March 17, 1964 M. W. NEWBERRY 3,125,245

ARTICLE DISPENSING MECHANISM

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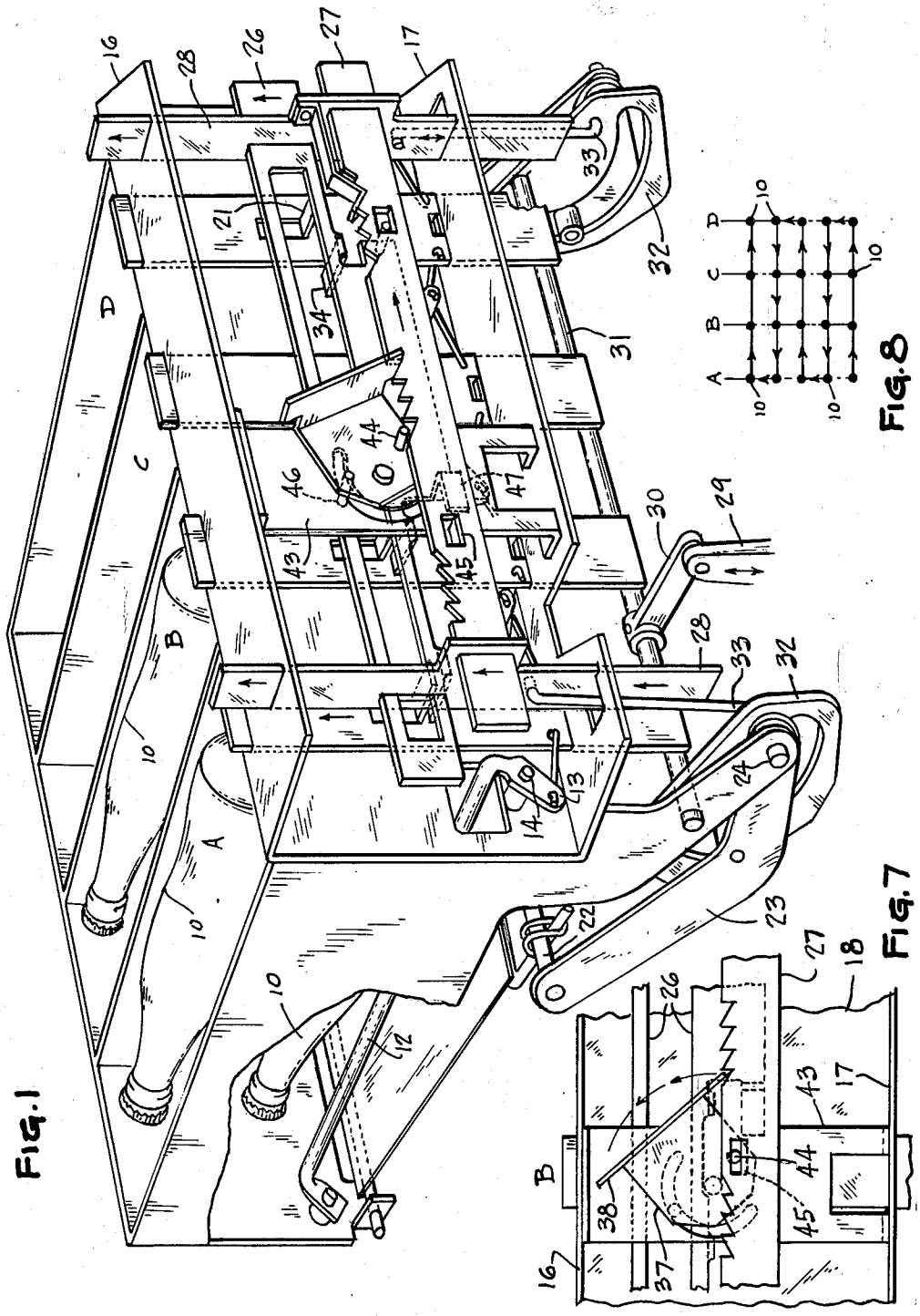


