Sept. 25, 1934. S. E. LINK ET AL 1,974,800

REFRIGERATED VENDING APPARATUS

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Fig. 1.

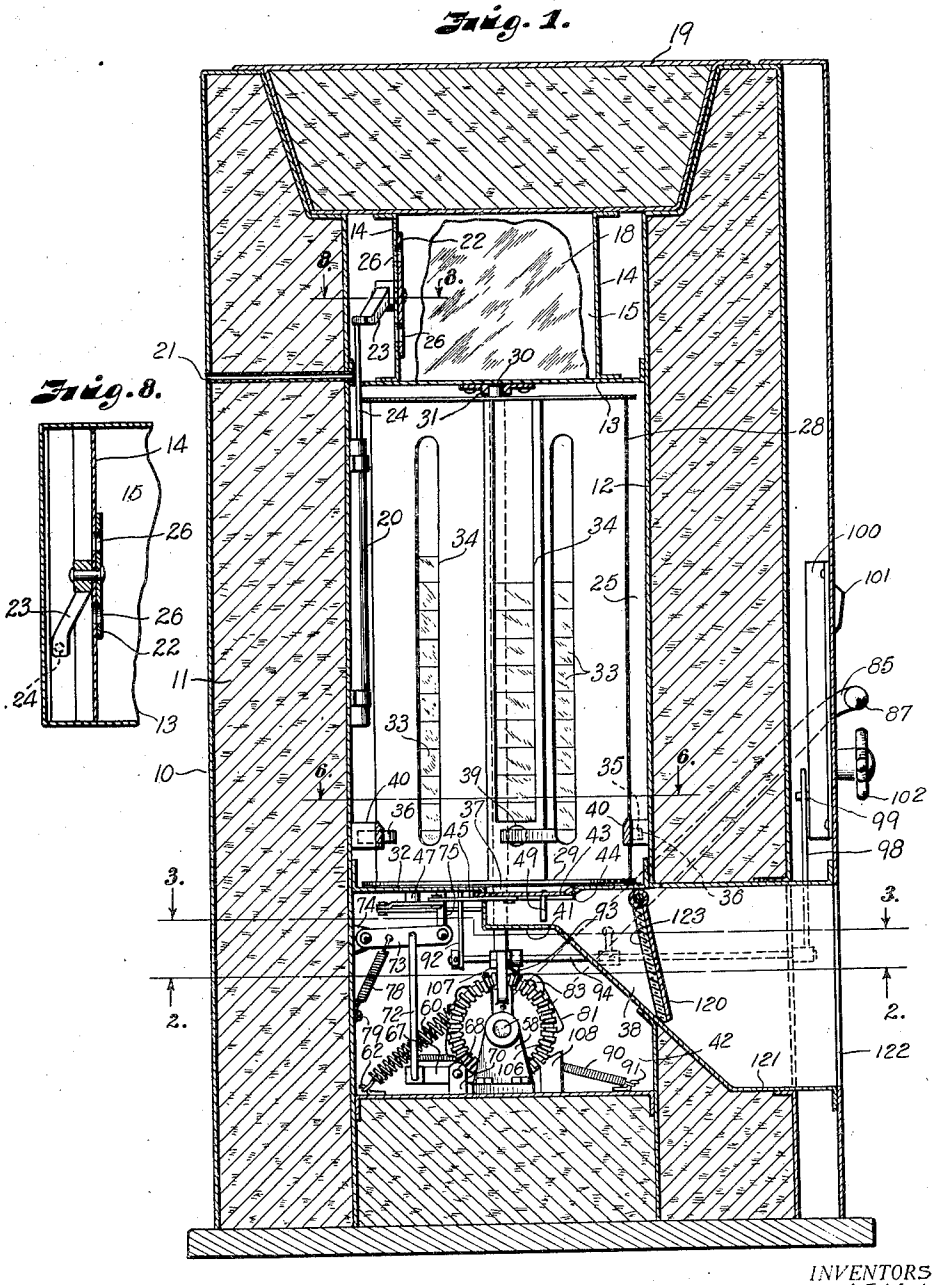


Fig. 8.

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Fig. 2.

