

Nov. 20, 1962

D. A. COUNCIL

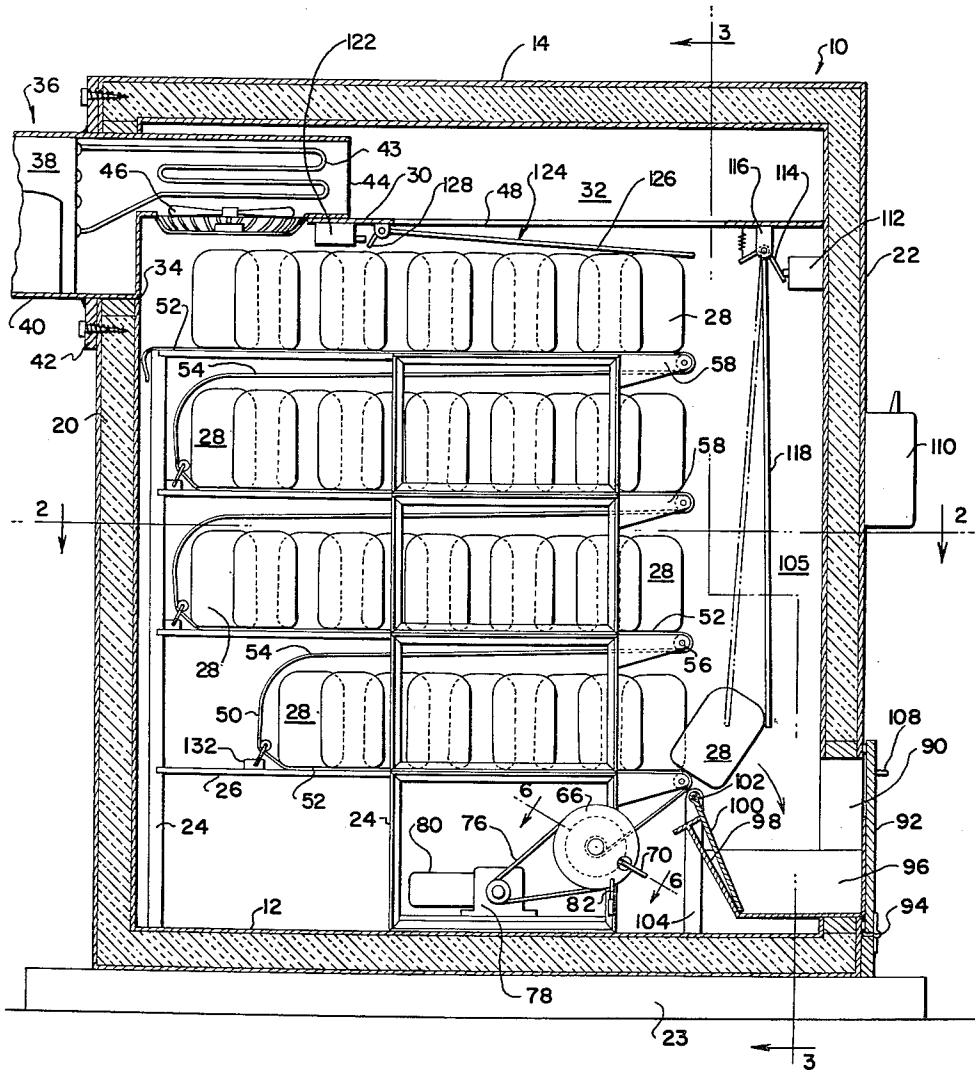
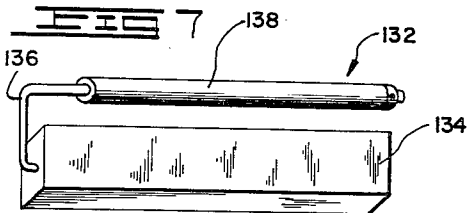
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BELT-OPERATED MERCHANDISE DISPENSING CABINET

