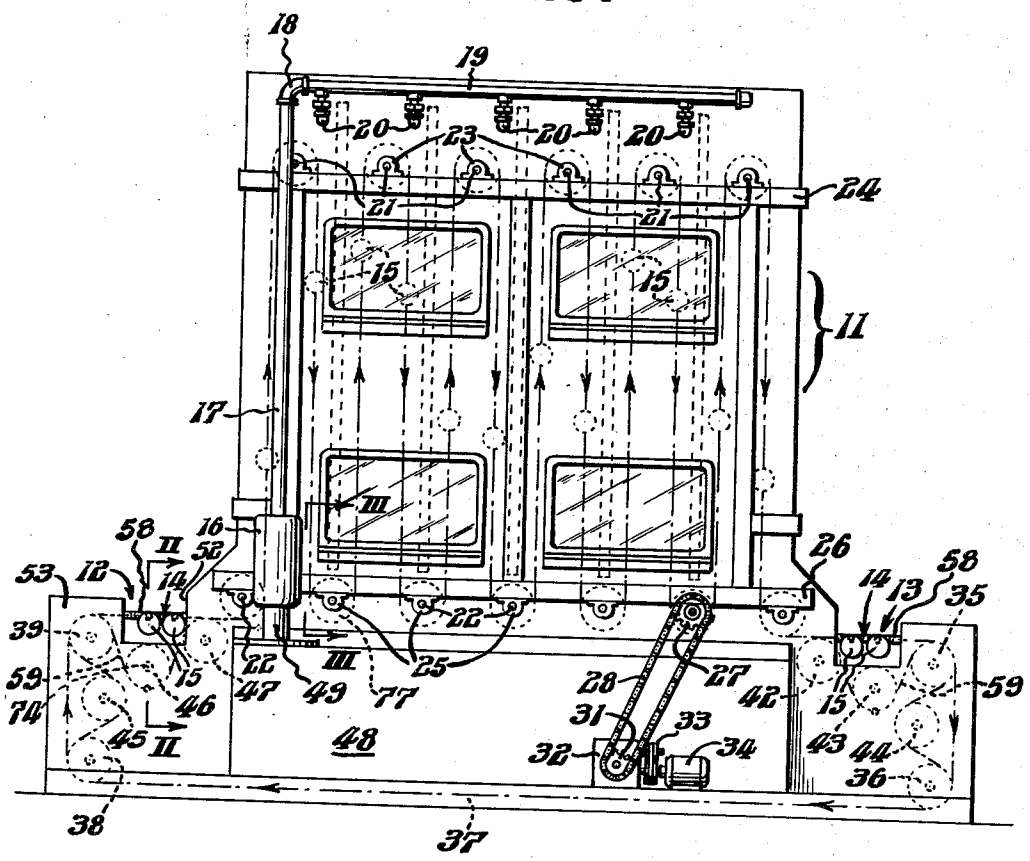
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TRAVELING GUARD CONVEYORIZED DEGREASER

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FIG. 1



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FIG. 2.

