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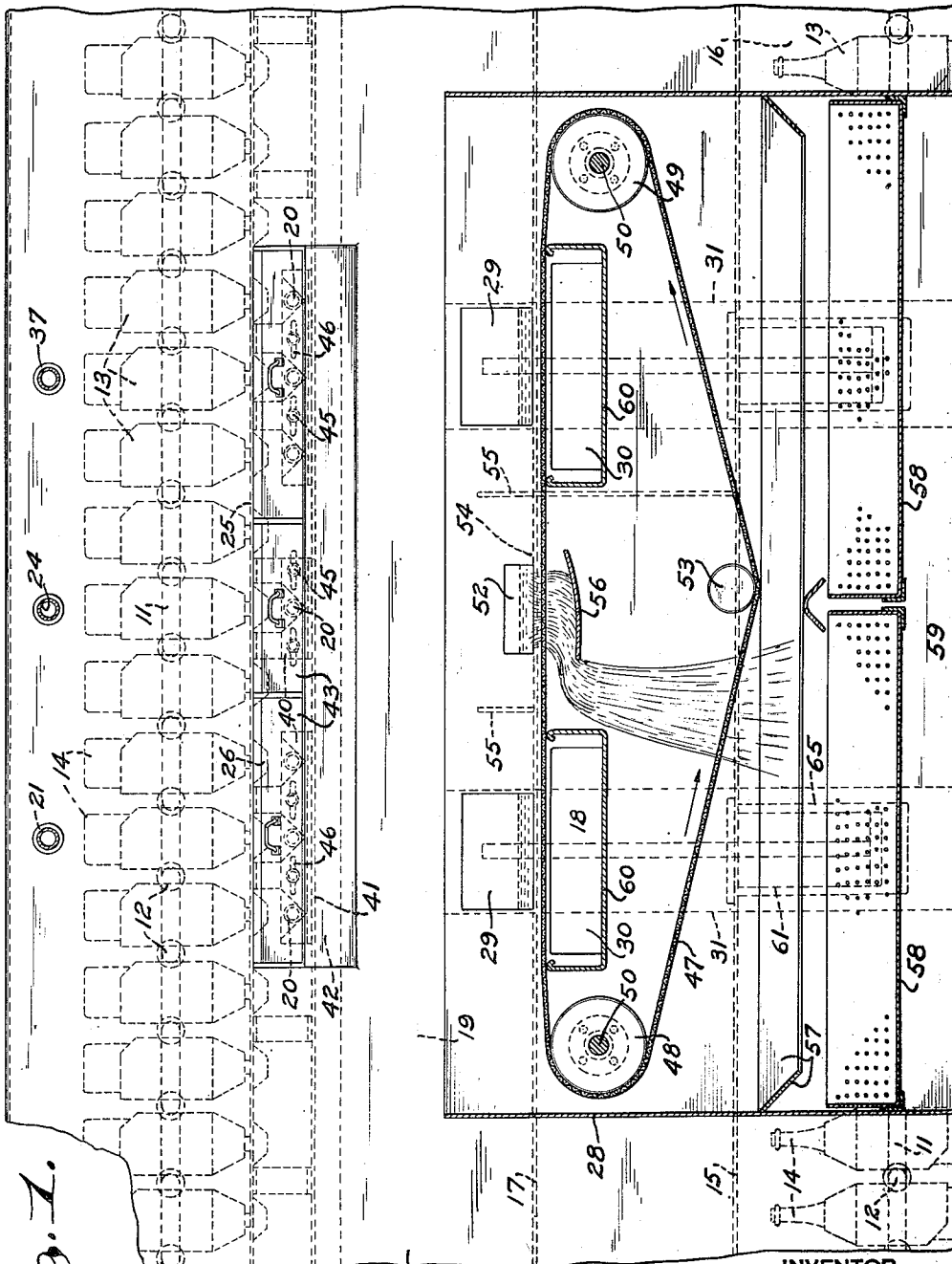
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BOTTLE WASHING APPARATUS

