April 14, 1953 G. E. ROWE 2,634,737

MACHINE FOR WASHING OR RINSING GLASS CONTAINERS

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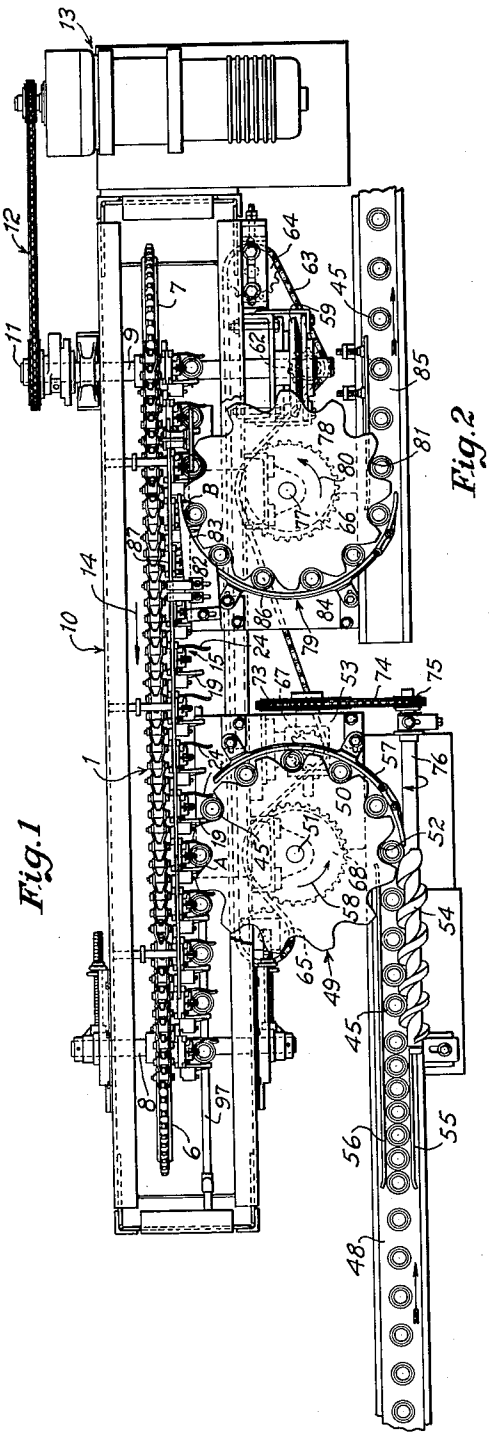


Fig. 1

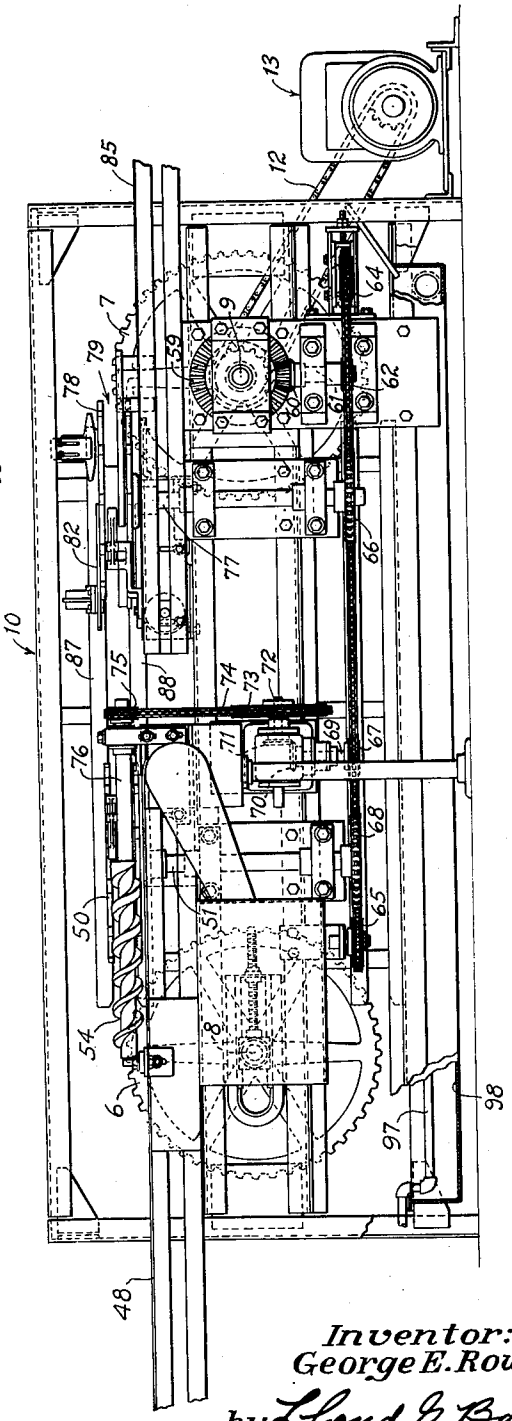


Fig. 2

Inventor:
George E. Rowe
by Lloyd S. Bates
Attorney.

