May 29, 1962 M. W. NEWBERRY 3,036,730

DISPENSING APPARATUS

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FIG.1.

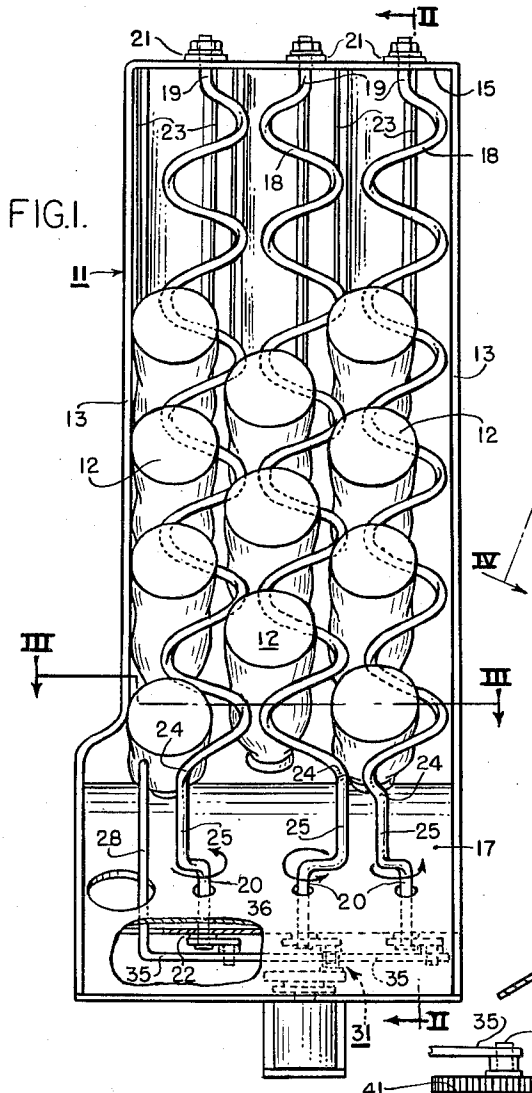

FIG.2.

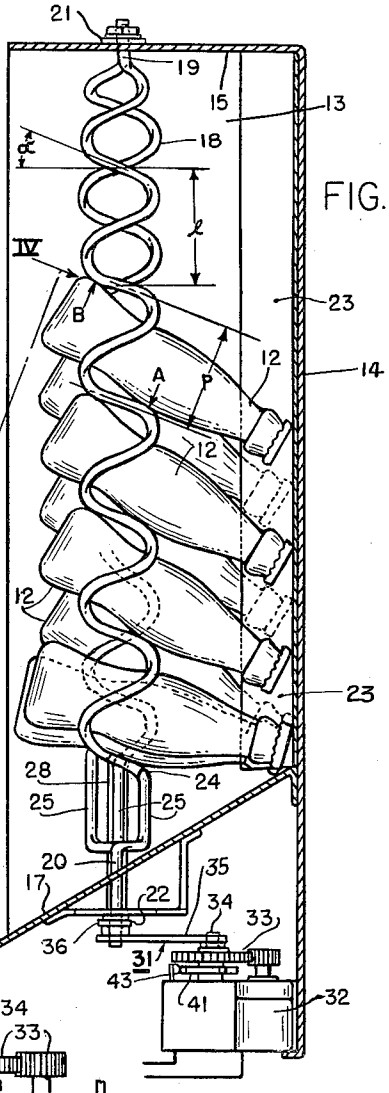

FIG.5.

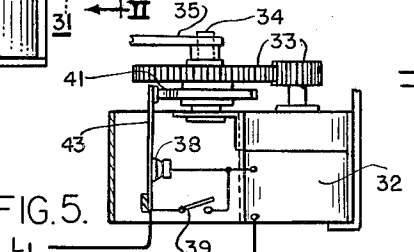

FIG.6.

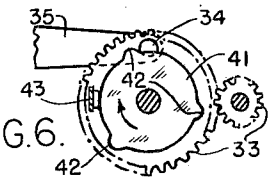

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FIG. 3.

