June 13, 1961 E. C. JOHNSON ET AL 2,988,246

DOUBLE DEPTH STAGGERED STACK CYLINDRICAL PACKAGE VENDER

Filed May 14, 1956 2 Sheets-Sheet 1

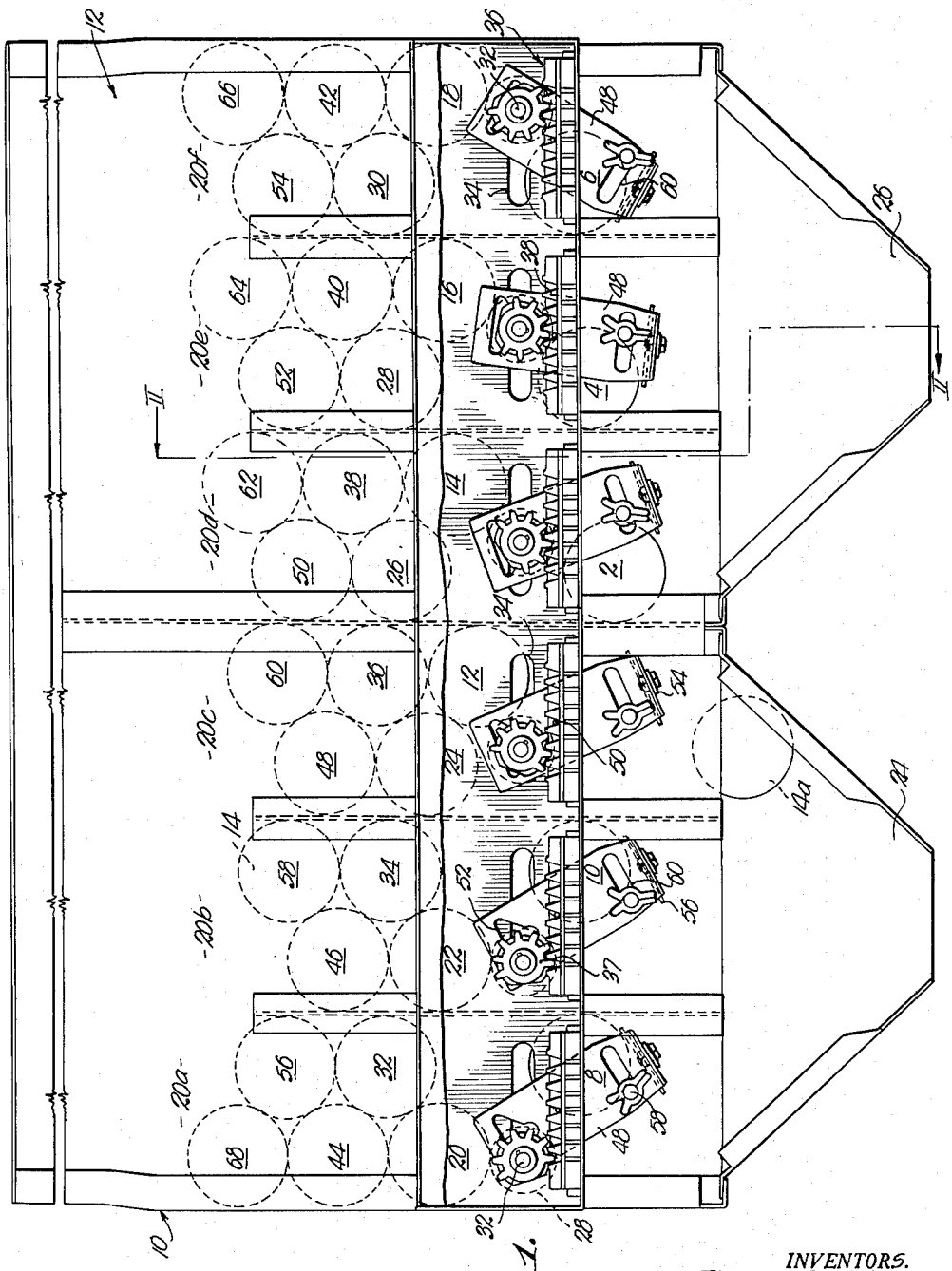

Fig. 1.