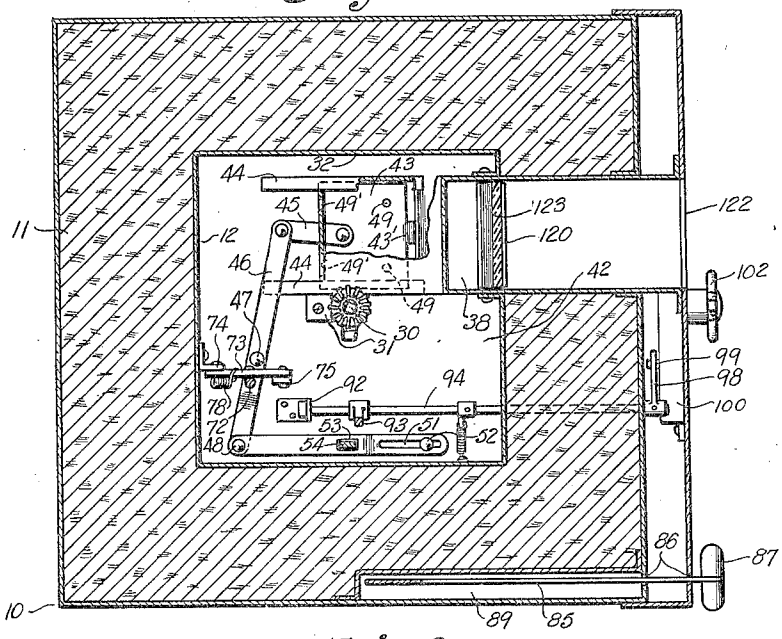
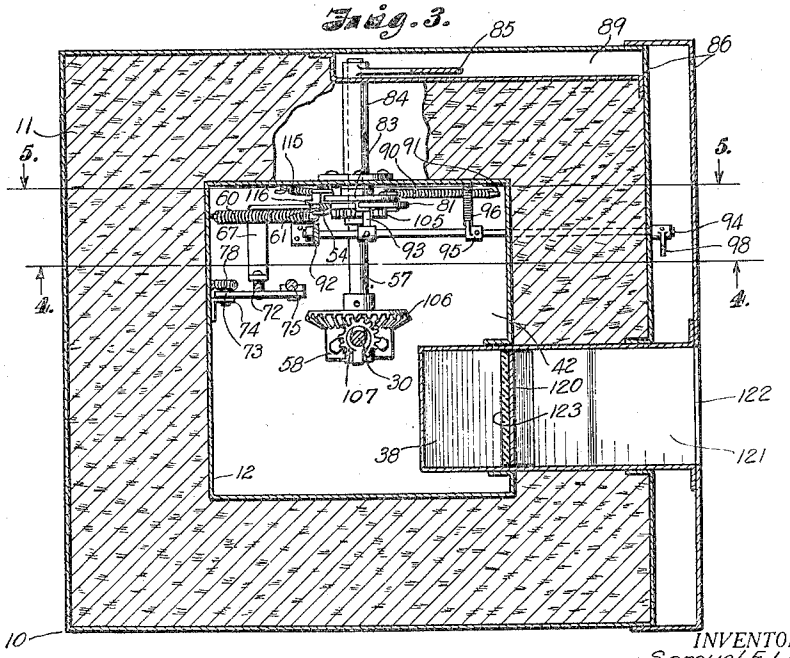


Fig. 3.



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Fig. 4.