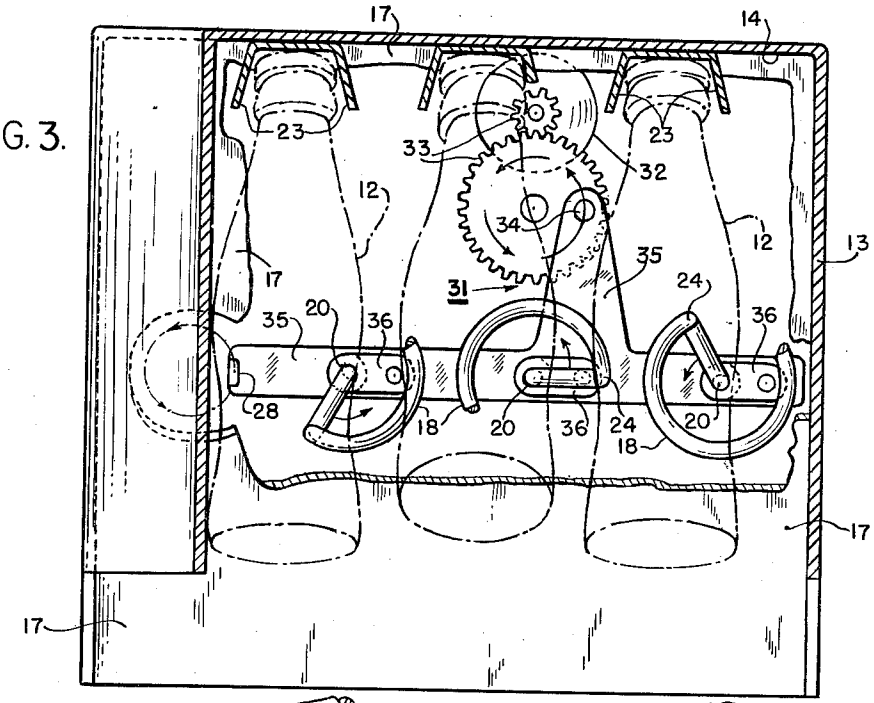

FIG. 4.

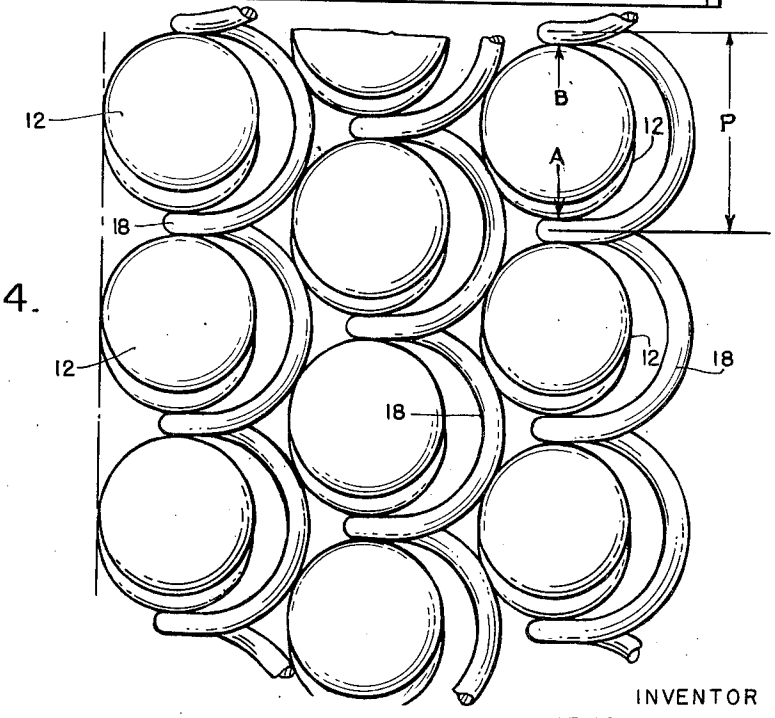

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FIG. 7.

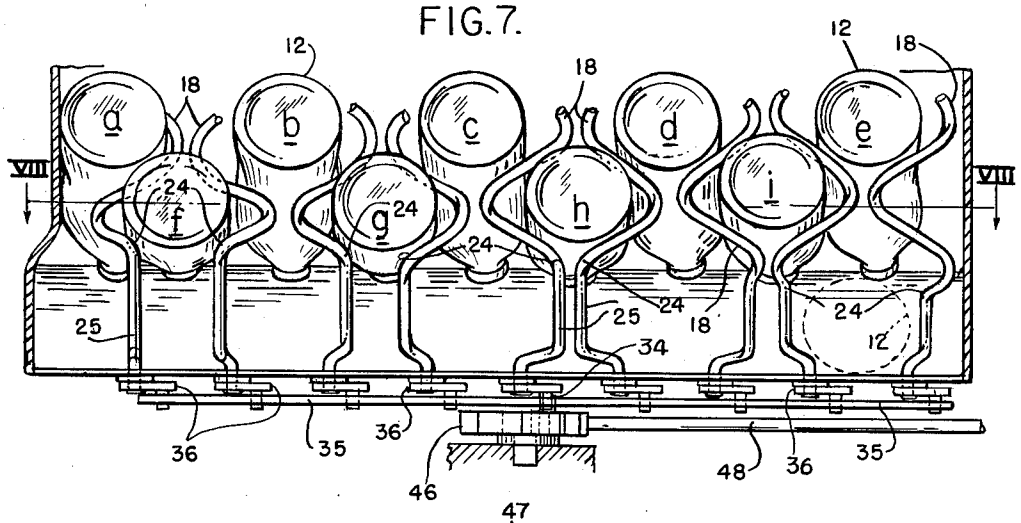
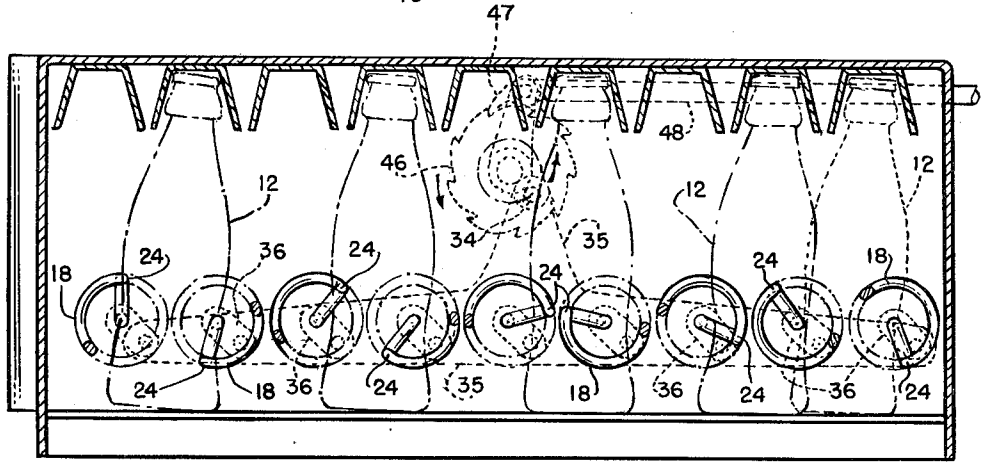


