

March 13, 1945.

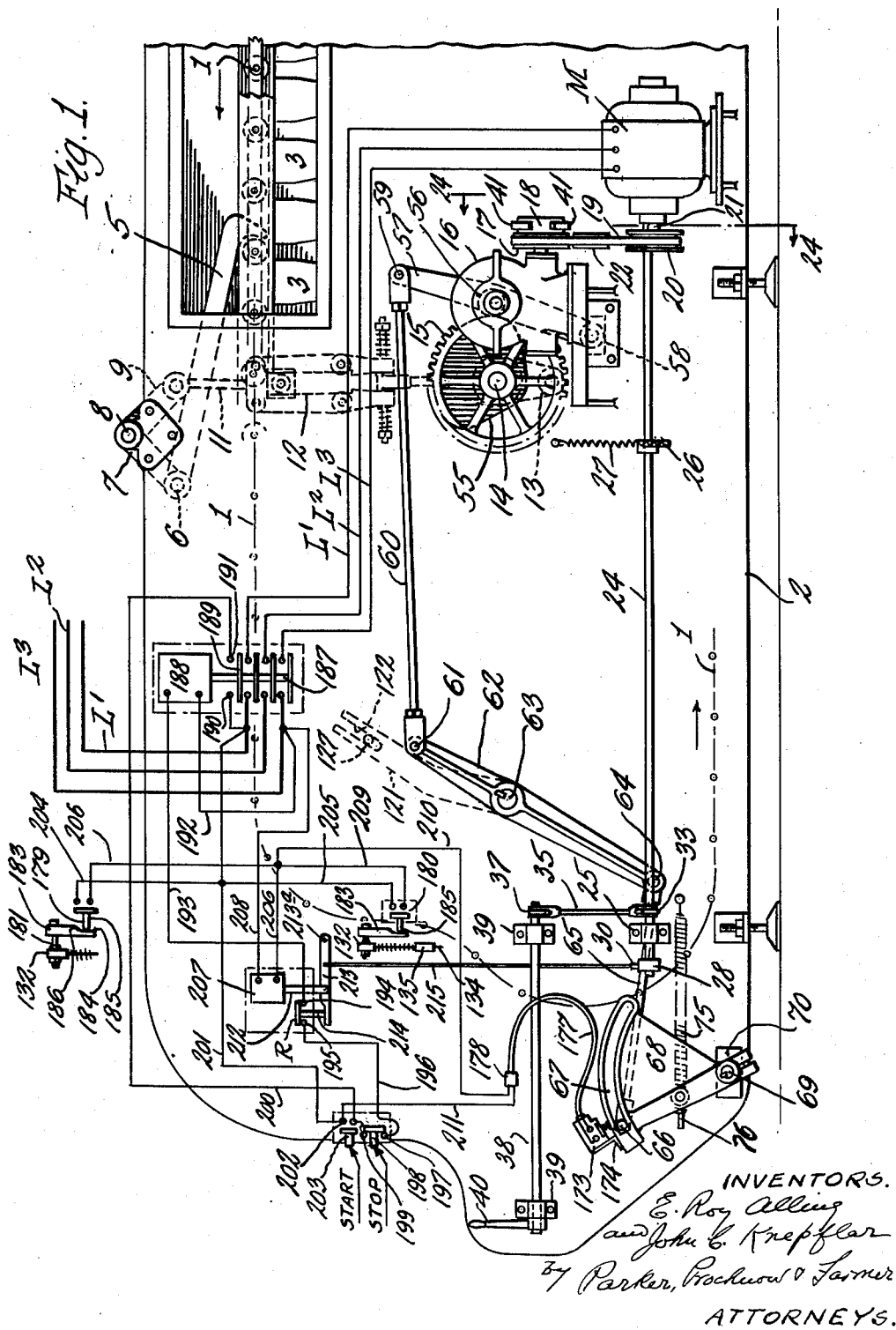
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CONTAINER HANDLING MEANS

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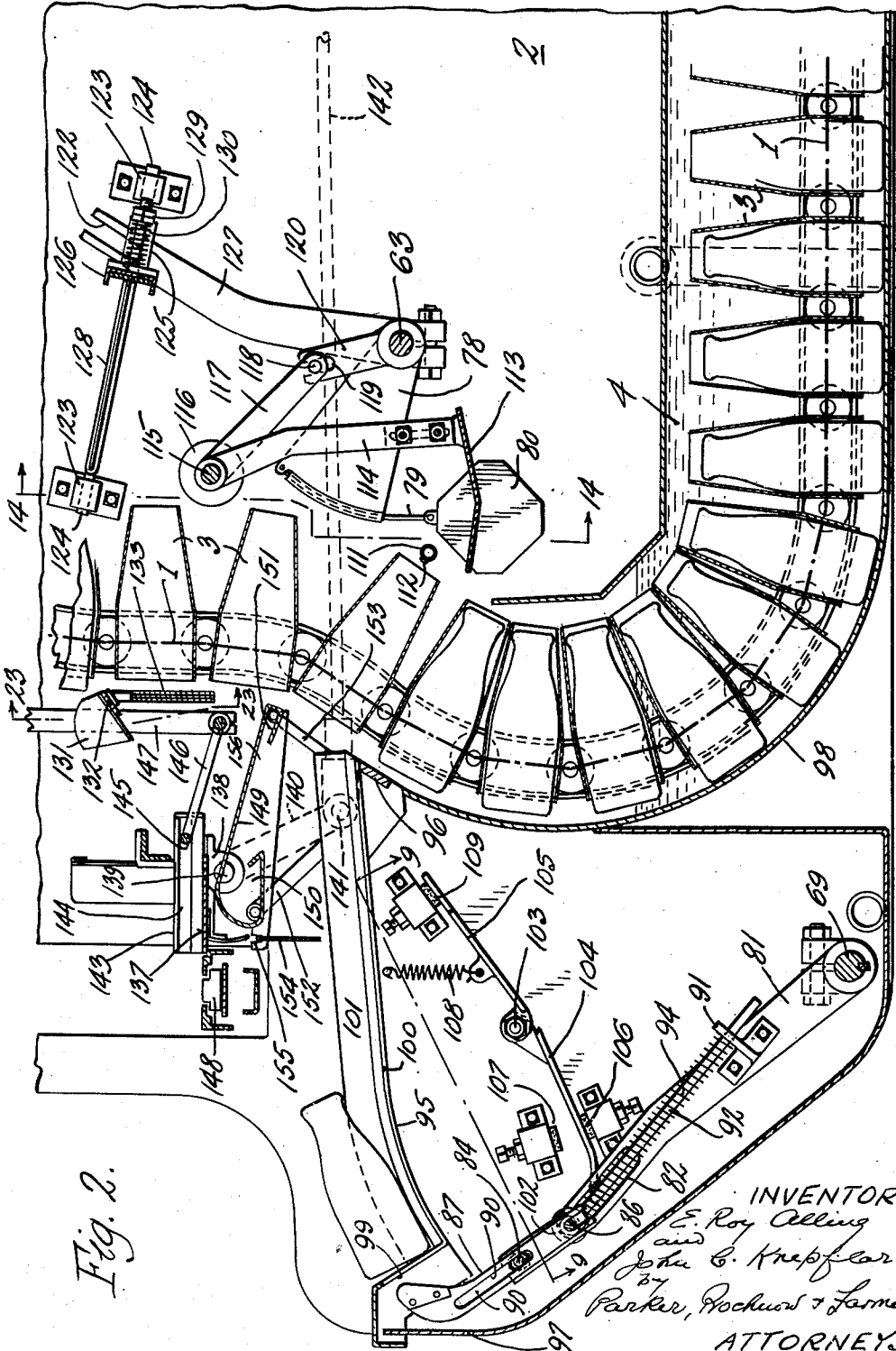
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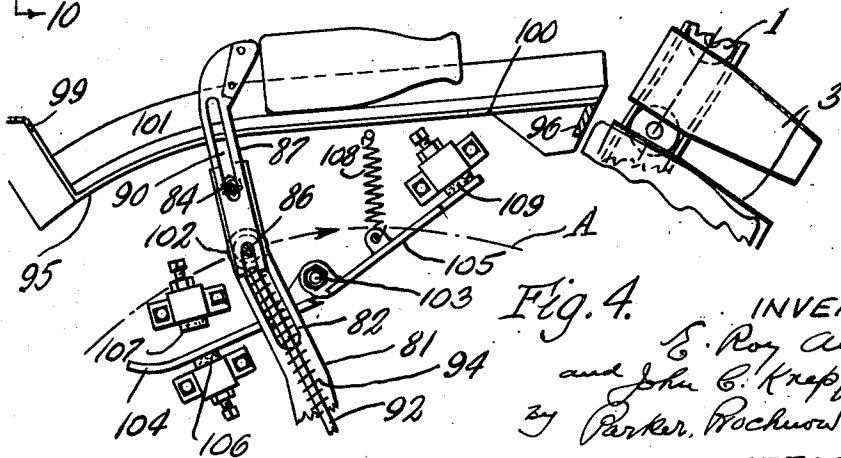
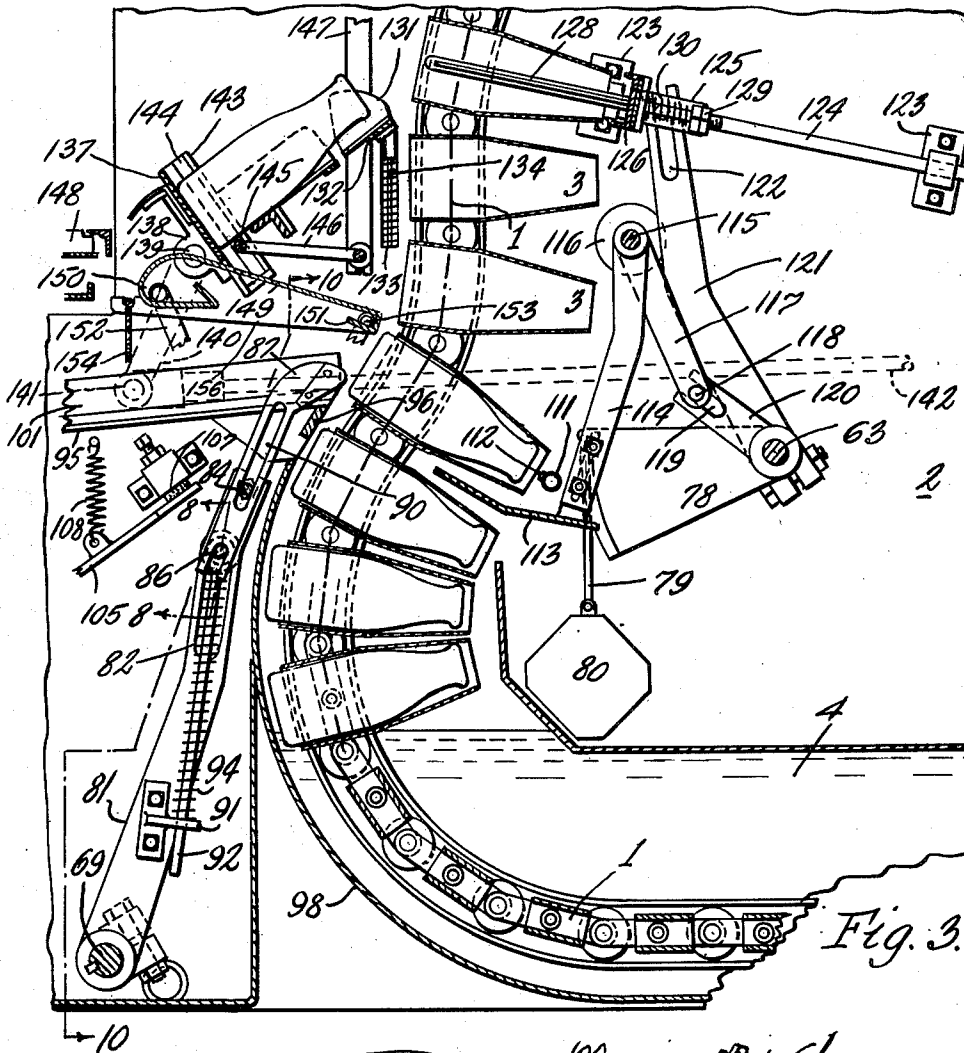
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8 Sheets-Sheet 3



