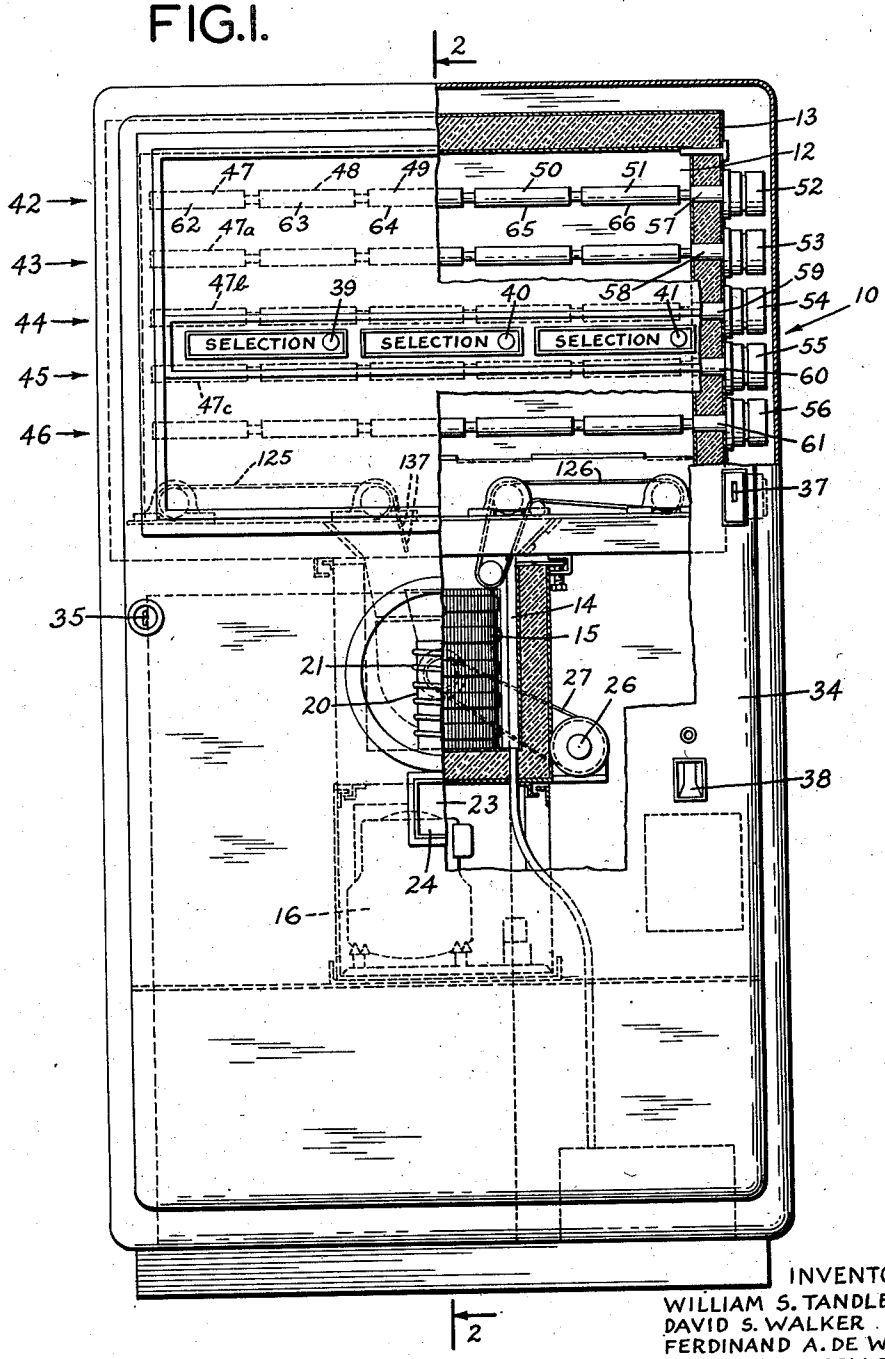
Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 1

FIG. 1.



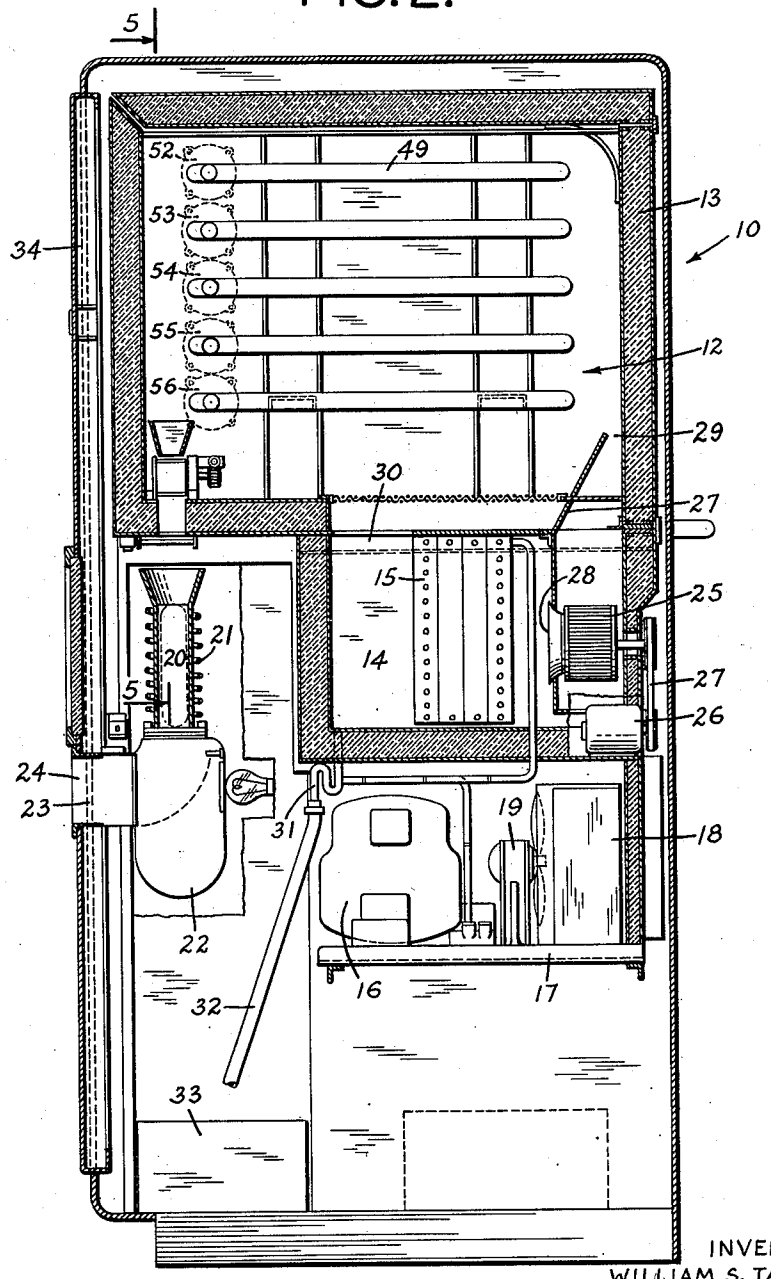
INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
WILLIAM M. TELLER
BY Campbell Brumbaugh & Free
THEIR ATTORNEYS.

Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 2

FIG. 2.



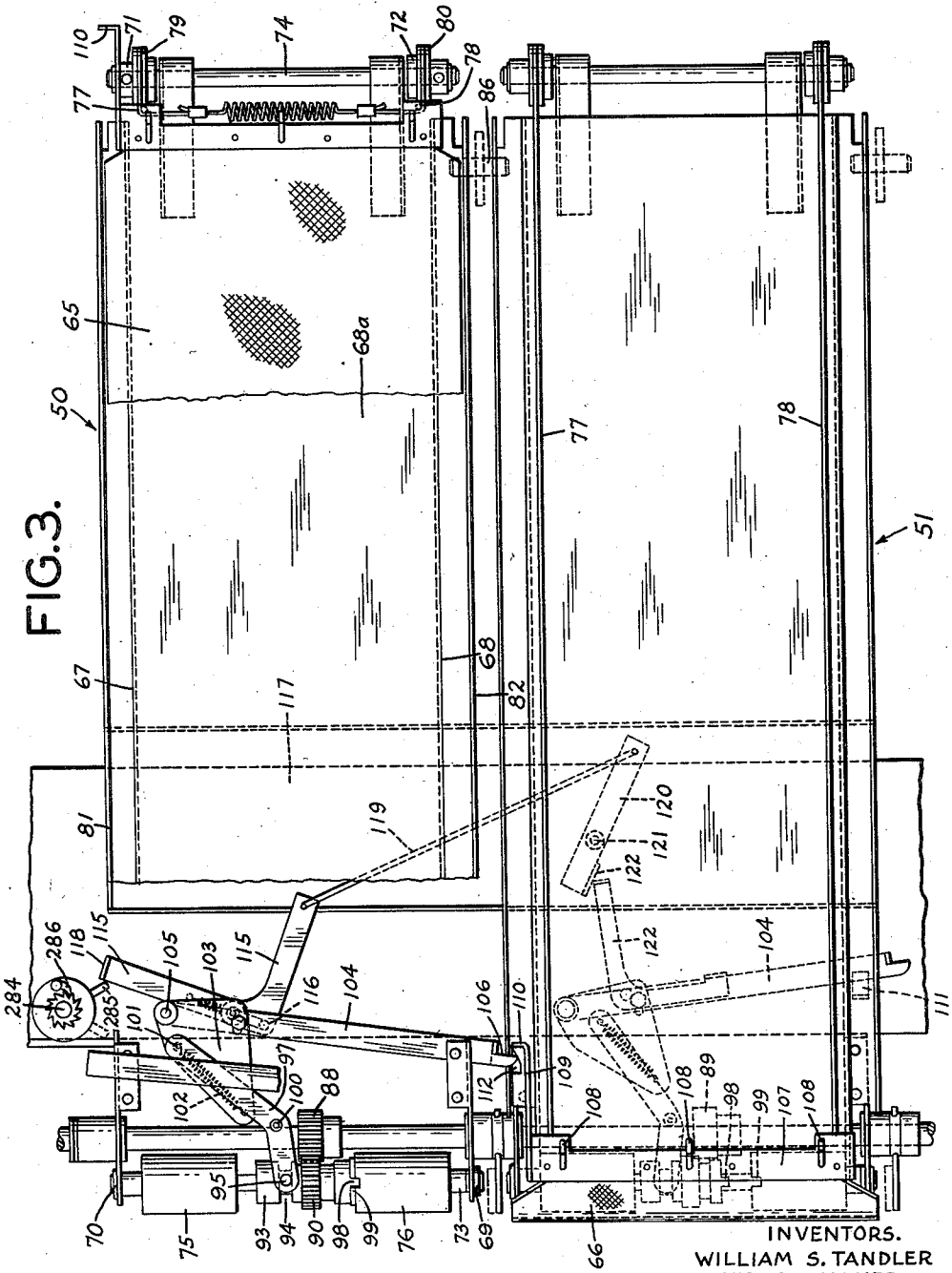
INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
WILLIAM M. TELLER
BY Campbell, Brumbaugh & Free
THEIR ATTORNEYS.

Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 3

FIG. 3.



INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
WILLIAM M. TELLER

BY Campbell, Brumbaugh & Free
ATTORNEYS.

Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 4

FIG. 4.

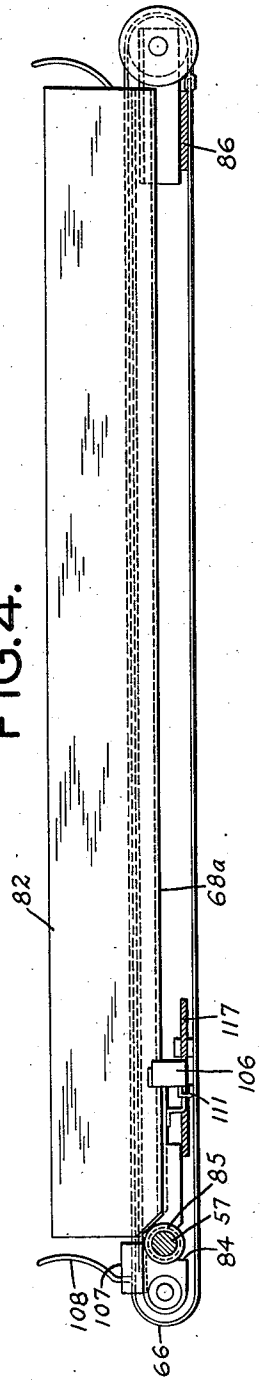
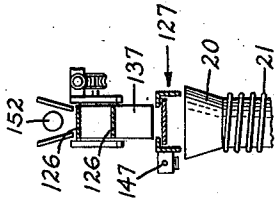


FIG. 6.



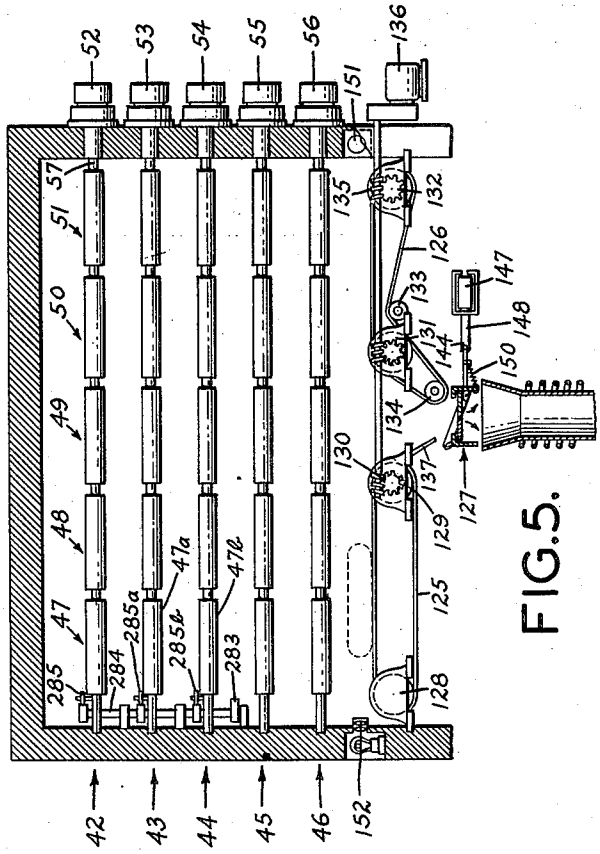


FIG. 5.

INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
WILLIAM M. TELLER

BY Campbell, Brumbaugh & Free

THEIR ATTORNEYS.

Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 5

FIG.7.

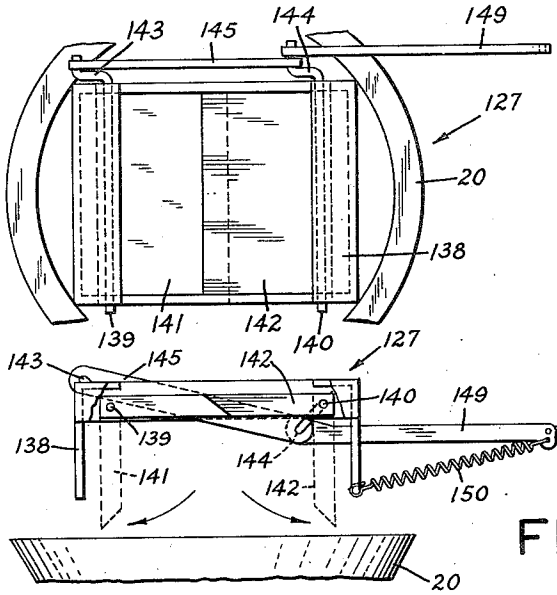
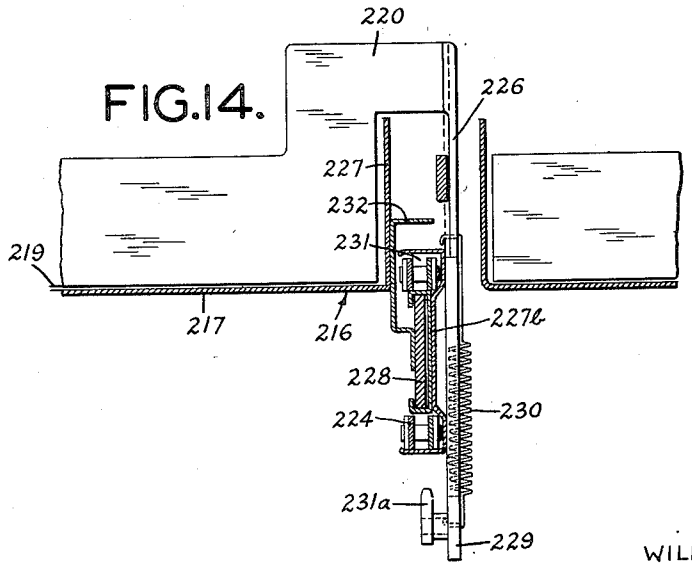


FIG.8.

FIG.14.



INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
WILLIAM M. TELLER

BY Campbell, Brumbaugh & Free
THEIR ATTORNEYS.

Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 6

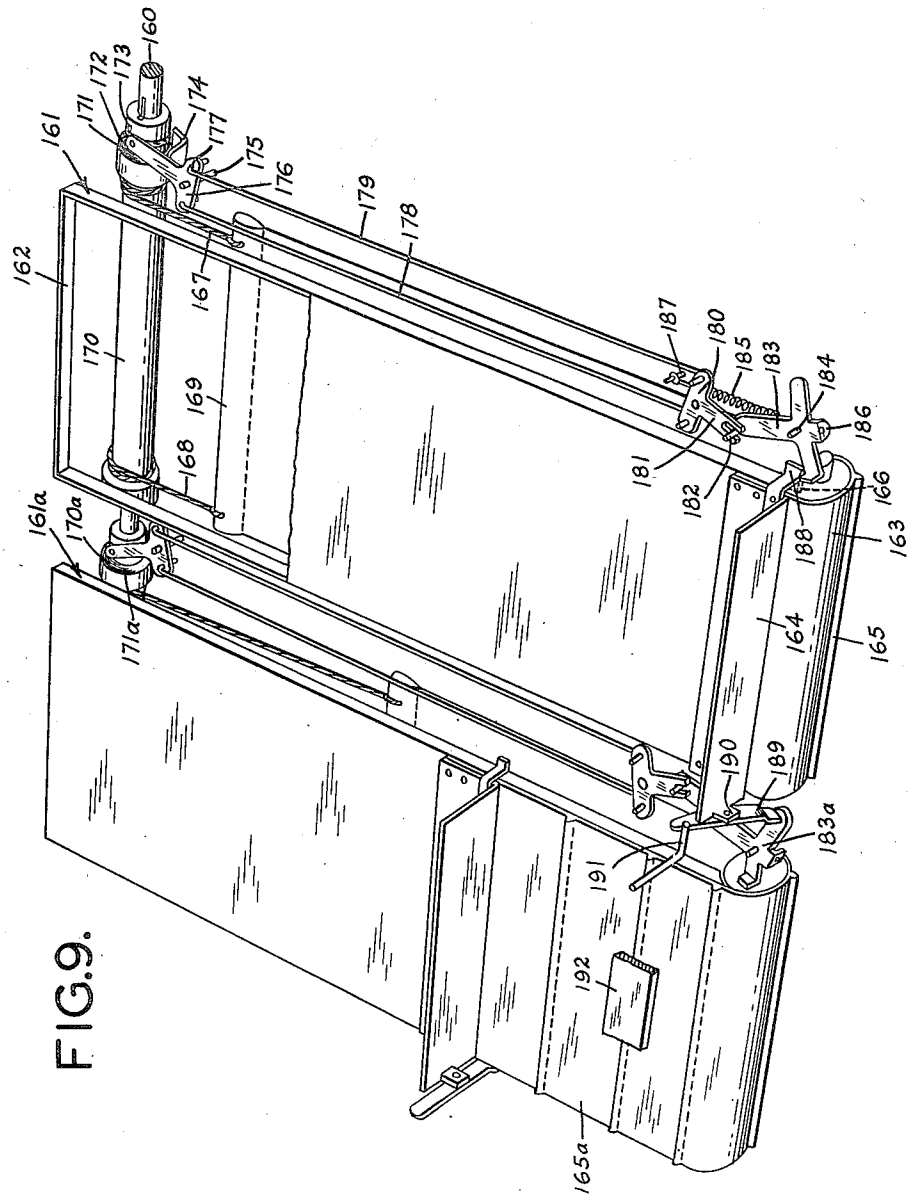


FIG.9.

INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
WILLIAM M. TELLER
BY Campbell, Brumbaugh & Free
THEIR ATTORNEYS.

Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 7

FIG. 11.