FIG. 8



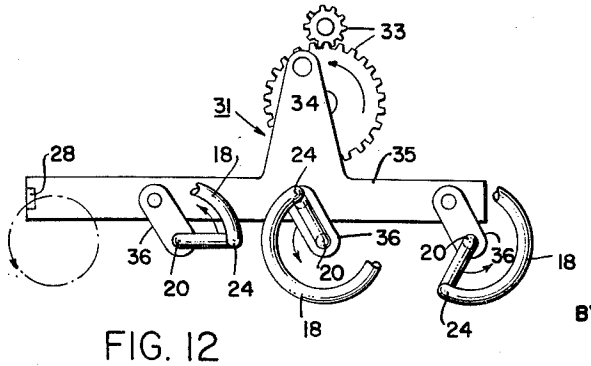


FIG. 12

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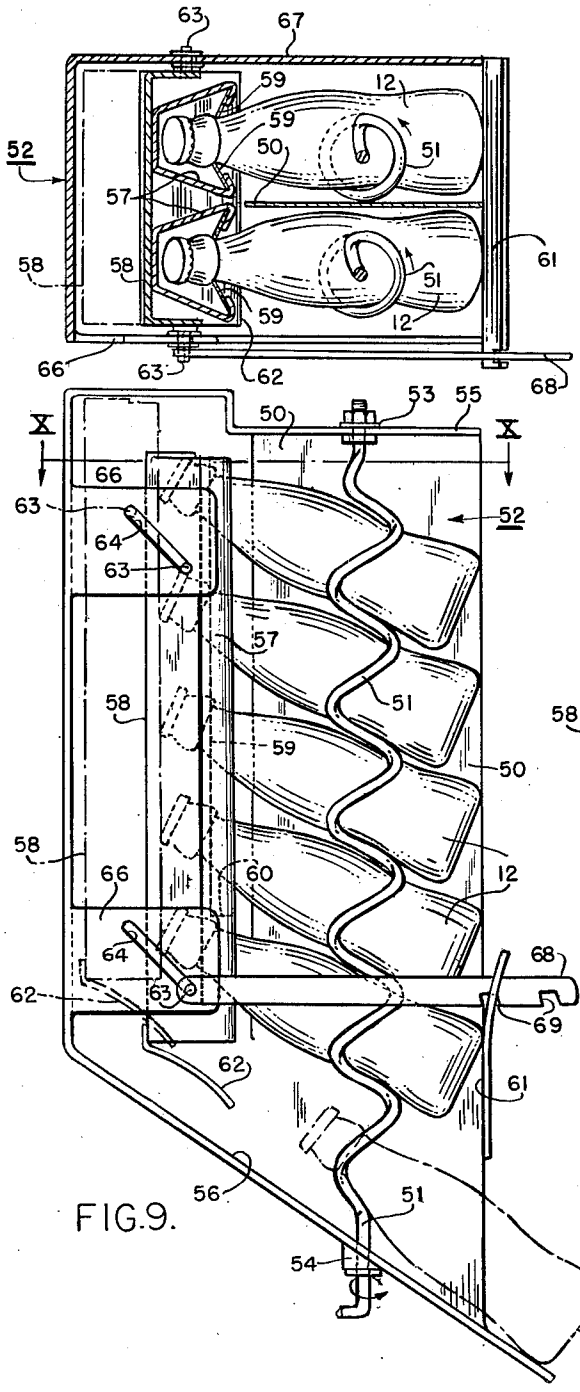

FIG.9.

FIG.10.

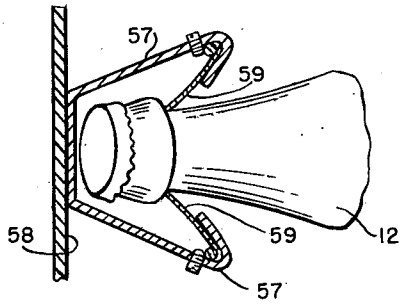

FIG.11.

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DISPENSING APPARATUS

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Filed Aug. 29, 1958, Ser. No. 758,027

1 Claim. (Cl. 221—75)

This invention relates to dispensing apparatus and more particularly to storage and dispensing mechanisms for axially elongated articles of generally circular cross-section, such as bottles and cans.