Fig. 1

Fig. 8

Fig. 7

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FIG. 2

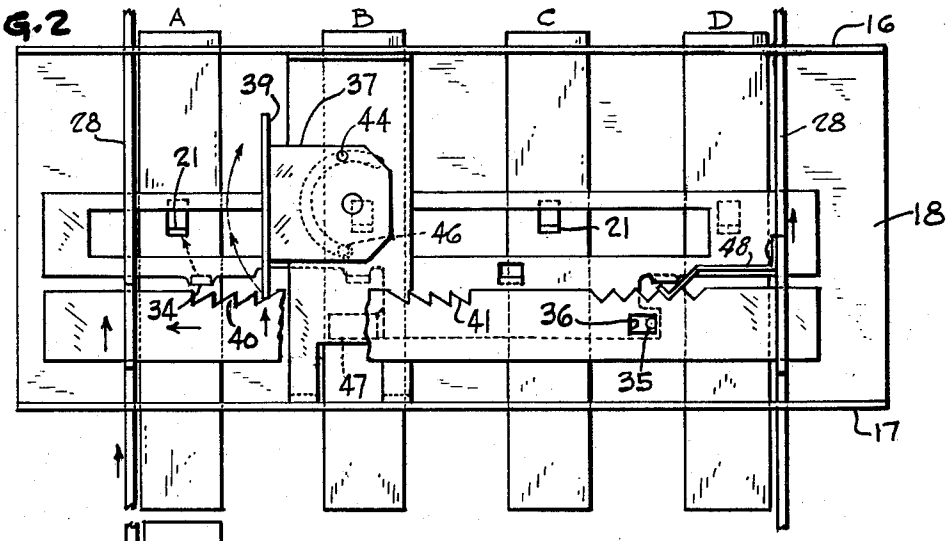


FIG. 3

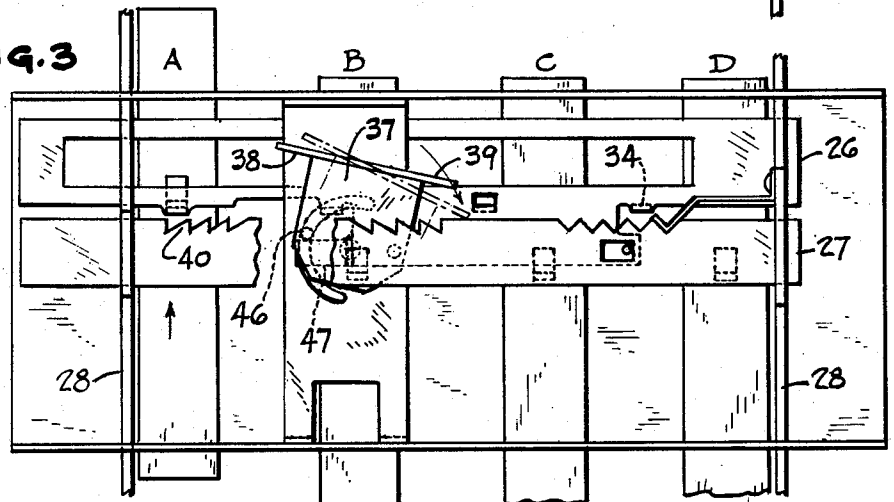
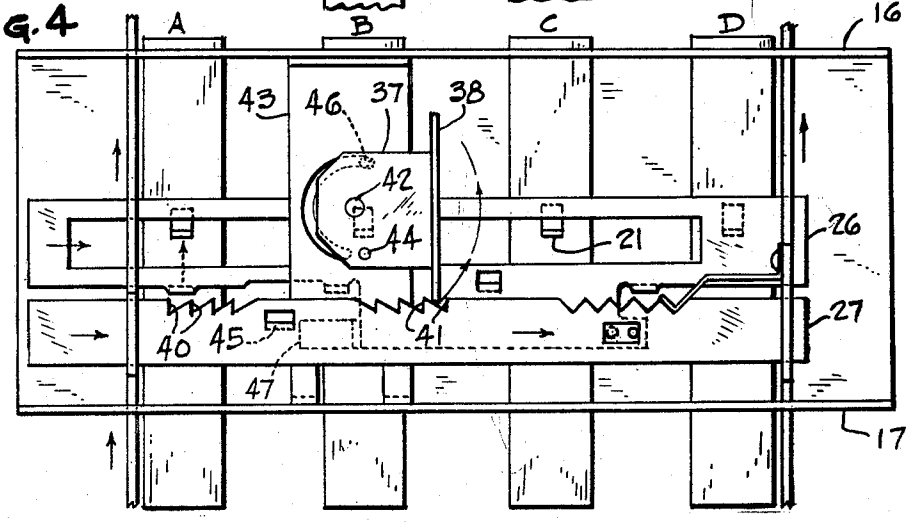


