Jan. 21, 1964 M. W. NEWBERRY 3,118,567

ARTICLE DISPENSING MECHANISM

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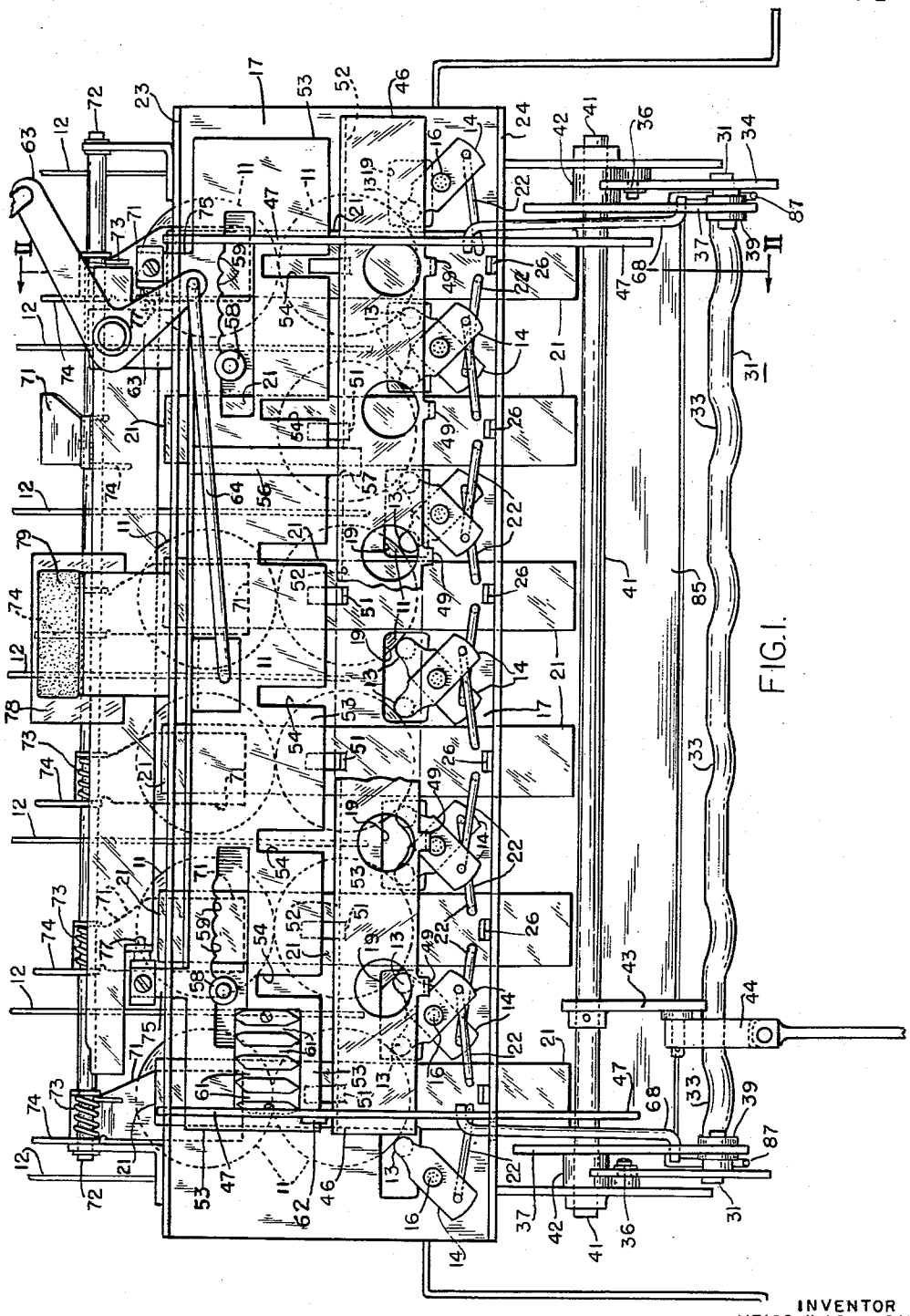


FIG. 1.

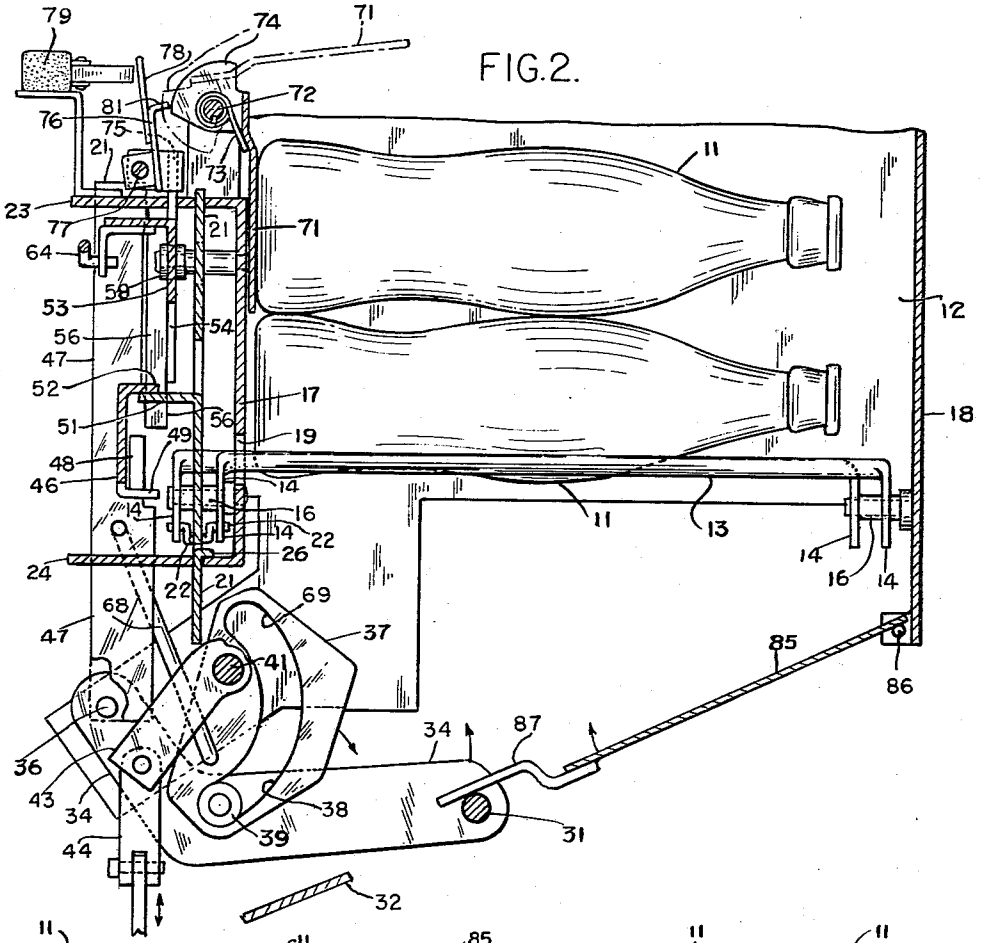
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FIG. 2.



