

Sept. 19, 1950

M. RIFKIN ET AL

2,522,896

MERCHANDISE DISPENSING DEVICE

Filed Dec. 2, 1946

4 Sheets-Sheet 1

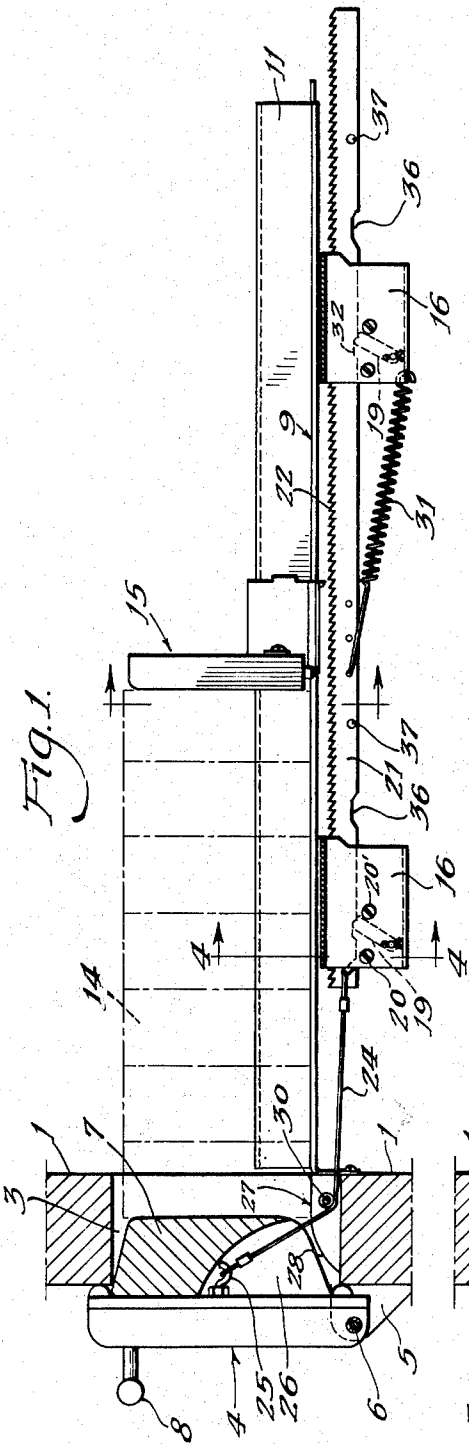


Fig. 1.

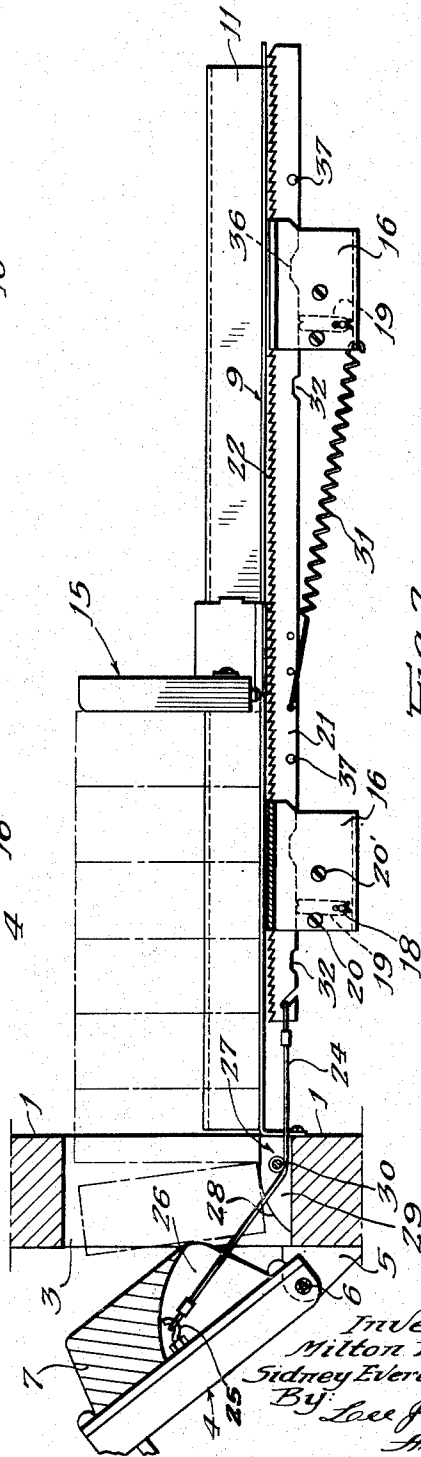


Fig. 2.