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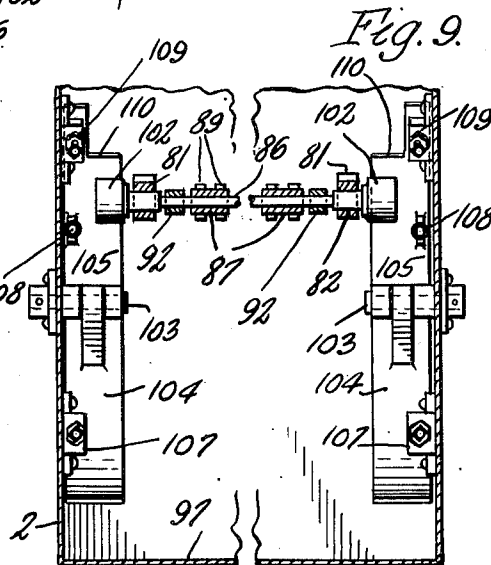
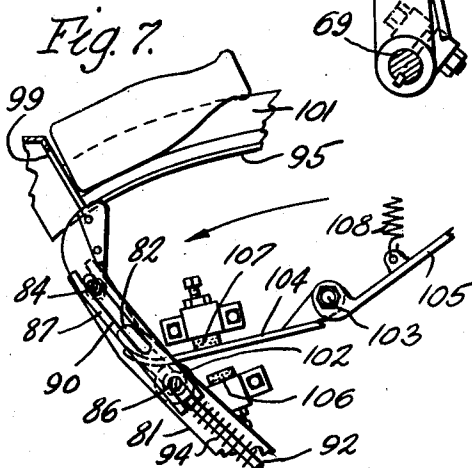
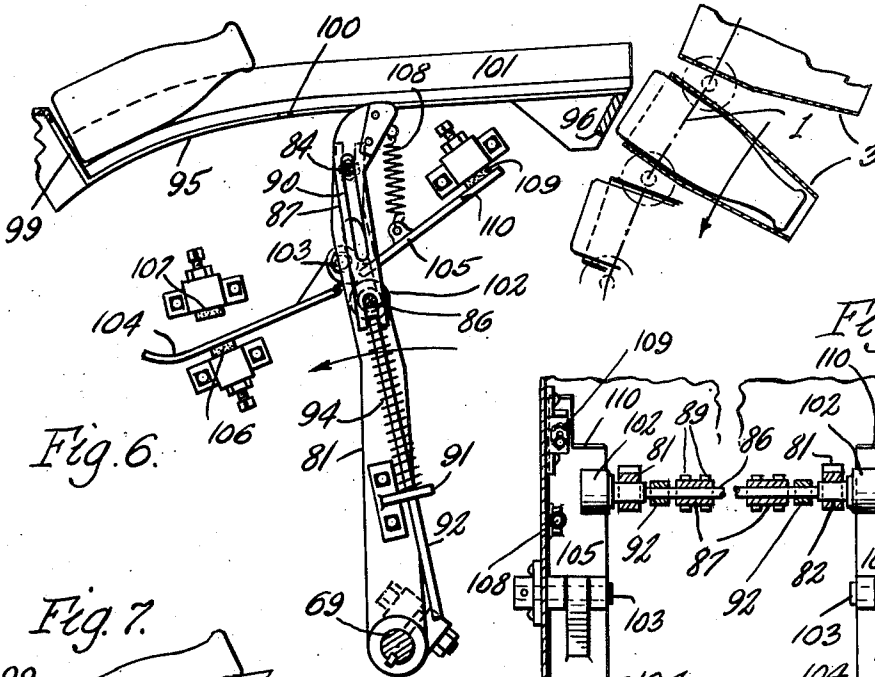
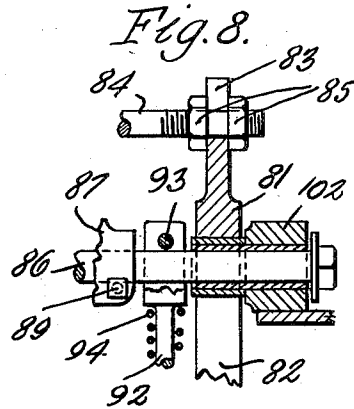
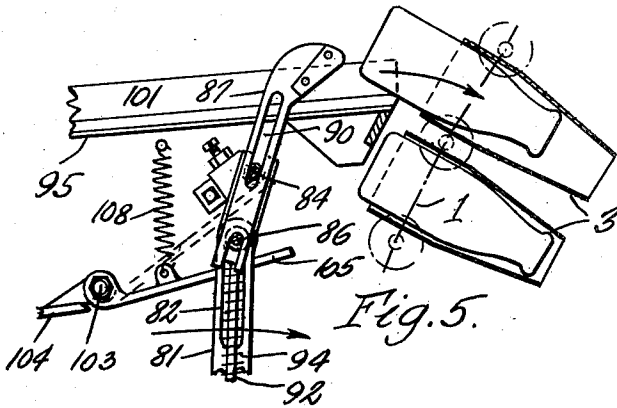
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8 Sheets-Sheet 4



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CONTAINER HANDLING MEANS

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8 Sheets-Sheet 5

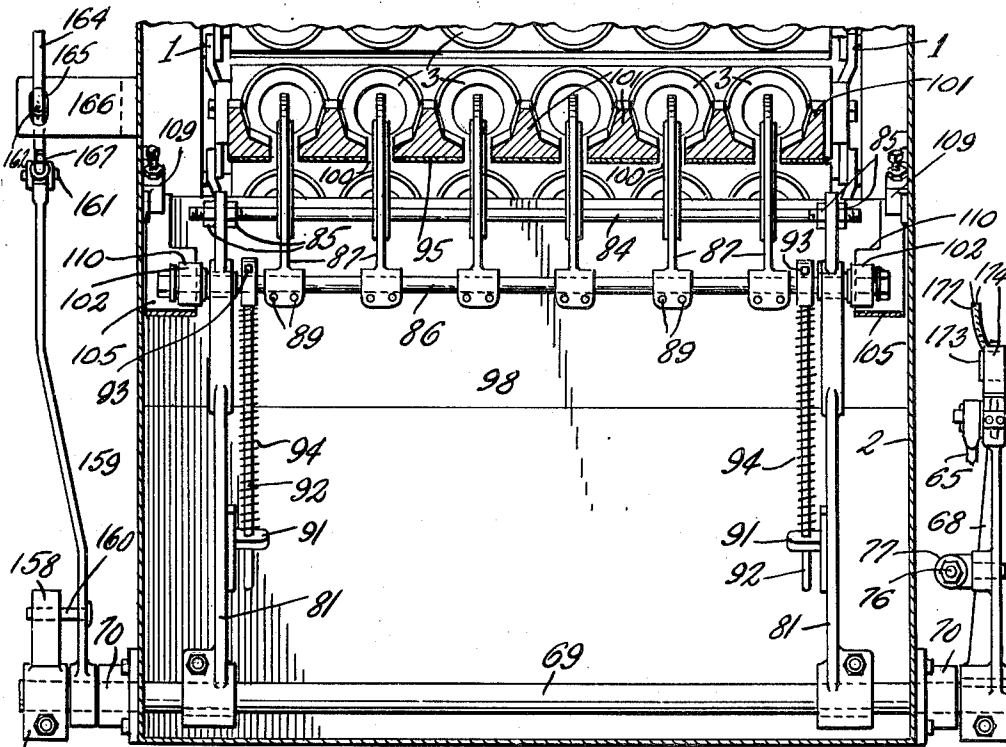
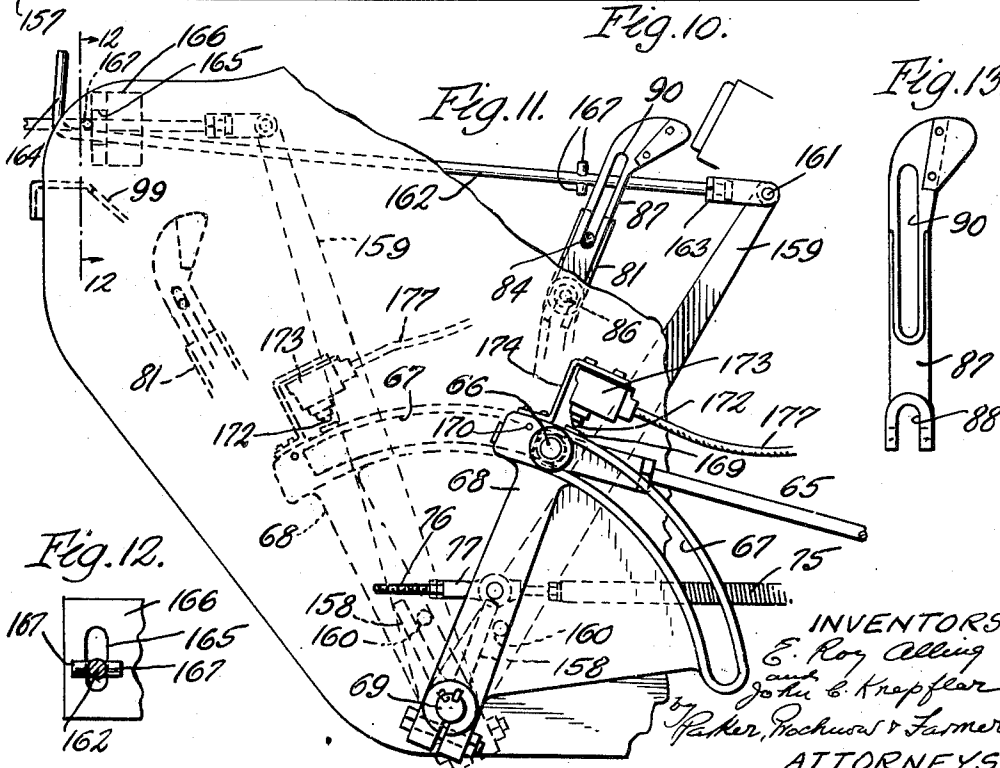


Fig. 10.



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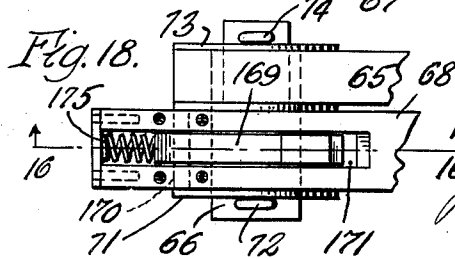
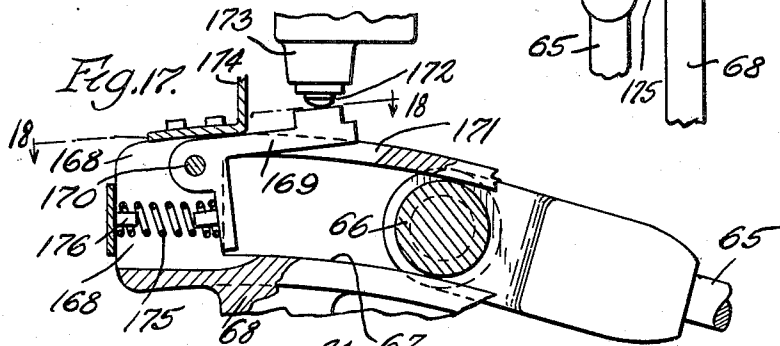
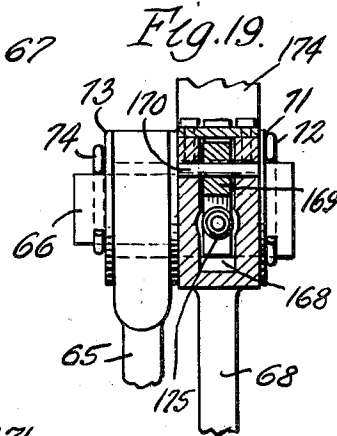
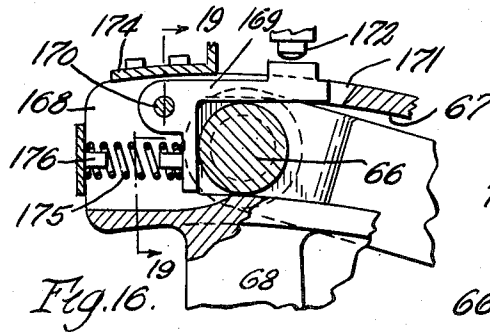
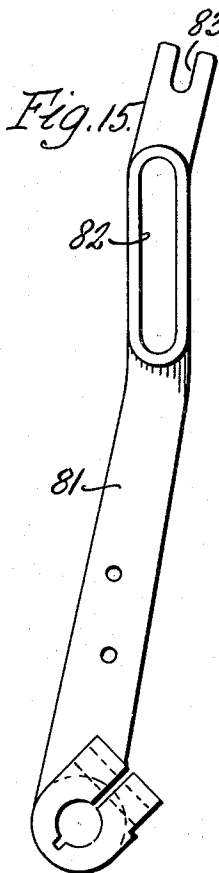
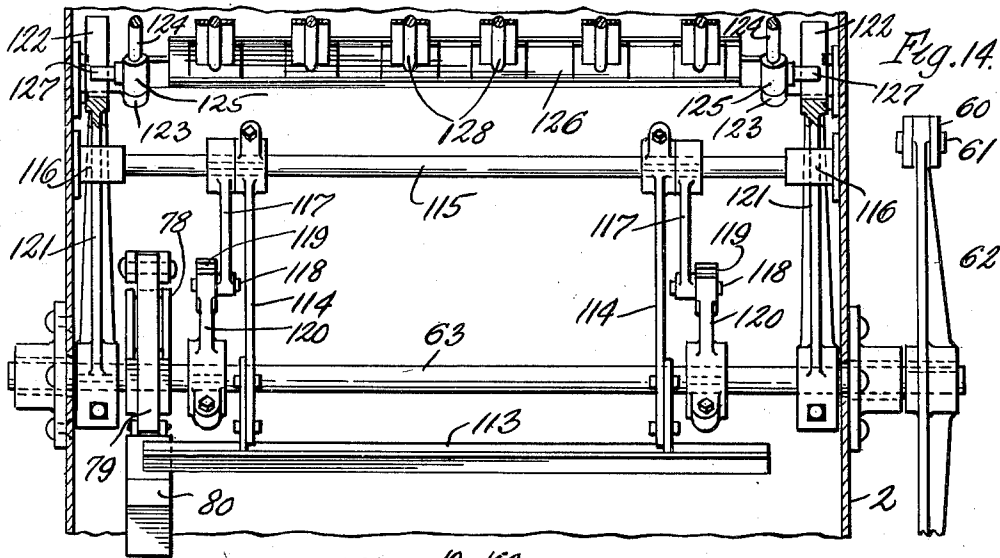
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CONTAINER HANDLING MEANS

