

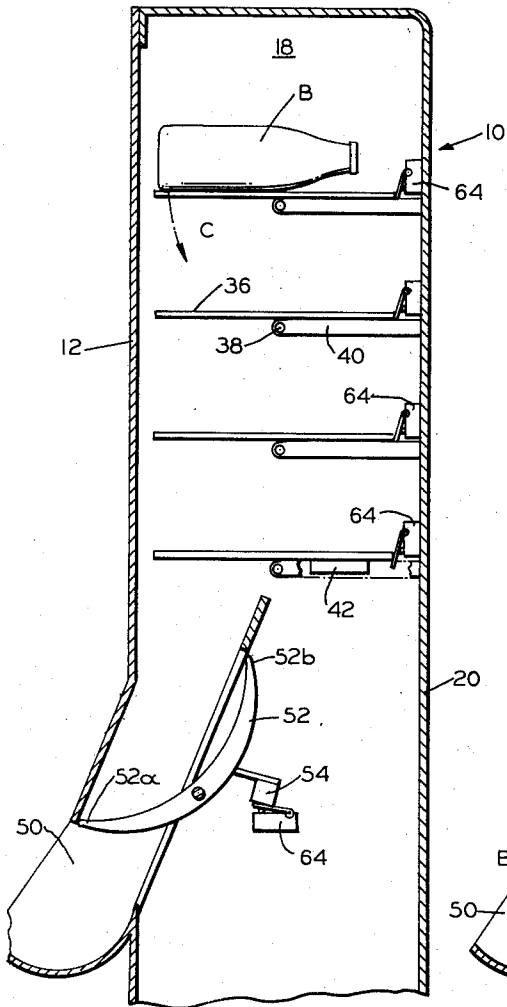
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VENDING MACHINE

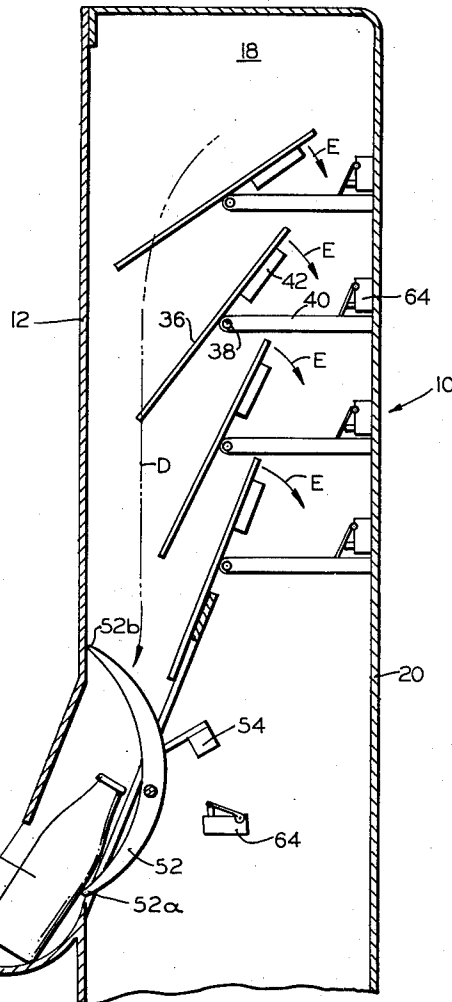
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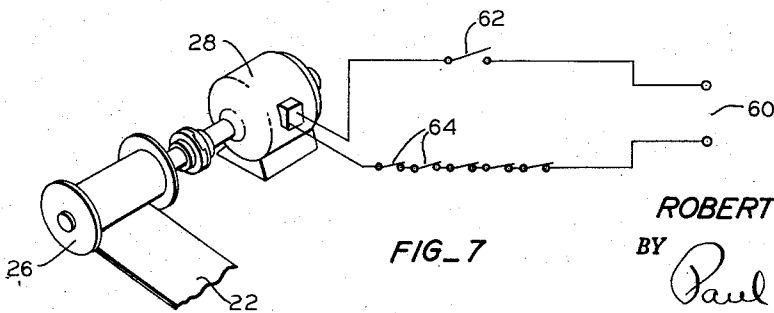
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FIG_5



FIG_6



FIG_7

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VENDING MACHINE

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The present invention relates to vending machines, and more particularly, to machines for vending packaged items such as bottled soft-drinks.

Various difficulties have been observed in commercially-available vending machines. Probably the most severe difficulty encountered results from the complexity and consequent high cost of such machines which allows only certain preferred locations to be economically feasible. Additionally, however, the complexity of these machines increases installation and maintenance costs. Moreover, in the case of bottled soft-drinks and other articles having frangible packaging, jamming and/or breakage of the articles presents an additional difficulty.