The dispensing apparatus of this invention is of the general type associated with soft drink bottle vending machines that are adapted to store a quantity of bottles therein and dispense individual bottles in response to the insertion of a check or coin into the machine. In the detailed description of the invention which follows, reference will be made in particular to bottle dispensing apparatus, although it is to be understood that the invention is adaptable to apparatus for dispensing other articles, particularly elongated articles and elongated cylindrical articles. This invention provides improved storage and dispensing facilities that enable a large number of articles to be stored in a limited space and enable individual articles to be dispensed from the storage facility in a positive but gentle manner so that the articles, and in the case of bottles, the contents thereof, are not endangered by rough handling.

In the interest of ease of servicing, this invention permits storage and dispensing facilities to be provided which are relatively simple in construction, and therefore less susceptible to mechanical faliure, and which may be quickly and easily refilled with articles when the supply becomes depleted.

The invention utilizes one or more open helical members for the purpose of supporting, transporting and releasing articles. These helical members are supported at their ends in such a manner as to leave the several turns, or convolutions, thereof open to receive the articles to be dispensed. The actual pitch of each helical member, i.e., the distance between turns of the helix measured normal to the turn, is greater than the diameter or transverse dimension of the article to be handled, such that each article can be carried between a convolution of the helical member with a substantial portion of the cross-sectional area of the article lying within the cylinder of revolution of the helical member, and with the article occupying more than one-half of the transverse extent of the member. The articles are carried between the turns of the helical member obliquely with respect to the axis of the helix, are confined against tilting motion by the turns of the helix, and can be held in the helical member by means of simple guide plates or walls disposed near the helix, or by another helical member located adjacent to the first.

In accordance with this invention, each helical member is capable of receiving between its turns a column of articles. Rotation of the helical member causes the articles to be transported downwardly until they are released, one at a time, from the lower end of the member. It is also contemplated that a plurality of these helical members be disposed side by side, in a row, with each member carrying a column of articles. Adjoining members are disposed sufficiently close together to enable the members to cooperate in supporting, transporting and releasing the column of articles which is disposed between the members. When a storage facility is provided that includes a plurality of helical members constructed and arranged in accordance with this invention, substantially the entire storage area can be filled with articles. The individual articles are, however, independently supported by the helical members so that the articles do not come in contact with one another, and rubbing and scuffing of adjacent articles is, therefore, prevented.

Other features and advantages of this invention will appear from the following detailed description thereof, which includes reference to the accompanying drawings wherein:

FIG. 1 is a front elevational view of a dispensing mechanism constructed in accordance with this invention;

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

FIG. 3 is an enlarged horizontal sectional view from above of the lower end of the dispensing mechanism shown in FIG. 1, and in which, portions of the mechanism have been broken away to show the mechanism drive more clearly. This view is taken as indicated by line III—III in FIG. 1;

FIG. 4 is an enlarged fragmentary front view of the dispensing mechanism showing the bottles and helical support members as they appear when viewed at an angle equal to the pitch angle of the helixes (see line IV—IV in FIG. 2);

FIG. 5 is a schematic control circuit for the dispensing mechanism of FIGS. 1 to 4;

FIG. 6 is a view of the under side of a cam employed in the control of the dispensing mechanism;

FIG. 7 is a partial front elevational view of another dispensing mechanism incorporating this invention;

FIG. 8 is a horizontal sectional view of the mechanism shown in FIG. 7, taken as indicated by the line VIII—VIII in FIG. 7;

FIG. 9 is a side elevational view of a bottle dispensing mechanism incorporating a modification of this invention;

FIG. 10 is a horizontal sectional view of the mechanism of FIG. 9, taken as indicated by the line X—X in FIG. 9;

FIG. 11 is an enlarged fragmentary sectional view of a bottle guide channel employed in the dispensing mechanism of FIGS. 9 and 10; and

FIG. 12 is a plan view of the lower end of the dispensing mechanism shown in FIG. 1, the mechanism being shown in a position rotated 120° counterclockwise from the position shown in FIG. 3.

The bottle dispensing apparatus of the first embodiment of this invention, which is shown in FIGS. 1 through 6, includes an upright magazine **11** adapted to contain or store a plurality of soft drink bottles **12** in three vertical columns. A single flavor dispenser, i.e. a dispenser in which all of the bottles **12** contain the same flavor drink, is shown which is adapted to release individual bottles sequentially from the three bottle columns.

The magazine **11** has a sheet metal exterior shell which includes a pair of spaced, parallel side walls **13**, a rear wall **14**, a top wall **15** and a bottom wall forming an inclined chute **17** which is adapted to direct bottles toward the front of the magazine as the bottles are released. The chute **17** would normally be aligned with a dispensing opening in the cabinet structure in which the magazine **13** is housed. To simplify the illustrations, the cabinet structure has been omitted. Such cabinets are generally equipped with some means for refrigerating the bottles **12** stored within the magazine **11** and the construction and arrangement thereof is well understood in the vending and dispensing art.

The bottles **12** are supported within the magazine **11** by three helical support members **18**, which are disposed in a row across the magazine **11** and which have their axes extending more nearly vertically than horizontally, and preferably vertically. Each support member **18** is formed from an elongated metal rod, or bar, having its middle portion shaped as a true helix, i.e. with a constant pitch angle and a constant diameter. The upper and

lower ends of each member, identified respectively by the numerals **19** and **20**, are formed to extend axially of the helix. The upper end **19** of each helical support member is journalled in a bearing **21** provided therefor in the magazine upper wall **15**, and the lower end **20** of each support member extends through another bearing **22** carried by a bracket attached to the under side of the delivery chute **17** as shown in FIG. 2. Each support member **18** is, therefore, supported within the magazine **11** for rotation about the axis of its helical turns or convolutions. All of the support members have the same direction of generation and are rotatable in the same direction, i.e. counterclockwise as viewed in FIG. 3. The support members are preferably installed under tension in order to increase their rigidity.

