March 11, 1930. G. F. SOELCH 1,749,989

BOTTLE WASHING MACHINE

Filed Oct. 29, 1925 3 Sheets-Sheet 1

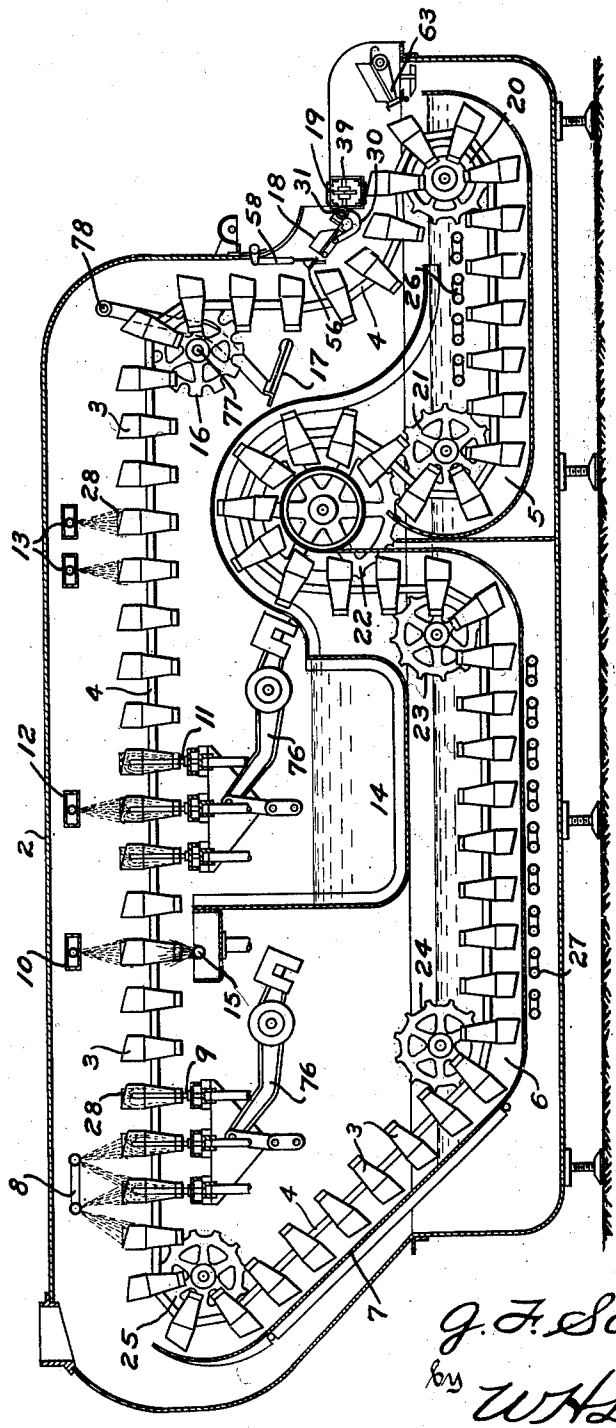


Fig. 1

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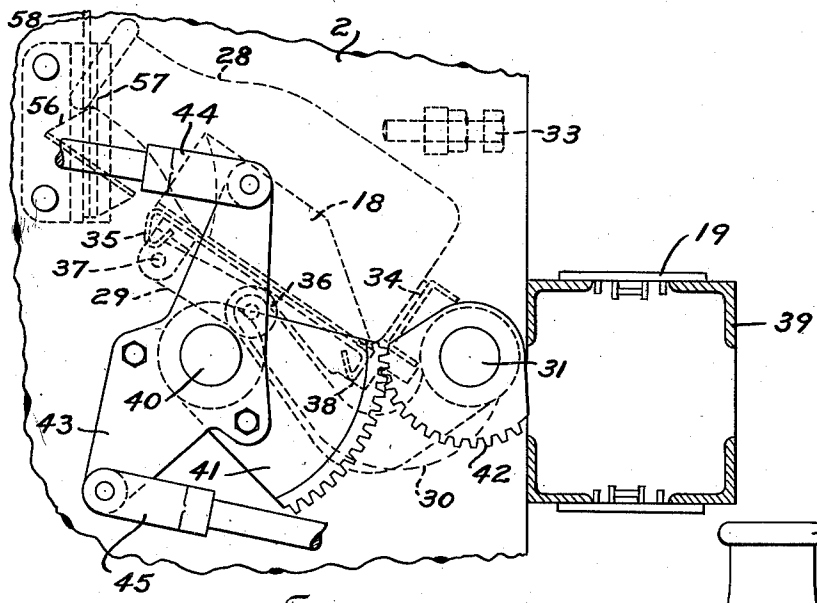