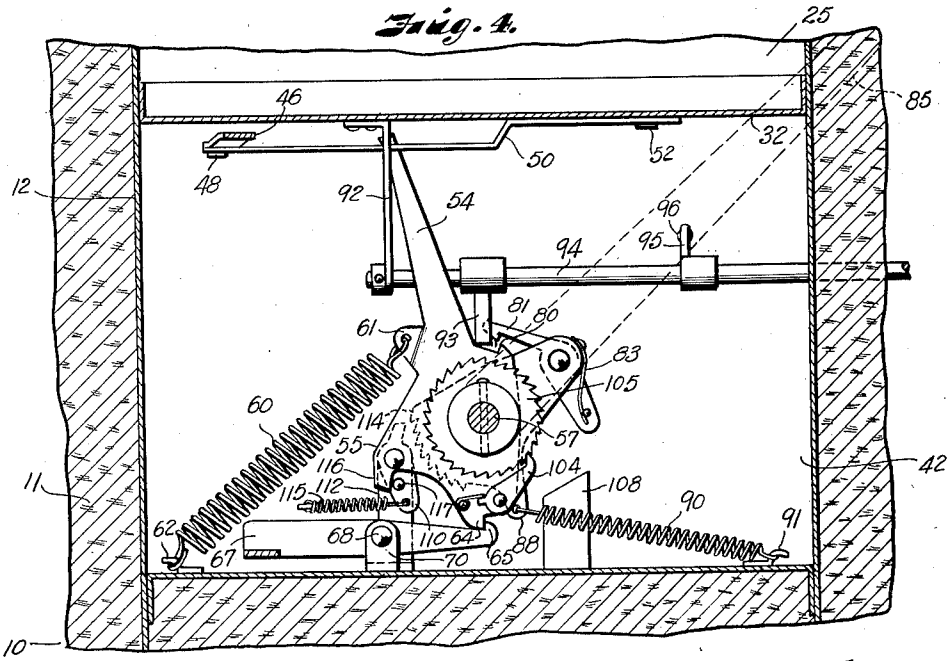
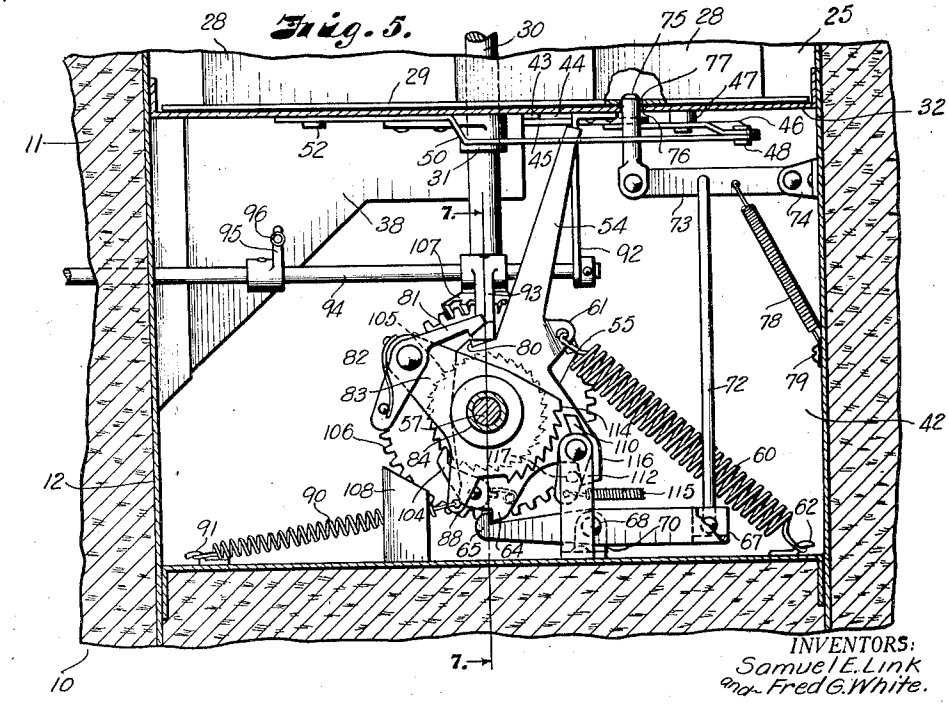


Fig. 5.



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Fig. 6.

