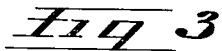
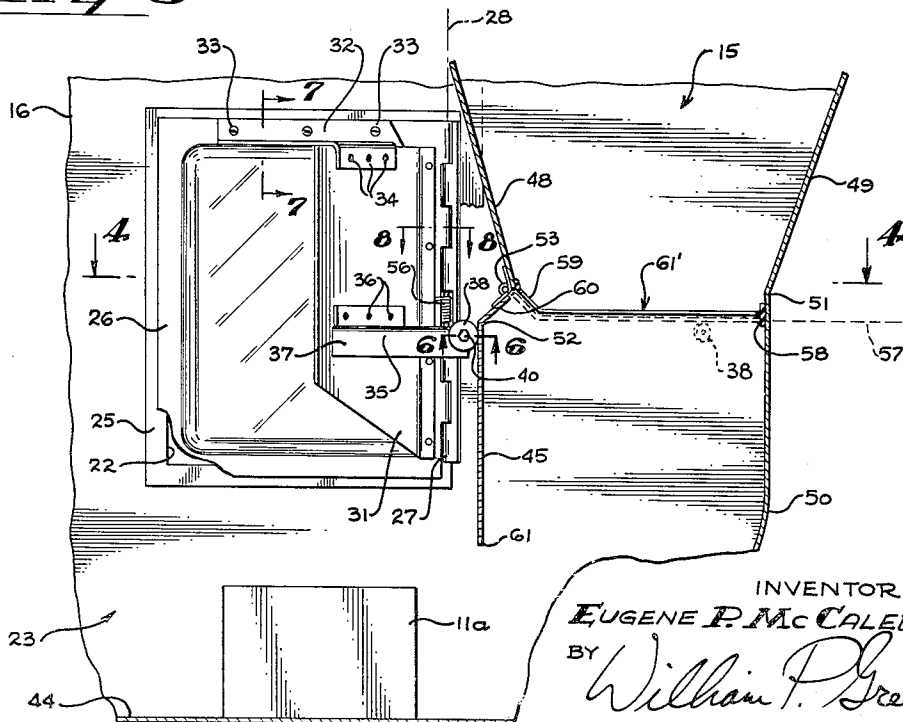


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2 Sheets-Sheet 1



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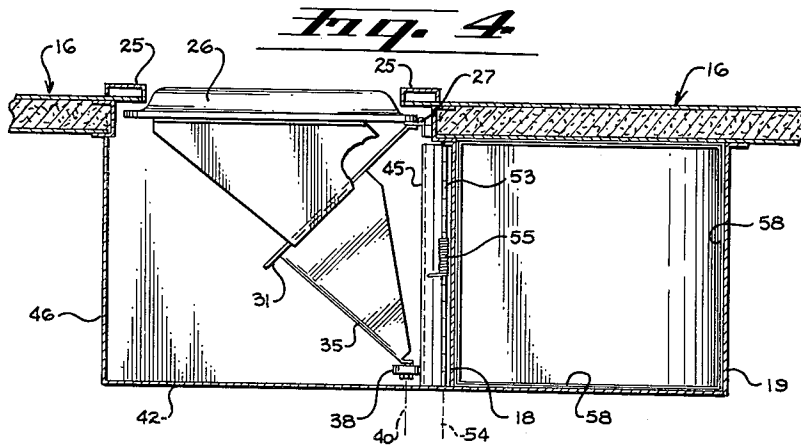
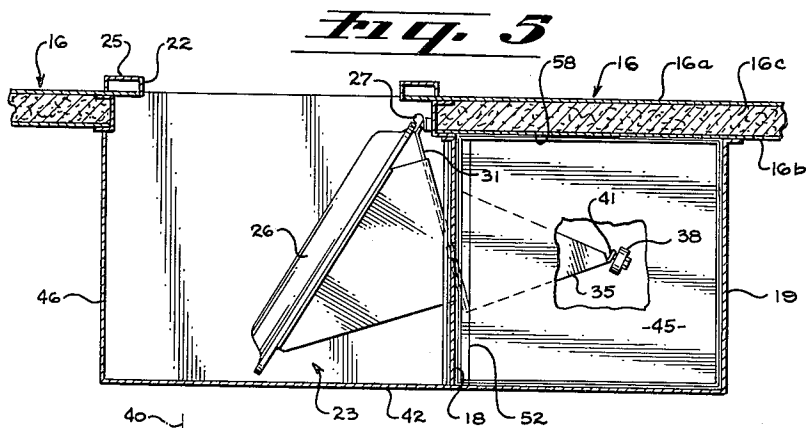
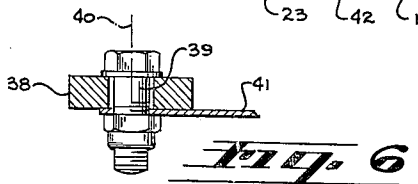
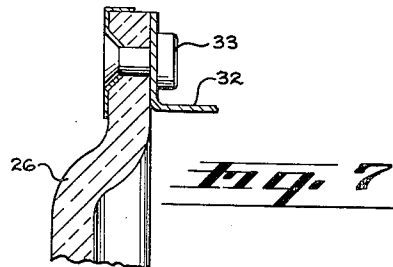
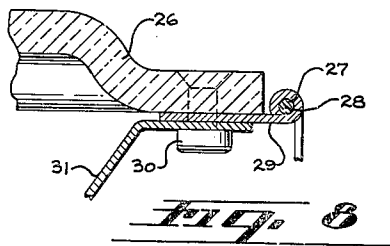
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DISPENSING MACHINE HAVING REACH-IN DOOR