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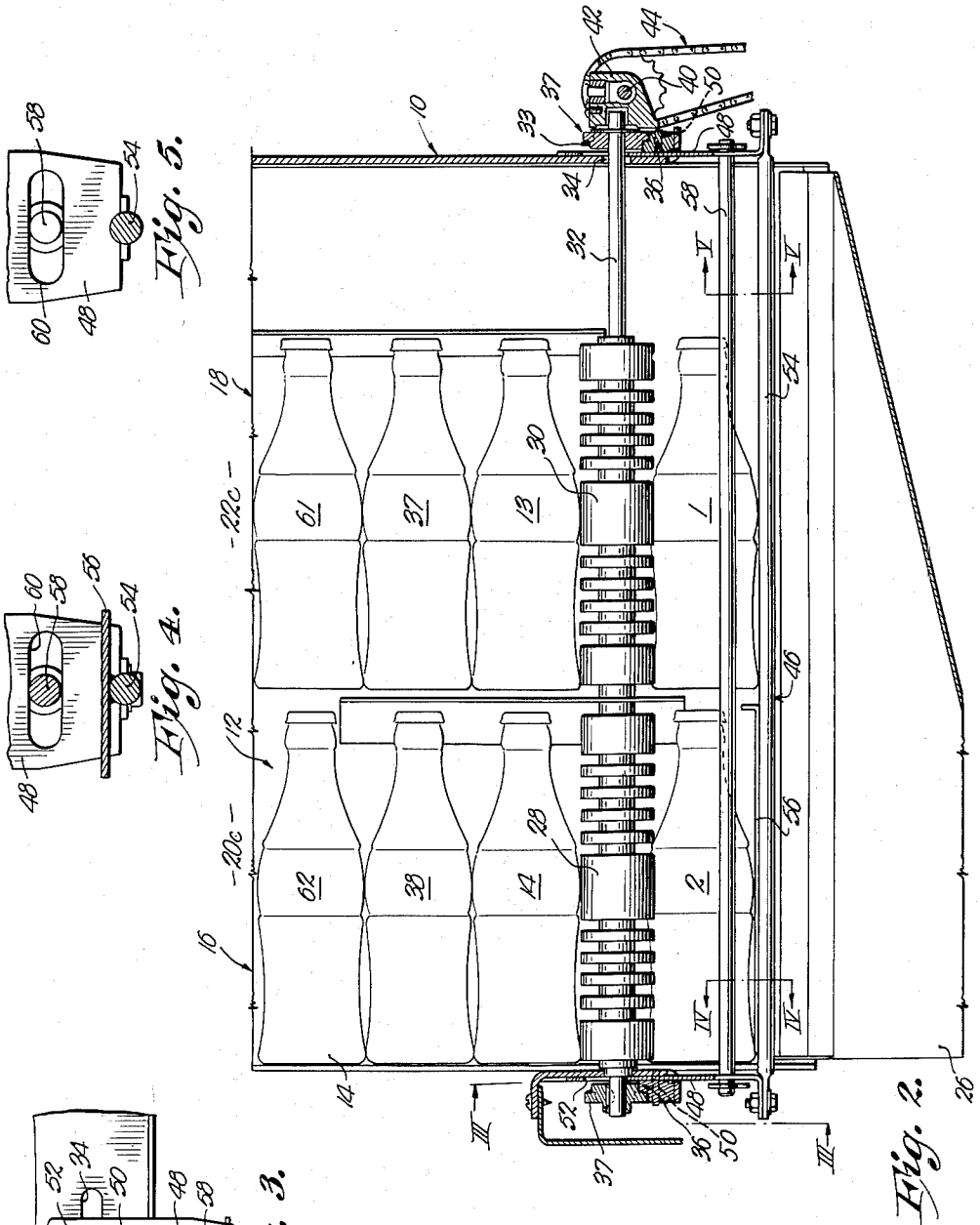

Fig. 2.

