March 17, 1959 S. L. CHILDERS ET AL 2,877,924

VENDING MACHINE

Filed Nov. 1, 1954 4 Sheets-Sheet 1

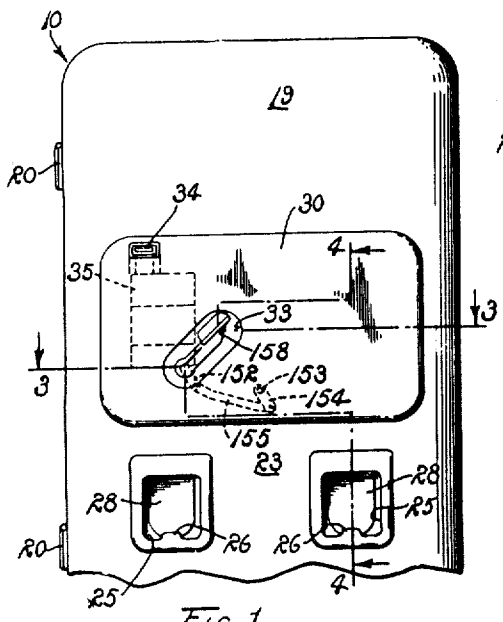


FIG. 1.

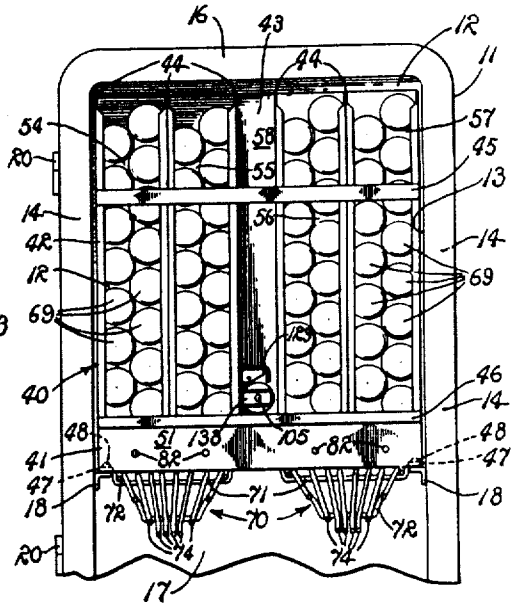


FIG. 2.

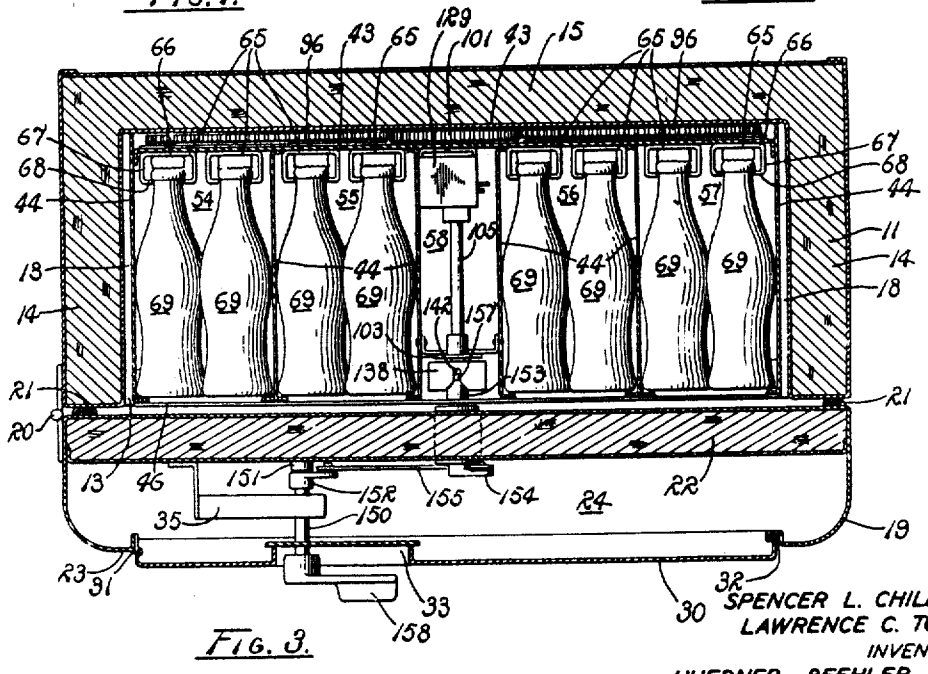


FIG. 3.

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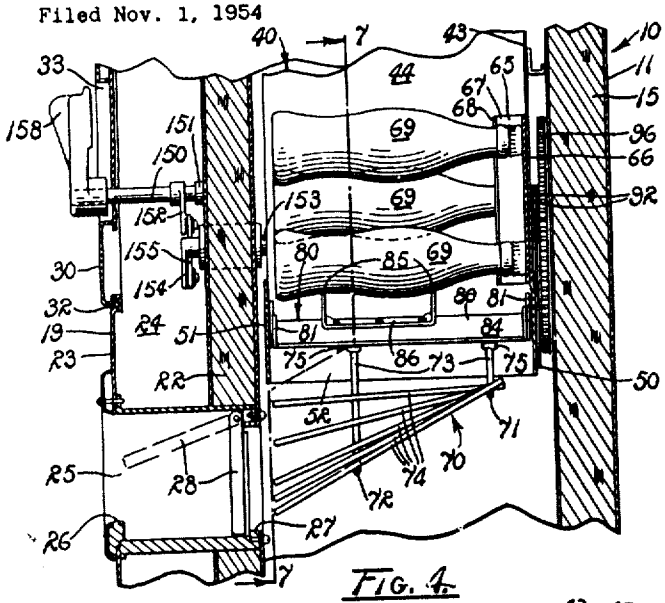


FIG. 4.

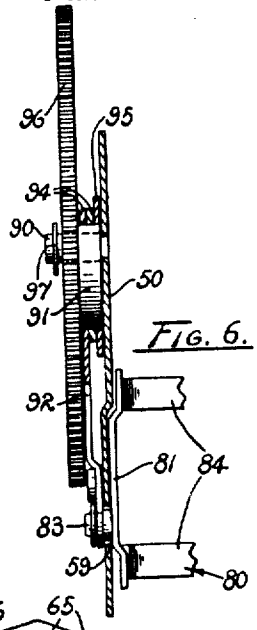


FIG. 6.

