April 30, 1963 R. R. LEONARD ETAL 3,087,649

REFRIGERATED-SANDWICH MERCHANDISING MACHINE

Filed May 2, 1958 3 Sheets-Sheet 1

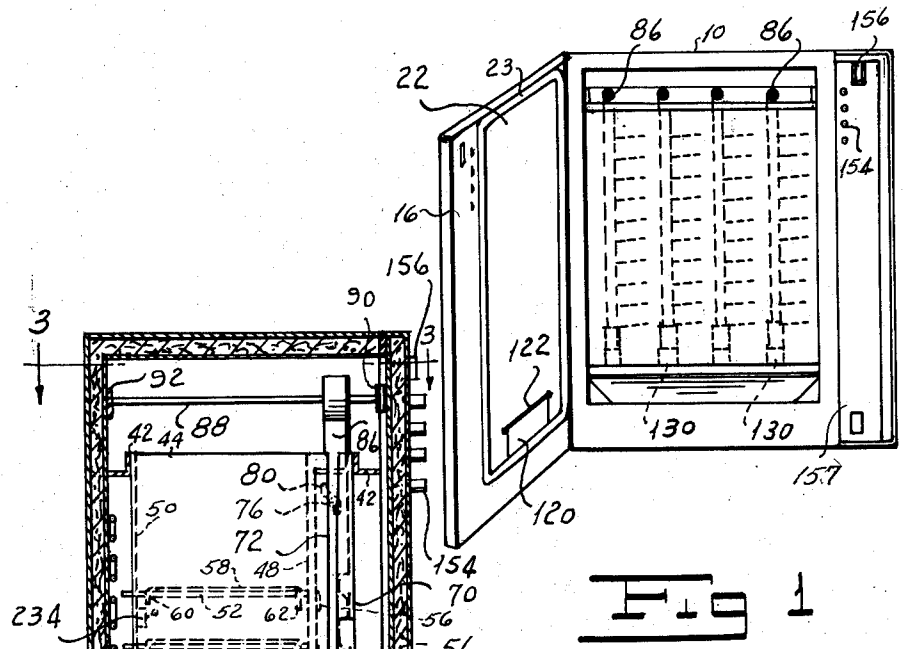


Fig 1

Fig 2

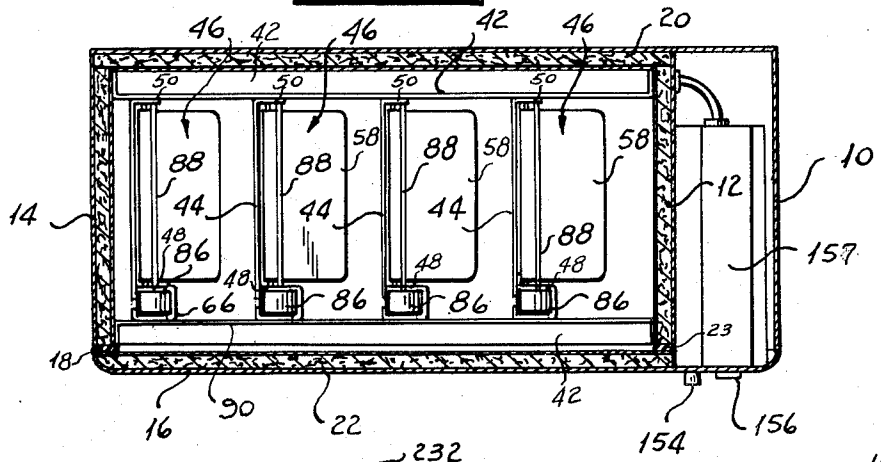
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REFRIGERATED-SANDWICH MERCHANDISING MACHINE