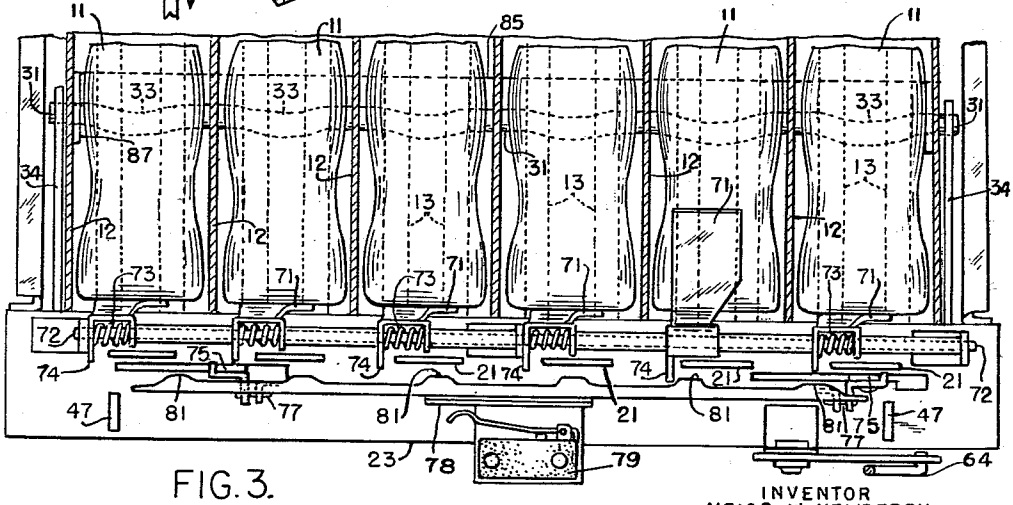


FIG. 3.

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FIG.4.

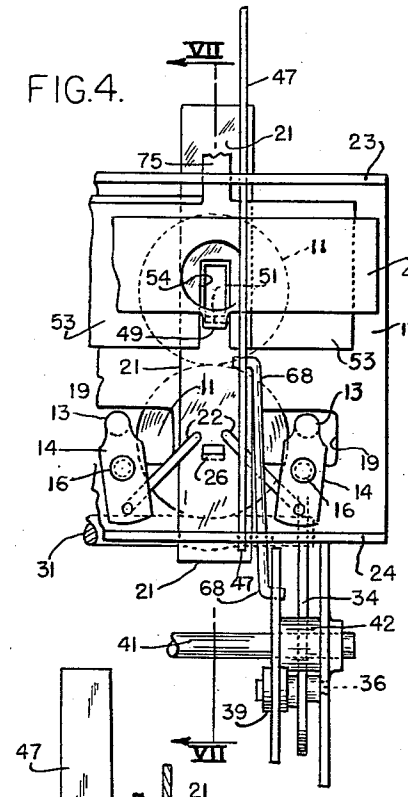


FIG.5.

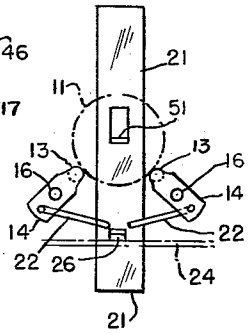


FIG.6.

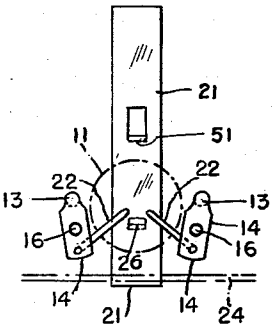
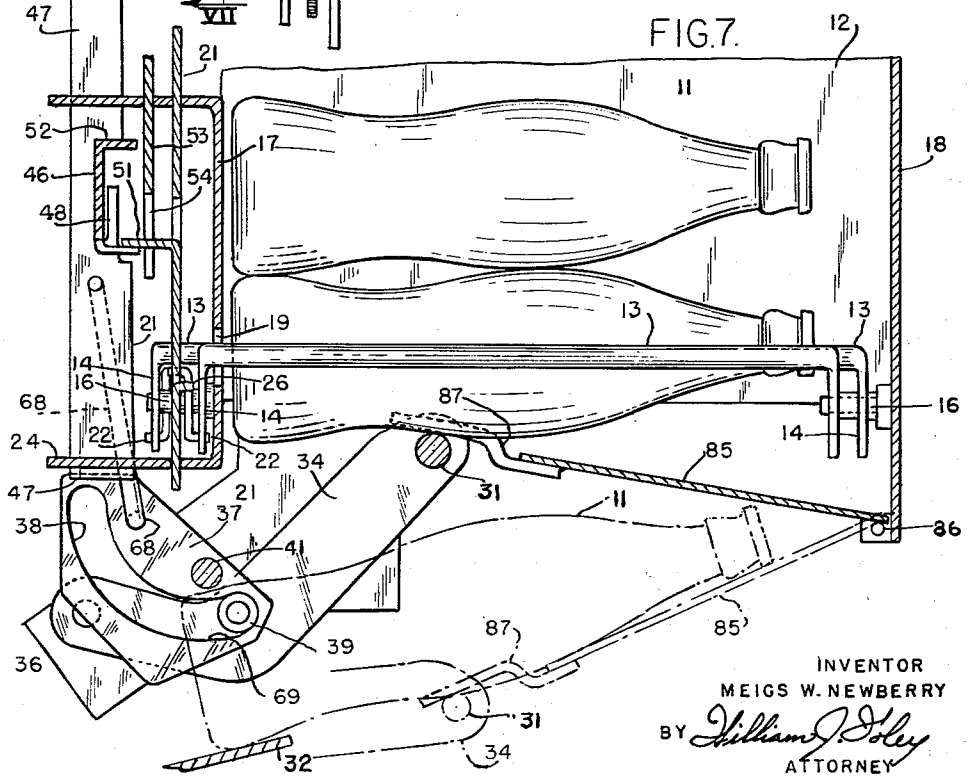


FIG.7.



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FIG.9.