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CONTAINER HANDLING MEANS

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8 Sheets-Sheet 7

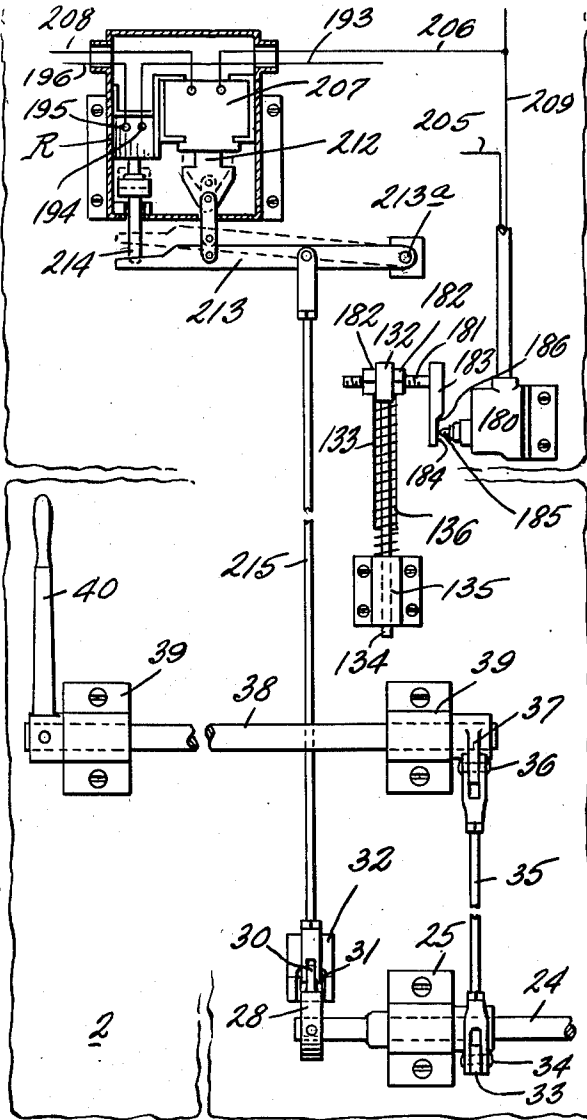


Fig. 20.

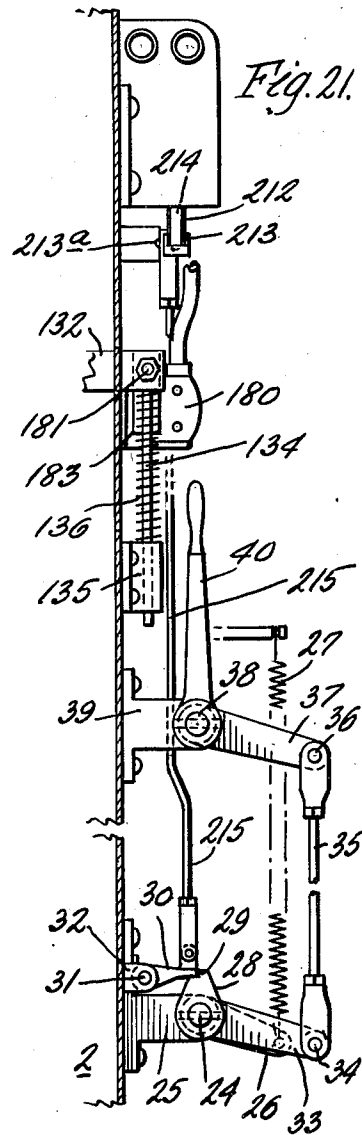


Fig. 21.

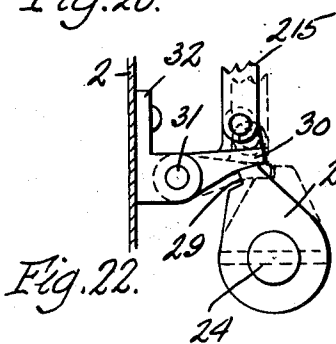


Fig. 22.

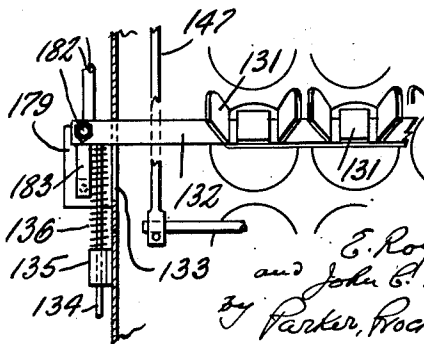


Fig. 23.

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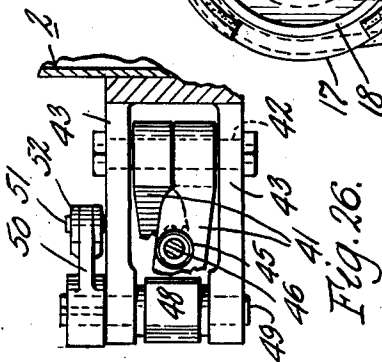
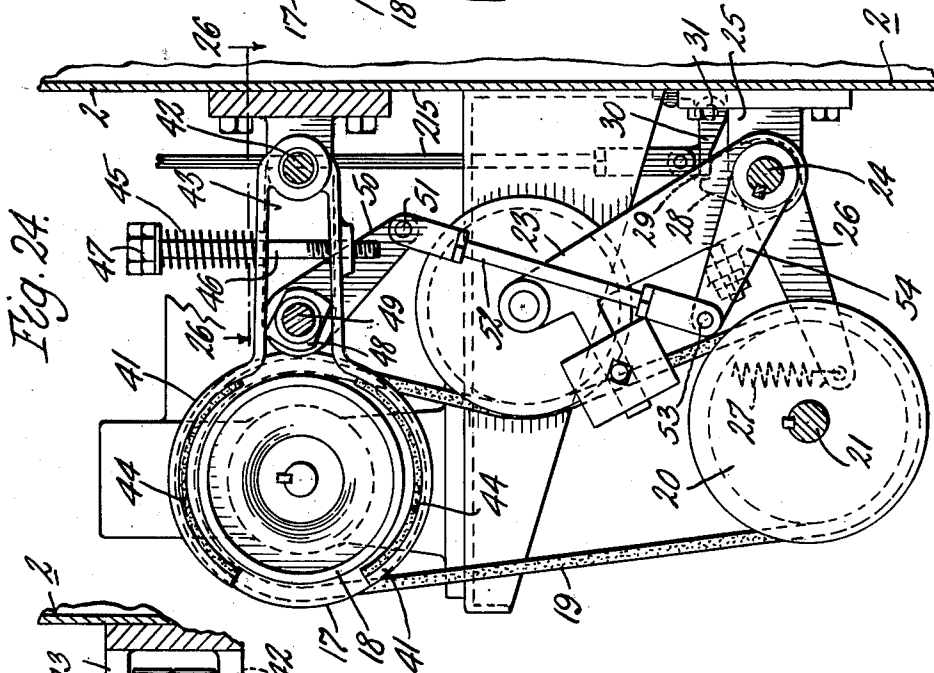
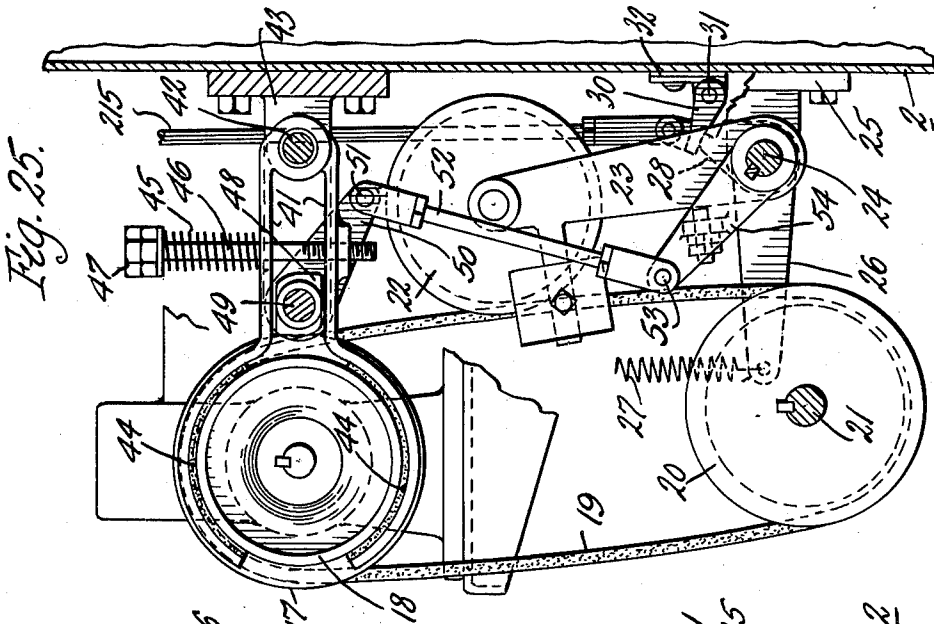
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CONTAINER HANDLING MEANS

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8 Sheets-Sheet 8



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UNITED STATES PATENT OFFICE

2,371,140

CONTAINER HANDLING MEANS

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Application April 25, 1941, Serial No. 390,400

22 Claims. (Cl. 198—27)

This invention relates to washers for containers of various types, and particularly to bottle washers.

An object of this invention is to improve washers of this type and minimize the danger of breakage of containers and of the washer mechanism in the event of some abnormal operating condition in the washer.

Another object of the invention is to provide an improved washer for containers of different types in which the containers are cleaned while being conveyed by a suitable conveyor in a selected path, with which the containers are loaded and discharged in a simple and effective manner, with which maximum possible time will be allowed for placing containers to be washed in position to be loaded, with which the jamming of a container while being loaded or discharged will automatically and promptly, and in a simple manner, interrupt the application of power to the conveyor and also render the source of power ineffective in order to minimize possible injury to the containers so jammed or to the washer mechanism, with which as soon as the loading of a container into a pocket is initiated, a new container may be placed in position to be loaded without waiting for the completion of the loading operation then under way, and with which the loading means may be incapacitated to facilitate the clearing of jammed containers without interfering with the operation of said conveyor.

Another object of the invention is to provide an improved power-operated washer, with which the improper loading of a container into the conveyor, or improper or incomplete discharge of a container from the conveyor, may cause an immediate termination of the operation of the washer before damage to the containers or the washing apparatus may occur.

Another object of this invention is to provide an improved washer for containers which will be safe in operation, which will offer the maximum of protection against injury to containers and the washer in case of inadvertent obstruction or jamming of the mechanism, which will be relatively simple and easy to operate and inexpensive to manufacture.

Another object of this invention is to provide an improved bottle washer in which there will be a minimum of wasteful splashing, or mixing of the initial rinse liquid with other bodies of washing liquid, and which will be effective and economical in operation.