Filed April 3, 1940

2 Sheets-Sheet 1



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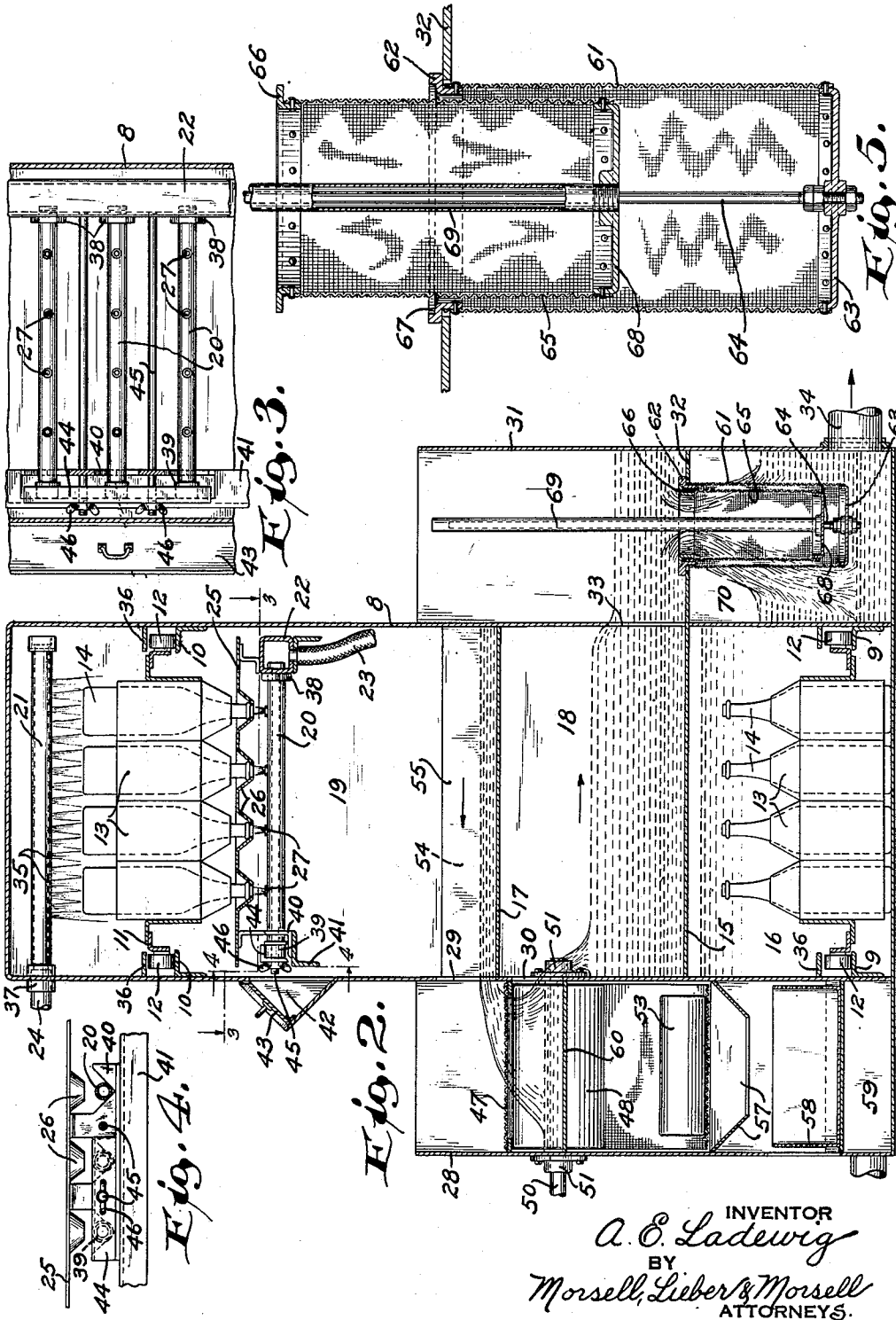
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UNITED STATES PATENT OFFICE

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BOTTLE WASHING APPARATUS

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4 Claims. (Cl. 141-7)

The present invention relates in general to improvements in the art of cleansing objects in succession, and relates more specifically to various improvements in the construction and operation of apparatus for washing bottles or the like.