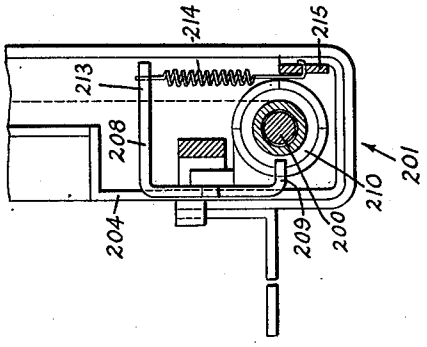
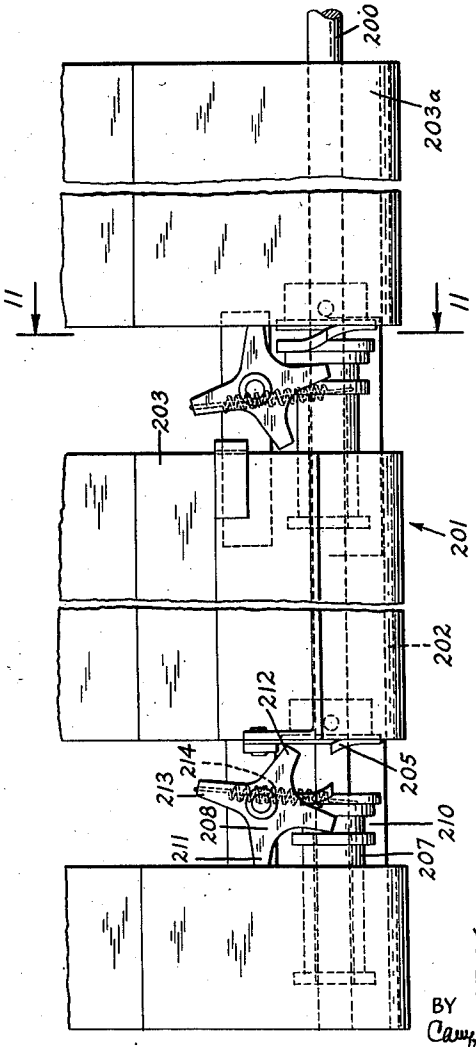


FIG. 10.



INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
BY WILLIAM M. TELLER
Campbell, Brumbaugh & Free
THEIR ATTORNEYS.

Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 8

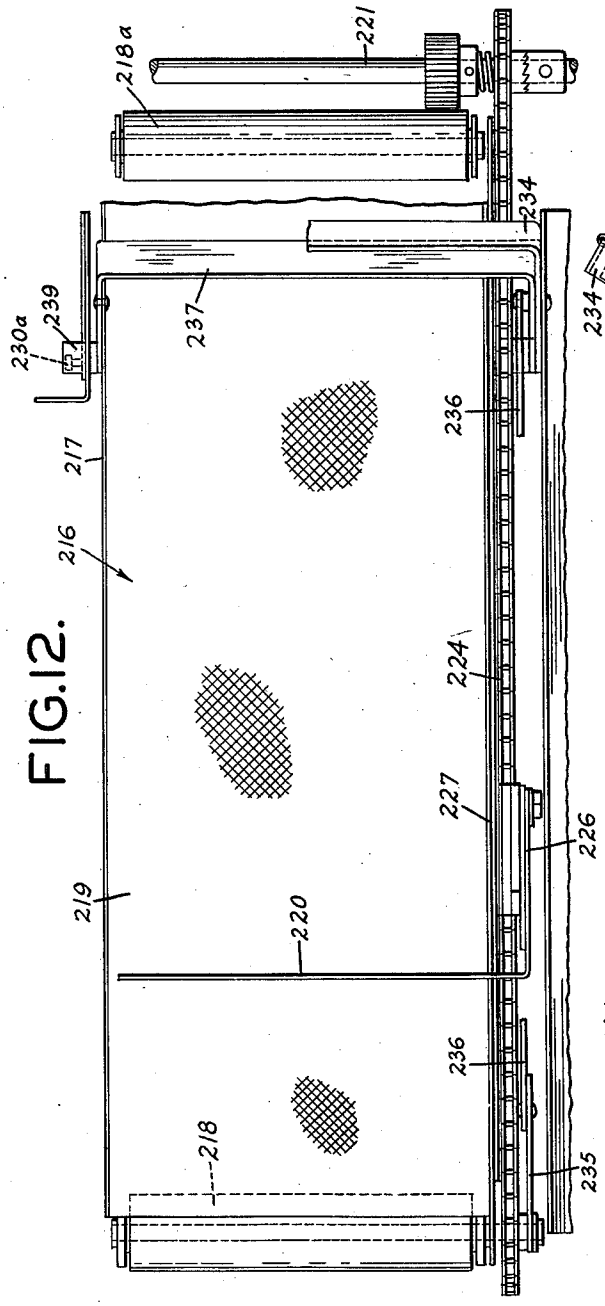


FIG. 12.

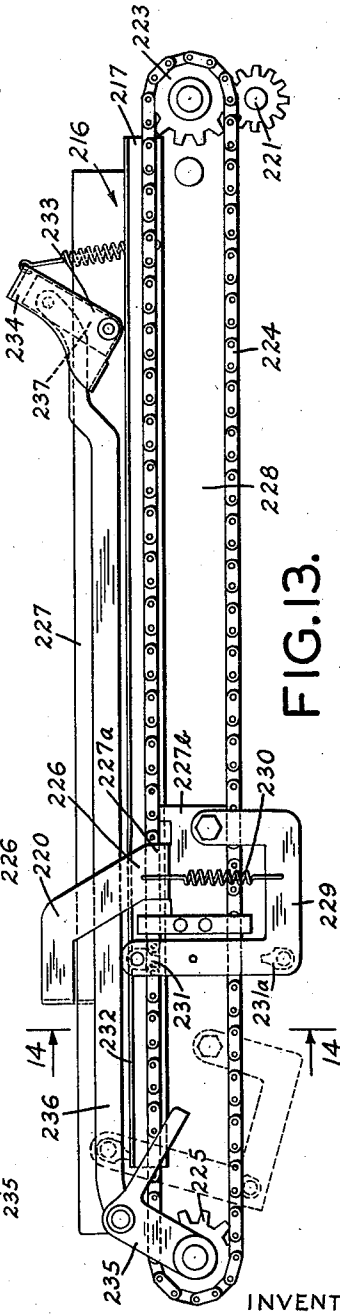


FIG. 13.

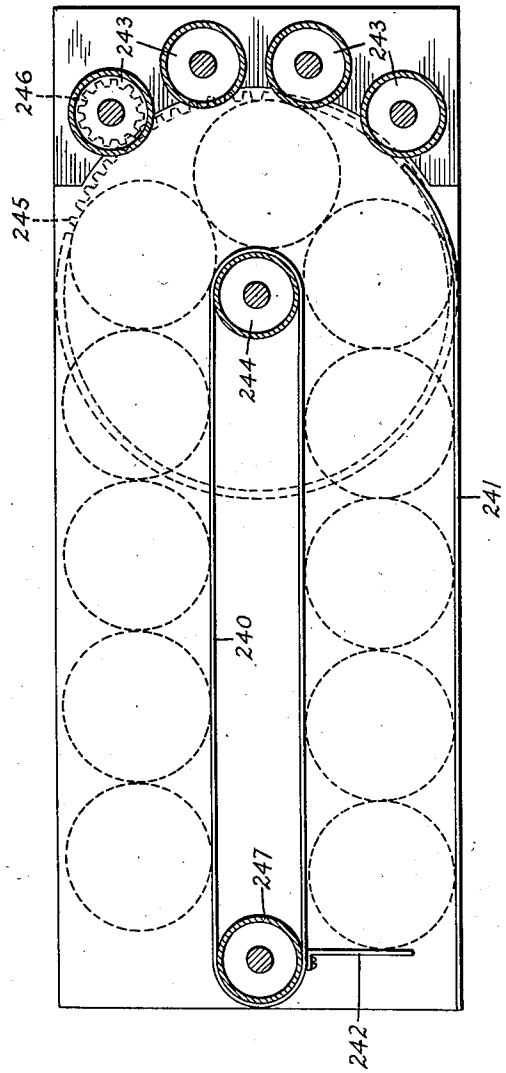
INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
WILLIAM M. TELLER
BY Campbell, Brumbaugh & Free
THEIR ATTORNEYS.

Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 9

FIG.15.



INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
WILLIAM M. TELLER

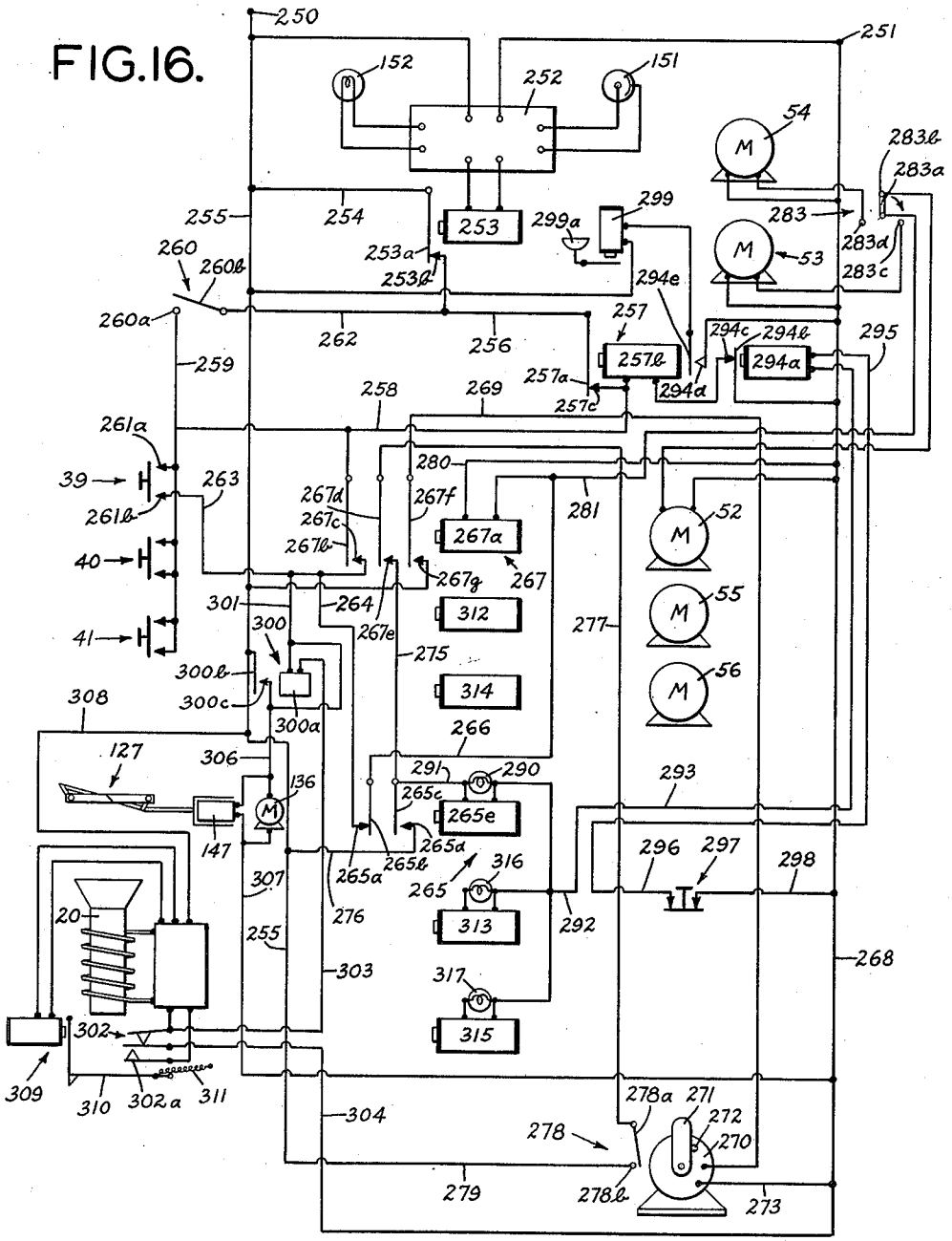
BY
Campbell, Brumbaugh & Free
THEIR ATTORNEYS.