Other objects and advantages will be apparent from the following description of one embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation of part of a bottle washer constructed in accordance with this invention, and showing somewhat diagrammatically the application thereto of improved safety features;

Fig. 2 is a longitudinal, sectional elevation through the loading and delivery end of the same;

Fig. 3 is a sectional elevation somewhat similar to Fig. 2, but illustrating the stage in the operation of the washer in which a bottle has just been loaded into the conveyor at the loading station and a cleaned bottle discharged therefrom at the unloading station;

Fig. 4 is a sectional elevation through the bottle loading means at an intermediate point in its loading movement;

Fig. 5 is a sectional elevation similar to Fig. 4 illustrating a still further step in the loading of a bottle into the conveyor;

Fig. 6 is a sectional elevation similar to Fig. 4, but showing the positions of the parts during a return of the bottle advancing member to initial or starting position;

Fig. 7 is another sectional elevation of a portion of the bottle loading mechanism showing a still different position of the parts during the return of the bottle loading member to its initial or starting position;

Fig. 8 is a transverse, sectional elevation, approximately along the line 8—8 of Fig. 3, through a portion of the bottle loading member to show certain details of construction;

Fig. 9 is a sectional plan of a portion of the bottle loading means, the section being taken approximately along the line 9—9 of Fig. 2;

Fig. 10 is a transverse, sectional elevation, approximately along the line 10—10 of Fig. 3, through the washer at the loading end thereof to illustrate the bottle loading member and its relation to the guides;

Fig. 11 is a side elevation of a portion of the loading end of the washer and showing different positions that may be assumed by the parts in a loading operation;

Fig. 12 is a sectional elevation through a part of the washer, the section being taken approximately along the line 12—12 of Fig. 11;

Fig. 13 is a side elevation of one of the fingers forming a part of the bottle loading means;

Fig. 14 is a transverse, sectional elevation through a portion of the machine, the section being taken approximately along the line 14—14 of Fig. 2;

Fig. 15 is a side elevation of one of the arms forming a part of the bottle advancing member;

Fig. 16 is a longitudinal, sectional elevation through a part of the mechanism, the section being taken approximately along the line 16—16

of Fig. 18 and illustrating the normal engagement of the bottle loading member with the shiftable abutment which controls its movement;

Fig. 17 is a sectional elevation similar to Fig. 16 but illustrating the relative positions of the parts during an abnormal operation of the mechanism;

Fig. 18 is a sectional plan of a portion of the mechanism shown in Figs. 16 and 17, the section being taken approximately along the line 18—18 of Fig. 17;

Fig. 19 is a transverse, sectional elevation of the mechanism of Figs. 16 to 18, the section being taken approximately along the line 19—19 of Fig. 16;

Fig. 20 is a side elevation of a portion of a washer on a somewhat larger scale than Fig. 1, with the housing for a solenoid broken away to show the interior mechanism and the manner in which the clutch is latched in power transmitting condition;

Fig. 21 is a transverse, sectional elevation through the portion of the washer shown in Fig. 20;

Fig. 22 is a transverse, sectional elevation of the part shown in the lower end of Fig. 21, but illustrating the relative positions of the parts when the clutch is released;

Fig. 23 is a transverse, sectional elevation of a portion of the washer and illustrating the safety mechanism associated with the bottles being discharged, the section being taken approximately along the line 23—23 of Fig. 2;

Fig. 24 is a transverse, sectional elevation through the clutch mechanism, the section being taken approximately along the line 24—24 of Fig. 1, with the clutch in power transmitting condition;

Fig. 25 is a view similar to Fig. 24, but with the clutch in idle or non-driving condition, and;

Fig. 26 is a sectional plan through a part of the mechanism shown in Fig. 24, the section being taken approximately along the line 26—26 of Fig. 24.

In the illustrated embodiment of the invention, the washer may be of any suitable type such as one in which an endless, flexible conveyor (Fig. 1) is conducted in a selected path through a housing 2, this being shown somewhat diagrammatically in Fig. 1 by the dash lines separated by small circles. Washers using endless chains or conveyors of this type are common in the art. These conveyors or chains are provided with a plurality of pockets 3 which are supported on the conveyor in horizontal rows (Fig. 10), and these rows are arranged in succession along the conveyor in the direction of movement of the conveyor. The bottles or containers to be washed are loaded into the pockets 3 and unloaded therefrom at the same end of the machine, and for this purpose it is customary to have a somewhat reverse bend in the path of travel of the pockets at the loading and unloading end of the washer, as shown by the diagrammatic illustration of the path of the conveyor in Fig. 1.

At this loading and unloading end of the washer, the pockets 3 are descending in an approximately vertical path through unloading position, then the pockets are carried in a path which is inclined to both vertical and horizontal for a short distance, and the bottles are loaded into the pockets while in this inclined portion of the path of movement. The conveyor is preferably made of connected links forming two

chains, one on each side of the housing on the inside thereof, which chains have corresponding links connected to one another from side to side by members carrying therein the pockets of a row, all of which is well known in the art. From this inclined portion of the path, representing a loading position, the pockets descend into a soaking tank or chamber 4 (Fig. 2) in which the bottles or containers are disposed upright so as to fill automatically with the liquid in the tank 4 and soak while they are being moved in succession through this soaking tank. This conveyor is advanced step by step, with intervals of rest between the increments of movement, by any suitable mechanism, and in the particular example illustrated, this advancement of the conveyor is obtained by operation of a pair of pawls 5 (Fig. 1), one on each side of the machine and engageable with the links of the chain at each side of the housing. Each pawl 5 is connected at 6 to an arm 7 which is fixed on a shaft 8 that extends crosswise of the housing at the top thereof.

The shaft 8 is rotatably mounted in suitable bearings at the top of the housing, and an arm 9 is fixed on the shaft 8 at one end thereof, which happens to be at the side of the housing opposite the side face shown in Fig. 1. The free end of the arm 9 is pivotally connected by a pin to one end of a link 11, and the latter includes therein between its ends, a lost motion and slip connection 12. At its other end the link 11 is connected to a crank arm 13 fixed on a shaft 14, which also extends crosswise of the housing from side to side and is suitably mounted for rotation. The shaft 14 at one end thereof, which is the end shown in Fig. 1, carries a gear 15 which meshes with and is driven by a speed reduction mechanism enclosed in a housing 16. Said speed reduction mechanism is in turn driven by a pulley 17 (Figs. 1, 24 and 25). The pulley 17 has a brake drum 18 projecting from one end face thereof for a purpose which will appear shortly. The pulley 17 is driven by a belt 19 which also operates over a suitable pulley 20. The pulley 20 is fixed on a motor shaft 21 of a motor M which serves as a source of power for operating the conveyor in a step by step movement as well as the mechanism for loading and unloading the containers.

Referring particularly to Figs. 24 and 25, the pulleys 17 and 20 and the belt 19 form part of what may be considered a clutch for transmitting power from the driving pulley 20 to the driven pulley 17. The belt 19 is normally of such length that when free it is slack, as shown in Fig. 25, and slips on the pulleys so as to exert no substantial driving action between them. An idler pulley 22 is rotatably supported on the end of an arm 23 which is fixed on shaft 24. Said shaft 24 extends in a direction endwise of the washer, as shown in Fig. 1, and is rotatably supported in suitable bearings 25 on the outside of the housing. The shaft 24 also carries an arm 26 to which is connected one end of a spring 27, the other end of the spring being suitably anchored to the housing 2 as shown in Fig. 1. This spring 27 urges the arm 26 and the shaft 24 in a clockwise direction in Fig. 24, so as to carry pulley 22 in a direction away from the belt 19. The shaft 24 also carries, adjacent the loading and unloading end of the housing, a latch arm 28 (Figs. 20 and 22) fixed thereon, and this arm 28 has a notch 29 at its free end which cooperates with a latch dog 30. The dog 30 is pivoted

at 31 to a suitable bearing 32 on the side wall of the housing 2.

The idler pulley 22 is so disposed on the arm 23 as to engage with the belt 19 and tighten it, as shown in Fig. 24, when the shaft 24 is rocked counter-clockwise in Fig. 24. When the shaft 24 is so rocked, the notch 29 will be carried beyond the end of the dog 30, whereupon the dog 30 will fall into the notch as shown in Figs. 21 and 24. This releasably prevents movement of the shaft 24 in the opposite direction under the action of the spring 27. The dog 30 thus holds the idler pulley in belt tightening position which is the driving condition of the clutch formed of above described pulleys and belt. The shaft 24 carries an arm 33 (Figs. 20 and 22), which is fixed thereon and pivotally connected by pin 34 to one end of a link 35. The other end of link 35 is pivotally connected by a pin 36 to the free end of an arm 37 which extends from and is fixed to a counter-shaft 38. The shaft 38 is rockably mounted in suitable bearings 39 on the side wall of the housing, extends into a position adjacent the loading end of the machine, and there mounts an operating handle 40. By rocking the handle 40, the link 35 may be shifted endwise to rock the arm 33 and the shaft 24 in a direction to carry the arm 28 into latching engagement with the dog 30, and thereby shift the idler pulley 22 into its belt tightening position. During such movement the spring 27 is further tensioned.

When the dog 30 is operated to release the arm 28 on shaft 24, the spring 27 rocks the shaft 24 to carry the idler pulley 22 from the driving position shown in Fig. 24 to the idle position shown in Fig. 25 and thereby interrupts the driving action between the pulleys 17 and 20. When the driving power to the pulley 17 is interrupted in this manner by a slacking of the belt 19, it is often desirable to stop the movement of the mechanism driven from the pulley 17 as quickly as possible, and for that purpose, a pair of brake arms 41 (Figs. 24 and 25) are hinged upon a bearing pin 42 which is supported in bearing arms 43 (Figs. 24 and 26) carried by and projecting from the side wall of the housing 2. The arms 41 at their free ends are oppositely and arcuately curved to extend in opposite directions partially around the drum 18, and each arcuate end of an arm is provided with a brake shoe or pad 44 of suitable friction creating material, such as, for example, the brake shoe material or lining used on the brakes of automobiles. The two arms 41 are independently rockable on the pin 42, but are urged towards one another by a spring 45 which bears against one of the arms 41 and surrounds a rod 46 extending from the other arm 41 through the first-mentioned arm. The spring 45 bears, under compression, against a head 47 on the rod 46. This spring 45 thus tends to draw the brake shoe arms 41 toward one another and in a direction to engage between them the brake drum 18.

Disposed between the drum 18 and the pin 42 as well as between the arms 41 is a cam 48 which is fixed on a shaft 49 (Fig. 26) that is rockably mounted in the free ends of the bearing arms 43. An arm 50 is fixed on one end of the shaft 49, and the free end of that arm 50 is pivotally connected by pin 51 to one end of a link 52, the other end of which link being pivotally connected by pin 53 to the free end of an arm 54 which is also fixed on the shaft 24. When the shaft 24 is rocked from the position shown in Fig. 24 to that shown in Fig. 25, so as to carry the idler pulley

22 into belt loosening position, the arm 54 will act through the link 52 to rock the cam 48 from the position shown in Fig. 24 where it holds the arms 41 separately from one another and out of engagement with the brake drum 18 on pulley 17, into a position in which it releases the arms 41 and allows the spring 45 to clamp the brake linings 44 firmly against the drum 18 and stop further rotation of pulley 17. When the shaft 24 is rocked back into the position in which it places the idler pulley 22 in belt tightening position, the cam 48 will be rocked back into the position shown in Fig. 24 where it forcibly separates the arms 41 and removes the brake linings 44 from engagement with the drum 18.

Also fixed on the shaft 14 is a cam 55 (Fig. 1), and a roller 56, which is pivotally mounted on an arm 57, rolls along the peripheral edge of the cam 55. The arm 57 is rockably mounted at its lower end in a suitable bearing 58, and the other or upper end of arm 57 is pivotally connected by a pin 59 to one end of a link 60, the other end of said link being pivotally connected by a pin 61 to one arm of a lever 62. Lever 62 is fixed on a shaft 63 which also extends crosswise of the housing 2 from side to side, and is rotatably supported thereby. The other arm of the lever 62 is pivotally connected by a pin 64 to one end of a link 65 (Figs. 10 and 11 also). The other end of the link 65 is pivotally connected to a pin 66. The pin 66 extends laterally from the link 65 and through a slot 67 provided in a sector shaped arm or element 68 which is fixed on a shaft 69. Shaft 69 extends from side to side of the housing across the interior thereof at the loading end of the machine, and is rockably supported in the suitable bearings 70 (Fig. 10). The slot 67 is shown as concentric to the shaft 69, and the pin 66 (Figs. 18 and 19) at the side of the element 68 opposite from the link 65 is provided with an encircling washer 71 which is confined against the side of the slot portion of element 68 in any suitable manner such as by a cotter pin 72. A similar washer 73 is confined on the opposite end of pin 66 by a cotter pin 74 (Fig. 18). This prevents disengagement of the link 65 and pin 66 from the element 68.

A spring 75 is connected at one end through a rod 76 (Figs. 1, 10 and 11) to the element 68 and at its other end to the housing 2. It yieldingly, resiliently and continuously urges the element 68 in a direction for clockwise rotation in Fig. 11, and so as to normally maintain one end of the slot 67 against the pin 66. The rod 76 passes through a sleeve 77 (Fig. 10) which is swivelled to one side of the element 68, so that the spring 75 may pull in an approximately straight line as the element 68 rocks with the shaft 69. Suitable nuts on the rod 76 which engage with the end of the sleeve 77 enable the rod 76 to be drawn through the sleeve 77 in a direction to tighten or loosen the spring 75 and thereby determine the tension which the spring 75 exerts on the element 68 tending to press one end of the slot against the pin 66 on the link 65. It will be noted that because of the slot 67, the element 68 may be rocked with its shaft 69 counter-clockwise in Fig. 11, during which the pin 66 will move along the slot 67 toward the right-hand end of slot 67 in Fig. 11. The spring 75, however, normally holds the left-hand end of slot 67 in Fig. 11 against the pin 66 and causes said end of slot 67 to follow the pin 66 when the latter is moved to the right in Figs. 1 and 11.