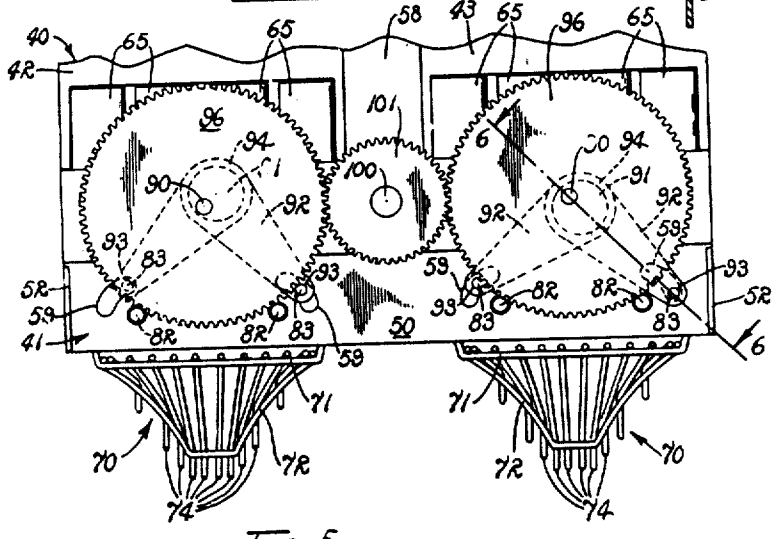


FIG 5.


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VENDING MACHINE

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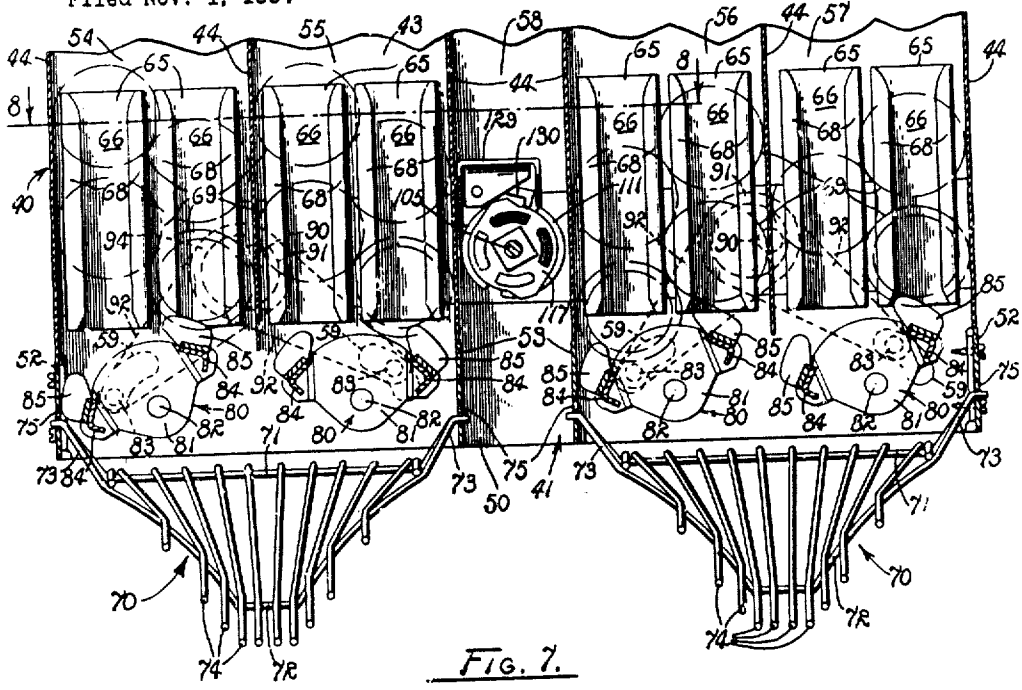


FIG. 7.

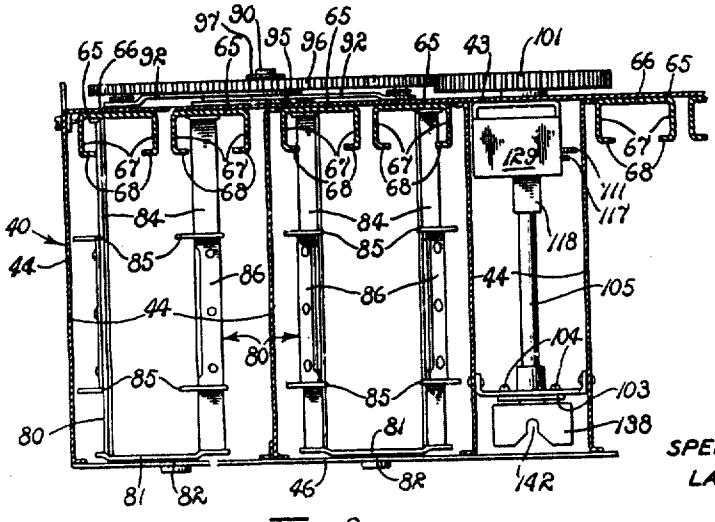


FIG. 8.


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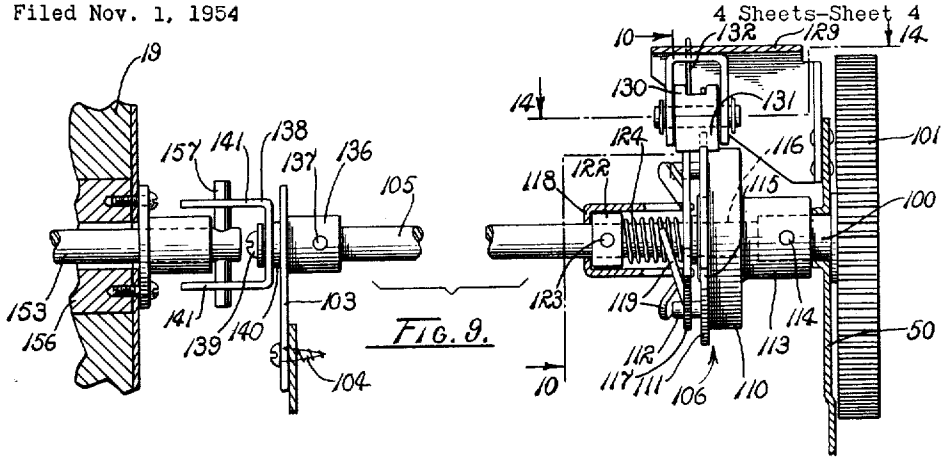



FIG. 9.

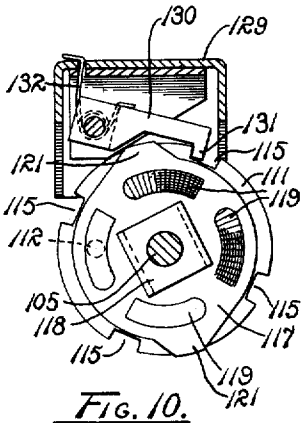



FIG. 10.

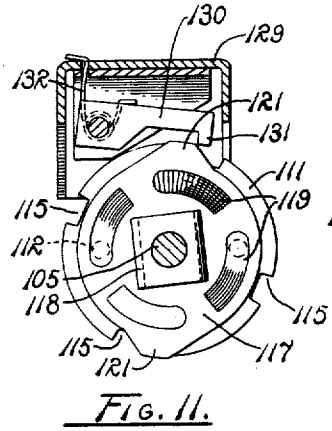



FIG. 11.