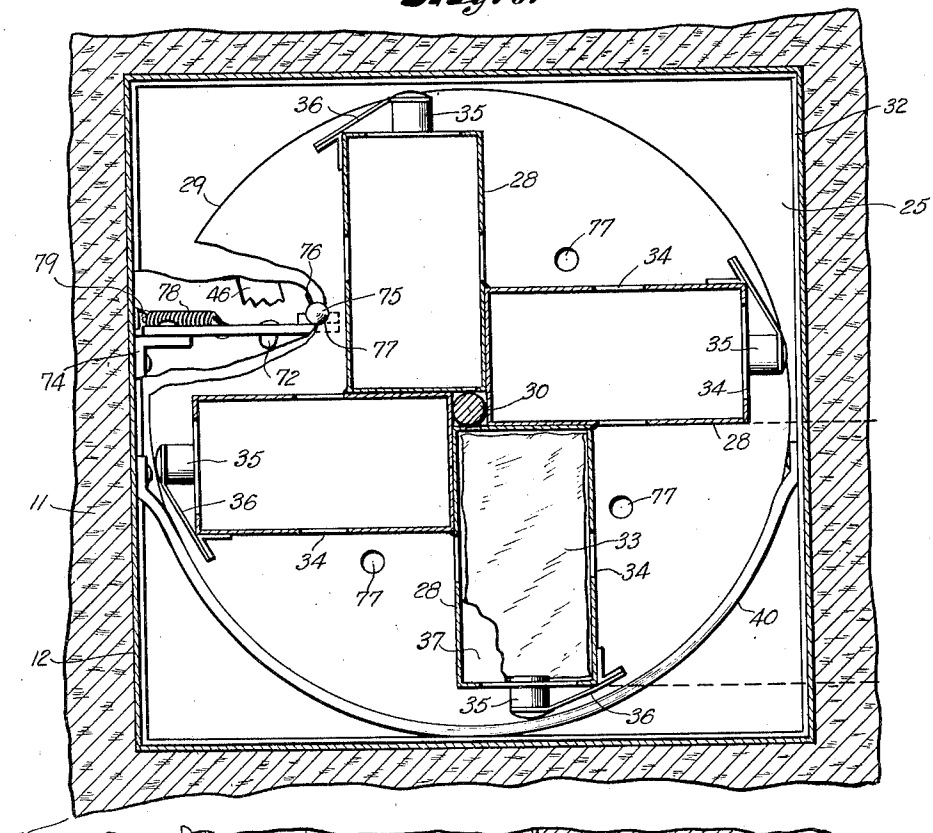
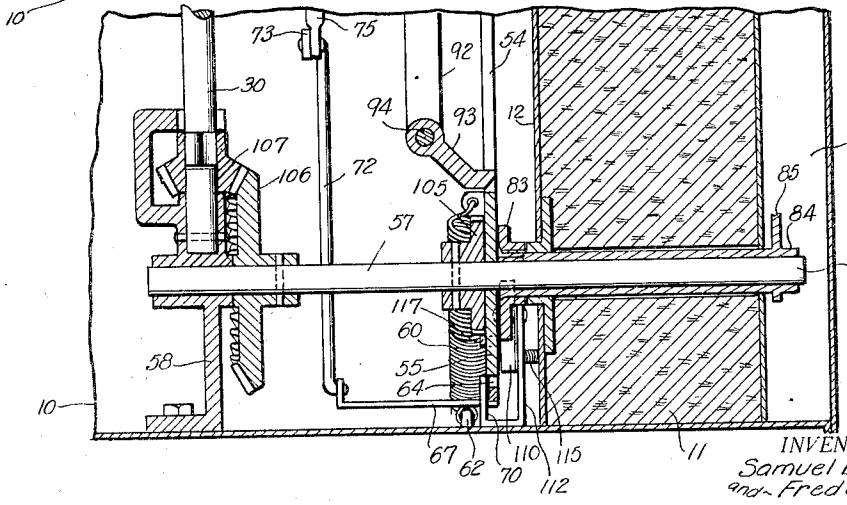


Fig. 7.



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Patented Sept. 25, 1934

1,974,800

UNITED STATES PATENT OFFICE

1,974,800

REFRIGERATED VENDING APPARATUS

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Application July 27, 1931, Serial No. 553,264

7 Claims. (Cl. 312—36)

The present invention relates to vending apparatus, with special reference to apparatus suitable for the vending of frozen confection products (although not intended to be confined to such use), and accordingly one of the primary objects of my invention is to devise an improved form of refrigerated vending apparatus wherein means is provided for maintaining the supply of merchandise to be vended in an efficiently refrigerated condition, together with a coin-control mechanism adapted to eject a package of the merchandise from the apparatus when released for operation by use of the proper coin.

