Sept. 3, 1963 B. A. ANDREWS ET AL 3,102,761

VENDING APPARATUS HAVING A PLURALITY OF COMPARTMENTS

Filed April 7, 1961

3 Sheets-Sheet 1

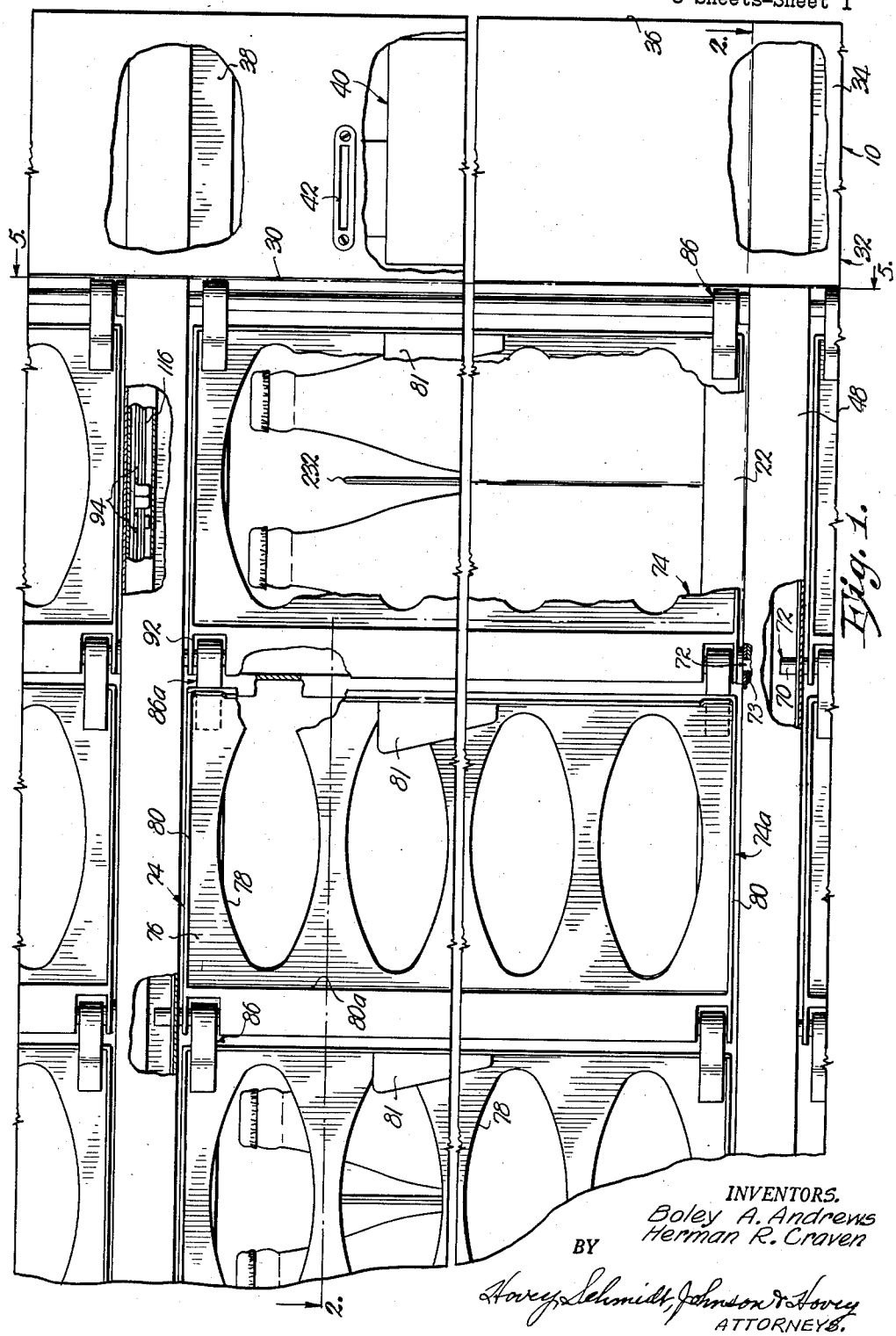


Fig. 1.

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Filed April 7, 1961 3 Sheets-Sheet 2