Generally defined, an object of my invention is to provide various improvements in the details of construction of automatic bottle cleansing apparatus, whereby such mechanisms may be maintained in most effective operating condition with minimum effort and attention.

Some of the more important specific objects of the invention are as follows:

To provide new and useful means for removing debris and impurities from the cleansing liquid utilized in a receptacle washing assemblage.

To provide improved instrumentalities for collecting and for effecting removal of labels from the washing liquid which is being circulated through the label removing zone of a bottle washing machine or the like.

To provide an improved system for effecting recirculation of relatively clean liquid through the nozzles of an automatic bottle washing machine or the like.

To provide various improvements in the construction and operation of receptacle washing machines of the combined soaking and spray type, whereby the manufacture thereof is simplified, while the economy and efficiency is enhanced to a maximum.

These and other objects and advantages of the present invention will be apparent from the following detailed description.

A clear conception of the several features constituting the present invention, and of the mode of constructing and of operating bottle washing machines built in accordance with the improvement, may be had by referring to the drawings accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a fragmentary part sectional side view of an improved bottle washing machine, showing the improved assemblage for effecting insertion and removal of the nozzle pipes, and also showing the improved label removing apparatus in section;

Fig. 2 is a transverse vertical section through the portion of the machine shown in Fig. 1, but additionally revealing one of the improved liquid filtering assemblages;

Fig. 3 is a fragmentary top view showing sev-

eral of the jet delivery pipes and a structure for effecting insertion and removal thereof, the section through the main casing having been taken along the line 3-3 of Fig. 2;

Fig. 4 is a fragmentary side view of the assemblage shown in Fig. 3, the enclosing casing or housing having been eliminated, the view being taken along the line 4-4 of Fig. 2; and

Fig. 5 is an enlarged central vertical section through one of the liquid filtering units, showing the internal basket partially removed as when effecting removal of accumulated impurities.

Although the invention has been shown by way of illustration, as being specifically applied to a machine for automatically washing bottles of a particular type, by combined soaking and spraying action, it is not my desire or intent to unnecessarily restrict the scope or use of this invention by virtue of such specific embodiment.

Referring to the drawings, the improved bottle washing assemblage shown therein comprises in general an enclosing housing or casing 8 having therein sets of lower and upper horizontal rails 9, 10 respectively, which are connected by the usual upright and curved end rails to provide a pair of spaced continuous tracks; an endless bottle conveyor 11 having a succession of articulably interconnected rollers 12 coacting with the rails 9, 10, and also having successive sets of bottle carrier pockets 13 which are cooperable with bottles 14 and are intermittently movable along the continuous tracks by the conveyor 11; a lower transverse partition 15 spanning the casing 8 within the endless track and above the lower rail 9 to provide a soaking basin 16 through which the bottles 14 are transportable while in upright position; an upper transverse partition 17 spanning the interior of the casing 8 somewhat above the partition 15 but beneath the upper rails 10 to provide intermediate and upper chambers 18, 19 respectively; a plurality of lower and upper liquid distributing conduits or pipes 20, 21 respectively, of which the lower pipes 20 communicate with the usual liquid supply pump through a header 22 and connection 23 and are located beneath the rails 10, while the upper pipes 21 have supply connections 24 connected to the pump and are disposed above the rails 10 in vertical alinement with the pipes 20; an approximately horizontal bottle lifting and supporting plate 25 having a succession of conical sockets 26 cooperable with the heads of the bottles 14 while inverted to center the bottle openings relative to the orifices or nozzles 27 of the pipes 20; an improved label collecting and

removing assemblage having a casing 28 communicating at its upper portion through openings 30 with the chamber 18; and a pair of improved liquid filtering or straining assemblages each having a casing 31 divided by a partition 32 into upper and lower chambers, the upper of which communicates through an opening 33 with the main casing chamber 18, and the lower of which communicates through a pipe 34 with the suction inlet of the liquid circulating pump.