Fig. 2

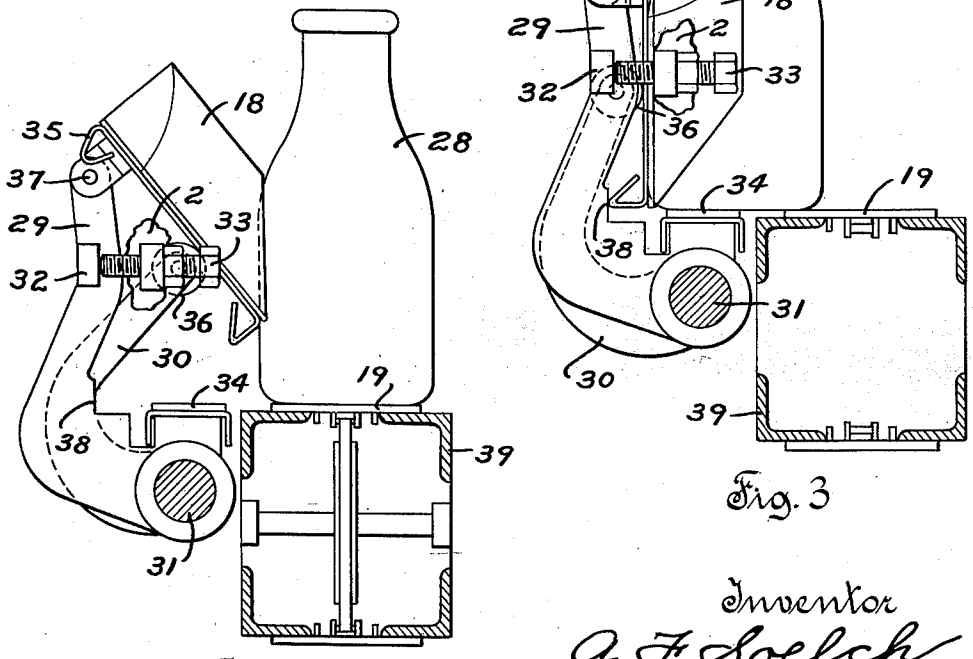


Fig. 3

Fig. 4

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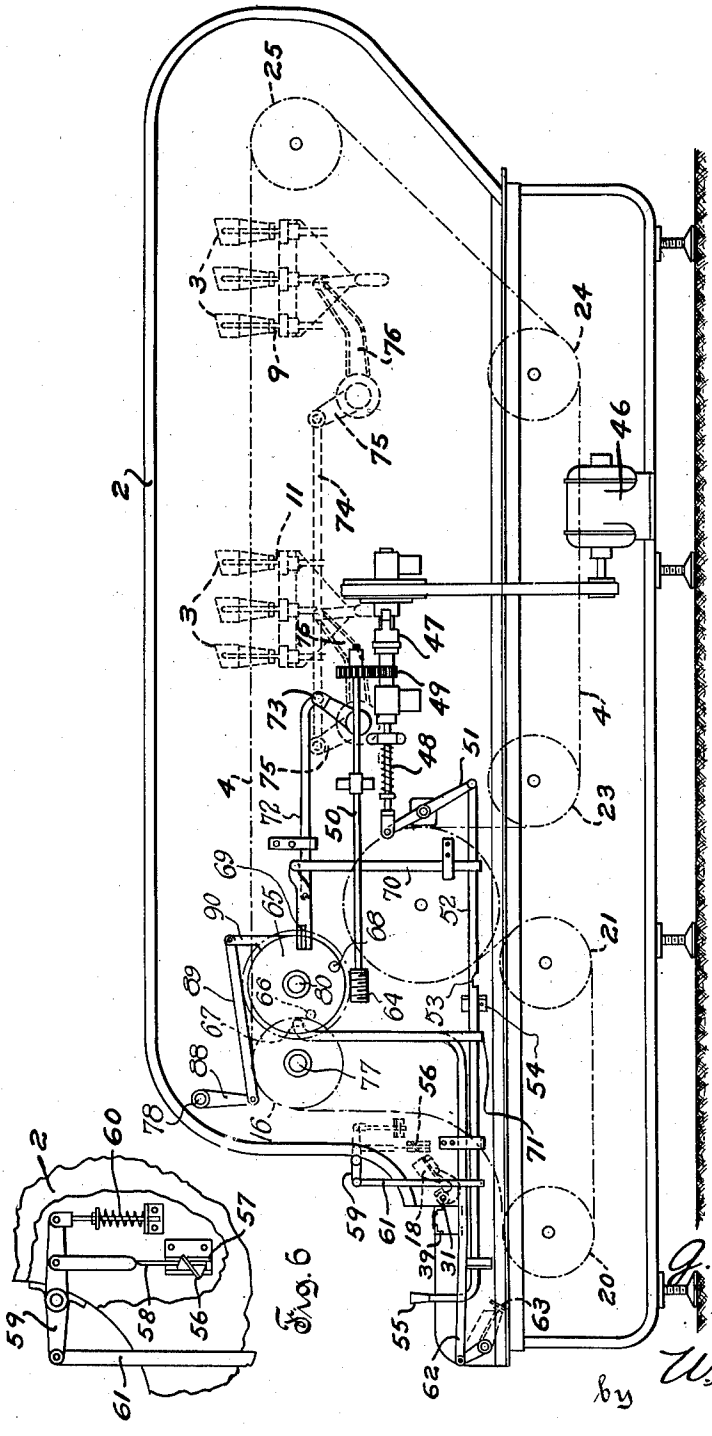