Referring now to Figs. 2 and 10, the shaft 63

extends across the interior of the housing, and within the interior has fixed thereon an arm 78 which is arcuate and convex at its free end. A flexible strap or cable 79 is secured to the free end of the arm 78, depends over this arcuate, convex, free end thereof and at its depending end supports a weight 80. This weight 80 urges the shaft 63 counter-clockwise in Figs. 1 and 2, which is in a direction to maintain the roller 56 (Fig. 1) against the periphery of cam 55 as the roller follows the peripheral undulations of that cam.

Fixed on the shaft 69 (Fig. 10) are a pair of arms 81 adjacent opposite sides of the inside of the housing 2. These arms are upstanding from the shaft 69 and each is provided intermediate of its ends with a slot 82 (Fig. 15) that is elongated in a direction endwise of the arm. Each arm is also provided at its free end with a notch 83 which is shown as opening into the end edge of the arm. A rod 84 (Fig. 10) extends across between the free ends of the arms 81 and through the notches 83. The ends of the rod 84 are threaded, and nuts 85 are threaded on each end of the rod on opposite sides of each arm 81, so that by tightening the nuts on the ends of the rod into engagement with the opposite faces of the free ends of arms 81, the ends of rod 84 will be firmly but removably clamped to the free ends of the arms 81. Another rod 86 (Fig. 10) extends between and through the arms 81, that is, through the slots 82 in the arms 81, and between the arms 81 the rod 86 mounts a plurality of fingers 87 (Fig. 13). For this mounting, the lower ends of the fingers 87 are provided with notches or slots 88 which engage over the rod 86 and are confined thereon by bolts or screws 89 which tend to hold fingers against endwise movement along the rod 86 from the spaced relation shown in Fig. 10.

Each finger 87 between its ends is also provided with a slot 90 (Fig. 13) which is elongated in a direction endwise of the fingers, and the rod 84 passes through the slots 90 of all of the fingers 87 and acts as a guide rod for keeping the fingers 87 in parallel relation to one another. Each arm 81 is provided, on its face towards the other arm, with an ear or lug 91, and a rod 92 is slidably mounted in an aperture in that ear. Each rod 92 at its upper end is bifurcated or forked, with the arms of the fork straddling the rod 86 and connected together by a screw or bolt 93 beyond that rod (Figs. 8 and 10). A coil spring 94 surrounds each rod 92 and is compressed between the adjacent ear 91 and a shoulder on each rod 92 adjacent the forked end. The springs 94 thus yieldingly and continuously urge the rods 92 upwardly and, through the bifurcated ends of rods 92, yieldingly and continuously urge the rod 86 upwardly so as to push the fingers 87 upwardly until the rod 86 engages the upper ends of the slots 82 in the arms 81, as shown in Fig. 8.

From the foregoing, it will be observed that the two arms 81 are fixed on the shaft 69 in parallel relation to one another, and because of the nature of the connections thereto of the rods 84 and 86, the rods 84 and 86 and the fingers 87 will rock as a unit with the arms 81 and with the shaft 69, yet the rods 84 and 86 with the fingers 87 may independently and separately move somewhat radially with respect to the shaft 69 so as to enable the free ends of the fingers 87 to be pulled towards the shaft 69 or to move outwardly to an extent permitted by the outer ends of the slots 82 in the arms 81.

A generally horizontal guide is disposed in

front of the conveyor and extends from adjacent the loading zone or position in the inclined portion of the path of the conveyor, outwardly towards the adjacent end of the housing as shown in Fig. 2. This guide is shown as including a sheet metal plate 95 which is supported at one end on a cross-bar 96 (Fig. 2) and at its outer end upon the upstanding wall 97 of an auxiliary housing which is disposed in front of the upwardly extending bottom wall 98 of the tank 4. This plate 95 has a downwardly indented, angular portion 99 adjacent its outer end (Fig. 2), and from the lower end of this portion 99 the plate extends upwardly at a small inclination to the horizontal, and then generally horizontally toward the conveyor with the pockets. Thus, the bottles or containers to be washed may be disposed on this guide with the bottoms abutting and resting against this angular portion 99 as shown by the position of a bottle on the plate 95 in Fig. 2. The plate 95 is provided with parallel slots 100 which run lengthwise thereof, that is, toward the conveyor with the pockets (Fig. 10), and the fingers 87 extend upwardly through the slots 100.

Supported on the plate 95 between the slots and along the outer sides of the slots, are guide bars 101 which decrease in width upwardly so as to form between them grooves in which the bottles are received and kept in proper aligned position as they are moved toward the pockets of the conveyor. The slots 100 in plate 95 extend into the angular end 99, so that the fingers 87 may pass through the slots at the forward ends of the machine as shown in Fig. 2. It will be understood that there are as many fingers 87, slots 100 and grooves for receiving, supporting and guiding bottles to the pockets of the conveyor, as there are pockets in a horizontal row in the conveyor, and that the fingers 87, rods 84 and 86, the arms 81, the shaft 69 and element 68 together function as a unit which oscillates to advance or push the bottles toward the conveyor, and for that reason may be collectively referred to, when desired, as a member which advances the bottles or containers to the conveyor to load them in the pockets that are aligned at any time with the adjacent end of the guide grooves. The position of a row of the pockets of the conveyor that is aligned with the adjacent ends of the grooves for receiving the bottles may also be considered as a loading position, because the bottles or containers are loaded into the pockets when the pockets are in that position of rest for the conveyor.

It is important that after a group of bottles resting on the plate 95 has been started towards the pockets for loading therein, the attendant will be able to start placing other containers or bottles on the guides for loading, and to aid this, provision is made for retracting the fingers 87 down into the slots in which they move, below the paths of the bottles as the latter move along the guides toward the conveyor. This retraction or lowering of the fingers 87 takes place while the fingers are being returned to the starting position, after having delivered a group of bottles into a horizontal row of pockets in the conveyor. The mechanism for accomplishing this retraction and then release of the fingers 87 will now be described.

Referring now particularly to Figs. 2 to 9, the rod 86 extends beyond the slots 82 of the arms 81 as shown in Fig. 8, and carries rollers 102 which are adjacent the side walls of the hous-

ing. A short bearing stud 103 (Fig. 9) is provided on each side wall of the housing so as to extend toward one another within the housing, and on each of these studs are hinged cam plates 104 and 105 (Fig. 9), which plates at each side of the housing extend in opposite directions from one another. An adjustable stop 106 is disposed beneath each plate 104 on the adjacent side wall of the housing, so as to limit the downward movement of that plate 104 under the action of gravity, and its upper limit of movement is similarly limited by an adjustable abutment 107 also mounted on the inner face of the adjacent side wall of the housing. Each plate 104 is therefore free to move to a limited extent between the abutments 106 and 107, and this range of adjustment may be varied by adjustment of the abutments 106 and 107 in the mountings by which they are secured to the side walls of the housing. The free end of the plate 104 is bent arcuately upward as shown particularly in Fig. 6. Each plate 105 is yieldingly and resiliently urged upward by an individual spring 108, and such upward movement of each plate 105 is limited by an adjustable abutment 109 also mounted on the inside face of the adjacent side wall of the housing. The extent of this upward movement of each plate 105 may be varied by suitable adjustment of the abutment 109 in its mounting on the side wall of the housing.

The rollers 102 (Fig. 9) extend over these plates 104 and 105. When the fingers 87 are moved forwardly to shift a row of bottles toward the pockets in loading position, the rollers 102 will move above the plates 104 and 105 as shown by the dash line and arrow A in Fig. 4, but as the fingers 87 approach their limit of movement toward the conveyor pockets, the rollers 102 will engage with the upper faces of the plates 105 and cam the plates 105 downwardly as shown by the difference in the dash lines and full lines for plate 105 in Fig. 5. Just before the fingers 87 reach their forward limit of movement, the rollers 102 clear the free ends of plates 105, whereupon the springs 108 immediately raise the plates 105 to their upper positions against the abutments 109. As shown in Fig. 9, the free ends of plates 105 may be notched as at 110 to determine the point of release of the plates 105. This is shown by the position of the fingers 87 in Fig. 3 which is the extreme forward limit of movement of the fingers 87, after the bottles have been pushed fully into the pockets of the conveyor then in loading position.

During the return movement of the fingers 87, the rollers 102 will engage beneath the plates 105, but since plate 105 is limited against further upward movement by the abutment 109, continued backward movement of the fingers 87 will produce a camming action between the plates 105 and the rollers 102, which shifts the rollers 102 and the rod 86 toward the shaft 69 with further compression of the springs 94. This movement is permitted by the slots 82 in the arms 81 and the slots 90 in the fingers 87. This withdraws the fingers well down into the slots, and below the paths of travel of the bottles or containers when moving along the guide as shown clearly in Fig. 6.

As further return movement of the fingers 87 occurs, the rollers 102 will engage beneath the plates 104 and cam them upwardly to the extent permitted by the stops or abutments 107 as shown in Fig. 7, and these plates 104 will keep the fingers 87 below the path of any bottles or containers resting on the guides until the fingers have passed

the shoulder portion 99 of the guide. When this happens, the rollers 102 will clear the plates 104, and the springs 94 will thereupon shift the fingers 87 outwardly into positions behind the angular portion 99 of the guide plate as shown in Fig. 2. The plates 104 will then immediately drop by gravity so that when the fingers 87 again start forwardly, the rollers 102 will pass over the plates 104 as shown in Fig. 4. With such an arrangement, as soon as the fingers 87 start to push a row of bottles or containers along the guides toward the conveyor, an attendant may start placing additional bottles or containers upon the guides at their outer ends, because the fingers 87 in returning will move below the bottles or containers resting on that guide.

When the bottles are first loaded into the conveyor as shown in Fig. 3 and before the conveyor moves a new row of pockets into loading position, it is often desirable to pre-rinse the containers or bottles so as to remove from them as much foreign matter as possible and prevent contamination of the cleaning solution with such foreign matter. Accordingly, we dispose across the interior of the housing and across the lower ends of the pockets in the row in loading position, a pre-rinse pipe 111 (Fig. 3) which has nozzles 112, one for each pocket in the row, for directing into the pockets, in a direction endwise thereof, a stream of rinsing liquid such as water. Since the bottles are in inclined positions while in the loading position, the rinse liquid will immediately drain out and carry with it any foreign matter which has been loosened thereby.

It is undesirable to allow much of this pre-rinse liquid to drain into the soaking tank 4, yet the tank 4 must be open at its top sufficiently to allow the conveyor with the bottles therein to descend into the tank. While some of the pre-rinse liquid draining out of the containers may fall upon the top of the tank 4 and be diverted thereby to a suitable drain, the amount diverted may be increased by a drip plate 113 (Figs. 3 and 14) which is mounted to swing into a position between the row of pockets in loading position and the next lower row of pockets which has just left the loading position. This drip plate 113 is secured at its ends to the free ends of depending arms 114 (Fig. 14). The arms 114 are secured or fixed upon a shaft 115 which extends across the interior of the housing and is rotatably supported in bearings 116 on the inside faces of the side walls of the housing. Also fixed on the shaft 115 are arms 117 which at their free ends carry laterally extending pins 118 that are received in slots 119 provided in arms 120 fixed on the shaft 63. This shaft 63 as explained above, is oscillated by the cam 55, arm 57, link 60, and arm 62.

When the shaft 63 is rocked in a clockwise direction in Fig. 1, it returns the bottle feeding fingers 87 back to the starting position, and the arms 120 (Figs. 2 and 14) will also move clockwise in Fig. 2. Arms 120 in turn, will rock arms 117, shaft 115, and arms 114 in a counter-clockwise direction to withdraw the drip plate 113 from below the pockets and into the position shown in Fig. 2. During the time when the parts are in the Fig. 2 positions, the conveyor will be advanced one step by the crank arm 13 to bring a new row of bottles into loading position. At the conclusion of the advance of the conveyor through one step, the cam 55 will release the arm 57 and thereupon the shaft 63 will be rocked by the weight 80 in counter-clockwise direction. This causes an advance of the fingers 87 that push a

new, freshly placed row of bottles into the pockets in loading position and counter-clockwise rocking of shaft 63 in Fig. 2 to shift the drip pan 113 into the collecting position shown in Fig. 3. During this same movement the bottles which have been washed and which are descending in the conveyor just above loading position are ejected so as to make room for other bottles to be cleaned. This ejection is accomplished in a manner which will now be described.

Also fixed on the shaft 63 are arms 121 (Figs. 1, 2, 3 and 14) which at their free ends are provided with slots 122. Lugs 123 are secured on the inside face of each side wall of the housing and a rod 124 extends between the lugs 123 on each side wall in approximate parallelism with the axes of the pockets in the unloading position. Slidably mounted on each rod 124 is a sleeve 125 and these sleeves 125 are connected rigidly together by a channel bar 126 (Figs. 2 and 14). Each sleeve 125 also has a pin 127 extending laterally therefrom and which is slidably received in the slot 122 of the adjacent arm 121 so that when the arm 121 is rocked, it will shift the adjacent sleeve 125. Since the sleeves 125 are connected to one another by the channel bar 126 and the arms 121 rock in unison, the channel bar 126 will be shifted toward the pockets then in unloading position when shaft 63 is rocked counter-clockwise in Fig. 1. Arranged in spaced relation to one another across the channel bar 126 and in alignment with the pockets of the row then in unloading position are ejector bars 128, one for each pocket, and when the channel bar 126 is shifted toward the pockets, these ejector bars 128 will enter the pockets and eject therefrom any bottles or containers then in those pockets. Each ejector bar 128 has a reduced shank which extends through and is slidably supported in an aperture in the bottom or web of the channel bar, and at its end carries nuts 129 threaded thereon. A spring 130 on each shank and acting between the web of the channel bar and the nuts 129 serves to hold the ejector rods 128 individually and yieldingly against the bottom of the channel bar.