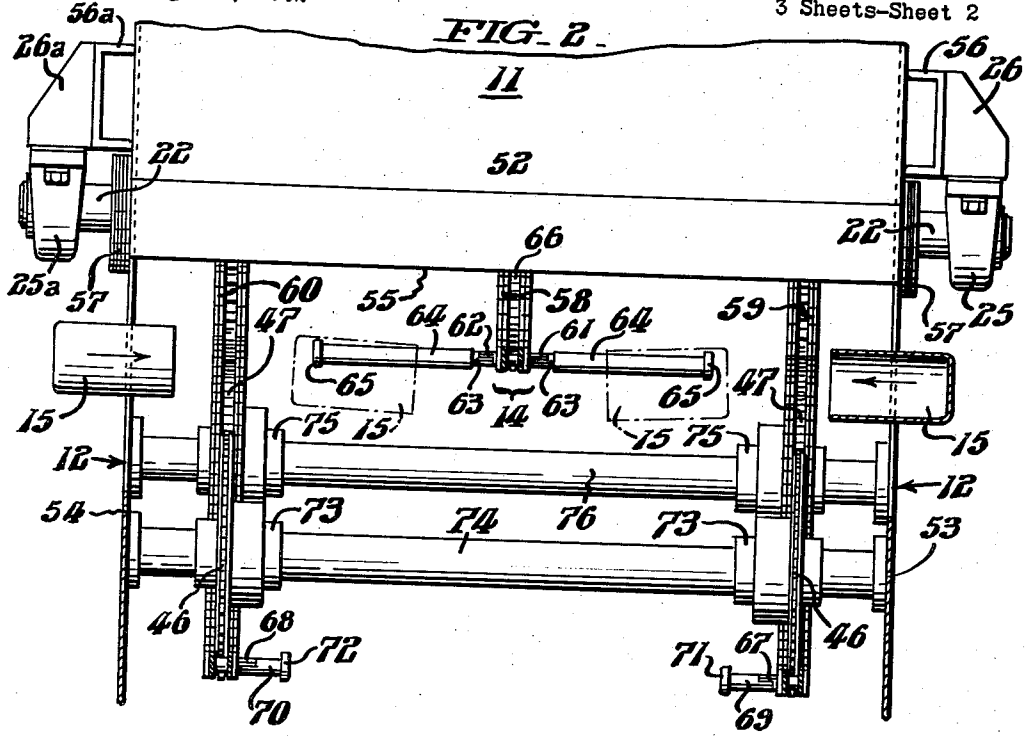
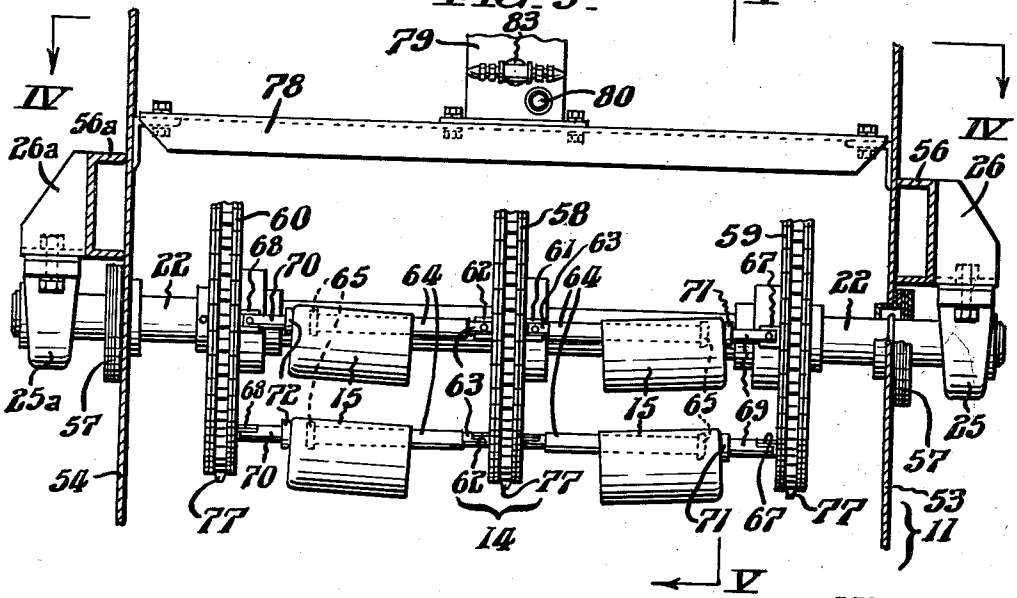


FIG. 3.



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FIG. 4.