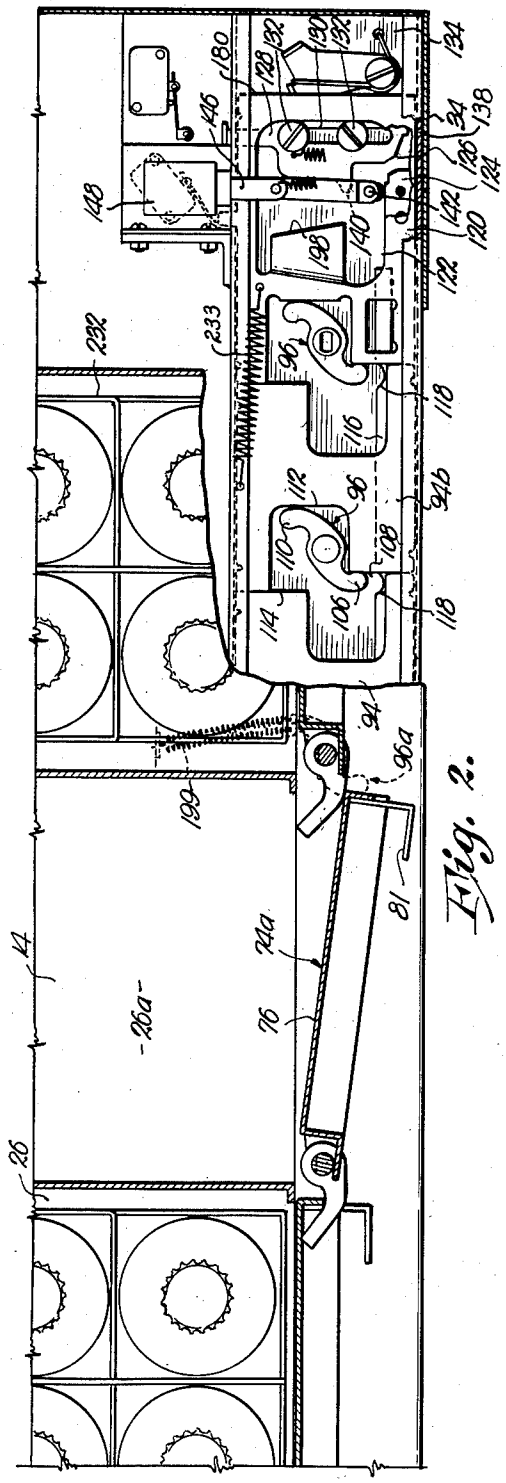


Fig. 2.

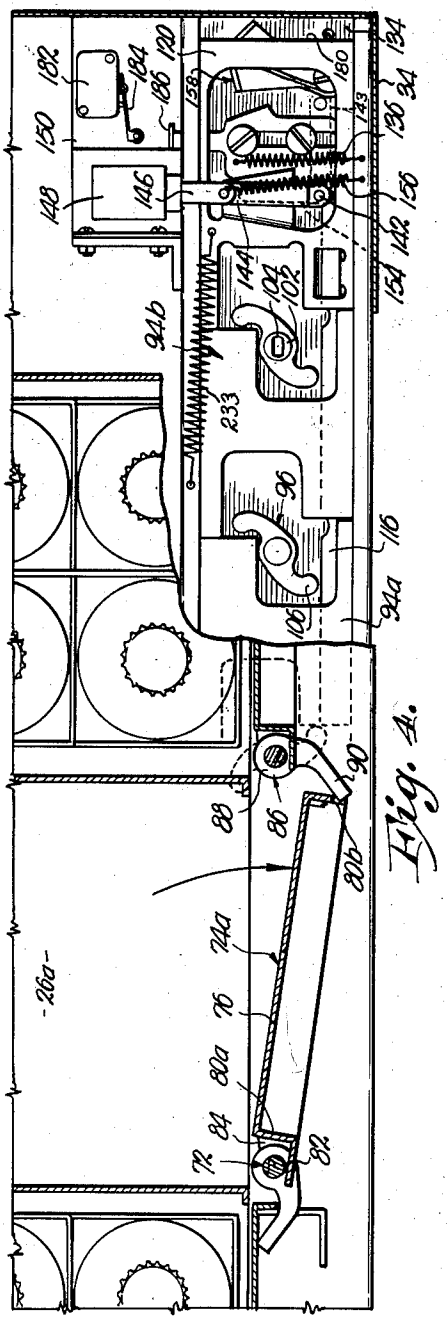


Fig. 4.

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VENDING APPARATUS HAVING A PLURALITY OF COMPARTMENTS

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3 Sheets-Sheet 3

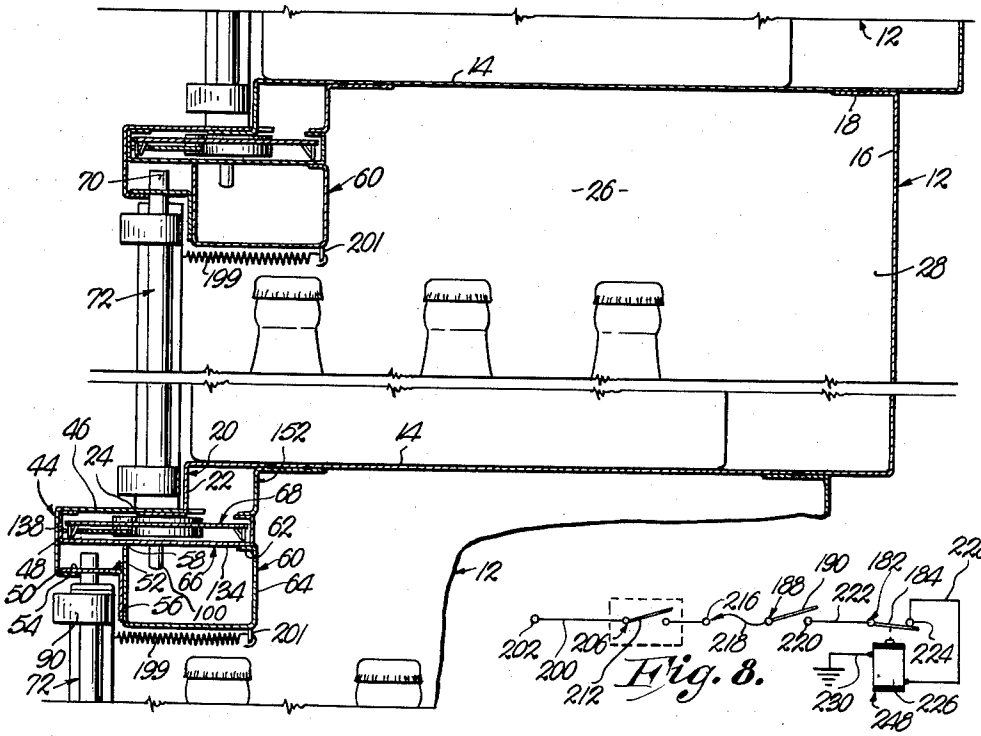


Fig. 5.