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Fig.10

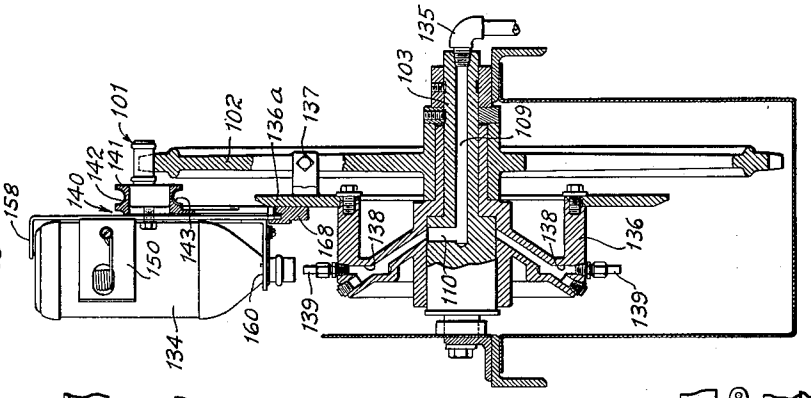
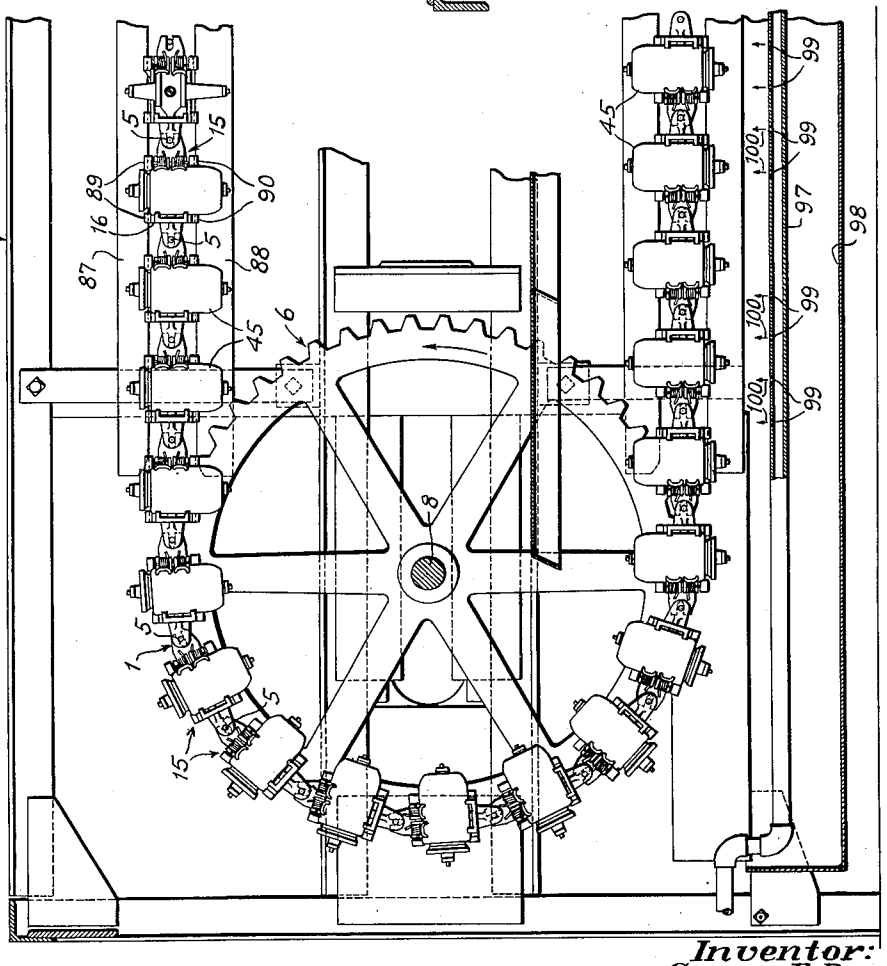


Fig.3



Inventor:
George E. Rowe
by Lloyd G. Bates
Attorney.

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MACHINE FOR WASHING OR RINSING GLASS CONTAINERS

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Fig.4

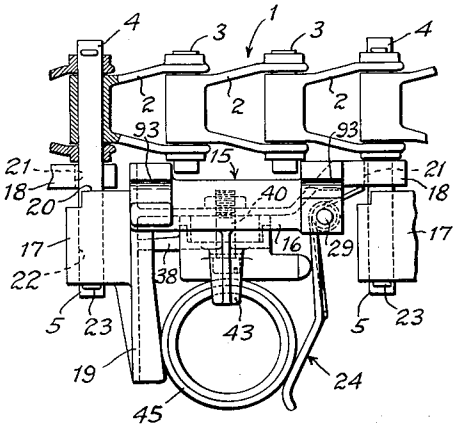


Fig.5

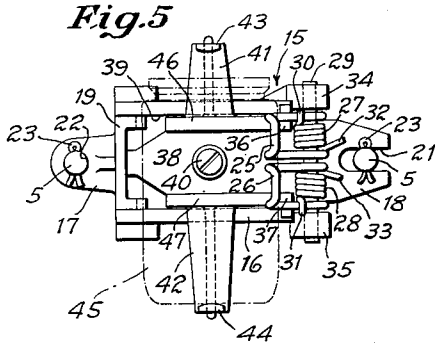


Fig.7

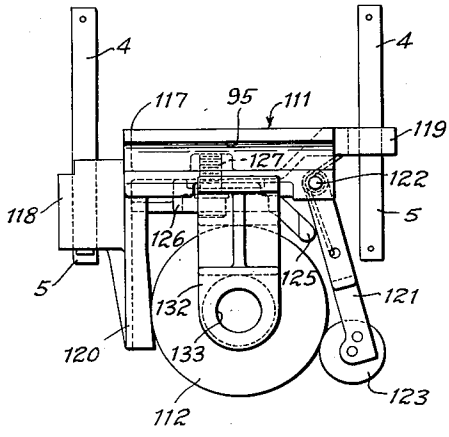
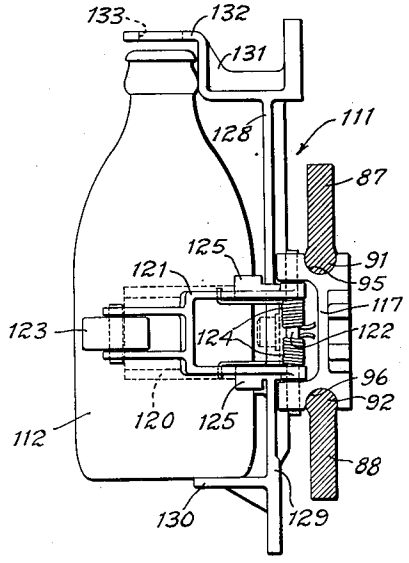


