

Nov. 27, 1956

R. H. MENNING ET AL

2,772,022

VENDING MACHINE HAVING MULTIPLE BOTTLE CONVEYOR SYSTEM

Filed July 16, 1951

4 Sheets-Sheet 1

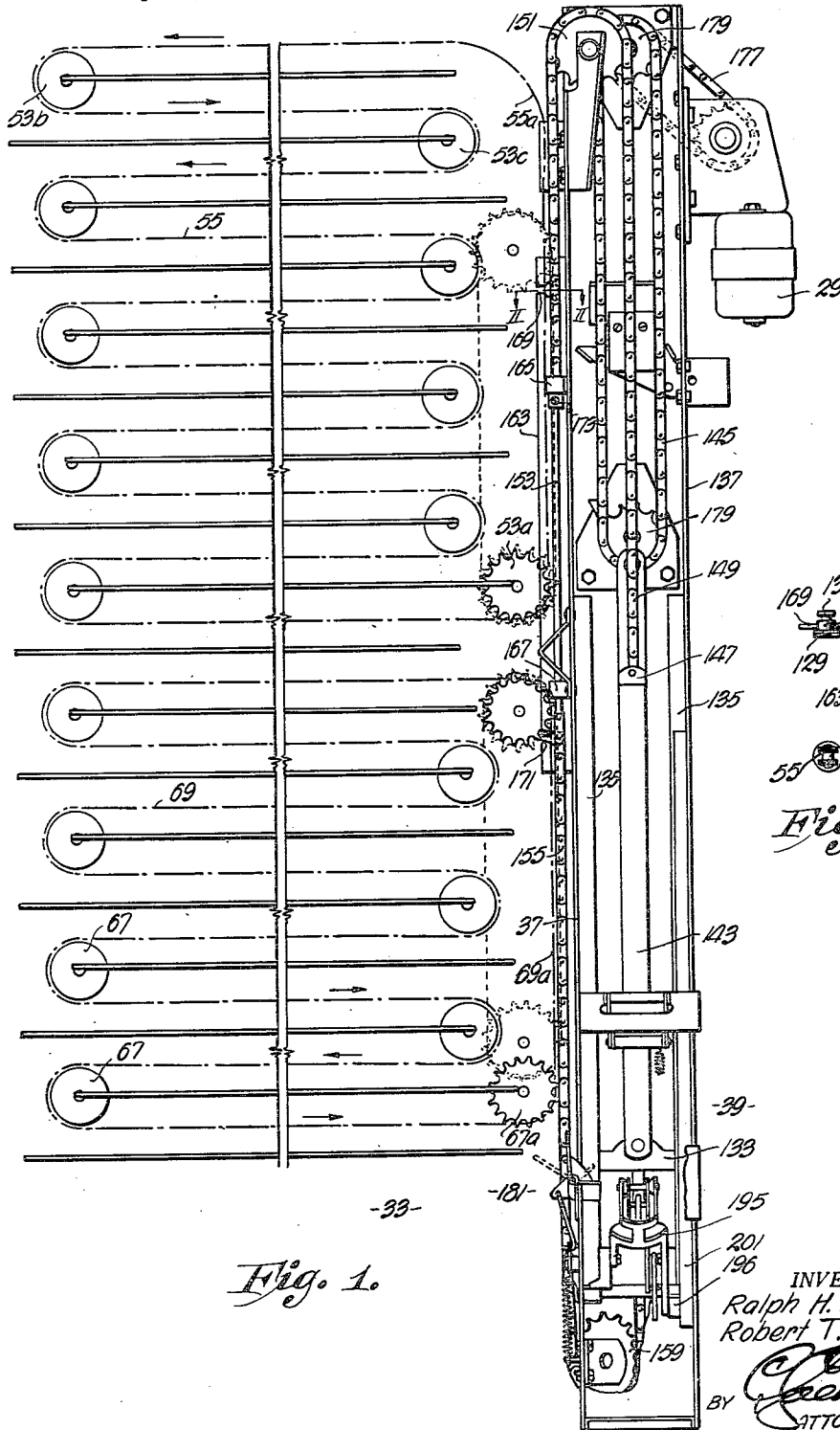


Fig. 1.

Fig. 2.

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4 Sheets-Sheet 2

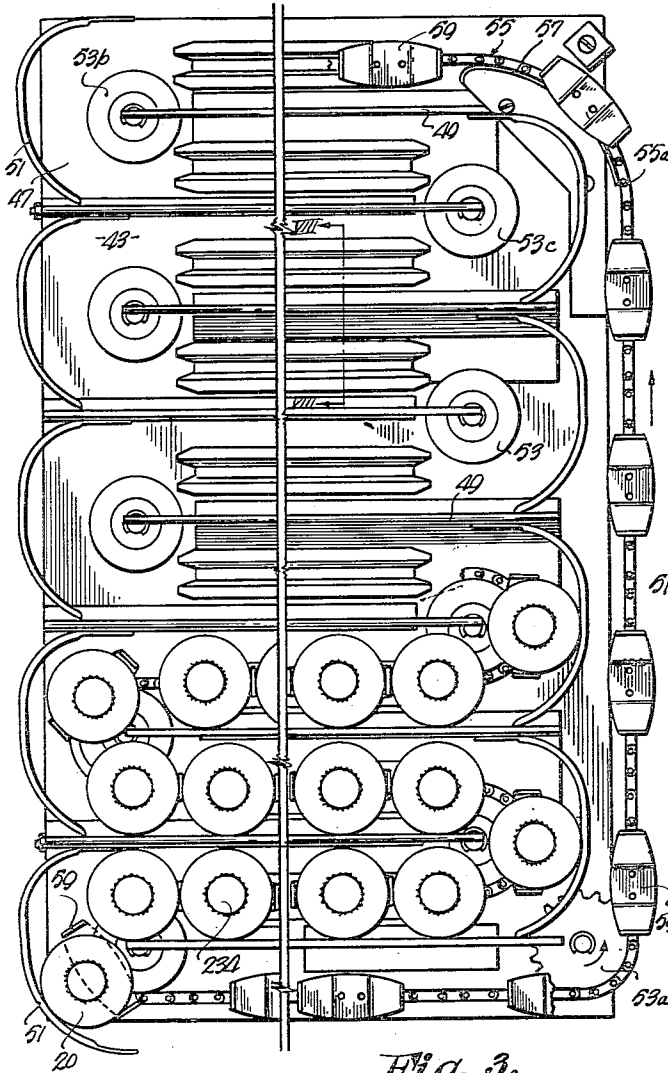


Fig. 3.