Fig. 8.

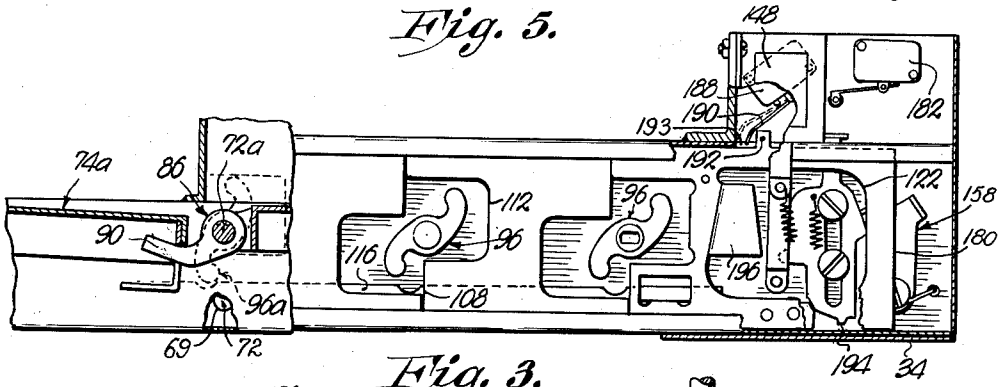


Fig. 3.

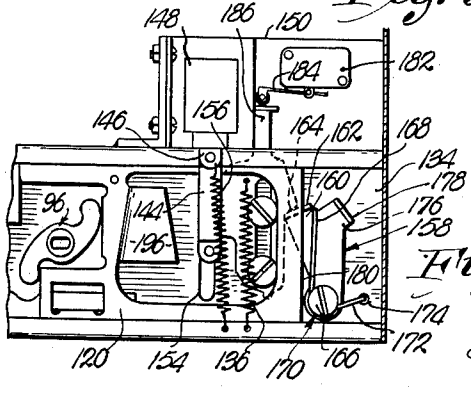


Fig. 6.

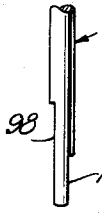


Fig. 7.

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United States Patent Office 3,102,761 Patented Sept. 3, 1963

3,102,761

VENDING APPARATUS HAVING A PLURALITY OF COMPARTMENTS

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Filed Apr. 7, 1961, Ser. No. 101,423
10 Claims. (Cl. 312—35)

This invention relates to vending apparatus, and more particularly to a machine having a plurality of product compartments therein each accessible to a customer with only one of the doors normally closing corresponding compartments being movable to an open position by the customer upon the deposit of coinage of proper value into the coin unit of the machine.

It is the primary object of the present invention to provide vending apparatus having a plurality of product compartments each accessible to a customer, wherein a great variety of products to be vended may be placed in the compartments with the customer being permitted to view the products and thereby select one which he wishes to purchase. A further object in this respect is to provide novel mechanism for preventing the customer from gaining access to one of the product compartments until after coinage of predetermined value has been inserted into the machine, and also precluding the customer from opening more than one closure means normally closing respective compartments each time coinage of proper value is deposited in the machine.

A further important object of the invention is to provide vending apparatus as described, wherein is included simple and inexpensive lock structure for preventing opening of the doors normally closing the product compartments until after coins of selected value have been inserted into the machine, and with the lock structure being positioned to be displaced by corresponding doors upon opening thereof so that upon re-closing of each of the doors, the same remain in an unlocked condition to preclude loss of deposit by a customer opening the door corresponding to an empty compartment.

A still further important object of the invention is to provide vending apparatus having a plurality of customer accessible product compartments, wherein the lock structure for preventing opening of more than one door at a time includes a plurality of hook elements for each of the doors, secured to respective rotatable members and normally located in overlying relationship to the outer margin of a corresponding door whereby the hook elements must be displaced as a respective door is opened, and captive link means operably coupled to each of the hook element carrying members to preclude rotation of more than one of the same upon deposit by the customer of proper coinage in the machine to assure that only one product may be removed from the machine during each vending cycle.

Another important object of the invention is to provide vending apparatus as referred to above, wherein the lock elements are positioned to return to the initial disposition thereof after being displaced by respective doors, and prior to the doors being swung to the fully open positions thereof so that upon return of the doors, the same engage corresponding lock structures and are thereby maintained in a partially open position to indicate to the

customer that a product has been removed from a respective compartment.

Also another important object of the invention is to provide novel captive link means operably coupled to the lock structures and adapted to sense initial door movement by a customer to thereby test the coin unit of the machine for insertion of a proper deposit therein and thus greatly simplifying the coin-controlled mechanism forming a part of the vending apparatus and eliminating costly and troublesome components which would require frequent replacement and maintenance.

Other important objects and details of construction of the present apparatus will become obvious or be explained in greater detail as the following specification progresses.

