Jan. 10, 1950 H. P. SMITH 2,493,837

SYSTEM OF DRAINING CONTAINERS

Filed Nov. 10, 1945 3 Sheets-Sheet 1

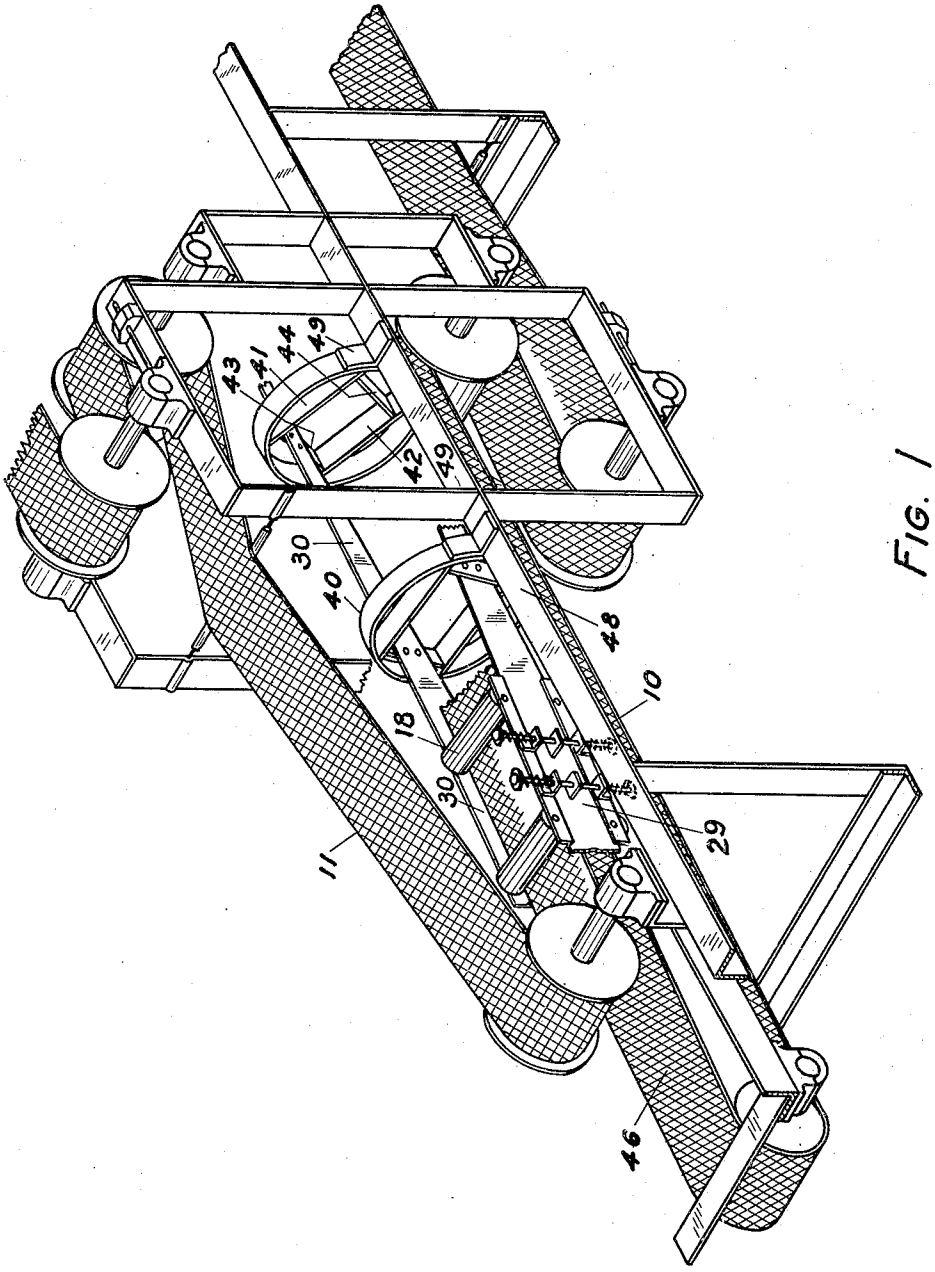


FIG. 1

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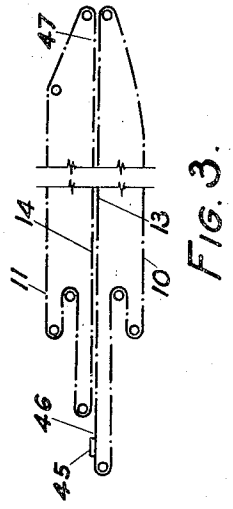


FIG. 3.