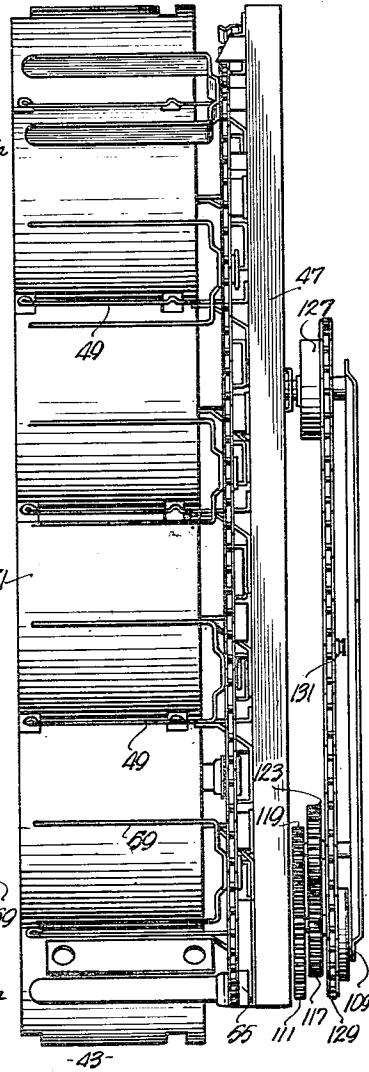


Fig. 4.

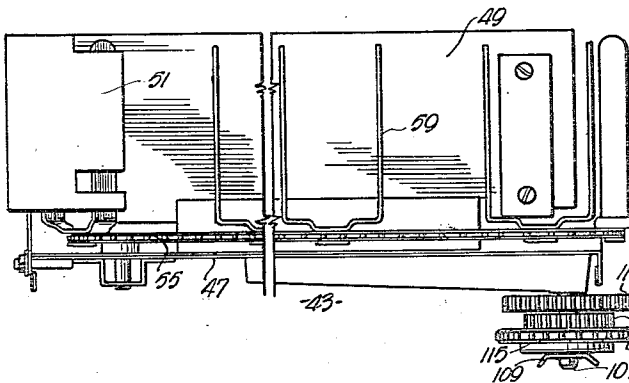


Fig. 5.

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4 Sheets-Sheet 3

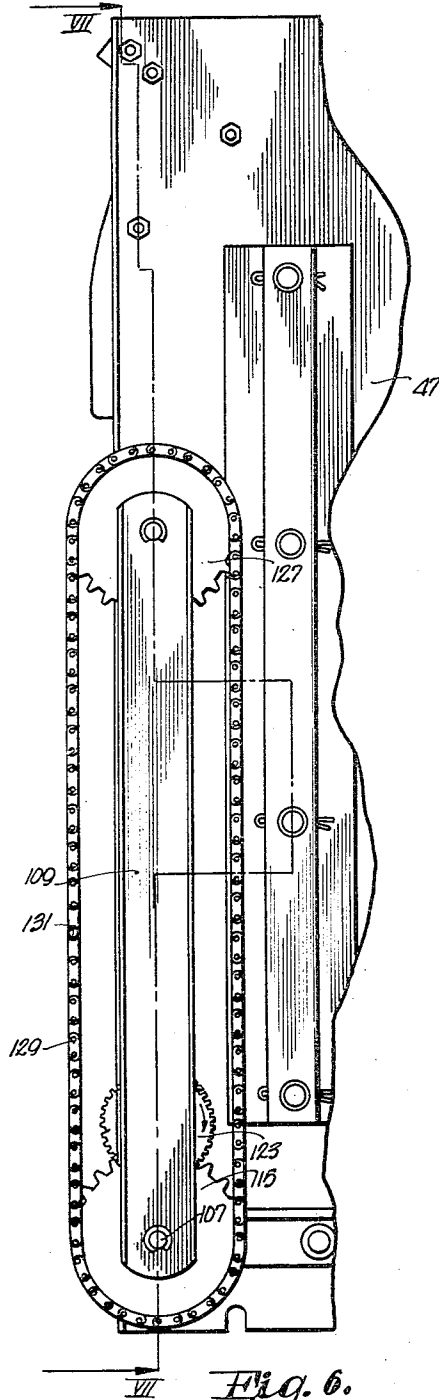


Fig. 6.