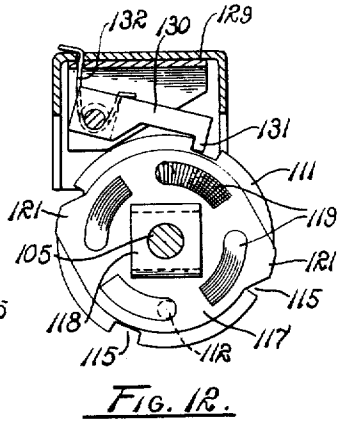



FIG. 12.

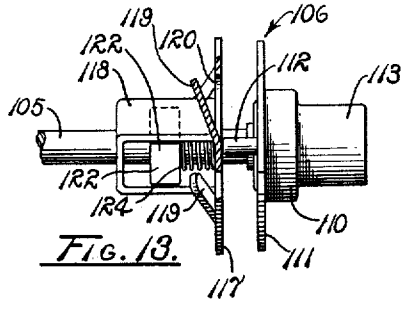



FIG. 13.

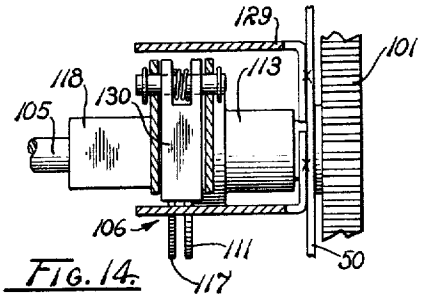



FIG. 14.

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United States Patent Office 2,877,924 Patented Mar. 17, 1959



2,877,924

# VENDING MACHINE

Spencer L. Childers and Lawrence C. Tober, Fresno, Calif., assignors, by direct and mesne assignments, to The Vendo Company, Kansas City, Mo., a corporation of Missouri

Application November 1, 1954, Serial No. 465,779

15 Claims. (Cl. 221—67)

The present invention relates to vending machines and more particularly to such machines in which articles to be vended are releasably retained prior to vending in magazines therefor in vertically staggered overlapping stacks in the manner typified by the vending machine of the patent to Hoffman No. 1,205,094 and to a somewhat lesser extent by the dispensing machine of the patent to Hoopes et al No. 1,711,021. While the storage of vendible articles in such interlaced or interlocked stacks has been well known and the advantages incident thereto partially understood, the dependable retention and successive vending or other dispensing of such articles in an improved manner is a prime consideration of the instant invention.

While the present invention is in no sense limited to application to bottle vending machines, it was developed as a solution to problems encountered in the vending of refrigerated bottle beverages and is conveniently illustrated in connection with such embodiment.

Inasmuch as bottle vending machine location is dependent largely upon the density of potential customer traffic in proposed sites of installation and since such traffic is generally found of highest density in restricted areas or passages, it will readily be appreciated that such machines must be as compact as practical for the capacity required. For example, vending machines are frequently located in hallways or corridors of buildings housing large numbers of people, theater foyers, railway stations, airports, service stations, subways, and other points of public concentration or restrictions through which heavy pedestrian traffic passes. In such locations, not only is it desirable for the vending machines to be compact but of particular importance is that they be shallow with respect to their front to back dimensions so that when located against walls they impede passage as little as possible.

Although compact and shallow vending machines are particularly desirable, such attributes are attainable only to an extent commensurate with required capacity and the attainment of thoroughly dependable operation. Additionally, such vending machines should be capable of receiving, refrigerating, and vending bottled beverages with a minimum of damage to the bottles and with the least possible jarring or jolting which not only subjects the bottles to damage but the frequently carbonated contents thereof to foaming action. Further, such machines should be quickly and easily loaded so that the service requirements are minimized. Finally, and perhaps of greatest significance, the machines must be of such simplicity and durability that they can be economically produced and operated over protracted periods with a minimum of operational expenses.

An object of the present invention is, therefore, to provide an improved compact vending machine.

Another object is to provide such a machine in which articles to be vended are releasably retained in magazines therefor in vertically staggered, overlapping, interlocked stacks.

Another object is to provide an improved mechanism



for controlled retention and dependable dispensing of articles arranged in the manner described in a suitable magazine therefor.

Another object is to provide a vending machine of such decreased front to back depth as to make possible its location in restricted areas and passages heretofore regarded as unable to accommodate vending machines.

Another object is to provide a compact vending machine of the character described which is thoroughly dependable in its operation.

Another object is to minimize bottle damage and jarring of bottle contents in a bottle vending machine.

Another object is to provide a bottle vending machine which is quickly and conveniently loaded.

An additional object is to provide a vending machine having associated magazine and dispensing apparatus conveniently and easily removed from a cabinet therefor and/or mounted therein.

Other objects are to provide a vending machine of the character described which is economical to produce and to operate.

Further objects and advantages will become apparent in the subsequent description in the specification.

In the drawings:

Fig. 1 is a fragmentary front elevation of a vending machine embodying the principles of the present invention.

Fig. 2 is a view similar to Fig. 1 but showing a forwardly disposed service door of the vending machine removed for illustrative convenience.

Fig. 3 is a somewhat enlarged horizontal section taken on line 3—3 of Fig. 1.

Fig. 4 is a somewhat enlarged fragmentary vertical section taken on line 4—4 of Fig. 1.

Fig. 5 is a somewhat enlarged fragmentary internal rear elevation of a support frame and associated structure adapted for mounting in the vending machine of the present invention.

Fig. 6 is a somewhat enlarged fragmentary section taken on line 6—6 of Fig. 5.

Fig. 7 is a somewhat enlarged vertical section taken on line 7—7 of Fig. 4.

Fig. 8 is a horizontal section taken on line 8—8 of Fig. 7.

Fig. 9 is an internal elevation of portions of a controlled mechanism provided in the vending machine showing mounting structure therefor in section for illustrative convenience.

Fig. 10 is a section taken on line 10—10 of Fig. 9.

Fig. 11 is a view similar to Fig. 10 showing the device illustrated therein in a successive step of operation.

Fig. 12 is a view similar to Figs. 10 and 11 but showing the device in a still further position of operation.

Fig. 13 is a side view of the portion of the controlled vending mechanism shown in Figs. 10 to 12 similar to a portion of Fig. 9 but showing the structure in disengaged position in contrast to the engaged position of Fig. 9.

Fig. 14 is a fragmentary horizontal section taken on line 14—14 of Fig. 9.

