This invention relates to vending machines for dispensing bottles, cans or similar packages.

It is an object of the invention to provide an improved vending machine of the staggered stock gravity feed column type. One improvement of this invention is the provision of package-handling means that move the lower-most package into an "escrow" position separated from the rest of the stock and in a position where it can be viewed by a prospective customer.

Another object is to provide a simple vending machine where the packages are close to the discharge chute and the chute is of substantial cross-section, but the machine is "pilfer proof" as a result of cam operated mechanism that prevents unauthorized movement of the package holding parts.

Other objects, features and advantages of the invention will appear or be pointed out as the specification proceeds.

In the drawing, forming a part hereof, in which like reference characters indicate corresponding parts in all the views:

FIGURE 1 is a diagrammatic sectional view of a vending machine made in accordance with this invention; FIGURE 2 is a sectional view taken on the line 2—2 of FIG. 1; and FIGS. 3—6 are diagrammatic views showing the way in which the cams shown in FIG. 1 move into different positions to operate the feed mechanism in a predetermined sequence.

The vending machine includes a feed column 10 having end walls 12 and 14, and side walls 16 and 18. The end walls 12 and 14 are preferably fixed, but each of the side walls 16 and 18 hangs from the upper ends of the end walls 12 and 14 with brackets 20 connected to side walls and slideable along the upper edges of the end walls.

The feed column 10 contains packages which are shown in the drawing as bottles 22. The distance between the side walls 16 and 18 is greater than the width of any one of the bottles 22 but less than the width of the two bottles. Thus the packages or bottles 22 occupy a staggered relation to one another in the feed column, as is clearly shown in FIG. 2 where every other bottle 22 rests against an opposite side wall of the feed column 10. When the packages are rectangular, they are loaded in the chute with their diagonal substantially vertical.

In order to adjust the width of the feed column; that is, the distance between the walls 16 and 18 to obtain the desired staggered relation of the bottles 22, or to accommodate bottles of different diameter, there are screws 26 located on opposite sides of the feed column. These screws 26 thread through fixed blocks 28 on both sides of the feed chute and contact with the wall 16 and 18 for holding the walls 16 and 18 at any desired distance from one another. The screws 26 have heads 30 shaped to receive a wrench or other tool by which the screws are adjusted to change the width of the feed column.

At the lower end of the feed column 10, there is a feed mechanism which includes two cradles or holders 34 and 36. The holder 34 is located in substantial alignment with the centers of the bottles 22 which rest against the sidewall 16, and the holder 36 is in a similar position under the bottles 22 which rests against the sidewall 18.

The upper surface of each of the holders 34 and 36 is made concave or otherwise shaped to receive the circular outside surface of one of the bottles and to hold the bottle centered on the cradle or holder 34 or 36.

The holders 34 and 36 have their upper ends connected with bearings 40 which are located on supporting shaft 42 which serves as a fulcrum about which each of the holders 34 and 36 can move with angular movement.

The holder 34 has a depending element 44 which extends downwardly to a cam follower 46 which is preferably a roller and which is so shown in the drawing. The roller 46 rotates about an axis 48 connected to the depending element 44. The cam follower also includes a bracket 49 secured to the depending element 44 and forming a unitary part thereof. Most of the time the roller 46 is in contact with a cam 50 located immediately below the holder 34; but part of the time the arm 49 of the cam follower is in contact with the cam 50 as will be explained in connection with FIGS. 5—6. There is another cam 54 secured to this same shaft 52 so that the shaft 52 serves as a common operating element for both of the cams.

Each of the cams 50 and 54 has a hub 55 which can be adjusted axially for packages of different diameter; and the hubs 55 are secured to the shaft 52 by set screws 57.