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2 Sheets-Sheet 2



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2,990,227 DISPENSING MACHINE HAVING REACH-IN DOOR

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2 Claims. (Cl. 312-35)

This invention relates to dispensing machines, for vending or dispensing packaged items, such as small cartons or cans containing individual servings of milk, cold drinks, or the like.

A machine constructed in accordance with the invention includes a housing containing a relatively large compartment within which a supply of the items to be dispensed is contained, with apparatus being provided for successively delivering these items individually from the storage chamber to a delivery location at which a delivered item is accessible to a purchaser from the outside of the housing. One difficulty which is encountered when designing a machine of this type is the problem of providing for convenient access to the delivered item from the outside of the housing, while at the same time avoiding any possibility of access through the delivery location to the supply of items contained within the main storage chamber. From experience with vending machines in actual public use, it is known that, if any type of open passage is left between the delivery location and the storage area, through which a person may either reach with his arm or insert a wire or tool, pilferers will eventually learn of the weakness of the machine, and will rob it of its contents without paying for the contained items.

With this in mind, the major object of the present invention is to provide a unique door arrangement which will very positively and effectively prevent any possibility of access from the exterior of the housing and through the delivery location to the inner storage chamber within which the supply of items to be dispensed is contained. This result is achieved by a unique double door arrangement, controlling access through two different openings to a delivery compartment, into which the individual items are delivered by the dispensing mechanism. One of the doors is a swinging front access door, for closing a main opening in the housing through which an operator can reach to pick up a delivered item. The second door is designed and positioned to close a passage through which the dispensing mechanism feeds the individual items into the delivery compartment. In order to attain the protective feature of the invention, there are provided means for automatically holding the second mentioned door in closed condition upon opening movement of the first door, so that whenever an operator has the front access door open, while he is reaching past that door to pick up a delivered item, the second door is automatically maintained in closed condition in order to prevent the operator from reaching through both doors and into the storage compartment. This automatic actuation may be attained by means of a roller device attached to the front access door and receivable beneath the second door in its closed position. Preferably, the front access door is mounted to swing about a vertical axis, while the inner door is mounted to swing about a horizontal axis.