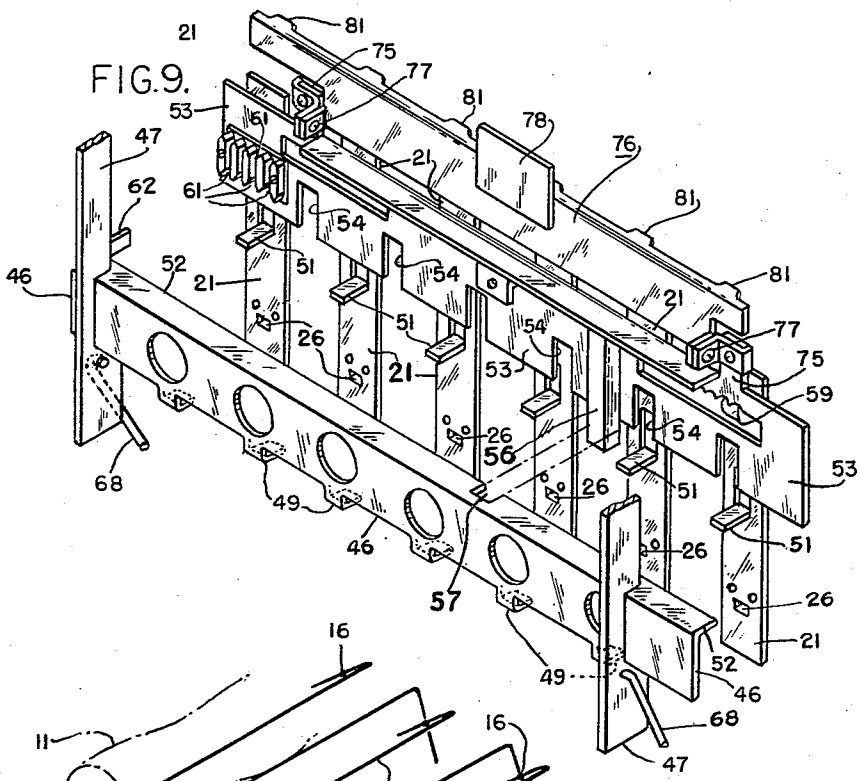
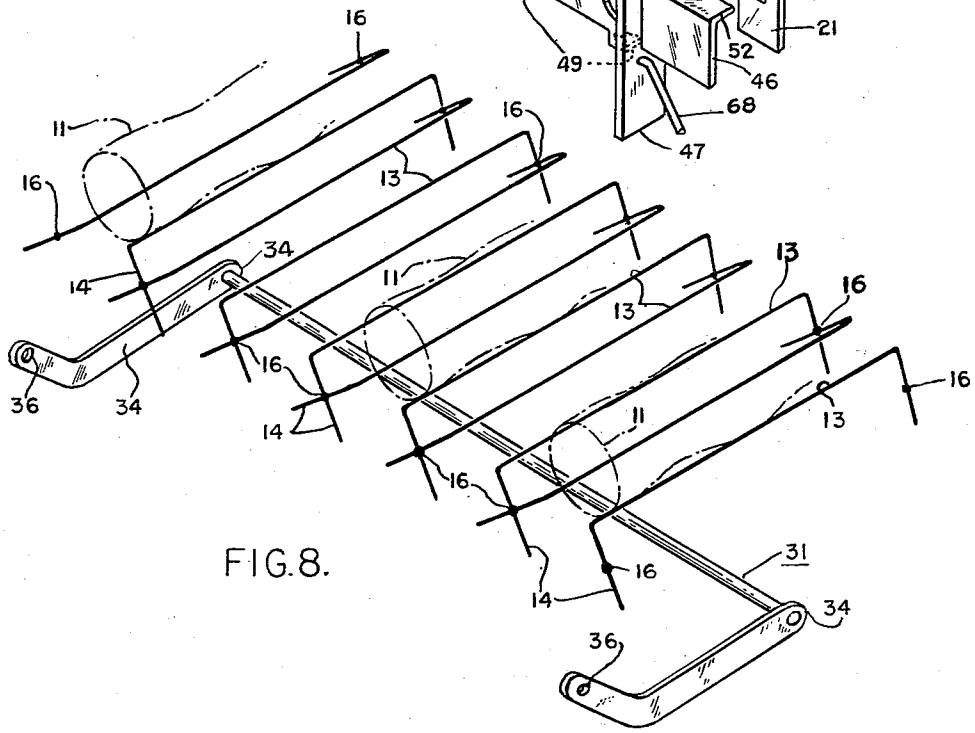


FIG.8.



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3,118,567

ARTICLE DISPENSING MECHANISM

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Filed Feb. 4, 1960, Ser. No. 7,509
10 Claims. (Cl. 221—126)

This invention relates to dispensing mechanisms and particularly to mechanisms for selectively dispensing individual articles from a plurality of article columns or stacks.

Dispensing mechanisms of the type encompassed by this invention are generally employed to control the release of articles, such as soft drink bottles, from a coin-controlled vending machine. Particularly, the dispensing mechanism of this invention is usable in that type of vending machine wherein the customer is offered a variety of different articles, such as different flavored drinks, and wherein the customer selects the article he wishes to purchase by manually setting an operator on the machine.

It is the principal object of this invention to improve the reliability and at the same time reduce the cost of dispensing mechanisms of the aforesaid type.

The dispensing mechanism constructed in accordance with this invention employs individual releasing means for each of the columns, or stacks of articles handled thereby. Provided for cooperation with the several releasing means is a single lowering means which serves to control the lowering of each of the several article columns and also controls the discharge of an article released from any of the columns. By providing a single lowering means, rather than a lowering means for each of the article columns, substantial reduction in the cost and complexity of the dispensing mechanism is effected.

The invention also provides a novel selecting system whereby actuation of the releasing means for the several columns is controlled so that but one of the releasing means is actuated at any one time and so that all of the remaining releasing means are effectively locked against accidental or purposeful actuation to preclude the release of more than one article at any one time.

The invention also contemplates the utilization of a unique and novel empty signalling system whereby but a single electrical switch is effective to control energization or deenergization of a signalling circuit to give an indication of the presence or absence of articles in each of the several article columns.

The dispensing mechanism constructed in accordance with this invention further includes certain novel anti-theft features which render it difficult, if not impossible, to surreptitiously remove articles from the mechanism.

Other objects, features and advantages of the invention will be apparent from the following detailed description wherein reference is made to the accompanying drawings, forming a part hereof, and wherein:

FIG. 1 is a front elevational view of a bottle dispensing mechanism embodying this invention;

FIG. 2 is a vertical sectional view of the bottle dispensing mechanism, taken generally as indicated by the line II—II in FIG. 1;

FIG. 3 is a plan view of the mechanism shown in FIG. 1;

FIG. 4 is a fragmentary front elevational view of the bottle dispensing mechanism illustrating the components of the mechanism in further operating positions;

FIGS. 5 and 6 are fragmentary front views illustrating, somewhat diagrammatically, the action of bottle releasing means employed in the mechanism;

FIG. 7 is a sectional view taken generally as indicated by the line VII—VII in FIG. 4;

FIG. 8 is a schematic illustration of the bottle dispensing mechanism; and

FIG. 9 is an exploded perspective view of a selective drive and interlock employed in the mechanism.

Referring particularly to FIGS. 1 to 3, the invention is illustrative as applied to a dispensing mechanism for a multi-product bottle vendor, although it is to be understood that the invention is equally applicable to mechanisms for handling articles other than bottles.