One end of the shaft 52 is supported in a bearing 56, and the other end by a bearing in a housing of a clutch mechanism 58 which is connected with the shaft 50 and which turns the shaft 52 through a half-turn each time the clutch 58 is operated. The clutch then disengages. Half-turn clutches of this type are well understood in the mechanism art and no further description of the clutch is necessary for a complete understanding of this invention. The clutch 58 is actuated by a motor 60, in the preferred embodiment of the invention, but may be operated by other means if desired. Operation of the motor 60 is responsive to a coin controlled switch mechanism 62 connected with a power line 64 and connected with the motor 60 by electrical conductors 66. This mechanism is merely representative of means for causing the cams 50 and 54 to turn one-half revolution in response to the placing of a coin in the vending machine.

The cam 54 is located under the holder 36 which has a depending element 74 with a roller cam follower 76 at its lower end and an arm cam follower 79 extending from its lower end, the construction being similar to that of the parts 44, 46 and 49 already described in connection with the cradle or holder 34.

When the cam 50 is in the position shown in FIG. 1, the bottle 22 on the holder 34 is removed from the other bottles in the feed column 10 and is in a mid-position between its storage position in the feed column and the position in which it is discharged from a delivery chute 82. This mid-position is referred to herein as the "escrow" position. One feature of the invention is the provision of a window 84 in a front wall 86 of the machine housing and through which a respective purchaser can view a bottle or other package which is located in the escrow position.

With the bottle 22 in the escrow position, it is prevented from moving forward and into the chute 82 by the lower part of the wall of 86. Although a person can reach up the chute 82 under the wall 86 and touch the holder 34 and the bottle on the holder, it is impossible to tilt the holder 34 downward to discharge the bottle because the depending element 44 and the cam follower 46 are supported from the cam 50 and prevent any downward movement of the holder 34 until the cam 50 has rotated far enough to permit the cam follower to move down nearer to the shaft 52.

The cams 50 and 54 are constructed so that approximately half of the circumference of each cam is the active portion of the cam which causes movement of the holder and the other half is a holding portion of the cam.
for preventing operation of one of the holders of the feed mechanism while the other holder is in operation. The cams 50 and 54 are positioned on the shaft 52 at opposite phase angles so that at any given time the opposite portion of the cam 50 is in contact with its cam follower 53 as compared with the portion of the cam 54 which is in contact with its cam follower 57.

As a result of this correlation of the cams 50 and 52, the cam 50 swings the holder 34 into position to discharge a bottle 22 into the delivery chute 82 when the cam 50 moves from the position shown in FIG. 1 to that shown in FIG. 3. In FIG. 3 the holder 34 has moved into contact with the bottom of the delivery chute 82 and the cam follower 46-49 is over a depressed sector 88 of the cam 50 and is not in contact with the cam 50. The other cam 54 has its circumferential "inactive" section in contact with the follower roller 76 and holds the bottle 22, which is on the holder 36, in its initial horizontal position in which it supports all of the other bottles in the chute 10.

As the cams move from the position shown in FIG. 3 to that shown in FIG. 4, a rise 90 on the cam 50 contacts with the arm 49 of the cam follower, and continued rotation of the cam 50 lifts the holder 34 back into horizontal position as shown in FIG. 5.

As the holder 34 is thus restored to its horizontal position, the cam 54 lowers the holder 36 part way toward the delivery chute and stops with the bottle on the holder 36 in the escrow position. This lowering of the holder 36 permits the bottles in the feed column 10 to move downward until the next bottle rests on the horizontally extending holder 34. FIG. 5 shows the holder 36 and its bottle 22 in the escrow position. The machine stops with the parts in this position and remains so until actuated again by the insertion of another coin into the coin controlled mechanism.

When the machine is again actuated by insertion of another coin, the shaft 52 again turns the cams 50 and 54 and the initial rotation causes the cam 54 to lower the holder 36 into contact with the delivery chute 82 so that the bottle 22 which was in escrow position is discharged down the delivery chute 82 and the cam follower 76 and arm 79 are over a depression in the cam 54, corresponding to the situation shown in FIG. 3 for the cam 50.