In the drawings:

FIGURE 1 is a fragmentary, front elevational view of vending apparatus embodying the preferred concepts of the present invention, with certain portions thereof being broken away and in section to reveal details of construction of the components therebehind;

FIG. 2 is a fragmentary, horizontal, cross-sectional view taken substantially on the irregular line 2—2 of FIG. 1 and illustrating one of the doors in the condition thereof after a customer has removed a product from the respective compartment;

FIG. 3 is a fragmentary, horizontal, cross-sectional view similar to FIG. 2 and illustrating the disposition of one of the doors during initial movement thereof from the closed position of the same;

FIG. 4 is a fragmentary, horizontal, cross-sectional view illustrating the position of the door shown in section in FIG. 2, in the disposition of the same as the door is being moved to the open position;

FIG. 5 is a fragmentary, vertical sectional view taken on line 5—5 of FIG. 1;

FIG. 6 is a fragmentary, horizontal sectional view similar to FIGS. 2 to 4 inclusive and illustrating the captive link means in one of the conditions thereof during opening of a product compartment door by a customer;

FIG. 7 is a fragmentary, side elevational view of one of the rotatable members carrying lock structure for a respective compartment door; and

FIG. 8 is a simplified schematic representation of a portion of the control mechanism forming a part of the vending apparatus.

Briefly, the present vending apparatus includes an upright housing having a number of horizontally and vertically spaced product compartments therein, each of which is accessible to a customer. The product compartments are normally closed by individually movable doors which are restrained against movement by lock structure engaging the outer margin of each door until a customer has deposited proper coinage in the machine.

The lock structures positioned to engage the outer margin of each of the doors, are located in dispositions where the same are displaced by a respective door upon opening thereof so that when the door has been opened to a position clearing the lock structures, the same return to the initial positions thereof prior to the door being moved to a fully open position whereby, upon return of a corresponding door to substantially the closed position of the same, the door remains in an unlocked condition so that a subsequent customer will not lose his

deposit if he inadvertently opens the door corresponding to an empty compartment. In order to simplify the construction of the machine, the doors are pivotally mounted on corresponding rotatable members carrying lock elements which normally overlie the next adjacent door to preclude opening thereof until proper coinage has been inserted in the machine and also serving to preclude opening of more than one door at a time.

Vending apparatus constructed in accordance with the preferred concepts of the present invention, is designated generally by the numeral **10** and includes a plurality of compartment defining wall sections **12**, each of which includes a horizontal, generally rectangular wall segment **14** integral with a corresponding upright, rear wall segment **16** provided with an inturned flange **18** on the upper horizontal margin thereof and suitably affixed as by welding or the like, to the under face of the wall segment **14** next above.

A generally L-shaped flange portion **20**, integral with the forwardmost margins of each of the wall segments **14**, includes an upright segment **22** and a horizontal, forwardly extending segment **24** parallel with the adjacent wall segment **14**.

The wall sections **12** are positioned in vertically offset relationship rearwardly of machine **10** as the upper extremity thereof is approached, to permit the customer to view products in the various compartments **26** defined in part by wall sections **12**, regardless of the vertical location of such compartments. Rectangular side walls **28** extending between wall segments **14**, cooperate with the latter to present a plurality of the compartments **26** which are open at the front thereof to permit a customer to have access to each of the compartments.

It is to be understood that the compartments **26** at the side extremities of machine **10**, are closed by vertical end walls **30**, while the housing of the machine includes a hollow end section **32** defined by a front wall **34**, a corresponding end wall **30**, as well as a side wall **36** and by a rear wall **38** projecting outwardly from end wall **30**. End section **32** may house a coin-accepting and changing unit **40** in operable communication with a coin slot **42** in front wall **34**. A generally L-shaped, horizontally positioned plate **44** is secured to each of the wall segments **14** and includes a horizontal main plate portion **46** secured to a corresponding segment **24**, projecting outwardly therefrom and integral with a downwardly extending leg portion **48** spaced from the outer extremity of each of the segments **24**.

An inturned flange **50** integral with the lower margin of each of the leg portions **48**, serves as means for carrying an elongated, L-shaped member **52** having a horizontal leg **54** carried by each of the flange portions **50**, and a generally vertical leg **56** secured to the vertical portion **58** of a channel **60** underlying the forward margin of each of the wall segments **14**. The inturned flange portion **62** of each channel **60** and integral with the inner upright leg **64** thereof, is secured to the underside of a corresponding elongated channel **66** underlying each of the segments **24** and adapted to receive captive link structure broadly designated **68**.

The legs **54** of each member **52** are provided with a series of openings **69** therein adjacent side walls **28** and end walls **30** respectively, for receiving the upper ends **70** of corresponding rotatable members broadly designated **72**. The plate portions **44** also have openings **73** therein vertically aligned with the openings **69** in members **52** for rotatably receiving the lower extremity **100** of each of the rotatable members **72**.

As shown in FIGS. 1, 2 and 4, rectangular doors, generally designated **74**, are rotatably mounted on those members **72** which are positioned to the left side of each of the compartments **26**. It is to be recognized that doors **74** may be of any desired configuration, but for purposes of illustration, and to show the manner in which such doors may be made very inexpensively, it is to be noted that the same may be press-formed in a conventional manner to present a rectangular main panel **76** having a series of openings **78** therein to permit customers to readily observe the character of the product within corresponding compartments **26**. Relatively narrow, outwardly projecting flanges **80**, integral with panels **76**, impart rigidity to the latter. Handles **81** are provided on each of the flange portions **80***b* of flanges **80** of doors **74** to facilitate opening of the same. The flange portion **80***a* of each of the doors **74** carries an integral, outwardly projecting flange section **82** having horizontal ear means **84** thereon rotatably receiving corresponding members **72** which are rotatable with respect to adjacent doors **74**. Each of the doors **74** is of a configuration to completely close the opening in a horizontally aligned compartment **26** and, therefore, preclude a customer from gaining access to such compartment until a corresponding door **74** has been opened.