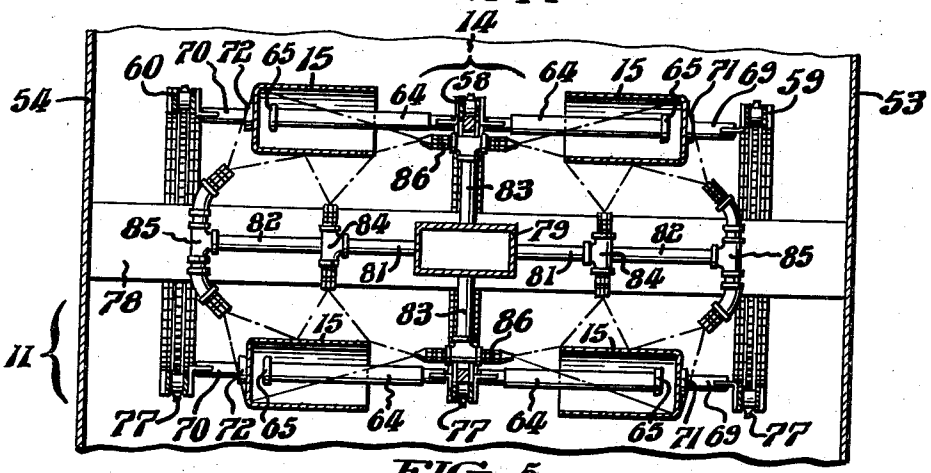
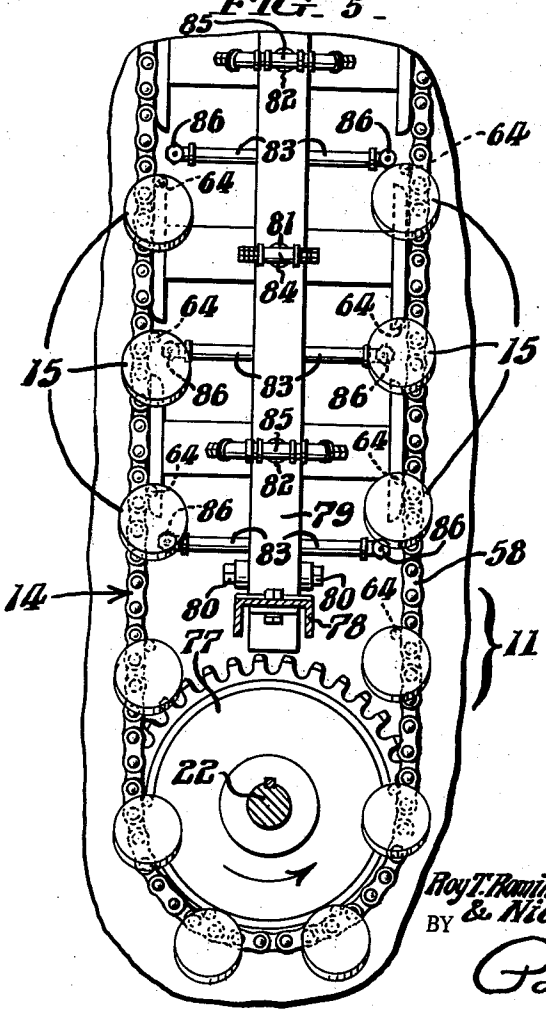


FIG. 5.



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TRAVELING GUARD CONVEYORIZED DEGREASER

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3 Claims. (Cl. 134—127)

This invention relates to commercial washing apparatus, and more particularly it relates to commercial washing apparatus for automatically washing a continuous supply of open ended containers.

Various forms of apparatus are known for use in the conveyorized washing within an enclosure of a continuous supply of articles to be washed, whereby the articles are brought in to one or more washing zones where washing by dipping, soaking, spraying, and subsequent drying may be accomplished without the necessity of manual handling during the successive process operations. In such apparatus, the peculiar construction of the article to be washed dictates the general construction of the conveying mechanism, for the obvious reason that complete washing must be accomplished to achieve an operable result. A particular problem in this respect is that class of articles which constitute containers or the like, and which have at least one opening formed therein, presenting the problem of effective cleaning of the open ended container on both the inside and outside thereof. Among such containers meeting the above specifications are can-type containers which have not been sealed, cups, bottles, and the like.

It is therefore an object of this invention to provide a conveyorized washing apparatus embodying a minimum of structural attachments, but adapted to permit the complete washing of a plurality of open ended containers, whereby maximum container size variation is permitted.

It is another object of this invention to provide such a conveyorized washing apparatus which is designed to reduce the possibility of breakdown due to article dislodgement during the washing process.