Referring more particularly to the drawings:

The vending machine 10 of the present invention is shown in Figs. 1 to 3 inclusively, as having an insulated cabinet 11 defining a refrigerated compartment 12 to which access is gained through an opening 13. The cabinet includes insulated side walls 14, rear wall 15, top wall 16, and bottom wall, not shown, to which no further reference is made. In the well known manner, the lower portion 17 of the cabinet is provided with a refrigerating or heat exchanging unit, also not shown, adapted to cool the interior of the cabinet. Suitable brackets 18 are attached to the side and rear walls of the cabinet

releasably to support a magazine and associated operating mechanism subsequently described.

An insulated door 19 is mounted on the cabinet 11 by hinges 20 for movement between an open and a closed position relative to the access opening 13. A seal 21 is provided between the door and front edges of the side walls 13 in the usual manner to exclude warm air externally of the cabinet and to retain refrigerated air within the cabinet. Although not shown, because it has no essential relation to the subject invention, a latch or lock is preferably provided for maintaining the door in closed position. The door has an insulated wall 22 and an outer sheet metal wall 23 defining a space or compartment 24 intermediate said walls. The door provides a pair of delivery openings 25 located at a height convenient for customer receipt of delivered bottles. Each delivery opening has a front stop 26 and a rear stop 27, best shown in Fig. 4. Further, a pivotal flap 28, of well known form, is mounted in each of the delivery openings and is adapted for movement between an opening position for bottle delivery, shown in dashed lines, and a closed position, shown in full line in abutment against the rear stop in its respective delivery opening.

An auxiliary door 30 for the compartment 24 is mounted by means of a hinge 31 in the door 19 above the delivery openings 25. A seal 32 is preferably provided between the door 20 and the door 30 more effectively to exclude dust and foreign material from the compartment 24. The auxiliary door provides a recess 33 and a coin slot 34. Although forming no essential part of the present invention, a coin responsive mechanism 35 is mounted in the space 24 within the door 19 in coin receiving relation to the coin slot. As is the usual practice, the coin mechanism 35 renders the vending machine operable upon receipt of a coin or coins of predetermined acceptable denominations. There being may usable forms thereof commercially available, it is not described in detail.

The foregoing represents a convenient operative environment for the incorporation of the structure of the present invention. It should be understood that the described structure is not to be considered as limiting the use of the present invention but only to exemplify such use.

Referring now more particularly to Figs. 2, 3, 4, 7 and 8, a support frame 40 is mounted on the brackets 18 and includes a lower chassis section 41 and a removable top section 42. The top section provides an upper rear panel 43 and a plurality of transverse partition walls 44 extended perpendicularly from the rear panel in horizontally spaced parallel relation to each other. The partition walls are held in rigid relation to each other by an upper brace 45 and a lower brace 46 connected therebetween.

The chassis 41 and the top section 42 are releasably mounted in the cabinet 11 by resting the chassis on the brackets 18 which are inwardly extended from the side walls 14 adjacent to the front and to the back of the compartment 12. Flanges 47 are provided in the lower portion of the chassis in overlaying relation to the forward brackets 18 and secured to their respective brackets by bolts 48 passed therethrough and screw-threadedly engaged in their respective brackets. Thus the entire support frame 40 and associated structure are mounted and secured in the cabinet by the two bolts 48 and can be released for removal by removing just two bolts.

The chassis section 41 includes a lower rear panel 50, a front plate 51, in substantially parallel relation to the rear panel, and a pair of side plates 52 connecting the rear panel to the front plate.

A pair of center plates 53 are provided in the chassis section intermediate the side plates 52 thereof. By reference to Fig. 7, it will be noted that when the top section 42 is placed in position on the chassis section, the upper rear panel 43 is in coplanar relation with the lower rear panel 50, the outer partition walls 44 are in coplanar relation with the side plates 52 and the inner partition walls 44 are in coplanar relation with the center plates 53. In this manner, a plurality of compartments 54, 55, 56 and 57 are defined between the spaced partition walls 44. For descriptive convenience, the space between the inner most partition walls will be referred to hereinafter as the central space 58. The chassis section 41 also provides a plurality of arcuate kidney-shaped slots 59 individually disposed beneath each of the compartments for a purpose subsequently to be described.



A pair of channel members 65 are attached in vertical position to the rear panel 50 centrally of each of the compartments 54, 55, 56 and 5 7adjacent to the lower ends thereof. Each channel member has a flat back 66 secured to the rear panels 50, as by spot welding, parallel sides 67 right angularly extended therefrom in parallel relation and inturned flanges 68 adapted slidingly to engage the necks of bottles 69 received therein.

A pair of delivery chutes 70 each having a pair of transverse U-shaped rods 71 and 72 providing outwardly extended hangers or hooks 73 are individually mounted beneath the pairs of adjacent compartments 54—55 and 56—57, respectively. The rearward most rod 71 is substantially straight throughout almost its entire length while the forwardmost rod 72 has a markedly depressed central portion. Each delivery chute has a plurality of longitudinal slide rods 74 rested on and connected to the transverse rods which are extended convergently downwardly and forwardly as best shown in Figs. 4 and 7. The side plates 52 and center plates 53 are provided with openings 75 adapted removably to receive the hanger ends of the rods 71 and 72 to enable positioning the delivery chutes in bottle receiving position beneath the compartments.

A plurality of gates or delivery rockers 80 are mounted in the support frame 40 individually beneath each of the compartments 54, 55, 56 and 57. Each rocker provides a pair of erect end plates 81 in parallel spaced relation having horizontal rocker pins 82 journaled in the lower rear panel 50 and the front plate 51 of the chassis section 41. The end plates are spaced a distance greater than the lengths of the bottles 69 and are adjacent to the rear panel and front panel respectively. A control pin 83 is extended from each of the end plates adjacent to the rear panel 50 through the adjacent arcuate slot 59 in such panel for movement relative thereto. A pair of elongated transversely angulated bars 84 are extended in parallel spaced relation between the end plates 81 of each rocker 80. In this regard, it is to be noted that the bare are spaced from each other a distance greater than the maximum diameter of the bottles to be vended so as to provide a dispensing opening therebetween.

It will be evident that the angulated bars 84 constitute bottle supporting means which are mounted by the end plates 81 for synchronous and opposite pivotal travel to and from predetermined bottle supporting and releasing positions beneath their respective columns of bottles 69. A pair of bottle supporting fingers 85 are extended upwardly in transverse relation from each of the bars 84. A convenient and economical construction is to form both fingers from a single strap of metal or the like and to bend the fingers right angularly upwardly at opposite ends of the strap. In this manner the fingers are interconnected by a central portion 86 of the strap which is riveted, spot welded, or otherwise secured to its respective bar thus mounting both fingers in a single operation.

A shaft 90 is journaled in the rear panel 50 of the chassis section 41 intermediate each pair of compartments 54–55, and 56–57, respectively. Eccentric disks 91 are rigidly connected to the shafts 90 for rotation therewith. A pair of levers 92 are provided, each having one end 93 pivotally connected to an extended end of one of the control pins 83 and an opposite end providing an eccentric collar 94 rotatably fitted to one of the eccentric disks 91. It will be seen that each control pin 83 has a lever 92 in driving connection thereto which in turn has driven connection to an eccentric disk 91 individual thereto.