The above and other features and objects of the present invention will be better understood from the following detailed description of the typical embodiment illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view of a vending machine constructed in accordance with the invention, and having

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its front wall partially broken away to show generally the inner dispensing mechanism;

FIG. 2 is an enlarged fragmentary partially broken away perspective view of the double door mechanism, shown from the inner side of the front wall of the vending machine housing;

FIG. 3 is an enlarged fragmentary vertical section through the double door arrangement, taken on line 3-3 of FIG. 2;

FIG. 4 is a horizontal section taken on line 4-4 of FIG. 3;

FIG. 5 is a view similar to FIG. 4, but showing the two doors in the positions which they assume while a user is reaching through the front access door to remove a delivered item from the delivery compartment; and

FIGS. 6, 7 and 8 are enlarged fragmentary sections taken on lines 6-6, 7-7, and 8-8 respectively of FIG. 3.

Referring first to FIG. 1, I show at 10 a vending machine constructed in accordance with the invention and which may typically be utilized for vending small individual milk cartons 11, or other small individual packaged items. The vending machine 10 has an outer typically rectangular housing 12, which contains a fairly large supply of the cartons or items 11 to be dispensed. Upon actuation of the machine by insertion of a proper coin into the apparatus, the dispensing mechanism contained within housing 12 acts to feed an individual one of the cartons 11 into a forward vertically extending chute or delivery passage 15 formed in the housing at the rear side of front wall 16 of the housing. The dispensing mechanism for thus feeding individual ones of the milk cartons or the like 11 into vertical passage 15 may typically take the form of four vertically spaced dispensing units 14 of the type described in detail in Patent No. 2,735,578 of A. C. Woodruff, issued February 21, 1956 on "Beverage Vending Machine." Since the novelty of the present invention is not concerned with the specific construction of these dispensing units, I will not attempt to describe these units in detail in the present application, beyond stating generally that each unit 14 includes an endless belt 116, whose advancement through a predetermined range of movement upon coin controlled energization of the machine will act to advance a single carton 11 forwardly to fall off of the forward end of the belt and into the vertical passageway 15. Associated with each of these belts 116, there is provided an inclined shelf 13, holding a supply of the cartons 11 which are automatically fed onto the belt when needed. Each of the units 14 may supply a different flavor of beverage, or the like, and may be controlled by a different one of the control buttons 17 at the front of the housing.

The vertical passageway 15 may be defined by two spaced parallel vertically extending opposite side walls 18 and 19, which are typically welded or otherwise secured at their forward edges 20 to the vertical front wall 16 of the housing. Walls 18 and 19 may extend perpendicular to front wall 16, as will be apparent from FIG. 2. Thus, the two walls 18 and 19 form with the intermediate portion of wall 16 a three sided vertical passageway, which is open only at its rear side for reception of the individually dispensed cartons 11 from dispensing units 14. It is contemplated that the front wall 16 should usually be formed as a forward door, for closing the front side of the housing, and typically hinged at its left side 21 for forward swinging movement to an open condition providing access to the interior of the device (for loading, repair, etc.). Also, this front wall and the rest of the outer walls of the housing may all be suitably heat insulated, if the milk or other items to be dispensed are refrigerated. For this purpose, front wall

16 is typically illustrated as formed of two spaced parallel metal sheets 16a and 16b having heat insulation 16c therebetween.