Fig. 5

Fig. 6

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UNITED STATES PATENT OFFICE

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BOTTLE-WASHING MACHINE

Application filed October 29, 1925. Serial No. 65,569.

This invention relates in general to improvements in the art of cleansing receptacles such as cans, jars or bottles, and relates more specifically to improvements in the construction and operation of machines for automatically washing and sterilizing milk bottles or the like, in succession.

An object of the invention is to provide an improved bottle washing machine which is simple in construction and efficient in operation. Another object of the invention is to provide improved mechanism for enhancing the efficiency of operation of bottle washing machines of the type forming the subject of Patent No. 1,734,585, issued November 5, 1929. A further object of the invention is to provide improved mechanism for automatically and effectively delivering bottles in succession from a bottle washing machine or the like, without damaging the bottles. Still another object of the invention is to provide improved safety appliances for automatically preventing the operation of or stopping a bottle washing machine or the like, under abnormal operating conditions. These and other objects and advantages of the present improvement will be apparent in the course of the following description.

While the improvements have been shown and described herein as being specifically applied to a machine for automatically washing glass milk bottles of relatively standard design, such disclosure should not be considered as an intentional limitation in the scope of the invention the principles of which are obviously capable of more general application.

A clear conception of embodiments of the various features of the present invention and of the operation of devices constructed in accordance with the improvement, may be had by referring to the drawings accompanying and forming a part of this specification, in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is a somewhat diagrammatic longitudinal section through an improved automatic milk bottle washing machine, some of the operating mechanism having been omitted for the sake of clearness.

Fig. 2 is an enlarged fragmentary side elevation of the improved bottle discharge mechanism.

Fig. 3 is an enlarged side elevation of a portion of the improved bottle discharge mechanism, showing the elements in another position of adjustment.

Fig. 4 is an enlarged side elevation of a portion of the improved bottle discharge mechanism, showing the elements in still another position of adjustment.

Fig. 5 is a somewhat diagrammatic side elevation of the improved bottle washing machine showing the automatic control and stop mechanisms associated therewith.

Fig. 6 is an enlarged fragmentary side view of a portion of the improved automatic stop mechanism.

The improved automatically operable milk bottle washing machine specifically shown in the drawings, comprises in general a main frame and casing 2; an endless series of bottle carriers 3 transportable along a definite course within the casing 2 by means of conveyor chains 4; an initial soaking and washing basin 5 located in the lower portion of the casing 2 near the inlet end thereof; a final soaking and washing basin 6 located in the lower portion of the casing 2 adjacent to the basin 5; a rinsing water basin 14 located in the medial portion of the casing 2 above the basin 6; a series of external spray nozzles 8, 10, 12, 13 located in the uppermost portion of the casing 2 above the carriers 3; a series of internal spray nozzles 9, 15, 11 located within the casing 2 below the upper horizontal run of the conveyor chain 4; mechanism for supplying dirty bottles 28 to and for discharging clean bottles from the carriers 3 at the same end of the casing 2; and mechanism for automatically controlling and operating the movable nozzles 9, 11 and the conveyor chains 4.