Washers 95 are provided on the shafts 90 between the panel 50 and the collars 94. Driven gears 96 are rigidly secured to the shafts 90 and snap rings 97 are fitted on the shafts 90 for holding the gears in position.

A horizontal shaft 100 is journaled in the rear panel 50 intermediate the shafts 90 between the innermost partition walls 44. A drive gear 101 is secured to the shaft 100 and is in meshing engagement with both of the driven gears 96, as best seen in Fig. 5. A mounting plate 103 is attached between the walls 44 by screws 104 and extends upwardly therefrom. A control shaft 105 is mounted horizontally in the mounting plate for rotation therein in axial alignment with the shaft 100. A jaw or claw clutch generally indicated at 106 is provided for enabling stepped progression driving connection between the shaft 105 and the shaft 100.

The clutch 106 includes a driven member 110 having a ratchet wheel or rim 111. A pair of camming pins 112 are rigidly extended perpendicularly from the driven member 110 in spaced relation to the center thereof. A sleeve 113 is extended from the driven member and is secured to the shaft 100 by a pin 114. The ratchet wheel is provided with notches 115 disposed in equally spaced positions about the periphery thereof. The control shaft 105 has an extended end journaled in the driven member for rotation relative thereto, as indicated in dashed lines in Fig. 9. A driving camming plate 117 is mounted on the control shaft 105 by means of a U-shaped attaching plate 118 slidably fitted to the shaft and rigidly connected to the camming plate. The camming plate has a plurality of arcuately shaped tabs 119 pierced therefrom concentrically thereto constituting ramps or camways extended counter-clockwise progressively forwardly, as viewed in Figs. 10 to 12. The piercing leaves arcuate slots 120 in the plate concentric thereto. The plate also provides diametrically opposite peripheral projections defining ratchet release cams 121. A block 122 is mounted on the control shaft 105 intermediate the extended end and the mounting end by means of a pin 123. A helical compression spring 124 is mounted around the control shaft between the plate 117 and the block for urging the plate into engagement with the driven member 110. In this regard it should be noted that the camming plate is adapted for flush engagement with the driven member when the camming pins 112 are in registration with a pair of diametrically opposed slots 120. The plate is forced away from the driven member against the urgency of spring 124 when the camming plate is rotated to advance the camming pins along the camways 119.

A bracket 129 is mounted on the rear panel 50 and extends over the clutch 106. A pawl 130 is pivotally mounted in the bracket and provides a detent 131 engageable in the notches 115 of the ratchet wheel 111. A spring 132 interconnects the pawl and the bracket and urges the detent into engagement with the ratchet wheel. It is to be noted that the width of the detent is sufficient to permit engagement thereof with the ratchet release 121 on the camming plate when the plate is in substantially flush engagement against the driven member 110.

At a mounting end of the control shaft 104 there is provided a collar 136 secured to the shaft by a pin 137 which abuts the mounting plate 103. A U-shaped receiver plate 138 is connected to the control shaft by a bolt 139 and suitable lock washers 140 are provided on opposite sides of the receiver plate as will be apparent. The receiver plate provides arms 141 extended toward the wall 19 in parallel relation to the axis of the shaft 105 and in diametrically oppositely spaced relation thereto. Each arm has a key slot 142 disposed toward the wall 19, as best seen in Fig. 3.

Referring to Figs. 1, 3, 4 and 9, it will be seen that a shaft 150 extends through the auxiliary door 30 and is journaled in a socket 151 on the inner partition 22 of the main door 19. A crank 152 is connected to the shaft 150. A further shaft 153 extends through the inner partition 22



and provides a crank 154 on the inner end thereof in the space 24 in the door 19.

An elongated link 155 is pivotally connected at its opposite ends to the cranks 152 and 154. Preferably a sealed bearing sleeve 156 is provided around the shaft 153 to maintain adequate insulation and compartment tight integrity of the cabinet 11. A key 157 in the form of a pin is fitted in the shaft 153 and extended transversely thereof. The key is adapted for engagement with the key slots 142 in the receiver plate 138, as seen in Figs. 3 and 9. A manipulating lever 158 is connected to the outer end of the shaft 150 and is disposed in the recess 33 in a postion conveniently accessible for operation by the customer.

The cabinet 11 is adapted to hold a plurality of pairs of columns of bottles 69. In this regard, it will be noted that a pair of vertical horizontally overlapping columns of horizontally disposed bottles are stacked in each of the compartments 54, 55, 56 and 57. The bottles in each column are in vertically staggered relation with the bottles in the adjacent column in underlying supporting relation to their respective bottles next above in the adjacent column. In the interest of compact storage of the bottles in the compartments constituting the magazine of the vending machine, the walls 44 at each side of each compartment are spaced a distance greater than the diameter of a bottle and less than twice such diameter so that the consecutive bottles in each column are closely adjacent to each other. However, the maintenance of slight vertical spacing minimizes bottle abrasion and facilitates downward feeding to vending position.

*Operation*

The operation of the described embodiment of the invention is believed to be readily apparent and is briefly summarized at this point.

Assuming first that the vending machine is loaded with bottles 69, as shown in Fig. 2, the door 19 and auxiliary door 30 are then closed and locked in closed position. When it is desired to obtain one of the bottles, a coin, or coins, of suitable denomination is inserted in the coin slot 34 for deposit into the coin mechanism 35. The receipt thereof releases the shaft 153 in the well-known manner and enables the depressing of manipulating lever 158. When the manipulating lever is depressed the control shaft 105 is rotated by the key 157 turning the receiver plate 138. Rotation of the control shaft turns the camming plate 117. At this time the detent 131 is engaged in one of the notches 115 in the ratchet wheel 111. As the camming plate rotates, one of the ratchet release cams 121 engages the detent and lifts it from its position in the notch 115. The driven member 110 is in this manner conditioned for rotation and inasmuch as the camming pins 112 are at such time extended in the slots 120, rotation of the camming plate is transmitted to the driven member 110.

When the driven member 110 rotates, such movement is transmitted through the sleeve 113 to the shaft 100 and thence to the drive gear 101. This causes rotation of the driven gears 96 and imparts rotational movement to the eccentric disks 91. As the disks rotate, they actuate the levers 92 to oscillate the rockers 80 by movement of the pins 83.