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3 Sheets-Sheet 1

FIG. 1



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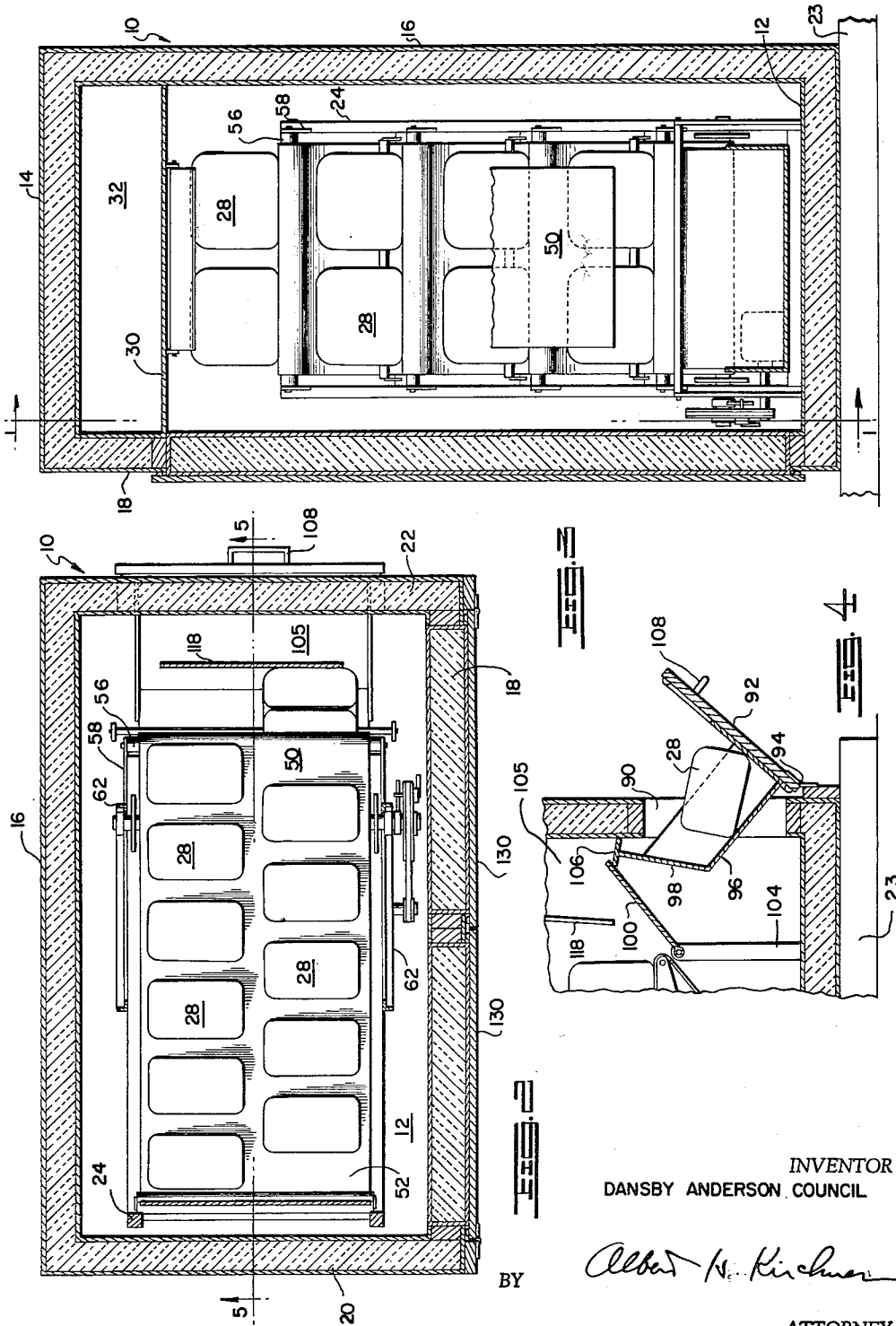
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BELT-OPERATED MERCHANDISE DISPENSING CABINET