Nov. 21, 1950 W. S. TANDLER ET AL 2,531,238

MERCHANDISE VENDING MACHINE

Filed April 17, 1947 10 Sheets-Sheet 10

FIG. 16.



INVENTORS.
WILLIAM S. TANDLER
DAVID S. WALKER
FERDINAND A. DE WIESS
WILLIAM M. TELLER

BY Campbell, Brumbaugh & Free

THEIR ATTORNEYS.

Patented Nov. 21, 1950

2,531,238

UNITED STATES PATENT OFFICE

2,531,238

MERCHANDISE VENDING MACHINE

William S. Tandler, David S. Walker, and Ferdinand A. de Wiess, New York, and William M. Teller, New Rochelle, N. Y., assignors to Vendomatic Machine Corporation, New York, N. Y., a corporation of Delaware

Application April 17, 1947, Serial No. 742,164

22 Claims. (Cl. 312—97)

1

This invention relates to vending machines and it relates more particularly to machines for cooking and vending food products, such as, for example, frankfurter and hamburger sandwiches.

It has been suggested heretofore that coin-controlled machines may be used for vending frankfurter sandwiches and that the frankfurters may be cooked prior to dispensing by means of a high frequency heating system so that the food products can be converted from an initially raw state into a cooked state in a relatively short period of time.

The prior vending machines have not been particularly satisfactory for the reason that foolproof operation is difficult to attain. Moreover, the prior devices have not had a sufficiently large capacity to permit the machine to be operated over extended periods of time without supervision.

An object of the present invention is to provide a fully automatic vending machine for freshly-cooked food products, such as, for example, meat sandwiches of various types, which is foolproof in operation and assures the prompt vending of the cooked product or the return to the customer of the money paid for the product.

Another object of the invention is to provide a compact vending machine which has a large capacity for storing the food products so that it does not require frequent refilling or have to be shut down while being refilled.

Another object of the invention is to provide a vending machine for food products and the like which is foolproof in operation and which permits a selection of a variety of products with the assurance that the customer will receive either the selected product or his money.

A further object of the invention is to provide a dispensing and supply system for vending machines whereby products can be dispensed in succession.

Other objects of the invention will become apparent from the following description of typical embodiments of the invention.

Vending machines, in accordance with the present invention, include an electric high frequency heating coil encircling or associated with a chamber in which the sandwich or other food product to be cooked is received during the cooking operation. The vending machine also includes a refrigerating compartment wherein the food products are stored prior to cooking in order to prevent spoilage and to comply with the various sanitary codes.

2

The present invention differs from prior devices in the means for storing the food products prior to cooking, the mechanism for discharging the products from the storage compartment to the cooking unit and to the controls for selecting and delivering the food products to the cooking unit and the mechanism for detecting the presence of a food product or, upon the failure to detect the presence of such a food product, for returning the coins to the customer or allowing him to make another selection.

A particular feature of the invention is the provision of a plurality of supporting elements for receiving rows of food products, such as, for example, frankfurters in rolls enclosed in a paper sack or other wrapping. These supports are arranged side by side and through a novel interlock system are adapted to be operated in predetermined sequence so that, when one support has discharged the food products thereon, another support is conditioned for operation to dispense the food products thereon, and so on through an entire series of supports with final transfer to the first support for another cycle of operation.

More particularly, each of the supports may be provided with a conveyor belt which is movable relatively to the support for advancing the food products and discharging them over one end of the support. Only one of the conveyor belts is driven at a time and mechanism is provided for disconnecting the driven conveyor belt and connecting another conveyor belt for movement when all of the articles have been dispensed from the first-mentioned conveyor belt.

When a plurality of rows of supports are present in the device, the rows may be set into operation successively so that the dispensing operation may be continued while other supports in a different row or, for that matter, in the same row, are being refilled with other food products.

Inasmuch as a plurality of article supports arranged in a horizontal plane are provided, a transfer mechanism, such as one or more belts, is used to deliver the food products discharged from the supports to a hopper which delivers the food products into the high frequency cooking device. Dispensing of more than one of the food products at a time is avoided by means of a detecting device, preferably of the photoelectric cell type, which senses the presence of an article discharged from one of the supports and prevents the machine from dispensing another article until additional coins are inserted in the machine.

The detecting mechanism may be connected with a time-control device whereby failure of the support or the conveyor belt thereon to discharge the article within a limited time will actuate a coin-return mechanism to return the coin or coins to the customer or to reset the machine to allow the customer to make another selection. Thus, the present invention takes care of all contingencies in the operation of the dispensing or vending device whereby the customer is either assured of receiving an article of his own selection or having his money, which he has paid for the article, returned to him.

For a better understanding of the present invention, reference may be had to the accompanying drawings, in which:

Figure 1 is a view in front elevation and partly broken away of a typical form of vending machine embodying the present invention;

Figure 2 is a view in section taken on line 2—2 of Figure 1;

Figure 3 is a plan view illustrating one form of transfer mechanism for coupling the feed belts successively to a drive member, with parts broken away to disclose details of construction of the transfer member;

Figure 4 is an end view of the mechanism disclosed in Figure 3;

Figure 5 is a view in section of the vending machine taken on line 5—5 of Figure 2;

Figure 6 is an end view of the transport mechanism disclosed in Figure 5;

Figure 7 is a plan view of the control gate or trap door for delivering the articles to the cooking chamber with parts of the device broken away for clarity of disclosure;

Figure 8 is a view in side elevation of the control gate or trap door illustrating it in closed and open positions;

Figure 9 is a perspective view of a group of supports for the article, partly broken away to illustrate details of the transfer mechanism of the device;

Figure 10 is a plan view of a part of a modified form of transfer mechanism disclosing details of a clutch for the transfer mechanism;

Figure 11 is a view in section taken on line 11—11 of Figure 10;

Figure 12 is a plan view of a modified support for advancing articles including a modified form of drive and transfer mechanisms;

Figure 13 is a view in side elevation of the support shown in Figure 12;

Figure 14 is a view in section on line 14—14 of Figure 13;

Figure 15 is a view in longitudinal section of still another form of feeding mechanism; and

Figure 16 is a schematic wiring diagram of the electrical system of the device illustrating the electrical transfer-control mechanism and the time and coin-controlled mechanism utilized in the device.

The present invention will be described with reference to a device for dispensing frankfurter and hamburger sandwiches in which wrapped sandwiches containing the raw or partially-cooked meat are retained under refrigeration until they are delivered to a cooking device to be cooked and then dispensed to the customer. The devices described hereinafter may be used for dispensing other articles.

The shape, design and arrangement of the device is susceptible to considerable modification, in accordance with requirements.

The form of vending machine illustrated includes a rectangular boxlike casing 10 which is divided into a plurality of compartments for receiving the dispensing, cooking and other mechanisms required for operation. As shown in Figures 1 and 2, the top section of the box is provided with a compartment 12 having insulated walls and top 13, inasmuch as this section forms a refrigerator and storage compartment for the food products. The bottom of the compartment 12 is provided with an offset compartment 14 in which is mounted an evaporating coil 15 of any desired construction which is supplied with a refrigerant for evaporation therein by means of a compressor 16 mounted on a shelf or platform 17 below the compartment 14.

The shelf 17 also supports a condenser 18 for receiving the compressed vapor from the compressor 16 and condensing it into liquid form for delivery to the evaporating coil 17. The condenser may be of the air-cooled type and an electric fan 19 is provided for cooling the condenser.

Directly in front of the compressor 16 and the offset portion 14 of the refrigerating compartment is the cooking unit which, as illustrated, may include a glass tube 20 having a flared top which is encircled by a heating coil 21 supplied with high frequency current from the electronic power unit 22 mounted beneath the coil. The lower end of the tube 20 is disposed above a dispensing chute 23 which opens to the outside of the compartment through an aperture 24 in the front panel in the case.

The electronic heating unit described generally above is of a conventional type well known in the art and is not believed to require further description herein.

Proper refrigeration of the compartment 12 is assured by circulation of air throughout the compartment by means of a blower or fan 25 which is driven by means of a motor 26 mounted to one side of the compartment 14 and connected to the blower by means of a belt 27. The blower is mounted in a casing 27 having an intake opening 28 adjacent to the coil 25 and an exhaust opening 29 in the back of the compartment 12. The air must pass through the evaporating coil 15 before entering the blower 25 inasmuch as the coil extends substantially the full width and height of the compartment 14 at about the center thereof and air can enter the compartment only through the opening 30 at its left-hand end.

Moisture from the coil 15, when the coil is being defrosted, is withdrawn from the compartment 12 by means of a drainage coupling 31 and delivered by a tube or pipe 32 to a drip pan 33 in the lower front of the casing.

As best shown in Figure 1, the entire front 34 of the casing 10 may be opened or removed, and it is provided with lock 35 permitting access thereto only by authorized persons.

In addition to the other details of the casing, it may be provided with a coin-deposit slot 37, a coin-return slot 38 and a series of selector buttons 39, 40 and 41 for making a selection of the various products contained in the refrigerating compartment 12, as will be explained hereinafter.

The principal features of the present invention reside in the mechanism for supplying the products from the refrigerating compartment to the heating or cooking device and in the control system for regulating the operation of the supply mechanism to render it foolproof.

As disclosed generally in Figures 1 and 2, a typical dispensing device may include a plurality of supports for the products to be dispensed. For

example, the device includes five rows 42, 43, 44, 45 and 46 of supports, each row containing five supporting and feeding devices 47, 48, 49, 50 and 51, successively lower rows being identified by alphabetical designations, such as 47a, 47b, 47c and so forth. The rows 42, 43, 44, 45 and 46 of supports are driven by separate motors 52, 53, 54, 55 and 56 which are conveniently mounted on the exterior of the insulated side wall of the refrigerating compartment 12 but within the outer casing 10 so that they may not be tampered with. These motors may be provided with reduction gearing so as to reduce the speed of the output shafts 57, 58, 59, 60 and 61 to which they are connected.