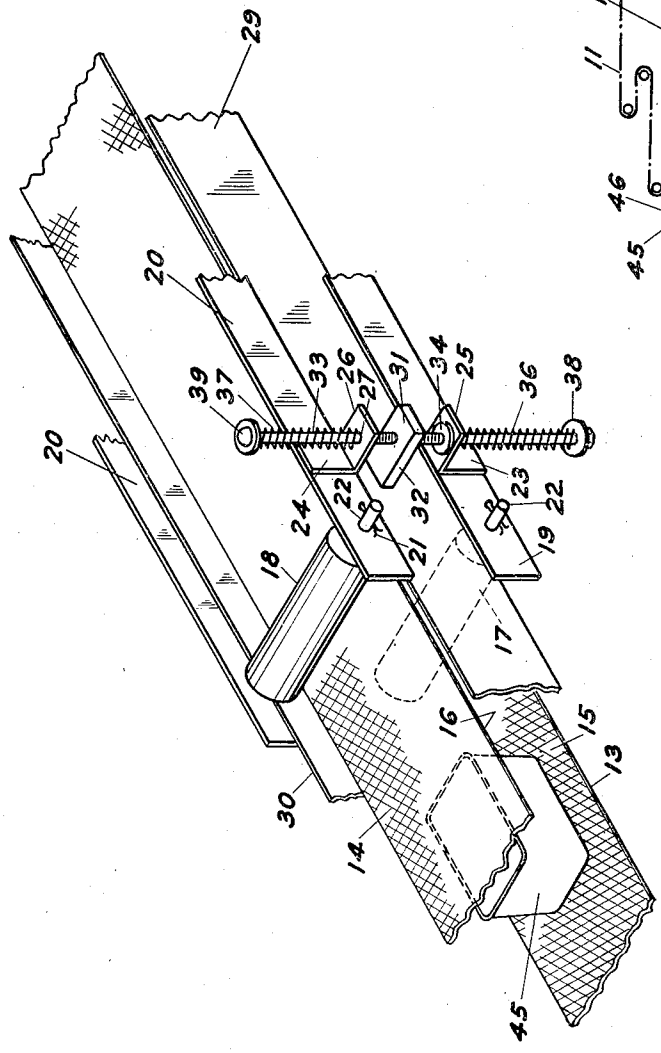


FIG. 2

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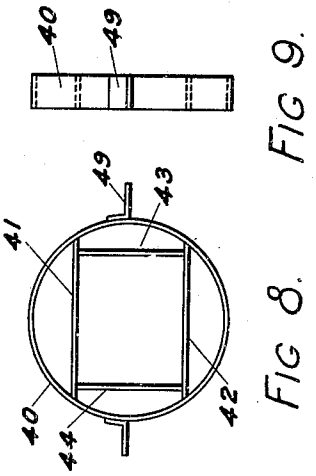


FIG. 8.

FIG. 9.

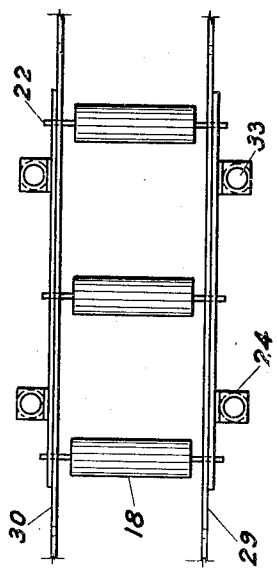


FIG. 7.

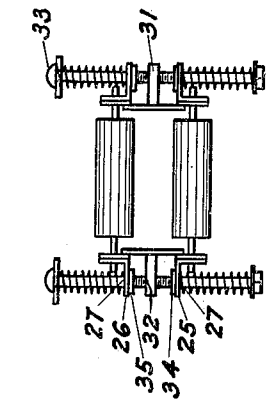


FIG. 6.