In accordance with this invention, the convolutions or turns of each helical support member **18** are formed to receive bottles **12** therebetween with the axes of the bottles passing through the plane containing the axes of the support members. Referring particularly to FIG. 2, it will be noted that the actual pitch of each helix, identified in the drawings by the letter P, is greater than the diameter of the bottles **12**. This relationship between the configuration of the helix and the size of the bottles, coupled with the fact that each support member **18** has an open, or unobstructed, central region, permits the bottles **12** to nestle within the turns of the support member when the bottles are disposed obliquely with respect to the axis of the support member, so that a major portion of the cross-sectional area of each bottle lies within the cylindrical confines of its support member and each bottle occupies more than one-half the transverse extent of its support member (see FIG. 4). When the axes of the support members are disposed vertically, as illustrated, the bottles are inclined from the horizontal by an angle equal to or greater than the lead angle α of the helical portion of the support members, depending upon the relationship between the bottle diameter and the pitch of the helix. A bottle having a diameter approximately equal to the actual pitch of the helix will be carried therein at an angle approximating the lead angle of the helix. Bottles having proportionally smaller diameters will be carried at proportionally greater angles to the horizontal. With reference to the axis of the support member, the bottles are carried at an angle equal to or less than the complement of the lead angle of the helix.

As shown in FIGS. 2 and 4, each bottle is engaged by its support member **18** at two longitudinally spaced points, identified as points A and B, on respectively the lower and upper sides thereof, so that tilting of the bottle in the support member is limited. The rear wall **14** of the magazine **11** is spaced from the support members **18** a distance sufficient to permit the bottles **12** to nest within the turns of the support members in a position in which the center of gravity of the bottles is rearward of the axes of the support members. Thus, each bottle **12** is engaged at the points A and B by a support member **18** adjacent the butt end of the bottle and is prevented from sliding rearwardly out of the support member **18** by the rear wall **14** of the magazine. This rear wall **14** carries three vertically disposed channels **23** which confine the neck, or cap, ends of the bottles **12** to vertical paths of movement as the bottles are transported downwardly by rotation of the support members **18**.

The several bottle supporting members **18** are so arranged with respect to one another that adjacent members cooperate in supporting, transporting and releasing bottles **12** therefrom. For this purpose, adjacent support members are closely spaced from one another, with the cylinder of revolution of one helix being spaced from the cylinder of revolution of an adjacent helix a distance no greater than the diameter of the bottles carried by the support members. In other words, the support members must be close enough together to prevent bottles from falling freely between them. In addition, each support member **18**, preferably, is axially advanced, or displaced, with respect to adjacent support members by a distance equal to one-half of the lead of the helix, identified as *l* in FIG. 2. This relationship permits the bottles carried by one support member to actually occupy space which is within the cylinder of revolution of an adjoining support member, thereby enabling the support members to be located more closely together for the most economical utilization of storage space (see FIGS. 1 and 4).

It will be noted that, although the closely spaced bottles **12** within one column, or between columns, are separated solely by the helical support members **18**, the bottles are, nonetheless, entirely out of contact with one another, so that the problem of bottle scuffing as a result of their rubbing together is avoided with the storage arrangement of this invention.

The left side wall **13** of the magazine **11** serves as a guide and retaining means for the column of bottles carried by the leftmost helical support member **18**. (See FIG. 1.) The space between this wall and the adjacent support member **18** is just sufficient to permit the bottles **12** to nest loosely within the turns of the support member.

The three support members **18** are adapted to be rotated simultaneously, counterclockwise when viewed from above, to simultaneously lower the three columns of bottles **12** to sequentially dispense single bottles from the bottom of each column. To permit the release of bottles from the support members **18**, the helical portion of each support member terminates a short distance above the magazine chute **17** in a knee or bend **24** which joins the helical portion to a longitudinal extension **25**. The knee **24** and extension **25** respectively provide a releasing point and a releasing region for each support member **18** which enable the bottles **12** to be freed from the support members to fall onto the chute **17**.

As best shown in FIG. 3, the release knees **24** of the support members **18**, i.e. the lower terminal of the helical portions of the members, are angularly offset with respect to each other to effect sequential releasing of individual bottles from the three bottle columns. There being three support members **18** in the dispensing mechanism shown, and because each member releases one bottle during one complete revolution, the release knees are angularly displaced by approximately 120°. It can be appreciated that, in a dispensing mechanism employing a larger number of support members, the offset increment would be less, and would be equal to 360° divided by the number of support members.