Another object of this invention is to provide such a conveyorized washing apparatus of a simplified design to facilitate the maintenance and repair thereof.

Another object of this invention is to provide such a conveyorized washing apparatus wherein visual inspection of the washing operation is facilitated during the process run.

Other objects and advantages of the apparatus of this invention will readily become apparent from a reading of the following description and drawings wherein:

FIG. 1 is a side elevational view showing a complete apparatus constructed in accordance with this invention, certain parts being shown schematically therein;

FIG. 2 is an enlarged sectional view taken along the lines and in the direction of the arrows II—II of FIG. 1, the parts thereof being shown in greater detail;

FIG. 3 is an enlarged sectional view taken along the lines and in the direction of the arrows III—III of FIG. 1;

FIG. 4 is a sectional view taken along the lines and in the direction of the arrows IV—IV of FIG. 3;

FIG. 5 is a sectional view taken along the lines and in the direction of the arrows V—V of FIG. 3.

Referring now to FIG. 1, there is shown generally a housing 11. The conveyorized washing apparatus constructed in accordance with this invention is contained primarily within the housing 11, portions thereof being exposed for view at a loading opening 12 and an unloading opening 13. The basic transporting element of the conveying apparatus is an endless roller chain 14, to be

described more fully hereinafter. Said roller chain 14 is adapted to receive a continuous supply of open ended articles 15 at the loading opening 12, and to discharge a corresponding supply of articles 15 at unloading opening 13. The path of the roller chain and accompanying open ended articles 15 through the housing 11, is plotted by means of the directional lines indicated in FIG. 1 by arrows. It is therefore seen that the roller chain 14 and accompanying articles 15 traverse a plurality of vertical flights within the housing 11 between the loading opening 12 and the unloading opening 13, during which traverse, the open ended articles are washed by a high pressure liquid spray, the spray being conducted into the housing 11 by means of a pump 16, conduit 17, elbow 18, header 19, and branch fixtures 20. A train of sprocket wheels (shown as dotted circles in FIG. 1) is utilized within the housing 11 to propel the roller chain 14, the sprocket wheel system being supported by means of a plurality of upper shafts 21 and lower shafts 22. Upper shafts 21 are in turn supported in bearings mounted externally of housing 11 within a plurality of upper pillow blocks 23, which are in turn supported by a horizontal rib 24. In like manner the lower shafts 22 are supported within bearings mounted in the lower pillow blocks 25, which are in turn supported by the horizontal rib 26.

Affixed to the end of one of the lower shafts 22 and keyed thereon is a driving sprocket 27, about which is trained a drive chain 28. Drive chain 28 is also trained about a pinion sprocket 31, which is in turn keyed to the output shaft of a gear reduction unit 32. Gear reduction unit 32 is driven through a magnetic clutch 33 by a variable speed motor 34.

The roller chain 14 is endless, and as shown in FIG. 1 returns from the unloading opening 13 to the loading opening 12 through the housing 11 by means of idling sprockets 35, 36, passageway 37, and idling sprockets 38, 39. Idling sprockets 35, 36, 38, 39 are rotatably mounted within housing 11. Idling sprockets 42, 43, 44, 45, 46, 47, the purpose of which will be hereinafter explained, are similarly rotatably mounted within housing 11. A sump tank 48 provides the supply of washing liquid for pump 16 through supply conduit 49, tank 48 extending within housing 11 in a manner such that it underlies the space traversed by the vertical flights of the roller chain 14, thereby serving to catch the washing liquid as it falls during the washing operation.

Referring now to FIG. 2, housing 11 is shown in greater detail and includes an end wall 52, front wall 53, and rear wall 54. The lower edge 55 of end wall 52 partially defines the unloading opening 12 (FIG. 1). The horizontal rib 26 is mounted on the front wall 53 by means of the channel member 56. A corresponding channel member 56*a* affixed to the rear wall 54 provides support for the corresponding horizontal rib 26*a*, which in turn supports a corresponding lower pillow block 25*a* within which one end of a lower shaft 22 is rotatably journalled. A pair of circular seals 57 provide the access of shaft 22 into the housing 11, and prevent vapors from the washing liquid from escaping therefrom.