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3 Sheets-Sheet 2



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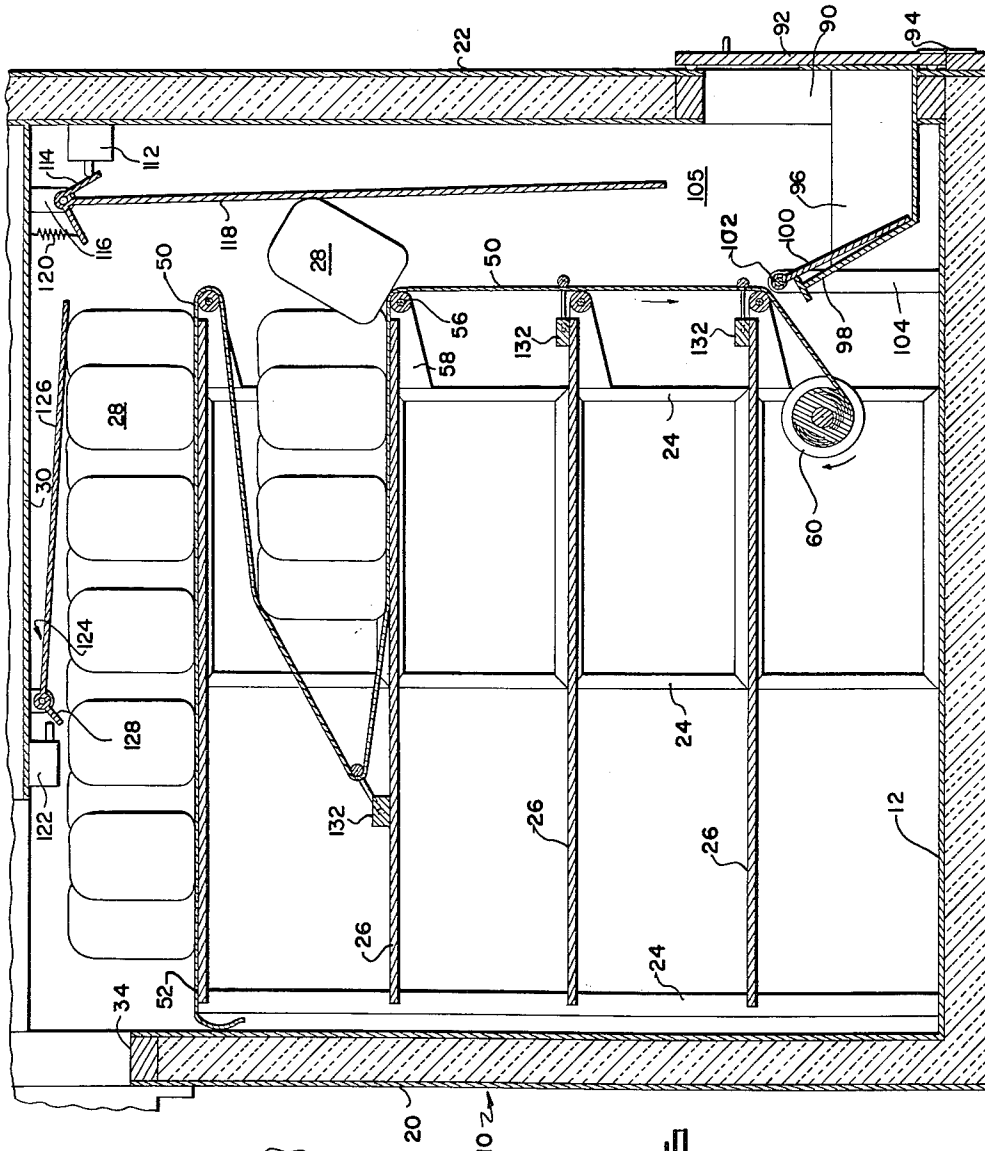
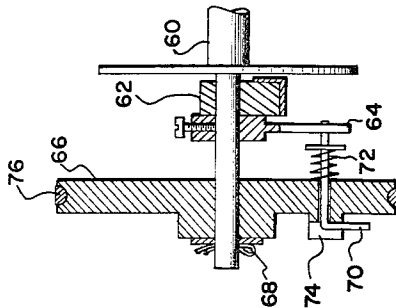
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BELT-OPERATED MERCHANDISE DISPENSING CABINET