Each of the members **72** carries a pair of lock or hook elements broadly designated **86**, which are secured to each member **72** for rotation therewith. As best shown in FIGS. 2 and 4, each of the lock elements **86** includes a cylindrical section **88** telescoped over and secured to respective members **72**, and an outer, longitudinally arcuate section **90** positioned to overlie the outwardly extending flange portion **80***b* of an opposed door **74**. It is to be noted that each of the sections **90** is of a length to clear an opposed door **74** after the same have been moved through a relatively short, angular path of travel during opening of the same, and further, that the hook elements **86** are located adjacent the upper and lower extremities of flanges **80***b* to prevent prying open of doors **74** prior to unlocking of the same.

As shown in FIG. 1, flange sections **82** of each of the doors **74**, are provided with inwardly extending, horizontal notches **92** therein for clearing corresponding lock elements **86** on members **72**.

The captive link structure **68** carried by each of the channels **66**, includes a plurality of generally H-shaped plates **94** with one plate being provided for each of the doors **76** in a horizontal row thereof and normally located in end-to-end, abutting relationship. Generally S-shaped spreaders **96** are secured to each of the members **72** for rotation thereby and located between adjacent pairs of plates **94** as shown in FIGS. 2, 3 and 4.

As indicated in FIG. 7, each of the members **72** is provided with a flat section **98** on opposed ends thereof adapted to complementally fit within semicircular openings in sections **88** of lock elements **86** to preclude rotation of the latter with respect to respective members **72**. Furthermore, the lower extremities of each of the members **72** are provided with a flat section **100** in direct opposition to the adjacent flat section **98** thereon.

The spreaders **96** are provided with central bosses **102** having elongated openings **104** complementally receiving the lower extremities of members **72** with the flat sections **98** and **100** engaging the flat portions of the bosses **102** defining openings **104** therethrough. The extremity **106** of each spreader **96** normally overlies and engages the transversely extending margin **108** of the next adjacent plate **94**, while the opposite extremity **110** of each spreader **96** is located in proximity to the transversely extending edge **112** of such plate and thereby in spaced relationship to the margin **114** of the opposed plate **94**. An elongated common bar **116**, extending substantially the full length of each of the structures **68**, and located adjacent the leg **48** of each plate **44**, is provided with a notch **118** therein for each of the extensions **106** and positioned to receive a corresponding extension when one of the spreaders **96** is rotated, as will be hereinafter explained.

An end plate **120** is positioned at the extremity of the row of plates **94** proximal to end section **32**, and is in normally abutting relationship to the end plate **94** corresponding to the first compartment **26** in a respective hori-

zontal row of compartments on the right-hand side of machine 10. The common bar 116 is secured to plate 120 for movement therewith, so that upon rotation of one of the spreaders 96 to shift end plate 120, the notches 118 move out of alignment with those extensions 106 which have not been rotated and thereby prevent swinging of more than one door 74 at a time, as will be explained.

End plate 120 has a central, irregularly configured opening 122 therein and is provided with an abutment member 124 on the under face thereof adjacent a corresponding leg portion 48 of each of the plates 44 and disposed to contact a surface 126 on a slidable blocking member 128 which is shiftable along a path perpendicular to the path of travel of end plate 120. As best shown in FIG. 2, blocking member 128 has an elongated slot 130 therein extending transversely of a respective captive link structure and slidably receiving a pair of spaced screws 132 which are threaded into the horizontal wall portion 134 of each of the captive link structures 68. Coil spring 136 interconnecting the slidable plate 128 and the upright outer wall segment 138 of the corresponding channel 66, biases the plate 128 of each of the structures 68 toward the adjacent member 124, as shown in FIG. 2.

An integral, outwardly projecting extension 140 on each of the plates 128, is positioned to be engaged by an upright pin 142 which is carried by a lever 143, shown in dashed lines in FIG. 4, pivotally carried by the under face of each of the channels 66, as well as by a link 144 overlying a corresponding end plate 120 and operably coupled to the armature 146 of a solenoid 148 mounted on bracket 150 secured to the L-shaped member 152 on each of the wall segments 14, as shown in FIG. 5. It is to be noted that members 152 are joined to the under face of corresponding wall segments 14, as well as to the upper extremity of the adjacent margin of each of the channels 66. The wall portion 134 of each channel 66 is provided with a transversely extending slot 154 therein for clearing the pin 142 of each structure 68 as the armature 146 is reciprocated. Coil spring 156 couples armature 146 of each solenoid 148 to the upright portion of a respective channel 66 adjacent plates 44 and in proximal relationship to a corersponding coil spring 136.

A latch, broadly designated 158, is rotatably mounted on the wall 134 of each channel 66 and includes an extension 160 having an upright ear 162 thereon positioned to engage shoulder 164 of a respective blocking plate 128 when the latter is shifted by armature 146 of a proximal solenoid 148. Screw means 166 serve to pivotally mount each of the latches 158 on a corersponding bottom wall 134 with the leg 168 of a spring 170 trained around screw 166 being positioned in engagement with a corresponding extension 160, while the opposite leg 172 of such spring is received within an opening 174 therefor in bottom wall 134. In this manner, the extension 160 of each latch 158 is biased toward the adjacent blocking plate 128. Another extension 176 on each latch plate 158, has an upright ear 178 thereon positioned to be engaged by the outer margin 180 of a corresponding end plate 120 when the later is shifted by the spreader 96 corresponding to the right-hand compartment 26 of a respective row.