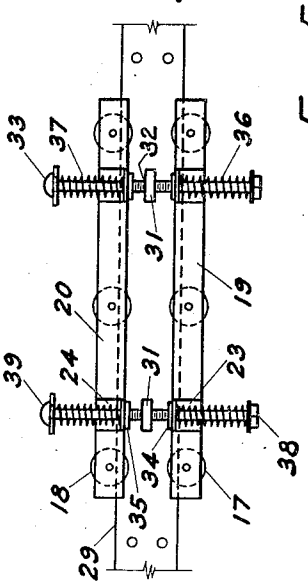


FIG. 5

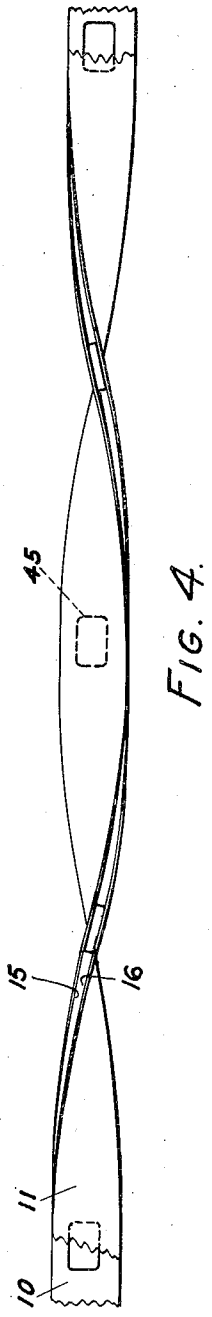


FIG. 4.

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SYSTEM OF DRAINING CONTAINERS

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Application November 10, 1945, Serial No. 627,919

7 Claims. (Cl. 226—22)

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This invention relates to can drainers, more particularly to conveyor apparatus for inverting packed but open containers to drain off surplus fluids, such as the natural juices produced during a cooking process prior to filling the containers with oils or sauces, and before the sealing thereof.

In certain known methods of can draining wherein the container is inverted, the turning operation is performed by a quick revolution of individual units. The very nature of this method requires individual operation, or at least the feeding of a very limited number of units to the inverter. In one of the most efficient of such devices the maximum number of units inverted has been found to be 90 per minute. It is within the contemplation of my invention to overcome this shortcoming in drainers of the said general category by increasing the capacity considerably above that heretofore obtained. I have found that in an apparatus made according to this invention the capacity was 150 units per minute.

Another shortcoming of draining methods heretofore used, especially of the quick inverting type above referred to, is that the operative action is not always positively effective, inasmuch as the short time factor and the presence of obstructing elements of the contents within the container prevent a sufficient draining. It is also an important object of this invention to eliminate this hit-and-miss aspect of conventional drainers, by permitting an extension of the active draining period, and by so conveying the containers that there will be a gradual though positive draining action. And in this aspect of my invention, it is a further object to enable such draining action to be accomplished in an apparatus of comparatively large capacities.

It is also an object of this invention to provide simple and self-adjusting means for firmly holding the conveyed units in proper position during the complete operative cycle, whereby they are in continuous control and safe against dislodgment at all times.

And in the last-mentioned aspect of this invention, it is also an object to provide means against the slippage of the units being conveyed, whereby the apparatus may be safely used for glass containers as well as cans.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings

Figure 1 is a perspective view of a portion of an apparatus embodying my invention.

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Figure 2 is a fragmentary perspective showing a can between two coacting belt portions yieldably supported by the structure of my invention.

Figure 3 is a diagrammatic view of the path of the belts of the apparatus of Figures 1 and 2.

Figure 4 is a fragmentary plan view of a portion of the two coacting belts shown twisted through 180 degrees and operatively supporting therebetween cans for draining.

Figure 5 is a side elevation of the yieldable belt-supporting means shown in Figure 2.

Figure 6 is an end view of Figure 5.

Figure 7 is a top view of Figure 5.

Figure 8 is a front view of the guide-strip supporting device, and

Figure 9 is a side view of Figure 8.

In the particular embodiment of the invention illustrated, there are two continuous open-mesh chain belts 10 and 11 both driven at the same speed from one end by suitable driving mechanisms not shown. The operative portions 13 and 14 of the belts travel in the same direction, are parallel to each other, and have their operative or container-engaging surfaces 15 and 16, respectively, in facing relation. The said operative parallel portions of the belts travel between and in engagement with spaced, yieldably supported rollers 17 and 18 (to be more specifically hereinafter described), their plane of travel varying from a horizontal position at the beginning of the cycle or operative path, through a 180° turn at the center of the path, and then back again through a 180° turn to the original horizontal position. The arrangement is such that containers fed at the loading end are yieldably held between the belts in an upright position, with the container opening at the top, and then gradually inverted while the belts are travelling in a generally horizontal direction, until the surplus fluids are discharged in the central region of the operative path, the containers then being returned in their original upright position at the exit end of the apparatus.