The bottles, when ejected from the pockets in unloading position, are received in short chutes 131 (Figs. 2, 3, and 23) which are arranged in a row running crosswise of the housing on a common bar or support 132 that extends through slots 133 in the side walls of the housing. The slots 133 are vertical and keep the bar 132 in the same position while allowing movement thereof vertically, but the upper ends of the slots limit the upward movement of the bar 132 to the proper bottle receiving position shown in Figs. 2 and 3. Each outer end of the bar 132, after passing through the adjacent slot 133, is provided with a depending rod 134 which is slidably mounted in a bearing 135 fixed on the outer face of the adjacent side wall of the housing. A coil spring 136 surrounds each rod 134 between the bearing 135 and a suitable abutment on the rod 134 such as the lower edge of the bar 132. These springs 136 are normally under compression and yieldingly urge the bar 132 into a position at its upper limit of movement as determined by the upper end of the slots 133, and yet the springs 136 yield and allow depression of the bar 132 at either or both ends under pressure during an abnormal operating condition which will be explained herein later.

To receive the bottles or containers discharged from the chutes 131, a platform 137 (Figs. 2 and

3) extends across the housing between the side walls thereof and at its ends is provided with depending ears or lugs 138 fixed on short shafts 139 which extend through the housing walls and are rotatably supported therein. On one of these shafts 139 and exteriorly of the housing is fixed a crank arm 140 which is pivotally connected at its free end by a pin 141 to a link 142. This link 142 is operated in a manner old in the art from a cam which is controlled or operated from the shaft 14, so that the platform 137 is rocked or tilted between its discharge position shown in Fig. 2 and its bottle receiving position shown in Fig. 3 in proper timed relation to the movements of the conveyor.

Just prior to the time when bottles are to be ejected from the conveyor pockets, the platform 137 is tilted into the inclined position shown in Fig. 3 to receive the bottles, then, after the ejector rods 128 have ejected from the pockets in unloading position any bottles that were therein, the platform is tilted into the upright position of Fig. 2. Each end of the platform has an upstanding side flange 143 with a groove 144 on its inside face. A rod 145 (Figs. 2 and 3) extends from end to end of the platform between the flanges 143 and its ends run in the grooves 144. This rod 145 is hinged by arms 146 to swingable arms 147 and at the proper time by means old in the art, the rod 145 is moved forwardly while the platform 137 is in its upright position. During this forward movement, the rod 145 engages any bottles then resting on the platform 137 at a point slightly above the platform and pushes them laterally from the platform over upon an endless, jointed conveyor 148 (Fig. 2), which carries the cleaned bottles away from the washer such as to a filling machine. Inasmuch as the mechanism for tilting the platform 137 and for operating the rod 145 to push the bottles from the platform is old in the art, no further description of the operating mechanism is believed necessary.

Disposed immediately below the platform 137 is a splash hood 149 which may conveniently be of sheet metal. It extends across the interior of the housing from side wall to side wall and is supported at its ends adjacent these side walls. This hood has a roof portion which is slightly inclined and disposed at an acute angle across the extended axis of the pockets in the row of said conveyor then in loading position which also is the pre-rinsing position. Consequently, if there is no bottle in a pocket in loading position, the stream of water or rinsing liquid which would normally be stopped by the bottle in that pocket will engage the under face of the hood or shield 149 and be deflected laterally thereby. At its front and rear edges this hood or shield 149 is flanged backwardly underneath the roof, and its edges are further and upwardly flanged so as to form shallow channels 150 and 151 along the front and rear edges of this hood in which the water or rinsing liquid, deflected by the roof portion of the shield or hood, may collect.

A pipe 152 drains off all of the liquid collecting in the channel 150 and another pipe 153 opens from the channel 151 and conveys away all the liquid collected therein. A baffle plate 154 is hinged at its upper edge, at its ends, in notches 155 provided in plates 156 forming side walls of the hood 149. The plate 154 dangles freely from its pivoted upper edge towards the guide along which the bottles are shifted into loading position, and will be cammed rearwardly and aside

by the bottles or containers moving along the guides toward loading position, yet will drop back into vertical position as soon as the bottles or containers have passed. This baffle plate also aids in limiting the field of any splashing liquid from the pre-rinse pipe that is not intercepted by a bottle or container in the pockets in the conveyor.

Referring now particularly to Figs. 10 and 11, the shaft 69, at the end opposite from the element 68, carries a collar 157 which is fixed thereon, and this collar is provided with a radially extending arm 158. Rotatably mounted on the same end of the shaft 69, between the collar 157 and the bearing box 70, is a lever 159 which carries a laterally extending pin 160 in a position to engage behind the arm 158 and rock the arm 158, and through it the shaft 69, when the lever 159 is rocked in one direction. The free end of the lever 159 is pivotally connected by a pin 161 to one end of a link 162 which has a swivel joint 163 included therein, and the other end of link 162 is bent angularly to form a handle 164. The swivel joint 163 enables rotation of the handle and of the link with respect to the end which is pivoted by pin 161 to link 159. The pivoted, handle-carrying end of link 162 extends through an aperture 165 (Fig. 12) in a flange or lug 166 which extends laterally from the housing at the forward end thereof. The slot 165 is elongated vertically, and the link 162 slides freely therethrough. The swivel end of the link 162 also carries a pair of oppositely extending pins 167 which will pass through the slot 165 when the handle 164 is rotated to vertically position pins 167, and the link 162 is drawn forwardly.

After the pins 167 have passed through the slot 165, a turning or swivelling of the link 162 will place the pins 167 crosswise of the slot or aperture 165 and serve to releasably hold the link 162 in its forwardly drawn position, as shown by the dash lines in Fig. 11, and the full lines in Fig. 12. The lever 159 is normally at its rearward position shown by full lines in Fig. 11, at which time the handle 164 is adjacent the plate or flange 166. The pin 160 on the arm 159 is normally beyond the path of movement of the arm 158 as the shaft 69 is rocked to cause a loading of the bottles into the pockets. If, however, a bottle or container should be jammed during movement of the same towards the pockets in loading position, so that a complete loading movement of the fingers 87 cannot occur, the attendant may grasp the handle 164, pull it outwardly or toward him, which will rock the lever 159 and through the pin 160 will engage arm 158 and rock shaft 69 in a direction towards its starting position. This will pull all of the fingers 87 back near starting position.

The handle 164 may then be rotated, as permitted by the swivel joint 163, to cause the pins 167 to pass through the slot 165 and then again rotated to place the pins 167 crosswise of the slot and hold the fingers 87 all in substantially initial positions. This permits the attendant to work over the guides and remove any jammed container or bottle without danger of the fingers 87 being released and suddenly moving toward the conveyor without warning. After the machine is placed in condition for free operation, the attendant may rock the handle 164 to release it and return it to the position shown in full lines in Fig. 11.

It is also desirable to provide means for stopping the source of power and all the moving parts of the machine whenever any abnormal operating

condition in the washer occurs, such as the jamming of a bottle or container. Improvements in certain safety features for performing such functions form a part of this invention and will now be described. The member 68 (Figs. 16—19) is provided adjacent the one end of the slot 67 with an auxiliary slot or recess 168 in which a small bell crank lever 169 is disposed and pivotally supported such as by a pivot pin 170. One arm of this bell crank lever is disposed to depend into the slot or notch 168 and form an abutment or part of the end wall at one end of the slot 67 for engagement by the abutment or pin 66. The other arm of the bell crank lever 169 extends upwardly through a branch 171 of the slot 168 to engage against a switch button 172 of an electric switch 173 which is supported on an angular bracket 174 also fixed upon the upper end of the element 68.

A coil spring 175 acts between an abutment 176 in the slot 167 and the depending arm of the bell crank lever 169 so as to normally urge the lever 169 into the position shown in full lines in Fig. 17 in which the switch button 172 is depressed by reason of the pressure exerted by the coil spring 175. When the pin 66 on the link 65 abuts against the end of the slot 67 having this bell crank lever 169, it will rock the lever 169 from the position shown in full lines in Fig. 17 into the position shown in full lines in Fig. 16, which releases the switch button 172 so that the switch 173 may open. Therefore, if the pin 66 moves away from that end of the slot 67, the spring 175 will immediately rock the lever 169 and cause a depression of the switch button 172 to close the switch 173. The contact terminals of the switch 173 (Fig. 1) are connected by a flexible twin cable 177 to an anchorage member 178 on the side of the housing 2, so that the switch 173 may normally oscillate with the element 68 while continuous circuit connections to the contacts thereto are maintained.

Referring now particularly to Figs. 1 and 20 to 23, a pair of safety switches 179 and 180 are associated with the opposite ends of the bar 132, so that one or both of these switches will be closed whenever the bar 132 is depressed in the slots 133 against the action of springs 136. Inasmuch as both switches 179 and 180 are of the same type and disposed on opposite sides of the housing, a description of switch 180 and the manner of its operation will apply also to the switch 179 and the manner in which it is operated on the opposite side of the machine. The end of the bar 132 which extends through the slot 133 (Figs. 20 and 21), carries a transversely extending rod 181 which is provided with nuts 182 on opposite sides of the bar 132, so that by shifting of the nuts 182 and by threading them along the rod 181, the rod 181 may be shifted through bar 132 to different extents and thus caused to project forwardly from the bar end 132 to a selected and adjustable extent. Tightening of the nuts 182 will securely clamp each rod 181 in any position.

A cam 183 is carried on the end of the rod 181, and it extends parallel to the direction of movement of the bar end 132 when the latter moves along the slot 133. It has a portion 184 which clears the switch button 185 of switch 180, and an inclined cam portion 186 which, when the bar 132 at that end is depressed in the slot 133, will engage the switch button 185 and cam it inwardly into switch 180 and cause a circuit in the switch 180 to be completed. The remaining cam surface 186 is parallel to the portion 184 so

that if bar 132 continues to move downwardly, such continued movement of the bar 132 along slot 133 will be permitted without further pressure on the operating button 185 of the switch 180. When the bar 132 returns to its upper position against the upper end of slot 133, the cam 183 will release the button 185 and allow the switch 180 to open, it being understood that the switches 179 and 180 are both identical and of the normally open, but pressure-closed type.

The use of these switches 173, 179 and 180 will now be explained. The electric motor M (Fig. 1) is supplied with operating current through line wires L1, L2 and L3 from any suitable source of commercial current, and the circuit to the motor M may be made and broken by a starting switch 187. This switch 187 is illustrated as operated by an electro-magnet 188 of the solenoid type. When the solenoid 188 is energized, it carries three bridges into circuit-completing relation between the parts of the line wires L1, L2 and L3, and completes the circuit to the motor. The movable member of the switch 187 also carries a bridge contact 189 which, when solenoid 188 is energized, is adapted to bridge contacts 190 and 191 for a purpose which will appear presently. One terminal of the solenoid 188 is connected by wire 192 to the line wire L3 and the other terminal of solenoid 188 is connected by wire 193 to contact 194 of a normally closed switch R, and the other contact 195 of that switch is connected by a wire 196 to a contact 197 of a normally closed, stop switch 198. The other contact 199 of stop switch 198 is connected by a wire 200 to the contact 191 of the switch 187, and the contact 190 of that same switch is connected to the line wire L1.

The line wire L1 is also connected by a wire 201 to a contact 202 of a normally open starting switch 203, and the other terminal of switch 203 is connected to the wire 200. The wire 201 is also connected by a branch wire 204 to one contact of the normal open switch 179 and by a branch wire 205 to one contact terminal of the normally open switch 180. The other contact terminal of the switch 179 is connected by a wire 206 to another electro-magnet in the nature of a solenoid 207. The other side of the solenoid 207 is connected by a wire 208 to the line wire L3. The other terminal contact of switch 180 is connected by a wire 209 to the wire 206, and the wire 206 is also connected by a branch wire 210 and one of the wires of the cable 177 to one terminal of the switch 173. The other terminal of the switch 173 is connected through a wire of the cable 177 and a wire 211 to the wire 201 which is directly connected to the line wire L1.

The solenoid 207, when energized, operates a core or rod 212 (Fig. 20) which is connected to and operates a lever 213 that is hinged at 213a to the housing 2. The lever 213 at its free end engages with and operates the movable switch element 214 of the normally closed switch R having the terminals 194 and 195, so that whenever the solenoid 207 is energized, it will rock the lever 213 and open the switch R at the contacts 194 and 195. The lever 213 is also connected by a link 215 to the latch dog 30 (Fig. 21) to cause a release of the arm 28 on shaft 24 whenever the solenoid 207 is energized.