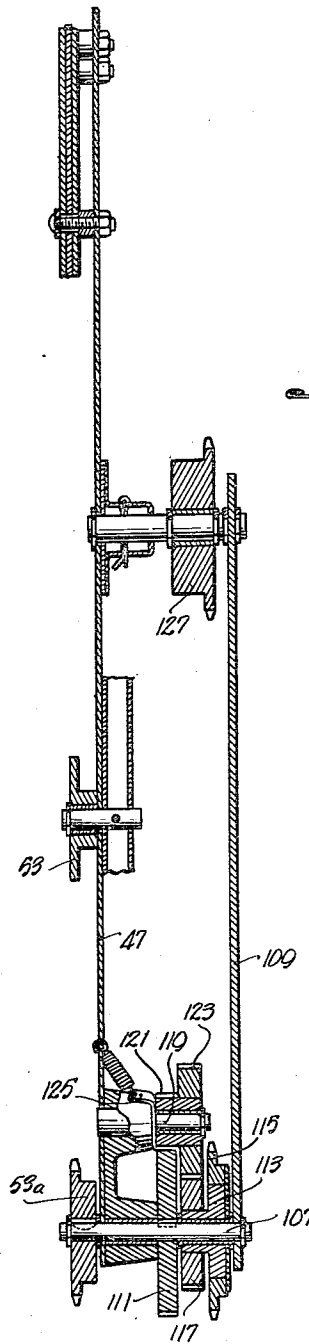


Fig. 7.

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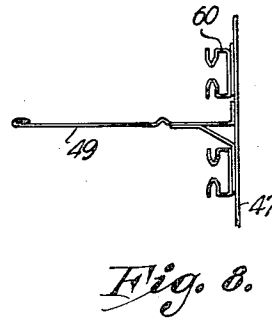


Fig. 8.

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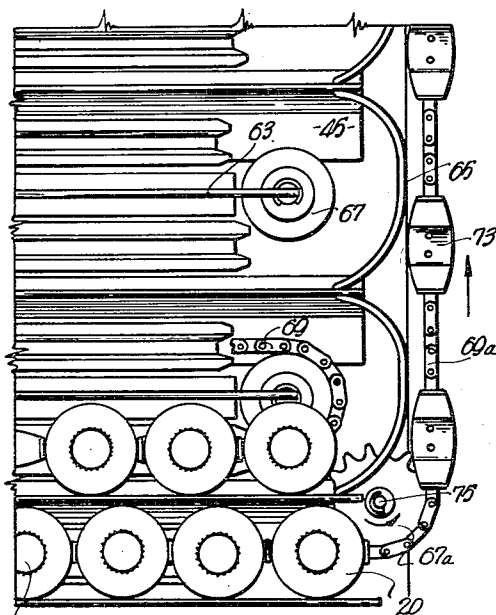


Fig. 9.

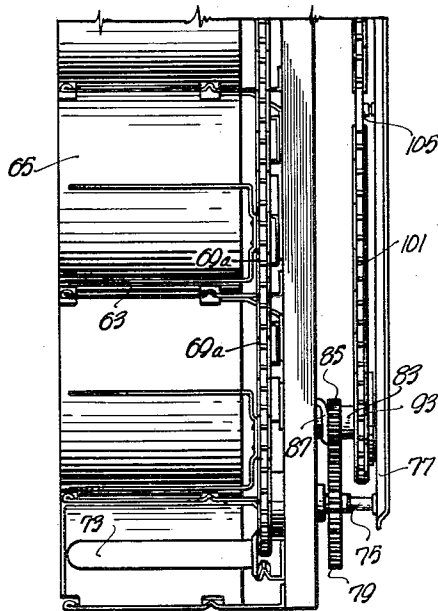


Fig. 10.

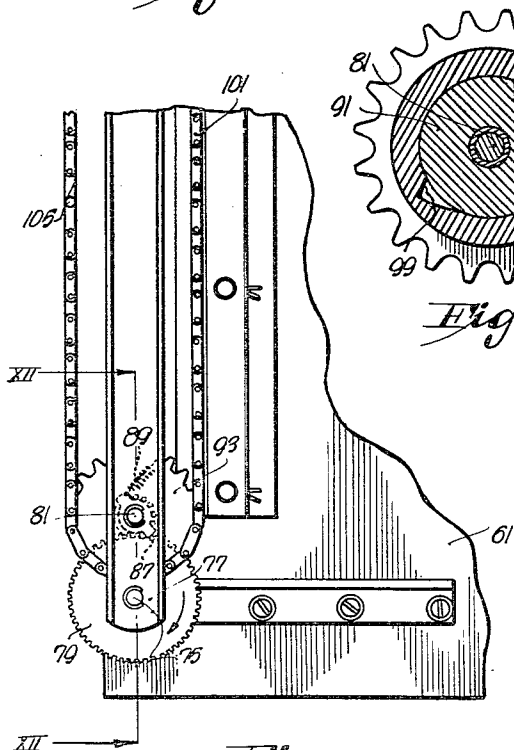


Fig. 11.

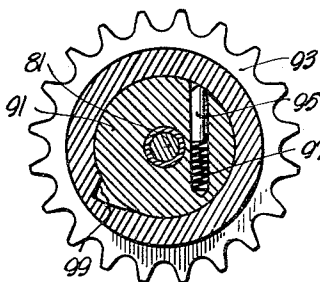


Fig. 13.

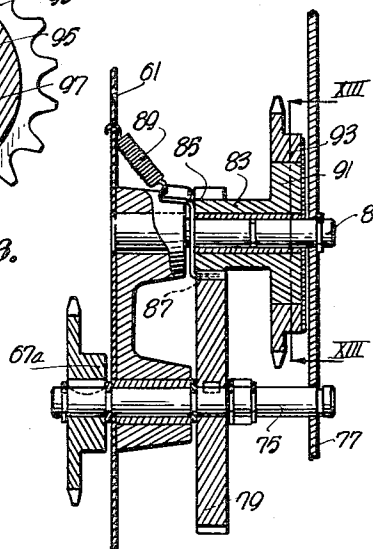


Fig. 12.

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VENDING MACHINE HAVING MULTIPLE BOTTLE CONVEYOR SYSTEM

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Application July 16, 1951, Serial No. 236,916

8 Claims. (Cl. 221—85)

This invention relates to automatic vending machines of the kind adapted upon insertion of coins to dispense liquids such as beverages or other substances by removing caps from bottles containing the same and pouring the contents into a cup or other container.