Switch 182 mounted on the upper face of bracket 150 of each structure 68, has a switch arm 184 positioned to be engaged by an extension 186 on each of the plates 128 as the latter are shifted toward bracket 150. Another switch 188 also mounted on bracket 150 of each structure 68, has a switch arm 190 normally held in the open condition thereof by a tab 192 integral with each of the end plates 120 and slidable in a slot 193 therefor in the proximal upright segment of the respective channel 66.

Each of the blocking plates 128 is also provided with a secondary extension 194 thereon positioned to engage the proximal abutment member 124 on each end plate 120 if an attempt is made to reopen one of the doors 74 after the same has been fully opened and then returned to a partially closed condition. A transversely L-shaped,

anti-jackpot projection 196 on each of the end plates 120 and extending into the openings 122 therein, is disposed to engage an adjacent pin 142 when the armature 146 of each solenoid 148 is energized. The outer surface 198 of each projection 196 is beveled in a direction to bias the adjacent pin 142 toward a corresponding solenoid 148 if one of the projections 198 moves into engagement with a pin 142.

Coil springs 199 are secured to each of the doors 74 adjacent the axis of pivoting thereof and extend inwardly into each of the compartments 26 below channels 60 as indicated in FIG. 5. Downwardly projecting ears 201, connected to the under faces of channels 60, serve as means for receiving the inner ends of each of the springs 199.

In the very simplified wiring diagram illustrated in FIG. 8, the coin unit includes a power line 200 connected to a power terminal 202, and operably connected to switch structure 206. It is to be understood that switch structure 206 is intended to represent schematically, switch means under the control of deposit totalizing mechanism whereby the switch 206 remains open until coins of predetermined value have been deposited in unit 40 and with switch 206 then remaining closed until a vend cycle has been completed as will be outlined hereinafter.

For purposes of simplifying the diagram in FIG. 8, the switch arm 212 of schematic switch structure 206 is shown as being coupled directly to line 200. The switch arm 190 of switch 188 is coupled to contact 216 associated with switch 206 by suitable coupling means 218. The contact 220 of switch 188 is coupled to the switch arm 184 of switch 182 by a line 222. The contact 224 of switch 182 is joined to the coil 226 of solenoid 148 by a line 228, while a ground line 230 is also coupled to coil 226.

Although not illustrated in the drawings, it is to be understood that electrically operated interlock means is operably coupled to each of the captive link stnuctures 68 associated with the vertically spaced, horizontal rows of compartments 26. The interlock means connected to captive link structures 68 is designed to permit only one of the vend plates 120 of the vertically spaced structures 68 to be shifted at a time during each vend cycle and thereby serving to prevent a customer from opening doors 74 on more than one level of machine 10 upon deposit of proper coinage in unit 40. Thus, the customer may select any product he desires in the vertically spaced horizontally disposed rows of compartments 26 but the interlock means and the captive link structures 68 cooperate to prevent more than one door 74 of the entire machine from being opened each time coinage of proper value is inserted in coin unit 40. The interlock means between captive link structures is brought into operation as soon as a customer commences to open one or more of the doors 74 and prevents more than one of the doors 74 to be swung through an arc to permit even the slightest access to a corresponding compartment 26.

Operation

In operation, the compartments 26 are all filled with products to be vended, and for purposes of illustration, the compartments 26 are filled with cartons 232 of soft drinks. The manner in which compartments 26 are loaded will be explained hereinafter and it is initially assumed that each of the compartments 26 has a carton 232 therein. The customer deposits a predetermined amount of money in the machine by inserting the coins in slot 42, whereby the same pass into the coin unit 40.

Assuming that sufficient coins are inserted to effect the closing of switch 206, a circuit is completed to all of the switches 188, but the solenoids 148 are not energized because all of the switches 188 are maintained in an open condition by the tabs 192 on corresponding end plates 120. The customer then chooses one of the cartons 232

in compartments 26 and grasps the operating handle 81 of the corresponding compartment 26 in which the carton 232 is contained and pulls outwardly on door 74*a* to swing the same about the axis of a respective member 72.

During initial swinging movement of the door 74*a*, as shown in FIG. 3, the lock elements 86 on the member 72 adjacent the handle 81, are displaced from the initial positions thereof to effect rotation of the rotatable member 72 associated therewith and thus causing the spreader 96 on the lower extremity of such member 72, to be rotated about a vertical axis. A small amount of free movement of the lock elements 86 is permitted even if proper coinage has not been deposited in unit 40 to effect testing of the coin unit 40 for insertion of a required amount of money. This free motion is provided by virtue of the fact that the abutment member 124 of a corresponding captive lock structure 68 is spaced from a proximal plate 128 a distance permitting the end plate 120 to move in a direction through a limited path of travel and thereby effecting shifting of switch arm 190 into engagement with contact 220 as the tab 192 moves away from the proximal arm 190.

Unless proper coinage has been inserted in unit 40, closing of switch 188 does not energize solenoid 226 because the switch 206 is in an open condition. Therefore, if a necessary amount of money has been inserted in unit 40, outward swinging of the door 74*a*, as indicated in FIG. 3, causes the member 72*a* associated therewith, to be rotated and thereby swing the spreader 96*a* on the lower extremity thereof in a counterclockwise direction to shift the plates 94*a*, 94*b* and end plate 120 toward the adjacent blocking plate 128 as the extremity 106 on spreader 96*a* engages the margin 108 on plate 94*b*.

Since the switch 206 is now closed, the closing of switch 188 as the associated tab 192 moves out of engagement with the respective switch arm 190, results in energization of solenoid 226 through a circuit traced by terminal 202, line 200, the switch arm 212 of switch 205, the line coupling the contact of switch 206, to the connector means 218, switch arm 190 of switch 188, line 222, switch arm 184 in normal engagement with contact 234, line 228, the coil 226 of solenoid 148, and ground line 230.