Assuming that the machine is in idle condition and it is desired to start the same, the attendant operates the start switch 203 which completes a circuit as follows: Line wire L1, wire 201, contact 202 of switch 203, stop switch 198, wire

196, normally closed switch R, wire 193, solenoid 188, wire 192, line wire L3. This completes a circuit through solenoid 188 to energize it, whereupon it operates its core and completes a circuit through the line wires L1, L2 and L3 to the motor M which starts the motor in operation. The core of solenoid 188 also operates bridge 189 and completes a holding circuit at the contacts 190 and 191 as follows: Line wire L1, contact 190, bridge 189, contact 191, wire 200, stop switch 198, wire 196, switch R, wire 193, solenoid 188, wire 192, and line wire L3. This holding circuit is independent of the starting switch 203, so that as soon as the solenoid 188 has been energized, the attendant may release the button of switch 203, and the solenoid 188 will remain energized until its circuit is broken by the operation of the stop switch 198 or of the switch R.

The attendant then may operate the handle 40 which rocks the shaft 24 through the mechanism shown in Figs. 20, 21, 22, 24 and 25, shifts the idler 22 into belt tightening position and starts the operation of the shaft 14. During this operation of shaft 14, the crank arm 13 will operate the pawls or dogs 5 which engage the conveyor, advance it step by step, and bring the rows of pockets of the conveyor successively into unloading position and then shortly thereafter into loading position. The pockets, after passing loading position, are carried through the soaking tank 4 and then upwardly along the upper stretch of the conveyor where the soaking solution is drained out of bottles in the pockets and the bottles are washed, rinsed and sterilized as is usual with soaker type bottle washers.

The cam 55 operates in timed relation to the conveyor advancing means, and oscillates the shaft 63 to shift the abutment pin 66 to the right in Fig. 1 and back. The spring 75 urges the element 68 to follow the pin 66 which results in a movement of the row of fingers 87 toward the conveyor to push a group or row of bottles or containers resting on the guides toward the conveyor and into the pockets then in loading position. Thereafter, fingers 87 are returned to their starting positions. During their return, the fingers 87 are cammed below the paths of the bottles on the guides until they approximately reach starting position and are then released for movement outwardly into positions to push additional bottles or containers, that may have been placed on the guides in the meantime, towards the conveyor pockets.

If a bottle should become stuck in its guide, or should not fully enter the pockets in loading position, the finger 87 engaging that bottle will be stopped, and this will stop all of the fingers and the element 68, with the result that the element 68 will no longer follow the pin 66. The pin 66 will then move along the slot 67, but as soon as the pin 66 moves away from the end of the slot, the bell crank lever 169 (Figs. 16 to 18), which until then was held in the position shown in Fig. 16, will be released and its spring 175 will rock it into the position shown in Fig. 17 where it operates the switch button 172 of switch 173. This completes a circuit as follows: From line wire L1, through wire 201, contact 202 of the start switch, wire 211, switch 173, wire 210, wire 206, solenoid 207, wire 208, and line wire L3. This completes a circuit through solenoid 207 which elevates its core 212 and performs two functions, one of which is to open the switch R and break the holding circuit through the solenoid 188, and the other of which is to pull

up on the link 215 and disengage the dog 30 from the arm 28 which releases the shaft 24.

When the solenoid 188 is deenergized by breaking its holding circuit, its core 187 will drop, open the circuit to the motor, allow the motor to stop, and also break the holding circuit between contacts 190 and 191. This holding circuit remains broken until it is re-established by reenergizing of solenoid 188 through operation of the switch 203. The release of the shaft 24 enables a rocking thereof by the spring 27 and arm 28 in a manner to remove the idler pulley 22 from belt tightening position, which immediately interrupts the transmission of power from the motor M to the shaft 14 even before the motor M has stopped running. At the same time that the belt is slackened to interrupt the driving connection between the pulleys 17 and 20, the brake arms 41 are released and cause brake shoes 44 to engage the drum 18 on pulley 17 so as to aid further in bringing shaft 14 to a stop as quickly as possible, thus avoiding breakage of any bottles which may have been caught in the mechanism.

The attendant then operates the handle 164 to pull all the fingers 87 back near starting position and temporarily hold them there while the jammed bottle is cleared or any other obstruction removed. The handle 164 is then released and the fingers moved forwardly to the extent permitted by the pin 66. The operator now may restart the machine by operating the starting switch 203 and then again rocking the handle 40 to again shift the idler pulley into belt tightening position on belt 19.

Referring to Figs. 2 and 3, it will be noted that the bottles when ejected from the pockets are received in the chutes 131 and delivered to the tiltable platform 137 which is then in tilted position to receive the ejected bottles. If a bottle is only partially ejected from the pockets, it will remain in the chute 131 and then, when the conveyor starts to move, such bottle will be depressed against the chute 131 and will depress it and the bar 132 at one or both ends against the action of one or both springs 136, and this depression of bar 132 will cause the cams 183 at one side or other of the machine to close the switch 179 or 180 or both. If the switch 180 is closed, a circuit is completed as follows: Line wire L1, wire 201, wire 205, switch 180, wires 209 and 206, solenoid 207, wire 208 and line wire L3. This completes a circuit through the solenoid 207 and causes stoppage of the motor, loosening of the belt 19, and the application of the brakes to the drum 18 in the same manner as when the switch 173 is closed. If the switch 179 is closed, it completes a circuit similar to that completed by the switch 180, because wires 204 and 206 leading to switch 179 are connected in parallel to the wires 205 and 209 that lead to the switch 180. Thus, if a bottle or container is jammed when being ejected from the conveyor or in the process of being loaded thereon, safety switches will be immediately operated, and such operation not only will shut off the power to the motor but will also disconnect the motor from the mechanism driven thereby and apply brakes to the driven mechanism so as to obtain an exceptionally prompt stoppage of the mechanism with minimum danger of breakage of the containers or damage to the washer apparatus.

Since an attendant is able to lock the loading fingers 87 back in starting position after they have been moved from any point in their stroke, he can safely reach over into the machine and

remove any jammed container or obstruction of the mechanism without danger of injury from the feeding fingers through their sudden release when removing the cause of the jam. It will be also noted that bottles may be effectively pre-rinsed in loading position without any material dilution of the soaking liquid and without increasing the length of the washer, also that spattering of liquid upon the attendant, if a bottle is missing from a pocket during a pre-rinsing operation, is effectively prevented.

It will be understood that while the invention has been described in connection with the washing of bottles, it is applicable to the washing of other containers and articles where the same or similar problems are encountered, and the use of the term bottle in the claims is not to be taken as a strict limitation to bottles only.

It will be understood that various changes in the details, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

We claim as our invention:

1. In a washer for containers comprising a conveyor movable along a selected path and having pockets to receive and move the containers, said pockets being movable in succession through a loading position, means for pushing a container into one of said pockets which is in loading position, driven means for operating said conveyor, a source of power, an interruptible driving connection between said source of power and said driven means, means for holding said driving connection in driving relation between the source of power and said driven means, but releasable to permit movement of said connection out of said driving relation, means for automatically shifting said interruptible connection out of driving relation when said connection is released, and means responsive to an abnormal operating condition in the pushing of a container partially but not entirely into a pocket of said conveyor for releasing said interruptible connection, whenever any container partially but not completely enters any of said pockets in loading positions.

2. In a container washer comprising a conveyor movable in a prescribed path and having container receiving pockets arranged therealong for movement in succession through a loading position, a guide extending away from said loading position and operable to guide any container resting thereon into a pocket in loading position, a member hinged to rock on a fixed axis toward and from said loading position, means slidably mounted on said member for substantially straight line movement approximately radial to said axis into and out of a position to engage behind a container resting on said guide and to push that container to loading position as said member rocks in one direction, means yieldingly urging said slidable means into said position, means operable automatically at the start of a return movement of said member from adjacent said loading position for retracting said slidable means out of said position sufficiently to clear any container on said guide, and holding it retracted until it reaches substantially its starting position behind any container resting on said guide, and means for causing rocking movements of said member in timed relation to the movements of said conveyor in said path.

3. In a bottle washer comprising a conveyor chain having bottle receiving pockets arranged

therealong, means for advancing said chain step by step with periods of rest between movements and including an element through which power is received, a source of power having a power delivering element operated thereby, a clutch interposed between said elements, releasable means for holding said clutch in driving relation between said elements, means for urging said clutch into non-driving relation between said elements when said clutch is released, brake means having actuating means separate from said urging means connected to said first element and effective when released to stop the motion of that element and the chain advancing means, means controlled by said clutch for holding said brake means inactive when the clutch is in driving relation, and releasing it when said clutch is released to cause a braking action automatically when said clutch interrupts driving connection between said elements, and means responsive to an abnormal operating condition in said washer for releasing said clutch.

4. In a bottle washer comprising a conveyor chain having bottle receiving pockets arranged therealong, means for advancing said chain step by step with periods of rest between movements and including an element through which power is received, a source of power having a power delivering element operated thereby, a clutch interposed between said elements, releasable means for holding said clutch in driving relation between said elements, means for urging said clutch into non-driving relation between said elements when said clutch is released, brake means connected to said first element and the chain advancing means, means controlled by said clutch and operable on said brake means to cause a braking action automatically when said clutch interrupts driving connection between said elements and releases said first mentioned element when said clutch is in non-driving relation between said elements, a solenoid, means controlled by the solenoid for releasing said clutch, and switch means controlling said solenoid and operable automatically upon the occurrence of an abnormal operating condition in said machine to cause a release of said clutch.

5. In a bottle washer comprising a conveyor chain having bottle receiving pockets arranged therealong, means for advancing said chain step by step with periods of rest between movements and including an element through which power is received, a source of power having a power delivering element operated thereby, a clutch interposed between said elements, releasable means for holding said clutch in driving relation between said elements, means for urging said clutch into non-driving relation between said elements when said clutch is released, brake means connected to said first element and effective when operated to stop the motion of that element and the chain advancing means, means controlled by said clutch and operable on said brake means to cause a braking action automatically when said clutch interrupts driving connection between said elements and releases said first mentioned element when said clutch is in driving relation between said elements, a solenoid, means controlled by the solenoid for releasing said clutch, switch means controlling said solenoid and operable automatically upon the occurrence of an abnormal operating condition in said machine to cause a release of said clutch, and means also controlled by said solenoid for

shutting off the source of power automatically upon the release of said clutch.

6. In a bottle washer comprising a delivery chain having bottle receiving pockets arranged in succession therealong, an operating motor, a pulley operated by said motor, mechanism for advancing said chain intermittently and having a pulley by which it is driven, a belt connecting said pulleys and normally too slack to effect a driving connection between them, an idler pulley shiftable in a direction to tighten the belt and cause a driving action between said pulleys, means for latching said idler pulley in belt tightening position, means for yieldingly urging said idler pulley out of belt tightening position, means responsive to an abnormal operating condition in said washer for operating said latch to release said idler pulley for movement out of belt tightening position, a brake drum driven by said mechanism pulley, brake means shiftable into and out of braking engagement with said drum and normally and yieldingly urged into braking engagement with said drum by a pressure separate and independent from said urging means for said idler pulley, means normally preventing operation of said brake means on said drum and connected to said idler pulley for preventing the action of said brake means on said drum when said idler pulley is in belt tightening position and operable automatically to release said brake means for a braking action whenever said pulley is moved out of belt tightening position.

7. In a washer for containers comprising a conveyor movable along a selected path and having pockets arranged along the same in the direction of its movement, to receive and convey the containers to be washed, a guide disposed in a position to support and guide containers toward said pockets when in a loading position, said guide having a slot in the bottom thereof, an arm mounted for oscillation below said guide and having its free end slidably shiftable in a substantially straight line approximately radially of the axis of oscillation of said arm and to a limited extent, means for shifting said free end to its outer limit of movement, in which it extends through said slot sufficiently to engage a container on said guide and, when the arm is rocked, move the container towards the pockets of the conveyor, and means operable automatically during the return movement of said arm for first shifting said free end below said guide sufficiently to clear any container that may be resting on said guide in loading position, keeping said free end below said guide until said arm approximately reaches its return position, and then releasing it for movement into a position to move a container resting on said guide.

8. In a washer for containers comprising a conveyor having pockets therein to receive the containers, a guide extending toward said conveyor and in a direction to guide a container toward the conveyor and discharge it into a pocket therein, said guide being formed to support the containers on their sides and direct them in that position toward the conveyor, an arm mounted for oscillation toward and away from said conveyor and having a free end portion slidable endwise of the arm to a limited extent, means resiliently urging said free end outwardly of the arm into a position to engage a container resting on said guide and direct it, during a forward rocking oscillation of said arm, toward a pocket of the conveyor, and cam means engageable with said free end portion during the return oscilla-

tion of said arm for moving said free end toward the axis of oscillation of said arm sufficiently to clear a container in loading position on said guide, holding it in such container clearing position until the arm approximately reaches the outer end of said guide, and then releasing said free end for movement to a position beyond the outer end of said guide, where, upon the next forward movement of said arm, said free end will engage any container resting on said guide and push it toward the conveyor.