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FIG 3



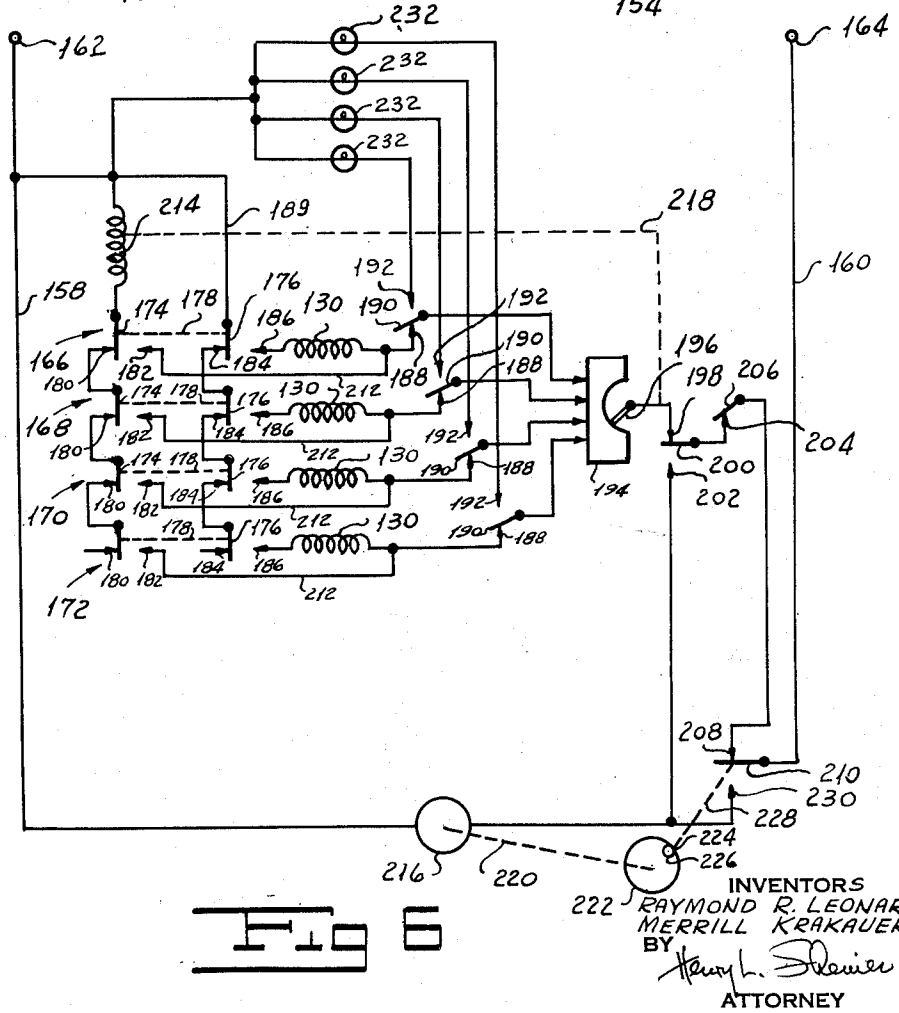


FIG 6

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REFRIGERATED-SANDWICH MERCHANDISING MACHINE

Filed May 2, 1958 3 Sheets-Sheet 3

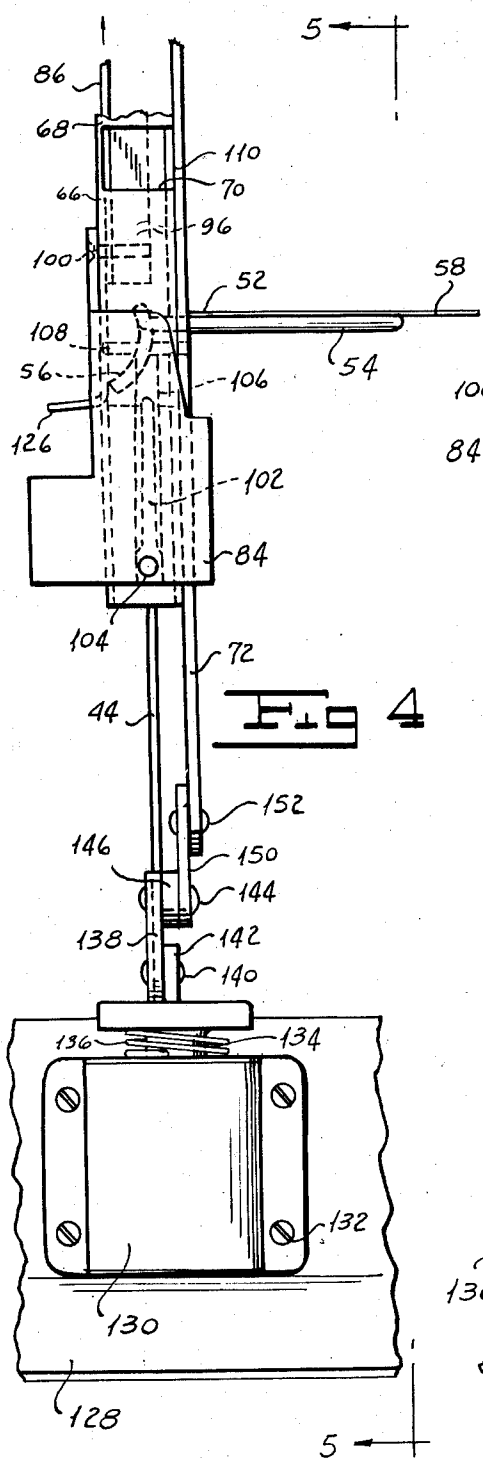


Fig 4

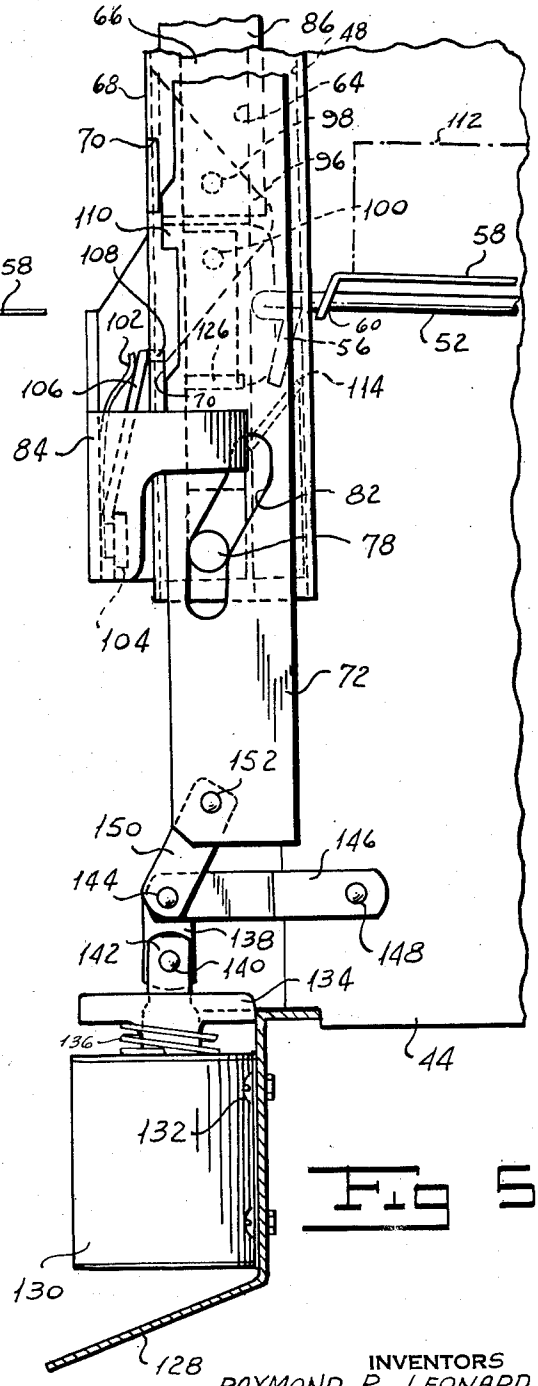


Fig 5

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3,087,649
REFRIGERATED-SANDWICH MERCHANDISING MACHINE

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Filed May 2, 1958, Ser. No. 732,476
1 Claim. (Cl. 221—90)

Our invention relates to a refrigerated-sandwich merchandising machine and more particularly to a merchandising machine of the pivoted-shelf type for dispensing articles such as sandwiches or the like which must be refrigerated for storage.

Patent No. 2,652,304, issued September 15, 1953, to Christian Gabrielsen, discloses a pivoted-shelf merchandising machine which is adapted to dispense articles of merchandise such as bars of candy or the like. The machine disclosed in this patent has a number of manually-operated dispensing means which are freed upon the deposit of coins in the machine to permit a selection to be made.