The said sets of rollers 17 and 18 are, in the particular form illustrated, rotably supported by parallel plate sections 19 and 20, respectively, the rollers being held against detachment by cotter pins 21 or other analogous means, extending through shafts 22. Attached to said plate sections are oppositely disposed angle bars 23 and 24, the respective spaced parallel legs 25 and 26 thereof having holes 27 in registry.

Extending along the path of travel of the said operative portions 13 and 14 of the conveyor belts are the guide strips 29 and 30, each of these strips

being adjacent and extending along the longitudinal extent of said plate sections 19 and 20. Affixed to each of said strips 29 and 30 are outwardly protruding walls 31 with a hole 32 in registry with said holes 27, each wall 31 being disposed between the legs 25 and 26 of said angle-bars and parallel thereto. Extending through each set of holes 27 is a bolt 33, each of said bolts being fixedly secured to wall 31 by suitable fastening means, such as by internal threads in hole 32 in engagement with threads at the central portion of the shank of bolt 33. Each of the bolts carries stops or washers 34 and 35, the former in engagement with leg 25 of the angle bar 23, and the latter in engagement with the leg 26 of angle bar 24, the minimum spacing between said legs being determined by the distance between the said washers 34 and 35. Disposed over the shank of each of said bolts 33 are two springs 36 and 37, the former being positioned between leg 25 and enlarged terminal 38 of the bolt, and the latter between leg 26 and terminal 39. The lower terminal 38 is affixed to the framework 48, as indicated in Figure 1.

The arrangement of rollers and their supporting structure is hence such that the set of rollers 17 are maintained at a predetermined minimum distance from the set of rollers 18, but at the same time permitting the distance between said sets to be yieldably increased against the action of the springs 36 and 37. This arrangement not only permits cans or other units to be yieldably and firmly held by the coacting parallel belts 10 and 11 throughout the entire operative cycle, and thereby safe against dislodgement, but also enables units of slight dimensional variations to be, without adjustment, operatively used with the apparatus of my invention.

The variations in the plane of travel of the belts 10 and 11 are effectuated by the disposition and arrangement of the said guide strips 29 and 30 which yieldably support the rollers guiding the belts. These strips in turn are supported along spaced sections of their length by mountings (to be hereinafter described) which progressively change the direction of the strips with respect to the horizontal, and the inclination of the flat faces of the strips, and which at the same time maintain the strips in parallel facing relation. The strips can be said to be oppositely disposed helices. The arrangement is such that a continuous plane between said strips and normal to the opposing faces thereof will be progressively twisted about a longitudinal axis parallel to the two strips, the amount of twist depending upon the relative positions of the two opposing faces of the strips. These strips are of flexible material and are accordingly twisted along their respective lengths so as to produce the desired path of travel of the belts as above described. The mountings for said guiding strips consist of a plurality of spaced rings 40 each containing, in the preferred embodiment of my invention, a rectangular arrangement of bars 41, 42, 43 and 44, the first two being chords of the ring 40 and suitably secured thereto, and the latter two serving as guide bars and being attached to the bars 41 and 42. The said guide bars 43 and 44 are parallel to each other, and are spaced a distance from each other substantially corresponding to the distance between strips 29 and 30 which extend through the said rings and are attached to the said guide bars 43 and 44. It is important that the distance between the guide bars in each ring 40 be such as to maintain the guide strips 29 and 30 uniformly

spaced apart throughout their entire extent, whereby they may be permitted operatively to support the rollers 17 and 18.