9. In a washer for containers comprising a conveyor having pockets arranged in succession therealong and shiftable by operation of the conveyor in succession through a loading position, a guide extending in a direction away from said loading position and operable to direct a container resting thereon into a pocket in loading position, a member disposed adjacent said guide and operable to shift a container resting on said guide along said guide into a pocket, means for yieldingly urging said member in a direction toward said loading position, an abutment opposing movement of said member and movable back and forth in the directions of movement of said member, means for operating said conveyor in step by step movements with an interval of rest between movements, in which intervals of rest a pocket is in loading position, and means operable in timed relation to the movements of said conveyor for shifting said abutment in a direction to release said member for movement to shift a container into a pocket in loading position while said conveyor is at rest, and then back in the opposite direction to return said member to starting position, whereby if a container becomes stuck on said guide or fails to fully enter a pocket in loading position during operation of said member by said urging means, the abutment moving means may continue its movement without injury to the container.

10. In a washer for containers comprising a conveyor having pockets arranged in succession therealong and shiftable by operation of the conveyor in succession through a loading position, a guide extending in a direction away from said loading position and operable to direct a container resting thereon into a pocket in loading position, a member disposed adjacent said guide and operable to shift a container resting on said guide along said guide into a pocket, means for yieldingly urging said member in a direction toward said loading position, an abutment opposing movement of said member and movable back and forth in the directions of movement of said member, means for operating said conveyor in step by step movements with an interval of rest between movements, in which intervals of rest a pocket is in loading position, means operable in timed relation to the movements of said conveyor for shifting said abutment in a direction to release said member for movement to shift a container into a pocket in loading position while said conveyor is at rest, and then back in the opposite direction to return said member to starting position, whereby if a container becomes stuck on said guide or fails to fully enter a pocket in loading position during operation of said member by urging means, the abutment moving means may continue its movement without injury to the container, a switch operable by relative separation of said member and abutment, and means controlled by said switch and rendered effective by operation of said switch upon

separation of said abutment and member for automatically interrupting the application of power to said conveyor and to said abutment moving means.

11. In a washer for containers comprising a conveyor having pockets arranged in succession therealong and shiftable by operation of the conveyor in succession through a loading position, a guide extending in a direction away from said loading position and operable to direct a container resting thereon into a pocket in loading position, a member disposed adjacent said guide and operable to shift a container resting on said guide along said guide into a pocket, means for yieldingly urging said member in a direction toward said loading position, an abutment opposing movement of said member and movable back and forth in the directions of movement of said member, means for operating said conveyor in step by step movements with an interval of rest between movements, in which intervals of rest a pocket is in loading position, means operable in timed relation to the movements of said conveyor for shifting said abutment in a direction to release said member for movement to shift a container into a pocket in loading position while said conveyor is at rest, and then back in the opposite direction to return said member in starting position, whereby if a container becomes stuck on said guide or fails to fully enter a pocket in loading position during operation of said member by said urging means, the abutment moving means may continue its movement without injury to the container, and means normally out of the path of movement of said member, but manually operable to engage said member and shift it into starting position from any position in its movement in shifting a container into a pocket, and to hold said member releasably in said initial position, irrespective of the position of said abutment, whereby in the case of jamming of a container being delivered into a pocket, said member may be manually returned to initial starting position and there held without movement of said conveyor and said abutment, enabling free access to the container and the guide for removing the jammed container without interference from said member.

12. In a washer for containers, comprising a conveyor having pockets arranged in succession therealong with respect to its direction of movement, a source of power, means operable from said source of power for advancing said conveyor in step by step increments of movement with intervals of rest between movements and including a clutch by the operation of which the delivery of power from said source to said conveyor may be established or interrupted, means for securing said clutch in power delivering position between said source and said conveyor, means urging said clutch yieldingly into power interrupting position when released from said securing means, means including an electro-magnet for releasing said clutch from said holding means, a switch broken by operation of said releasing means under the control of said electro-magnet whenever said clutch is released, a second electro-magnet, means controlled by said second electro-magnet for rendering said source of power effective or ineffective, a holding circuit for said second electro-magnet completed by that electro-magnet when energized, means including a starting switch for initially completing a circuit through said second electro-magnet, said

holding circuit including in series therein said first-mentioned switch, and a switch disposed in a position for operation automatically upon the occurrence of an abnormal operating condition in said washer, and thereby causing an operation of said first-mentioned electro-magnet in a manner to open said first mentioned switch and release said clutch, whereby immediately and automatically the conveyor will be disconnected from said source of power, and said source of power will be rendered ineffective upon the occurrence of said abnormal condition.

13. In a container washer, a conveyor having carrier pockets for containers, power means for moving said conveyor by increments and advancing said pockets successively into and out of a discharge position at a selected station in the path of movement of said conveyor, a container guide disposed adjacent a pocket in said discharge position for guiding a container being discharged from said pocket, means for supporting said guide and yieldable in the general direction of travel of the adjacent portion of said conveyor when subjected to abnormal forces in said direction, means including an electric circuit and a switch in said circuit operable by movement of said guide in said general direction, for automatically interrupting the application of power to said conveyor whenever a container is caught between said guide and conveyor.

14. In a container handling device, a conveyor having pockets for containers arranged in transverse rows, power means for moving said conveyor by increments and advancing said rows of pockets successively into and out of a discharge position at a selected station in the path of movement of said conveyor, means disposed to receive the containers discharged from said pockets in said position, guiding means disposed between said receiving means and said pockets in discharge position for guiding the discharged containers to said receiving means, said guiding means extending along the row of pockets in discharge position and being floatingly mounted at both ends for movement generally parallel to the direction of travel of the conveyor at said discharge position, a switch device at each side of said guiding means and operable at the beginning of any movement of said guiding means at that side in the direction of movement of the conveyor at said discharge position, an electric circuit controlled in parallel by both of said switch devices, and means controlled by said circuit for automatically interrupting the application of power to said conveyor whenever a container is partially but not fully discharged from a pocket in discharge position and which overlaps said guiding means.

15. A container handling device comprising a conveyor having pockets arranged in succession therealong with respect to its direction of movement, a source of power, means operable from said source for advancing said conveyor in step by step increments of movement with intervals of rest between movements, and including a clutch by the operation of which delivery of power from said source to the conveyor may be established or interrupted, means for mechanically holding said clutch in power-delivering condition between said source and said conveyor, means yieldingly urging said clutch into power-interrupting condition when released by said holding means, an electromagnet having a movable armature, means connecting said armature

to said holding means to release said clutch from said holding means, a plurality of safety switches automatically operable for different abnormal operating conditions, and connected in parallel to one another to control the circuit through said electromagnet, whereby the operation of any one of said switches will cause operation of said electromagnet, an electromagnet controlling the activity of said source of power and having a self-closed holding circuit, a starting switch for said second electromagnet, and a normally closed switch in said holding circuit and opened by said first electromagnet when the armature of the latter is operated to release said clutch and stop movements of the conveyor.

16. A container handling device comprising a conveyor having container receiving pockets arranged in succession therealong, a source of power, means operated by said source for advancing said conveyor intermittently by increments, said means including therein a clutch, means urging said clutch in a direction to open the drive connection between said source and said conveyor, and said clutch having an operating shaft which by rotation connects and disconnects said source to said conveyor advancing means, means yieldingly urging said shaft in a direction to open said clutch, a member carried by said shaft and having a shoulder thereon, a latch yieldingly urged against said member and into latching engagement behind said shoulder when said clutch couples said source to said conveyor, an operating arm disposed adjacent one end of the conveyor, means connecting said arm to said shaft by which operation of said arm will rock said shaft in a direction to engage said clutch, and means responsive to abnormal operating conditions of said conveyor for moving said latch out of engagement with said shoulder to release said shaft and cause an opening of the clutch.

17. A container handling device comprising a conveyor having pockets arranged in succession therealong and shiftable successively through loading position by increments of movement of said conveyor, means for feeding containers into said pockets as said pockets move through loading position and including a member mounted for rocking movement back and forth about a fixed axis, means yieldingly urging said member to rock in a direction to feed a container toward a pocket in loading position, an abutment element disposed in a position to hold said member in its initial position against the action of its urging means and to move in the direction of rocking movement of said member in order to allow said member to follow it and cause a feeding of a container to a pocket in loading position, said element being operable back and forth in timed relation to the increments of movement of said conveyor and by which said member is allowed to rock in a container feeding direction while said conveyor is idle, switch means carried by said rocking member and operable upon relative movement between said abutment element and the part of said member against which it abuts, whereby if said rocking member fails to follow said abutment element at any time in a feeding movement, this relative separation will cause an operation of said switch, and means controlled by said switch for interrupting the operation of said conveyor when said switch is operated by failure of said rocking member to follow said abutment element.

18. A loading device comprising a conveyor

movable along a selected path and having pockets arranged along the same in the direction of its movement to receive and convey the containers, a guide disposed in a position to support and guide containers toward said pockets when in a loading position, a member hinged to rock on a fixed axis toward and from said loading position and having a free end portion shiftable thereon to different radial distances from said fixed axis and operable, when in its outermost position to push containers on said guide and when in its innermost position to clear such containers whenever said member is rocked, a follower carried by said free end portion, a cam track extending for less than the distance of travel of said follower but generally in the direction of travel of said follower and having opposite end sections hinged to swing about axes parallel to said fixed axis and with said end sections extending from their hinged ends away from one another, the end section adjacent said member at the start of a rocking movement dropping by gravity out of the path of movement of said follower when said member rocks toward said pockets, stops limiting the swinging movement of that end section of the track in both directions, means yieldingly urging the other end section of said track partially across the path of movement of the follower, a stop limiting the movement of said last named end section to a position in which that section is across the path of movement of said follower, whereby when said rocking member moves toward a conveyor pocket in loading position, said follower will move over and clear said gravity operated section and will engage and cam aside the spring operated track section and then clear it before the follower reaches its limit of rocking movement in that direction, and when said member moves in a return direction, said follower will engage with and be cammed by said spring operated track section in a direction toward said fixed axis so as to draw the finger end of said rocking member toward said fixed axis until it clears any container on said guide during the return movement of said rocking member, said gravity operated track section being cammed in a direction away from said fixed axis until limited by a stop which keeps said finger end withdrawn from the path of movement of a container on said guide until the rocking member reaches approximately its initial position, whereupon said follower clears said gravity operated track section and releases the finger end for movement into a position to engage behind any container on said guide, and allows said gravity operated section to drop and clear said follower on the next movement of said rocking member, and means for causing rocking of said member in timed relation to the movements of said conveyor.

19. In a washer for containers comprising a conveyor movable along a selected path and having pockets to receive and move the containers, said pockets being movable in succession through a loading position, means for pushing a container into one of said pockets which is in loading position, and having a normal stroke at each movement sufficient to place a container being pushed, fully into a pocket in loading position, driven means for operating said conveyor, a source of power, an interruptible driving connection between said source of power and said driven means, means for holding said driving connection in driving relation between the source

of power and said driven means, but releasable to permit movement of said connection out of said driving relation, means controlled by said pushing means and operable automatically whenever said pushing means stops before it completes a pushing movement for causing a release of said holding means and thereby interrupting said driving connection.

20. In a washer for containers comprising a conveyor movable along a selected path and having pockets to receive and move the containers, said pockets being movable in succession through a loading position, means for pushing a container into one of said pockets which is in loading position and having a normal stroke at each movement sufficient to place a container being pushed, fully into a pocket in loading position, driven means for operating said conveyor, a source of power, an interruptible driving connection between said source of power and said driven means, and means cooperating with said pushing means and operable automatically, whenever said pushing means fails to complete a pushing movement, to cause an interruption of said driving connection.

21. In a washer for containers comprising a conveyor movable along a selected path and having pockets to receive and move the containers, said pockets being movable in succession through a loading position, means for pushing a container into one of said pockets which is in loading position, means for yieldingly urging said pushing means in a pushing direction, an abutment opposing such pushing movement and operable in one direction to retract said pushing means against the action of said urging means and in the opposite direction to release said pushing means for a pushing operation, during which movement in said opposite direction said pushing means follows said abutment for its full pushing operation, means for operating said conveyor along said path, means for operating said abutment in timed relation to the movements of said conveyor, and means associated with both said abutment and said pushing means and operative upon separation of said abutment and pushing means for causing an interruption of operation of said conveyor.

22. In a washer for containers comprising a conveyor movable along a selected path and having pockets to receive and move containers, said pockets being movable in succession through a loading position, means for pushing a container into one of said pockets which is in loading position, means for yieldingly urging said pushing means in a pushing direction, an abutment opposing such pushing movement and operable in one direction to retract said pushing means against the action of said urging means and in the opposite direction to release said pushing means for a pushing operation, during which movement in said opposite direction said pushing means follows said abutment for its full pushing operation, means for operating said conveyor along said path, means for operating said abutment in timed relation to the movements of said conveyor, a switch device normally moving with said pushing means and said abutment but operated by their separation, and means for causing a discontinuance of operation of said conveyor upon said operation of said switch.

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