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3 Sheets-Sheet 3



SEE FIG. 1

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3,064,856 BELT-OPERATED MERCHANDISE DISPENSING CABINET

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7 Claims. (Cl. 221-13)

The present invention relates to dispensing apparatus and more particularly to merchandise vending machines.

In a preferred embodiment, in which the invention has been commercially practiced and in which it will be depicted and described in this application for Letters Patent, the apparatus comprises a relatively large cabinet intended to be capable of outdoor installation, as at roadsides, in shopping centers and the like, designed especially to contain and dispense packaged ice cubes or pellets automatically on deposit of appropriate coins in a delivery control means.

More particularly in this embodiment the machine comprises an insulated storage room or housing provided with electrically operated refrigerating means and a plurality of shelves on which a large number of bags of ice will be stored and from which they will be delivered, one at a time, in response to actuation of the coin control mechanism, through a doorway equipped with safeguards against entry from the outside and protected against removal of more than a single bag in response to a single payment.

In the accompanying drawings forming part of this application and illustrating the preferred embodiment which has been introduced into commercial use and has been found entirely satisfactory in actual practice,

FIGURE 1 is a vertical sectional view through the cabinet of the apparatus, taken on a plane just inside the near side wall, on the line 1-1 of FIG. 3, showing the internal mechanism in side elevation, and illustrating delivery of a package;

FIG. 2 is a horizontal sectional view taken on the line 2-2 of FIG. 1;

FIG. 3 is a vertical sectional view through the front portion of the cabinet, on the line 3-3 of FIG. 1;

FIG. 4 is a detail vertical sectional view of the delivery door and appurtenant structure showing a package in position to be removed by a purchaser;

FIG. 5 is a substantially central vertical sectional view, generally similar to that of FIG. 1 taken on the line 5-5 of FIG. 2 and showing the storage portion of the cabinet after most of the packages have been delivered;

FIG. 6 is a detail sectional view taken on the line 6-6 of FIG. 1, showing the clutching mechanism; and

FIG. 7 is a perspective view of a drag weight used in the apparatus.

In these figures, the reference numeral 10 designates generally a large enclosure comprising a cabinet having a thermally insulated floor 12, roof 14, rear side wall 16, front side wall 18, rear end wall 20 and front end wall 22, all fabricated in any appropriate manner preferably to resist outdoor weather conditions and provide adequate resistance to heat transfer, and all joined together in permanent fashion to make up an ice storage housing mounted on a concrete base 23.

A skeleton framework 24 consisting of spaced uprights mounted in the rear and intermediate zones of