FIG. 4



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FIG. 5

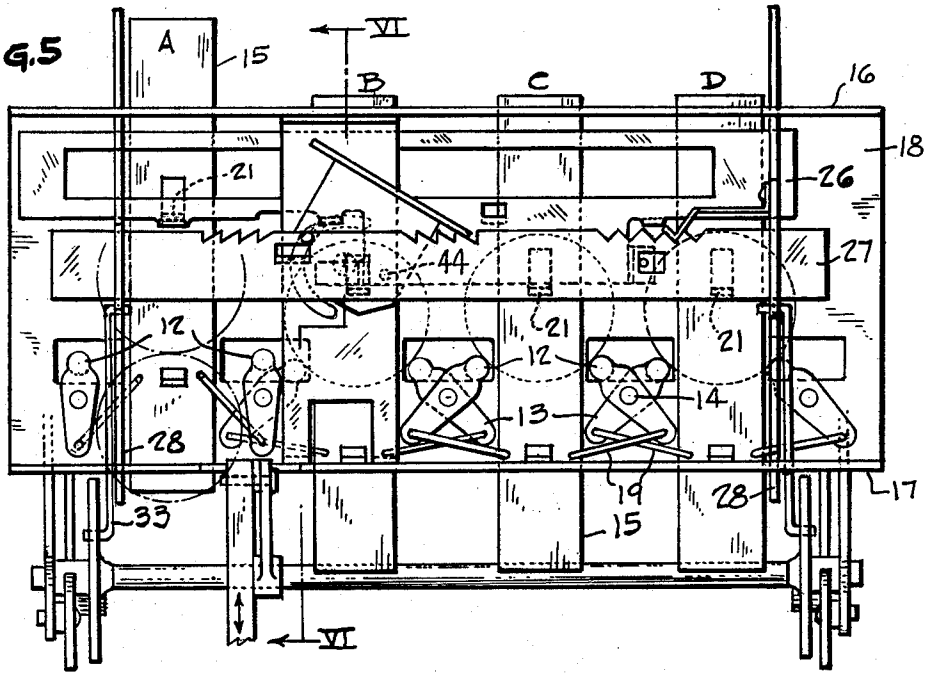
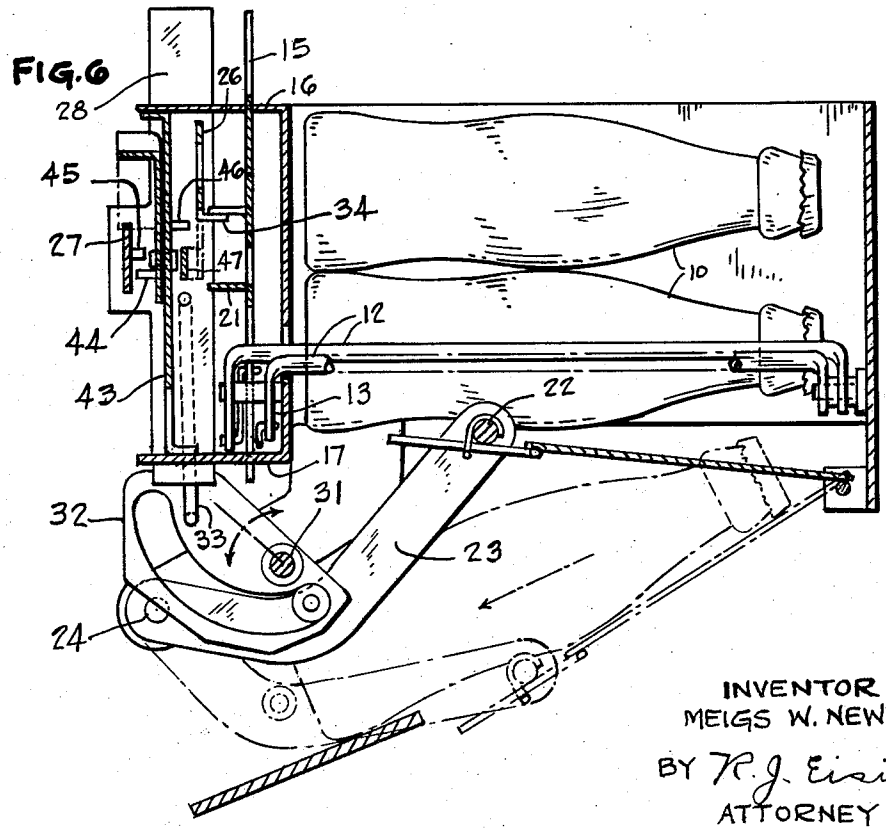