The mechanism for driving the endless conveyor 11 so as to transport the carrier pockets 13 and bottles 14 by successive steps, through the interior of the casing 8 and along the rails 9, 10, is of relatively old and well known construction, and this is also true of the pump for circulating liquid through the pipes 20, 21. While the lower pipes 20 are provided with nozzles 27 adapted to deliver jets of liquid upwardly into the lower openings of the inverted bottles 14 while at rest, the upper liquid supply pipes 21 are provided with orifices 35 adapted to deliver sprays of liquid downwardly over the bottles 14 during transportation thereof along the rails 10 and while the nozzles 27 are delivering jets into the bottles. The bottle soaking basin 16 which is located in the lower portion of the main casing 8, and through which the successive bottles 14 are transported before being subjected to jet and spray washing and rinsing, is normally supplied with an abundant quantity of soaking solution; and the guide rails 9, 10 are preferably provided with guards 36 for maintaining the rollers 12 in coaction with the track.

It is desirable to have the liquid supply and distributing pipes 20, 21 quickly and conveniently accessible for inspection and cleaning especially when the cleansing liquid is being recirculated; and the upper pipes 21 which are fixedly located within the casing 8, are preferably connected to the supply pipes 24 by means of detachable couplings 37, so that detachment of the pipes 24 will permit ready cleaning of the interiors of the pipes 21 and orifices 35. The lower pipes 20 however communicate with the header 22 which is housed within the casing 8, and because of this fact, and also because these pipes 20 are subject to considerable debris deposit and must also be externally cleaned, special means for effecting quick removal of the pipes 20 have been provided. The pipes 20 may be arranged in groups, and the inlet ends of the pipes 20 are provided with screw threads and stop nuts 38 coacting with the header 22, while the opposite ends of these pipes 20 are closed by pipe caps 39 and rest in V-notches formed in several supporting plates 40 which are mounted upon a horizontal angle beam 41 fixedly secured within the casing 8, see Figs. 2, 3 and 4. The fixed bottle elevating, guiding and centering plate 25 may be supported from the header 22 and from the pipe supporting plates 40, as shown, and the main casing 8 is provided with an elongated side opening 42 which is normally closed by removable covers 43, so that removal of one of the covers 43 will give access to one group of pipes 20. An angle bar 44 coacts with the closure caps 39 of each group of pipes 20, and each angle bar 44 is clamped against the caps of its group by means of threaded rods 45 secured to the header 22 and penetrating the adjacent plate 40, and by nuts 46 coacting with the rods 45. Obviously, by removing the covers 43 and releasing the thumb nuts 46, the angle bars 44 may be withdrawn, whereupon the pipes 20 may be unscrewed from

the header 22 and removed from within the casing 8.

Liquid is constantly being delivered into the washing chamber 19 by the pipes 20, 21 through the nozzles 27 and orifices 35, and labels and other debris are being removed from the bottles 14 and deposited in the bottom of the chamber 19 with the wash water. In order to permit clarification of the liquid for subsequent re-use, it is desirable to first remove the labels and the bulk of the debris, and this is accomplished by the improved label remover housed within the auxiliary casing 28. Confined within the casing 28, is an endless flexible screen 47 which coacts with pulleys 48, 49 carried by shafts 50 journaled in bearings 51, and one of these shafts 50 is being constantly rotated during normal operation of the machine so as to impart motion to the screen 47. The upper stretch of the screen 47 is disposed slightly below and in close proximity to the main casing openings 29 and an intermediate opening 52, and a relatively heavy roller 53 rests upon the lower stretch of the screen belt so as to maintain the upper stretch taut at all times, see Fig. 1. The medial opening 52 communicates with a trough 54 formed by two upright partitions 55 and to which relatively clean liquid is supplied, and the liquid discharged onto the screen 47 through the opening 52, passes through the upper stretch and is deposited upon a distributing plate 56 from whence it is cascaded through the lower stretch so as to wash the adhering labels and debris therefrom. The lower interior portion of the casing 28 is provided with an apron 57 and with removable perforated drawers 58, the former of which guides the label laden liquid into the latter, and the latter of which collect the debris while permitting the liquid to escape to the chamber 59 from whence it is removed by the circulating pump. The openings 29 deliver the label laden liquid to the endless screen 47, above transverse liquid collecting boxes or troughs 60 which catch the separated liquid, while the labels stay upon the screen belt to be subsequently removed into the drawers 58. The troughs 60 communicate through the openings 30, with the intermediate chamber 18 of the casing 8, and the liquid flowing through the chamber 18 is initially purified by removal of the labels and other debris, and is delivered by gravity into the auxiliary casings 31 through the openings 33.