Fig. 5.

Fig. 4.

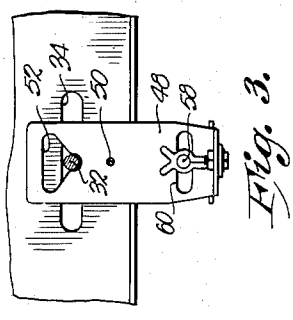

Fig. 3.

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DOUBLE DEPTH STAGGERED STACK CYLINDRICAL PACKAGE VENDER

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4 Claims. (Cl. 221—67)

This invention relates to improvements in vending machines and more particularly to automatic structure for discharging articles singly to a customer upon insertion of a coin or other suitable medium, the primary object being to appreciably increase the capacity of the machine without substantial increase in the dimensions of the storage chamber, all through novel vending mechanism specially adapted therefor.

It is the most important object of the present invention to provide a vending mechanism wherein the storage chamber thereof is adapted to receive a plurality of stacks of articles arranged in pairs and overlapping relationship with the articles disposed end to end and side by side in a compact manner, yet vendable through a plurality of separate vending units operable identically and in a novel synchronized manner.

Another important object of the instant invention is to provide an automatic mechandise vending machine subdivided into a plurality of side by side juxtaposed units and each unit including front and rear stacks from which articles are released simultaneously and subsequently vended one at a time.

A further object of the present invention is to provide a vending mechanism having structure normally holding four stacks of articles within the storage chamber and operable to release two articles during each operation of the structure, together with apparatus for receiving the articles from the structure and vending the same singly.

A still further object of the instant invention is to provide in the aforesaid apparatus means to prevent theft and at the same time operable to vend first one of the articles which it supports and then the other such article, all by virtue of combining a plate and a rod as a part of the apparatus.

It is an important object of the present invention to cam drive the said apparatus from the primary releasing structure and to provide proper dwells within the transmission of power from the structure to the apparatus so that during each cycle of operation each unit delivers four articles singly to the customer.

Other objects include the way in which a floating bar is provided in the anti-theft apparatus for holding the articles in place prior to the time of vending and permitting the vending of articles from both sides of the said plate and rod; the manner of vending articles from both sides of the rod by imparting swinging movement to the latter; the way in which the plate is swung and therefore tipped to vend articles from opposite edges of the plate; the manner of delaying vending of one of the articles by virtue of the widths of the plates as compared with the smaller dimensions of the rod; and many more minor objects including important details of construction to be made clear as the following specification progresses.

In the drawings:

FIGURE 1 is a fragmentary, front-elevational view of a double depth, staggered stack, cylindrical package vender made according to the present invention showing the same entirely removed from within the refrigerated cabinet normally housing the same;

FIG. 2 is a fragmentary, vertical, cross-sectional view taken substantially on line II—II of FIGURE 1, but

with the vending apparatus shown in FIG. 2 disposed vertically;

FIG. 3 is a fragmentary, detailed, cross-sectional view taken on line III—III of FIG. 2; and

FIG. 4 is an enlarged, fragmentary, detailed cross-sectional view taken on line IV—IV of FIG. 2;

FIG. 5 is an enlarged, fragmentary, detailed cross-sectional view taken on line V—V of FIG. 2.