The mechanism herein disclosed is adapted to release individual bottles, identified in the drawings by the reference numeral 11, from a plurality of side-by-side vertical stacks, or columns. Such mechanisms are utilized, for example, for controlling the discharge of bottles from a storage magazine in coin-controlled vending machines. In use, the mechanism generally forms the lower portion of a gravity feed magazine adapted to hold a plurality of bottle columns in which the individual bottles have their axes arranged generally horizontally and rest upon one another in the columns. Only a portion of the magazine is illustrated in the drawings in the form of vertical partitions 12, which separate the several bottle columns and maintain the individual bottles in stacked relationship.

In accordance with this invention each of the several bottle columns rests upon and is supported by releasing means comprising a pair of gate members, or gates, 13 which are movable toward and away from one another to effect the release of the lowermost bottle from the column with which they are associated. The gates 13 are rod-like members extending from front to rear beneath their respective columns and are disposed on opposite sides of the column centerline in a manner to engage spaced lower portions of the lowermost bottle in the column. Each gate 13 is provided with downwardly turned arms 14 at the front and rear ends thereof which are pivotally mounted on stationary pins 16 carried respectively by front and rear vertical walls 17 and 18 of the dispensing mechanism. The gates extend forwardly through openings 19 provided therefor in front wall 17 so that the front arms 14 thereof are disposed forwardly of wall 17 and outside of the path of downward movement of the bottles 11.

The gates 13 for each column, when occupying the position shown in FIGS. 1 and 5, are disposed inwardly of the axes of the pivot pins 16 by which they are supported and the space therebetween is substantially less than the diameter of the bottle resting thereon so that downward movement of the bottle is prevented. The gates 13 of each pair are movable clockwise and counterclockwise, respectively, about their pivot pins 16 and transversely of their bottle column to the positions illustrated in FIGS. 4 and 6 in which the space therebetween is greater than the diameter of the bottles 11 so as to permit a bottle to move downwardly therebetween. It can readily be appreciated that moving the gates 13 supporting a column of bottles 11 from the "closed" position of FIG. 5 to the "open" position of FIG. 6 and then returning the gates to their "closed" position in proper timed relationship to the descent of the column of bottles thereabove is effective to release a single bottle from that bottle column.

In the interest of conserving space as well as minimizing the number of components required in the overall mechanism, certain of the pivot pins 16 are employed to support one gate 13 of each of two adjoining bottle columns. This is shown in FIG. 1 in which it can be seen that several of the pivot pins 16 support the left-hand gate 13 for the bottle column to the right of the pin and the right-hand gate 13 of the bottle column to the left of that pin.

Movement of the gates 13 of each gate pair is effected

by vertical reciprocation of an actuator or slide member 21 which is connected to the gates 13 by two toggle links 22. The toggle links 22 each have one end thereof pivotally connected to the slide 21 and its opposite end pivoted to a downward extension of the front arm 14 of a gate 13. The slide members 21 are slidably received in openings provided therefor in upper and lower horizontal flanges 23 and 24 on the mechanism front wall 17 and each of the slide members is provided with stop means in the form of a projection 26 thereon which is engageable with the upper surface of flange 24 for limiting the downward movement of the slide. When the gate members 14 are "closed," as shown in FIGS. 1 and 5, the slides 21 connected thereto rest in a lowered position in which their projections 26 engage flange 24. The connection of the toggle links 22 to the slides 21 and the gates 13 is such as to cause the gates 13 to swing apart, or "open," when their slide 21 is moved upwardly to the position shown in FIGS. 4 and 6.

It should thus be apparent that the release of the lowermost bottle 11 from any of the six bottle columns handled by the mechanism can be effected by reicprocating motion of the slide 21 associated with the selected column. In accordance with this invention, novel means are provided for lowering the column of bottles from which a bottle is being released and for controlling the downward descent of a bottle released from any one of the several columns. This lowering means includes a unitary lowering bar 31 disposed beneath the bottle columns and extending transversely thereof across the width of the dispensing mechanism in such a manner that there is at least a portion of the lowering bar 31 beneath each of the bottle columns (see FIG. 1). The lowering bar 31 is movable from a lowered, or repose, position thereof illustrated in FIGS. 1 and 2 to an elevated position, shown in FIGS. 4 and 7 in which it is adjacent the lowermost bottles in each of the bottle columns and in a position to limit the downward descent of bottles in any of the bottle columns. As will be explained in greater detail hereinafter, movements of the lowering bar 31 are related to movements of the gates 13 in such a manner that the bar 31 is raised to a position adjacent the lowermost bottles in the columns as the gates 13 for any one column are being opened. Thus, the bar 31 is positioned to assume support for a column which has been released by its gates 13 and subsequent downward movement of the lowering bar 31 effects a lowering of the released column to the point at which the gates 13 are closed to again assume support for the column. Further downward movement of the lowering bar 31 is employed to control the descent of the single bottle released from that column so that the released bottle is gently lowered onto a chute 32, or other portion of the cabinet (not shown) with which the dispensing mechanism is associated, to be conveyed to a preselected delivery location. The relationship between the lowering bar 31 and the gates 13 of the several releasing means is schematically illustrated in FIG. 8.

It is to be noted that, unlike prior dispensing mechanisms, the mechanism constructed in accordance with this invention employs but a single lowering means (bar 31) for the several bottle columns from which bottles are selectively released. This feature of the invention effects simplification and consequent economies of manufacture for the dispensing mechanism. Simplification, meaning principally a reduction in the number of parts required, also results in increased reliability of the dispensing mechanism inasmuch as there are fewer parts subject to failure or malfunction.

The lowering bar 31 may, if desired, be provided with a series of undulations 33 in alignment with the bottle column thereabove for the purpose of discouraging transverse movement of a bottle resting on the lowering bar and maintaining alignment thereof during the descent of the bottle.

The lowering bar 31 is supported at its ends by a pair of arms 34 which are pivotally mounted at 36 to a stationary portion of the dispensing mechanism. Raising and lowering of the bar 31 is effected by oscillation of a pair of cam plates 37 having slots 38 therein for receiving follower rollers 39 pivotaliy secured to the arms 34 intermediate their ends. The cam plates 37 are secured to a shaft 41 extending transversely across the front of the dispensing mechanism and carried by suitable bearing supports 42. The shaft 41 has a crank arm 43 secured thereto which, in turn, is pivotally connected to a force transmitting push rod 44. By reference to FIGS. 2 and 7 it will be observed that upward movement of push rod 44 effects clockwise rotation of shaft 41 and cam plates 37 secured thereto. The configuration of cam slots 38 and the disposition of followers 39 with respect to shaft 41 and pivots 36 is such that clockwise rotation of cam plates 37 away from the position shown in FIG. 2 raises followers 39, causing counterclockwise swinging movement of arms 34 about their pivots 36 and raising lowering bar 31. Similarly, counterclockwise movement of cam plates 37 away from the position shown in FIG. 7 effects clockwise movement of arms 34, to lower bar 31.