Accordingly, it is a general object of the present invention to provide a simple, but extremely effective vending machine, particularly though not exclusively, adapted for dispensing bottled soft-drinks.

It is a feature of the invention to provide a vending machine having a plurality of compartments of utmost design simplicity and adapted to discharge bottles or other packaged goods stored therein through a common discharge or delivery chute.

It is a further feature of the invention to provide such compartments with an extremely simple but effective means for precluding accidental discharge of bottles or other articles therefrom except when properly actuated by the vending mechanism.

Additionally, it is a feature of the invention to effect completion of the bottle delivery to the consumer after initial instigation by the single vending mechanism mentioned hereinabove through additional mechanism automatically actuated by the weight of the bottle or other article itself.

It is a correlated feature of the invention to provide for the automatic controlled discharge of the bottles or other packaged goods wherefore even though they move under their own weight, as mentioned above, no breakage or jamming is experienced.

It is another feature of the invention to provide means for rendering the vending mechanism inoperative once a given vending or dispensing cycle has been instigated and to maintain such inoperativeness until the vending is complete.

Additionally, it is a feature of the invention to provide for the delivery or discharge of the bottles or other packaged goods from the vending machine through a chute whose passage is restricted in a manner permitting the discharge of a single bottle, but precluding simultaneous passage of more than one bottle and also precluding insertion of any foreign object wherefore the device is rendered tamperproof.

These and other objects and features of the invention will become more apparent from a perusal of the following description of the accompanying drawings wherein:

FIG. 1 is a fragmentary elevational view of a vending machine embodying the present invention with the front thereof removed to illustrate interior details of its construction,

FIGS. 2 and 3 are fragmentary diagrammatic views illustrating successive stages in the vending or dispensing of a bottle from one compartment of the structure, as illustrated in FIG. 1,

FIG. 4 is a fragmentary perspective view of the vending structure illustrated in FIGS. 1 through 3 and illustrating additional details of construction,

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FIGS. 5 and 6 are two similar views constituting fragmentary sections taken substantially along line 5-5 of FIG. 1 and illustrating successive stages in the dispensing of a single bottle, and

5 FIG. 7 is a schematic diagram of the electrical circuit of the mechanism illustrated in FIGS. 1 through 6.

As shown in the drawings, the vending machine includes a generally rectangular cabinet or housing 10, having a front cover or wall 12 (see FIGS. 5 and 6) which is removable to enable loading of articles into the housing and access to the operating parts for periodic maintenance or repair. Suitable refrigerating equipment (not shown) can be installed in the bottom of the housing 10 to maintain its contents at the desired temperature.

15 A plurality of compartments 14 are formed in mirror symmetry on opposite sides of the housing 10 for storage of soft-drink bottles B, as illustrated, or other articles to be vended. It will be observed that while the following description of structure and operation is made with reference to bottled soft-drinks, other articles can be vended through its utilization.

The mentioned compartments 14 are of appropriate dimensions to receive the bottles B in side-by-side prone dispositions and are quite simply formed by a plurality of 25 superposed shelves 16 which are fixed to the side and rear walls 18, 20 of the cabinet 10 so as to slope upwardly slightly from each side toward the central portion thereof. The side walls of each compartment 14 are formed by the rear and side walls 18, 20 of the housing and by the front cover 12, when the latter is in closed position, as shown in FIGS. 5 and 6, but the space between the inwardly-projecting ends of the superposed shelves 16 is left open to provide a lateral exit 14a for the bottles B or other articles therewithin.

35 In order to discharge bottles B one-by-one from the compartments 14 through the described lateral exit 14a, a belt 22 is fixed to the end of the lowermost shelf 16, as indicated at 24, and is then folded successively into each of the compartments so as to surround the bottles B loaded therewithin and extend along the resulting sinuous path to a reel 26 disposed above the uppermost shelf. This reel 26 is driven slowly by a motor and suitable gear reduction unit 28 (see FIG. 7) to revolve in the direction of the arrow A in FIG. 1 so that the belt is wound on the reel and tends to achieve a disposition defining the shortest distance between the reel 26 and its fixed end 24 at the edge of the lowermost shelf 16. Consequently, if the shelves 16 illustrated at the left of FIG. 1 be considered, winding of the belt 22 on the reel 26 will initially tend to 50 foreshorten the belt between the two uppermost shelves 16 so as to urge the bottles B lying in the compartment 14 therebetween to the right wherefore continued turning of the reel will discharge first one and then another of the bottles from the uppermost compartment. Once the uppermost compartment 14 is emptied, the same effect occurs in the compartment 14 therebelow until almost all of the bottles B are discharged as can be seen by reference to the right side of FIG. 1, and finally, all the bottles B are discharged leaving the belt 22 stretched tautly from its fixed end connection 24 over the edges of the superposed shelves 16 and thence around the reel 26.