Reference may be had to a co-pending application filed on even date herewith entitled "Machine for Vending the Contents of Bottled Goods" for a full disclosure of a vending machine such as above mentioned and including the improvements forming the subject matter hereof, said copending application including one James R. Pratt, as an additional co-patentee.

It is the most important object of the present invention to provide an automatic vending machine such as disclosed in U. S. Letters Patent No. 2,333,118, of Olsen, dated November 2, 1943, and particularly to improve upon the apparatus therein set forth for storing a plurality of bottles or the like and advancing the same to a reciprocable cradle forming a part of the machine.

It is an important object hereof to provide improved multiple bottle conveyor structure for vending machines interconnected with common actuating apparatus therefor to automatically deliver a bottle to a hopper during each cycle of operation of the machine.

Another important object of the present invention is to provide a pair of superimposed conveyor assemblies, each comprising an individual unit, one conveyor assembly being operable to deliver a bottle to a hopper and the other assembly advancing a bottle to a lowermost conveyor during each cycle of operation of the machine.

It is another object of the present invention to provide a multiple conveyor system wherein a single prime mover is provided for actuating the same, which prime mover, through the novel construction hereinafter set forth, need operate in only one direction during each cycle.

It is a further object of this invention to provide dual conveyor structure wherein the common actuating means therefor includes reciprocable means capable of actuating one conveyor when the same travels in one direction and the other conveyor when the actuating means moves in the opposite direction.

Other objects include the way in which the individual conveyor units are separately supported; the way in which each conveyor system need move only its contained bottles; the manner of forming the separate units so that the same are synchronized for proper operation; the way in which a delay is provided during each cycle of operation before the two conveyor systems actually are placed in operation; and many more minor objects which will be made clear as the following specification progresses.

In the drawings:

Figure 1 is a view in part schematic, illustrating the multiple bottling conveyor system hereof and in part in elevation, showing the actuating structure for the conveyor system.

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Fig. 2 is a fragmentary, detailed, cross-sectional view taken on line II—II of Fig. 1.

Fig. 3 is a condensed front elevational view taken on an enlarged scale illustrating the upper conveyor unit shown in Fig. 1.

Fig. 4 is an elevational view of the upper conveyor unit showing that edge thereof next adjacent the partition illustrated in Fig. 1.

Fig. 5 is an inverted plan view of the unit shown in Figs. 3 and 4.

Fig. 6 is an enlarged, fragmentary, rear elevational view showing that part of the upper conveyor unit adjacent the partition of Fig. 1.

Fig. 7 is a cross-sectional view taken on line VII—VII of Fig. 6 looking in the direction of the arrows.

Fig. 8 is a fragmentary, detailed, cross-sectional view taken on line VIII—VIII of Fig. 3.

Fig. 9 is a fragmentary, elevational view similar to Fig. 3 showing the lower conveyor unit.

Fig. 10 is an elevational view similar to Fig. 4 but showing the lower conveyor unit.

Fig. 11 is a rear elevational view similar to Fig. 6 but illustrating the lower conveyor unit.

Fig. 12 is an enlarged, fragmentary, cross-sectional view taken on line XII—XII of Fig. 11, looking in the direction of the arrows; and

Fig. 13 is a cross-sectional view taken on line XIII—XIII of Fig. 12.

The bottle conveyor system of the vending machine about to be described, is adapted for use in an assembly wherein is provided a storage cabinet for a relatively large number of capped bottles filled with liquid or other pourable substance, together with automatic mechanism for receiving the bottles singly from the conveyor system elevating the same, removing the cap from the bottle and thereupon pouring the contents into an accessible cup or other container. The empty bottle is thereupon elevated and ultimately forced into an empty bottle compartment and such empty bottles find their way into an available empty stall of the upper conveyor unit hereinafter fully set forth.

The bottle conveyor system shown in the drawings is mounted in its entirety within a compartment of a cabinet not shown, which compartment may be designated in Fig. 1 of the drawings, by the numeral 33. Such cabinet is provided with a vertical partition 37, thereby setting off a second compartment which may be designated in the schematic illustration of Fig. 1 by the numeral 39.

Compartment 39 in turn houses the aforesaid mechanism for elevating, decapping and pouring of the contents of a bottle 20 hereinafter more fully described for purposes of clarification only.

The conveyor system within compartment 33 includes an upper conveyor 43 and a lower conveyor 45. In addition to the schematic illustration of these two conveyors in Fig. 1, the upper conveyor 43 is shown by Figs. 3 to 8 inclusive, and the lower conveyor 45 is more particularly detailed by Figs. 9 to 12 inclusive.

Conveyor 43 is provided with a rearmost, vertical panel 47 serving as a means for mounting the same within the vending machine cabinet defining the compartments 33 and 39. The normally front face of the panel 47 illustrated in Figs. 1 and 3, carries a plurality of spaced-apart, elongated shelves or guides 49, that are horizontal and in superimposed relationship. Alternate shelves are interconnected at each end thereof by arcuate strips 51 in such manner as to present a tortuous path of travel for the bottles 20 carried by the shelves 49 in the manner illustrated in Figs. 1 and 3.

There is provided an idler sprocket 53 on the front face of panel 47 adjacent each arcuate strip 51 respectively at

the left hand side of the conveyor 43 and similarly, adjacent each arcuate strip 51 along the right-hand side of conveyor 43, viewing either Figs. 1 or 3.