The push rod 44 attached to crank arm 43 is connected to any suitable drive system (not shown) which may be manual or otherwise. An electric motor may, for example, be employed to effect reciprocating motion of the push rod. It should be apparent that such a drive system, whether manual or motorized, would simply perform the function of oscillating crank arm 43 and shaft 41 so as to cause cam plate 37 to oscillate from the position thereof shown in FIG. 2 to the position thereof shown in FIG. 7 and then back to the FIG. 2 position, whereby the lowering of a selected bottle column and the bottle released therefrom is effected.

Selective Drive and Interlock

The gates 13 which form part of the releasing means for the several columns of bottles 11 are selectively connected to the drive elements for the lowering bar 31 by means of a selection and interlock system including a selector bar 46 (see FIGS. 1, 2 and 9). This selector bar extends transversely of the dispensing mechanism at the front thereof in the vicinity of the gates 13 and is supported for vertical reciprocating movement and longitudinal movement transversely of the bottle columns by means of two guide posts 47, which are provided with slots 48 (see FIG. 2) for slidably embracing end regions of the selector bar. Each of the guide posts 47 projects through guide openings provided therefor in the upper and lower flanges, 23 and 24, projecting forwardly from the mechanism front wall 17. The guide posts 47 slide freely in the aforesaid openings and are thus capable of transporting the selector bar 46 upwardly from the position shown in FIG. 1.

Projecting rearwardly from the lower edge of the selector bar 46 are a plurality of tabs, or projections, 49 equal in number to the number of bottle columns handled by the dispensing mechanism. These selectors tabs are adapted to engage respective fingers 51 projecting forwardly from the slides 21 of the bottle releasing means.

It will be noted that the slide fingers 51 are equidistantly spaced across the front of the dispensing mechanism. The selector bar tabs 49 are also spaced equidistantly but the spacing thereof differs from the spacing of the slide fingers 51 so that no more than one selector tab 49 may be placed in vertical alignment with one of the slide fingers 51 for any one longitudinal position of the selector bar 46. It wil be noted that in FIG. 1 the selector bar 46 is disposed in a position such that the tab 49 thereon which is farthest to the right is aligned vertically with the finger 51 of the slide 21 associated with the rightmost column of bottles 11. It will further be observed that upon vertical movement of the selector bar

46 this rightmost tab 49 will eventually be brought into engagement with the rightmost finger 51 and that continued upward movement of the selector bar 46 will result in lifting the slide 21 associated with the rightmost bottle column to open the gates 13 of that bottle column. (See FIGS. 4 and 7.) Subsequent lowering of selector bar 46 permits the lifted slide 21 to descend to close the gates 13 associated therewith. The selector bar 46 is also provided with a continuous flange 52 extending rearwardly from the top edge thereof in a position to engage the uper edge of slide fingers 51 to insure positive return of the slides 21 to their lower position when the selector bar 46 is lowered.

It will be noted from FIG. 1 that when the selector bar 46 is in the position there shown in which its rightmost tab 49 is in vertical alignment with the rightmost slide finger 51 all of the remaining fingers 49 thereof are laterally displaced from beneath their respective slide fingers 51 so that these latter slide fingers are out of the paths of movement of their respective tabs 49 as the selector bar 46 is lifted and lowered. Shifting the selector bar 46 to the left in regular increments from the position shown in FIG. 1 results in different sets of selector tabs 49 and slide fingers 51 being brought into alignment with one another. Thus, by proper longitudinal positioning of the selector bar 46 it is possible to select for subsequent actuation (through vertical movement of the selector bar) any one of the release means for the several columns of bottles.

In order to positively prevent accidental or calculated actuation of more than one release means at any one time the dispensing mechanism is, in accordance with this invention, equipped with means for positively locking the non-selected release means in their gate closed positions, shown in FIGS. 1 and 2. This locking means includes a transversely slidable locking plate 53 disposed in a vertical plane at the front of the dispensing mechanism just above the fingers 51 on the slides 21. The locking plate 53 has a plurality of release notches 54 extending upwardly from the lower edge thereof, which are equal in number to the number of columns of bottles handled by the mechanism. The notches 54 are spaced from one another similarly to the spacing of the selector tabs 49 on selector bar 46 and the notches 54 and the tabs 49 are maintained in vertical alignment by a guide block 56 secured to the front face of the locking plate 53 and slidably received in a notch 57 in flange 52 on the selector bar 46 (see FIGS. 1 and 9). The coaction of the vertically disposed guide block 56 within the notch 57 in the selector bar 46 provides for concomitant transverse sliding movement of the locking plate 53 and the selector bar 46, yet permits movement of the selector bar 46 vertically with respect to locking plate 53. It should be apparent that as a result of the vertical alignment of the selector tabs 49 and their respective release notches 54, whenever one of the selector tabs 49 is in alignment with its respective slide finger 51 a release notch 54 will also be in alignment with that slide finger 51 so as to permit vertical movement of the slide 21 which carries that particular finger 51. Furthermore, all of the remaining release notches 54 are out of vertical alignment with their respective slide fingers 51 so that a solid edge portion of the locking plate 53 is disposed within the path of upward movement of these other slide fingers 51 so as to prevent them from being moved sufficiently to open the gates 13 with which they are connected. Consequently, the gates 13 of all but the one selected bottle column are locked against opening so that a bottle may be released from but one column at a time.

The locking plate 53 is preferably supported, at least in part, by one or more detent rollers 58 which are carried on the mechanism front wall 17 for engagement and cooperation with serrated edges 59 of openings provided in the locking plate 53. The spacing of the serrations on plate edges 59 correspond to the increments of

movement of the locking plate 53 and selector bar 56 necessary to shift the selection from one bottle column to an adjoining bottle column. The detent action of the rollers 59 on serrated edges 59 provides a degree of positive positioning for the locking palte 53 and the selector bar 46 in each of their several selection positions. In addition, the selecting system may, if desired, be provided with additional guide blocks 61 affixed, in any suitable manner, to the front face of locking plate 53 for cooperation with a guide projection 62 projecting rearwardly from the left-hand support post 47. These guide blocks 61 are provided with pointed lower ends for guiding the projection 62 either to the outside of the endmost projections or between two projections to positively position the locking plate 53 and the selector bar 46 as the bar 46 and the support posts 47 are moved upwardly to commence the release of a bottle from one of the bottle columns. As soon as the guide projection 62 is raised sufficiently to come in contact with the guide blocks 61 the locking plate 53 and the selector bar 46 become locked against transverse movement, so as to preclude shifting of these members and the selection of a different bottle column after the mechanism has commenced to undergo a bottle releasing sequence of operation.