The bottle carriers 3 are arranged in rows extending transversely across the machine and supported from the conveyor chains 4 by means of supporting bars. The conveyor chains 4 are positively guided and supported within the casing 2 by means of sprockets 16, 20, 21, 22, 23, 24, 25 associated with shafts extending transversely through and supported in bearings in the main casing 2. The

sprockets 16 are associated with the driving shaft 77 which is intermittently rotatable by means of a motor 46 in a manner which will be explained later.

The initial soaking and washing basin 5 contains a strong solution of liquid which is capable of being heated by virtue of a heating coil 26 immersed therein. The final soaking and washing basin 6 may contain a weaker but hotter solution of liquid which is capable of being heated by virtue of a heating coil 27 located below the basin 6. An inclined wall or guide 7 extends upwardly from the discharge end of the final basin 7 toward the carrier inverting sprocket 25. The nozzles 8, 9 may be supplied with liquid from the basin 6 as shown and described in the patent above referred to, and the rinsing nozzles 10, 11, 12, 15 may be supplied with relatively clean liquid from the basin 14. The rinsing nozzles 13 may be supplied with pure liquid from any suitable source and the liquid delivered from these nozzles is eventually delivered into the basin 14. The movable internal spray nozzles 9, 11 are adapted to be vertically reciprocated by means of arms 76 and levers 75 in a well known manner.

The mechanism for supplying the dirty bottles 28 to the washing machine, comprises a series of guides and an oscillatory stop plate 63 formed to periodically release a series of bottles 28 resting upon the guides. The mechanism for delivering the clean bottles 28 from the washing machine is located at the same end of the casing 2 as the supply mechanism, and comprises a series of bottle ejectors 17 supported for periodic oscillation about a pivot 78, and bottle receiving and righting devices cooperable with the ejectors 17. The ejectors 17 are adapted to push the clean bottles 28 from the successive rows of carriers 3 upon laterally spaced weighted bottle retainers 18 secured to an oscillatory plate or support 35. The support 35 is suspended at its upper end upon the swinging extremity of carrier arms 29, by means of a transverse pivot 37. The carrier arms 29 are journalled upon an oscillatory shaft 31, and are provided with upper and lower abutments 32, 38, and with a bottle bottom support 34. The upper abutments 32 are cooperable with adjustable limit stops 33 on the casing 2, to limit the movement of the arms 29 in a clockwise direction as viewed in Figs. 2, 3 and 4. The lower abutments 38 are engageable with the lower extremity of the plate 35 to arrest the movement of the support 35 in a clockwise direction about the pivot 37, as viewed in like manner. One or more push arms 30 rigidly attached to the shaft 31 carry rollers 36 at their upper ends, which are engageable with the rear medial portion of the support 35. A bottle discharge conveyor 19 of well known construction is supported upon a frame 39 and extends transversely across the machine in proximity to the bottle retaining supports 18 and support 35 closely adjacent to the bottle supply mechanism.

The actuating mechanism comprises a motor 46 drivingly connected with a main driving shaft 50 through a jaw clutch 47 and gearing 49. The clutch 47 is manually operable by means of a handle 55, a connection 52 and a lever 51, a spring 48 at all times tending to disconnect the clutch 47. The connection 52 has a lower notch 53 cooperable with a latch plate 54 secured to the casing 2, to hold the spring 48 in compression and to maintain the clutch 47 in normal driving position. The drive shaft 50 has a worm 64 secured to an end thereof, which meshes with a worm wheel 65 secured to the transverse power shaft 80. From the shaft 80, intermittent motion is transmitted to the carrier driving sprockets 16, to the movable nozzles 9, 11, to the bottle supply plate 63 and to the bottle discharge mechanism, by means of Geneva gearing as shown and fully described in the aforesaid Patent No. 1,734,585. The Geneva gearing associated with the shaft 77 is operable to intermittently reciprocate the connection 44 and to thereby simultaneously oscillate the transverse shafts 40, 31 in opposite directions by virtue of the lever 43 and the mutilated gears 41, 42 shown in Fig. 2. The lever 43 is drivingly connected with the supply plate 63 by means of a connection 45. The bottle ejectors 17 are secured on the shaft 78, the latter carrying a crank 88 (see Fig. 5) having a connection 89 with a pivot lever 90 which is actuated by a grooved cam of ordinary construction secured to the power shaft 80 inwardly of the worm wheel 65, whereby timed reciprocatory movement is imparted to the ejectors 17.