Fig.8



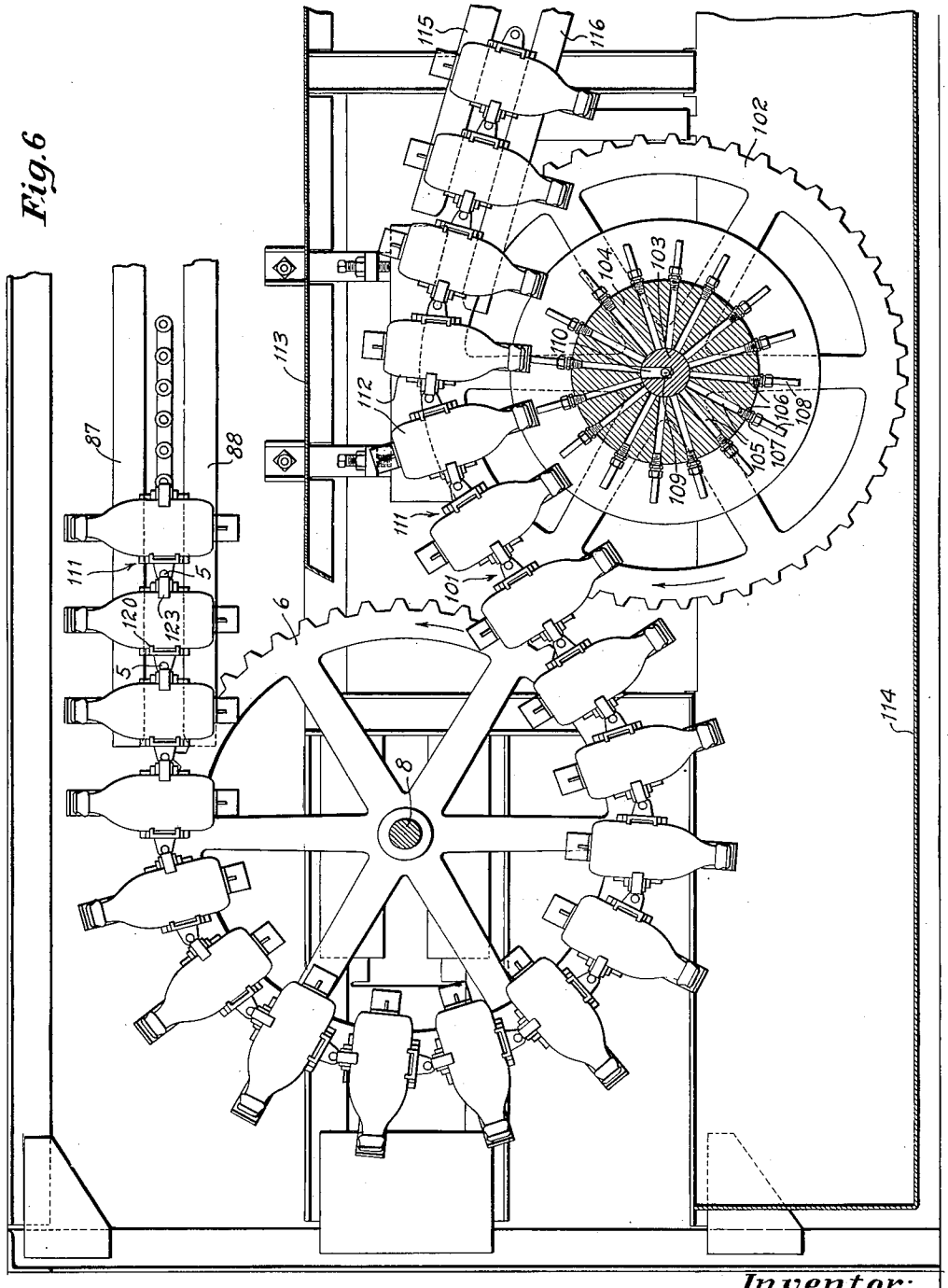
Inventor:
George E. Rowe
by Lloyd S. Bates
Attorney.

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Fig. 6



Inventor:
George E. Rowe
by Lloyd G. Bates
Attorney.

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Fig.9

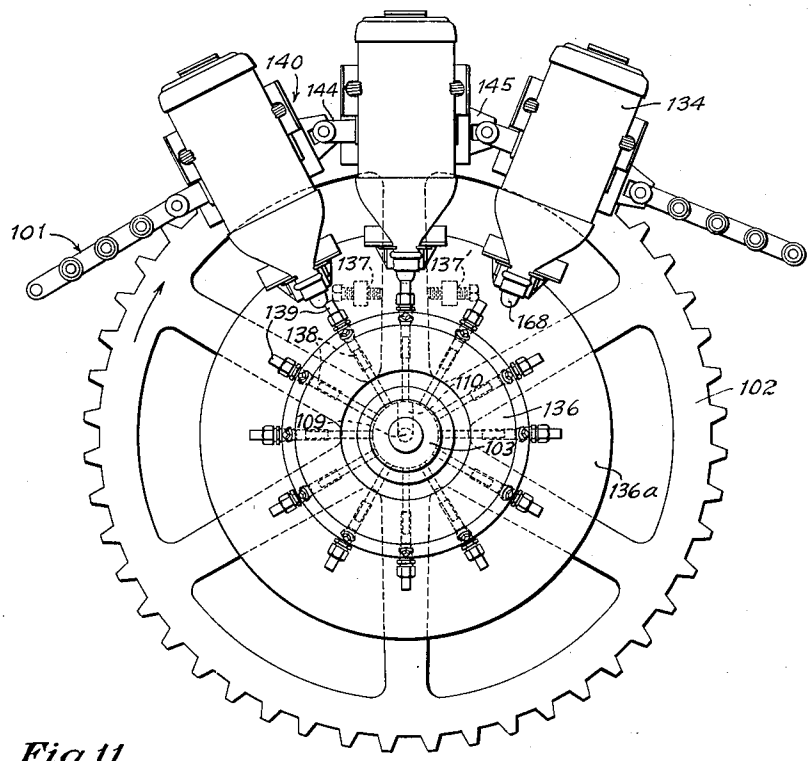


Fig.11

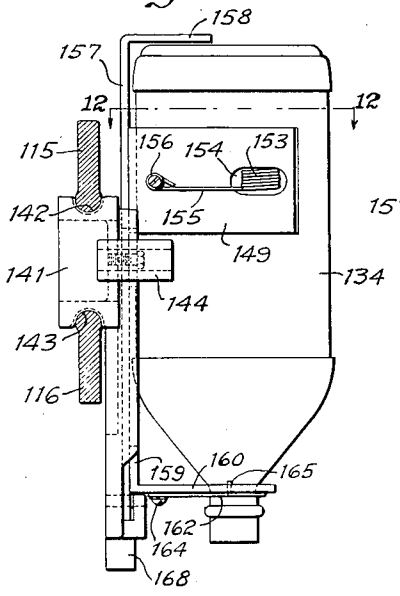


Fig.12

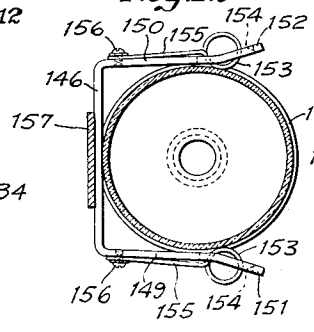
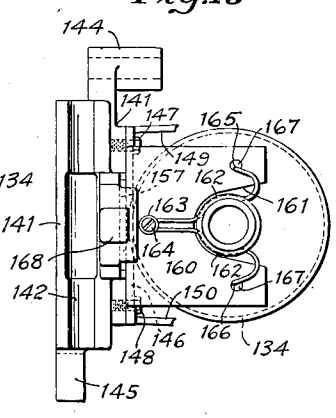


Fig.13



Inventor:
George E. Rowe
by Lloyd G. Bates
Attorney.