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the cabinet supports a series of horizontal shelves 26 all terminating short of the front end wall 22 and all equally vertically spaced somewhat more than enough to accommodate in upright position the packages that are to be stored and dispensed, which in the present instance are bags 28 of ice cubes or pellets. The top-most shelf is spaced a slightly greater distance beneath a horizontal partition 30 which spans the entire width of the cabinet, as shown in FIG. 3, and extends from the front end wall 22 to a point somewhat short of the rear end wall 20, as shown in FIG. 1. The partition 30 thus cooperates with the roof 14 to provide an upper chamber 32 in the cabinet. The upper central portion of the rear end wall 20 is provided with an opening 34 opposite this chamber, and a removable refrigeration unit designated generally 36 is insertible into this opening. As best shown in FIG. 1, the unit may comprise an electric motor driven compressor-condenser assembly 38 housed in a covering 40 which projects out from the rear end wall and is bolted to it by means of a surrounding flange 42 and is connected to an evaporator 43 in an extension 44 of the covering 40 which projects into the chamber 32 and has its inner end supported on the partition 30. The bottom of the inner extension 44 is apertured or louvered below a motor driven fan 46, and most of the forward portion of the partition 30 is open, as shown at 48, so that when the refrigeration unit 36 is energized, by plugging into an electrical outlet, and the fan 46 is driven, cold air will circulate through the evaporator 42, opening 48 and the aperture below the fan and throughout the shelved portion of the housing so as to refrigerate the packages 28 stored on the shelves.

As has been stated, an important object of the invention is to dispense the packages one by one on actuation of a suitable coin control mechanism. This is accomplished by the following mechanism:

Before any of the packages 28 are put on the shelves, a lengthy belt 50, of suitable heavy canvas or the equivalent, substantially as wide as the shelves, is convoluted back and forth over the shelves, with a lower run 52 of the belt resting on each shelf and underlying the packages thereon, and with a successive upper run 54 of the belt overlying the same packages, as best shown in FIGS. 1 and 5. The forward zones of the belt are turned about rollers 56 journaled in brackets 58 at the front ends of the shelves. One end of the belt hangs free at the rear of the uppermost shelf, beyond the rearmost packages 28 on the shelf, and the other end is fastened to a winding spool 60 which is mounted in the bottom of the cabinet, on the floor 12, below the front portion of the lowermost shelf 26, as shown in FIGS. 1 and 5. The shaft of this spool is extended beyond the spool ends and is journaled in brackets 62 that are securely fixed on the floor 12 and/or to the framework 24 and one of these ends, e.g., the end nearer front side wall 18, is extended beyond the adjacent bracket to receive the drive connection shown in FIGS. 1 and 6.

This drive mechanism comprises a clutch plate or arm 64 setscrewed or otherwise made fast on the shaft and a pulley or sprocket wheel 66 loose on the shaft but made captive thereon as by means of a cotter pin 68. A clutch pin 70 having a right angular handle as shown in FIG. 6 projects from a hole in the wheel 66 and is urged by a spring 72 toward the clutch arm 64 for engagement with

an edge thereof (being shown so engaged in FIG. 6). However, the pin can be retracted and held retracted by turning the handle portion over a keeper abutment 74 on the wheel 66. A belt or sprocket chain 76 connects the wheel with the drive pulley of a reduction gear box 78 powered by a motor 80 based on the framework or floor. A trip finger 82 (see FIG. 1) projects from the framework or floor into the circular path traversed by the handle of the pin 70 when it is retracted on the keeper 74 and the wheel 66 is rotated. The finger thus operates to displace the handle and allow the spring 72 to project the pin for engagement with an edge of the clutch plate on continued rotation of the wheel 66.

The lower portion of the front end wall 22 is provided with a delivery opening 90 closed by a door 92 which is bottom hinged at 94 to the sill of the opening, in substantially the plane of the floor 12 of the cabinet. A hopper 96 is fixed to the inside of the door and comprises an open tray having a rearwardly and upwardly sloping back wall 98. When the door 92 is in its closed position, the upper edge of the back wall 98 of the hopper 96 lies in substantially the vertical plane of the rollers 56 that are mounted on the ends of the brackets 58 on the front edges of the shelves 26 and are spaced back from the cabinet front end wall 22 a distance about equal to the extent to which the hopper projects back into the cabinet. Overlying the back wall 98 of the hopper is a stiff sheet metal flap or barrier gate 100 to the upper edge of which is horizontally hinged at 102 to the top of a pair of upstanding brackets 104, so that the flap normally hangs in the back of the hopper and will swing forwardly and upwardly from its normal position of FIGS. 1 and 5 (when the door 92 is in closed position) to the position shown in FIG. 4 (when the door is opened). Thus the normal position of the flap leaves the hopper 96 open and serves to guide into it a package 28 falling from one of the shelves 26 down the drop space 105 between the vertically aligned front edges of the shelves and the cabinet front wall 22 (see FIG. 1), while the flap functions to block off access into the cabinet through the delivery opening 90 while the door 92 is open (see FIG. 4).