The automatic motion preventing and stop mechanisms are shown in detail in Figs. 5 and 6, and comprise means for automatically stopping the machine in the event that the supply plate 63 fails to assume normal bottle receiving position; means for automatically stopping the machine in case the ejectors 17 fail to discharge a bottle from a carrier 3; and means for automatically stopping the machine if the internal spray nozzles 9, 11 are prevented from functioning properly. These several automatically functioning stop mechanisms are operated by means of properly spaced pins 66, 68 secured to an element such as the worm wheel 65 on the power shaft 80, and cooperating with elements 67, 69 which are normally retracted from the paths of revolution of the pins 66, 68. The means for automatically stopping the machine when the supply plate 63 fails to assume normal bottle receiving comprises a connection 62 connecting the element 67 with a crank on the shaft

89 which supports the plate 63, and a latch release bar 71 secured to the vertical portion of the connection 62. The means for automatically stopping the machine in case the ejectors 17 fail to deliver a bottle from a carrier 3, comprises a cross-plate 56 vertically slidably supported in guides 57 on the casing 2; a lever 59 pivotally associated with the casing 2 and connected to the plate 56 by means of connections 58; a spring 60 cooperating with one end of the lever 59 to normally urge the plate 56 upwardly in the guides 56; and a latch release bar 61 connecting an end of the lever 59 with the connection 52. The means for automatically stopping the machine if the spray nozzles 9, 11 fail to function properly, comprises an arm 73 secured to the nozzle actuating shaft; a horizontally movable connection 72 secured to the arm 73; a lever element 69 pivotally associated with an end of the connection 72; a latch release bar 70 connecting an end of the element 69 with the connection 52; and levers 75 and a connection 74 for simultaneously actuating the two sets of nozzles 9, 11.

During normal operation of the improved bottle washing machine, the motor 46 is operating and the hand lever 55 has been pulled forward to cause the latch 54 to engage the notch 53 in the connection 52 thereby compressing the spring 48 and positively holding the elements of the jaw clutch 47 in driving engagement. With the clutch 47 thus engaged, continuous rotary motion is transmitted through the gears 49, shaft 50 and gearing 64, 65 to the power shaft 80, and from the shaft 80 through the Geneva gearing to the various movable elements of the machine in the form of intermittent motion. Intermittent motion is thus imparted to the chains 4 and to the carriers 3 supported thereby. Dirty bottles 28 are placed in inverted position upon the feed plate 63 while the plate is in upper position, whereupon any liquid contained by the bottles is drained off. The intermittent motion transmitted through the connection 44, lever 43 and connection 45 eventually causes the plate 63 to move downwardly and to precipitate the row of dirty bottles 28 by gravity into the carriers 3 below. After the bottles have been thus delivered to the carriers 3, the plate 63 is again automatically returned to bottle receiving position and the advancing carriers 3 submerge and transport the bottles in and through the initial soaking bath 5. At the end of the bath 5 the bottles 28 are elevated from the liquid and inverted to empty the same after which they are submerged in and transported through the second bath 6. From the bath 6 the bottles 28 substantially filled with the final soaking liquid, are eventually elevated along the inclined wall 7 after which the bottles are inverted and emptied by the reversing sprocket 25. As the carriers 3 and the inverted bottles 28 therein are intermittently advanced through the upper portion of the casing 2, the spray nozzles 8, 9, 10, 15, 11, 12, 13 automatically function to cleanse the bottles by delivering liquid spray thereagainst, the nozzles 9, 11 being movable into and out of the successive bottles by means of the levers 76 and weights associated with these levers. At the supply end of the machine, the carriers 3 and the clean bottles therein are carried over the sprocket 16 and are eventually brought into proximity with the ejector 17 which positively pushes the successive bottles 28 from the carriers 3 onto the inclined support 35, the bottles 28 assuming the tilted position shown in Fig. 2. When the bottles have been thus positioned upon the carrier arms 29 and the support 35, the push arms 30 are swung forward and urge the support 35 and the arms 29 forwardly to the position shown in Fig. 3 whereupon the bottles 28 are fully righted and momentarily rest upon the arm support 34 in the plane of the top of the conveyor 19. When the elements have been so positioned, the arm abutments 32 engage the adjustable stop 33 and the motion of the arms 29 is arrested. The push arms 30 however continue to move the support 35 forward causing the support to swing about the pivot 37 and to push the clean bottles 28 from the arm support 34 onto the moving conveyor 19 as shown in Fig. 4. The conveyor 19 automatically removes the clean bottles 28 from the machine and the discharge mechanism is returned to bottle receiving position as the next row of carriers 3 is brought into cooperative relation with the ejectors 17. In this manner the successive bottles 28 delivered to the machine are thoroughly cleaned and automatically discharged by the conveyor 19 at the same end of the washer, without in any manner damaging the bottles.