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4 Sheets-Sheet 2

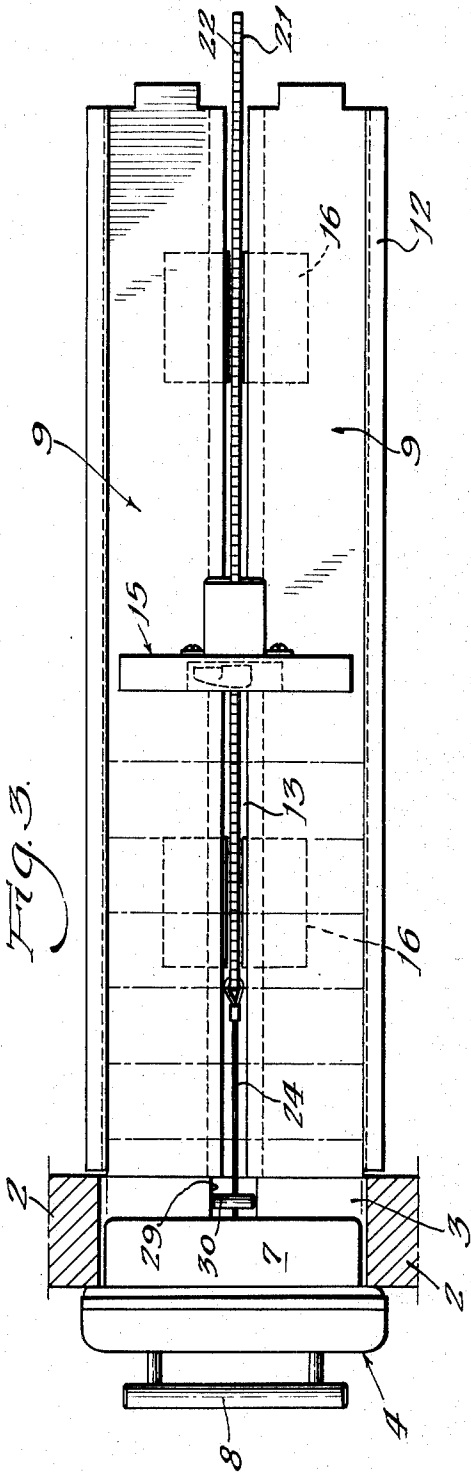


Fig. 3.

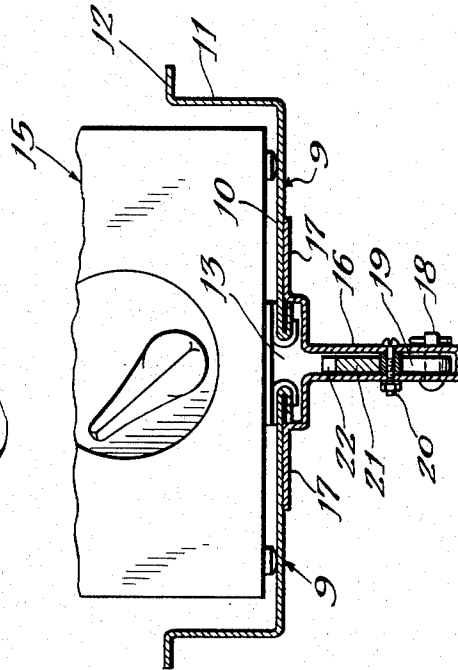


Fig. 4.