In the form of the invention illustrated, the shafts 57—61 are mounted near the forward edge of the rows of supports and are utilized, as shown in Figures 1 and 2, to drive the conveyor belts 62, 63, 64, 65 and 66 which form the surfaces of the supports and receive the food products.

Referring now to Figures 3 and 4, each of the supports, for example, support 50, includes a pair of side plates 67 and 68, connected to a flanged base plate 68a, which carry at one end the bearings 69 and 70. The base plate supports the bearings 71 and 72 at its rear end. The shafts 73 and 74 are mounted in the bearings 69, 70 and 71, 72, respectively. The forward or front idler shaft 73 is provided with a pair of spaced-apart rollers 75 and 76 which are secured to the shaft 73 by set screws or the like for rotation therewith and which engage and support the belt 65. The belt 65 and the other belts on the supports preferably are strips of fabric, the opposite ends of which are connected by means of cables or wires 77 and 78 which pass over the pulleys 79 and 80 on the rear shaft 74. Thus, the belt is supported for movement along the supporting member to advance a row of articles which is deposited thereon.

The articles are kept from being displaced transversely of the belt by the flanges or partitions 81 and 82 carried on the supports.

Each of the side plates 67 and 68 is provided with a notch 84 (Figure 4) for receiving the bearing members 85 that are rotatably mounted on shaft 57, for example. The rear edge of the support rests upon a cross brace 86 so that the entire support may be lifted up and removed through the front of the refrigerating compartment 12 by removing the belt.

The conveyor belts in row 42 of the supports are driven by the shaft 57. The shaft 57 is provided with gears 88, 89, etc., each corresponding to one of the supports 42 to 45. The gear 88 meshes with the gear 90 on the idler shaft 73 and the other gears 89, etc. mesh with similar gears on the corresponding idler shafts of the other supports in a row. The gear 90 is fixed to a clutch sleeve 93 which is slidable axially of and rotatable relatively to the shaft 73 and is provided with an external groove 94 for receiving rotatably the pin 95 on the shifter fork 97. The left-hand end of clutch sleeve 93 is provided with clutch teeth 98 for engagement with the complemental clutch element 99 on the drive roller 76 so that when the clutch elements 98 and 99 are engaged, the idler shaft 73 is connected to the shaft 57 and is driven thereby. When the clutch sleeve 93 is shifted away from the clutch element 99, the shafts 57 and 73 are disconnected and the belt 65 is stationary. Inasmuch as it is disconnected from the drive shaft 57, the belt 65 may be drawn backwardly and refilled, and the entire support may be removed by removing the belt.

The shifter fork 97 is supported on a pivot pin 100 which is fixed to the base plate 68a and carries a pin 101 for engaging with one end of a spring 102 that is connected at its opposite end to a plate member 103 secured to an actuating lever 104. The actuating lever 104 is mounted on a pivot pin 105 also secured to the base plate 68a for rocking movement thereabout and extends generally transversely of the base plate having an upwardly and outwardly projecting end portion 106 which extends beyond the conveyor belt 65, for example. The above-described shifter fork 97 and lever arrangement provides a toggle mechanism whereby, upon rocking of the lever 104, the clutch members 98 and 99 may be engaged and disengaged with a snap action. Each of the supports 45 to 51 is provided with a toggle clutch actuating mechanism like that described above, and these toggle mechanisms are used to transfer the motion of the drive shaft 57 successively to the various conveyor belts on the supports 48 to 51. For example, conveyor belt 66 associated with the support 51 is provided with a cross plate 107 having upwardly extending curved fingers 108 thereon for advancing the food products and having at its right-hand end a rearwardly projecting tripping member 109 having an outwardly extending end 110 which engages the end 106 of the lever 104 as the plate 107 approaches the front end of the support. As the conveyor belt 65 advances, the lever 104 is rocked in a clockwise direction as viewed in Figure 3 until the toggle mechanism snaps the shifter fork 97 over to engage clutch elements and connect the shaft 57 to the conveyor belt 65 on the support 50. The toggle action advances the member 106 ahead of the finger 110, as shown. Shortly thereafter, a small U-shaped tripping member 111 on the interior of the conveyor belt 66 of the support 51 engages the lever 104 associated with that support and moves it in a counter clockwise direction to snap the shifter fork 97 in such a direction as to disengage the clutch elements 98 and 99 associated therewith. Therefore, the advancing movement of any of the conveyor belts on the supports 48 to 51 will eventually disconnect the advancing conveyor and connect the next adjacent conveyor to the shaft 57. During this movement of the conveyor 66, the finger 110 engages a cam member 112 fixed to the base plate which deflects the finger 110 out of the path of the lever end 106 to permit the belt to travel far enough to unclutch itself and prevent stalling of the mechanism when the device is completely sold out.

When all of the conveyors 48 to 51 have discharged their contents and the conveyor on the support 47 approaches the end of its movement, it is necessary to reconnect the shaft to the conveyor 51. This may be accomplished by means of the lever and link system disclosed best in Figure 3. In Figure 3, a transfer system for only two of the supports 50 and 51 is illustrated in order to simplify the drawings but it will be understood that the system for the five conveyors, as illustrated in Figure 1, is exactly the same with the exception that the driving transfer is made between the supports 47 and 51 rather than the supports 50 and 51, as shown in Figure 3. The transfer lever system consists of a first bell crank lever 115 mounted on a pivot 116 supported on a transverse plate 117, Figures 3 and 4. The lever 115 has an upwardly extending end portion 118 which is in the path of the member 110 so that, as the member 110 of the support 50

advances, it rocks the lever 115 in a counter clockwise direction. The inner end of the lever 115 is connected by means of link 119 to another straight lever 120 which is also supported by a pivot 121 on the plate 117. The lever 120 has an upwardly-bent end portion in the path of the rearwardly extending arm 122 of the lever 104 for conveyor belt 66. Thus, when the lever 115 is rocked counter clockwise, the lever 120 is also rocked counter clockwise displacing the toggle lever 104 clockwise and snapping the clutch elements 98 and 99 associated with the support 51 into engagement. In this way, it is possible to repeat continuously the successive operation of the conveyors on the supports 51, 50, 49, 48 and 47 with a transfer back to the support 51 if this support has been refilled after it has been emptied.

It is also possible to transfer from one row, 42 for example, to another successively lower row 43 or 44, if desired, by successively connecting the motors for driving the rows of supports in the control circuit. The electrical circuit for accomplishing this transfer is described in detail hereinafter. However, in every instance, the driving transfer is made from one end of a row of supports to the other even though that row is not to be actuated until one or more additional rows have been actuated to discharge their contents.

Referring now to Figures 5 to 8, the device includes a transport mechanism for delivering the articles discharged from the various supports to the cooking device. As shown best in Figure 5, the transport device may consist of a pair of belts 125 and 126 which travel in opposite directions to deliver the material to a trap door 127 above the cooking chamber 20.

The belt 125 is supported at its opposite ends on the pulleys 128 and 129, the latter being connected by a worm gear mechanism 130 to the pulley 131 which supports a portion of the conveyor belt 126. The conveyor belt 126 is further supported by means of a pulley 132, and an idler tensioning pulley 133 as well as a pulley 134 disposed below and to the left of the pulley 131 to cause the belt 126 to be inclined outwardly toward the trap door 127. The pulley 132 may be driven also by a worm gear mechanism 135 which is actuated by a motor 136. In this way, any article falling on either of the belts will be advanced toward the center of the machine and will be fed either down the inclined end of the conveyor 126 to the trap door 127 or down the inclined wall of the hopper 137 to the trap door. The positive drive of the inclined portion of the conveyor 126 prevents jamming of the article in the hopper and assures its feed in proper position to the trap door 127.

As shown in Figures 7 and 8, the trap door 127 consists of a frame work 138 of generally square shape which supports a pair of shafts 139 and 140 which carry flat gate members 141 and 142 for movement with the shafts. The inner ends of the gate members 141 and 142 are beveled and overlap.

The shafts 139 and 140 have cranks 143 and 144 thereon which are connected in about 90° relationship by means of a link 145 so that, upon endwise movement of the link 145, both of the gate members 141 and 142 will swing downwardly to discharge the article thereon into the funnellike portion of the cooking chamber 20. Such endwise movement of the link 145 may be produced by means of the solenoid 147 having a reciprocating armature 148 that is connected by means of a link 149 to the link 145. A spring 150 is connected between the link 149 and the frame 138 of the trap door 127 normally urging the gate members 141 and 142 to closed position. The energization of the solenoid 147 will be described hereinafter.

At opposite ends of the conveyor belts 125 and 126 are located photoelectric cell 151 and an electric lamp and lens system 152 for directing a light beam on the cell 151. The cell 151 and the lamp 152 are so located that any merchandise falling on either of the belts 125 and 126 will interrupt the beam. Such interruption of the light beam is utilized to stop any of the motors 52 to 56 which is operating at that time and thereby prevent additional articles from being dispensed from the supports.

The above-described support and conveyor systems may be modified substantially and other types of mechanisms for discharging the merchandise one by one may be used with equal facility.

Another form of actuating mechanism and transfer mechanism is disclosed in Figure 9 of the drawings. Only two supports are disclosed in Figure 9 but it will be understood that as many supports as desired may be arranged side by side and a plurality of horizontal rows of such supports provided, as previously described. In this form of support and conveyor mechanisms, the drive shaft 160 for one row is located at the rear of the supports 161 and 161a. A support 161 may consist of a traylike member 162 over the surface of which travels a conveyor belt 163 carrying a pusher plate 164 on its rear edge. The conveyor belt 163 may be provided with a plurality of ribs 165 for more positively advancing the merchandise. The pusher plate 164 is provided with inturned flanges 166 on its opposite edges for engagement beneath the traylike member 162. The conveyor is advanced over the member 162 by means of cables or cords 167 and 168 which are secured to a reinforcing member 169 at the front edge of the conveyor belt. These cords or cables are adapted to wind around a drum member 170 which is rotatably mounted on the drive shaft 160. If desired, the conveyor belts may be wound around the drum member 170.

The right-hand end of each drum member is provided with a clutch member 171 which may be a tooth or dog type of clutch or, as illustrated, a cone-type clutch, which cooperates with a complemental cone-clutch element 172 on a sleeve 173 which is slidable but non-rotatably mounted on the shaft 160. The sleeve 173 is moved axially of the shaft by means of a shifter fork 174 which is pivotally supported by a pivot pin 175 supported in any desired way in the casing. The shifter fork is provided with laterally-extending arms 176 and 177 which are connected by tie rods 178 and 179 to a small T-shaped member 180 which is mounted for pivotal movement about a vertical axis on the tray member 162. The upright 181 of the T-member is slotted to receive a pin 182 on another T-shaped member 183 that is also supported on a pivot pin 184 carried by the tray member 162. A spring 185 extends from a downwardly struck lug 186 on the forward end of the T-shaped member 183 to a fixed pin 187 carried by the tray so that a snap toggle action is obtained as the T-member 183 is rocked past dead-center position. Such rocking movement of the T-member 183 is transmitted by the structure described above

to the sleeve 173 to engage or disengage the clutch elements 170 and 171.