The upper edge of the back wall 98 of the hopper may be flanged as shown at 106 to stiffen it and perform the added functions of striking the front end wall 22 of the cabinet to limit the swinging movement of the door to open position and of bridging the space between the front end wall and the front edge of the flap 100 when the door is open, as shown in FIG. 4.

A handle 108 may be provided on the door to facilitate its being opened. If the door is properly designed and proportioned in the manner shown in the drawings, it will be overbalanced toward closed position by the weight of the hopper and will require no spring to close it and no latch to keep it closed. The door is not kept locked but is freely openable at all times.

A coin deposit box 110 is mounted conveniently on the outside of the cabinet, say on the front end wall 22 above the door 92, and contains suitable mechanism for starting the motor 80 upon actuation by coins of proper value. The motor circuit includes also a normally closed switch 112 operated to open position by a bellcrank 114 journaled in brackets 116 depending from the partition 30 in the front upper part of the storage portion of the cabinet as shown in FIGS. 1 and 5. Rigid with the bellcrank 114 is a long feeler arm or plate 118 which hangs down in front of the shelves 26, and a spring 120 biases the feeler toward the shelves and the bellcrank 114 away from the switch 112 so that the switch contacts are closed. The arrangement and relationship of the parts are such that any package 28 toppling into the drop space 105 from any of the shelves will strike the feeler and swing it from the broken line position of FIG. 1 to the full line position so as to actuate the switch 112 to open its contacts.

A similar switch 122 with normally closed contacts in the motor circuit is mounted in the storage portion of the cabinet on the under side of the partition 30, back near the rear end of the partition, and hinged in front of this switch is a bellcrank 124. One arm of this bellcrank is a long one 126 and extends forwardly, resting by gravity on the packages 28 on the top shelf, and the other arm is a short one 128 arranged to engage the switch 122 and open its contacts when the long arm falls, as of course it does when the last one of the packages 28 which support it is removed from the top shelf.

The front side wall 18 of the cabinet is provided with one or more openings closed by doors 130 to provide access to the interior by an attendant for such purposes as stocking the packages 28 on the shelves and servicing the mechanism whenever required.

The cabinet and apparatus being constructed as thus described, the operation and use are as follows:

With the refrigeration unit 36 installed and operating in the usual manner, under the control of a thermostat so as to maintain a sub-freezing temperature in the cabinet, an attendant will open the doors 130 and prepare to stock the shelves with a full load of packages 28. Before putting the packages on the shelves, the attendant will disengage the clutch that couples the drive wheel 66 to the belt winding spool 60 by retracting the pin 70 and turning it onto the keeper 74. This frees the spool from its driving connection, so that the belt 50 can be readily unwound from the spool. The attendant pulls the belt from the spool, up in front of the rollers 56, lays the terminal length of the belt on the top shelf, and weights down this run of the belt with a full shelf complement of packages 28. The belt is then pushed back into the spaces between shelves, beginning with the second shelf from the top, and into each convolution a tier of packages is inserted, with the packages resting on the lower run 52 of the belt and covered by the upper run 54. In the illustrated embodiment of the invention the shelves and the belt are wide enough to accommodate two lines of packages set side by side. In such case the packages of the two lines are staggered sidewise, as shown in FIGS. 1, 2 and 5, for a reason that will soon appear.