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4 Sheets-Sheet 3

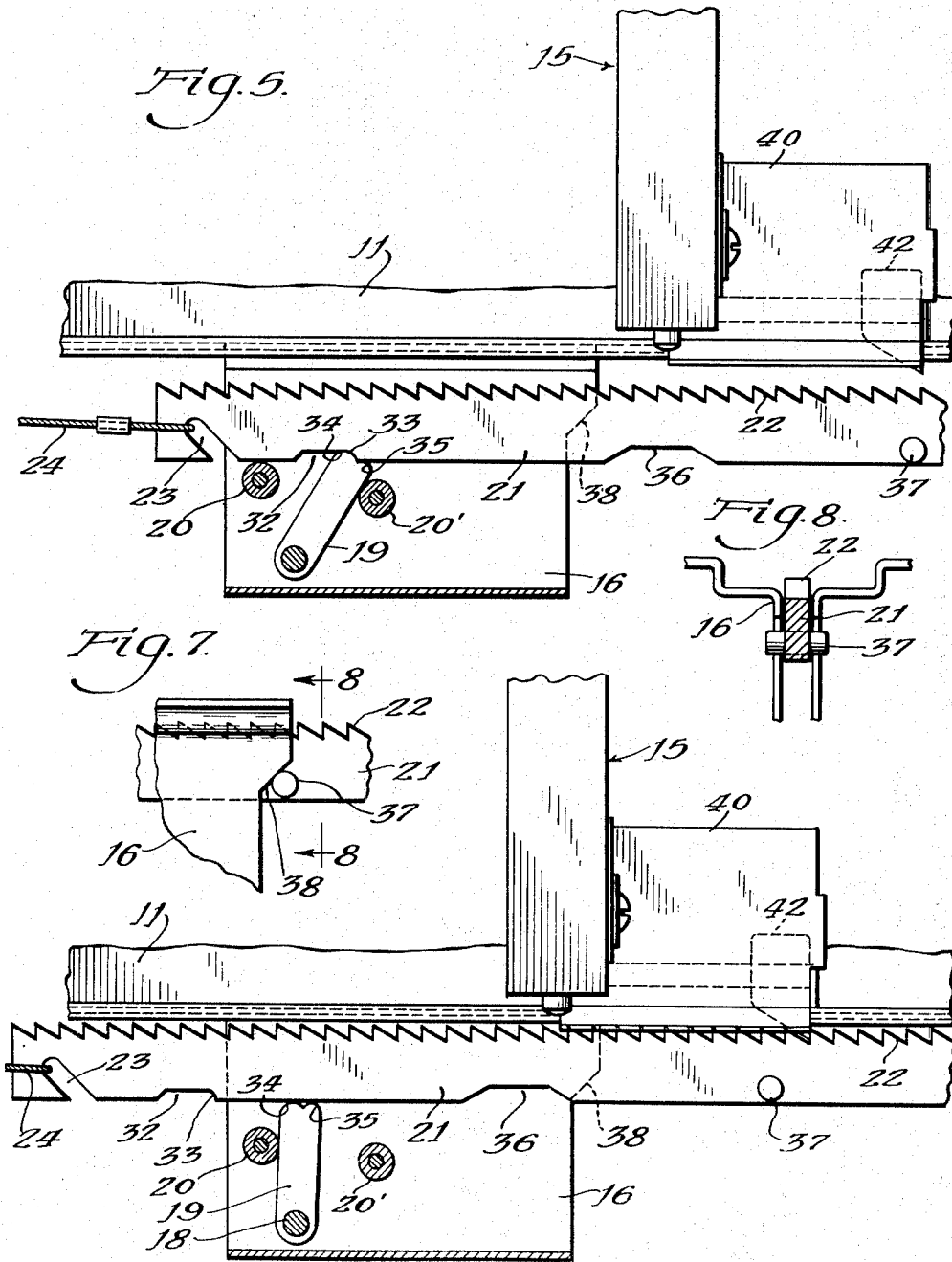


Fig. 6.

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Fig. 9.

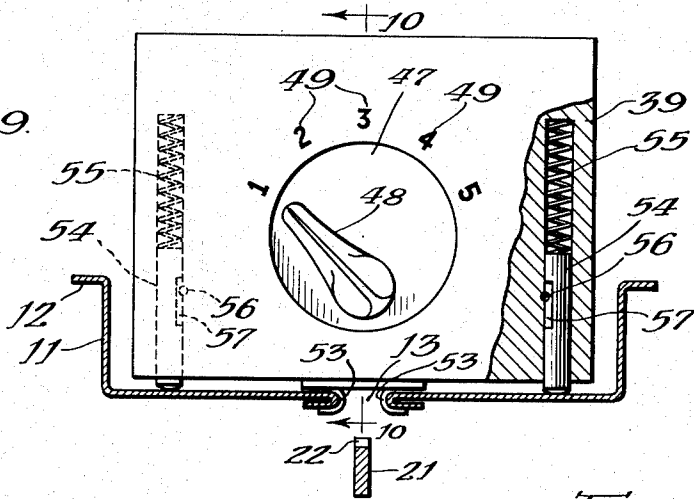


Fig. 10.

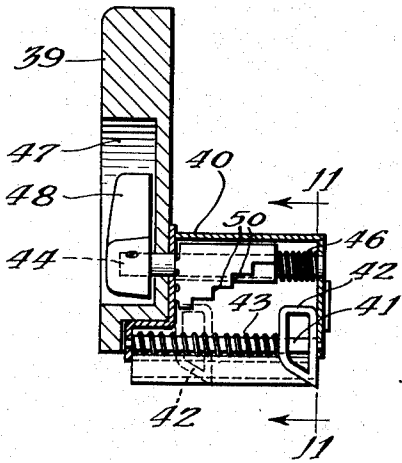


Fig. 11.

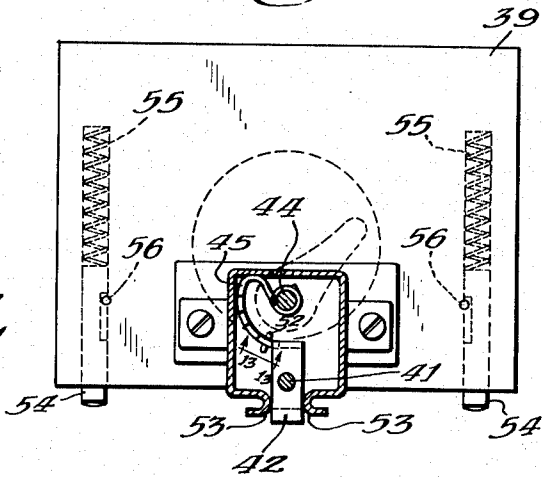


Fig. 12.