There is shown in FIGURES 1 and 2 of the drawings framework or auxiliary cabinet means broadly designated by the numeral 10 formed to present a hollow storage chamber 12 having spaced, upright article sustaining means therewithin and presenting compartments for articles of merchandise 14 such as beverage bottles (see FIG. 2) to be released from the chamber 12 and subsequently vended. Bottles 14 are arranged within the chamber 12 in a special manner to conserve space and for purposes of explanation the chamber 12 may be said to consist of a front portion 16 and a rear portion 18, both of which receive the articles as seen in FIG. 2. In FIGURE 1 the bottoms of the bottles 14 in chamber portion 16 only can be seen. It is seen further in FIGURE 1 that the bottles 14 are arranged in the front chamber portion 16 to present a plurality of stacks arranged in pairs with the bottles 14 in staggered overlapping relationship. Accordingly, the six pairs of stacks shown in FIGure 1 are designated 20*a*, 20*b*, 20*c*, 20*d*, 20*e* and 20*f*.

Manifestly, the bottles 14 are arranged in the same manner in the chamber portion 18 and since the only bottles of the portion 18 that can be seen in FIG. 2 are disposed rearwardly of the two stacks 20*c*, the same are designated in FIG. 2 by the numeral 22*c*.

The primary article releasing structures for releasing the bottles from the stacks and for vending the bottles to the customer, and particularly to chutes 24 and 26, are identical, only one will be described.

The primary releasing structure consists of a front roller 28 and a rear roller 30, both of which are preferably rotatable freely on a common horizontal shaft 32, the rollers 28 all being within the front chamber portion 16 and the rollers 30 all being manifestly disposed in the rear chamber 18. Shaft 32 is horizontally reciprocable transversely of its longitudinal axis and the cabinet assembly 10 may be provided with suitable clearance slots 34 therefor.

Rollers 28 and 30 are disposed beneath the stacks engaging the lowermost bottle thereof to hold all four stacks against descent. However, when rollers 28—30 are shifted to one end of their paths of travel, two bottles 14 descend, one from each chamber portion 16 and 18, respectively. Conversely, when the rollers arrive at the opposite end of their paths of travel, a pair of bottles 14 are released from the opposite side of the rollers 28 and 30.

Integrally formed, combined guiding wheels and sprockets or gears are provided at each end respectively of each of the shafts 32. The wheel portions 33 ride on horizontal tracks 36 and sprocket portions 37 mesh with underlying horizontal racks 38, the racks 38 and the tracks 36 being integrally construed.

A specially formed, horizontal, compound screw 40 at the back of the machine is provided to reciprocate the shafts 32 in timed and synchronized relationship, there being a follower 42 threaded on the screw 40 for each shaft 32 respectively and pivotally connected with the latter. Chain, sprocket means or the like broadly designated by the numeral 44 and operably connected with a suitable prime mover (not shown) may be provided in operable connection with the screw 40 to rotate the latter continuously in one direction. Screw 40, followers 42 and means 44 may be of that type of construction more particularly described in U.S. Letters Patent No. 2,585,012

and also referred to in U.S. Letters Patent No. 2,762,524 granted in each instance to Elmer C. Johnson, a coinventor of the present invention.

The secondary article releasing means or apparatus for receiving the two bottles released by rollers 28—30 is essentially U-shaped, including, therefore, a horizontal bight broadly designated by the numeral 46 and a pair of upstanding identical links or legs 48 rigid to the bight 46. The links 48 are in the nature of elongated flat plates having pivot pins 50 pivotally connecting the same to the castings forming the tracks 36 and racks 38, thereby mounting the apparatus for swinging movement on a horizontal axis parallel with and below the shaft 32. An opening 52 formed in each of the links 48 at the uppermost ends therefor for clearing the shaft 32 is triangular shaped presenting, therefore, three corners into which the shaft 32 moves during the cycle of operation of the machine. As will hereinafter appear, the openings 52 present cam means for swinging the links 48 and therefore the bights 46 as the shafts 32 are reciprocated.

Bight 46 includes a first article supporting means in the nature of rod 54 underlying the rollers 28 and 30 and a second article supporting means comprising relatively wider plate 56 underlying the roller 28 only. For convenience of mounting, the rod 54 interconnects the links 48 and the plate 56 is mounted upon the rod 54 at the forwardmost end of the latter.