To reload the emptied compartments 14, the front cover 12 is opened and the reel 26 temporarily disengaged from its drive connection. The belt 22 is then refolded into the compartments 14 whereupon a new supply of bottles B may be inserted in their side-by-side prone dispositions within all of the compartments.

65 Since the shelves 16 slope upwardly to the lateral exit 14a, the bottles B are maintained within the compartments 14. However, to restrict the lateral exit 14a and prevent accidental discharge of a bottle, the belt 22 is arranged to pass around a rod or roller 30 that is ro-

tatably and slidably suspended at its ends in parallel slots 32 that slope inwardly and downwardly at the extremity of each shelf 16. The weight of this rod or roller 30 is sufficient to urge the contacted portion of the belt 22 downwardly to partially close the exit 14a from each compartment 14 when no tension is placed upon the belt in the manner illustrated in full lines in FIG. 1 and in phantom lines in FIG. 2. However, when rotation of the reel 26 in the direction of the arrow A in FIG. 1 is instigated, the tension on the belt 22 initially causes the roller 30 to move upwardly in its slot to the full line position in FIG. 2 and thus open the compartment exit 14a for passage of a bottle B therethrough. After the rod 30 has been moved upwardly to open the lateral exit 14a for passage of a bottle, continued winding of the belt 22 on the reel 26 effects movement of the bottles B to the right, until the outermost bottle is shoved out of the compartment 14 and onto a receiving shelf 36 to be described hereinafter, as illustrated in FIG. 3. When the winding of the reel 26 stops, the rod 30 pushes the belt 22 downwardly into its exit-blocking position once again, and such position is maintained until another vending operation is instigated.

One of the mentioned receiving shelves 36 is supported between each pair of compartment shelves 16 on opposite sides of the vending machine housing 10 so as to be in position to receive a bottle dispensed either from the left hand or right hand compartment 14 adjacent thereto. As best shown in FIGS. 4, 5 and 6, each of these shelves 36 is pivoted at a central position about a substantially horizontal bar 38 suitably supported on brackets 40 which project from the rear wall 20 of the housing. A counter weight 42 is attached to the rear portion of each pivoted shelf 36 so as to hold the same normally in a horizontal disposition, as shown in FIGS. 4 and 5, but when a bottle B is received with its heavier bottom end on the forward portion of the shelf, the counter-weight 42 is overcome and the shelf 36 pivots towards a vertical disposition in the direction of the arrow C in FIG. 5. After a certain amount of pivotal motion has occurred, the bottle B will slide along the surface of the tilted shelf 36 to eventually engage the forward portion of the next shelf thereunder and also the front cover 12 of the housing so as to be guided successively between the pivoted shelves 36 and the cover 12 into the interior end of a discharge or delivery chute 50, the described bottle path being indicated by the arrow D in FIG. 6. After the bottle B has passed, the counter weights 42 on the respective shelves 36, in turn, cause each to return in the direction of arrows E in FIG. 6 to its horizontal disposition preparatory to reception of a successive bottle.

The mentioned discharge chute 50 is supported by and extends angularly through the front cover 12 of the housing 10 to enable delivery to the purchaser. However, in accordance with an additional aspect of the present invention, a cradle gate 52 in the form of a semi-cylindrical member is pivoted about a horizontal axis so that either its forward or rearward portion 52a or 52b respectively is projecting into the discharge chute 52 to block movement of articles therethrough. Normally, as illustrated in FIG. 5, the forward end 52a of the cradle gate 52 projects into the chute 50 under action of a counter weight 54 on the rear portion 52b thereof, but when a bottle B enters the cradle gate, it causes pivoting thereof in a counterclockwise direction into the position illustrated in FIG. 6 whereat the rear portion 52b of the gate is brought into blocking position, but the bottle B can move through the opened forward portion 52a to the exit of the discharge or delivery chute 50 for reception by the purchaser. It is to be noted that the cradle gate 52 is dimensioned so that only a single bottle B can be disposed therein at one time and any article of larger dimensions cannot be accommodated. In particular, it will be noted that any attempt to insert an ele-

ment into the discharge chute 50 from the exit end thereof will be effectively blocked by such gate 52. Consequently, no tampering with the contents of the unit is enabled.