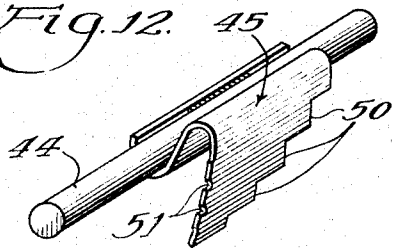
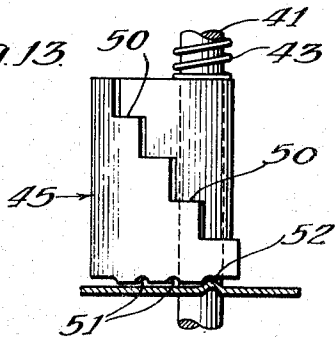


Fig. 13.



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UNITED STATES PATENT OFFICE

2,522,896

MERCHANDISE DISPENSING DEVICE

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Application December 2, 1946, Serial No. 713,426

8 Claims. (Cl. 312-71)

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This invention relates to improvements in dispensing cabinets and refers specifically to mechanism for urging articles, cartons or the like to be dispensed toward a dispensing door in the cabinet, the dispensing mechanism being actuated essentially by movement of the door.

In the type of dispensing cabinet wherein articles, cartons or the like are periodically moved forwardly within the cabinet to dispensing position adjacent a door-closed dispensing opening in the cabinet wall such as described in my previously issued Patents Nos. 2,446,788 and 2,460,396, it is desirable that the dispensing mechanism be such that an article, carton or the like previously removed from the cabinet can be replaced in the cabinet through the dispensing opening without the necessity of manipulating levers or buttons to disengage the mechanism which urges the merchandise forwardly toward the opening. The same problem occurs when it is desired to load the cabinet with articles, cartons or the like through the dispensing opening when the supply of such merchandise in the cabinet becomes exhausted.

As one feature of my invention a mechanism is provided whereby the agency which urges the articles, cartons or the like forwardly becomes automatically disengaged after a predetermined degree of movement, or when the urging force stops and reverses its direction.

Specifically, where the urging mechanism is actuated by movement of the dispensing door to move a column of cartons forwardly toward the dispensing opening, when the door has been moved a predetermined distance means is actuated for disengaging the urging agency to permit the column to be moved rearwardly to accommodate one or more cartons which may be inserted through the dispensing opening and positioned at the forward portion of the column.

Such a situation frequently arises in connection with dispensing cabinets in so-called self service retail stores. The customer, after removing one or more cartons from the cabinet may find that through inadvertence the carton or article removed is not the merchandise desired or that too many have been removed. In such a situation the door need only be opened and the carton or cartons be simply replaced at the head of the column of articles in the cabinet merely by moving the column rearwardly in the cabinet.

The present invention also contemplates means for disengaging the urging agency when the actuating force reverses itself. This pro-

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vision is important where a dispensing door has been partially opened (the movement of the door comprising the actuating force for moving the column forwardly) and for some reason or another the door is closed without completely opening the same and without removing a carton therefrom. For instance, in the retail store cabinet hereinbefore described, the customer may find that the wrong door was opened and the door had been only partially opened before the error was discovered. In this case, partial opening of the door moves the column of articles or cartons forwardly which, of course, necessitates the urging agency being in operation which, however, becomes inoperative and disengaged when the door is closed, permitting free rearward movement of the column.

As another feature of my invention, means is provided for conveniently varying the forward movement of the column of articles, cartons or the like with a movement of the door through a constant predetermined distance which permits of sequential dispensing of articles or cartons of predetermined width.

Other objects and advantages of my invention will be apparent from the accompanying drawings and following detailed description.

In the drawings,

Fig. 1 is a detailed sectional view of one unit of a dispensing cabinet.

Fig. 2 is a similar view showing the door partially opened illustrating the position of the dispensing mechanism during the door-opening operation.

Fig. 3 is a top plan view of the device illustrated in Figs. 1 and 2.

Fig. 4 is a transverse sectional view taken on line 4-4 of Fig. 1.

Fig. 5 is an enlarged detail view showing the dispensing mechanism in inoperative position.

Fig. 6 is a similar view with the dispensing mechanism in operative position.

Fig. 7 is a fragmentary view of an auxiliary means for rendering the dispensing mechanism inoperative.

Fig. 8 is a sectional view taken on line 8-8 of Fig. 7.

Fig. 9 is a front elevational view, parts being broken away and parts being shown in section, of the pusher block.

Fig. 10 is a sectional view taken on line 10-10 of Fig. 9.

Fig. 11 is a sectional view taken on line 11-11 of Fig. 10.

Fig. 12 is a detailed perspective view of the variable pusher block control stop.

Fig. 13 is a detail view of the device shown in Fig. 12.