The swingable bottle-receiving and bottle-vending apparatus includes additionally an elongated bar 58 spanning the distance between the links 48 and freely shiftable within elongated slots 60 formed in the links 48 transversely thereof immediately above the bight 46.

The component parts above described are shown by FIG. 1 in substantially the position which the same assume after delivery of a bottle 14*a* to chute 24 from the front chamber portion 16 and particularly from stacks 20*c*, the bottle 14*a* having just rolled off the roller left hand edge of plate 56 thereabove.

The bottles 14 are consecutively numbered from 1 to 68, inclusive, and the next bottle to be delivered is number 1 shown in FIG. 2 only directly behind bottle number 2 and forming a part of stacks 22*c* and 20*c*, respectively.

It is noted that bottles 1 to 6, inclusive, of which bottles 3 and 5 are not shown in the drawings but will be understood as disposed behind bottle 1 in FIG. 2, will be delivered (viewing FIGURE 1) to the left of corresponding bights 46 whereupon vending commences again with the stacks (not shown) of chamber portion 18 behind the stacks 20*a*. During the last half of the cycle moving from left to right viewing FIGURE 1 the articles will all be delivered to the right of the bights 46.

As aforementioned, each time rollers 28 and 30 are shifted to one end of their paths of travel, two bottles are released from the stacks. At this time, the corresponding bight 46 is moved into disposition to receive the released bottles and prevent further downward movement of the same. As illustrated in FIG. 1, it can be seen with reference to the stack 20*a* and the associated bottle release mechanism, that when the rollers 28 and 30 are at the end of their paths of travel to the left, legs 48 carrying bight 46 are swung to the right within the path of travel of the two bottles which have been released from stack 20*a* by rollers 28 and 30. During swinging movement of the legs 48 to the right, the bar 58 carried thereby shifts downwardly within respective slots 60 to the lowermost end of its path of travel as shown, whereby the bar 58 cooperates with the proximal side wall of the compartment for stack 20*a* as well as with the plate 56 and bar 54 to prevent the bottles from gravitating into the chute 24, notwithstanding the fact that the bottle supports presented by bar 54 and plate 56 are disposed to the right of the lowermost bottle 8. Bar 58 further acts as an antijackpot device to prevent manual removal of bottle 8 prior to actuation of the coin mechanism forming a part of the vending apparatus. The rods 54 receive

the rearmost bottles and the plates 56 receive the forwardmost bottles. In each case, both bottles are retained by the bars 58. After the bights 46 have swung a predetermined distance, the rearmost bottle will be vended but by virtue of the increased width of the plate 56 as compared with the rod 54, additional movement on the part of the bight 46 is necessary before the front bottle is vended. Consequently, while the rollers 28—30 release two bottles at a time the underlying apparatus vends a single bottle each time a customer inserts the proper coin medium.

It can now be seen that during each cycle of operation of the machine, 24 bottles are vended, 12 on the left side of the bights 46 and 12 on the right side thereof. It can be further seen that the bars 58 shift by gravity from one end of the slot 60 to the opposite ends thereof, thereby always being in position to retain the two bottles released by the rollers 28—30 thereabove until such time as the bights 46 swing to a position first for vending a rear bottle and subsequently for vending a front bottle.