The actual vending operation is instigated, as previously mentioned, by the turning of one or the other of the belt reels 26, and such action is, in turn, started by closure of an electrical circuit, as diagrammatically indicated in FIG. 7, which energizes the motor unit 28 which drives the reel. The motor is connected in a circuit which includes a 110 volt A.C. source 60 and a main switch 62 which is closed through insertion of a coin into a coin control mechanism, or any similar actuating mechanism which forms no part of the present invention. The circuit also includes a number of normally closed switches 64 arranged for actuation by movement of the pivoted shelves 36 and the cradle gate 52. Physically, one switch 64 is disposed on the rear wall 20 of the housing 10 adjacent the rear end of each of the pivoted shelves 36 so that when such shelf leaves its normal horizontal disposition, the switch 64 is opened to thus break the circuit and stop the motor unit 28 which drives the reel 26. Another switch 64 is similarly associated with the cradle gate 52 so as to be opened when the cradle gate is swung to its bottle-dispensing position, as illustrated in FIG. 6.

Consequently, after the motor has been energized through suitable actuation of the coin control mechanism, the reel 26 will turn until one bottle B has been moved from its compartment 14 onto the pivoted shelf 36 and such shelf has started to move from its horizontal towards a vertical disposition. At this point, the associated switch 64 opens so that further rotation of the reel 26 ceases and the circuit remains deenergized until the bottle B has been removed by the purchaser from the exit of the delivery chute 50. The machine is then ready for instigation of another bottle dispensing operation.

It will be noted that the only requisite actuation is the small movement of the belt 22 to instigate initial movement of the bottle B from the compartment 14 onto the adjacent pivoted shelf 36; thereafter the bottle B resting on the uppermost shelf 36 moves downwardly from one shelf to the next and through the cradle gate 52 under its own weight. Although the bottle B does travel thus under its own weight, the counter weights 42, 54 on the shelves 36 and the cradle gate 52 are sufficient to restrain its motion to a relatively slow speed so that the resultant controlled descent eliminates the possibility of bottle breakage and consequent jamming.

Further, it will be observed that while the bottles B roll out of the compartments 14 during their initial motion, other packaged goods of more rectangular configuration can be slid therefrom by the same belt-actuating mechanism and may thereafter travel down the shelves 36 and through the cradle gate 52 for delivery to the purchaser. Thus, as previously mentioned, the vending machine is not restricted to the handling of bottles.

Various alterations and/or modifications can obviously be made in the described structure without departing from the spirit of the invention and accordingly the foregoing description is to be considered as purely exemplary and not in a limiting sense. The scope of the invention is to be indicated by reference to the appended claims.

What is claimed is:

1. A vending machine which comprises a plurality of superposed, fixed shelves forming a plurality of compartments therebetween for storage of bottles or the like and having lateral exits, said shelves being disposed to support, substantially, the entire weight of the bottles and to resist, by gravitational force, bottle movement through said lateral exits, a belt arranged for folded insertion into said compartments to encompass the bottles therewithin, said belt being fixed at one end, a winding reel for said belt at its remote end, means for rotating said reel to wind in said belt and urge said

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bottles off the end of said shelves and out of said compartments, and means movably supported in engagement with said belt at the exit end of each compartment and arranged to urge said belt into exit-blocking position.

2. A vending machine which comprises a plurality of superposed, fixed shelves forming a plurality of compartments therebetween for storage of bottles or the like and having lateral exits, a belt arranged for folded insertion into said compartments to encompass the bottles therewithin, said belt being fixed at one end, a winding reel for said belt at its remote end, means for rotating said reel to wind in said belt and urge said bottles off the end of said shelves and out of said compartments, and means movably supported in engagement with said belt at the exit end of each compartment and arranged to urge said belt into exit-blocking position, said belt engaging means including a roller rotatably and slidably supported at its ends in slots. 15

3. A vending machine which comprises a plurality of superposed fixed shelves forming a plurality of compartments therebetween for storage of bottles or the like and having lateral exits, said shelves being disposed to support substantially the entire weight of the bottles and to resist by gravitational force bottle movement through said lateral exits, a belt arranged for folded insertion into said compartments to encompass the bottles therewithin, said belt being fixed at one end, a winding reel 20

for said belt at its remote end, means for rotating said reel to wind in said belt and urge said bottles off the end of said shelves and out of said compartments, means for stopping rotation of said reel in response to the movement of the bottle out of any compartment, said reel-stopping means including a pivoted shelf arranged to receive a bottle from one of said compartments and an associated switch actuated by pivotal motion of said shelf, said pivoted shelf being normally disposed in a substantially horizontal disposition but arranged to pivot toward vertical disposition under the weight of a received bottle. 25

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