Front wall 16 of the housing contains, near the lower end of vertical passageway 15, a front typically rectangular access opening 22 (see FIGS. 1 and 3) through which a purchaser may reach rearwardly from the exterior of the housing into an inner delivery compartment 23, to remove a delivered carton 11a therefrom. A suitable frame 25 may extend about and define front access opening 22. Opening 22 is closed by a rectangular glass door 26, through which the interior of delivery compartment 23 is visible, so that a purchaser may know when one of the cartons has been delivered to the pick up location 11a represented in FIG. 3. Door 26 is mounted by a hinge structure 27 (see FIGS. 3, 4, 5 and 8) to front wall 16 of the housing, for inward swinging movement into compartment 23 and about a vertical axis represented at 28 in FIGS. 3 and 8. One of the halves 29 of hinge structure 27 is rigidly attached to an edge of door 26, by means of a series of vertically spaced rivets 30, which also serve to attach an edge portion of a metal plate 31 (see FIG. 8) to the door. This plate extends at an angle rearwardly from the edge of the door, as seen in FIGS. 4 and 8, and the plate 31 is rigidly braced at its upper end in fixed position relative to the door by a bracket plate 32, one of whose edges is riveted at 33 to the upper edge of the door, and the other of whose edges is welded, riveted, or otherwise rigidly secured to the upper edge of plate 31 at 34. Both of the parts 31 and 32 are formed of essentially rigid sheet metal, as is a third plate 35, which is welded or otherwise secured to plate 31 at 36, and which may have the essentially right triangular configuration shown in FIGS. 4 and 5, when seen in plan view. The edge portion of plate 35 may be turned downwardly at 37 to increase the strength and rigidity of the part. At its inner extremity, element 35 rotatably carries a roller 38, typically mounted by a transverse bolt or shaft element 39 (see FIG. 6), which roller 38 is rotatable about a horizontal axis 40 relative to the vertically extending extremity 41 of flange 37 by which it is carried. As seen in FIG. 4, when door 26 is in its closed position, the rotary axis 40 of roller 38 desirably extends perpendicular to the plane of front wall 16 of the housing.

The delivery compartment 23 at the rear of front access door 26 is defined by walls which completely close off all access to the interior of the compartment except through front access opening 22 and an upwardly facing second access opening 61' (see FIG. 2) communicating with vertical passageway or chute 15. The front side of compartment 23 is of course formed by front wall 16 of the housing, while the rear side of the compartment is formed by a vertical imperforate wall 42 extending parallel to wall 16. The bottom of compartment 23 is defined by a horizontal bottom wall 44 extending between front wall 16 and rear wall 42. This bottom wall 44 is spaced considerably beneath the front access opening 22 (see FIG. 3), so that there is room for door 26 to open rearwardly into compartment 23 without being obstructed by a delivered one of the cartons 11a. Also, this positioning of bottom wall 44 on the relatively low level allows room for carton 11a to pass the lower edge of the second and inner door 45 during delivery of the carton to the pick up location of FIG. 3.

One side of compartment 23 is defined by a vertical side wall 46, while the top of the compartment is defined by an upper wall 47. A portion of a second side of the compartment is defined by an inclined lower portion 48 of sheet metal element 18 which forms one side of the previously discussed vertical delivery chute 15. A corresponding inclined lower portion 49 of wall 19 of the chute is located opposite inclined wall 48, with these two wall portions 48 and 49 converging downwardly to

the discussed upwardly facing opening 61' through which compartment 23 communicates with passageway 15.

The positioning of the various dispensing units 14 in the interior of the machine is such that, when a single carton is dispensed from either of these units into vertical passageway 15, that carton will fall downwardly at a location to pass through aperture 61' into compartment 23. After passing through this aperture 61', the carton engages a camming portion 50 of bottom wall 44, which portion is curved upwardly in the manner shown in FIG. 2 and to the point of juncture at 51 with wall 49, so that the curving configuration of portion 50 of the wall cams carton 11a laterally and to the delivery position of FIG. 3.

The door 45 is provided for closing inner delivery aperture 61' when access door 26 is in its open condition. For this purpose, door 45 is adapted to be actuated by roller 38 between the full line depending open position of FIG. 3, and the upwardly swung broken line closed position of that figure. Door 45 may take the form of an essentially rectangular piece of rigid sheet metal, which is planar except for a bend provided at the location 52 near its upper edge, and which sheet is attached by a hinge 53 to inclined wall 48 for swinging movement between its two positions about a horizontal axis extending perpendicular to front wall 16 of the housing. This axis is represented at 54 in FIGS. 2 and 4. At some point along the extent of hinge 53, there is provided a spring 55, which yieldingly urges door 45 to its open full line position of FIG. 3. A similar spring 56 is provided on hinge 27 of main door 26, to normally urge that door to its closed position of FIG. 4. When door 26 is closed and door 45 is open, the latter engages roller 38 to limit the spring urged opening movement of door 45 at the FIG. 3 position.

