and a solenoid mechanism of group **40** by a wire **54**.

The vend limit switches **A69** through **E69** and the flavor-out switches **A52** through **E52** function automatically in response to the absence of a container **18** thereon, said switches being located at the junction of the lowermost chute **17** with the vertical chute **19** (FIGURES 2 and 3).

Mode of operation

When the machine is connected to a power source, current flows from lines **48** and **49** to display light **91** and can opener **90**. Then when money is deposited in changer **63**, it operates in a conventional manner to complete its cycle during which lines **48**, **96** and **97** are connected to line **101** to energize relay coil **39***a*. Relay **39***a* closes its contact **105** which is locked in energized condition until later de-energized through any one of solenoid switch contacts **A50** through **E50**. Relay **38***a* opens its contacts **110** which de-energizes the changer **63** to prevent it from receiving more money. Also, relay **39***a* closes its contacts **67** and connects line **48** through the changer to lines **65** and **66**, to relay contacts **A85** through **E85**, and to push button switches **A41** through **E41** at line **113**.

At this time, any one of the switches **A41** through **E41** may be operated. For example, when **A41** is operated, the line **113** is connected to line **114**; and if merchandise is available, and if the switch **A52** is closed to connect lines **71** and **141**, the **A1** relay is energized to complete the circuit.

Upon energization of relay **A1**, the latter operates contacts **A85**, **A78** and **A57**. Contact **A85** closes to con-

nect lines **66** and **115** and thereby energizes the time delay relay. Also, the contacts A85 opens line **66** to line **113** so that neither of the relays B1, C1, D1 nor E1 can operate from their respective push buttons **124**. The contacts of A78 close to connect lines **117** and **118** to lock relay A1 energized when push button switch A41 is released. The contacts of A57 close and, after one second time delay, the line **65** is connected through the time delay relay contacts to line **54** to energize vending solenoid A39 which releases the lowermost container **18** in chute **20** for delivery.

Since solenoid switch A50 is mechanically linked to solenoid A39, it opens contacts and removes the power from relay coil *39a*, thereby de-energizing and causing all of the circuitry to return to normal upon completion of the vending cycle. The above sequence is substantially the same for any one of the five assemblies A through E.

Should any of the flavor-out switches A52 through E52 be operated because the merchandise is exhausted or not available in the respective assemblies, the corresponding switch will prevent the associated solenoid and relay from operating, even though the flavor push button is pressed.

Switches A69 through E69 are connected in parallel so that when the machine is empty, the line **49** is opened to line **75**, thereby de-energizing the coin changer **63** so that it rejects any money deposited. However, should any one of the assemblies A through E have merchandise available, the machine will vend such merchandise until the available supply is exhausted.

The function of the manual switch **103** is to bypass the changer **63** and continuously energize relay *39a*; and when a flavor-select push button is operated continuously, the machine will vend once every second to unload that flavor for service reasons. Also, the switch **103** may be used for testing purposes.

Press button interlock

Each of the press button switches A41 through E41 is in normally open position and adapted to be closed by a push button **124** (FIGURES 1 and 4–7). In order to prevent simultaneous operation of two or more switches A41 through E41 during a vending cycle, a flexible and substantially non-stretchable cable or cord **123** is extended across the paths of inward movement of the five press buttons **124** and then anchored to door **14** as at **125, 125**. The intermediate portion of the cable between the points of anchorage is slidably confined at points **126** between adjacent press buttons **124**. It is important to note that only enough slack is provided in the cable between points **125** to permit a single selected push button to move inwardly to a switch-closing position such as shown in FIGURE 7; consequently, only one of the vending assemblies may be actuated during a vending cycle. The simultaneous pressing of two or more buttons **124** will not actuate either of the corresponding switches since only a fractional amount of the required cable slack to close a switch will be available to each of the pressed buttons.

In the drawings and specification a preferred embodiment of the invention has been disclosed; and although specific terms are employed, these are used in a descriptive sense and not for purposes of limitation, the scope of invention being defined in the following claims.

We claim:

1. Vending apparatus for containerized merchandise comprising:

(a) a box having a vertically disposed front opening and closure means for said opening;

(b) a rearwardly inclined gravity feeding chute having a container receiving inlet forming a continuation of said front opening;

(c) a forwardly inclined gravity feeding chute having an upper container receiving inlet communicating with the lower end of said first chute, said forwardly inclined chute having its outlet communicating with said front opening, whereby a substantially V-shaped compartment will be formed between said chutes and communicating with the front opening;

(d) a rearwardly extending housing disposed in said compartment;

(e) means for detachably securing the front end of said housing to the front end of said compartment; and

(f) a star-wheel rotatably mounted in said compartment and having radially extending prongs engageable by successive lowermost gravity-fed containers in said chute as the wheel rotates,

(g) an escapement pawl having one arm engageable with one of said prongs to block forward rotation of said wheel and disengageable with the latter prong to release the wheel for said forward rotation and thereby release the lowermost container from the chute, said pawl having a second arm alternately operable with the said first arm and engageable with another of said prongs to block further rotation of the wheel upon said container release,

(h) means carried by said pawl and operable upon the blocking of the said last-named container for locking said wheel against reverse rotation.

2. Vending apparatus as in claim **1**, wherein said reverse rotation blocking means comprises a notch in said first-named pawl arm and engageable by said prongs.

3. Vending apparatus for containerized merchandise comprising:

(a) a box having a vertically disposed front opening and closure means for said opening;

(b) a forwardly inclined gravity feeding container chute having an outlet communicating with said front opening;

(c) a rotary star wheel having radially extending prongs engageable by successive lowermost gravity-fed containers in said chute as the wheel rotates,

(d) an escapement pawl having one arm engageable with one of said prongs to block forward rotation of said wheel and disengageable with the latter prong to release the wheel for said forward rotation and thereby release the lowermost container from the chute, said pawl having a second arm alternately operable with the said first arm and engageable with another of said prongs to block further rotation of the wheel upon said container release,

(e) means carried by said pawl and operable upon the blocking of the said last-named container for locking said wheel against reverse rotation.

4. Vending apparatus as in claim **3**, wherein said reverse rotation blocking means comprises a notch in said first-named pawl arm and engageable by said prongs.

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U.S. Cl. X.R.

194—10; 221—6, 109, 125, 129, 295