Disengagement of the clutch elements of the conveyor 161 is accomplished by means of a tripping member 188 carried by the pusher plate 164 so that, when the pusher plate 164 is advanced sufficiently far to discharge the last article on the belt 165, the T-member 183 is rocked to disengage the clutch element 171.

At the same time, the corresponding T-shaped member 183a on the adjacent conveyor is rocked in a clockwise direction by means of a lever 189 which is carried pivotally by a lug 190 extending forwardly from the left-hand end of the pusher plate 164, as viewed in Figure 9. The lever 190 has a lower end adapted to engage the right-hand leg of the T-member 183a and when its upper end engages a downwardly extending tripping member 191 which is carried by a cross member 192 in the casing of the machine. Thus, as the pusher plate 164 advances, the upper end of the lever 189 strikes the downwardly projecting tripping member 191 and rocks the T-member 183a in a clockwise direction, thereby engaging the clutch elements 170a and 171a which couple the conveyor belt 165a to the drive shaft 160.

Reverse transfer from the left-hand support and conveyor in a row to the right-hand conveyor in the row is accomplished by the mechanism similar to that disclosed in Figures 3 and 4.

Another form of transfer mechanism is illustrated in Figures 10 and 11. The structure of the transfer mechanism disclosed therein is similar to that shown in Figure 9, with the exception that the drive shaft 200 is at the front of the support 201 and passes directly through the center of the roller 202 which drives a continuous or endless conveyor belt 203 extending around the supporting tray member 204. The roller 201 is rotatable relatively to the shaft 200 but can be coupled thereto by means of a clutch element 205 on the roller and a cooperating clutch element 206 on the right-hand end of a sleeve 207 which is movable axially of the shaft 200 but keyed thereto. The shifter fork for moving the sleeve 207 is a 4-armed member 208 having its forward arm 209 bent downwardly to engage in a groove 210 in the sleeve 207. The lateral projecting arms 211 and 212 are engaged by a tripping mechanism like the lever 189, as shown in Figure 9, and the tripping lug 188 also disclosed in Figure 9. The member 208 has a snap action for the reason that its rearwardly projecting arm 213 is connected by means of a spring 214 to a pin 215 or other element carried beneath the shaft 200.

The operation of this transfer mechanism is exactly like those described above in that the conveyor belts 203, 203a and so forth are connected successively to the drive shaft 200. If desired, the belts 203, 203a may be arranged to wind up on the roller 202 or other corresponding roller.

Figures 12, 13 and 14 illustrate still another type of supporting and feeding mechanism for supplying the merchandise to the cooking device. The support 216 illustrated in these figures of the drawing includes an inverted channel-like base plate member 217 having rollers 218 and 218a journalled in its opposite ends. The rollers 218 and 218a support a conveyor belt of the endless type 219 which carries an L-shaped member 220 constituting the pusher member for advancing the articles with the conveyor belt. Near the rear end of the channel member 217 is a drive shaft 221 which is driven by means of an electric motor (not shown) through a ratchet-type clutch 222. The shaft 221 is provided with a sprocket 223 which is connected by means of a chain 224 to a sprocket 225 fixed to the forward roller 218. A series of such supports are arranged along the shaft 221 and all of the chains associated with the supports are driven simultaneously. The means for coupling the conveyor belt to the chain includes an arm 226 on the pusher member 220 which extends over a side plate 227 on the side of the base member and has a downwardly projecting portion 227a terminating in a plate 227b having inturned flanges which engage over guide plate 228 fixed to the side of the channel member. The guide plate 227b carries a U-shaped arm 229 which is supported for pivotal movement and is normally urged upwardly by means of a spring 230 connecting the arm with the guide plate 226. The vertical arm 229a of the U-shaped member 229 is provided with oppositely and inwardly projecting pins 231 and 231a which are adapted to engage the upper and lower flights of the chain 224. The upper pin 231 is so positioned that it normally lies above the level of an outwardly directed flange 232 carried by the side plate of the device. When the pin 231 is disposed beneath the flange 232, it is in engagement with the chain 224. When the pin 231 is above the flange 232, the lower pin 231a is engaged in the lower flight of the chain 224. This arrangement permits the forward and reverse drive of the conveyor belt to advance the articles and then retract the belt for refilling with other articles.

The conveyor is coupled to the chain by means of a bell crank lever 233 which is pivotally supported on the side plate 217 of the conveyor support. This lever includes a bail 234, only partially shown, which extends across the entire row of conveyors and supports for actuation by the last conveyor in the row.

When the bell crank 233 is rocked counter clockwise and with the conveyor in its retracted position, the pin 231 which is below the bell crank 233 will be displaced downwardly into engagement with the chain 224 and will be driven by the chain 224 to the left. As the pin moves toward the left it engages beneath the flange 232 and thereby is locked in engagement with the chain to cause the upper flight of the conveyor to move to the left as viewed in Figure 13. When the conveyor reaches the left-hand end of its path of travel, the pin 231 disengages from the flange 232 and is urged upwardly by the spring 230 to engage the lower pin 231a in the chain 224. This immediately causes a change of direction of the conveyor belt and the conveyor 219 then travels to the right until the pin 231a is disengaged from the chain 224 by engagement with the bell crank lever 233. At this stage, both of the pins 231 and 231a are out of engagement with the chain. During movement to the right the pin 231a is retained in engagement with the chain 224 because the pin 231 is in engagement with the top of the flange 232.

The transfer operation to the next successive conveyor when the conveyor belt has moved to the left of its path of travel is produced by means of the lever 235 which is pivotally supported on the end of the shaft which supports the roller 218. The lever 235 is connected by means of a link 236 to a bail 237 which carries at its end a tripping member 239 corresponding to the bell crank lever 233 so that it can engage the pin

230a on the next support with its corresponding chain 224a. The right-hand end of the lever 235 is so disposed that it is above the path of travel of the pin 231 carried by the U-shaped member 229 when the pin 231 is in engagement with the chain 224. Thus, the pin moves underneath the lever 235 until the pin 231 is disengaged from the chain at which time the pin 231 rises and upon return movement of the U-shaped member 229 with the conveyor, the lever 235 is rocked counter clockwise, thereby moving the tripping member 239 and connecting the next adjacent conveyor to the drive shaft 221.

When the last conveyor is emptied, a lever corresponding to lever 235 moves the link corresponding to the link 236 and thereby rocks the bail 234 and its lever 233 to connect the conveyor 219 to the chain 224, as previously described. In this way, a series of conveyors can be supported side by side and operated successively with the final drive transfer from the last conveyor of the series to the first conveyor of the series in order to permit repetition of the cycle.

While the supports have been disclosed as actually supporting a single row of articles, it will be understood that the conveyors may be used to advance a double row of articles, as shown in Figure 15. In this modification a continuous conveyor belt 240 is disposed above a guide plate 241 which extends parallel to the lower flight of the conveyor 240 and partially around the back end of it. The plate 241 supports the merchandise until it is advanced around the end of the conveyor 240 by means of the pusher member 242 on the conveyor and the driven rollers 243 at the curved end of the plate. The rollers 243 are coupled to the roller and supporting member 244 by means of a gear 245 rotatable with the member 244 and meshing with gears 246 fixed to the rollers 243. Either the member 244 or the roller 247 at the opposite end of the conveyor may be driven by any of the drive and transfer mechanisms described above.

The above-described elements of the apparatus are controlled by a suitable electrical circuit which is illustrated in Figure 16 of the drawings. A suitable source of power represented by the terminals 250 and 251 is connected to an amplifier 252, which is continuously energized to supply electrical energy to the lamp 152 and the photoelectric cell 151. A relay member 253 is responsive to the photoelectric cell and has a pair of normally-closed contacts 253a and 253b which remain closed so long as the light beam impinging on the cell 151 is not interrupted and open when the light beam is interrupted. The movable contact is connected by means of a conductor 254 to the power line 255 having a terminal 250. The fixed contact 253b is connected by a conductor 256 to a movable contact 257a of a relay 257 having a coil 257b and a fixed contact 257c. The fixed contact 257c is connected to one side of the coil 257b and by means of a conductor 258 to a conductor 259 which leads to one contact 260a of a coin-controlled switch 260 and to one contact 261a of the selector button switch 39 and also one contact of each of the other selector button switches 40 and 41.

The opposite movable contact 260b of the coin-controlled switch 260 is connected by the conductor 262 to the fixed contact 253b of the relay 253.

The opposite contact 261b of the selector switch 39 is connected by a conductor 263, conductor 264 to one contact 265a of a relay 265. The opposite movable and normally-closed contact 265b is connected by a conductor 266 to one side of a relay coil 267a of the relay 267 and the opposite side of the coil 267a is connected through line 280 to the line 268 connected to the terminal 251. The relay 267 includes three pairs of normally-open contacts 267b, 267c and 267d, 267e, 267f and 267g. The contact 267b is connected to the conductor 258 and its cooperating contact 267c is connected to the conductors 263 and 264. The contact 267g is connected to the power line 255. Its opposite cooperating contact 267f is connected by a conductor 269 to one terminal of a timing device 270 which has a movable contact arm 271 that is driven in a counter clockwise direction by operation of the timing device but can snap back against the stop 272 when the timing device is de-energized. The opposite terminal of the timing device is connected by conductor 273 to the power line 268.

The third pair of contacts 267e and 267d are connected as follows: Contact 267e is connected by conductor 275 to the movable contact 265c of a relay 265 which has a normally-spaced contact 265d connected by the conductor 276 to the power line 255.

The contact 267d is connected by conductor 277 to the movable contact 278a of a switch 278 that is moved by the tripping arm 271 of the timer 270. The other contact 278b of the switch 278 is connected by the conductor 279 to the power line 255.

One side of the relay coil 267a is connected by means of a conductor 280 to the power line 268. The other side of the relay coil 267a and the conductor 266 are connected to a conductor 281 which is connected to the rotary contact 283a of a transfer switch 283 having three additional contacts 283b, 283c and 283d which are connected respectively to the motors 52, 53 and 54. The opposite sides of the motors are connected to the power line 268.