FIG. 6



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3,125,245

ARTICLE DISPENSING MECHANISM

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Filed Sept. 18, 1961, Ser. No. 138,646
4 Claims. (Cl. 221—114)

This invention relates to a mechanism for operating a plurality of other mechanisms one at a time in predetermined sequence, and particularly for alternately operating all the mechanisms once in a predetermined sequence and then all the mechanisms once in reverse sequence. The invention is particularly applicable, for example, to the bottle dispensing apparatus shown in my Patent No. 3,118,567, granted January 21, 1964. That apparatus includes a longitudinally movable selector bar having tabs which are adapted to register with the respective operating fingers upon longitudinal movement of the bar to different positions. It is adapted for a multi-flavor bottle vending machine wherein the user can select a desired flavor by moving the selector bar to the corresponding position.

The present invention concerns a single-flavor machine, and the object is to dispense bottles from the several columns in sequence, so that the several columns will be emptied at approximately the same rate.

The present mechanism is adapted to dispense first one bottle from each column in one sequence and then to dispense a second bottle from each column in the reverse sequence, and then continue to dispense alternately in the first or predetermined sequence and the reverse sequence. In this mode of dispensing, the releasing mechanisms for the first and the last columns should be operated twice in succession, first to release the last bottle of one sequence and then to release the first bottle of the next sequence.

It is an object of the present invention to provide a sequencing mechanism which will first effect operation of all the mechanisms in predetermined sequence and then effect operation of all of the mechanisms in reverse sequence, and then continue to operate the mechanisms alternately in the first-mentioned sequence and then in the reverse sequence.

A more particular object is to provide a mechanism for actuating a selector bar longitudinally to successive positions and simultaneously to operate the operated mechanisms, and to alternately reverse the direction of movement of the bar upon completion of movement in one direction.

A further object is to provide a sequencing mechanism which will operate the first and the last operated mechanisms twice in succession, first as the last step of one sequence and then as the first step of the next sequence.

The foregoing and other objects are effected by the invention as will be apparent from the following description taken in connection with the accompanying drawing, forming a part of this application, in which:

FIG. 1 is a perspective view of bottle dispensing apparatus provided with a sequencing mechanism in accordance with the present invention;

FIG. 2 is a front elevation of the sequencing mechanism, showing its position prior to actuation of the first column as the last step of a right to left sequence;

FIG. 3 is a similar view of the mechanism in the course of actuation of the first column;

FIG. 4 is a similar view showing the mechanism after actuation of the first column and ready for another actuation of the first column as the first step in the succeeding sequence, which is left to right;

FIG. 5 is a similar view showing the mechanism in the course of the second actuation of the first column;

FIG. 6 is a vertical section taken on the line VI—VI of FIG. 5;

FIG. 7 is a fragmentary elevational view showing the pawl being swung counterclockwise at the end of a left to right sequence; and

FIG. 8 is a schematic view showing the sequencing pattern of the delivered products.