The improved apparatus is particularly adapted for use with the so-called "dry ice" type of refrigerant requiring but small space for a supply of such refrigerant material, and the present construction provides a refrigerating space or compartment below the refrigerant compartment and so arranged that the supply of merchandise to be vended may be placed or stored within the refrigerating space by way of the "dry ice" compartment, and the two compartments thereafter simultaneously closed by means of a single closure member effectively sealing the same, ready for the vending operation.

The improved apparatus also comprises a structure adapted to employ a multiple-magazine form of container structure, in unitary form adapted to be inserted into operative position within the refrigerating compartment, and one primary object of the invention is to provide suitable vending mechanism adapted to vend the merchandise successively from the several containers of said magazine structure until the complete supply of merchandise is exhausted therefrom.

Accordingly, the invention comprises a multiple container structure for storage of the merchandise to be vended, and in a refrigerated condition, if desired, together with coin-control mechanism for successively vending the merchandise from the several containers of the storage structure, in which operation means is also provided for temporarily locking or latching the magazine structure between successive ejecting operations of the vending mechanism, as hereinafter explained.

With the foregoing general objects in view, as well as various objects involving improvements in refrigerator structures and vending means per se, the invention will now be described by reference to the accompanying drawings, illustrating one form of construction which has been devised for embodying the several features of improvement, after which those features and combinations deemed to be novel will be set forth and claimed.

In the drawings—

Figure 1 is a vertical sectional view showing a refrigerated vending machine constructed in accordance with the present invention;

Figures 2 and 3 are transverse or horizontal sections taken on the lines 2—2 and 3—3, respectively, of Figure 1;

Figures 4 and 5 are enlarged vertical sections taken on the lines 4—4 and 5—5, respectively, of Figure 3;

Figure 6 is an enlarged horizontal section taken on the line 6—6 of Figure 1;

Figure 7 is a vertical section taken on the line 7—7 of Figure 5; and

Figure 8 is a horizontal section taken on the line 8—8 of Figure 1.

Referring to the drawings, these illustrate the apparatus as comprising a suitable cabinet structure 10, the walls of which are packed with appropriate insulating material 11 surrounding a central interior space which is lined with a suitable metallic heat conducting material 12, e. g., aluminum, in heat conducting relation to a removable flanged plate 13 (of similar heat conductive material) forming the floor of the refrigerant space and carrying a pair of spaced upright partition members 14 providing an interior refrigerant chamber 15, all as clearly illustrated in Figure 1. The chamber 15 is designed for receiving a supply 18 of solid CO_2 or "dry ice", for which purpose a removable cover member 19 is provided to afford access to the chamber 15 from the exterior.

A suitable vent passage 21 may be provided for escape of the CO_2 gas to the outside of the cabinet 10, and a rotary shutter 22 is carried by one of the partitions 14 and provided with an operating arm 23 actuated by a link 24 from a thermostat device 20 located in the space or chamber 25 below the floor 13, whereby openings 26 in the partition are opened or closed to a greater or less extent for regulating the rate of escape of the CO_2 gas from the chamber 15 and thereby varying the refrigerating effect to a corresponding degree. The arm 23 operates of its own weight to close the shutter, the free end of the arm resting loosely upon the upper end of the link 24 of the thermostat.

The space 25 provides a chamber for a multiple magazine structure which may be placed in position through the cover opening (the cover 19 as well as the plate 13 and parts carried thereby being temporarily removed), said structure

comprising a plurality of containers 28 secured in any practical manner (as by soldering) to a vertical shaft 30 engageable with bearings 31 located centrally of the floor 13 and the floor 32 at the bottom of said chamber, these containers 28 being designed to be filled with a supply of parcels 33 of a frozen confection, e. g., the product commonly known as Eskimo Pies, and longitudinal openings 34 in the sides of the containers facilitating the filling and alinement of the merchandise therein as well as affording a means of observing the extent to which they are filled. Each container is also provided with a detent or pressure device comprising a small plunger element 35 carried by a spring arm 36 and operating inwardly through an opening 39 (Figure 1) near the bottom of the container for engagement with the lower portion of the stack of merchandise during the operation of the ejector mechanism hereinafter described, in which operation the lowermost parcel of the stack passes through an opening 37 of the floor 32 and thence into a discharge or delivery chute 38.