We have discovered that a machine employing a number of successively released pivoted shelves is well suited for dispensing of articles such as sandwiches or the like. These sandwiches are made from meat, mayonnaise, and other foodstuff which is likely to spoil. The sandwiches must be served within a very short time after they are made or, if they are to be stored, they must be refrigerated to prevent spoiling.

Attempts to refrigerate manually-operated, pivoted-shelf merchandising machines of the type disclosed in the patent discussed hereinabove have been unsuccessful. The manually-operable dispensing mechanism of this machine includes a movable pull bar which must extend through the front wall of any refrigerated housing containing the merchandise. It is impossible to provide effective seals at the openings through which these movable bars extend. As a result, warm, vapor-laden air is permitted to enter the refrigerated housing. It will be obvious that this entry of warm air renders the refrigeration less efficient than is desirable. In refrigerating a machine of the type disclosed in the said patent, it would be necessary to house the delicate coin-controlled mechanism within the refrigerated housing. In addition to making refrigeration more difficult, entry of the vapor-laden air into the housing and condensation would corrode or otherwise injure the delicate parts of the coin-controlled mechanism. Vapor entering the housing condenses on the moving parts of the dispensing mechanism in the housing and freezes on these members to interfere with their operation. For these reasons the machine discussed in the patent is not satisfactory for dispensing articles of merchandise such as sandwiches which require refrigeration for storage.

We have invented a mechandising machine of the pivoted-shelf type for dispensing articles of merchandise such as sandwiches which require refrigeration. The refrigerated housing of our machine has no openings through which movable parts of the dispensing mechanism of the machine extend. The coin-controlled mechanism of our machine is disposed outside the refrigerated housing. Our machine is provided with an extremely simple mechanism for actuating the operating parts of the machine.

One object of our invention is to provide a merchandising machine of the pivoted-shelf type which is adapted to dispense articles of merchandise requiring refrigeration.

Another object of our invention is to provide a merchandising machine having a refrigerated housing with no openings through which moving parts of the dispensing mechanism extend.

Still another object of our invention is the provision of a merchandising machine of the pivoted-shelf type having an extremely simple mechanism for operating the traveler-release bar of the machine.

A still further object of our invention is to provide a merchandising machine having a refrigerated housing in which the coin-controlled mechanism may be mounted outside the refrigerated housing.

Other and further objects of our invention will appear from the following description.

In general our invention contemplates the provision of a merchandising machine having a cabinet and a refrigerated housing within the cabinet. We mount a plurality of pivoted shelves within the cabinet and provide mechanism including a vertically reciprocable and laterally shiftable bar for releasing the pivoted shelves in succession to dump the articles of merchandise to a delivery tray. We provide a solenoid and a novel linkage connecting the solenoid armature to the bar for moving the bar vertically while permitting it to shift laterally to release a shelf-tripping member. The shelves, the shelf-tripping mechanism, and the solenoids all are disposed within the refrigerated housing. We provide a coin-controlled mechanism, associated selecting buttons and circuitry for selectively energizing a solenoid after the deposit in the machine of a sum in coins aggregating the purchase price of the desired article. The only connection between the coin-controlled selecting means and the dispensing mechanism is through electrical conductors connecting the exterior circuitry to the respective solenoids. These conductors pass through a single sealed opening in the refrigerated housing. A door at the bottom of the refrigerated housing may be opened manually by a customer to permit removal of a dispensed article of merchandise.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIGURE 1 is a perspective view of one form of our refrigerated-sandwich merchandising machine.

FIGURE 2 is a sectional view of our refrigerated-sandwich merchandising machine.

FIGURE 3 is a sectional view of our refrigerated-sandwich merchandising machine taken along the line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary elevation of our refrigerated-sandwich merchandising machine showing the shelf-release mechanism.

FIGURE 5 is a fragmentary side elevation of our refrigerated-sandwich merchandising machine taken along the lin 5—5 of FIGURE 4.

FIGURE 6 is a schematic view of one form of electrical control circuit which may be employed with our refrigerated-sandwich merchandising machine.