Referring to the drawings in detail, the invention is shown incorporated in a bottle dispensing apparatus of the type disclosed and claimed in my mentioned Patent No. 3,118,567, comprising four bottle columns A, B, C and D. The releasing mechanism for each column comprises a pair of gate members **12** (see FIG. 5) having downwardly extending levers **13** pivoted at **14**. The gate members are movable toward each other to hold the lowermost bottle **10** and away from each other to release the lowermost bottle. The releasing means further comprises a vertically slidable member or plate **15** slidable in flanges **16** and **17** extending forwardly from a front wall **18**. The front wall **18** and its flanges **16** and **17** are part of the stationary supporting structure of the bottle dispensing apparatus. The lower ends of the levers **13** are connected to the slide member **15** by links **19** arranged so that, in the lowermost position of the slide member **15**, the gates **12** are moved toward each other to hold a bottle, and in the raised position of the slide member the gate members are moved apart to release the lowermost bottle, all as clearly shown in FIG. 5. The slide member **15** is provided with a forwardly extending finger **21** whereby the slide member is adapted to be raised for operating the releasing means.

A lowering bar **22** shown in FIG. 6 extends transversely of the bottles and is adapted to receive and lower the lowermost bottle from the releasing means whose gates are open. The bar **22** is fixed to the movable ends of, and is actuated by, levers **23** movable about a stationary pivot **24**.

The sequencing mechanism of the present invention comprises a horizontally elongated selector member or bar **26** and a horizontally elongated member or bar **27** for actuating the selector bar **26**. The members or bars **26** and **27** extend through, and are horizontally movable in, openings in guide posts **28**. The latter, in turn, extend through, and are vertically movable in, openings formed in the horizontal flanges **16** and **17**. Thus, the members **26** and **27** are vertically movable, in fixed vertical relation to each other, by vertically moving the posts **28**. To effect such actuation, power is applied (see FIG. 1) through a link **29** and a lever **30** to a shaft **31**, thence through levers **32** fixed thereon and links **33** to the posts **28**, all as will be apparent from the drawings.

The selector member or bar **26** is formed with a plurality of rearwardly extending tabs **34** for engaging the fingers **21** of the several releasing means. The tabs **34** are spaced so that, in the position of the selector bar furthest to the left, the tab **34** furthest to the left is in vertical alignment with the finger **21** of the column A, and so that upon successive movements of the selector bar **26** to the right, the tabs **34** come into registry successively with the respective fingers **21** of the columns B, C and D. The spacing is also such that not more than one finger **21** can ever be engaged by a tab **34** at any one time.

The selector bar **26** is horizontally moved by the actuator bar **27** through a lost-motion connection comprising a pin **35** carried by the selector bar and extending through an opening **36** formed in the actuator **27**. The purpose of the lost-motion connection will be explained later.

To effect horizontal movement of the member **27**,

there is provided a ratchet mechanism which comprises a pawl 37 having fingers 38 and 39 engageable with ratchet teeth 40 and 41, respectively, formed in the actuator 27. The pawl 37 is pivoted at 42 on a stationary support plate 43 attached to the stationary flanges 16 and 17.

The ratchet teeth 40 and 41 are provided by forming notches in the actuator bar 27 as shown on the drawing. The teeth 40 are disposed to the left of the pawl 37 and of a form to move the bar 27 to the left upon engagement with the finger 38, and the teeth 41 are disposed to the right of the pawl and of a form to move the bar 27 to the right upon engagement with the finger 39. The vertical surfaces of the end notches are considered as ratchet teeth for the purpose of this case.