The switch 283 is utilized to transfer the energy from one motor to another, for example, motor 52 to motor 53 to motor 54 and back to motor 52. The rotary contact 283a of the switch 283 is driven by means of a shaft 284, Figures 3 and 5, mounted on a wall of the refrigerating compartment and extending adjacent the left-hand supports 47, 47a and 47b. The shaft 284 is provided with lever members 285, 285a and 285b which are in the paths of the transfer levers 118 associated with each row so that as, the transfer lever moves in response to movement of the conveyors on the supports 47, 47a and 47b, the shaft 284 is rotated by means of a pawl-and-ratchet connection 286 between the lever member 285 and the shaft 284. Thus, as the conveyors on the supports 47, 47a, and 47b reach the end of their travel in dispensing the last article, the switch is shifted to connect the motors 53, 54 and 52 in succession in the circuit.

In order to signal the fact that the dispensing operation is not taking place properly or that the particular merchandise selected is sold out, a signal lamp 290 is connected in parallel with the coil 265e, one end of the coil 265e and the lamp 290 being connected by the conductor 291 to the contact 265c while the opposite ends thereof are connected by means of the conductor 292 to the conductor 293, the relay coil 294a, conductor 295, conductor 296, the normally-closed switch 297 and conductor 298 to the power line 268.

The relay coil 294a controls two contacts 294b and 294c which are normally closed and are connected between the relay coil 257b and the power line 268. Another pair of open contacts 294d and 294e are connected respectively to the power line 268 and to one side of the solenoid 299 of a coin return device including a tilting cup 299a. The opposite side of the solenoid 299 is connected to the power line 255. The relay contacts 294d and 294e are normally open.

The trap door 127 is responsive to operation of any of the selector buttons 39, 40 and 41 and opens whenever a selector button is pressed. This is accomplished by means of the normally-open relay 300 having a coil 300a, one end of which is connected by conductor 301 to conductor 263, and the other end being connected through the normaly closed switch 302 and the conductors 303 and 304 to the line 268. The relay has two normally open contacts 300b and 300c. The contact 300b is connected to power line 255. The contact 300c is connected to conductor 301 and to one end of the solenoid 147 by conductor 306. The other end of the solenoid 147 is connected by conductor 307 to the line 268. When the relay coil 300a is energized the contacts 300b and 300c close forming a holding circuit through the coil 300a, conductor 303, switch 302 and conductor 304 from the line 255 to line 268. Also the solenoid 147 is energized through contacts 300b, 300c conductors 306 and 307, opening the trap door 127.

The motor 136 driving the transport belts 125 and 126 is connected in parallel with the solenoid 147. The trap door 127 stays open until the article drops into the cooking chamber 20 where the article strikes the switch 302 thereby opening it and de-energizing the relay 300 and allowing the contacts 300b and 300c to open. The trap door 127 then closes.

The cooking unit 22 is also set into operation by entry of the article into the chamber 20. The switch 302 has a third contact 302a which is connected to the unit 22 and the conductor 304 when the article is in the cooking chamber 20. The other side of the unit 22 is connected by conductor 308 to the line 255. The unit contains a timer (not shown) which times the operation of the unit and at the conclusion of the cooking period it momentarily energizes the electric latch 309 and releases the trap door 310 thereby discharging the cooked product. The trap door 310 is returned by means of a spring 311 to closed position.

The above-described circuit operates in the following manner: When coin is deposited in the machine through the coin deposit slot 37, it passes through the usual slug-detecting device and momentarily closes the coin switch 260. Inasmuch as the lamp 152 and photoelectric cell 151 are continuously energized as in the relay coil 253, when the coin switch 260 closes a circuit is completed from terminal 250, line 255, conductor 254, switch contacts 253a, 253b, conductor 262, switch 260, conductors 259, 258, relay coil 257b, relay contacts 294c, 294b to power line 268, thereby energizing the relay coil 257b and closing the contacts 257a and 257c. When these contacts close, a holding circuit for the relay coil 257b is made between power line 255, conductor 254, relay contacts 253a, 253b, conductor 256, contacts 257a, 257c, coil 257b, switch contacts 294b, 294c to power line 268.

The next operation is the selection of the merchandise to be dispensed. Assuming that the customer presses the selector button 39, the following circuit is produced: Power line 255, conductor 254, relay contacts 253a, 253b, conductor 256, relay contacts 257a, 257c, conductor 258, conductor 259, switch contacts 261a, 261b, conductors 263, 264, contacts 265a, 265b, conductor 266, relay coil 267a to power line 268. Also, a circuit is created as indicated above from conductors 266, 281, rotary switch contacts 283a, 283b to motor 52 and from motor 52 to power line 268, thereby starting the motor 52. At the same time, all of the contacts of the relay 267 are closed so that a holding circuit for the motor 52, or any of the other motors which are connected in the circuit by means of the switch 283, is produced. This circuit is as follows: Power line 255, conductor 264, closed relay contacts 253a, 253b, conductor 256, contacts 257a, 257c, conductor 258, contacts 267g, 267c, conductor 264, contacts 265a, 265b, 266 through the relay coil 267a and motor 52 to the power line 268. Also, inasmuch as the relay contacts 267f and 267g are closed, the timer 270 is started by the following circuit: Power line 255 contacts 267g, 267f, conductor 269, timer 270, conductor 273 to power line 268, thereby setting the timer into operation and causing the tripping arm 271 to rotate slowly in a counter clockwise direction. Simultaneously the solenoid 147 is energized, opening the trap door 127 and the transport motor 136 is set into operation.

If the dispensing device operates properly and an article is dispensed from one of the article supports, it will intercept the light beam impinging on the photo-electric cell 151, thereby temporarily de-energizing it and also the relay coil 253, with the result that the relay contacts 253a and 253b are opened, which in turn de-energizes the relay coil 257 and the relay coil 267a, thereby shutting down the operation of the motor 52 and discontinuing the operation of the feeding system until the coin-controlled switch 260 is again closed. The solenoid 147 and the motor 136 remain energized until the article drops into the cooking chamber 20 and the switch 302 is actuated.

If an article is not dispensed, either because the dispensing device is sold out or because of some mechanical failure, the tripping arm 271 will eventually, for example, in about twenty seconds, close the switch 278. When the switch 278 closes, a circuit is completed as follows: Power line 255, conductor 279, contacts 278b, 278a, conductor 277, relay contacts 261d, 267e, conductor 275, relay coil 265a, lamp 290, conductor 291, conductor 292, conductor 293, relay 294, conductors 295, 296, reset switch 297, conductor 298 to power line 268. As a result, contacts 265a and 265b open and contacts 265c and 265d close, the lamp 290 is lighted, warning that the merchandise is sold out and the relay 294 is energized. When the relay 294 is energized, the contacts 294c and 294b disengage, thereby disconnecting the relay coil 257b from the power line 268 and permitting its contacts 257a, 257c to open. Also, the contacts 294d and 294c engage, energizing the solenoid 299 and tipping the coin cup 299a to return the deposited coins to the coin-return chute. Also, when the relay 265 is actuated, the contacts 265a and 265b separate, thereby breaking the circuit through the relay coil 267a and through the motor 52, stopping the motor and opening of all the contacts by the relay 267. This also de-energizes the solenoid 147, closing the trap door 127 and stops the motor 136.

In order to reset the machine for operation under these conditions, it is necessary to open the switch 297 momentarily, which de-energizes the relay coil 265e and resets the device for operation.

All of the other selector switches 40 and 41 are connected in a manner similar to the switch 39, involving the use of the corresponding relays 312, 313 and 314, 315, respectively, and connections between the relays and the motors 55 and 56, respectively. Each of the switches 40 and 41 has a sold-out lamp 316, 317 connected therewith so that the timer 270 is effective to indicate when merchandise is sold out corresponding to any of the selector switches.

If desired, the relay 294 and the coin-return mechanisms 299 and 299a may be omitted and the conductor 296 may be connected directly to the conductor 292. With this construction, the coins are not returned but the relay 257 is not de-energized so that a customer may make another selection by depressing one of the other buttons, for example, the button 40 to start the dispensing operation without the necessity of inserting additional coins.

From the preceding description, it will be apparent that feeding devices are provided by this invention which are foolproof in operation, automatic and capable of holding and dispensing large numbers of articles without the necessity of constant attention and refilling.

The feeling mechanism is fully automatic and assures the dispensing of the article selected, the return of the coin if the article selected is sold out or of resetting itself so that the customer can make another selection if he so desires.

The dispensing device is, of course, capable of substantial modification, particularly in the shape and size of the cabinet therefor, the construction of the cooking unit and the arrangement of the feeding mechanism or supports therein. Also, the clutching mechanisms are capable of modification, and equivalent forms of clutching mechanisms may be used without departing from the invention. Therefore, the above-described forms of the invention should be considered as illustrative and not as limiting the scope of the following claims.

We claim:

1. A dispensing device comprising a plurality of substantially horizontal supports arranged side by side, each of said supports being adapted to receive a row of articles, a means for advancing each row of articles along its support for discharge, one by one, by gravity at one end of each support, driving means, a separate clutch for each advancing means for connecting and disconnecting each of said advancing means and said driving means, and mechanism responsive to movement of one of said advancing means to a position corresponding to the position of discharge of the last article thereon for actuating its clutch to disconnect said one of said advancing means from said driving means, and for actuating said clutch of another advancing means to connect it to said driving means.

2. A dispensing device comprising a plurality of substantially horizontal supports arranged side by side, each of said supports being adapted to receive a row of articles, a conveyor belt for advancing each row of articles along its support for discharge, one by one, by gravity at one end of each support, driving means, a clutch for each conveyor belt for connecting and disconnecting each of said conveyor belts and said driving means, and mechanism responsive to movement of one conveyor belt to a predetermined position for actuating its clutch to disconnect said one conveyor belt from said driving means and for actuating said clutch of another conveyor belt to connect it to said driving means.

3. A dispensing device comprising a plurality of substantially horizontal supports arranged side by side, each support being adapted to receive a row of articles, a conveying means for each support for advancing each row of articles for discharge by gravity at one end of each support, a drive shaft rotatable relative to each of said conveying means for driving the latter, clutch means interposed between said drive shaft and each conveying means for connecting and disconnecting said drive shaft and said conveying means, and clutch actuating means responsive to movement of a driven conveying means to a position to discharge the last article therefrom for disconnecting said driven conveying means from said drive shaft, and for actuating another clutch means to connect another conveying means to said drive shaft when the last article is discharged from said driven conveying means.

4. A dispensing device comprising a plurality of supports arranged side by side, supporting shafts adjacent each end of each support, a conveyor belt mounted on said supporting shafts for advancing a row of articles thereon for discharge at one end of said support, a drive shaft adjacent to said supports and rotatable relatively to said supporting shafts, means including an engageable and disengageable clutch for each conveyor belt for connecting and disconnecting said drive shaft and one supporting shaft on each support, toggle means for shifting each clutch into and out of engagement, and means on said conveyor belts engageable with said toggle means for disengaging the clutch of a driven conveyor belt and engaging the clutch of another conveyor belt when the last article is discharged from a driven conveyor belt.