During this interval of the vending operation, the rotation of the shaft 30, as hereinafter referred to, brings the containers 28 in succession over the ejector mechanism, and this movement causes the elements 35 to be successively actuated by engagement with a cam strip 40 (see Figure 6) for projecting said elements into the containers for supporting engagement with the merchandise therein and thus taking the load off the underlying parcels during the vending operation.

The vending or ejecting means is of the coin control type and comprises the following mechanism located in the compartment 42 below the floor plate 32 in the bottom portion of the cabinet 10. An ejector plate 43, provided with depending article-engaging pins 49, is mounted in guide strips 44 for horizontal sliding movement on the under face of the floor plate 32 across the opening 37, the front margin of which is downturned slightly for appropriate stopping engagement with an upturned finger 43′ on the forward edge of the ejector plate (see Figure 2). The plate 43 is connected by a link 45 with one end of a lever 46 pivotally supported intermediate its ends by a post 47 carried by the floor plate 32, the other end of said lever being pivotally connected at 48 to the rear end of an angular slide bar 50 provided with a slot 51 in sliding engagement with a pin 52 on the bottom face of said plate 32. The bar 50 is also formed with a slot opening 53 through which projects the upper end of an ejector-retracting arm 54 forming part of a plate 55 loosely journaled upon a shaft 57 mounted in suitable bearing brackets 58 supported on the floor of the compartment 42.

It is desirable that the ejecting plate be normally closed across the opening 37 to protect the chamber 25 against outside temperature influences as much as possible; accordingly, the arm 54 is held in normally retracted position, corresponding to the advanced or ejecting position of the ejector plate 43, by means of an actuating spring 60 secured at one end to a lug 61 at the base of said arm and anchored at the other end to the floor of the compartment 42 as indicated at 62. The movement of the arm 54 in response to the action of spring 60 is limited by a marginal lug 64 on the plate 55 engaging a catch lug 65 on the end of an angular lever 67 fulcrumed at 68 in a floor bracket 70, the other end of said lever being connected by a link 72 to an arm 73 fulcrumed on a wall bracket 74 and carrying a vertical latch pin 75 projecting through an opening 76 in the floor 32 and also adapted to be projected through any one of a series of openings 77 in the bottom 29 of the magazine structure for latching the latter with the bottoms of the containers 28 successively in register with the floor opening 37 during the intervals between successive ejecting operations. The retraction of said pin 75 is effected by the action of a spring 78 anchored at 79 to the wall of compartment 42 and attached to the arm 73 (see Figure 5), while opposite or latching movement of the pin is effected by the depressing of the free end of the lever 67 by the lug 64 during the retraction of the arm 54,—the forward movement of said arm being accompanied by a backward movement of the lug 64 sufficient to permit the necessary rocking of the lever 67 in response to the pull of the spring 78 for unlatching purposes.

The plate member 55 is also formed with a lug or tooth 80 adapted for operative engagement with a spring-actuated pawl 81 fulcrumed at 82 on a plate 83 carried by the inner end of a sleeve 84 journaled upon the shaft 57, the outer end of said sleeve being provided with a lever 85 accommodated in a suitable space 89 inside the cabinet 10 and of an appropriate size to permit the operative movements of the lever, which projects through slots 86 in the front of the cabinet (Figures 1 and 2) where it is provided with an exterior operating handle 87. The plate 83 is formed with a projecting lug 88 to which is attached a spring 90 anchored at 91 to the floor of compartment 42, the action of said spring serving to return the operating lever 85 and its parts to the inoperative position illustrated in Figures 1 and 2. In this position the pawl 81 is maintained out of operative engagement with the tooth 80 by coin control means comprising a pawl-disengaging arm 93 carried by a shaft 94 journaled in the cabinet structure and a hanger 92 within the compartment 42 (Figure 5), this shaft being also provided with a finger 95 engaged by a spring 96 anchored to the wall of the compartment 42 (as at 97) for maintaining the pawl-disengaging action of the arm 93. The outer end of the shaft 94 carries an arm 98 projecting into position for operative engagement with a pin 99 forming part of a coin control mechanism 100 of a conventional type, at the front of the cabinet, and including the coin slot opening 101 and operating knob 102, whereby the pin 99 may be caused to actuate the arm 98 and rock the shaft 94 as required for effecting release of the pawl 81 by said arm 93.