Referring in detail to the drawings, 1, 1 indicate horizontal frame members and 2, 2 indicate vertical frame members comprising a portion of the front wall of a dispensing cabinet. The entire cabinet, for purposes of clarity, is not shown inasmuch as the present invention is directed particularly to one of a number of similar units which are duplicated in the complete cabinet.

The frame members 1, 1 and 2, 2 define a dispensing opening 3 which is normally closed by a hinged door 4. A lug 5 is positioned beneath, and adjacent each side of the opening 3 and a hinge pin 6 carried by the door 4 is journaled in the spaced lugs whereby said door may be swung into and out of closure position. In view of the fact that dispensing cabinets are frequently refrigerated, when used to dispense frozen foods or the like, the door may be insulated, being of relatively thick construction and having an inwardly extending block 7 upon its inner face. A handle 8 is carried upon the outer face of the door whereby the door can be conveniently opened and closed.

Extending rearwardly from the opening 3 and inwardly with respect to the cabinet front wall is a pair of merchandise supports or ways 9 which are preferably constructed of metal. Each of the ways 9 is similar having a horizontal supporting portion 10 and a guide portion 11, the terminating edge being flanged outwardly, as shown best at 12. The opposite longitudinal edges of the ways are folded upon themselves and are spaced from each other to provide a slot 13.

As will be hereinafter more fully described the merchandise to be dispensed, here diagrammatically illustrated as cartons 14, are adapted to be carried upon the portions 10 of the ways 9 and a pusher block 15 is adapted to be guided for longitudinal movement along said ways by the slot 13.

A pair of channel members 16 having outwardly extending flanges 17 are secured, preferably by welding or the like, to the lower surfaces of the ways 9, said members being spaced longitudinally from each other. Each of the members 16 carries a pivot pin which in turn swingably supports a cam bar 19. A pair of arcuately spaced stops 20 and 20' are also carried by the channel members 16, stops 20 being adapted to limit counterclockwise rotation of the bars 19, and stops 20' being adapted to limit clockwise rotation of said bars, as viewed in Figs. 1, 2, 5 and 6. The function of the cam bars 19 will be hereinafter more fully described.

A rack 21 is slidably positioned between the webs of each channel 16 and is supported upon the free ends of the cam bars 19, the upper or rack surface 22 being disposed immediately beneath slot 13. The forward end portion of the rack 21 is provided with an inclined recess 23 forming a hook adapted for engagement with a cable 24. The opposite end of cable 24 engages with a hook 25 secured to door 4, the block 7 being slotted, as shown best at 26 in Figs. 1 and 2, to receive the cable. A threshold 27 having a curved forward edge 28 is positioned at the lower defining edge of the opening 3, the threshold being also slotted, as shown best at 29 in Fig. 3, for the reception of cable 24. A pulley or roller

30 is positioned in the slot 29 and the cable 24 is adapted to pass thereunder intermediate its length.

The length of the cable 24 is such that when the door 4 is opened about hinge pins 6 the ratchet bar 21 moves forwardly within channels 16 a predetermined distance. To retract the bar 21 and also apply tension to the door 4 to resiliently resist opening thereof, a coil spring 31 is anchored at one end upon an intermediate portion of bar 21 and at the other end upon the U-bent portion of the rear channel 16. It will be noted that the spring 31, by virtue of its anchorages exerts both a horizontal force, or force along the length of bar 21 and a vertical force, or force at right-angles to the length of the bar, the latter force tending to maintain bar 21 seated upon the free ends of the cam bars 19.

The lower surface of the ratchet bar is provided with two similar recesses 32 of generally trapezoidal contour. However, the rear defining edge of each of the recesses 32 is curved, as shown best at 33 in Figs. 5 and 6. The upper end of each of the cam bars 19 has a double curved contour, shown best at 34 and 35 in Fig. 6, being the forward and rearward curved surfaces respectively. The radius of curvature of the surface 34 is substantially the same as that of the defining edge 33 of recess 32, as shown best in Fig. 5, whereby when the bar 21 is in the position shown in said figure the curved surface 33 of the recess and the curved surface 34 of the cam bar are in substantial coincidence.

The position of the recesses 32, the stops 20', and the length of the cable 24 are so correlated that when the door 4 is closed, the parts are in the position shown in Fig. 5, that is, the ratchet bar 21 is in its lowermost position and the cam bars 19 are in contact with the stops 20'.

When the door 4 is opened, the cable 24 is tensioned pulling the ratchet bar 21 forwardly toward said door. This movement rocks the cam bars 19 in a counterclockwise direction, as viewed in Figs. 5 and 6, whereby the ratchet bar is raised against the vertical component of the force of the spring 31. As the opening of the door progresses, the cam bars come into limiting position against the stops 20 and thereafter sliding movement of the ratchet bar takes place along the surfaces 34 of said cam bars, as shown best in Fig. 6.