After the liquid has been screened for initial removal of the labels and debris, it should preferably be further clarified before recirculation thereof by the pump, and this further clarification or filtering is accomplished with the apparatus confined within the casings 31. Each of the final clarifiers comprises an outer filtering cup or basket 61 having a top supporting ring 62 which rests upon the adjacent transverse partition 32, and also having a bottom 63 provided with a fixed upstanding guide rod 64; and an inner filtering cup or basket 65 disposed concentric with respect to the basket 61 and having a top supporting ring 66 coacting with a circular recess 67 in the ring 62, and also having a bottom 68 provided with an upstanding central tube 69 embracing the guide rod 64. The interior of each inner basket 65 is in constant open communication with the chamber 18 through the opening 33 above the adjacent partition 32, and the exterior of the outer basket 65 of each set is in communication with the pump suction pipe 34 through a chamber 70 below the partition 32. The liquid level within the casing

31 above the partition 32 can never rise over the top of the open casing; and the inner basket 65 may be removed from within the outer basket 61 without disturbing the latter, with the aid of the tube 69, as shown in Fig. 5. After the inner basket 65 has been thus removed, the outer basket 61 may also be freely vertically removed from within the casing 31 with the aid of the rod 64, thus permitting convenient removal of both baskets 61, 65 for periodic inspection and cleaning.

While the normal operation of the improved bottle washing apparatus should be rather apparent from the foregoing detailed description, a short résumé of this operation will be given. When the bottle washer is operating in a normal manner, the successive dirty bottles are loaded into the successive groups of carrier pockets 13 at the inlet end of the machine, and the bottles 14 are first transported in upright position through the soaking basin 16, after which they are inverted and are carried forwardly over the elevating and centering plate 25. The advancement of the conveyor and of the carrier pockets 13 is by intermittent steps, so that the bottles 14 are subjected to internal washing only when the heads of the bottles are in the recesses 26 and while the bottles are stationary. When the bottles 14 are thus positioned, jets of cleansing liquid are delivered upwardly through the nozzles 27 into the interiors of the bottles, and the exteriors thereof are simultaneously subjected to external sprays of liquid delivered from the orifices 35. This external washing removes the labels and the label laden liquid is discharged by gravity from the washing zone and drops into the bottom of the chamber 19. From the bottom of the chamber 19, the label laden liquid flows through the openings 29 onto the endless screen 47, as illustrated in Fig. 2, and the liquid passes through the screen 47 while the labels are carried from the upper stretch of the screen around the pulley 48 and are deposited into the drawers 58. If the labels are not removed by gravity, the relatively fresh liquid passing through the screen 47 from the trough 56 and through the opening 52, will positively flush the labels off of the screen and into the drawers 58. In the drawers 58, the labels will accumulate while the entrained liquid passes through the perforations in the drawers and into the chamber 59 from whence the liquid is removed by the pump. The accumulated labels may be periodically removed by removal of the drawers 58, and the apron 57 will insure delivery of the labels into these drawers. The liquid which passes through the belt screen 47 at the openings 49, is deposited into the troughs 36 from whence it flows through the chamber 18 and through the opening 33 into the filter casing 31, see Fig. 2. From the filter casing 31 the liquid passes downwardly through the inner basket 65 and through the outer basket 61, into the chamber 70 from whence it is removed by the pump through the suction connection 34. The same action takes place in each of the filter casings 31, and the baskets 65, 61, which may be provided with filtering material of different mesh, effectively remove the finer impurities and deliver relatively clean water to the chamber 70.