It is common practice to provide a movable selector operator, or knob, on the front of selective bottle vending machines to enable the purchaser to select the particular flavor of drink which he wishes to purchase. The operator is not illustrated in the drawings inasmuch as it is felt that such devices are well known and well understood by those skilled in this art. An operator of this type is connected to the dispensing mechanism of this invention by means of a suitable linkage, including elements such as a bell crank 63, a rod 64 attached to the crank and to a bearing member 66 carried by the locking plate 53, whereby movement of the selector operator is transmitted to the locking plate 53. Selective transverse movement of the locking plate 53 is transmitted to the selector bar 46 via the guide block 56, as discussed previously.

Vertical reciprocation of the selector bar 46 to actuate the selected release means of any one of the bottle columns is effected in synchronized relationship with movement of the lowering bar 31. A simple mechanical linkage between these two elements is provided in the form of two rod-like links 68 each of which has the lower end thereof pivotally connected to one of the oscillatable cam plates 37 and its upper end pivotally connected to one of the support posts 47 which carry the selector bar 46. As is apparent from comparing FIGS. 2 and 7, clockwise rotation of the cam plates 37 causes links 68 to push upwardly on support posts 47 to slide these posts upwardly and move one of the selector tabs 49 into engagement with the finger, 51 on the selected slide 21. Similarly, counterclockwise movement of cam plates 37 from the position shown in FIG. 7 effects lowering of the support posts 47 and the selector bar 46 carried thereby.

There is lost motion provided between the selector tabs 49 and their slide fingers 51 so that the gates 13 are not affected during initial upward movement of the selector bar 46 from the position shown in FIG. 2. This delay in actuation of the gates 13 following initiation of a bottle releasing sequence, plus the additional movement of the selector bar 48 and the slides 21 necessary to move the gates 13 to fully open position, is sufficient to enable the lowering bar 31 to be raised to its elevated position to receive the lowermost bottle descending from one of the columns. It is preferable that the lowering bar 31 be raised to its uppermost position prior to the cam plate 37 reaching its limit of clockwise movement so that the cam slot 38 may include a dwell portion 69 of constant radius. By this construction, the lowering bar 31 can be caused to dwell in its uppermost position while the cam plate 37 continues to move clockwise to effect the final upward movement of selector bar 46 and final opening of the selected gates 13.

During lowering movement of the lowering bar 31, i.e. movement away from the position of the bar illustrated in FIG. 7 and which is produced by counterclockwise movement of cam plate 37, there exists another period of lost motion between the selector bar 46 and the finger 51 of the slide 21 which has been raised by the selector bar 46. This is the result of the vertical spacing of the selector tabs 49 and the top flange 52 on the selector bar 46. As can be seen from FIG. 7, downward movement of the selector bar 46 from the position shown will not result in any positively induced downward movement of slide 21 until flange 52 is moved down into engagement with finger 51 on the slide 21. The cam plate 37 is thus able to commence downward movement of the lowering bar 31 before gates 13 are positively driven to their closed position, thereby allowing sufficient downward movement of the bottle column to insure that the lowermost bottle is beneath the gates 13 before they are closed to engage the bottle next above and regain support for the remainder of the bottle column. On the other hand, subsequent engagement of flange 52 with finger 51 insures positive closure of the gates 13 to prevent more than one bottle from being released from a column at any one time.

Empty Signalling

It is common practice in the vending and dispensing art to provide some means visible to the prospective purchaser for indicating that one or more, as the case may be, of the flavors or articles being dispensed are "sold out." In accordance with this invention, the dispensing mechanism is equipped with a simple, yet effective, means for signalling or indicating to the prospective customer whether the column of bottles which he selects has at least one bottle available to be dispensed from that column. Because some of the columns may have such a bottle available while others may not, the signalling system itself need be selective, so as to give the customer a positive indication with respect to the particular column which he may select and not create confusion by signalling with respect to the remaining columns in the dispensing mechanism.

The existence of bottles in the bottle column is sensed by a plurality of sensing plates 71 which are pivotally carried by a shaft 72 mounted on the upper portion of the dispensing mechanism. Each sensing plate 71 is adapted to lie flush against the rear face of the front wall 17 of the dispensing mechanism when engaged by the butt end of the second bottle from the bottom in the bottle column with which it is associated. Biasing means, in the form of a coil spring 73 is provided for swinging each sensing plate 71 upwardly (counterclockwise as viewed in FIG. 2) in the absense of this second bottle in that column. Each sensing plate 71 has secured thereto an actuating cam 74 which cooperates with a selector arm 76 extending across the front of the dispensing mechanism in the vicinity of the several cams 74. As best shown in FIG. 3, the selector arm 76 has a plurality of projections 81 extending rearwardly from the upper edge thereof for selective engagement with respective ones of the cams 74.

The arm 76 is carried for pivotal movement on a pair of pivot pins 77 which permit the arm to move about a horizontal axis extending lengthwise of the arm. The pins 77 are mounted on upwardly projecting extensions 75 of the locking plate 53 so that the selective arm 76 undergoes longitudinal movement which is concomitant with movement of the locking plate 53. The arm 76 is provided with a push plate 78 which projects upwardly from a central region thereof in position to actuate a stationarily mounted electrical switch 79.

The several cams 74 associated with the several sensing plates 71 are spaced equidistant across the dispensing mechanism. The selector arm projections 81 are also spaced equidistant but the spacing differs from the spacing of the cam 74 so that only one sensing projection 81 may be brought into alignment, or registry, with one of the cams 74 in any one of the several positions which the arm 76 may assume. The arrangement of the projections 81 and the cam 74 is such that the cam for a particular bottle column and its corresponding projection 81 will be brought into alignment when the locking plate 53 and the selector bar 46 are brought to the position for selecting that bottle column. If that particular column has but one bottle 11 therein the sensing plate 71 will have been swung upwardly by its spring 73 so as to dispose a portion of its cam 74 in a position to engage the corresponding projection 81 on arm 76 as that projection is moved into alignment with that cam. Engagement of any one of the cams 74 with its respective projection 81 causes arm 76 to tilt forwardly about its pivot pin 77, moving push plate 78 into engagement with a portion of switch 79 to actuate the switch. Of course, if there are at least two bottles in the selected column the second bottle will hold the sensing plate 71 for that column down so that the cam 74 attached to that sensing plate 71 does not contact its projection on the arm 76 and the switch 79 remains unactuated. In a sense, the switch 79 can be said to function as a means for sensing engagement of any of the arm projections 81 by their respective cams 74.

The switch 79 can be employed in any one of several common empty control circuits (not shown) so as to energize, for example, an electric lamp to illuminate a "sold out" or "empty" sign or to energize a solenoid to move a locking plate over the coin inlet opening for the machine. Similarly, the switch 79 may be employed to open the circuit to a coin reject system of the coin receiving mechanism so as to effect the return of coins in the event the switch has been actuated indicating the unavailability of a bottle in the column selected.