The axial offset of adjoining support members **18**, preferred for reasons of economical bottle storage, as described above, results in the bottles in one column being staggered, or offset vertically with respect to the bottles in an adjoining column (see FIGS. 1 and 4). This offset of adjoining bottle columns requires that the bottles be released from the lower portions of the support members **18**, not in series sequence, but in a sequence that includes every other bottle column. For example, FIGS. 1 to 3 show the three support members **18** of the dispenser in the positions which they occupy during movement to release a bottle **12** from the left-hand bottle column and, from FIG. 1, it can be seen that following release of the lowermost bottle in the left-hand column, the lowermost bottle in the right-hand column, rather than the middle column, is in position to be released next. Continuing the releasing sequence, the next bottle thereafter released is from the middle column, the next from the left-hand column, etc. To effect this delivery releasing sequence, the release knee **24** of the right-hand support member **18** lags, or follows, the release knee **24** of the left-hand support member by 120°, and the release knee of the middle support member lags the release knee of the right-hand member by 120°.

The support members **18** actually cooperate with one another in controlling the release of bottles **12** from the

middle and right-hand bottle columns. Since the release knees 24 of the several support members 18 are angularly offset with respect to each other, the distance between release knee 24 of the leftmost support member and the release knee 24 of the middle support member will change as the three support members are simultaneously rotated. This is also true with respect to the release knees 24 of the middle and rightmost support members 18. During one complete revolution of each of the support members 18 the release knees 24 of adjacent support members pass through one relative position wherein there is a minimum distance between the knees and another relative position in which there is a maximum distance between the knees. When the knees 24 of adjacent support members move apart, so to speak, sufficient space is provided to permit a bottle to pass downwardly between the extensions 25 and onto the chute 17. This releasing action occurs once for each column of bottles during one complete revolution of the support members 18.

The lowering and releasing of the leftmost column of bottles 12 is controlled by but a single support member 18. While it is possible to control the release of bottles from the bottom of this column solely by movement of the knee 24 of the leftmost support member 18 relative the left wall 13 of the magazine, a more positive releasing action is obtained by utilizing a movable release arm 28 positioned along-side the lower end of the leftmost support member 18. The release arm 28 is an upwardly projecting member having its upper end in a position to contact the lowermost bottle of the leftmost column. This release arm undergoes horizontal translatory movement in a circular path and its motion is related to movements of the knee 24 of the leftmost support member 18 so that the distance between the arm 28 and that knee 24 changes as the support members 18 are rotated.

The positions in which the components of the dispensing apparatus are illustrated in FIGS. 1 to 3 are those which these components pass through when a bottle is being released from the leftmost bottle column. The knee 24 of the leftmost support member 18 and the release arm 28 are both moving counterclockwise, but are moving away from one another and opening a space therebetween for releasing the lowermost bottle 12. This bottle will be released when the space between that knee 24 and the arm 28 becomes greater than the diameter of the bottle, which condition will occur when these elements have rotated, approximately, an additional 25°.

The three support members 18 and the release arm 28 are driven simultaneously and maintained in proper position relationship to one another for delivering bottles sequentially from the three support columns by means of a drive mechanism 31 illustrated in FIGS. 1 through 3 and FIG. 12. The drive mechanism 31 includes an electric motor 32 which provides the motive force for rotating the several bottle support members 18 and the release arm 28. Rotary movement of the shaft of the motor 32 is transmitted through a gear train 33 to a crank pin 34 carried by the driven gear of the train 33. This crank pin 34 is connected to an extension of a master connecting arm 35 which is pivotally connected to a plurality of crank arms 36, each of which is attached to the lower end 20 of a support member 18. As can be seen in FIGS. 3 and 12, all of the support member crank arms 36 are parallel to one another and parallel to the crank arm for the crank pin 34 which drives the master arm 35. Thus, as the crank pin 34 is moved in a circular path, the several crank arms 36 are caused to swing in unison and, in turn, simultaneously rotate the several bottle support members 18. The master crank arm 35 undergoes rotary translatory movement in a circular path. The release arm 28, referred to above, is integral with the left end of the master crank 35 and moves therewith, also in a circular path. There is thus provided a simple means for driving the release member 28 through its required path of movement in proper position relationship to the release knee 24 of the leftmost support member 18.

From the foregoing it should be apparent that, were the motor 32 energized continuously, the support members 18 would rotate continuously and release individual bottles one after the other in sequence from the three bottle columns. Most vending applications call for a dispensing mechanism that is capable of delivering a single bottle upon the insertion of one or more coins into the vending machine. A control for energizing and deenergizing the drive motor 32 to cause but a single bottle to be delivered from the magazine 11 is illustrated in FIGS. 5 and 6. As shown in FIG. 5, the motor 32 receives electrical current through a pair of conductors L1 and L2, the latter of which is connected directly to the motor. Conductor L1 has two switches therein, indicated at 38 and 39, that are connected in parallel with one another. Switch 39 is adapted to be momentarily closed, either manually or by means of a suitable coin control mechanism, to initiate a dispensing operation by completing an electrical circuit to the motor 32. Switch 38 is employed to complete a holding circuit for the motor 32 in parallel with switch 39 and is opened to deenergize the motor 32 upon delivery of a bottle from the magazine 11.

The switch 38 is actuated by a cam 41 having three equally spaced lobes 42 on the periphery thereof which are adapted to engage an arm 43 connected to the movable contact of switch 38 (see FIG. 6). Cam 41 is mounted for rotation with the driven gear of gear train 33 which carries crank pin 34. The cam lobes 42 are angularly positioned with respect to the crank pin 34 in a manner to engage the switch actuating arm 43 to open switch 38 whenever the bottle support members 18 are driven to a position in which a bottle has just been released from one of the bottle columns. In the case of a three column dispenser such as is here illustrated, this will occur three times during each complete revolution of the crank pin 34. Consequently, the three cam lobes 42 are spaced 120° apart and are effective to deenergize the motor 32 after the bottle support members 18 have been rotated through 120° of movement, which movement is sufficient to release one bottle from one of the three columns.