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MACHINE FOR WASHING OR RINSING GLASS CONTAINERS

George E. Rowe, Wethersfield, Conn., assignor to Emhart Manufacturing Company, Hartford, Conn., a corporation of Delaware

Application October 31, 1945, Serial No. 625,706

8 Claims. (Cl. 134—128)

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This invention relates to improvements in machinery for washing glass containers, typically bottles and jars.

An object of the invention is to provide a simple, reliable and efficient machine for taking successive upright terminal containers of a single row on an incoming conveyor, for moving such containers continuously along such a path and in such a manner that each container is subjected while in an inverted position to an internally applied washing or rinsing spray or stream of cleaning fluid and is allowed to drain for an adequate period of time, and for thereafter delivering the containers in an upright position and a single file order onto an outgoing conveyor.

A further object of the invention is to provide, in a machine of the character described, an endless moving conveyor formed of articulated or flexibly connected links and having vertically spaced upper and lower stretches, together with a series of lateral container-holding pocket mechanisms carried by the links of the conveyor, and a novel arrangement of structural elements for supporting and guiding the conveyor links and their associated container-holding pocket mechanisms to prevent tilting or sagging thereof during movement of these parts along the upper run of the conveyor.

A further object of the invention is to provide a novel and improved arrangement of a chain type moving conveyor, lateral container-holding pocket mechanisms thereon, means for inserting successive containers accurately into successive pocket mechanisms at one place along a substantially horizontal run of the conveyor and reliable means for removing containers from such pocket mechanisms at another place along the same run of the conveyor.

Another object of the invention is to provide a moving conveyor having a substantially horizontal upper stretch and carrying lateral container-holding pocket mechanisms so constructed and arranged that the containers loaded into the pockets of such mechanisms are guided into such pockets by yieldable spring-actuated side jaws or gripper members, whereby jamming or breakage of a container during the loading thereof is effectually prevented.

A still further object of the invention is to provide a novel and improved container-holding pocket mechanism which includes a main body portion attachable to a conveyor and a cooperative further portion removably fastened to the body portion and being a selected one of a plurality of interchangeable, specifically different

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such parts, whereby containers of different sizes and shapes may be carried at different times by such pocket mechanism.

Other objects and advantages of the invention will hereinafter be pointed out or will be apparent from the following description of illustrative practical embodiments of the invention as shown in the accompanying drawings, in which:

Figure 1 is a plan view of one form of washing machine of the invention;

Fig. 2 is a side elevation of the machine of Fig. 1, the endless, main conveyor being omitted;

Fig. 3 is a relatively enlarged, fragmentary view, mainly in side elevation, of a portion of the same machine, some of the parts thereof being in section;

Fig. 4 is a plan view of one of the container-holding pocket mechanisms of the machine as shown in the preceding views, together with a fragmentary portion of the chain conveyor of that machine;

Fig. 5 is a front view of the pocket mechanism of Fig. 4;

Fig. 6 is a view generally similar to Fig. 3 but showing a different type of washer, a different species of pocket mechanism, and narrow neck bottles carried by the pocket mechanisms instead of jars, as in the preceding views;

Fig. 7 is a plan view of the pocket mechanism of the Fig. 6 form of construction;

Fig. 8 is a view, mainly in side elevation, of the pocket mechanism of Figs. 6 and 7, showing also in section cooperative guiding and supporting rails of the machine;

Fig. 9 is a fragmentary view, mainly in side elevation, of a washing wheel and associate parts of the machine of Fig. 6 as modified for use to convey and wash larger narrow neck bottles than those shown in Fig. 6, a specifically different pocket mechanism being included in such modification;

Fig. 10 is a transverse vertical section through the portion of the machine that is partially shown in Fig. 9;

Fig. 11 is a view similar to Fig. 8, showing the pocket mechanism and container of the Fig. 9 set-up;

Fig. 12 is a plan section through a portion of the parts shown in Fig. 11, the view being approximately along the line 12—12 of Fig. 11; and

Fig. 13 is a bottom plan view of the structure shown in Fig. 11.

The improved machine may comprise an endless, main conveyor 1, the upper stretch of which is shown in Fig. 1 and a portion of which also

is shown in Fig. 3. As best appears from Fig. 4, this conveyor may consist of links 2 articulated or pivotally connected in a series by pivot pins 3 and 4, the latter being located at regular intervals, as in alternation with sets of two adjacent pivot pins 3, and having projecting end portions 5 at what may be termed the front side of the machine. Pocket mechanisms are mounted on these projecting end portions, as hereinafter will be explained.

The conveyor 1 is trained about and carried by a pair of horizontally spaced sprocket wheels 6 and 7, respectively, Figs. 1 and 2. These are carried by parallel, horizontal shafts 8 and 9, respectively. These extend transversely of and are mounted in the sides of a generally rectangular supporting framework structure, generally designated 10, the details of which are immaterial here and may be conventional. One of the sprockets, in this instance the sprocket 7, is positively driven, as by having a rearwardly extending end portion 11 of its shaft 9 provided with a driven connection, indicated at 12 in Fig. 1, with a suitable prime mover, such as the motor unit 13. The sprocket 7 is of course fixed to its shaft in this arrangement, which is such as to move the upper stretch of the conveyor 1 from right to left as viewed in Fig. 1, this direction being indicated by the arrow 14 in that view.