Sprockets 53 are adapted to receive a continuous chain 55 having a vertical stretch 55a along the right-hand side of conveyor 43, viewing Fig. 3, and extending from the lowermost sprocket 53a upwardly over an arcuate guide 57. From guide 57, the chain 55 extends above the uppermost shelf 49 and passes over the uppermost sprocket 53b at that end of the uppermost shelf 49 opposite to guide 57. Chain 55 thereupon extends horizontally from sprocket wheel 53b between the upper two shelves 49 and passes over sprocket wheel 53c that is substantially aligned with the second shelf 49 and substantially directly below the guide 57.

It is obvious that this serpentine path of travel of the chain 55 continues downwardly throughout the height of upper conveyor 43 until the same passes over the lowermost sprocket 53a, that is also directly below the guide 57, all as is clear from the schematic representation of Fig. 1 of the drawings.

Continuous chain 55 is provided with a plurality of U-shaped brackets 59 having the bight thereof secured directly to one or more of the links of chain 55 and the legs extending horizontally therefrom between pairs of shelves 49 in parallel embracing relationship to the bottles 20 with the cap 234 thereof facing outwardly as illustrated in Fig. 3. In other words, each bracket 59 is adapted to receive one bottle 20 with the latter resting for sliding movement on an underlying shelf 49 and with the brackets 59 relatively close together whereby to accommodate a large number of bottles 20 on each shelf 49 respectively.

Each horizontal stretch of the chain 55 is guided by means of a channel 60 having the cross-sectional configuration shown in Fig. 8 of the drawings and adapted to clear the connection between the brackets 59 and the chain 55.

It is seen that when chain 55 is advanced in the direction of the arrows of Fig. 1, bottles 20 will be moved to the left on the uppermost shelf 49, to the right on the second shelf 49 and so on. Except during the time bottles 20 move around the ends of the shelves 49, they are wholly supported by shelves 49 and during the turn, arcuate strips 51 serve to hold the bottles 20 within their corresponding brackets 59 as is evident by the lower left-hand corner of conveyor 43 in Fig. 3 of the drawings.

So far as the construction thus far described, is concerned, the lower conveyor 45 (Figs. 9 to 13 inclusive) is substantially identical with upper conveyor 43; thus, conveyor 45 has a supporting back panel 61, a plurality of superimposed, horizontal shelves 63, a number of arcuate end strips 65, a plurality of idler sprockets 67 rotatably mounted on back panel 61 and a continuous chain 69 trained over the sprocket wheels 67 and having a plurality of bottle-receiving brackets 73 secured thereto. Conveyor chain 69 is likewise provided with a vertical stretch 69a along the right-hand side of conveyor 45 viewing Figs. 1 and 9, and chain 69 travels in the direction of the arrows shown in Fig. 1.

Conveyor unit 45 just described, is disposed directly below the unit 43 as shown in Fig. 1, to receive bottles 20 from the upper unit 43 and to carry the same to the lower right-hand corner of unit 45. These two units 43 and 45 are separately mounted and supported within the cabinet and may be separately removed therefrom as desired. Accordingly, the weight of the bottles carried by unit 43 is not imparted to the conveyor 45 and likewise, the latter is separately supported for receiving only the weight of the bottles contained thereby.

As about to be described, the two chains 55 and 69 of units 43 and 45 respectively, are also separately driven to the end that each chain need only shift a portion of total bottle capacity of the cabinet during each step-by-step operation of the entire assembly.

The lowermost idler sprocket 67a for the lower conveyor unit 45 is mounted on a shaft 75 that is in turn supported by the panel 61 and by an auxiliary plate 77 spaced rearwardly from panel 61 as shown in Fig. 12, and a gear 79 is keyed directly to the shaft 75 between panel 61 and plate 77. Another short shaft 81 directly above the shaft 75 and also carried by panel 61 and plate 77, has a sleeve 83 loosely mounted thereon, sleeve 83 being in turn provided with a small gear 85 constantly in mesh with the gear 79. A small ratchet 87 carried for oscillation by the shaft 81, is held biased against the teeth of gears 79 and 85 by means of a spring 89 that joins ratchet 87 with the panel 61, thus gear 85 is free to rotate in one direction to drive the gear 79 and consequently the sprocket 67a that is keyed to shaft 75, but ratchet 87 locks with such teeth of the gears 85 and 79 to prevent rotation in the opposite direction.

Sleeve 83 is provided with an annular out-turned flange 91 that loosely receives a ring-like sprocket wheel 93 circumscribing its periphery. A reciprocable pin 95, carried by the flange 91, is biased outwardly against the sprocket wheel 93 by a spring 97 and a notch formed in the sprocket wheel 93 presents a shoulder 99 adapted for engagement by the pin 95, when sprocket wheel 93 is rotated in one direction, thereby preventing rotation of the gear 85 in the opposite direction. In this connection, it is to be noted that when the sprocket wheel 93 is rotated in the opposite direction, ratchet 87 will operate to prevent rotation of gear 85 by virtue of the frictional contact between sprocket 93 and flange 91.

A continuous drive chain 101 trained over the sprocket wheel 93, also passes over an idler sprocket wheel 102, between the uppermost and lowermost ends of the lower conveyor unit 45 and between panel 61 and plate 77.

Drive chain 101 is provided with a laterally extending connecting pin 105 for purposes hereinafter described. The drive assembly for the upper conveyor 43 is substantially the same as that for the lower assembly 45 in that the lowermost sprocket 53a is secured to a shaft 107 corresponding to shaft 75 and supported by panel 47 and plate 109. Shaft 107 has a gear 111 thereon (Fig. 7) similar to gear 79 in Fig. 12, and the drive unit shown in Fig. 7 is likewise provided with a sleeve having an out-turned flange 113 with a sprocket wheel 115 circumscribing the same, such sleeve having a gear 117 thereon. A spring-loaded pin and shoulder such as at 95 and 99 respectively, in Fig. 13, is also provided for the flange 113 in sprocket wheel 115. Flange 113, gear 117 and sprocket 115 are loosely mounted for free rotation on shaft 107. A shaft 119 corresponding to shaft 81 loosely carries a pair of interconnected gears 121 and 123 in mesh with gears 111 and 117 respectively.