Having filled the shelves, the attendant applies to the rear end of the run of belt on each of the shelves a drag weight 132, as shown in FIG. 7. This device comprises a friction shoe 134 of appropriate weight, provided with a pivoted bail 136 which may be equipped with a roller 138 to make anti-friction contact with the belt. The bail may be open at one end, or openable, so that the belt can be looped through the bail with the shoe resting on the shelf surface behind the rear turn in the belt, as shown in FIGS. 1 and 5. It will be appreciated that the frictional engagement of these drag weights holds the lower belt runs 52 snugly down on the shelves behind the rearmost package on each shelf and effectively prevents tipping or upsetting the packages at the rear of the shelves when the belt runs are pulled forward to move the packages to the fronts of the shelves.

The shelves being filled, the doors 130 are closed and locked, and the installation is ready for patronage.

When a customer makes the appropriate coin deposit in the box 110, the motor 80 is put into operation. This is accomplished by well known coin controlled switch mechanism that forms no part of the present invention but is commercially available and hence requires no explanation. During the first revolution of the drive wheel 66, the handle of the clutch pin 70 strikes the finger 82 and is tripped off the keeper 74. Immediately thereafter, on further rotation of the wheel, the projected finger engages the edge of the clutch plate 64 and the spool 60 becomes coupled to the drive wheel and begins to rotate. This starts the belt 50 winding on the spool and pulls the run 52 of the belt forward on the lowermost of the shelves 26. The packages 28 on this run of the belt all

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move forward with the run until the foremost package tips over the roller 56 at the front edge of the shelf and topples down through the lower part of the drop space 195 into hopper 96. However, as soon as the package tilts over the edge of the roller, it strikes the feeler 118, swinging it from the broken to the full line position of FIG. 1 and thereby opening the switch 112, promptly stopping the motor and bringing the belt to a halt before another package can be moved into tipping position.

The customer hears the package drop into the hopper and opens the door 92 and removes the package. FIG. 4 illustrates how the package is made available while access into the cabinet is prevented.

After the lowermost shelf has been emptied, the belt extends straight up to the roller 56 of the next superjacent shelf and deliveries from that shelf begin. The drag weight 132 of the lowermost shelf remains at the front edge of that shelf, with the belt sliding freely behind the bail of the weight. Deliveries in this manner continue as long as any package remains on any shelf. When the last package has dropped from the topmost shelf, the feeler 126 is lowered and the switch 122 opens and remains open, thus preventing further operation of the motor 80 until the cabinet is again filled. If desired, a second switch, well known in the art, may be operatively associated with the switch 122 to energize a signal light or the like to indicate to prospective customers the information that the cabinet is empty.

While the structure and apparatus have been illustrated and explained in terms of their embodiment in a packaged ice vending installation, intended for public use outdoors, it will be obvious that the invention is of broad scope and comprehends other and specifically modified embodiments for the dispensing of other and different articles and goods, whether refrigerated or not. Thus, not all the elements and details of the disclosed construction need be used or associated in the particular combinations shown, but many may be omitted or modified within the spirit of the invention as defined by the more broadly worded of the appended claims. Thus, to state a typical example, in some of the commercial embodiments made by the assignee, the shelf 30 has been omitted, the refrigeration unit 36 being mounted entirely on the wall 20 in the familiar manner of a window-mounted room air conditioner, and the switches 116 and 122 being attached directly to the roof 14.

Moreover, it is to be understood that the invention is not to be considered limited to the handling of the packaged ice pellets used in the foregoing description. The apparatus is well adapted to be used with any of a wide variety of goods, comprising substantially any kinds of discrete articles of reasonable size, whether or not bagged or otherwise wrapped. The expression "package" used in the claims is accordingly intended to comprehend all articles capable of fitting into the cabinet and of being dropped from the shelves as explained.