The primary object of permitting the storage of a relatively large amount of merchandise within a small space is therefore accomplished. At the same time, the secondary vending apparatus prevents pilfering in that it is impossible to reach into the machine through the chutes 24—26 and remove a bottle from any of the stacks or from any of the vending apparatuses.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a vending machine, the combination of: first and second, upright, parallel, side-by-side article sustaining means each adapted for laterally confining therewithin and guiding during descent therethrough first and second stacks respectively of generally cylindrical articles arranged in a pair of upright columns in each article sustaining means with the individual articles in said stacks being in relative staggered, alternately transversely overlapping relationship with the longitudinal axes of the articles of said first stack in the first article sustaining means being generally parallel to and in alignment with the axes of corresponding articles of the second stack in said second article sustaining means; primary, article releasing structure means common to said stacks below and extending under the open bottoms of both of said article sustaining means, said releasing structure means normally engaging the lowermost article of each of said stacks from therebelow to prevent downward movement of said articles; means shiftably mounting said releasing structure means and adapting the same for movement progressively between a pair of alternate, extreme positions, said releasing structure means being in underlying supporting relationship to the lowermost article in one column of each of said stacks and in clearing relationship to the lowermost article in the other column of each of said stacks when in one of said extreme positions, in underlying supporting relationship to the lowermost article in said other column of each of the stacks and in clearing relationship to the lowermost article in said one column of each of said stacks when in the other of said positions and in underlying supporting relationship to the lowermost article of each column of each of the stacks when intermediate said extreme positions, whereby the lowermost articles are released simultaneously from said stacks whenever said releasing structure means is shifted to either of said extreme positions thereof; secondary, article releasing apparatus means extending under the open bottoms of both of said article sustaining means beneath said releasing structure means, said releasing apparatus means including first article supporting means individual to one of said stacks and disposed beneath said one of the stacks for receiving and releasably retaining thereon articles released from said one stack by said releasing structure means, and second article supporting means individual to the other of said stacks and disposed beneath said other of the stacks for receiving and re-

leasably retaining thereon articles released from said other stack by said releasing structure means; means shiftably mounting said releasing apparatus means and adapting the same for movement progressively from an extreme, article retaining position in which said articles theretofore received upon said first article supporting means and the second article supporting means are retained upon the first and second article supporting means, through an intermediate, article releasing position in which said article theretofore received upon one of said first article supporting means and said second article supporting means is retained thereon but said article theretofore received upon the other of said first article supporting means and said second article supporting means is released therefrom, through another intermediate, article releasing position in which said article theretofore received upon said one of the said first article supporting means and second article supporting means is released therefrom to an opposite, extreme article retaining position in which articles released by said releasing structure means from said stacks may be respectively received and retained upon said first article supporting means and said second article supporting means, said releasing apparatus means including a U-shaped, bail-like assembly swingably mounted below said stacks of articles and provided with an elongated horizontal bight which includes said first and second article supporting means, said first and second article supporting means being of different lateral dimensions in the direction of travel thereof during swinging of said assembly, said assembly further including an elongated bar and means mounting the bar on the assembly above the bight in substantial longitudinal parallelism with the latter for free shifting movement thereof laterally with respect to the bight, said bar shifting into a position at a respective end of the path of travel thereof disposed to cooperate with said first and second article supporting means in supporting the articles released from said stacks upon shifting of the releasing structure means through a portion of its path of travel adjacent one of said extreme positions thereof, said bar clearing the bottles supported thereby when the first and second article supporting means are shifted into dispositions effecting successive release of the articles therefrom; means operably interconnecting said releasing apparatus means with said releasing structure means for movement of said releasing apparatus means progressively between said extreme positions thereof as said releasing structure means is shifted progressively from either of said pair of extreme positions thereof to the other of the same; and means operably coupled with said releasing structure means and said releasing apparatus means for shifting the same between said positions thereof.

2. In a vending machine as set forth in claim 1 wherein: said releasing structure means includes roller structure beneath each of said stacks and means mounting each of the roller structures for simultaneous rotation and reciprocation in a horizontal direction transverse to the axis of rotation thereof.

3. In a vending machine as set forth in claim 2 wherein: said assembly further includes legs at least one of which is provided with cam surfaces thereon; said legs are pivotally supported; and said means operably interconnecting said releasing apparatus means with said releasing structure means includes a member operably coupled with said roller structure and movable with the roller structure into engagement with said cam surfaces for swinging said assembly as said roller structure is reciprocated.

4. In a vending machine as set forth in claim 3 wherein: said legs are provided with elongated slots therein above said bight; and said bar is shiftably received adjacent its extremities in said slots.

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