Energization of coil 226 causes the armature 146 to be retracted thereinto against the influence of spring 156, whereby the pin 142 is shifted along the longitudinal length of slot 154. When the pin 142 engages the extension 140 on the proximal plate 128, the latter is shifted transversely of the path of travel of plate 120 and toward the solenoid 148. The plate 128 is shifted to a disposition permitting the extension 160 on latch 158, to move behind the shoulder 164, whereby the blocking plate 128 is maintained in a latched condition against the action of coil spring 136.

When the extension 186 on the blocking plate 128, contacts the switch arm 184 of switch 182, the extension shifts the position of the switch arm to cause the same to move out of engagement with the contact 224, whereby the circuit to coil 226 of solenoid 148 is broken. The armature 146 is thereby permitted to return to the initial disposition thereof under the influence of coil spring 156 whereby the pin 142 is moved out of the path of travel of anti-jackpot projection 196. The blocking plate 128 is maintained in a latched condition by latch 158 and the end plate 120 is thereby permitted to move toward latch 158 as the door 74 is swung further toward the open position thereof.

When the end plate 120 contacts the ear 178 on latch 158, the latch is swung about the axis of screw means 166 against coil spring 170 to thereby shift the ear 162 out of engagement with the shoulder 164 on the proximal plate 128. When the ear 162 is released from the plate 128, the latter is permitted to return to the initial position of the same under the influence of coil spring 156.

The blocking plate 128 initially shifts through a path of travel, causing the extension 194 thereon to engage the member 124 on the associated end plate 120 with extension 194 riding on the abutment member until such extension clears the proximal end of the member 124. As soon as the extension 196 moves in behind the blocking extremity of member 128, the end plate 120 cannot be returned to the outermost position thereof releasing latch 158.

Continued return of the end plate 120 toward the initial position thereof, causes the surface 126 on blocking member 128 to return to a location within the path of travel of abutment member 124. It can, therefore, be seen that as soon as the customer has pulled the door 74*a* outwardly to a point where the flange 80*b* on such door, clears the outwardly extending block elements 86, the same immediately return to the initial position thereof under the influence of spring means 233 which is shown in FIGS. 2 and 4 secured by suitable means to end plate 120 and member 152 biasing all of the plates 94, as well as end plates 120, to the left, viewing FIGS. 2, 3 and 4.

The customer may reach into the compartment 26*a* as soon as the door 74*a* is substantially fully open, and remove the carton 232 therefrom. Release of the operating handle 81 causes the spring 199, connected to door 74*a*, to return the same to the initial position thereof, although as indicated in FIG. 2, it is to be noted that the door actually engages the outer surfaces of the lock elements 86*a* to preclude re-locking of such door. In this manner, the customer will not lose his deposit if he inadvertently opens a door corresponding to a compartment which is empty.

The anti-jackpot projection 196 operates to prevent opening of one of the doors 74 in that particular row if the solenoid 148 should remain energized for any reason whatsoever. It can be seen that the pin 142 associated with the jammed solenoid 148, would remain within the path of travel of the associated projection 196, thereby precluding movement of the proximal plate 120 in a direction allowing one of the corresponding doors 74 to be opened.

A particular feature of the present apparatus is the fact that various types of merchandise may be vended, and at different price levels, depending upon the number of horizontal rows of compartments 26. The customer may readily view the merchandise through the openings 78 and decide which purchase he wishes to make.

The configuration and disposition of the lock elements 86 is also an important feature of the present apparatus by virtue of the fact that these lock structures are positioned to prevent robbing of a compartment 26 by virtue of prying open the upper or lower extremity of a respective door, even though the same are made of relatively lightweight material. Furthemore, the maintenance of a door 74 corresponding to an empty compartment in an unlocked condition, prevents inadvertent loss of a deposit by a customer.

When it is desired to refill the compartments 26, this may easily be accomplished by the serviceman opening a door 74 and then manually pulling the associated lock elements 86 outwardly until a carton may be inserted in the machine. It is to be understood that suitable switch means is provided in section 32 for overriding unit 40 so that the serviceman may actuate lock elements 86 without deposit of coins in unit 40.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In vending apparatus, a housing having a plurality of product compartments each accessible to a customer; closure means movably mounted on the housing in normal closing relationship to each of the compartments and individually movable to open positions providing access to respective compartments; lock means for each of said closure means and positioned to be displaced from the initial locations of the same when the closure means

are moved to the open positions thereof; and coin-controlled mechanism operably coupled to each of said lock means for preventing movement of the same until proper coinage has been deposited in the apparatus, and for precluding displacement of more than one of said lock means by a corresponding closure means when proper coinage has been inserted into the apparatus, said mechanism including means operably coupled to said lock means for shifting each of the displaced lock means toward the initial locked location thereof as soon as a respective closure means has been moved toward said open position thereof a sufficient distance to provide customer access to the respective compartment whereby upon return of a corresponding closure means to substantially the closed position of the same, the latter remains in an unlocked condition after initial opening thereof to preclude loss of deposit by a customer opening the closure means corresponding to an empty compartment.