The lower edge of the ratchet bar is provided with a pair of recesses 36 of substantially trapezoidal contour, which are spaced from the respective pair of recesses 32 a distance equal to substantially the horizontal "throw" of the ratchet bar which in turn is dependent upon horizontal displacement of the hook 25 in its movement from the vertical or closed position of door 4 to its horizontal or completely opened position. The curved upper portion of cam bars 19, coming into contact with the forward inclined defining edges of the recesses 36 tend to move clockwise, or rearwardly due to the vertical component of the force of the spring 31. This rearward canting position of the cam bars moves them away from a dead center position and the force of the spring predominates in moving the cam bars to their clockwise or rearward limiting positions against stops 20'. This permits the ratchet surface 22 to be lowered under the influence of spring 31 to substantially the position shown in Fig. 5.

In order to insure that the ratchet bar will be completely lowered at the limiting forward movement of said bar, that is, when the door 4 is completely opened, a pair of transversely positioned

pins 37 is carried by the ratchet bar 21. The rearward edges of the webs of the channels 16 are tapered, as shown best at 38 in Figs. 5, 6 and 7, whereby pins 37 come into contact with said tapered surfaces 38 to move the ratchet bar downwardly under the actuating force of the operator in the act of opening the door 4.

The camming action of the tapered surfaces 38 cooperating with pins 37 takes place simultaneously with ratchet bar lowering action hereinbefore described as being attributable to spring 31, cam bars 19 and recess 36, one being auxiliary to the other. It is to be understood that the present invention broadly contemplates either or both expedients for lowering the ratchet bar.

Another desirable feature of the present invention resides in the fact that when the ratchet bar is raised by the opening of the door and the forward movement of the ratchet bar ceases while said bar is supported by the cam bars 19 between the recesses 32 and 36 and while so supported the ratchet bars horizontally forward motion is reversed, the bar is permitted to drop, under the influence of spring 31, to its lower inoperative position. This situation may occur when an operator partially opens door 4 and for some reason or another, possibly opening the door in error, permits the door to close before it has been completely opened. The partial opening of the door, moves the ratchet bar forwardly and upwardly where it rides upon the cam bars 19 in their substantially dead center position. As long as the forward movement of the ratchet bar takes place, the cam bars remain in contact with the stops 21. However, when the motion of the ratchet bar is reversed the cam bars 19 initially move rearwardly with said ratchet bar due to friction of the curved surfaces 34 and the straight surface of the ratchet bar. The cam bars 19 are unsupported in this position by either of the stops and hence are easily rotated by the vertical component of the spring force in a rearwardly direction and eventually the cam bars fall to their rearward limiting position against stops 20' and bar 21 falls to inoperative position.

The pusher block 15 comprises essentially a block 39 constructed of wood or other strong, rigid material upon which is carried a housing 40. A rod 41 is positioned in housing 40 and carries a pawl 42, the engaging edge of which is adapted to protrude downwardly through slot 13 when the block is mounted in operative position upon ways 9. A coil spring 43 embraces rod 41 and bears against the pawl 42 resiliently confining it against the rear wall of the housing 40.

In the operation of the device, the ratchet teeth 22 of the ratchet bar 21 operatively engage the pawl 42 when the ratchet bar is in its raised position thereby moving the block 15 forwardly along ways 9 when the door 4 is being opened. This forward movement of the block 15 moves the column of cartons 14 forwardly along the ways 9 bringing the foremost carton into dispensing position. As the column of cartons thus moves forwardly the foremost carton moves over the curved surface 28 of the threshold or sill 27 and tips forwardly into a reclining position upon the block 7 of the door 4 in a convenient position to be grasped by the operator.

When the door 4 has been completely opened, the ratchet bar 21 drops and is forced to inoperative position and; hence, if the operator so desires the column of cartons 14 may be pushed rearwardly since the pusher block 15 is then disen-

gaged and is free to slidably move in either direction.

This aspect of the invention is of particular importance in the use of such device. For instance, the operator may find that upon extracting the carton that the wrong merchandise was inadvertently selected. In these circumstances the operator can conveniently replace the carton at the head of the column by merely moving the column rearwardly against the then inoperative pusher block, or the carton may merely be replaced in its reclining position upon block 7 and the door released whereby the spring 31 will close the door and the carton will be guided by the surface 28 and the curved surfaces of the block into its original position at the head of the column, the door forcing the column of cartons rearwardly along the ways 9.

Another aspect of the invention is of importance in use and is illustrated by the following situation. The operator may partially open the door 4 which moves the cartons forwardly. Then for some reason or another the operator may decide not to completely open the door nor extract a carton, but merely releases the door. The spring 31, in these circumstances, tends to reverse the movement of the ratchet bar and thus said bar drops from operative position with respect to pawl 42 permitting the door 4 to slidably move the column of cartons and pusher block 15 rearwardly.