The conveyor 1 carries a series of container-holding pocket mechanisms, generally indicated at 15 in Figs. 1, 3, 4 and 5 and shown in detail in Figs. 4 and 5. This mechanism comprises a main part or body 16 which may be made by casting and machining, or in any other suitable known manner and which may include oppositely extending integral attaching lugs 17 and 18, respectively, and a forwardly extending integral container side engaging arm or fixed jaw 19. The lug 18 is located rearwardly of the plane of the rearward surface 20, Fig. 4, of the lug 17 and is of considerably less fore-and-aft thickness than the latter. The lug 18 is slotted at 21 to fit over the projecting end portion 5 of a pivot pin 4 in a position close to the front edge of the conveyor 1. The lug 17 is apertured at 22 to fit over the portion 5 of the preceding pivot pin 4 of the conveyor. In assembling a series of these pocket mechanisms on the conveyor, the lug 17 of each is carried on its pivot pin projection 5 next to the lug 18 of the preceding pocket mechanism, a cotter pin 23 or the like being provided adjacent to the outer end of the pivot pin projection to retain these lugs in assembled positions thereon. See Fig. 4. Relative shifting movements between the slotted lugs 18 and the pivot pin projections extending therethrough obviate binding of the connected separate parts of the conveyor and series of pocket mechanisms when the conveyor is mounted and driven as hereinbefore described.

The fixed arm or jaw 19 projects forwardly from the pocket mechanism body 16 at the side of the latter next to the attaching lug 17. A cooperative, spring pressed, pivoted jaw, generally indicated at 24 in Fig. 4, projects forwardly from the body 16 adjacent to the opposite side of such body. As best seen in Fig. 5, the spring pressed jaw comprises upper and lower similar sections 25 and 26, respectively, formed of suitably bent intermediate portions of spring wires which have their end portions bent to form torsion spring coils 27 and 28, respectively, encircling a vertical pivot pin 29, the remote ends 30 and 31, respectively, of the two coils bearing against the outer sides of the jaw sections 25 and 26, respectively, and the adjacent ends 32 and 33 of such coils bearing against the lug 18. The vertical pivot pin 29 is carried by vertically spaced apertured ears or lugs 34 and 35, respectively, on the pocket mechanism body 16. The arrangement is such as to urge the pivoted spring jaw members 25 and 26 pivotally around the axis of the pivot pin 29 in the direction of the fixed jaw 19 and against stops 36 and 37, respectively, on an insert 38 which is secured in a fixed position in a front recessed portion 39 of the body 16, as by the screw 40. The insert 38 has upwardly and downwardly extending integral arms 41 and 42, respectively, projecting above and below the upper and lower edges of the body 16, respectively. The arms 41 and 42 have forwardly turned terminal portions 43 and 44, respectively, of sufficient length to serve as stops to limit axial movement of a container 45 relative to the pocket mechanism in which the container is being held by the cooperative side engaging jaws 19 and 24. The insert 38 also may have upper and lower horizontal front flanges or enlargements 46 and 47, rsepectively, for contacting with the container to limit the rearward movement of the container 45 in the pocket between the jaws 19 and 24.

The washing machine may include an incoming horizontal conveyor 48, Fig. 1, on which the containers to be washed are brought in an upright position and in a single file order to a loading mechanism, generally designated 49, by which successive containers 45 are transferred to the pockets of the container-holding mechanisms 15 as such mechanisms are brought in turn by the upper stretch of the main conveyor 1 to a loading station A.

The loading mechanism comprises a horizontally disposed star wheel 50 which is mounted to rotate about the axis of a vertical shaft 51 by which such star wheel is carried. The star wheel 50 has a series of regularly spaced recesses or cutaway portions 52 in its periphery, each adapted to accommodate one of the upright containers 45 and to sweep that container from the incoming conveyor 48 onto and across a dead plate 53 to position to be embraced and gripped by the cooperative container side engaging jaws 19 and 24 of the pocket mechanism 15 at the loading station A. The containers may be disposed in regularly spaced relation on the incoming conveyor 48 as they approach the star wheel 50 and be fed to the peripheral recesses 52 of the star wheel by a longitudinally extending horizontal feed worm 54. Cooperative side rails 55 and 56 may be provided above part of the incoming conveyor 48 to direct the containers 45 into engagement with the feed worm 54, one of such guide rails, as the guide rail 56, extending beneath the star wheel so as to cooperate with the feed worm to guide the containers successively into successive recesses 52 in the periphery of the star wheel. A further container guiding and retaining rail, designated 57, extends part way around the star wheel from the incoming conveyor to the vicinity of the main conveyor to prevent accidental displacement of the containers from the peripheral recesses of the star wheel during transit of the containers to position to be embraced by the container side engaging jaws of successive pocket mechanisms on the upper stretch of the main conveyor 1.

As shown in Fig. 1, the container side engaging jaws of the pocket mechanism immediately preceding that at the loading station A are mov-

ing into a peripheral recess of the star wheel at opposite sides of the container 45 therein. By the time the movement of the main conveyor 1 carries that pocket mechanism to the loading station, these jaws will embrace the container referred to. This is clear from the relationship of the parts shown at the loading station in Fig. 1. The rotation of the star wheel and the rectilinear movement of the main conveyor 1, respectively indicated by the arrows 58 and 14 in Fig. 1, cause the container side engaging jaws to move into the pocket approaching the loading station so as to grip the container therein. During the transfer to such pocket, the trailing jaw 24 may yield, being spring pressed, sufficiently to assure accurate positioning of the container between the jaws of the pocket mechanism involved by the time that pocket mechanism and its container reach the loading station. Thereafter, the further rotary movement of the star wheel 50 and the continued rectilinear movement of the main conveyor 1 will remove the container from the star wheel so that it will be carried between the container side engaging jaws of its pocket mechanism. When the container is in its pocket, the spring pressed jaw will press firmly against the side of the container forwardly of the vertical center line of the container and thus will tend to hold the latter against outward displacement from such pocket.