Exposed to the loading opening 12 in FIG. 2 are three sections of roller chain 14, which constitutes the basic conveying mechanism of the apparatus of this invention. These sections comprise a central section 58, a front chain section 59, and rear chain section 60. Each chain section 58, 59, 60 proceeds continuously in a plane passing therethrough and perpendicular to the plane of the drawing. As the complete path of the roller chain 14 is shown schematically in FIG. 1, details thereof only are shown in FIGURES 2, 3, 4, and 5 with successive passages of the chain being essentially duplicates of these detailed showings. The central section 58 of the roller

chain is provided at equidistant lengths thereof with laterally extending attachments 61, 62. Each attachment 61, 62 has affixed thereto an extended pin 63, which pin is provided with a cover 64, which is preferably constructed from a non-corroding material such as plastic or the like. The distal end of each cover 64 is provided with an enlarged portion 65 thereof. The central section 58 of the roller chain 14 proceeds through the unloading opening 12 along a generally horizontal path from the idling sprocket 39 and is trained upwardly around the sprocket wheel 66, which is mounted centrally of the housing 11 on the lower shaft 22 and keyed thereon. It may thus be seen that in the position shown in FIG. 2, an open ended article 15 may be placed on each of the covers 64 of the extended pins 63 in the position outlined in broken lines in said figure.

The front chain section 59 and rear chain section 60 are likewise provided with attachments 67, 68 at the same linear spacing of attachments 61, 62, attachment 67 being provided with a hold down pin 69 and attachment 68 being provided with a hold down pin 70. Pins 69, 70 are covered with a non-corroding material such as plastic or the like, and have enlarged portions 71, 72 formed thereon. It is clear from FIGURES 2, 3, 4, that the chain sections 58, 59, 60 are maintained at a constant transverse spacing during the continuous traverse of the chain sections throughout the apparatus. The paths of each section follow generally parallel courses, however at the loading opening 12 and the unloading opening 13, the front chain section 59 and the rear chain section 60 are caused to depart from the path followed by the central chain section 58. This is accomplished by means of the idling sprockets 46 which are keyed to hubs 73 which are in turn rotatably mounted on shaft 74. The chain sections 59, 60 are next trained over identical sprockets 47, which are in turn keyed to hubs 75 and rotatably mounted upon shaft 76, whereby chain sections 59, 60 are returned to a parallel relationship to the path of chain section 58. The relationship of the extended pins 63 with the hold down pins 69, 70, is synchronized by proper orientation and timing of the chain sections 58, 59, and 60, whereby after passing the loading opening 12, the general arrangement of the conveying means has the appearance shown in FIG. 3. As shown therein the articles 15 are prevented from being dislodged from their position on the extended pin 63 by means of the closely opposed alignment of the corresponding hold down pins 69, 70.

Referring now to FIGS. 4 and 5, there is shown the apparatus as arranged for the spray washing of the articles 15 during the vertical traverse caused by the rotation of sprocket wheels 77. A transverse support 78 has mounted thereon a vertically oriented spray header 79 which is fitted at the lowermost extremity thereof with drain plugs 80.

The spray header 79 is supplied with washing liquid at the upper end thereof through one of the branch fixtures 20. This enables spray header 70 to supply washing liquid to a plurality of nozzle pipes 81, 82, 83, which communicate with the interior of spray header 79.

The nozzle pipes 81 supply the nozzle pairs 84. The nozzle pipes 82 supply the nozzle pairs 85, while the nozzle pipes 83 supply the nozzle pairs 86. From the plan views and elevational views of FIGS. 4 and 5, it is apparent that the spray piping and nozzle arrangement is designed to repeatedly subject all surfaces of the open ended articles 15 to the action of the washing liquid, the spray pattern being indicated by broken lines extending from the nozzle tips. It is also apparent from FIG. 4, which depicts an in process view of the apparatus, that while the spray action has lifted the container 15 from contact with the extended pins 63, the hold down pin 69, 70, prevents the containers 15 from fouling the mechanism of the apparatus, while at the same time allowing complete coverage of the spray pattern to insure effective washing action. It will be apparent that the relative length of the extended pins 63 and the hold down pins 69, 70 may be varied to suit the size and configuration of the open ended container 15 which is being processed on the conveying apparatus.