A spring-loaded ratchet 125 corresponds to ratchet 87 and operates to releasably lock the gears 111 and 121 against rotation. The sprocket wheel 115 is operably connected with an idler sprocket 127 intermediate the upper and lower extremities of unit 43 between panel 47 and plate 109 by a continuous drive chain 129. Chain 129 has a connecting pin 131 (Fig. 4) corresponding to the connecting pin 105 for chain 101 (Fig. 10).

In Figure 1 of the drawings, there is illustrated a cradle-frame 133 mounted for vertical reciprocation along a rectilinear path of travel within a pair of opposed guide channels 135 in the compartment 39, one of the channels 135 being secured directly to the partition 37 and the other channel 135 being secured to an opposed, vertical plate 137, preferably forming a part of the partition 37 and being releasably secured therewith to the back wall of the cabinet by suitable brackets. An elongated bar 143 pivotally connected to frame 133 at the uppermost end of the latter, extends upwardly between partition 37 and plate 137 and pivotally connects at its uppermost end with a continuous chain 145, also disposed between partition 37 and plate 137. Bar 143 has a laterally extending bracket 147 spaced below its uppermost end for receiving

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one end of a chain 149, the latter passing upwardly from bar 143 and being trained over idler sprocket 151 above the uppermost end of the partition 37. Chain 149 extends downwardly from idler sprocket 151 and connects with the uppermost end of a vertical rod 153. A chain 155 joined at one end thereof with the lowermost end of rod 153 extends downwardly along the partition 37 within compartment 33 and passes through an opening within partition 37 beneath an idler sprocket 159 and joins directly with cradle-frame 133 at the lowermost end of the latter.

An elongated connector 163, within compartment 33 adjacent partition 37, is U-shaped in cross-section and has a pair of spaced-apart bearings 165 and 167 rigid to one leg thereof and slidable on the rod 153. Spaced-apart openings 169 and 171 formed in the other leg of the connector 163, are adapted to receive pin 131 on chain 129 (Fig. 4) and pin 105 on chain 101 (Fig. 10) respectively. A collar 173 adjustably secured to the rod 153 is disposed between the bearings 165 and 167.

A prime mover, such as an electric motor 29 (Fig. 1), is provided to drive chain 145 and accordingly, to reciprocate cradle-frame 133 through bar 143, chains 149 and 155 and rod 153, and also to advance conveyor units 43 and 45 through connector 163. Prime mover 29 is mounted on a plate 137 adjacent the uppermost end thereof and is operably connected with a sprocket wheel (not shown and disposed behind a sprocket wheel 179) by means of a continuous chain 177. Sprocket wheels 175 and 179 are interconnected by the chain 145.

In understanding the operation of the unit thus far described, it is to be noted that the motor 29 operates in only one direction and each time the same is energized to drive the chain 177 and accordingly, the chain 145, the cradle-frame 133 and its component parts are raised and lowered within the guide tracks 135. As chain 145 advances, bar 143 is carried upwardly thereby, over sprocket wheel 179 and thence downwardly to the stand-by position shown in Fig. 1 of the drawings. Such movement of the bar 143 reciprocates the cradle-frame 133 within the tracks 135 by virtue of the pivotal connection between bar 143 and the upper end of frame 133. Simultaneously, the bracket 147 on chain 149 moves upwardly as does the connection between chain 155 and the frame 133 at the lower end of the latter. Such reciprocable movement of the chains 149 and 155 is imparted to the rod 153. As bracket 147 moves upwardly, collar 173 moves downwardly with rod 153 until the same comes into contact with the lowermost bearing 167 of connector 163. Thus, there is a period of "dwell" before the collar 173 operates to drive the lower conveyor 45 through connector 163. As collar 173 forces bearing 167 and accordingly, connector 163 downwardly, such downward action is imparted to chain 101 through pin 105 (Figs. 10 and 11). Sprocket wheel 93 is thereby driven in one direction and its shoulder 99 coming into contact with pin 95, drives out-turned flange 91, sleeve 83 and gear 85 in the same direction. Spring 89 yields, rendering ratchet 87 ineffective in preventing gear 85 from rotating gear 79 in the opposite direction. Such rotation of gear 79 rotates shaft 75 and accordingly, sprocket wheel 67a, in the direction of the arrow shown in Fig. 9. Conveyor chain 69 is thereby shifted in the direction of the arrow shown in Fig. 1 until rod 153 and accordingly collar 173 and connector 163 reach the lowermost end of their paths of travel as determined by the uppermost end of bar 143 passing over sprocket 179 and returning downwardly to the position illustrated by Fig. 1.

When the lower conveyor unit 45 is thus advanced, all of the bottles 20 carried thereby, are shifted one step and the lowermost bottle adjacent the sprocket wheel 67a (Fig. 9) is moved into a hopper 181 (Fig. 1) hereinafter more fully described. Hopper 181 forms the subject matter in our co-pending application filed on even date herewith and entitled "Tiltable Bottle Hopper for Auto-

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matic Vending Machines." Hopper 181 is swingable and shown in full lines of Fig. 1 in the position the same assumes when transferring a bottle 20 from the lowermost shelf 63 of conveyor 45 to cradle 195 within frame 133. The dotted line position of hopper 181 shown in Fig. 1 of the drawings, adapts hopper 181 for receiving the bottle 20 from lower conveyor 45 and retaining the same until the machine operates hopper 181 to transfer the bottle into the cradle 195. Such advancement of the lower conveyor unit 45 leaves an empty space or empty bracket 73 at the uppermost extremities of the lower unit 45, or at the uppermost end of vertical stretch 69a. Such downward travel of the connector 163 also moves the connector pin 131 of chain 129 downwardly, but such movement of chain 129 will not impart movement to the upper conveyor unit 43 not only because of the arrangement of the pin and shoulder means in sprocket 115 and flange 113, which as above described, is similar to that shown in Fig. 13, but because of the operation of ratchet 125 locking the gears 121 and 111 against rotation.