Roller 38 is so located that its uppermost portion lies and moves within a plane 57 corresponding substantially to the plane of the undersurface of door 45 in the closed position of the door (see FIG. 3). When door 45 is held in this closed position by roller 38 the door engages upwardly about its periphery against a sealing element or flange 58, typically formed of a suitable resinous plastic material adapted to form a peripheral seal about the door. The seal element 58 may extend angularly upwardly at 59, adjacent hinge element 53, in correspondence with the angularity of the uppermost portion 60 of door 45. When door 45 is in its open position, the lower extremity 61 of the door is spaced above bottom wall 44 of compartment 23 a distance sufficient to pass carton 11a beneath door 45 and to the position of FIG. 3.

To now describe the manner of use of the apparatus, assume that the inner shelves 13 within housing 12 are properly loaded with different items to be dispensed, and assume that the dispensing mechanism is all in condition for operation. If a purchaser then drops a proper coin into coin reception slot 62 in the front of the machine, and then presses a desired one of the selector buttons 17, one of the dispensing units 14 will be automatically energized to advance one of the cartons or containers 11 forwardly, and drop that container downwardly within front passage or chute 15. Since door 26 is normally held in its closed position by spring 56, and door 45 is normally held in its open position by spring 55, the carton is free to fall downwardly through opening 41, and to be cammed laterally by curving wall 50 to the position represented at 11a in FIG. 3. The user then pushes inwardly on front access door 26 and removes the item 11a from compartment 23. As the user thus opens door 26 inwardly about axis 28, the roller 38 which is mounted to the inner side of door 26 deflects door 45 laterally and upwardly to the closed broken line position of FIG. 3, so that the user can not possibly reach through compartment 23 and upwardly through opening 61' to the location at which others of the cartons 11 are stored.

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In the fully open position of door 26, roller 38 is located beneath approximately the center of door 45, and leaves no possibility whatsoever of opening the door. The rotatability of roller 38 about its axis 40 relative to the door structure by which it is carried allows the roller to roll along the undersurface of door 45 as door 26 opens and closes.

The bend 52 which is provided in door 45 attains the result of allowing spring 55 to assist spring 56 in closing door 26 during the final portion of a closing movement, while avoiding any tendency for spring 55 to close door 26 when the latter is in a more open position. For example, when door 45 is in its fully closed position door 45 acts directly downwardly on roller 38 and that downward force has no component tending to urge roller 38 in a direction to close door 26. However, when the roller passes bend 52 of door 45 during the closing of door 26 door 45 commences to open, and thereafter exerts a force against roller 38 in a direction tending to close door 26. Thus, a very effective final closing action on door 26 is attained, without at the same time producing an excessive spring urged tendency to close door 26 when it is in a relatively widely opened condition, as usually occurs in a spring urged door arrangement.

I claim:

1. A dispensing machine comprising a housing forming a storage chamber adapted to contain a supply of packaged items to be dispensed, said housing having a wall containing an access opening, means forming in the housing behind said access opening a delivery compartment essentially isolated from said storage chamber, there being a second opening in the top of said delivery compartment and offset to a side of said first opening, dispens-

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ing mechanism operable to successively dispense said packaged items downwardly through said second opening and into said compartment at a side of said first opening, said compartment having a bottom wall beneath said second opening which is inclined to direct said downwardly falling items laterally to a location directly behind said first opening, a first door essentially closing said first opening, first hinge means mounting said first door for swinging movement about an essentially vertical axis and essentially horizontally inwardly into said compartment, a second door for essentially closing said second opening, second hinge means mounting said second door for swinging movement about an essentially horizontal axis between a generally horizontally extending closed position and a downwardly swung open position for passing said items downwardly into the compartment, a structure mounted to the rear of said first door for swinging movement therewith and including a closing element positioned to engage said second door upon opening movement of the first door and cam the second door upwardly to closed position, a first spring yieldingly urging said first door to closed position, and a second spring yieldingly urging said second door to open position.

2. A dispensing machine as recited in claim 1, in which said closing element is a roller rotatably mounted to said structure, said second door including a main essentially horizontal portion and a smaller inclined portion adjacent said second hinge means.

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