It will be readily apparent that the construction of the apparatus adjacent the unloading opening 13 is similar to that adjacent the loading opening 12, in that the front chain section 59 and rear chain section 60 are provided with similar means to alter their paths away from and below that of the center chain section 58, which permits the removal of the containers 15 at the completion of the washing process.

In utilizing the apparatus of the invention it is practicable to load articles 15 either manually or automatically and to unload them in a comparable manner, in accordance with the necessity of the individual operation.

Operation

The operation of the apparatus constructed in accordance with this invention is begun by first energizing pump 16, which supplies washing liquid to the nozzle pairs 84, 85, 86. Motor 34 is energized and its speed adjusted so as to drive the roller chains 14 at the desired rate of speed. Assuming that the apparatus is empty of articles to be washed, a supply of open ended articles 15 is made available manually or mechanically at the loading opening 12. During the passage of center chain section 58 through loading opening 12, open-ended articles 15 are placed on the extended pins 63 at either side of the central chain section 57 in the broken line position shown in FIG. 2. As the chain movement continues the hold down pins 67, 68 are brought into the position shown in FIG. 3, by the corresponding movement of chains 59, 60 thereby opposing any tendency for the containers 15 to become dislodged from the extended pins 63. This relative position of the extended pins 63 and the corresponding hold-down pins 67, 68 is maintained throughout the traverses of the chain sections 58, 59, 60 through the housing 11 during the exposure to the spray nozzles 84, 85, 86. Upon reaching the opening 13, the front chain section 59 and rear chain section 60 are deflected from the plane of the path followed by the central chain section 58, thereby removing the hold-down pins 67, 68, from their positions of close opposition to the extended pins 63, and thereby permitting manual or mechanical removal of the articles 15 from the apparatus.

It is to be understood that the form of this invention herewith shown and described is to be taken as a preferred embodiment. Various changes may be made in the shape, size and arrangement of parts. For example, additional housings similar to housing 11 may be added to the apparatus whereby diverse washing liquids may be used to treat the articles 15. Likewise, a housing similar to housing 11, but containing drying apparatus, may be added to the apparatus according to the principles defined herein. Furthermore, the apparatus of this invention may be utilized at one-half capacity by disposing containers 15 only between either chain pair 58—59 or chain pair 58—60, all without departing from the spirit or scope of the invention as defined in the subjoined claims.

Having thus described our invention we claim:

1. In a continuous conveyor, the combination of a support, a first endless flexible member mounted on said support and adapted to follow a definite course with respect to said support, individual attachment means affixed at spaced apart equidistant points throughout the length of said endless member and having a lateral extension formed thereon, said lateral extension being adapted to loosely receive an open ended container, thereon, a second endless flexible member mounted on said support and adapted to follow substantially the course followed by said first endless flexible member in a plane

parallel to the plane of the course of said first member, means affixed equidistantly throughout the length of said second endless member at the same spacing as said individual attachment means on said first endless member and adapted to closely oppose said lateral extension of said individual attachment means, drive means connected to each of said flexible members and adapted to drive said members in mutual synchronization, whereby open ended containers loosely disposed on said lateral extension are prevented from being dislodged therefrom by the close opposition of said means affixed to said second endless member.

2. The apparatus in accordance with claim 1, wherein said conveyor has disposed thereabout an enclosed housing, said housing having formed therein a pair of spaced apart openings, each opening exposing a portion of said first endless member, means positioned adjacent said openings for temporarily diverting said second endless member from the course followed by said first endless member when said drive means is actuated, whereby an open ended container may be moved through said opening and alternately onto and off of one of said individual attachments to said first endless member.

3. The apparatus in accordance with claim 2, including liquid spraying means mounted within said housing and adapted to direct a liquid spray in a locus surrounding the course of said attachments affixed to said first endless member, said lateral extension of said attachment having a pin-like configuration with an enlarged annular head portion at the distal end thereof.

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