More particularly, referring now to FIGURES 1 to 3 of the drawings, our machine includes a cabinet **10** containing a refrigerated housing having side walls **12** and **14**, and a back **20**.

A door **16** supported on the cabinet **10** by a hinge **18** may be moved to close both the refrigerated housing and the cabinet **10**. Any suitable locking device (not shown) known to the art may be employed to lock door **16**. We form the sides **12** and **14** and back **20** from a suitable insulating material. An insulated area **22** on the door **16** and a gasket **23** around the periphery of the area **22** seal the refrigerated housing when the door is closed. A motor **24** carried by the base **26** of cabinet **10** drives a pulley **28** which drives a belt **30**. Belt **30** drives a pulley **32** carried by the shaft **34** of a compressor **36** which supplies a suitable refrigerant to an expansion coil **38** in the refrigerated housing through a tube **40**.

Brackets 42 supported between the sides 12 and 14 by any convenient means such as by screws or the like carry a plurality of panels 44 which are spaced to divide the housing into a plurality of respective columns 46. Each vertical panel 44 is formed with a pair of flanges 48 and 50 extending along its outboard edges. These flanges 48 and 50 pivotally support a plurality of horizontally extending wire supports 52.

Referring now to FIGURES 1 to 5, we form each wire 52 with a bent portion 54 and with a crank 56 in the end of the wire outboard of the flange 48. Each wire 52 carries a shelf 58 by means of a pair of depending lugs 60 and 62 formed on the shelf. It will be seen that each wire 52 not only supports a shelf 58 for pivotal movement on the flanges 48 and 50, but also may shift laterally with respect to the flanges, this lateral movement being permitted by the straight end of the wire in flange 50. When the shelf 58 is erected, wire 52 is in a position at which its crank 56 engages a vertical flange 64 extending outboard of flange 48 to prevent the shelf from dropping to dump an article of merchandise supported by the shelf. In order to dispense an article of merchandise carried by a shelf, we provide means for shifting the associated wire 52 to the left as viewed in FIGURE 5 to move the crank 56 outboard of the flange 64 to permit the shelf to fall under the influence of gravity to dispense an article of merchandise.

We form a channel-shaped member 66 integrally with the flange 48. This channel-shaped member 66 includes a vertical flange 68 formed with a number of openings 70.

We mount a vertically reciprocating release bar 72 on a pair of pins 76 and 78, carried by flange 68, by means of respective cam slots 80 and 82 formed in the bar 72. We mount a traveling member 84 for vertical movement up and down along the channel-shaped member 66. It is to be understood that a traveling member 84 is associated with each of the respective columns 46. For purposes of simplicity we will describe only one of the members 84 and its associated structure in detail. A negative spring 86 carried by a shaft 88 supported within the housing by any convenient means such as by brackets 90 and 92 tends normally to coil about the shaft 88 rather than to uncoil. We connect the end of spring 86 remote from shaft 88 to a cam 96 by means of a pin 98. A pin 100 connects the cam member 96 to the traveler 84. Owing to the connections just described, spring 86 normally urges the traveler 84 to move upwardly as viewed in the drawings. A leaf spring 102 carried by a pin 104 on traveler 84 normally urges a latch 106, loosely supported on pin 104, in a direction to engage the toe 108 of the latch in a notch or opening 70 in the channel member 66. We form the bar 72 with a plurality of stops 110 adapted to be engaged by toe 108 when the traveler 84 is released in the course of a dispensing operation.

With a shelf in a position at which the crank 56 engages the flange 64 to support an article 112, bar 72 is moved downwardly as viewed in the figures to initiate a dispensing operation in a manner to be described. As the bar moves downwardly, slots 80 and 82 ride on pins 76 and 78 to move the bar to the left as viewed in the figures. As the bar moves to the left, it engages the toe 108 to move it out of the slot 70 to permit spring 86 to move the traveler 84 upwardly. We provide each traveler 84 with a cam 114 adapted to engage the crank 56 as the traveler moves upwardly. When the traveler moves upwardly through a sufficient distance, it shifts the crank 56 outboard of the flange 64 to permit the associated shelf to dump its article of merchandise, which falls to a chute 116 forming the bottom of the refrigerated housing. Chute 116 directs the article toward an opening 118 which is normally closed by a door 120 urged to closed position by a spring 122. A handle 124 permits door 120 to be opened to enable a customer to obtain the dispensed article of merchandise.