Rotation of control shaft 105 is permitted only through a predetermined angle as limited by the space between the notches 115 in the ratchet wheel 111. Thus, when the detent 131 on pawl 130 again falls into the next succeeding notch 115, further rotation of control shaft 105 is precluded. At this point, a bottle is discharged from one of the compartments into one of the delivery openings 25, as will be subsequently described in greater detail, and the customer releases the manipulating lever 158 for return to its upper position. Inasmuch as there are four compartments in the machine shown from which four rockers 80 dispense bottles and

since it is desired to dispense only one bottle during each operational movement of the lever **158**, the driven connection of the rockers to the gear **101** through the pins **83**, levers **92**, eccentric disks **91**, and gears **96** are such that the rockers are separated as to their attitudes or positions by one quarter of their complete operating cycle. Thus when one rocker is delivering a bottle, the next to deliver is one quarter of its cycle from delivery position, the following rocker one half of its cycle from delivery position and the succeeding rocker three-quarters of its cycle from delivery position.

When the lever **158** moves upwardly the control shaft **105** rotates in the reverse direction and thus likewise rotates the camming plate **117** in the reverse direction. When this occurs, the camways **119** ride on the now stationary camming pins **112** thus moving the camming plate from the driven member **110** aaginst the urging of spring **124**. The reverse rotation of the camming plate continues until the slots **120** again move into alignment with camming pins **112** whereupon the camming plate again falls into engagement against the driven member. This action may be visualized by reference to Figs. 10 and 12. In Fig. 12 it will be apparent that clockwise rotation of the camming plate, as viewed, is preferred for vending purposes. This represents rotation of the control shaft by depression of the manipulating lever. However, release of the manipulating lever operates to move the camming plate in a counterclockwise direction, from a position as shown in Fig. 12 to a poistion as shown in Fig. 10 whereby the ratchet release cam **121** is again disposed behind the detent **131**.

From the foregoing, it will be understood that depression of the manipulating lever operates to deposit a bottle in one of the delivery openings **25** and release of the manipulating lever operates to recondition the clutch mechanism **106** for a subsequent cycle of operation permitted by the insertion of a coin in the coin slot **34** and depression of the manipulating lever.

Considering the specific operation of the bottle dispensing rockers **80** by reference to Fig. 7, it is seen that the manipulating lever **158** has just been depressed and that a bottle **69** is about to move from the compartment **56** into the associated delivery opening **25**. It will be noted that the rocker of compartment **56** has been rocked in a counterclockwise direction, as viewed, sufficiently that the fingers **85** at the right of the compartment have moved upwardly into supporting engagement with the lowermost bottle of the right column in the compartment while the fingers at the left have been retracted downwardly and to the left from their bottle supporting position so that the lowermost bottle of the left column is released to roll between the bars **84** and descend endwardly into the delivery chute **70** therebelow. The second bottle in the left column is dependably supported in wedging engagement between the wall **44** adjacent thereto nad the lowermost bottle in the right column. All bottles thereabove are supported by the interlocked relation of the columns. In such position of the rocker, the fingers supporting the lowermost bottle at the right of the compartment have passed to the left of vertical alignment with the center of said bottle. In such position, the lowermost bottle is dependably held in position between its adjacent wall **44** and the fingers, with the lowermost bottle at the right of the compartment rested thereon.

A bottle **69** is discharged from only one of the compartments during a cycle of operation motivated by depressing the lever **158**. Thus, as the lowermost bottle from the left column of compartment **56** is dispensed, the lowermost bottles in the right columns of compartments **54**, **55**, and **57** are supported by the fingers previously moved upwardly and inwardly thereunder.

During the next operating cycle, the rocker of the compartment **56** is rocked in a clockwise direction, as viewed in Fig. 7, as are all of the other rockers. At the end of such cycle, the rocker of compartment **56** is in the position represented by the rocker of the compartment **54** in Fig. 7 and the rocker of compartment **55** has rocked sufficiently so that the lowermost bottle in the right column of that compartment is released by movement of the fingers in supporting relation thereto downwardly and to the right incident to rocker movement. At the same time, the fingers at the left of the rocker for compartment **55** move upwardly and inwardly to support the lowermost bottle of the left column in the compartment which descends thereagainst.

The succeeding cycle of operation in a similar manner releases the lowermost bottle in compartment **57** and the next cycle of operation the lowermost bottle in compartment **54**. At such time, the rocker of compartment **56** has been oscillated sufficiently that upon the next succeeding cycle of operation, it dispenses the lowermost bottle in the right column of its compartment. It will be visualized that the succeeding cycles of operation vend a single bottle from the machine and that all bottle supporting and dispensing is attained by equal and opposite movement of the fingers of each rocker between inwardly and upwardly disposed bottle supporting positions and downwardly and outwardly retracted bottle releasing positions.

During the entire bottle retention and dispensing operations, a plurality of the lowermost bottles in each column in each compartment are dependably held in their interlocking arrangement by the engagement of neck ends of the bottles between the inwardly turned flanges **68** of the channel members **65**. Thus jamming of bottles in the lower ends of the compartments by angular displacement is effectively avoided.

As evident in Fig. 2, the vending machine of the present invention is compact, there being a minimum of operating mechanism, and the bottles **69** being nested in compact relation with a minimum of magazine structure. As shown in Fig. 3, the entire front to back depth of the vending machine is approximately twice the length of the bottles **69** vended therefrom. The machine can even be made shallower by reducing the overall thickness of the door **19**, it being illustrated in greater thickness, for illustrative convenience, than actually required. The compartment **24** can be as shallow as desired commensurate with the space requirements of the operating mechanism contained thereby.

The rockers **80** provide dependable bottle retention and dispensing in a structure which is durable and virtually fool proof. The rockers employed in the manner shown with the channel members **65** having the flanges **68** effectively preclude bottle theft by reaching through the delivery opening **25**. The compartments **54**, **55**, **56** and **57** are speedily and easily loaded by opening the door **19** and inserting the bottles horizontally into the compartments alternately in the adjacent columns. Bottle chipping and abrasion during loading, storage, and vending is effectively minimized. During vending operations, the bottles are gently lowered in periodic or aperiodic increments dependent upon frequency and regularity of customer demand. The entire support frame **40**, chassis **41**, top section **42**, delivery chutes **70** and associated structure can be removed from the cabinet **11** for repair and/or replacement purposes simply by removing the bolts **48** which secure the chassis to the brackets **18**.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and apparatus.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a vending machine, means for supporting pairs of columns of vendable articles with the articles in one

column of each pair being in vertical staggered relation to the articles in the other column of such pair so that the lower articles of each column are positioned in supporting relation to the upper articles of the other column in the associated pair, a rocker positioned beneath each pair of columns each having elongated article engaging means extended in substantially parallel relation to the articles in the columns and alternately engageable with lowermost articles in the respective columns of their rockers, said article engaging means being spaced a distance sufficient for the passage of the articles therebetween, and means for oscillating the rockers in synchronized stepped progression to displace in sequence each rocker from engagement with the lowermost article in their respective pair of columns to enable gravitational descent of such lowermost article through the rocker.