The plate member 55 also carries a spring-actuated pawl 104 in operative engagement with a ratchet wheel 105 secured to the shaft 57, the inner end of which carries a bevel gear 106 meshing with a bevel pinion 107 adapted for removable engagement with the lower end of the shaft 30 by which the magazine structure is rotated. This movement is effected as the plate member 54 is rotated by the operating means after engagement of the pawl 81 with the tooth 80, and at the end of the operative stroke of the lever 85 the pawl 81 is automatically disengaged from said tooth by means of an upright cam member 108 from the floor of compartment 42 in position to engage the tail end of the pawl 81 (Figures 4 and 5). This releases the plate 55 to the return action of its spring 60 for effecting the package-ejecting operation, after which the pawl 104 ratchets back idly over the wheel 105.

Means is also provided for preventing any backward movement of the operating mechanism

during the ejecting operation, this means comprising a pawl 110 carried by a floor bracket 112 in position for engaging a series of teeth 114 on the margin of the plate 83. This pawl 110 is held by a spring 115 in engagement with said teeth at all times excepting when the ejector arm 54 is in fully retracted position, as shown in Figure 5, when a lug 116 (depending from the plate member 55) engages a pin 117 carried by the pawl 110 and thereby withdraws the latter from engagement with the teeth 114 of the plate 83.

In the use of the apparatus, as for the vending of packages 33 containing a frozen confection, the cover member 19 is removed, together with the partition structure 13—14 from the refrigerant chamber 15, which permits the multiple container structure to be withdrawn for filling purposes.

After the merchandise has been stacked in the containers 28, the magazine structure is restored to the refrigerating chamber 25, the shaft 30 being slipped through the lower bearing 31 into engagement with the pinion 107; after which the partition structure 13—14 is placed back into the chamber 15, with the upper bearing 31 receiving the upper end of said shaft, and the shutter lever 23 in engagement with the upper end of the thermostat rod 24, as shown in Figure 1. A supply of the "dry ice" 18 is placed in the chamber 15, and the cover member 19 put back in position. When a coin is inserted through the coin receiving slot 101, the knob 102 may be turned to rotate the arm 98 and shaft 94 to effect release of the pawl 81 into operative engagement with the tooth 80, whereupon depression of the operating lever 85 will effect partial rotation of the sleeve 84 and plate 83 carrying said pawl, which produces a corresponding partial rotation of the plate 55 carrying the arm 54 by which the slide bar is operated to retract the ejector plate 43, in which movement the ejector pins 49 clear the end of the chute structure by passage through openings 49' therein (see Figure 2). This permits one of the packages 53 to drop through the opening 37 onto the shelf 41 at the top of the chute 38 and in front of the pins 49 carried by said plate 43. At the end of the operating movement of the lever 85 the pawl 81 is tripped by the cam 108, thereby releasing the plate 55 and lever 54, and the spring 90 returns the operating lever 85 to initial position, while the spring 60 effects the return movement of lever 54, operating the ejector plate 43 to discharge the package 33 from the shelf 41 and into the chute 38. The vended package slides beneath a swinging door 120 onto a second shelf 121 where it is accessible to the operator through the exterior opening 122.

The door is provided with insulation 123 as a protection against the warmer exterior atmosphere and conceals the inner end of the chute passage and also makes it difficult to tamper with the ejecting mechanism. The first or forward movement of the lever 54 releases the means for actuating the pin 75 to the action of spring 78 for retracting said pin and unlatching the magazine structure, and thereafter the return movement of said lever is also accompanied by a partial rotation of the ratchet wheel 105 by virtue of the pawl connection between it and the plate member 55, which results in a partial rotation of the bevel gear 106 and pinion 107 and shaft 30 and a consequent shifting of the magazine or container structure to present another container over the opening 37, in which position the container structure is again latched by depression of the free end of the lever 67 by means of the lug 64 on the plate 55, ready for another operation of the vending mechanism. It is to be noted that after the operation of the lever 85 has been started, following the release of the pawl 81, the lever may not be again raised until completion of its operative movement, because of the locking action of the pawl 110 upon engaging the teeth 114 of the plate 83; also, that as each of the containers approaches vending position as well as during the period of the vending operation, and as the container leaves that position, the lower portion of the stack of packages is engaged by the plunger element 35, leaving the lowermost package free to drop through opening 37, and promoting greater freedom of action for the ejecting operation by relieving the bottom packages of the greater portion of the weight of the stack.