5. A dispensing device comprising a plurality of substantially horizontal movable conveyors arranged side by side for supporting a plurality of rows of articles, a drive member, clutch means for releasably coupling said drive member to said conveyors to move the latter to discharge articles from one end of said conveyor, a member movable with each of said conveyors for actuating said clutch means selectively to connect said conveyors successively and in a predetermined order to said drive member, and detecting means in the path of an article discharged from said conveyors for stopping said drive means upon detection of a discharged article.

6. A dispensing device comprising a plurality of substantially horizontal, movable conveyors arranged side by side for supporting a plurality of rows of articles, a drive member, means for releasably and selectively coupling said drive member to said conveyors to move the latter, and means responsive to movement of a conveyor coupled to said drive member for releasing said conveyor from said drive member as said conveyor moves to a predetermined position and for coupling another conveyor to said drive member.

7. A dispensing device comprising a plurality of substantially horizontal, movable conveyor members arranged side by side, each member being adapted to receive a row of articles to be discharged, one by one, by gravity at one end of said conveying members by movement thereof, a movable driving member, means for

connecting and disconnecting said driving member and said conveyors to discharge the rows of articles in succession, at least one conveyor extending transversely of and below said conveyor members adjacent to said one end for receiving the articles discharged from said conveyor members, means for driving said conveyor in one direction, and detecting means adjacent to said transverse conveyor and responsive to passage of an article on said transverse conveyor for stopping said driving member.

8. A dispensing device comprising a plurality of movable conveying members arranged side by side, each member being adapted to receive a row of articles to be discharged, one by one, from said conveying means by movement thereof, a movable driving member, a motor for driving said driving member, means for connecting and disconnecting said driving member and said conveyors to discharge said rows successively, timing means, means for initiating operation of said motor and said timing means substantially simultaneously, photoelectric detecting means in the path of articles discharged from said conveying members for discontinuing operation of said motor and said timing member upon detection of a discharged article, said timing means being connected to said motor to stop the latter within a predetermined time after initiation of its operation upon failure of said detecting means to detect a discharged article.

9. A dispensing device comprising a plurality of movable conveying members arranged side by side, each member being adapted to receive a row of articles to be discharged, one by one, from said conveying means by movement thereof, a movable driving member, a motor for driving said driving member, means for connecting and disconnecting said driving member and said conveying members to discharge said rows successively, timing means, control means for initiating operation of said motor and said timing means substantially simultaneously, and detecting means in the path of articles discharged from said conveying members for discontinuing operation of said motor and said timing member upon detection of a discharged article, said timing means being connected to said motor to stop the latter within a predetermined time after initiation of its operation upon failure of said detecting means to detect a discharged article.

10. A dispensing device comprising a plurality of movable conveying members arranged side by side, each member being adapted to receive a row of articles to be discharged, one by one, from said conveying means by movement thereof, a movable driving member, a motor for driving said driving member, means for connecting and disconnecting said driving member and said conveyors to discharge said rows successively, timing means, coin-controlled means for initiating operation of said motor and said timing means substantially simultaneously, detecting means in the path of articles discharged from said conveying members for discontinuing operation of said motor and said timing member upon detection of a discharged article, said timing means being connected to said motor to stop the latter within a predetermined time after initiation of its operation upon failure of said detecting means to detect a discharged article, and means connected to said timing means for returning said coin when said timing means stops said motor.

11. A dispensing device comprising a plurality of movable conveyor members arranged side by side, each member being adapted to receive a row of articles to the discharged, one by one, at one end of said conveying members by movement thereof, a movable driving member, means for connecting and disconnecting said driving member and said conveyors to discharge the rows of articles in succession, and a transfer conveying means below said conveying members for receiving said discharged articles, a hopper for receiving said articles from said conveying means, and photoelectric cell detecting means adjacent to said conveying means and connected with driving means for stopping said driving means upon detection of an article on said conveying means.

12. A dispensing device comprising a plurality of movable conveying members arranged side by side, each member being adapted to receive a row of articles to be discharged, one by one, from said conveying means by movement thereof, a movable driving member, a motor for driving said driving member, means for connecting and disconnecting said driving member and said conveying members to discharge said rows successively, timing means, control means for initiating operation of said motor and said timing means substantially simultaneously, and detecting means in the path of articles discharged from said conveying members for discontinuing operation of said motor and said timing member upon detection of a discharged article, signalling means for indicating the failure of the conveying members to discharge an article, said timing means being connected to said signalling means and said motor to stop the latter within a predetermined time after initiation of its operation upon failure of said detecting means to detect a discharged article and to actuate said signalling means.

13. A dispensing device for supplying articles to an electric cooking device comprising a plurality of movable conveying members arranged side by side, each member being adapted to receive a row of articles to be discharged, one by one, from said members, by movement thereof, a movable driving member, a motor for driving said driving member, means for connecting and disconnecting said driving member and said conveying members to discharge said rows successively, detecting means in the path of said articles discharged from said conveying members for stopping said motor upon detection of a discharged article, movable transfer means for transporting a discharged article to said cooking device, trap-door means between said transfer means and said cooking device, means for starting said motor, said transfer means and opening said trap-door simultaneously, and means responsive to entry of an article into said cooking device for stopping said transfer means and closing said trap-door means.

14. A dispensing device comprising a first group of movable conveyors arranged side by side for supporting a plurality of rows of articles, a first drive member, means for releasably coupling said drive member to said conveyors to move the latter, and means responsive to movement of said conveyors for connecting said conveyors successively and in a predetermined order to said drive member, a second group of movable conveyors arranged side by side, a second drive member, means responsive to movement of said conveyors of said second group for connecting said conveyors successively to said second drive member, and means responsive to movement of one of the conveyors of said first group for

actuating said second drive member and stopping said first drive member.

15. A dispensing device comprising a plurality of groups of movable conveying means, each group including a plurality of movable conveying means arranged side by side for supporting a plurality of rows of articles, separate motors for driving each group of conveying means, means responsive to movement of the conveying means of each group for connecting the conveying means of its group successively and in a predetermined order to the motor for driving the group, an electrical circuit for connecting said motors to a source of electrical energy, and switching means in said circuit for connecting a motor of one group in said circuit, in response to movement of a conveying means of another group.

16. A dispensing device comprising a drive shaft, a first belt conveyor adjacent to said drive shaft for receiving a row of articles, a roller supporting said conveyor, a first clutch element fixed to said roller, a second clutch element connected to and driven by said drive shaft and movable into and out of clutching engagement with said first clutch element, a second belt conveyor adjacent to said first conveyor, toggle means actuated by said second conveyor for moving said clutching elements into engagement, and means carried by said first conveyor for actuating said toggle means to disengage said clutch elements.

17. A dispensing device comprising a support, a first shaft having a pair of spaced apart drive rollers at one end of said support and at least one additional roller at the opposite end of said support, a belt conveyor supported by said rollers, a drive shaft adjacent to said drive rollers, a first clutch element fixed to said first shaft, a second clutch element rotatably mounted on said first shaft between said drive rollers and movable into and out of engagement with said first clutch element, means connecting said second clutch elements to said drive shaft for rotation thereby, and toggle means for moving said second clutch element into and out of engagement with said first clutch element.

18. A dispensing device comprising a support, a belt conveyor mounted for movement relatively to said support, an endless chain carried by said support having upper and lower flights substantially parallel with said conveyor, means for driving said chain in one direction, a shiftable member connected to said conveyor and movable therewith, means on said shiftable member selectively engageable with said upper and lower flights of said chain, first means for shifting said shiftable means when the latter is near one end of said support to engage the means on said shiftable member with one flight of said chain to move said shiftable means toward the other end of said support, and second means for shifting said shiftable member to engage said means on said shiftable member with the other flight of said chain to move said shiftable member toward said one end of said support.

19. A dispensing device comprising a support, a belt conveyor mounted for movement relatively to said support, an endless chain carried by said support having upper and lower flights substantially parallel with said conveyor, means for driving said chain in one direction, a shiftable member connected to said conveyor and movable therewith, means on said shiftable member selectively engageable with said upper and lower flights of said chain, first means for shifting said shiftable means when the latter is near one end of said support to engage the means on said shiftable member with one flight of said chain to move said shiftable means toward the other end of said support, second means for shifting said shiftable member to engage said means on said shiftable member with the other flight of said chain to move said shiftable member toward said one end of said support, and means extending lengthwise of said support for retaining said means on said shiftable member in engagement with said flights in either direction of movement.

20. A dispensing device comprising a plurality of feeding devices arranged side by side, each having a support, a belt conveyor mounted for movement relatively to said support, an endless chain carried by said support having upper and lower flights substantially parallel with said conveyor, means for driving said chain in one direction, a shiftable member connected to said conveyor and movable therewith, means on said shiftable member selectively engageable with said upper and lower flights of said chain, first means for shifting said shiftable means when the latter is near one end of said support to engage the means on said shiftable member with one flight of said chain to move said shiftable means toward the other end of said support, second means for shifting said shiftable member to engage said means on said shiftable member with the other flight of said chain to move said shiftable member toward said one end of said support, and means responsive to said second means of one of said feeding devices for actuating said first means of another of said feeding devices.

21. A dispensing device comprising a plurality of supports arranged side by side, supporting shafts adjacent each end of each support, a conveyor belt mounted on said supporting shafts for advancing a row of articles thereon for discharge at one end of said support, a drive shaft adjacent to said supports and rotatable relatively to said supporting shafts, means including an engageable and disengageable clutch for each conveyor belt for connecting and disconnecting said drive shaft and one supporting shaft on each support, toggle means for shifting each clutch into and out of engagement, means on said conveyor belts engageable with said toggle means for disengaging the clutch of a driven conveyor belt and engaging the clutch of another conveyor belt after the last article is discharged from a driven conveyor belt, and means in the path of said means on said conveyor belt and said toggle for displacing them relatively out of engaging position after said toggle means has disengaged said clutch of said driven conveyor belt.

22. A feeding mechanism for dispensing devices comprising an endless conveyor belt, rollers supporting said belt to provide upper and lower substantially horizontal flights connected by curved portions of said belt, means for driving one of said rollers, a supporting plate spaced beneath said lower flight in radially spaced relation to one end of said belt, a plurality of rollers radially spaced from one of said curved portions of said belt, means for driving said radially spaced rollers to cause their inner peripheries to move in the same direction as the opposed curved portion of said belt, and a pusher member on said conveyor for moving articles along said plate, and together with said radially spaced rollers upwardly around said one end of said belt and then

in a direction opposite to the movement of said articles along said plate.

WILLIAM S. TANDLER.
DAVID S. WALKER.
FERDINAND A. DE WIESS.
WILLIAM M. TELLER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,092,988	Gilbert	Apr. 14, 1914
2,158,069	Grover	May 16, 1939
2,392,511	Thompson	Jan. 8, 1946