2. In a vending machine having an enclosed cabinet provided with a delivery opening therein, means in the cabinet for supporting a pair of columns of articles to be delivered for customer access to said delivery opening with the articles in one column being in vertically staggered relation to the articles in the other column and with the articles in each column being in underlying supporting relation to the articles next adjacent thereabove in the other column, a pair of spaced parallel bars disposed substantially horizontally beneath the columns of articles and having upwardly extended fingers engageable with the lowermost articles in the columns, the space between corresponding fingers of each pair of bars being greater than the width of the articles, and means interconnecting the bars for moving the bars in units of stepped progression between alternate positions with the space between the bars in registry with the opposite columns to enable gravitational descent of the lowermost article in said pair of columns between said bars for delivery to the delivery opening.

3. A vending machine comprising a cabinet having a compartment therein; a magazine mounted in the compartment having a pair of substantially parallel erect walls for confining therebetween a pair of vertical, interlocked columns of substantially uniform articles to be vended, the articles of the separate columns being in vertically staggered overlapping relation and the articles of each column supporting the next adjacent higher articles of the opposite column; a pair of substantially parallel bars individual to the columns positioned beneath the columns; movable means interconnecting the bars in fixed spaced relation sufficient for the passage of the articles to be vended therebetween; and control means connected to the movable means operable to oscillate the movable means and reciprocate the bars alternately and oppositely between positions in supporting relation to their respective columns and positions retracted therefrom.

4. A vending machine comprising a cabinet having a compartment therein and a delivery opening; a magazine mounted in the compartment above the delivery opening having a pair of substantially parallel erect walls for confining therebetween a pair of vertical, interlocked columns of substantially uniform articles to be vended, the articles of the separate columns being in vertically staggered overlapping relation and the articles of each column supporting the next adjacent higher articles of the opposite column; a pair of substantially parallel bars individual to the columns positioned beneath the columns and above the delivery opening; movable means mounting and carrying the bars in fixed spaced relation sufficient for the passage of the articles to be vended therebetween; and control means connected to the movable means for oscillating the movable means and carrying the bars alternately and oppositely between positions in supporting relation to their respective columns and positions laterally retracted therefrom permitting passage of lowermost articles between the bars.



5. A vending machine comprising a cabinet having a compartment therein, a magazine mounted in the compartment having a pair of substantially parallel erect walls for confining therebetween a pair of vertical, interlocked columns of substantially uniform articles to be vended, the articles of the columns being in vertically staggered overlapping relation and the articles of each column supporting the next adjacent higher articles of the opposite column, a rocker mounted for oscillation beneath the walls having a substantially horizontal axis of rotation substantially equally spaced from the walls and providing substantially parallel horizontal bars individual to the columns spaced for passage therebetween of the articles to be vended and located in substantially equally spaced relation to said axis, and control means connected to the rocker operable to oscillate the rocker and the bars alternately and oppositely between positions in supporting relation to their respective columns and retracted positions downwardly spaced therefrom to permit successive passage of articles between the bars.

6. In a vending machine having an enclosed cabinet provided with a delivery opening therein, means in the cabinet for supporting pairs of columns of articles to be delivered for customer access to said delivery opening, the articles in each column of each pair being in vertically staggered relation to the articles in the opposite column and with the articles in each column in underlying supporting relation to the articles next adjacent thereabove in the opposite column of its pair, a rocker mounted for oscillation in the cabinet beneath each pair of columns and having a pair of bars mounted in substantially horizontally spaced parallel relation, there being a bar individual to each column, fingers mounted on the bars adapted for engagement with the lowermost articles in their bars' respective columns, means for synchronously oscillating the rockers in predetermined sequence alternately and oppositely to carry the bars of each rocker in units of stepped progression between predetermined positions in supporting relation to the lowermost articles of their respective columns and retracted positions downwardly and laterally therefrom with the bars of the several rockers moving singly and successively to and from their fully retracted positions whereby the articles are released into the delivery opening one at a time.

7. A vending machine comprising a cabinet having a plurality of delivery openings; a magazine mounted in the cabinet above the delivery openings having a plurality of laterally spaced, substantially parallel, erect walls defining a plurality of compartments for confining pairs of substantially vertical, interlocked columns of substantially uniform articles to be vended, adjacent walls of each compartment being spaced a distance greater than the maximum transverse dimension of one of said articles to be vended as stacked between the walls and less than twice said maximum transverse dimension, the articles of the columns being in vertically staggered, overlapping relation and the articles of each column supporting the next adjacent higher articles of their respective opposite column; rockers mounted for oscillation individually beneath the compartments, above the delivery openings, on substantially horizontal axes, and substantially equally spaced from the adjacent walls of their respective compartments, each of the rockers providing a pair of substantially parallel, horizontal bars individual to the columns of their respective compartments, spaced for passage therebetween of the articles to be vended, and located in substantially equally spaced relation to the axis of their respective rocker; control means connected to the rockers operable to oscillate the rockers synchronously in predetermined units of stepped progression to move the bars of each rocker alternately and oppositely between positions in supporting relation to their respective columns and retracted positions permitting passage of lowermost articles between the bars; and

delivery chutes having upper ends disposed beneath the rockers for receipt of articles from between the bars of the rockers and lower ends in registry with the delivery openings.

8. In a selective bottle vending machine for refrigerated bottled beverages having a refrigerated cabinet provided with an access opening therein; a door mounted on the machine for movement between open and closed positions relative to the opening and having a plurality of bottle discharge openings therein; a support frame mounted in the cabinet including a plurality of vertically extended horizontally spaced walls defining compartments each adapted to contain a plurality of columns of substantially uniform bottles in vertical staggered relation and each having a width less than twice the width of such bottles; a plurality of vertically disposed channels mounted on the frame in the compartments having inturned flanges adapted slidably to receive the necks of the bottles during their descent in the compartments; a plurality of bottle delivery chutes each mounted on the frame beneath a pair of the compartments adapted to receive bottles from the compartments for delivery to one of the discharge openings in the door; a plurality of rockers individually mounted between the compartments and the associated delivery chutes for movement in timed sequence between positions permitting gravitational descent of a bottle from their respective compartments into their respectiye delivery chute and positions blocking such descent, each of the rockers including a pair of end plates pivotally mounted in the frame, a pair of elongated bars extended between the end plates and bottle engaging fingers extended from the bars; a control pin endwardly extended from an end plate of each rocker; a plurality of shafts journaled in the frame; a driven gear secured to each of the shafts; a disk eccentrically connected to each of the shafts; a plurality of levers having ends individually pivotally connected to the control pins and having collars at the other ends individually rotatably fitted to the eccentric disks; a driving gear mounted in the frame in meshing engagement with said driven gears; a ratchet wheel secured to the driving gear for rotation therewith; a pawl mounted in the frame yieldably urged into engagement with the wheel; camming pins extended perpendicularly from the wheel eccentrically thereof; a control shaft having one end journaled in the wheel in concentric relation thereto; means for oscillating the shaft; a cam plate mounted on the control shaft having apertures therein adapted to receive the camming pins to enable rotation of the ratchet wheel when the shaft is rotated in a predetermined forward direction; and means urging the plate into engagement with the wheel with the camming pins disposed in said apertures, the plate having tabs bent back from the apertures defining camways engageable with the camming pins during rotation of the shaft in the opposite direction for urging the plate out of engagement from the wheel, the plate also having peripherally extended pawl releasing cams adapted to engage the pawl during rotation of the plate in said forward direction to release it from engagement with the ratchet wheel.