We so arrange our dispensing mechanism that the shelf 58 is not released until bar 72 returns to its initial position. After toe 108 is released from a slot 70 when a dispensing operation is initiated, it travels along the edge of the bar until it engages a stop 110. At this time the cam 114 has not as yet moved crank 56 away from flange 64. When bar 72 returns to its initial position as it moves upwardly in a manner to be described, it also moves to the right to release toe 108 from the stop 110 to engage the toe with the channel member 66. When the toe is thus released from the stop 110, traveler 84 moves upwardly under the action of spring 86 until the toe 108 engages in the next slot 70. In the course of this operation, a shelf is released. Upon successive dispensing operations, the shelves 58 of a column are released sequentially from the bottom shelf through the top shelf.

We provide our machine with means for resetting all the released shelves in a very simple manner when the machine is to be loaded. When a column 46 is empty, traveler 84 is adjacent the top of the channel member 66. To load the machine, traveler 84 is moved downwardly against the action of spring 86. Pin 100 supports a right angle cam 126 on the traveler 84. As the traveler moves downwardly, cam 126 successively engages the cranks 56 to rotate them to positions at which the shelves 58 are erected. Immediately following this action of cam 126 on a crank, cam 96 engages the crank to shift the wire 52 axially to the right to position the crank in engagement with flange 64 to hold the associated shelf erect.

We provide respective means for selectively reciprocating bars 72 to actuate the travelers 84. A bracket 128 extending between the sides of the refrigerated housing supports a plurality of respective solenoids 130. Any suitable means such as screws 132 secure the solenoids 130 to bracket 128. Each solenoid 130 has an armature 134 normally held in a position partially out of the solenoid by a spring 136. A link 138 connects a pin 140, carried by a lug 142 on armature 134, to a pin 144 carried by an arm 146 pivotally supported on a pin 148 carried by a panel 44. A second link 150 connects pin 144 to a pin 152 carried by bar 72. This novel linkage including including links 138 and 150 and stabilizing arm 146 permits the straight-line motion of the solenoid armature to be translated to the downward and lateral motion of bar 72. When a solenoid 130 is energized, it pulls the associated bar 72 downwardly to actuate the traveler 84 in the manner described above to initiate a dispensing operation. After the momentary energization of the solenoid, the associated spring 136 returns the armature to its initial position to return bar 72 to its initial position to complete the dispensing operation. It will be seen that the only connection which need be made from the machine selecting mechanism, to be described hereinafter, to the interior of the refrigerated housing is an electrical connection to the solenoids 130. No movable part need extend through any opening in the housing and all the conductors leading to the solenoids may be brought through a single, hermetically sealed opening in the housing.

The door 16 of the cabinet 10 permits access to a plurality of selecting buttons 154 associated with the respective columns 46. Each button is adapted to be actuated to complete the circuit of a respective solenoid 130, in a manner to be described, after the correct sum in coins has been inserted in the machine. A coin slot 156 permits coins to be inserted into the coin register 157 of the machine, which is disposed in the cabinet 10 outside the refrigerated housing.

Referring now to FIGURE 6, one form of electrical control circuit which may be employed with our refrigerated-sandwich machine includes respective conductors 158 and 160 connected to the terminals 162 and 164 of a suitable source of electrical energy. The buttons 154 are adapted to actuate respective selecting switches, indicated generally by the respective reference characters 166, 168,