With motor 29 running in the same direction, as soon as the uppermost end of bar 143 passes over sprocket wheel 179 and commences its downward travel, collar 173 will move upwardly away from the lower bearing 167 without imparting any movement to the connector 163 and accordingly another "dwell" period will exist before the collar 173 contacts the upper bearing 165 and advances the upper conveyor 43. Upward movement of connector 163 moves pin 131 on chain 129 upwardly to rotate sprocket 115. By virtue of the pin-shoulder connection between sprocket 115 and flange 113 which is similar to that illustrated in Fig. 13, sprocket wheel 115 will rotate flange 113 and gear 117 therewith.

Gears 123 and 121 will be rotated in the opposite direction and gear 111 will rotate in the same direction as sprocket wheel 115 to rotate sprocket 53a therewith and thereby move conveyor chain 55 in the direction of the arrow shown in Fig. 1.

A bottle 20 carried by the bracket 59 next adjacent the sprocket wheel 53a will be deposited in the vacant bracket 73 of the lower conveyor 45 and an empty bracket 59 will be presented adjacent the guide 57. The fact that such upward movement of the connector 163 also drives the chain 101 through pin 105 has no effect upon the lower unit 45 because upward movement of pin 105 operates to drive the sprocket 93 in a direction to move its shoulder 99 away from the spring-loaded pin 95.

In summarizing the operation of the conveyor system above set forth, it is to be noted that bottles 20 are delivered singly to the cradle 195, and that the latter is elevated by upward, vertical movement of the frame 133, each time the machine is placed in operation. Prime mover 29, driving chains 177 and 145 causes bar 143 to move upwardly until pivotal connection between bar 143 and chain 145 passes over sprocket wheel 179, whereupon the bar 143 and accordingly the frame 133, as well as the cradle 195, move downwardly as guided by tracks 135. The cradle 195 is swingable within the frame 133 and its swinging movement during vertical reciprocation, is controlled by a serpentine groove (not shown) within a bar 201 for receiving a roller 197 on the cradle 195. Such swinging movement of the cradle 195 is necessitated in order to render the decapping and pouring mechanism (above mentioned and forming no part of the present invention) operable substantially as set forth in the above identified patents.

By virtue of chain 149 connecting with bracket 147 on bar 143, and because of chain 155 being joined to the lowermost end of frame 133, prime mover 29 serves to, operate both upper conveyor 43 and lower conveyor 45. Since rod 153 joins chains 149 and 155, its stop 173 will alternately engage stops 165 and 167 on the connector means 163. When stop 173 moves downwardly after a delay period, it contacts stop 167 and thereby

advances the lower conveyor 45 to move a bottle into hopper 181. As bracket 147 moves downwardly from sprocket 179, the stop 173 will move away from stop 167 and after another period of delay, come into contact with stop 165 to actuate the upper conveyor 43.

Such operation causes a bottle to move from the upper conveyor to the lower conveyor and also presents a space or bracket 59 at the upper right-hand corner of conveyor 43 adjacent guide 57 for receiving an empty bottle. When filling the machine, i. e., the conveyors 43 and 45 with bottles 20, one bracket 59 is left empty to receive the first empty bottle forced therein by the cradle 195 within compartment 39. Accordingly, the machine will continue to operate until all of the capped bottles have been delivered to hopper 181, at which time the two conveyors 43 and 45 are filled with previously emptied bottles 20.

Attention is again called to the fact that although both chains 101 and 129 are actuated in both directions during each cycle of operation, the clutching arrangement shown in Fig. 13 provided for each conveyor unit respectively, permits alternate advancement of the two conveyors only as indicated by the arrows in Fig. 1 of the drawings.

Other important features include the fact that motor 29 always operates in the same direction, a common prime mover is provided not only for operating the cradle 195, but for operating both conveyors 43 and 45; each conveyor unit comprises a composite unit of itself, separately mounted and separately actuated; and by virtue of such construction of the conveyor system, each unit supports only its own bottles and each chain for advancing the bottles need only move the bottles of its respective unit.

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

1. In a vending machine, the combination of structure presenting an article-receiving passage; a pair of conveyor elements for advancing articles along the passage; reciprocable mechanism; an endless element having means for driving the same; a link pivotally interconnecting the element and the mechanism at one end of the latter for reciprocating the mechanism as the element is driven; a reciprocable rod; flexible means at each end respectively of the rod, one connected with the link and the other connected with the mechanism at the opposite end of the latter for reciprocating the rod as the mechanism reciprocates; movable apparatus coupled with one of the conveyor elements for advancing the same only upon movement of said apparatus in one direction; movable apparatus coupled with the other conveyor element for advancing the latter only upon movement of the apparatus of the other conveyor element in the opposite direction; and means coupling the rod with said apparatuses for moving the latter simultaneously first in said one direction and thence in said opposite direction alternately as the rod reciprocates.

2. A vending assembly for article vending machines including the combination of structure presenting an article receiving passage; a pair of conveyor elements disposed to advance articles along the passage; an endless drive element; an endless driven element operably coupled with the drive element and including a pair of reciprocable stretches, one stretch having a rod forming a part thereof; movable apparatus coupled with one of the conveyor elements for advancing the same only upon movement of said apparatus in one direction; movable apparatus coupled with the other conveyor element for advancing the latter only upon movement of the apparatus of the other conveyor element in the opposite direction; and means coupling the rod with said apparatuses for moving the latter simultaneously first in said one direction and thence in said opposite direction alternately as the rod reciprocates.