The feed worm 54, the star wheel transfer member 50 and the main conveyor 1 are driven in coordination with one another to assure accurate feeding of the containers from the incoming conveyor to the star wheel and from the star wheel to the sprockets of the container-holding mechanisms on the main conveyor. The mechanism for driving these parts comprises a bevel gear 59, Fig. 2, mounted to turn with the sprocket 7 about the axis of the sprocket carrying shaft 9. The bevel gear 59 drives a bevel pinion 60 on the upper end of a short vertical shaft 61. This shaft carries a horizontally disposed sprocket 62, Figs. 1 and 2, which is in driving engagement with a chain 63. The chain 63 is trained about a pair of horizontally spaced idler sprockets 64 and 65, respectively, mounted on the supporting framework structure of the machine. The arrangement is such that the outer stretch of the chain 63 not only is engaged by the driving sprocket 62 but is in driving engagement with a horizontal sprocket 66, another horizontally disposed sprocket 67 and a still further horizontally disposed sprocket 68, all as best seen in Fig. 1. The sprocket 68 is mounted on the lower end of the vertical shaft 51, by which the star wheel 50 is carried. The sprocket 67 drives a short vertical shaft 69, Fig. 2, which carries a bevel gear 70. The bevel gear 70 drives a bevel gear 71 on a short horizontal shaft 72, carrying a sprocket 73. A chain belt 74 is trained about the sprocket 73 and a cooperative sprocket 75 on a shaft 76, which carries the aforesaid feed worm 54. Thus the feed worm 54, the star wheel 50 and the main conveyor 1 all have driven connections with the same driving element and their operations thus are coordinated or synchronized.

The horizontal sprocket 66, above referred to, is mounted on the lower end of a vertical shaft 77, the upper end portion of which carries a star wheel 78 of an unloading mechanism generally designated 79. The star wheel 78 is turned in the direction indicated by the arrow 80, Fig. 1. This star wheel has regularly spaced recesses 81 in its periphery, each adapted to accommodate one of the containers. At an unloading station B, Fig. 1, a fixed horizontally disposed tapering finger 82 is provided between the unloading star wheel 78 and the upper stretch of the main conveyor. The tapering end of the member 82 will enter the pocket of each pocket mechanism back of the container therein as such pocket mechanism approaches the unloading station B. By the time such container has been brought to the unloading station by its pocket mechanism, an arcuately curved guiding surface 83 on the side of the member 82 next to the periphery of the star wheel will have biased the container outwardly from its pocket between the side jaws by which it was previously held, into one of the recesses 81 in the periphery of the unloading star wheel. As the rotary movement of the star wheel 78 continues, the container will be guided from its pocket mechanism onto and across a dead plate 84 and from the latter onto an outgoing or ware-removing conveyor 85. A fixed container guiding and retaining rail 86 may be provided around part of the unloading star wheel 78, so as to continue the guiding action of the curved surface 83 of the unloading member 82 and to prevent premature displacement of the containers from the recesses 81 in the periphery of the star wheel 78. Such containers will be carried on the outgoing conveyor 85 in upright position and in a single file order, and may be delivered thereby to any suitable associate mechanism, not shown.

The upper stretch of the main conveyor chain 1 and the pocket mechanisms thereon are prevented from sagging or tilting under the weight of such pocket mechanisms and the containers therein. The means for effecting this result may comprise a pair of vertically spaced horizontally extending rails 87 and 88, respectively, Figs. 2 and 3, and transversely grooved upper and lower portions 89 and 90, respectively, Fig. 3, of the body 16 of each pocket mechanism 15, which have sliding engagement with the adjacent edge portions of the fixed rails 87 and 88. The rails 87 and 88 may have their adjacent edge portions beaded and transversely rounded or convexly curved, as shown at 91 and 92, respectively, in Fig. 8, in which the rails shown are the same as those of the structures shown in Figs. 2 and 3. The transverse grooves in the portions 89 and 90 of the bodies 16 of the container-holding mechanisms may have transversely rounded or concavely curved walls, as shown by the shading of the upper groove 93 in the body of the pocket mechanism shown in Fig. 4 and as shown in cross-section for the grooves 95 and 96 in the body of the similar pocket mechanism shown in Fig. 8. The upper stretch of the main conveyor thus will be effectively held against tilting or sagging or side sway.

The containers carried by the pocket mechanism 15 on the main conveyor chain 1 will be inverted during the passage of the conveyor around the sprocket wheel 6, as best seen in Fig. 3. Jets of water or any other suitable cleaning fluid may be squirted upwardly into the down-turned mouths of these inverted containers while they are being carried along the lower run of the conveyor. To this end, a horizontal cleaning fluid discharge pipe 97, partially shown in Fig. 3, may be provided above a fluid catch basin 98 and beneath the path of movement of the inverted containers. The cleaning fluid may be supplied to the pipe 97 from any suitable source of supply, the arrangement being such that jets

of the cleaning fluid will be directed upwardly from jet holes 99 in the top portion of the pipe 97, as indicated by the arrows 100. It will be understood that in a fluid discharge mechanism of the general kind partially shown in Fig. 3, the pipe 97 may be closed at its end (not shown) which is remote from the source of supply of the cleaning fluid. The jet holes 99 may be provided in sets of a plurality, four in the example shown, of longitudinally spaced, adjacent jet holes, the adjacent sets being separated or spaced apart a distance considerably greater than that between jet holes of the same set. Thus, the inverted containers may be subjected to upward jets of cleaning fluid during an early part of the lower run of the main conveyor, then permitted to drain during a further part of that run, then subjected to further jets of cleaning fluid, and so on. Alternate washing or rinsing and draining operations may be continued for a predetermined part of the lower run of the main conveyor, it being understood that an adequate final draining period will be provided while the containers are still inverted or have not been righted sufficiently to prevent drainage of liquid therefrom.

After being guided by the sprocket 7 to the upper run of the conveyor, the washed or rinsed and drained containers, now upright, will be removed from their pocket mechanisms at the unloading station B, Fig. 1, by the unloading mechanism 79, as hereinbefore explained.