To swing the pawl 37 from the left-hand position shown in FIG. 2 to the right-hand position shown in FIG. 4, it is provided with a pin 46 extending rearwardly through an arcuate slot in the support plate 43 and adapted to be engaged by a finger 47 carried by the selector bar 26 and positioned to be in vertical alignment with the pin 46 when the bars 26 and 27 are at the left-hand end of their travel, as shown in FIG. 3. To swing the pawl in the opposite direction, from the right-hand position shown in FIG. 4 to the left-hand position shown in FIG. 2, it is provided with a forwardly extending pin 44 adapted to be engaged by a tab 45 extending rearwardly from the actuator bar 27 and positioned to be in vertical alignment with the pin 44, as shown in FIG. 7, when the bars 26 and 27 are at the right-hand end of their travel. Each of the elements for actuating the pins 44 and 46, in this case the tab 45 and the finger 47, may be carried by either of the bars 26 and 27 as long as it is positioned to be in vertical alignment with the pin that it is to actuate at the end of the respective horizontal movement of these bars.

A spring 48 attached to one of the guide posts 28 is formed with a detent adapted to engage in one of the notches in the actuator bar 27 for resiliently retaining the same in the position to which it is adjusted. Suitable provision may also be made for resiliently retaining the selector bar 26 in the position to which it is moved.

Operation

Assume that the sequencing mechanism is in the position shown in FIG. 2, in which the bars 26 and 27 are in the course of a sequence moving to the left and in which a bottle has most recently been dispensed from column B. To dispense the next bottle, from column A, the guide posts 28 are moved upwardly to the position shown in FIG. 3. As the bars 26 and 27 move upwardly, the finger 38 of the pawl engages one of the teeth 40 and is moved to the left along an arc indicated by the curved line of arrows until the finger reaches the level of the pivot 42. This movement to the left, transmitted to the selector bar 26 through the lost-motion connection, brings the tab 34 for column A into alignment with the finger 21 for that column and moves the same upwardly to the position shown in FIGS. 3 and 5, thereby opening the gates 12 to release a bottle. At the same time, the bar 22 is raised to receive the lowermost bottle. During this upward movement, the finger 47 moves into vertical alignment with the pin 46, as shown in FIG. 3, and swings the pawl 37 clockwise past center, so that as the members 26 and 27 return to lowermost or normal position, the pawl 37 drops down to the right-hand position shown in FIG. 4. This completes one sequence from the right-hand end to the left-hand end.

To begin the next sequence, a bottle should now be dispensed from column A. This is effected as follows: Upon the next upward movement of the guide posts 28, the finger 39 of the pawl 37 engages the first tooth 41 in the actuator bar 27, so that upon upward movement, the bar 27 is moved to the right. However, the right-hand movement is equal to the lost motion provided by the pin 35 and the opening 36, so that at this time the selector bar 26 is not moved to the right, but remains in the position with its tab 34 in vertical alignment with the finger 21 of column A, so that a bottle is again dispensed from column A. Upon downward movement of the members 26 and 27, the finger 39 of the pawl 37 engages in the second notch from the right, so that upon the upward movement of the next dispensing operation, the member 27 is moved one unit of length to the right, carrying with it the selector bar 26 to bring the tab 34 and the finger 21 for column B into registry, and upon downward movement of the bars 26 and 27, the finger 39 engages in the next notch. The next bottle is dispensed from column C, after which the next dispensing operation, for column D, brings the tab 45 on the actuator bar 27 into registry with the pin 44, as shown in FIG. 7, to swing the pawl 37 counterclockwise, or to the left, for subsequent actuation of the bar 27 to the left.

Upon the first dispensing operation thereafter, the finger 38 engages the first tooth 40 to move the actuator bar to the left. Its movement at this time is equal to the lost motion provided by the lost-motion connection 35–36, so that the selector bar 26 remains in position for dispensing the first bottle of the next sequence, right to left, from column D.

Upon the next dispensing operation, the selector bar 26 is moved to the left, through the lost-motion connection 35–36, for dispensing a bottle from column C, and the finger 38 drops into the next notch to engage the next tooth 40. In similar manner, a bottle is dispensed from column B and then from column A, when the pawl 37 is again swung to the right as shown in FIG. 3.