9. The combination of a magazine for supporting a pair of columns of articles of substantially uniform size with the articles in one column being in vertically staggered relation to the articles in the other column and with the articles in each column being in underlying supporting relation to the articles next adjacent thereabove in the other column, a pair of fingers individual to the columns positioned beneath the columns, means interconnecting the fingers in spaced relation sufficient for the successive passage therebetween of the articles and mounting the fingers for oscillation alternately and oppositely between positions in supporting relation to their respective columns and positions retracted therefrom, and control means operably associated with the finger interconnecting means for alternately and oppositely positioning the fingers in supporting and retracted positions.

10. The combination of a magazine for supporting a pair of columns of articles of substantially uniform size with the articles in one column being in vertically staggered relation to the articles in the other column and with the articles in each column being in underlying supporting relation to the articles next adjacent thereabove in the other column, a pair of article support members individual to and positioned beneath the columns, means rigidly interconnecting the support members in predetermined spaced relation to permit passage of the articles therebetween and mounting the support members for oscillation alternately and oppositely between positions in supporting relation to their respective columns and positions permitting passage downwardly therebetween of articles from the columns, and control means connected to the interconnecting and mounting means for alternately and oppositely positioning the article support members in supporting and retracted position.

11. The combination of a magazine for supporting a pair of columns of articles of substantially uniform size with the articles in one column being in vertically staggered relation to the articles in the other column and with the articles in each column being in underlying supporting relation to the articles next adjacent thereabove in the other column, a rocker positioned beneath the columns including a pair of spaced end plates, elongated bars interconnecting the plates individually positioned beneath the columns, and article engaging fingers extended from the bars in spaced relation to permit passage of articles therebetween and between the bars, means mounting the rockers for oscillation alternately and oppositely between a position with the fingers in supporting relation to their respective columns and a position retracted therefrom, and control means having driving connection to the rocker for moving it between said positions with the fingers in supporting relation and said retracted position.

12. In combination with a frame, a magazine mounted in the frame for supporting a pair of columns of articles of substantially uniform size with the articles in one column being in vertically staggered relation to the articles in the other column and to the articles in each column being in underlying supporting relation to the articles next adjacent thereabove in the other column, a pair of article support members individually positioned beneath the columns, means rigidly interconnecting the support members in predetermined spaced relation to permit passage of the articles therebetween and mounting the support members in the frame for oscillation alternately and oppositely between positions in supporting relation to their respective columns and positions permitting downward passage therebetween of articles from the columns, a drive shaft rotatably mounted in the frame, and means for rotating the drive shaft; a drive linkage adapted to interconnect the drive shaft and the mounting means for the article support members to communicate motivating force from the drive shaft to said mounting means controllably to move the article support members between supporting and retracted positions but to preclude independent self-operation of the article support members by said articles comprising a driven shaft rotatably mounted in the frame in axial alignment with the drive shaft, a driven clutch secured to the driven shaft for rotation therewith, a motion arresting member mounted in the frame for movement between a position precluding rotation of the driven shaft and a position retracted therefrom permitting rotation of the driven shaft, and a drive clutch secured to the drive shaft for rotation therewith and engageable with the driven clutch for rotation of the driven shaft after a predetermined initial increment of rotation of the drive shaft in a predetermined direction and including means engaging the motion arresting member for urging it into retracted position during said predetermined initial increment of

rotation of the drive shaft to enable rotation of the driven shaft.

13. A vending machine comprising a cabinet having a compartment therein; a magazine mounted in the compartment having a pair of substantially parallel erect walls for confining therebetween a pair of substantially vertical, interlocked columns of substantially uniform articles to be vended, the articles of the separate columns being in vertically staggered overlapping relation and the articles of each column supporting the next adjacent higher articles of the opposite column; a pair of article supporting members individual to the columns of articles positioned beneath their respective columns and horizontally spaced a distance sufficient for the successive passage therebetween of the articles; means mounting the supporting members for alternate and opposite movement thereof between individual predetermined article supporting positions in which they support the articles of both columns thereabove and article releasing positions, both of said positions for each supporting member being beneath its respective column and the releasing position of each member being spaced from the column opposite to its respective column a distance greater than its supporting position; and coin controlled drive means operatively associated with the supporting members for synchronously and oppositely moving said supporting members between their respective article supporting and releasing positions.

14. In a vending machine having an enclosed cabinet provided with a delivery opening therein, means in the cabinet for supporting a pair of columns of articles to be delivered for customer access to said delivery opening with the articles in one column being in vertically staggered relation to the articles in the other column and with articles in each column being in underlying supporting relation to the articles next adjacent thereabove in the other column; a pair of horizontally spaced article supporting members individual to the columns of articles positioned beneath their respective columns and horizontally spaced a distance sufficient for the successive passage therebetween of the articles; means mounting each of the supporting members for oscillation between individual predetermined article supporting positions in which they receive the articles of their respective columns in gravitationally rested position thereon and thereby support the articles of both columns thereabove and article releasing positions, said article releasing positions for the supporting members being lower than their respective article supporting positions so that in pivotal travel from the latter to the former the columns of articles rested on the supporting members are lowered in the cabinet, both of said positions for each supporting member being aligned beneath its respective column; and drive means operatively associated with the supporting members for synchronously and oppositely moving the same to and from their respective article supporting and releasing positions.

15. The combination of a magazine for supporting a pair of columns of articles of substantially uniform size with the articles in one column being in vertically staggered relation to the articles in the other column and with the articles in each column being in underlying supporting relation to the articles next adjacent thereabove in the other column, a pair of article support means individual to the columns positioned beneath their respective columns, means interconnecting the article support means in spaced relation to define a dispensing opening therebetween for the successive passage therethrough of the articles, means mounting the support means for oscillation alternately and oppositely between positions in supporting relation to their respective columns in which they support the articles thereabove in both columns and retracted positions, the dispensing opening being in registration with the lowermost article in one column for the passage of said article therethrough when a support means is in supporting relation to the lowermost article of the opposite column and the dispensing opening being in registration with the lowermost article in said opposite column when the other article support means is in supporting relation to the lowermost article of said one column, and drive means connected to the mounting means for oscillating the article support means between said positions.

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