I claim:

1. A package dispensing apparatus comprising a cabinet, a plurality of superposed elongated horizontal shelves fixed in the cabinet and having their front ends spaced behind the front wall of the cabinet to provide an intervening vertical drop space surmounting a delivery zone at the bottom, a flexible belt continuously convoluted back and forth over the shelves so as to dispose a run on each shelf adapted to underlie a series of packages aligned along the length of the shelf and a next adjacent run overlying the series, electrically operated drive means operable for pulling on one end of the belt to draw the runs forwardly successively along the shelves, thereby successively toppling the packages from the forward ends of the shelves into the drop space for falling into the delivery zone, and means for stopping operation of the drive means responsive to each package entering the drop space comprising an elongated feeler arm having one end pivoted in the upper portion of the drop space and extending

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substantially down to the level of the lowermost shelf, means biasing the arm back toward the front ends of the shelves so that a package entering the drop space from any of the shelves will strike the arm and swing it forwardly about its pivot, and a normally closed switch controlling the drive means operatively connected with the arm and adapted to be opened when the arm thus swings.

2. A package dispensing apparatus comprising a cabinet, a plurality of superposed elongated shelves fixed in the cabinet and having their front ends spaced behind the front wall of the cabinet to provide an intervening vertical drop space surmounting a delivery zone at the bottom, a flexible belt continuously convoluted back and forth over the shelves so as to dispose a run on each shelf adapted to underlie a series of packages aligned along the length of the shelf and a next adjacent run overlying the series, drive means operable for pulling on one end of the belt to draw the runs forwardly successively along the shelves, thereby successively toppling the packages from the forward ends of the shelves into the drop space for falling into the delivery zone, and means for stopping operation of the drive means responsive to each package entering the drop space, said drive means comprising a spool on which the belt is wound and including a motor, a wheel driven by the motor, a clutch comprising an element rotatable with the spool and a pin mounted on the wheel and projectible into a position in the path of said element for coupling the wheel in driving relation to the spool and retractible into uncoupling position onto a keeper, means biasing the pin into said projected position, and a trip fixed in the cabinet and projecting into the path of the pin for unseating the pin from the keeper for movement into projected position on rotation of the wheel.

3. A package dispensing apparatus as claimed in claim 2 in which the drive means is operable for pulling on the lower end of the belt to draw the runs of the belt from the lowermost shelf successively to the topmost.

4. A package dispensing apparatus comprising a cabinet, a plurality of superposed elongated horizontal shelves fixed in the cabinet and having their front ends spaced behind the front wall of the cabinet to provide an intervening vertical drop space surmounting a delivery zone at the bottom, a flexible belt continuously convoluted back and forth over the shelves so as to dispose a lower run on each shelf adapted to underlie a series of packages aligned along the length of the shelf and a next adjacent upper run overlying the series and connected with the lower run by a looped portion of the belt, drive means operable for pulling on one end of the belt to draw said lower runs forwardly successively along the shelves, thereby successively toppling the packages from the forward ends of the shelves into the drop space for falling into the delivery zone, means for stopping operation of the drive means responsive to each package entering the drop space, and means connected to each looped portion of the belt for imposing thereon yieldable resistance to forward movement of the looped portion so that the length of belt in the adjacent upper run remains substantially equal to the length of belt in the adjacent lower run as the looped portion moves forward.

5. A package dispensing apparatus as claimed in claim 4 in which each said yieldable resistance means is a weight frictionally engaged with the adjacent shelf and slidable along it.

6. A package dispensing apparatus as claimed in claim 4 in which each said yieldable resistance means is a friction shoe resting on the adjacent shelf and provided with a forwardly projecting bail engaged with the adjacent looped portion of the belt whereby tension on the lower run of the belt will pull the looped portion through the bail and drag the shoe along the shelf.

7. The combination claimed in claim 6 in which the bail is connected to the shoe at one end only and is unconnected therewith at its opposite end to facilitate thread-

ing of the looped portion of the belt into the bail at said opposite end.

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