The operation of the automatic stop mechanisms is as follows:—If for any reason, the supply plate 63 is prevented from assuming bottle receiving position, the connection 62 is forced rearwardly and causes the element 67 to remain in the path of movement of the pins 66. As one of the pins 66 engages the element 67, the bar 71 is pulled upwardly and engages the connection 52, releasing the notch 53 from the latch 54 and causing the spring 48 to become effective to release the jaw clutch 47 and to stop the machine. If the ejectors 17 fail to deliver a bottle from one of the carriers 3 upon the support 35, the retained bottle projecting from the advancing carrier 3 will strike the cross-plate 56 and will move this plate downwardly in the guides 57, causing the spring 60 to be compressed and raising the bar 61 associated with the lever 59. The upwardly moving bar 61 will engage the connection 52, likewise releasing the notch 53 from the latch 54 and

causing the spring 48 to become effective to release the jaw clutch 47 and to stop the machine. If for any reason, the reciprocable nozzles 9, 11 are prevented from moving downwardly out of the carriers 3, the lever element 69 will be held in the path of the revolving pins 68 by the arm 73 and the connection 72. As one of the pins 68 engages the end of the element 69, this element swings about its central pivot and raises the bar 70 thereby elevating the connection 52, releasing the notch 53 from the latch 54 and causing the spring 48 to become effective to release the jaw clutch 47 and to stop the machine. It will thus be apparent that the machine is automatically stopped under various abnormal conditions of operation thus avoiding destruction of the mechanism.

From the foregoing description, it will be noted that the invention provides improved means for automatically supplying and delivering bottles in succession to and from an endless series of movable carriers, and also provides simple and efficient mechanism for controlling the operation of bottle washing machines and for avoiding damage thereto.

It should be understood that it is not desired to limit the invention to the exact details of construction and operation herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:—

1. In combination, bottle transporting means, a support formed to receive bottles in tilted position from said means, and means for swinging said support about a pivot at one end thereof to right the bottles and for swinging said support about a pivot at the opposite end thereof to discharge the righted bottles from said support.

2. In combination, bottle transporting means, a support formed to receive bottles from said means, an arm swingable about a pivot at one end of said support, said support being suspended from a pivot at its opposite end, and means for swinging said arm and said support in succession about said pivots to right and discharge bottles therefrom.

3. In combination, bottle transporting means, a support formed to receive bottles in tilted position from said means, an arm swingably suspended near the lower end of said support, said support being swingably suspended at its upper end from the swinging end of said arm, and means for swinging said arm and said support in succession about their respective suspensions to right and discharge bottles therefrom.

4. In combination, bottle transporting means, bottle conveying means, a support formed to receive bottles in tilted position from said transporting means, and means for swinging said support successively about its opposite ends to right the bottles received from said transporting means and to deliver the righted bottles to said conveying means.

5. In combination, bottle transporting means, an arm movable about a pivot and having a bottle bottom suport adjacent to said pivot, a support pivotally suspended from said arm and cooperable with said bottom support to receive bottles in inclined position from said transporting means, and means for initially moving said arm and said pivotally suspended support to right the bottles and for finally moving said pivotally suspended support alone to deliver the righted bottles from said bottom support.

6. In combination, an arm movable about a pivot, a support pivotally associated with said arm, means for delivering bottles upon said support, and means for swinging said arm about said pivot to right bottles delivered to said support and for subsequently moving said support alone to discharge the righted bottles therefrom.

7. In combination, a carrier arm movable about a pivot, a support pivotally suspended by said arm, means for periodically delivering bottles in tilted position upon said support, and a push arm coacting with said support to swing said carrier arm and said support about the pivotal axis of said carrier arm to right bottles delivered thereto and to subsequently swing said support alone about its pivotal axis on said carrier arm to discharge the righted bottles.

8. In combination, a pivoted arm, a support pivotally suspended from said arm, means for delivering bottles in tilted position upon said support, means for simultaneously moving said arm and said support about the pivotal axis of said arm to right the bottles delivered thereto, and means for arresting the movement of said arm while permitting continued movement of said support about its pivotal axis on said arm to discharge the righted bottles.

In testimony whereof, the signature of the inventor is affixed hereto.

GEO. F. SOELCH.