The modification shown in part in Fig. 6 has a main conveyor chain, generally designated 101, like the conveyor chain 1, except that it may be longer, if required, to permit the lower stretch thereof to pass partially around and in engagement with the upper part of a vertically disposed idle sprocket 102. This sprocket 102 is mounted to rotate about a stationary horizontal shaft 103. A washing wheel 104 rotates with the sprocket 102 and is provided with radial passages 105 extending from the stationary shaft 103 to the outer periphery of the washing wheel. The outer end portions of the passages 105 may be screw-threaded at 106 for engagement with threaded attaching inner end portions 107 of nozzles 108. The shaft 103 has a partial bore 109 which may be adapted at its outer end for connection with a source of supply of a washing fluid under pressure, as hereinafter more particularly explained with reference to the structure shown in Fig. 10. The partial bore 109 leads to an upwardly turned radial passage 110 in the shaft. The passage 110 preferably is slightly wider than each of the radial passages 105. The number and spacing of the passages 105 are such, in relation to the pocket mechanisms, generally indicated at 111, on the conveyor chain 101, that each of the containers, shown as stubby bottles 112, carried by the pocket mechanisms 11, will be aligned with a nozzle 108 during the movement of that container and its aligned nozzle into and past register with the cleaning fluid supply passage 110. Each bottle 112 or other narrow neck container carried by a pocket mechanism 111, thus will receive its intended quota of cleaning fluid, which may be projected into the inverted container completely to the upper end thereof. A shield or baffle plate 113 may be mounted above the washing wheel and a catch pan or basin 114 may be disposed therebeneath. Also, vertically spaced guide rails 115 and 116, respectively, similar to the guide rails 87 and 88 heretofore described, may be provided in appropriate positions to cooperate with transversely grooved portions of the bodies of the respective pocket mechanisms 111 to prevent sagging or tilting of the lower stretch of the conveyor chain 101 and the container-carrying pocket mechanisms thereon after such chain passes the sprocket 102.

The container-holding pocket mechanisms 111 are shown in detail in Figs. 7 and 8. Each includes a body 117 having its upper and lower portions provided with the transversely extending grooves 95 and 96, respectively, Fig. 8, for engagement with the rounded adjacent edge portions of the rails 87 and 88 and with similar portions of the rails 115 and 116, as hereinbefore has been pointed out. The body 117 has lugs 118 and 119, similar to the lugs 17 and 18 on the body 16 of the pocket mechanism 15, hereinbefore described. These lugs are for mounting a pocket mechanism 111 on the projecting ends 5 of the pintles or pivot pins 4 of the main conveyor.

The body 117 has a forwardly projecting fixed jaw member 120. A cooperative, pivoted jaw member 121 is provided at the opposite side of the body 117, being mounted on a vertical pivot pin 122 and being provided at its free end with a roller 123. The member 121 is urged continuously toward the fixed jaw member 120 by torsion spring means, indicated at 124. Fixed stops 125 on an insert 126, which is fastened by a cap screw 127 to the body 117 at the front of the latter, limit the extent to which the pivoted jaw 121 can swing toward the fixed jaw 120 under the impulsion of the torsion spring means 124.

The insert 126 has an integral upwardly projecting arm 128 and a downwardly projecting integral arm 129. The latter has a forwardly extending shelf 130 thereon which may serve as a partial seat for the bottom of the container 112 when the latter has been gripped between the fixed and pivoted container side engaging jaws. The upwardly projecting arm 128 has a forwardly projecting top portion 131 which includes a stepped-up flat end portion 132. This will overlie the upper end of the container 112 and is provided with an aperture 133, Fig. 8, in register with the mouth of the container 112 to permit the jet or stream of washing fluid from a nozzle 108 of the washing wheel 104 to pass therethrough to the interior of the inverted container. The part 132 also may serve as a stop to limit downward movement of the inverted container in its holder.

The bottles 112 may be loaded into and unloaded from the pocket mechanisms on the main conveyor chain 101 in the manner and by means substantially as hereinbefore described. The structural details of the remainder of the modification, partially shown in Fig. 6, also may be substantially the same as those which have been pointed out in the description of the form of structure shown in Fig. 1.

The modification shown in part in Figs. 9 to 13, inclusive, is designed primarily for the handling and washing of relatively large, narrow neck containers, such as the bottles indicated at 134. In this modification, the main conveyor chain may be like that of the modification shown in Fig. 6, and therefore has been designated by the same reference character, that is, 101. The lower stretch of this conveyor chain may pass around the sprocket 102, Fig. 9, as in the case of the Fig. 6 form of construction. This sprocket is mounted to turn idly about the stationary horizontal shaft 103. As shown in Fig. 10, the shaft 103 has a partial bore 109 which is connected at

its outer end with a source of supply of a suitable cleaning fluid under pressure, represented by the pipe 135. At its inner end, the bore 109 is merged into the radial passage 110. A washing wheel 136 also is mounted on the shaft 103 and has a rim flange 136–*a*, adjustably connected at 137—137′ (see Fig. 9) to a spoke of the sprocket 102 to cause the washing wheel to turn with the sprocket.

The washing wheel has a series of generally radial passages 138, extending from the portion of the shaft 103 through which the passage 110 opens to the outer periphery of such washing wheel. A short nozzle or discharge nipple 139 is screwed into the outer end portion of each of the passages 138. The arrangement is such that each of these nozzles will be aligned with the mouth of each inverted container 134, carried by a container-holding pocket mechanism, generally designated 140, on the main conveyor chain 101 during the time that such container and its aligned nozzle are moved into the past register with the passage 110 in the upper part of the stationary shaft 103. A jet of stream of cleaning fluid thus will be directed into each of the containers 134 while it is inverted. The adjustable connections 137—137′ permit pre-adjustment of the washing wheel around the axis of the shaft 103 and relative to the sprocket 102 to assure accurate register of each nozzle 139 with a bottle in a pocket mechanism 140 on the chain 101.

The container-holding pocket mechanism 140 may comprise a body 141 having transversely extending rounded upper and lower grooves 142 and 143, respectively, for engaging with adjacent edges of the rails 87 and 88 during the upper run of the conveyor and similarly with rails such as 115 and 116, Fig. 6, during part of the lower run of the conveyor. The body 141 has attaching lugs 144 and 145, respectively, which serve the purpose of the lugs 17 and 18 of the pocket mechanism 15, hereinbefore described.