The machine does not stop in the position shown in FIG. 6 but continues the rotation of the cam until the cam 54 has lifted the holder 36 back into its horizontal position in the manner already described for the holder 34 in connection with FIGS. 4 and 5. With the holder 36 in horizontal position, the continued movement of the cams causes the cam follower 46-49 to come on to a portion 96 of the cam 50 and this portion 96 is of decreasing radius so that the holder 34 moves its bottle 22 downward into escrow position and the machine stops again in the position shown in FIG. 1.

The preferred embodiment of the invention has been illustrated and described, but changes and modifications can be made and some features can be used in different combinations without departing from the invention as defined in the claims.

What is claimed is:

1. In a vending machine having (a) a feed column container wider than packages that are to be dispensed by the machine whereby the packages are in staggered relation in the column container, (b) feed mechanism at the bottom of the column container in position to receive the lowest package from the column, (c) a delivery chute, (d) the feed mechanism including two package holders, one under each of the staggered portions of the column, each movable between a raised position for supporting the column of packages, and a lowered position that locates the lowest package on the holder at the delivery chute, (e) a different actuator for each of the package holders in the improvement which comprises, (f) each of the actuators including a displacement device that gently moves the column-supporting holder downward until the column rests on the other holder and that continues the downward movement of the lowest package to an escrow position, and then moves the lowest package at a rapid rate to lowered position at the delivery chute, (g) an abutment forward of the lower end of the feed column container for retaining a package in escrow position against movement into the delivery chute, (h) a normal position of the machine being with one holder supporting the lowest package in escrow position and the other holder supporting the rest of the packages, (i) and cycling means for moving, on each operation of said cycling means, one holder from escrow position to lowered position and back to raised position while the other holder moves from raised to escrow position.

2. The vending machine described in claim 1 characterized by the column having walls on sides of the container that are spaced from one another by a width greater than the width of a package, at least one of the walls being movable toward and from the other to change width of the column for packages of different size.

3. The vending machine described in claim 2 characterized by both of the walls being movable by equal amounts to maintain the column symmetrical with respect to the feed mechanism at the bottom of the column.

4. The vending machine described in claim 1 characterized by a housing in which the packages are located when in the feed column and when in escrow position, and a window in the housing in position to expose a package to view when the package is in escrow position.

5. The vending machine described in claim 1 characterized by the holder being movable to an intermediate escrow position at the region where it leaves all of the column except the lowest package supported by the other holder, means for stopping the actuator with the holder in the escrow position, the package being immediately adjacent to the delivery chute when in the escrow position, and the parts of the machine including positive stops for preventing a person from dislodging a package into the delivery chute by reaching into the machine through the chute and manually shifting the feed mechanism.

6. The vending machine described in claim 1 characterized by each of the displacement devices including a cam, a common operating mechanism comprising a shaft by which both of the cams are driven, the cams being similar and each having a 180° arc for actuating a package holder, and the cams being opposite phase angles on the shaft so that each one half turn of the shaft the active part of a different one of the cams is effective to operate one of the package holders, and coin controlled mechanism effective to cause one half revolution of the shaft.

7. The vending machine described in claim 6 characterized by each of the cams being set with its active arc only part way past its cam follower on each alternate movement of the cam in response to the control of the coin controlled mechanism so that one or the other of the package holders brings a package into the intermediate escrow position for each one half revolution of the shaft.

8. The vending machine described in claim 1 characterized by each of the package holders including a long cradle shaped to receive and hold a package of generally cylindrical shape, a bracket at the end of each cradle remote from the delivery chute, a pivot about which each of the brackets is independently movable to change the angular position of the cradle, a depending element extending down from the cradle, a cam follower at the lower
end of the depending element, the actuator including a
different cam under each of the cam followers, and a
common shaft to which both of the cams are secured,
the cams being in different phase angle relation to one
another whereby they produce opposite movements of
their followers.

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