Both of these features of the invention are of particular importance where the cabinet is a refrigerating cabinet and the merchandise contained is perishable, since it is imperative that the doors of the cabinet be closed when no dispensing operation is taking place and not be obstructed by a jammed carton and, further, that the goods being perishable, it is imperative that a convenient and simple means be provided for permitting the operator to return the goods to a refrigerated zone. In addition, units of the cabinet can very conveniently be charged or loaded through the dispensing openings which, of course, also involved a free rearwardly movement of the pusher block.

Another problem solved by the present invention resides in a pusher block construction which permits the degree movement of the pusher block to be independently controlled with respect to the degree of movement of the ratchet bar 21. This feature of the invention is particularly important where cartons or other articles of merchandise in the cabinet are of different thicknesses or depth dimensions. The present invention contemplates a pusher block construction characterized by the fact that each unit of the cabinet may carry different sized cartons within selected ranges.

As has been hereinbefore described, the operative end of pawl 42 engages the ratchet teeth 22, and that said pawl is resiliently movable along the length of rod 41. To control the movement of the pawl 42 upon rod 41, a second rod 44 is carried by housing 40 and a variable stop member 45 is mounted upon said rod within the housing. The member 45 is rigidly mounted upon rod 44 and a coil spring 46 embraces said rod and urges the rod and member 45 forwardly toward the forward wall of the housing. The rod 44 protrudes through the forward wall of the housing and the end thereof extends into a cavity 47 provided in the front face of the block 39. A knob 48 is mounted upon the extending end of the rod 44 within the cavity 47 whereby the

rod 44 may be conveniently rotated. A plurality of appropriately spaced indicia 49 are radially positioned upon the face of the block 39 and indicate, in conjunction with the knob 48, the angular position of the rod 44.

The rear edge of the variable stop member 45 is provided with a plurality of stepwise arranged shoulders which may be rotated when rod 44 is rotated into the path of travel of the pawl 42. Thus, forward movement of the pawl 42 compresses spring 43 but does not move block 15 until said pawl comes into contact with one of the shoulders 50, at which time the pusher block is moved in step with the pawl and ratchet bar. It can readily be seen that the degree of free movement of the pawl can be predetermined by the angular position of the rod 44 and stop member 45, by bringing a selected spaced shoulder 50 into the path of travel of the pawl 42.

The scale or indicia 49 is calibrated with respect to the position of the respective shoulders 50 whereby the "throw" of the pusher block may be controlled. This "throw" in turn determines the degree of movement of the column of cartons with each complete opening of the door 4 and is so correlated with the thickness or depth of the cartons as to move the carton column one or more complete carton thickness forwardly.

In order to appropriately set the variable stop member 45 so that one or the other of the shoulders 50 is in proper alignment with the path of travel of the pawl 42, a plurality of notches or scallops 51 are provided upon the edge of the member opposite the shoulders 50. The forward wall of the housing 40 is provided with a struck-up bead 52 which cooperates with one or the other of the notches 51 to orient the member 45, said member being resiliently urged to the forward wall and the bead 52 formed thereon by the spring 46.

As can be readily seen in Figs. 9 and 10, walls of the housing 40 terminate in a pair of opposite U-shaped beads 53 which slidably embrace the oppositely disposed edges of the supporting surfaces 10 of the ways 9. The block 15 is thus guided in its longitudinal movement along the ways.

Depending upon which shoulder 50 is disposed in the path of travel of the pawl 42, movement of the ratchet bar 21 will impart more or less free movement to the pawl 42 against spring 43 without moving block 15. During this free movement or lost motion, however, a degree of potential energy is stored in the spring 46 which tends to move the block 15. Therefore, in order to prevent movement of the block due to the compression of spring 46 and only permit said block to move when positive contact of the pawl 42 with one of the shoulders 50 occurs, a pair of pins 54 are slidably mounted within oppositely positioned bores in the block 39. The pins 54 are preferably constructed of rubber or other material having a relatively high coefficient of friction and are each pressed by a coil spring 55 so that the ends of said pins are resiliently urged into frictional contact with the upper surfaces of the supporting surfaces 10. To prevent unintended removal of the pins 54, keys 56 engage in notches 57 provided in the pins, said keys being removably positioned in the block 39.

It can readily be seen that herein is provided a dispensing device which has features which render it adaptable for the semi-automatic dispensing of merchandise, the device being simple and convenient to operate making it ideally suited

for use by retail trade in self-service stores. The device is also flexible in its ready adaptation to cartons or articles of different thickness or depth dimensions, the adjustments necessary being reduced to a minimum.

We claim as our invention:

1. In a dispensing cabinet having a dispensing opening in a wall thereof, a door swingably mounted adjacent said opening forming a closure for said opening, stationary supporting means for merchandise mounted within said cabinet adjacent said opening, means for slidably moving merchandise on said supporting means to dispensing position adjacent said opening, comprising a pusher block slidably mounted upon said supporting means, means connecting said moving means to said door comprising a rack slidably positioned adjacent said supporting means, and a cable connecting said rack and door whereby opening of said door moves said rack toward said door, a pawl carried by said pusher block for engagement with said rack, and means for rendering the connection between the pawl and rack inoperative by predetermined movement of said door.