It will be noted that in the dispensing mechanism shown in the drawings and as here described the switch 79 is actuated when a column is selected which still has one bottle therein. As a matter of convenience in reloading the dispensing mechanism with bottles it is desirable that one bottle be present in the mechanism, i.e. remain from the preceding loading. It should be apparent, however, that the empty signalling system described above may be arranged so as to actuate switch 79 only when all of the bottles in any one column have been released. Then sensing plate 71 may, for example, be extended downwardly so as to be engageable by the butt end of the lowermost bottle so that this plate senses the presence of a bottle at the lowermost bottle location and is not free to swing upwardly until the last bottle has been released.

Anti-Theft Features

It is recognized in the vending art that individuals sometimes seek to surreptitiously remove articles stored in a coin-controlled vending machine. To guard against such thefts the dispensing mechanism of this invention incorporates several features which make it exceedingly difficult to effect the release of a bottle therefrom, other than in the intended manner, by any effords short of actual destruction of components of the mechanism.

As pointed out previously, the selector bar 46, which extends across the front of the releasing mechanism and selectively effects actuation of the releasing means for the individual bottle columns, is provided at its upper edge with a flange 52 which bears down on slide fingers 51 when the selector bar is in its lowered position. Thus, this flange 52 prevents upward movement of the several slides 21 and, therefore, prevents manual opening of the releasing gates 13 through manual manipulation of the individual slides 21.

In addition, the toggle links 22 connecting the slides 21 to their respective gates 13 are so arranged as to occupy an "over-center" position when the gates 13 are closed and their slides are in their lowered position. It will be noted from FIG. 5 that the pivotal connections

between the links 22 and the slide 21 are disposed below the pivotal connections of these links 22 to the gate arms 14. With this disposition of the linkage elements, attempts to manually open the gates 13 by forcing the gates apart merely results in the slide projection 26 being pressed more firmly against the stationary flange 24. The limit stop effect of the projection 26 prevents further downward movement of the slide 21 and thereby prevents operation of the gates 13.

The dispensing mechanism also may include, as shown in the drawings, a guard plate, or screen, 85 which extends transversely beneath the several bottle columns, is pivotally supported at 86 for swinging movement about its rear edge and is supported at its front edge by means of two fingers 87 which rest on end portions of the lowering bar 31. The front edge of the guard plate 85 moves up and down with the lowering bar 31 and, when the bar 31 is in its uppermost position the guard plate 85 effectively prevents access to the bottle columns through the region behind the lowering bar and prevents surreptitious removal of bottles from the column whose gates 13 are open.

The guard plate 85 also additionally functions as an extension of the delivery chute 32 and assists in guiding bottles released from the columns down onto that chute (see FIG. 7).

From the foregoing it should be apparent that this invention provides an improved dispensing mechanism for use in multi-product vending machines and the like, which mechanism, while utilizing relatively few components, is effective to selectively release frangible articles such as bottles from any one of a plurality of stacked columns and of handling such articles in a positive but gentle manner.

It is of course to be understood that the invention is not limited to a dispensing mechanism having any particular number of bottle columns inasmuch as the principles of the invention can be employed in a mechanism for handling a greater or lesser number of columns than that shown.

While the invention has been shown and described with reference to but a single embodiment thereof, it is to be understood that the invention is not limited thereto and that certain changes and modifications may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. In dispensing apparatus, the combination of a plurality of columns of articles to be dispensed, respective releasing means engaging the lowermost article in each of said columns for supporting each column, each of said releasing means being actuatable from a first condition in which it prevents delivery of an article from its column to a second condition in which it permits the delivery of an article from its column, a single lowering member having at least some portion thereof disposed beneath each of said article columns, means supporting said lowering member for movement from a position of repose spaced beneath the lowermost articles in said columns to a raised position adjacent said lowermost articles and in such relation to each of said releasing means as to receive an article released by said releasing means, motive means for effecting movement of said member from its position of repose to its raised position and back to its repose position, and means selectively coupling said motive means to one of said releasing means for actuating the selected releasing means from its first condition to its second condition as said lowering member approaches its raised position and for actuating said releasing means from its second condition to its first condition as said lowering member is moved away from its raised position.

2. In apparatus for dispensing articles from a plurality of side-by-side article columns, the combination of respective releasing means engaging the lowermost article in each article column for supporting that column and for releasing a single article from that column when actuated, a unitary lowering bar positioned beneath said article columns and extending transversely thereof, said bar being positioned intermediate the ends of the articles in said columns and having at least some portion thereof disposed beneath each article column, means supporting said bar for movement from a lowered position spaced beneath the lowermost articles in said columns to a raised position adjacent said lowermost articles and in such relation to each of said releasing means as to receive an article released by said releasing means, motive means for effecting movement of said bar from its lowered position to its raised position and back to its lowered position, and means selectively coupling said motive means to any one of said releasing means for actuating the selected releasing means as said bar is moved to its raised position.

3. In a mechanism for releasing elongated articles of circular cross section from the bottom of a stacked column, the combination of a pair of gate members extending from front to rear of the column, means supporting said gate members for movement transversely of the article column toward and away from one another for respectively preventing and permitting the delivery of an article from said column, said supporting means including pivotally mounted arms joined respectively to said gate members, a slide positioned between said arms and mounted for reciprocating movement in a plane normal to the pivotal axes of said arms, a pair of toggle links respectively connecting said slide to said arms, the pivotal axis of each arm being disposed intermediate the gate member and the connecting point with its associated link, the arrangement being such that upward movement of said slide is transmitted by said links to said arms to move said gate members away from one another, and downward movement of the slide is transmitted to said gate members to move said members toward one another, and a stop limiting downward movement of said slide, the connecting points between said links and said slide being positioned to pass through a line extending through the connecting points between said links and said arms as said slide is moved downwardly to said stop, said gate members being disposed a substantial distance from each other and above said pivotal axes when said slide is against said stop, whereby manual movement of said gate members upwardly and away from one another is prevented when said slide is against said stop.

4. In apparatus for selectively dispensing articles from a plurality of side-by-side article columns, the combination of respective releasing means for said article columns, each of said releasing means comprising a member mounted for reciprocating movement in a vertical plane to effect release of an article from the column with which it is associated, a horizontally disposed selector bar extending transversely of said article columns, means supporting said selector bar and providing for vertical reciprocating movement and longitudinal movement of the bar, said selector bar having a plurality of tabs thereon at least equal in number to the number of article columns and being adapted to respectively engage said members when said bar is vertically reciprocated, said tabs being spaced longitudinally along said bar with the spacing therebetween differing from the spacing between said members whereby but one of said tabs can be aligned with its respective member at one time, a locking plate disposed in the path of movement of each of said members, said locking plate having a plurality of notches therein adapted to be placed in registry with said members to permit movement of the members, the spacing of the notches in said plate corresponding to the spacing of the tabs on said selector bar, whereby but one of said notches can be placed in registry with a member at any one time, means for simultaneously effecting longitudinal positioning of said selector bar and said locking plate to permit actuation of a selected one of said members, and motive means for effecting vertical re-

ciprocating movement of said selector bar to effect release of an article from the selected article column.