Dispenser of FIGS. 7 and 8

The application of the invention to dispensing apparatus employing nine bottle supporting members 18 and, consequently, capable of storing and dispensing from nine bottle columns, is illustrated in FIGS. 7 and 8. These figures are intended to illustrate the action and cooperation of the several bottle supporting members 18 and are, therefore, fragmentary and purposely omit some of the details of the dispensing mechanism that have been described previously with reference to the dispensing apparatus of FIGS. 1 through 6. As in the previously described apparatus, the bottle supporting members 18 have unobstructed helical portions which receive individual bottles between the turns or convolutions thereof.

The lower ends of the support members 18 are interconnected for causing simultaneous rotation of the support members by means of a master arm 35 which is pivotally connected to a plurality of crank arms 36, one of which arms 36 is secured to the lower end of each support member 18. Rotary translatory motion is imparted to the master arm 35 from a crank pin 34 mounted on a toothed ratchet wheel 46. The ratchet wheel 46 is indexed counterclockwise in steps of one-ninth of a revolution (40° of angular movement), as indicated by the arrows in FIG. 8, by a pawl 47 connected to a push rod 48. The push rod 48 is in turn connected to a manually actuated handle, or the like (not shown) disposed on the exterior of the cabinet in which the dispensing mechanism is housed.

Indexing the ratchet wheel 46 through one-ninth of one

revolution rotates each of the bottle support members 18 (counterclockwise as viewed in FIG. 7) one-ninth of a revolution. This movement is sufficient to cause a single bottle to be released from among the columns of bottles carried by the several support members 18. As in the previously described mechanism, each support member 18 is shaped to possess a release knee 24 and a release extension 25 which cooperate with similar portions of adjacent support members in releasing bottles from between the convolutions of the support members.

The release knees 24 of the several support members 18 in this mechanism are angularly off-set with respect to one another in increments of 40° so as to cause sequential dispensing of bottles from the several bottle columns. Like the preceding embodiment, in the mechanism shown in FIGS. 7 and 8, a bottle is released in sequence from every second bottle column. For example, the dispensing sequence is illustrated in FIG. 8 by the alphabetical notations appearing in the several bottle columns. With the helical bottle support members in the positions shown in FIGS. 7 and 8, the release knees 24 of the two rightmost support members 18 have been moved apart sufficiently to release a bottle 12 from column *e*, and a bottle will next be released from column *f*. Thereafter, a bottle will be released from column *g*, and so on in alphabetical order, with one bottle being released each time the support members are rotated 40°. A bottle is released from column *a* following the release of a bottle from column *i*.

If desired, of course, the dispensing mechanism of FIGS. 7 and 8 can be equipped with an electric drive similar to that shown and described above with respect to the apparatus illustrated in FIGS. 1 through 6. The control circuit would be similar to that shown in FIG. 5 but the cam 41 would be equipped with nine lobes 42 to provide the same number of drive periods as there are columns of bottles in the magazine.

Modification Shown in FIGS. 9 Through 11

The dispensing apparatus illustrated in FIGS. 9 through 11 utilizes open helical support members 51 which are similar to the support members 18 employed in the previously described apparatus but which do not require special lower end configurations. This apparatus includes a magazine 52 for housing two columns of bottles 12, which are separated by a partition 50, and two support members, 51, are employed, one for each bottle column. Each support member 51 extends from the top to the bottom of the magazine 52 with its axis of rotation disposed substantially vertically, and the upper and lower ends of the support members are received in bearings 53 and 54. The upper bearing 53 is carried by the top wall 55 of the magazine 52 and the lower bearing 54 is carried by the sloping bottom wall 56 of the magazine, which wall also functions as a delivery chute for bottles released from the bottom of the bottle columns.

Each helical support member 51 has an extended portion intermediate the axially disposed ends thereof formed into a plurality of turns or convolutions having a constant lead angle. The actual pitch of the helical portion of each support member is greater than the diameter of the bottles 12 so that the bottles are received between the turns of the support member with the axis of the bottle obliquely arranged with respect to the axis of the support member. When so carried by the support members 51, the bottles 12 are disposed at an angle with respect to the horizontal, with the cap, or neck, ends of the bottles elevated with respect to the bodies of the bottles. The bottles 12 are prevented from sliding axially out of the magazine by guide channels 57, which are carried by an adjustable plate or wall 58 spaced rearwardly of the support mmebers 51. Each channel 57 is vertically arranged and has a pair of resilient strips 59 at the mouth thereof which flex to admit the capped ends of the bottles into the channels 57 but resiliently grip the reduced diameter necks of the bottles (see FIG. 11) and prevent the bottles from sliding forward out of the magazine 52. The magazine is loaded with bottles by inserting the bottles, cap end rearwardly, between the turns of the support members 51 and moving the bottles rearwardly and upwardly into the magazine until the necks thereof enter the channels 57 and are gripped by the resilient strips 59. The bottles thus held in the magazine 52 are guided in a vertical path by the channels 57 as the support members 51 are rotated.