The rings 40 are each secured to the framework 48 by brackets 49, successive rings being so mounted that the planes of successive sets of guide bars 43 and 44 make first progressively decreasing and then progressively increasing angles with the horizontal, whereby the strips 29 and 30 supported thereby may be twisted and the plane therebetween revolved about a longitudinal axis through predetermined angles. And in the specific embodiment of the invention described, the successive variation in the angles of guide bars 43 and 44 extends through a total angle of 180° from the beginning of the cycle to the center thereof, and then back again through a total of 180° whereby the plane between the guide strips 29 and 30 and the operative portions 13 and 14 of the conveyor belts are accordingly also rotated through corresponding angles, to effect a complete inverting of the containers held by the belts and a return thereof to their normal positions. Figure 1 shows only two ring mountings 40, and accordingly only two different positions of the guide bars 43 and 44 and only a partial variation of the relative positions of the guide strips through a fragment of the cycle. Since the rollers 17 and 18 are supported by the strips and serve as guides for the belts, it is apparent that the belts will be twisted to correspond with the varying positions of the strips. As stated, it is contemplated to employ a 180° twist, as shown in Figure 4.

In the operation of this system, open filled cans or other containers 45, having surplus fluids therein are fed into the apparatus by placing them at the feeding end 46, whereafter they are engaged by the operative surfaces 15 and 16 of the belts 10 and 11, and conveyed through the inverting and re-inverting cycle. The inverting action is gradual, so that the surplus fluids will be given ample time to be discharged gravitationally, and be independent of centrifugal force as an ejection expedient. This gradual action does not disturb the contents, yet permits the discharge of any fluids that might temporarily be blocked by the solid contents. And upon the completion of the cycle, the containers emerge at the exit portion 47 in their original upright position, ready for the sealing operations.

It will be observed that the length of travel through the operative cycle permits of a large capacity of units being drained, the gradual turn permitting of large numbers of units to be conveyed, and the yieldable though positive grip on the containers permitting of a high belt speed, if need be, without danger of accidental displacement or loss.

It is understood that other additional forms and modifications of the apparatus and adaptations of the method constituting this invention can be employed beyond and in addition to those hereinabove described, all within the scope of the appended claims.

I claim:

1. In a system of draining containers, conveyor belt means disposed along a predetermined operative path, said means comprising two spaced parallel coacting belt portions adapted to travel in the same direction and at the same speed and having container-engaging surfaces in facing relation, whereby containers may be held by the belts between said surfaces during the operative movement of the belt, two parallel guide strips

extending along said path and helically twisted through an angle of substantially 180 degrees from the beginning of the path to a predetermined intermediate portion thereof and back again to substantially their original position at the end of the path, parallel plate means yieldably supported by said guide strips, and two parallel sets of spaced rollers rotatably supported by said plate means, the said belt portions being in operative engagement with said rollers, whereby the rollers and the belts are corresponding turned to cause an operative inverting of containers held between said belt portions.

2. In a system of draining containers, conveyor belt means disposed along a predetermined operative path, said means comprising two spaced parallel coacting belt portions adapted to travel in the same direction and at the same speed and having container-engaging surfaces in facing relation, whereby containers may be held by the belts between said surfaces during the operative movement of the belt, two parallel guide strips extending along said path and helically twisted through an angle of substantially 180 degrees from the beginning of the path to a predetermined intermediate portion thereof and back again to substantially their original position at the end of the path, parallel plate means yieldably supported by said guide strips, the yieldable supports for said plate means comprising bolts fixedly secured to said strips and spring means on the bolts yieldably supporting the plate means, and two parallel sets of spaced rollers rotatably supported by said plate means, the said belt portions being in operative engagement with said rollers, whereby the rollers and the belts are correspondingly turned to cause an operative inverting of containers held between said belt portions.

3. In a system of draining containers, conveyor belt means disposed along a predetermined operative path, said means comprising two spaced parallel coacting belt portions adapted to travel in the same direction and at the same speed and having container-engaging surfaces in facing relation, whereby containers may be held by the belts between said surfaces during the operative movement of the belt, two parallel guide strips extending along said path and helically twisted through a predetermined angle of more than 90 degrees from the beginning of the path to a predetermined intermediate portion thereof and back again to substantially their original position at the end of the path, a plurality of spaced outwardly extending walls fixedly attached to each of said strips, a plurality of spaced plate sections disposed longitudinally along both of said strips, said plate sections having outwardly extending wall members fixedly attached thereto and positioned to correspond with the said walls, the correspondingly positioned walls and wall members having holes therein in registry with each other, a bolt extending through each set of said holes in registry and fixedly supported by the walls attached to the guide strip, stop means on the bolt in engagement with the wall members of the plate sections for limiting the inward movement of said sections, springs mounted on the shank of each bolt and in engagement with the said wall members for yieldably limiting the outward movement of the sections, and two sets of spaced rollers rotatably supported by said sections, the said belt portions being in operative engagement with said rollers, whereby the rollers and the belts are correspondingly turned to cause an operative inverting of containers held between said belt portions.