5. In apparatus for selectively dispensing articles from a plurality of article columns, respective releasing means for said article columns, the combination of each of said releasing means comprising an actuator mounted for reciprocating movement to effect release of an article from the column with which it is associated, a selector bar extending in proximity to each of said article columns, means supporting said selector bar and providing for transverse movement and longitudinal movement of the bar, said selector bar having a plurality of tabs thereon at least equal in number to the number of article columns and being adapted to respectively engage said actuators when said bar is moved transversely, said tabs being spaced longitudinally along said bar with the spacing therebetween differing from the spacing between said actuators whereby but one of said tabs can be aligned with its respective actuator at one time, a plurality of sensing means respectively associated with said article columns, each of said sensing means including a member movable from a first position to a second position upon sensing the absence of an article at a particular location in its column, a selector arm extending in proximity to each of said members, said arm having a plurality of projections thereon adapted to respectively occupy positions of registry within the paths of movement of said members, the spacing of said projections differing from the spacing of said members whereby but one of said projections can be placed in registry with a member at one time, means supporting said arm for longitudinal movement, means for simultaneously effecting longitudinal positioning of said selector bar and said selector arm to place in registry the projection and the sensing member for the article column selected by said selector bar, and means for sensing engagement of said projections by their respective members.

6. In apparatus for selectively dispensing articles from a plurality of side-by-side article columns, the combination of respective releasing means for said article columns, each of said releasing means comprising a slide mounted for reciprocating movement to effect release of an article from the column with which it is associated, a selector bar extending transversely of said article columns, means supporting said selector bar and providing for transverse reciprocating movement and longitudinall movement of the bar, said selector bar having a plurality of tabs thereon at least equal in number to the number of article columns and being adapted to respectively engage said slides when said bar is reciprocated, said tabs being spaced longitudinally along said bar with the spacing therebetween differing from the spacing between said slides whereby but one of said tabs can be aligned with its respective slide at one time, a plurality of sensing means respectively associated with said article columns, each of said sensing means including a member movable from a first position to a second position upon sensing the absence of an article at a particular location in its column, a selector arm extending transversely of said article columns, said arm having a plurality of projections thereon adapted to respectively occupy positions of registry within the paths of movement of said members, the spacing of said projections differing from the spacing of said members whereby but one of said projections can be placed in registry with a member at one time, means supporting said arm for longitudinal movement, means for simultaneously effecting longitudinal positioning of said selector bar and said selector arm to place in registry the projection and the sensing member for the article column selected by said selector bar, and means for sensing engagement of said projections by their respective members.

7. In apparatus for selectively dispensing articles from a plurality of side-by-side article columns, the combination of a releasing means for each column, each releasing means comprising a pair of gate members extending from front to rear of each column, a vertically reciprocable member, and means for supporting and for effecting movement of said gate members transversely of the article column toward and way from one another for respectively preventing and permitting the delivery of an article from the column upon movement in one direction and the opposite direction respectively of said vertically reciprocable member, a horizontally disposed selector bar extending along said article columns, means supporting said selector bar and providing for vertical reciprocating movement and longitudinal movement of the bar, said selector bar having a plurality of tabs thereon at least equal in number to the number of said article columns and being adapted to respectively engage said reciprocable members when said bar is reciprocated, said tabs being spaced longitudinally along said bar with spacing therebetween differing from the spacing between said reciprocable members whereby but one of said tabs can be aligned with its respective member at one time, and motive means for effecting vertical reciprocating movement of said selector bar to effect release of an article from the selected article column.

8. In apparatus for selectively dispensing articles from a plurality of side-by-side article columns, the combination of a releasing means for each column, each releasing means comprising a pair of gate members extending from front to rear of each column, a vertically reciprocable member, and means for supporting and for effecting movement of said gate members transversely of the article column toward and away from one another for respectively preventing and permitting the delivery of an article from the column upon movement in one direction and the opposite direction respectively of said vertically reciprocable member, a horizontally disposed selector bar extending along said article columns, means supporting said selector bar and providing for vertical reciprocating movement and longitudinal movement of the bar, said selector bar having a plurality of tabs thereon at least equal in number to the number of said article columns and being adapted to respectively engage said reciprocable members when said bar is reciprocated, said tabs being spaced longitudinally along said bar with spacing therebetween differing from the spacing between said reciprocable members whereby but one of said tabs can be aligned with its respective member at one time, a single lowering member having at least some portion thereof disposed beneath each of said article columns, means supporting said lowering member for movement from a position of repose beneath the lowermost articles in said columns to a raised position adjacent said lowermost articles, said lowering member in said raised position being disposed in such relation to the gate members of each column as to receive an article released by said gate members, and motive means for effecting movement of said lowering member from its position of repose to its raised position and back to its position of repose and for effecting vertical reciprocating movement of said selector bar to effect release of an article from the selected article column, the arrangement being such that the gate members are moved away from one another to release an article as said lowering member approaches its raised position and are moved towards each other as said lowering member moves downwardly.

9. In apparatus for selectively dispensing articles from a plurality of side-by-side article columns, the combination of

a releasing means for each of a plurality of said columns, each releasing means comprising

at least one gate member extending from front to rear of the column,

a vertically reciprocable member, and

means for supporting and for effecting movement of said gate member transversely of the article column toward and away from a position beneath the lowermost article in the column for respectively preventing and permitting the delivery of said lowermost article from the column upon movement in one direction

and the opposite direction respectively of said vertically reciprocable member,

a horizontally disposed movable structure extending along said article columns, and comprising

an engaging element for each of said reciprocable members,

means for selectively positioning one of said engaging elements in registry with its associated reciprocable member, and

means for effecting vertical movement of said movable structure to actuate the releasing means whose reciprocable member is in registry with an engaging element.

10. In apparatus for dispensing elongated articles of circular cross section from a plurality of side-by-side article columns, the combination of

respective releasing means engaging the lowermost article in each of said columns for supporting each column, each of said releasing means being actuatable from a first condition in which it prevents delivery of an article from a column to a second condition in which it permits the delivery of an article from a column,

a lowering mechanism comprising

an article supporting element for each column,

motive means for raising and lowering all of said supporting elements concurrently, and

means for actuating a selected one of said releasing means in timed relation to movement of said lowering mechanism to release the lowermost article in the selected column as said lowering elements are at or near their uppermost positions.

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Hereby dedicates to the Public the entire remaining term of said patent.

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