It will thus be seen that, because of the lost-motion connection 35–36, the first dispensing operation of a sequence is always from the same column from which the last bottle was dispensed in the preceding sequence. Thus, all the columns are operated once during each sequence, so that all the columns are emptied at the same rate. This pattern of dispensing the bottles 10 is shown in FIG. 8.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. In a multi-column vending machine, the combination of a plurality of dispensing mechanisms each having a finger for effecting operation thereof, a longitudinally movable selector bar having a plurality of tabs adapted to register with the fingers of successive dispensing mechanisms upon successive longitudinal movements of the selector bar, means for actuating said selector bar transversely thereof and thereby actuating the dispensing mechanism whose finger is in registry with a tab on said selector bar, and mechanism for moving said selector bar longitudinally from one of said positions to the next upon such transverse movement, said last-mentioned mechanism comprising a ratchet pawl pivoted on a stationary structure and two sets of ratchet teeth which are engaged successively by said pawl upon the mentioned transverse movement to effect longitudinal movement of the selector bar, one set of such ratchet teeth effecting longitudinal movement in one direction and the other set effecting longitudinal movement in the other direction.

2. The combination set forth in claim 1 and further including means for swinging said ratchet pawl from engagement with one set of teeth to engagement with the other set of teeth upon completion of longitudinal movement of the selector bar in one direction.

3. The combination with a plurality of operating mechanisms each having a movable control element for controlling the operation thereof, of a mechanism for causing operation of said mechanisms alternately in pre-

determined sequence and in reverse sequence comprising a selector rail having a projection or projections arranged to align with said control elements successively upon longitudinal movement of the selector rail to successive positions, an actuator rail disposed adjacent and parallel to said selector rail and having a lost-motion connection therewith for moving the same longitudinally, means for moving said rails transversely to cause operation of the selected operating mechanism through the registering projection and control element, and means for moving the actuator rail longitudinally comprising a first and a second set of ratchet teeth provided on said actuator rail and a pawl pivoted to stationary structure on an axis extending transversely of the actuator rail and adapted to swing about its pivot from a position in engagement with one set of ratchet teeth to a position in engagement with the other set of ratchet teeth, the pawl and the ratchet teeth being arranged so that upon transverse movement of the rails the pawl is engaged by one of the ratchet teeth and is moved longitudinally to move the selector rail from one position to the next, and means for swinging said pawl from one position to the other comprising two pins carried by said pawl and disposed on oppoiste sides of the pivot thereof and a projection or projections carried by one or more of said rails and disposed to be in registry with one of said pins upon the last transverse movement of said rails in a predetermined sequence and in registry with the other of said pins upon the last transverse movement of said rails in a reverse sequence to swing the pawl to its opposite position for movement of the actuator rail in the opposite direction to effect the next sequence of operation, the extent of the lost motion provided by said lost-motion connection being such that the lost motion is taken up and the selector rail is moved longitudinally by the actuator rail upon the second movement in said next sequence of operation.

4. In a multi-column vending machine, the combination of

a plurality of dispensing mechanisms, each having a finger for effecting operation thereof,

a stationary member,

a longitudinally movable elongated selector member having a plurality of tabs adapted to register with the fingers of successive dispensing mechanisms upon successive longitudinal movements of the selector member,

means for actuating said selector member transversely thereof and thereby actuating the dispensing mechanism whose finger is in registry with a tab on said selector member, and

mechanism for moving said selector member longitudinally from one of said positions to the next upon such transverse movement,

said last mentioned mechanism comprising a ratchet pawl pivoted on one of said members and two sets of ratchet teeth provided on the other of said members and which ratchet teeth are engaged successively by said pawl upon the mentioned transverse movement of said selector member to effect longitudinal movement thereof, one set of such ratchet teeth effecting longitudinal movement in one direction and the other set effecting longitudinal movement in the other direction,

said mechanism further comprising cooperating elements brought into registry upon longitudinal movement of the selector member to a predetermined position in each direction and operable to swing the pawl from a position in engagement with one set of ratchet teeth to a position in engagement with the other set of ratchet teeth to reverse the direction of longitudinal movement of the selector member.

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Dedication

3,125,245.—*Meigs W. Newberry*, East Longmeadow, Mass. ARTICLE DISPENSING MECHANISM. Patent dated Mar. 17, 1964. Dedication filed Oct. 7, 1974, by the assignee, *The Vendo Company*.

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

[*Official Gazette May 6, 1975.*]