From the foregoing detailed description it will be apparent that the liquid which is being constantly circulated through the washer by the circulating pump, is maintained in relatively clean condition at the washing nozzles at all times. The label removing apparatus is visible through the open upper end of the auxiliary casing 28, 75

at all times, and if the labels are not completely removed by the liquid passing through the screen 47 from the opening 52, the adhering labels may be manually removed. The filtering unit is also constantly visible through the open upper end of the auxiliary casing 31, and either or both of the baskets 61, 65 may be removed at any time for inspection and cleaning. The interiors of the pipes 21 are accessible by detachment of the couplings 37, and the pipes 20 may be readily removed for inspection and cleaning by merely removing the closure covers 43 and by releasing the thumb nuts 46. The single endless screen 47 derives labels from a plurality of sources within the washer, and relatively clean liquid from the washing zone is utilized to remove all of the labels from the separating screen. All portions of the apparatus are therefore readily accessible and removable, and may be replaced in operative condition with minimum loss of time.

It will therefore be apparent that my present invention provides various improvements in the details of construction and operation of bottle washing machines, whereby such mechanisms may be readily maintained in most effective operating condition with minimum loss of time, and with minimum effort on the part of the attendant. The cleansing mechanisms function automatically to maintain the liquid in substantially clarified condition, and the removed solids such as labels and other particles, may be conveniently removed from the machine at any time, without necessarily interfering with the operation of the bottle washing mechanism. The fresh liquid which is used for final rinsing of the washed bottles, is subsequently used for final external and internal washing, and for removing the debris from the screen 47, thereby permitting operation of the washer with a minimum supply of fresh water. The entire assemblage is obviously simple, compact and efficient in operation, and can be installed in various types of washers at moderate cost. The cup filters 61, 65 which are suspended from the partition 32 and depend into the chamber 70, insure and maintain sufficient head of liquid in the chamber 70 at all times to prevent breaking of the pump section, and these filters may be removed either successively or simultaneously. The improvement has proven highly satisfactory in actual commercial use, and while the improved features have been shown as being applied to a bottle washer of a particular type, these features are obviously more generally applicable to various types of bottle washing mechanisms.

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

I claim:

1. In a receptacle washer, a main casing having a receptacle washing zone therein, means for subjecting receptacles to liquid within said zone, an auxiliary casing connected to and in communication with the main casing to receive spent washing liquid from several spaced portions of said zone, an endless screen operating entirely within said auxiliary casing for receiving the spent washing liquid to separate debris from the liquid, means coacting with said screen to maintain the screening portion thereof taut, and means within said casings for delivering

liquid from another portion of said zone reversely through said screen to remove debris therefrom.

2. In a receptacle washer, a main casing having a receptacle washing zone therein, means for subjecting receptacles to liquid washing action within said zone, an auxiliary casing connected to and in communication with the main casing to receive spent washing liquid from said zone, an endless screen operating entirely within said auxiliary casing and having an upper stretch for receiving the spent washing liquid and for separating debris from the liquid, means for constantly advancing said screen to present new portions thereof to the liquid for separating purposes, and means for delivering liquid from said zone reversely through the lower stretch of said screen to remove the debris therefrom.

3. In a receptacle washer, a main casing having a receptacle washing zone therein, means for subjecting receptacles to liquid washing action within said zone, an auxiliary casing connected to and in communication with the main casing to receive spent washing liquid from said zone, a continuously travelling endless screen operating entirely within said auxiliary casing

and having an upper stretch for removing debris from the spent washing liquid delivered from said zone, a roller coacting with an inner face of the lower stretch of said screen for continuously maintaining the upper stretch thereof taut, and means for delivering relatively clean liquid from said zone through the lower stretch of said screen to remove debris therefrom.

4. In a receptacle washer, a main casing having a receptacle washing zone therein, means for subjecting receptacles to liquid washing action within said zone, an auxiliary casing connected to and in communication with the main casing to receive spent washing liquid from said zone, a continuously travelling endless screen entirely within said auxiliary casing and having an upper stretch provided with spaced portions for removing debris from the spent washing liquid delivered from said zone, means for delivering relatively clean liquid from said zone through the lower stretch of said screen to remove debris therefrom, and a removable means within the auxiliary casing for collecting the removed debris.

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