The front of the magazine 52, at the lower end thereof, is equipped with additional guiding means for the bottles 12 in the form of a plate 61 which extends transversely across the open front of the magazine in a position to engage the lower or butt ends of the lowermost bottles in the magazine. This guide plate 61 maintains the bottles 12 within the support members 51 during the last portion of the bottles' downward travel and the lower edge of this guide plate is so located as to permit the discharge or escape of the lowermost bottle as it approaches the lowermost turn of the support member 51. The resilient strips 59 in the channels 57 terminate, as indicated at 60, a substantial distance above the lower ends of the channels 57 and thus release the neck of the bottles 12 as they reach the elevation of the front guide plate 61. It can be appreciated that, as a bottle is moved by its support member beyond the lower edge of the guide plate 61, the bottle is free to slide forward, under the influence of gravity, out of the magizine 52; the neck end of the bottle having previously been released by the guide channel 57. Disposed at the lower end of the guide channels 57 and secured thereto is a curved support plate 62 on which the neck end of the lowermost bottle 12 slides as it is released from the magazine 52. As the bottle being released begins to clear its support member 51, it is guided forwardly out of the magazine 52 by the sloping bottom wall 56 of the magazine.

Because the release of a bottle from the support members 51 of this embodiment of the invention is controlled by the disposition of the front guide plate 61, and not by cooperation between adjacent support members as in the previously described embodiments, the support members 51 require no special lower end configuration; the wire, or rod, of each support member is merely bent in such a manner that the helical portion of the support member is joined directly to the axially extending, end portion of the support member.

The direction of rotation of the support members 51 is counterclockwise when viewed from above and the two support members can be driven simultaneously by a drive mechanism of the type previously described, or they can be independently driven. Independent operation of the support members 51, which enables the magazine 52 to dispense two flavors of beverage, one from each bottle column, is possible because the support members are spaced apart sufficiently far that the bottles 12 carried thereby do not overlap one another. The bottle columns are actually separated by the partition 50 and the transporting and dispensing of bottles in each column is governed solely by rotation of the particular support member for that column. While this arrangement of the support members 51 with respect to one another results in a less economical utilization of storage space within the magazine 52 than is accomplished with the overlapping bottle storage arrangement of the previously described embodiments of the invention, it affords a more versatile operation, since the magazine is capable of storing and dispensing more than one flavor drink. Moreover, if single flavor operation and more economical bottle storage is desired, the releasing arrangement illustrated in FIGS. 9 and 10 can be employed in dispensers having closely spaced support members as in the first two embodiments of the invention.

The channel plate 58 is movably supported with respect to the bottle support members 51 to permit the distance

between these items to be adjusted for the purpose of accommodating bottles of different lengths. The adjustable support for the plate 53 includes a plurality of pins 63 which project transversely from offset edges of the plate. The pair of pins 63 on one edge of the plate 58 project through sloping elongated slots 64 provided in plate-like extensions 66 which project forwardly from the magazine rear wall. The pins 63 on the other edge of the plate 58 project through similar sloping openings 64 in the right side wall 67 of the magazine 52. One of the lower pins 63 projecting from the plate 58 also extends through the end of a movable arm 68 which extends toward the front of the magazine 52. The arm 68 has notches 69 in the bottom edge thereof which engage the slotted upper edge of the guide plate 61.

The channel support plate 58 is shown in full lines in FIG. 9 in the position which it occupies when relatively short bottles are to be stored and dispensed from the magazine 52. Longer bottles can be accommodated by shifting the plate 58 toward the rear of the magazine 52 to the dot and dash line position thereof shown in FIGS. 9 and 10. This adjustment is made by lifting the arm 68 and moving it rearwardly until the forwardmost notch 69 therein is in position to engage the upper edge of the guide plate 61.

From the foregoing it will be apparent this invention provides a unique and unusual arrangement for supporting and dispensing bottles, or other articles, from a magazine. The versatility of the helical member supporting arrangement of this invention has been amply illustrated by the several forms of the invention above described.

While several forms of this invention have been described, it will be apparent to those skilled in the art that the invention is not limited to these forms but that changes and modifications can be made therein without departing from the spirit and scope of the invention.

What is claimed is:

In a dispenser for axially elongated articles of generally circular cross section, a magazine adapted to contain a plurality of vertical columns of articles, a plurality of open helical members having unobstructed central regions and disposed in said magazine with their axes arranged parallel to one another and more nearly vertical than horizontal, all of said members having the same direction of generation and having an actual pitch greater than the diameter of the articles being dispensed, the articles in said columns having their axes disposed obliquely with respect to the axes of said members and passing through the plane of the axes of said members, whereby each of said article columns is carried by one of said members with the individual articles in each column disposed between the convolutions of a member in position to occupy more than one-half the transverse extent of the member carrying that column, said members being arranged adjacent one another whereby one member engages the articles carried by an adjacent member to retain the articles between the convolutions of said adjacent member, said magazine having a plurality of guide means associated respectively with the helical members, each guide means being disposed to receive and guide the ends of the articles carried by the associated helical member, and means for simultaneously rotating all of said members about their axes in the same direction to vertically transport all of said article columns.

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