170, and 172. Each switch 166 includes a pair of contact arms 174 and 176 mechanically ganged by a linkage 178. Arm 174 normally engages a contact 180 and is adapted to be moved to engage a contact 182. Arm 176 normally engages a contact 184 and is adapted to be actuated to engage a contact 186. We connect the contacts 180 of the respective switches 166, 168, and 170 to the arms 174 of switches 168, 170, and 172. Similarly, we connect the contacts 184 of switches 166, 168, and 170 to the arms 176 of switches 168, 170, and 172. In this manner, as will be described hereinafter, only one selecting switch can be actuated to energize its associated solenoid at one time. A conductor 189 connects arm 176 of switch 166 to conductor 158. We connect the respective solenoids 130 associated with columns 46 between the contacts 186 and respective empty-switch contacts 188. The arms 190 of the empty switches normally engage contacts 188 and may be actuated in a manner to be described to engage contacts 192. We connect the respective arms 190 to terminals of a totalizer plate 194 corresponding to the prices at which the articles of merchandise in the various columns are to be sold. Totalizer plate 194 forms a part of the coin-controlled mechanism of our machine. It may, for example, be a part of a coin totalizer such as is disclosed in the copending application of Halsted W. Baker, Jr., Serial No. 600,517, filed July 27, 1956. The coin mechanism includes a contact arm 196 adapted to be stepped in response to the deposit of coins in the machine to energize price lines and to give change as required in accordance with the sum in coins deposited in the machine and the price of a selected article. If a sum in coins at least equal to the purchase price of an article corresponding to selector switch 166 is deposited in the machine, arm 196 moves to energize the price line corresponding to the terminal to which the empty switch associated with switch 166 is connected. We connect arm 200 to the contact 204 of a coin-return switch having an arm 206 connected to one contact 208 of a motor-holding circuit switch having an arm 210 connected to conductor 160. A plurality of respective conductors 212 connect contacts 182 to contacts 188.

Upon a deposit in the machine of a sum in coins aggregating the purchase price of an article corresponding to switch 166, for example, and upon the actuation of the push-button 154 associated with switch 166, arms 174 and 176 engage contacts 182 and 186. This action completes the circuit of the associated solenoid 130 from conductor 158 through conductor 189, switch arm 176, contact 186, winding 130, contact 188, arm 190, plate 194, arm 196, contact 198, arm 200, contact 204, arm 206, contact 208, arm 210 to conductor 160. The solenoid then operates in the manner described above to dump an article from one of the shelves in the corresponding column 46.

We connect an unlatching solenoid winding 214 between the contact arm 174 of switch 166 and conductor 189. Engagement of arm 174 with contact 182 completes the circuit of winding 214 from conductor 158 through winding 214, arm 174, contact 182, contact 188, and through the empty switch, totalizer mechanism, motor-start switch, coin-return switch and motor-by-pass switch in the same manner as for winding 130. Energization of the unlatching solenoid winding 214 frees the coin-return lock assembly (not shown) to actuate arm 200 to move it out of engagement with contact 198 and into engagement with contact 202. We connect contact 202 to one terminal of the coin-mechanism motor 216, the other terminal of which is connected to conductor 158. Engagement of arm 200 with contact 202 energizes motor 216. For purposes of simplicity, we have indicated the relationship between solenoid 214 and arm 200 schematically by the linkage 218. When motor 216 begins to rotate in the manner described, its shaft 220 drives a cam 222 to move a follower 224 out of the cam slot 226. Follower 224 operates a linkage 228 to move arm 210 out of engagement with contact 208 and into engagement with a contact 230 connected to the terminal of motor 216 to which contact 202 is connected. When this connection is established, the coin-return switch including arm 206 is by-passed and operation of the switch will not interrupt the motor circuit. Continued rotation of motor 216 accepts the coins and resets arm 196 in a manner known to the art.

We connect a plurality of empty-signal lamps 232 in parallel between conductor 189 and the respective contacts 192. As has been explained hereinabove, when the column with which any lamp 232 is associated is empty, arm 190 engages contact 192 to light the lamp and to prevent energization of the unlatching solenoid 214 and of the delivery solenoid 130.

Referring now to FIGURE 2, the empty switch of a column may, for example, be a microswitch 234 carried by the panel 44 in a position to be actuated by an uppermost shelf 58 when this shelf dumps to deliver the last article of merchandise in the column. Upon its actuation, switch 234 causes arm 190 to engage contact 192.