An insert 146 is attached to the body 141 by the cap screws 147 and 148, Fig. 13. This insert has a pair of forwardly extending spaced arms 149 and 150 respectively, adapted to partially encircle the body of the container 134. These arms preferably although not necessarily, are made of a material having considerable inherent resilience, so that such arms, the outer end portions of which are flared at 151 and 152, respectively, will tend to exert a spring gripping action on the body of the container. These arms may carry spring jaws or container body engaging elements, in the form of loops 153 projecting through apertures 154 in the outer portions of the arms 149 and 150 against the body of the container 134 at places slightly in advance of the vertical center line of that container. These loops 153 have attaching stems or shanks 155 fastened at 156 to the arms 149 and 150, both the loops and their attaching stems being made of a spring metal wire or other material having good resilience. The insert 146 has a vertical projection 157 which is turned forwardly at 158 to provide a partial seat for the bottom of the container 134 when the container is upright. An oppositely extending vertical projection 159 has a forwardly turned portion 160 which is cut away or recessed at 161 to receive the neck portion of the container. A pair of spring gripping jaws 162 are carried by the part 160 to grip the neck portion of the container. As shown, Fig. 13, these spring grippers 162 are portions of a length of spring wire which has been appropriately bent to provide an intermediate or attaching eye or loop 163 fastened by a screw 164 to the part 160, and having its extremities bent for engagement at 165 and 166, respectively, with holes 167 in the part 160. The holder just described is well adapted to accommodate a relatively large narrow neck container, such as a quart bottle. Various inserts may be used with the same body 141 of the container-holding pocket mechanism 140 to adapt such mechanism for use to hold narrow neck container which respectively are larger or smaller than the bottle 134 and of the same or different shapes. The body 141 of the pocket mechanism may have a depending portion, such as that indicated at 168 in Fig. 10, adapted to slide on the face of the washer wheel flange 136–*a* to stabilize the movement of the main conveyor and of the inverted containers carried thereby during the washing operation.

From the foregoing description of illustrative practical embodiments of the invention, it will be clear that the invention provides practical and efficient automatic machinery of a relatively simple construction and mode of operation for taking wide-mouth or narrow neck containers from a moving line, as in a container packing or bottling plant, for thoroughly washing or rinsing such containers, and for thereafter returning them to the packing or bottling line, all these operations being performed rapidly so that they may be coordinated with the operations of the associate container packing or bottling equipment.

The invention is not limited to the details of the illustrative practical embodiments herein described as many changes therein and modifications thereof will now readily occur to those skilled in the art.

I claim:

1. In container washing or rinsing machinery, a flexible carrier, spaced pins projecting laterally from one edge of the carrier, and container holders, each comprising a rigid body having a pair of oppositely extending apertured, lateral attaching lugs respectively mounted on adjacent pins, a pair of cooperative container side grippers projecting from the side of the rigid body opposite said edge of the carrier, and a removable and replaceable insert fixedly secured to the same side of said rigid body and provided with a pair of opposed container movement limiting elements projecting at the same side of said rigid body as said side grippers at places spaced along a line extending approximately midway between the side grippers.

2. In container washing or rinsing machinery, a flexible carrier, spaced pins projecting laterally from one edge of the carrier, and container holders, each comprising a rigid body having a pair of oppositely extending lateral apertured attaching lugs respectively mounted on adjacent pins and also having a fixed jaw member projecting forwardly therefrom adjacent to a side edge thereof, a cooperative forwardly projecting jaw member pivotally mounted on the holder body adjacent to its opposite side edge, spring means urging the pivotally mounted jaw member toward the fixed jaw member, and an insert detachably secured to the front of said rigid holder body between said jaw members, said insert having stop means thereon for limiting the movement of said pivotally mounted jaw member toward the fixed jaw member.

3. The combination specified by claim 2 where-in said insert extends vertically above and below

the upper and lower ends, respectively, of said rigid body and is provided at its upper and lower ends with forwardly projecting elements adapted to serve as stops to limit vertical movement in either direction relative to said holder of a container disposed between and gripped by said cooperative jaw members.

4. The combination specified by claim 2 wherein said insert extends vertically above and below the upper and lower ends, respectively, of said rigid body and is provided at its upper and lower ends with forwardly projecting elements adapted to serve as stops to limit vertical movement in either direction relative to said holder of a container disposed between and gripped by said cooperative jaw members; the upper forwardly projecting element on said insert having an aperture formed therethrough in position to be aligned with the mouth of an upright container in the jaws of said holder.

5. The combination specified by claim 2 wherein said spring means is integral with and forms part of said pivotally mounted jaw member.

6. The combination specified by claim 2 wherein said spring means is separate from said pivotally mounted jaw member and the latter has a roller mounted at its free end for contact with the side of a container that is gripped between said jaw members.

7. In container washing or rinsing machinery, a flexible carrier, spaced pins projecting laterally from one edge of the carrier, and container holders, each comprising a rigid body having a pair of oppositely extending apertured attaching lugs respectively mounted on adjacent pins and a removable and replaceable insert fixedly secured to said rigid body and provided with a pair of forwardly projecting relatively spaced jaw members adapted to embrace and grip between them the body of a container, said jaw members being apertured and having spring pressed elements thereon extending through the apertures of the jaw members against the wall of the interposed container body, said insert also having a pair of vertically spaced forwardly projecting end portions, respectively adapted to engage with opposite end portions of said container to limit vertical movement thereof relative to said jaw members, the forwardly projecting end portion of the insert for the open end portion of the container being formed to partially encircle the latter and a spring clip thereon for gripping the partially encircled open end portion of the container.

8. In a machine for washing or rinsing glass containers, such as bottles and jars, a main conveyor comprising an endless chain, horizontally spaced vertically disposed sprockets operatively supporting said chain so that it has a substantially horizontal upper stretch and a lower return stretch, a series of holders for the containers, said holders being carried by said chain so as to be upright when on said upper stretch and inverted when on said lower stretch, said holders having container accommodating pockets open at one side of said chain for the ingress and egress of containers, and each being constructed and arranged to hold a container firmly but releasably therein so that the container will be inverted when its holder is inverted, means to drive said chain, means located below and in operative relation to the then inverted holders carried by said lower stretch to project cleaning fluid upwardly into the inverted containers in said holders, a pair of vertically spaced, fixed, horizontal guide rails respectively extending above and below the upper stretch of the main conveyor and transversely grooved elements at the tops and bottoms, respectively, of said holders and rigid therewith for receiving and slidably engaging adjacent edge portions of said guide rails to prevent sagging, tilting or side sway of the upper stretch of the main conveyor, the slidably co-engaging portions of said guide rails and transversely grooved elements having their contacting surfaces complementarily rounded in cross-sectional configuration.

GEORGE E. ROWE.

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