2. In a dispensing cabinet having a dispensing opening in a wall thereof, a door swingably mounted adjacent said opening forming a closure for said opening, stationary supporting means for merchandise mounted within said cabinet adjacent said opening, a pusher block slidably mounted upon said supporting means in pushing position with respect to said merchandise, a rack positioned adjacent and substantially parallel to said supporting means, a pawl carried upon said pusher block, means connecting said rack and the door to move said rack toward the dispensing opening when the door is opening, swingable means for moving said rack into engagement with said pawl when said rack moves toward said opening to slide said merchandise upon said support, and means for retracting said rack from engagement with said pawl by predetermined movement of said door.

3. In a dispensing cabinet having a dispensing opening in a wall thereof, a door swingably mounted adjacent said opening forming a closure for said opening, stationary supporting means for merchandise mounted within said cabinet adjacent said opening, a pusher block slidably mounted upon said supporting means in pushing position with respect to said merchandise, a rack positioned adjacent and substantially parallel to said supporting means, a pawl carried upon said pusher block, means connecting said rack and the door to move said rack toward the dispensing opening when the door is opening, swingable means for moving said rack into engagement with said pawl when said rack moves toward said opening to slide said merchandise upon said support, and means for retracting said rack from engagement with said pawl, when said rack has moved a predetermined distance toward said opening.

4. In a dispensing cabinet having a dispensing opening in a wall thereof, a door swingably mounted adjacent said opening forming a closure for said opening, supporting means for merchandise mounted within said cabinet adjacent said opening, a pusher block slidably mounted upon said supporting means, a rack positioned adjacent and substantially parallel to said supporting means, a pawl carried upon said pusher block, means connecting said rack and the door to move said rack toward the dispensing opening when

the door is opening, swingable means for moving said rack into engagement with said pawl when said rack moves toward said opening, and means for retracting said rack from engagement with said pawl when said door is moved toward closed position.

5. In a dispensing cabinet having a dispensing opening in a wall thereof, a door swingably mounted adjacent said opening forming a closure for said opening, supporting means for merchandise mounted within said cabinet adjacent said opening, a pusher block slidably mounted upon said supporting means, a rack positioned adjacent said supporting means, means connecting said rack and said door to move said rack toward said door when the door is opening, a pawl movably carried by said pusher block for engagement with said rack, an adjustable stop carried by said pusher block said pawl being resiliently biased toward a rearward position with respect to said stop and block permitting a predetermined independent movement of said pawl with respect to said block, and means for disengaging said rack and pawl by a predetermined movement of said door.

6. In combination, a rack, means for moving said rack forwardly in a longitudinal direction, single resilient means for resisting said forward movement and tending to urge said rack rearwardly and downwardly, movable means for supporting said rack, said rack being slidably supported upon the upper portion of said movable means in an upper position and in a lower position, forward movement of said rack raising said movable means to upper supporting position and rearward movement of said rack lowering said movable means to said lower supporting position, and a pawl positioned a predetermined distance above said rack and engageable with said rack when said rack is in its upper position and disengageable from said rack when said rack is in its lower position.

7. In combination, a rack, means for moving said rack forwardly in a longitudinal direction, single resilient means for resisting said forward movement and tending to urge said rack rearwardly and downwardly, movable means for supporting said rack in an upper position and in a lower position, forward movement of said rack raising said movable means to upper supporting position against said resilient means and rearward movement of said rack lowering said movable means to said lower supporting position, and a pawl positioned a predetermined distance above said rack and engageable with said rack when said rack is in its upper position and disengageable from said rack when said rack moves to its lower position under the influence of said resili-

ent means, said movable means comprising an eccentrically pivoted member upon which said rack is supported, and means upon said rack for swinging said member about its pivot to a substantially dead center position when the rack moves forwardly to position the rack a predetermined maximum distance above said pivot, rearward movement of said rack moving said member away from dead center position to its lower supporting position.

8. In combination, a rack, means for moving said rack forwardly in a longitudinal direction, single resilient means for resisting said forward movement and tending to urge said rack rearwardly and downwardly, movable means for supporting said rack in an upper position and in a lower position, forward movement of said rack raising said movable means to upper supporting position against said resilient means and rearward movement of said rack lowering said movable means to said lower supporting position, and a pawl positioned a predetermined distance above said rack and engageable with said rack when said rack is in its upper position and disengageable from said rack when said rack moves to its lower position under the influence of said resilient means, said movable means comprising a lever pivoted adjacent one end upon the free end of which said rack is supported, and means upon said rack for swinging said lever about its pivot to a substantially dead center position when the rack moves forwardly to position said rack a predetermined maximum distance above said pivot, rearward movement of said rack moving said lever away from dead center position to its lower supporting position.

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