3. In a vending machine, structure presenting a con-

tinuous, serpentine, article-receiving passage; a pair of flexible, endless conveyor elements in said passage for advancing articles therealong; a reciprocable member; a reciprocable device connected with said member for movement relative thereto; a projection on the device; a pair of stops on the member in the path of travel of said projection for transferring reciprocable movement from said device to the member, said stops being disposed, one on each side of the projection, for alternate engagement thereby, and being spaced-apart, whereby to delay said transfer of movement each time the device is reciprocated; movable apparatus coupled with one of the conveyor elements for advancing the same only upon movement of its apparatus in one direction; movable apparatus coupled with the other of said conveyor elements for advancing the same only upon movement of the apparatus of the other conveyor element in the opposite direction; and means connecting the member with the apparatuses for moving the apparatuses simultaneously in said one direction and in said opposite direction, alternately, whereby to advance one conveyor element when the member moves in one direction and to advance the other conveyor element when the member moves in the opposite direction.

4. In a vending machine, structure presenting a continuous, serpentine, article-receiving passage; a pair of flexible, endless conveyor elements arranged one above the other in said passage for advancing articles therealong; an oscillatory operating mechanism for each conveyor element respectively; movable means interconnecting said mechanisms for oscillating the same simultaneously; apparatus connecting the upper conveyor element with its mechanism for advancing the upper conveyor only during movement of the mechanisms in one direction; and apparatus connecting the lower conveyor element with its mechanism for advancing the lower conveyor element only during movement of the mechanisms in the opposite direction, whereby the upper conveyor element is advanced when said means moves in one direction and the lower conveyor element is advanced when said means moves in the opposite direction, there being a reciprocable device connected with said means for movement relative thereto, a projection on the device, and a pair of stops on said means in the path of travel of said projection for transferring reciprocable movement from said device to said means, said stops being disposed, one on each side of the projection for alternate engagement thereby, and being spaced-apart, whereby to delay said transfer of movement each time the device is reciprocated.

5. In a vending machine, the combination of structure presenting a continuous article-receiving passage; a pair of flexible, endless conveyor elements in said passage for advancing articles therealong; a reciprocable member; a reciprocable device connected with said member for movement relative thereto; a projection on the device; a pair of stops on the member in the path of travel of said projection for transferring reciprocable movement from said device to the member, said stops being disposed one on each side of the projection for alternate engagement thereby and being spaced apart, whereby to delay said transfer of movement each time the device is reciprocated; movable apparatus coupled with one of the conveyor elements for advancing the same only upon movement of said apparatus in one direction; movable apparatus coupled with the other conveyor element for advancing the latter only upon movement of the apparatus of the other conveyor element in the opposite direction; and means coupling the member with said apparatuses for moving the latter simultaneously first in said one direction and thence in said opposite direction alternately as the member reciprocates.

6. In a vending machine, the combination of structure presenting a continuous article-receiving passage; a pair of flexible, endless conveyor elements in said pas-

sage for advancing articles therealong; a first continuous chain having means for driving the same in one direction; a continuous element having a pair of reciprocable stretches and including a second chain; a device coupled with one of said stretches for reciprocation thereby as the first chain is driven; means connecting the other said stretches with said first chain for reciprocating the stretches; movable apparatus coupled with one of the conveyor elements for advancing the same only upon movement of the said apparatus in one direction; movable apparatus coupled with the other conveyor element for advancing the latter only upon movement of the apparatus of the other conveyor element in the opposite direction; and means coupling the device with said apparatuses for moving the latter simultaneously first in said one direction and thence in said opposite direction alternately as the device reciprocates.

7. In a vending machine, the combination of structure presenting a continuous article-receiving passage; a pair of flexible, endless conveyor elements in said passage for advancing articles therealong; a reciprocable device; an elongated reciprocable chain, said device being interposed in the chain; movable apparatus coupled with one of the conveyor elements for advancing the same only upon movement of said apparatus in one direction; movable apparatus coupled with the other conveyor element for advancing the latter only upon movement of the apparatus of the other conveyor element in the opposite direction, said apparatuses each including a pair of endless, flexible elements having a pair of reciprocable stretches; and means coupling the device with one stretch of each of said elements for reciprocating the latter simultaneously first in said one direc-

tion and thence in said opposite direction alternately as the device reciprocates.

8. In a vending machine, the combination of structure presenting a continuous article-receiving passage; a pair of flexible, endless conveyor elements in said passage for advancing articles therealong; a reciprocable device; movable apparatus coupled with one of the conveyor elements for advancing the same only upon movement of said apparatus in one direction; movable apparatus coupled with the other conveyor element for advancing the latter only upon movement of the apparatus of the other conveyor element in the opposite direction; an endless chain coupled with each apparatus respectively; reciprocable means joining the chains for driving the same simultaneously first in said one direction and thence in said opposite direction alternately as said means is reciprocated; and means operably connecting said reciprocable means with said device.

References Cited in the file of this patent

UNITED STATES PATENTS

927,168	Robb	July 6, 1909
1,640,133	Parker	Aug. 23, 1927
1,703,265	Darman	Feb. 26, 1929
1,949,040	Clausen	Feb. 27, 1934
2,189,740	Mills	Feb. 6, 1940
2,497,655	Bramson	Feb. 14, 1950
2,570,516	Bowman	Oct. 9, 1951
2,672,267	Menning et al.	Mar. 16, 1954

FOREIGN PATENTS

582,422	Great Britain	of 1946
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