4. In a system of draining containers, conveyor belt means disposed along a predetermined operative path, said means comprising two spaced parallel coacting belt portions adapted to travel in the same direction and at the same speed and having container-engaging surfaces in facing relation, whereby containers may be held by the belts between said surfaces during the operative movement of the belt, two parallel guide strips extending along said path and helically twisted through an angle of substantially 180 degrees from the beginning of the path to a predetermined intermediate portion thereof and back again to substantially their original position at the end of the path, supporting means for said strips comprising a plurality of pairs of parallel guide bars disposed along the said operative path, the bars of each pair being spaced apart a distance corresponding to the spacing of said strips, the strips being fixedly secured to said bars, and two sets of spaced rollers rotatably supported upon said strips, the said belt portions being in operative engagement with said rollers, whereby the rollers and the belts are correspondingly twisted to cause an operative inverting of containers held between said belt portions.

5. In a system of draining containers, conveyor belt means disposed along a predetermined operative path, said means comprising two spaced parallel coacting belt portions adapted to travel in the same direction and at the same speed and having container-engaging surfaces in facing relation, whereby containers may be held by the belts between said surfaces during the operative movement of the belt, two parallel guide strips extending along said path and helically twisted through an angle of substantially 180 degrees from the beginning of the path to a predetermined intermediate portion thereof and back again to substantially their original position at the end of the path, supporting means for said strips comprising a plurality of pairs of flat parallel guide bars disposed along the said operative path, the planes of successive pairs of guide bars varying to correspond with the adjacent portions of guide strips along the operative path, the bars of each pair being spaced apart a distance corresponding to the spacing of said strips, the strips being fixedly secured to said bars, and two sets of spaced rollers rotatably supported upon said strips, the said belt portions being in operative engagement with said rollers, whereby the rollers and the belts are correspondingly twisted to cause an operative inverting of containers held between said belt portions.

6. In a system of draining containers, conveyor belt means disposed along a predetermined operative path, said means comprising two spaced parallel coacting belt portions adapted to travel in the same direction and at the same speed and having container-engaging surfaces in facing relation, whereby containers may be held by the belts between said surfaces during the operative movement of the belt, two parallel guide strips extending along said path and helically twisted through an angle of substantially 180 degrees from the beginning of the path to a predetermined intermediate portion thereof and back again to substantially their original position at the end of the path, a plurality of substantially parallel rings the planes of which are substantially transverse with respect to the direction of travel of the belts, said rings being disposed in

spaced relation along the said path, each of said rings containing a pair of parallel guide bars spaced apart a distance corresponding to the spacing of said strips, the strips being fixedly secured to said bars, and two sets of spaced rollers rotatably supported upon said strips, the said belt portions being in operative engagement with said rollers, whereby the rollers and the belts are correspondingly twisted to cause an operative inverting of containers held between said belt portions.

7. In a system of draining containers, conveyor belt means disposed along a predetermined operative path, said means comprising two spaced parallel coacting belt portions adapted to travel in the same direction and at the same speed and having container-engaging surfaces in facing relation, whereby containers may be held by the belts between said surfaces during the operative movement of the belt, two parallel guide strips extending along said path and helically twisted through an angle of substantially 180 degrees from the beginning of the path to a predetermined intermediate portion thereof and back again to substantially their original position at the end of the path, a plurality of substantially parallel rings the planes of which are substantially transverse with respect to the direction of travel of the belts, said rings being disposed in

spaced relation along the said path, each of said rings containing a substantially rectangular arrangement of four bars, two oppositely disposed bars being attached to the ring periphery, and being in supporting engagement with the other two bars which are adapted to serve as guide bars, the planes of successive pairs of guide bars varying to correspond with the adjacent portions of the guide strips along the operative path, the strips being fixedly secured to said bars, and two sets of spaced rollers rotatably supported upon said strips, the said belt portions being in operative engagement with said rollers, whereby the rollers and the belts are correspondingly twisted to cause an operative inverting of containers held between said belt portions.

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