It will therefore be seen that a practical and efficient construction has been provided for fulfilling the desired objects of the invention, both as regards the refrigerating function and also the vending or package-ejecting mechanism.

The multiple container structure enables an ample supply of the articles or packages to be maintained for vending purposes, in view of the provision for shifting said structure and thereby alternating the ejecting function successively with reference to the several container compartments, and the efficiency of the refrigerating function is preserved by providing only one opening for serving both the merchandise and "dry ice" compartments; and in addition all due precaution is taken against the loss of the refrigerating effect by protecting the discharge points of the vending mechanism against exterior temperature influences by means of the insulated closure 20 and also by adapting the ejecting member 43 to function both as an ejecting device and also as a closure member for the ejecting or discharge opening 37 at all times except when the package is being discharged therethrough. The heat transfer action is carried out by the principle of conduction through the metallic walls 12 in communicating relation with both the walls and floor of the refrigerant compartment 15, whereby the refrigerating function, as well as its regulation by the described thermostat control, is accomplished in an effective manner.

The improved apparatus, in both its construction and operation is practical and efficient in all its details, and while there has been illustrated and described a practical form of embodiment of the various features of the invention, it is desired to reserve the right to make whatever changes or modifications may fairly fall within the scope of the appended claims.

Having described our invention, what we claim to be new and desire to secure by Letters Patent is:

1. Vending apparatus comprising a cabinet having a storage space, a multiple container structure rotatable within said storage space, article delivery means comprising mechanism operating to release and discharge an article from one of the container compartments, and means acting simultaneously with said delivery means to rotate said container structure to present another container compartment in discharge position, and locking means positively actuated in response to the operation of said first means for locking said container structure between successive article delivery operations.

2. Apparatus comprising a cabinet provided with a storage space, a rotatable container for

the articles to be vended mounted within said space, a container removably superposed within the top of said space upon said first container, means providing an article-delivery outlet from the lower portion of said space, and means for rotatably supporting said article container including an exterior bearing member carried by the bottom of said second container.

3. Vending apparatus comprising a cabinet having a rotatable container for the articles to be vended, a container superposed upon said article container, means for rotatably supporting said article container including a bearing member carried by the bottom of said second container, and article-delivery mechanism mounted in operative relation to the bottom of said article container and provided with a disconnectible drive connection thereto.

4. Vending apparatus comprising a multiple container structure, an article ejector operative to release and discharge an article from one of the container compartments, means acting simultaneously with said ejector operation to rotate said container structure to present another compartment in discharge position, and means for automatically locking said container structure between successive ejector operations, said locking means having provision for limiting the operative movement of said ejector.

5. Vending apparatus comprising a multiple container structure, an article ejector operative to release and discharge an article from one of the container compartments, means acting simultaneously with said ejector operation to rotate said container structure to present another compartment in discharge position, and locking means actuated by the operative movement of said ejector for intermittently locking and unlocking said container structure between successive ejecting operations.

6. Vending apparatus comprising a multiple container structure, means for intermittently rotating said structure, a horizontally sliding ejector for discharging articles from the container compartments, an arm rocking upon a horizontal axis for reciprocating said ejector, means for automatically locking said container structure between successive ejecting operations, and means controlled by the movements of said arm for actuating and releasing said locking means.

7. Vending apparatus comprising a multiple container structure, a horizontally sliding ejector for discharging articles from the container compartments, a rocking member provided with means for reciprocating said ejector, means for intermittently engaging and oscillating said rocking member, means actuated by the movement of said rocking member for intermittently rotating said container structure, and means also responsive to the movement of said rocking member for locking said container structure between successive rotative movements thereof.

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