2. In vending apparatus, a housing having a plurality of product compartments each accessible to a customer; door means for each of said compartments swingably mounted on the housing in normal closing relationship to respective compartments and individually movable to open positions providing access to corresponding compartments; lock means for each of said door means, pivotally mounted on said housing and normally overlapping the outer margin of respective door means remote from the axes of swinging thereof, said lock means each being positioned to be swung and thereby displaced from the initial locations of the same as respective door means are moved to the open positions thereof; and coin-controlled mechanism operably coupled to each of said lock means for preventing movement of the same until proper coinage has been deposited in the apparatus, and for precluding pivoting and thereby displacement of more than one of said lock means by a corresponding door means when proper coinage has been inserted into the apparatus, said mechanism including means operably coupled to said lock means for returning each of the displaced lock means to substantially the initial locked location thereof as soon as a respective door means has been moved toward said open position thereof a sufficient distance to provide customer access to the respective compartment whereby upon return of a corresponding door means to substantially the closed position of the same, the latter remains in an unlocked condition after initial opening thereof to preclude loss of deposit by a customer opening the door means corresponding to an empty compartment.

3. In vending apparatus as set forth in claim 2, wherein each of said lock means includes a rotatable member positioned adjacent the margin of each door means remote from the axis of swinging movement thereof, there being at least one hook element secured to each of the members for rotation therewith and positioned to normally overlie said margin of an adjacent door means in blocking relationship to a respective door means, said coin-controlled mechanism including captive lock structure operably connected to said member for precluding rotation of more than one member at a time.

4. In vending apparatus as set forth in claim 3, wherein is provided at least a pair of hook elements on each of the members, rotatable therewith and located adjacent opposed extremities of the margin of a proximal door means.

5. In vending apparatus, a housing having a plurality of product compartments each accessible to a customer; elongated, rotatable members positioned adjacent each side of each of the compartments and rotatable about parallel axes; door means pivotally carried by and rotatable relative to the members positioned on one side of each of the compartments and normally disposed in closing relationship to an adjacent compartment, said door means being individually movable to open positions providing access to a respective compartment; a lock element secured to each of said members for movement therewith and overlying the outer margin of the next adjacent door means in spaced relationship to the axis of swinging movement of corresponding door means, said lock elements being positioned to be rotated and thereby effect rotation of corresponding members as said lock elements are displaced from the initial locations of the same in response to respective door means being swung to the open positions thereof; and coin-controlled mechanism operably coupled to each of said members for preventing rotation of the same and thereby movement of corresponding lock elements until proper coinage has been deposited in the apparatus, and for precluding rotation and thereby displacement of more than one of said lock elements by a corresponding opposed door means when proper coinage has been inserted into the apparatus, said mechanism including means coupled to said rotatable members for returning the latter and thereby a displaced lock element, to substantially the initial locked location of said members and the lock means as soon as a respective door means has been moved toward said open position thereof a sufficient distance to provide customer access to the respective compartment whereby upon return of a corresponding door means to substantially the closed position of the same, the latter remains in an unlocked condition after opening thereof to preclude loss of deposit by a customer opening the door means corresponding to an empty compartment.

6. In vending apparatus as set forth in claim 5, wherein said coin-controlled mechanism includes a series of movable plates positioned in end-to-end relationship and having normally abutting portions, there being spreader means secured to each of said members for rotation thereby and each located proximal to one of said plates in a position to preclude movement of a respective plate in one direction and effect shifting of the plate in the opposite direction as the corresponding spreader means is rotated, and releasable means adjacent the end plate in the direction of movement of said plates during rotation of one of the spreader means for preventing movement of any of said plates until release of said releasable means.

7. In vending apparatus as set forth in claim 6, wherein said releasable means permits a limited amount of free movement of said plates in said opposite direction prior to release of said releasable means, and test means positioned to be actuated by said end plate during initial movement thereof and operably coupled to said releasable means for precluding release of the same until proper coinage has been deposited in the apparatus.

8. In vending apparatus as set forth in claim 7, wherein said releasable means includes shiftable blocking means normally positioned in the path of travel of said end plate after the latter has shifted said limited amount, solenoid means operably coupled to said blocking means for shifting the latter out of the path of travel of the end plate, said test means being operably coupled to said solenoid means for effecting actuation of the latter when proper coinage has been inserted in the machine, latch means engageable with said blocking means for releasably maintaining the latter out of the path of travel of the end plate, means operably coupled to said solenoid means and positioned to be actuated by said blocking means for deactivating said solenoid means when said blocking means is shifted to the postion thereof out of the path of travel of said end plate, and means for disconnecting said latch means from said blocking means upon return of the end plate to the initial location thereof.

9. In vending apparatus, a housing having a plurality of product compartments each accessible to a customer; a rotatable member adjacent each side of a respective compartment; closure means swingably mounted on the member adjacent one side of corresponding compartments, swingable relative to respective members, normally positioned in closing relationship to each of the compartments, and individualy movable to open positions providing access to respective compartments; lock means secured to

each of said members and normally overlying the margin of the next adjacent closure means remote from the axis of swinging movement of the respective closure means whereby the closure means are displaced to effect rotation of a corresponding member upon opening of a respective closure means, said lock means including lock elements secured to a respective member, extending outwardly therefrom in a direction perpendicular to the axis of rotation of a corresponding member, and of a length to clear the outer margin of an opposed closure means prior to the latter being moved to the fully open position of the same; and means operably coupled to said members for precluding rotation of more than one closure means at a time.

10. In vending apparatus as set forth in claim 9, wherein said closure means engage and are supported in a slightly open position by respective opposed lock elements after opening of corresponding closure means and return of the same to a location adjacent the initial positions thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

2,305,342	Fry	Dec. 15, 1942
2,727,654	Chiders et al.	Dec. 20, 1955
2,880,904	Linthicum	Apr. 7, 1959
2,898,001	Johnson	Aug. 4, 1959