In operation of our machine we will assume that all the columns 46 are full of merchandise and that the customer desires to purchase, for example, an article of refrigerated merchandise such as a sandwich contained in the column corresponding to selector switch 166. To obtain the article, the customer deposits a sum in coins in the machine through coin slot 156 to step arm 196 to a position at which it engages the contact of the totalizer plate 194 in the circuit of switch 166. The customer next actuates the push-button 154 corresponding to switch 166 to move arms 174 and 176 into engagement with contacts 182 and 186. When this occurs, the winding 130 is energized to pull bar 72 downwardly as viewed in FIGURE 4. As the bar moves downwardly, slots 80 and 82 riding on pins 76 and 78 move bar 72 laterally to cause the edge of the bar to lift the toe 108 of latch 106 out of the slot 70. Spring 86 moves the traveler 84 upwardly until toe 108 engages stop 110. It will be remembered that in the course of this movement the shelf 58 is not dumped.

Engagement of arm 174 with contact 182 energizes the unlatching-solenoid winding 214 to operate the mechanical linkage 218 to move arm 200 out of engagement with contact 198 and into engagement with contact 202. This actuation of the motor-start switch energizes motor 216 to drive cam 222 to operate the motor-by-pass switch to disable the coin-return switch and to cause the coin mechanism to accept money and to reset arm 196.

When arm 200 moves out of engagement with contact 198, the circuit of winding 130 is broken and spring 136 returns armature 134 to its initial position. When this occurs, bar 72 moves upwardly and to the right as viewed in FIGURE 5 to cause toe 108 to engage the portion of the channel member 68 between adjacent slots 70. Spring 86 moves traveler 84 upwardly until toe 108 rides into the next slot 70. As the traveler moves upwardly, cam 114 engages crank 56 to shift rod or wire 52 to the left as viewed in FIGURE 5 out of engagement with flange 64 to permit the shelf to dump its article 112 down onto chute 116. The customer then opens door 120 and removes the dispensed article. Since cold air is heavier than hot air, the momentary opening of the door 120 in the bottom of the refrigerated housing does not permit any appreciable amount of vapor-laden moist air to enter the housing.

When all the articles in a column have been dispensed, the last shelf in the column actuates switch 234 to move arm 190 out of engagement with contact 188 and into engagement with contact 192. As a result, the selecting mechanism of the particular column is disabled and the corresponding empty-signal light 232 lights when a sum in coins aggregating the purchase price of an article in the column is deposited in the machine.

When it is desired to load the machine, the door 16 of

the cabinet **10** is swung open. The traveler **84** may be moved downwardly by hand against the action of spring **86**. In the course of this movement, cam **126** first engages the cranks **56** to erect shelves **58** and then cam **96** shifts the wires **52** to the right as viewed in FIGURE 5 to position the cranks beyond flange **64** to retain the shelves in their erected positions.

It will be seen that we have accomplished the objects of our invention. We have provided a merchandising machine of the pivoted-shelf type which is adapted to dispense articles which require refrigeration for their storage. Our machine does not require any moving parts to pass through the wall of the refrigerated housing. Our machine is provided with an extremely simple mechanism which permits the straight line motion of a solenoid armature to cause an axial and transverse motion of an actuated bar.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of our claims. It is further obvious that various changes may be made in details within the scope of our claim without departing from the spirit of our invention. It is, therefore, to be understood that our invention is not to be limited to the specific details shown and described.

Having thus described our invention, what we claim is:

A merchandising machine including in combination a refrigerated compartment, a frame disposed within said compartment, a plurality of shelf supporting means carried by said frame, respective shelves carried by shelf supporting means, each of said shelf supporting means being movable to a first position at which its shelf supports an article of merchandise and being movable to a second position at which its shelf drops to dump an article of merchandise supported thereon, respective means normally retaining said shelf supporting means in their first positions, means including a longitudinally movable and laterally shiftable member for sequentially releasing said retaining means, electromagnetic means including an armature, means mounting said electromagnetic means on said frame within said compartment, means constraining said armature for linear movement upon energization of said electromagnetic means, an arm, means pivotally mounting said arm on said frame, a first link for connecting said arm to said armature, a second link connecting said arm to said member and means disposed outside said compartment for energizing said electromagnetic means to cause concomitant longitudinal and lateral movement of said member to release one of said shelf retaining means.

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