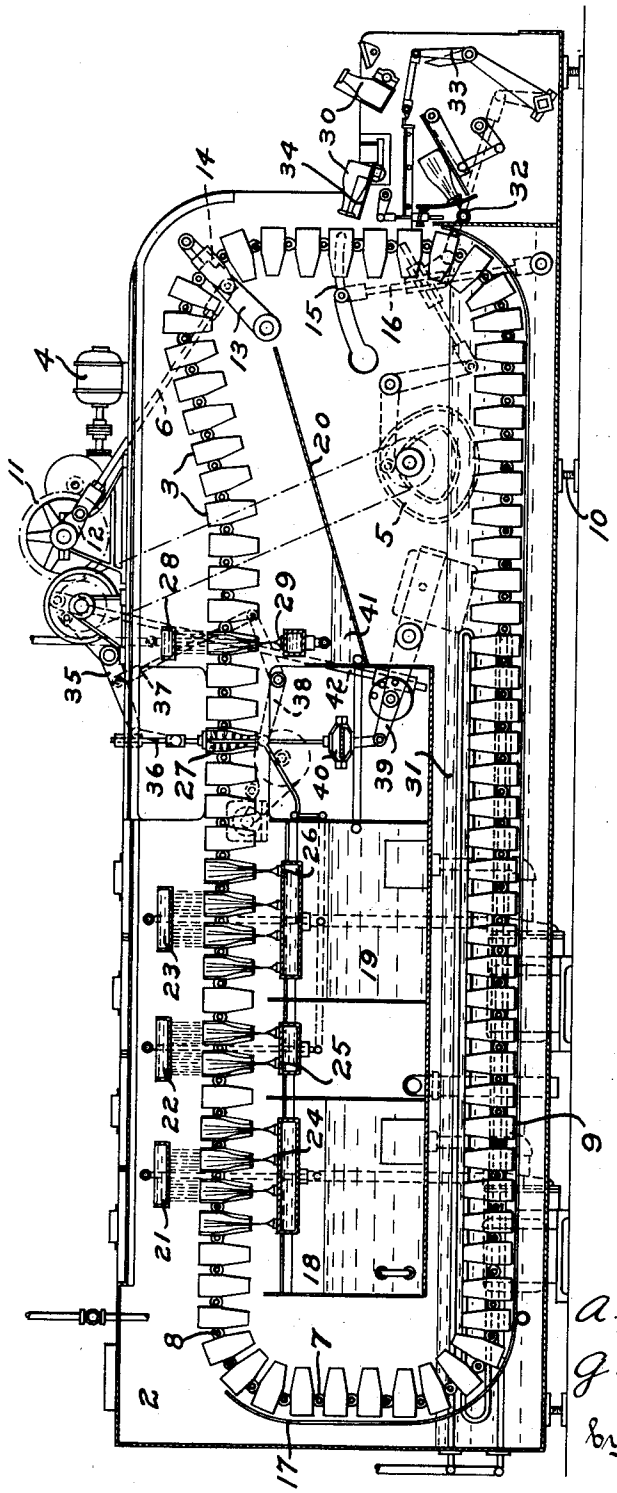
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BOTTLE WASHER

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## BOTTLE WASHER

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The present invention relates in general to improvements in the art of cleansing receptacles, and relates more specifically to an improved apparatus for automatically and effectively washing, sterilizing and rinsing a succession of milk bottles or the like.

A general object of the invention is to provide new and useful improvements in the art of cleaning milk bottles or the like, whereby a single compact machine may be utilized to automatically and effectively clean a succession of the receptacles, regardless of the nature of the impurities deposited thereon.

It has been common practice in the prior art of bottle washing, to utilize either one of two well known types of machines for the purpose of internally cleansing the bottles. These types may for reference purposes be designated as the spray machine and the brush machine, in both of which the bottles may be loaded and unloaded either at the same or at opposite ends of the machine, depending upon the selected design. In the spray machine, the bottles after having been immersed within and thus subjected to the soaking action of a suitable solution such as hot caustic soda for the purpose of initially loosening the dirt, are subjected internally to the action of spray jets for the purpose of finally removing the loose impurities. While this particular type of machine is relatively effective when treating bottles coated with ordinary grit, it is not efficient in the treatment of receptacles coated with oily or greasy substances. In the brush machine, the bottles are likewise initially subjected to the soaking action of hot caustic soda or the like, but are subsequently internally subjected to the cleansing action of rotary or otherwise movable brushes. Although this particular type of machine is effective for the purpose of loosening and partially removing oil and grease, when the brushes are new or perfectly clean, the greasy substances soon accumulate upon the brushes in sufficient quantities to prevent the brushes alone from effecting the desired final cleansing. Even jet washing followed by brush washing, either with or without initial soaking, will not insure proper removal of filth from receptacles such as milk bottles. Milk bottles in particular, are frequently put to many uses other than that for which they are intended, and the problem of thoroughly cleansing such bottles prior to refilling the same with milk, is extremely difficult.

It is a more specific object of the present invention to provide a single relatively simple and compact machine which is adapted to rapidly, automatically and effectively clean milk bottles or the like. In accordance with the present improvement, the successive bottles are subjected to both brush and jet cleansing in a manner whereby all filth is most effectively removed. The invention provides for initial removal of greasy substances by soaking and subsequent brush cleansing, and also provides for final removal of the remaining dirt by further soaking and subsequent jet washing. In accordance with the improvement, the bottles may be admitted and discharged either at the same or opposite ends of the single machine wherein complete cleansing is effected. The bottles may be transported several times along the same path by the same transporting mechanism, and are treated each time for the removal of filth deposits having different characteristics and requiring different methods of treatment for their removal, thus insuring thorough cleansing.

Some of the novel features of bottle washer structure disclosed but not specifically claimed herein, form the subject of copending applications Serial No. 179,424, filed March 30, 1927; Serial No. 337,312, filed February 4, 1929; and Serial No. 337,313, filed February 4, 1929.

A clear conception of the details of construction of one type of milk bottle washer embodying the present improvement, may be had by referring to the drawing accompanying and forming a part of this specification in which the various parts have been designated by suitable reference characters.

The single figure of the drawing is a somewhat diagrammatic longitudinal verti-

cal section through a milk bottle washing machine of the type wherein the successive bottles are loaded and unloaded at the same end of the machine. It is to be understood, however, that the invention is not confined to this particular type of washer, and is in fact capable of more general application.

The machine illustrated in the drawing comprises in general, a main housing or casing 2 having a soaking liquid basin 31 in the lower portion thereof; an endless series comprising an odd number of transverse rows of bottle carriers or pockets 3 intermittently movable by equal steps along a closed circuit within the casing 2; loading and unloading mechanism located at the same end of the casing 2, for delivering milk bottles 30 or the like to and from the successive carrier pockets 3; a plurality of nozzles 24, 25, 26, 29 formed to deliver jets of cleansing fluid into the interiors of bottles 30 supported by the holders or pockets 3; a scrubbing device or brushes 27 movable into and out of and rotatable within bottles 30 supported by the carrier pockets 3; and mechanism for automatically actuating or driving the various movable elements of the structure.

The main casing 2 may be supported upon adjustable jacks 10 for properly alining the casing, and the soaking basin 31 is preferably supplied with liquid such as caustic soda solution which may be heated by means of steam admitted to a coil extending through the liquid, as shown. Located within the basin 31, is a horizontal bottle retaining plate 9 which serves to maintain the bottles 30 within the pockets 3 passing directly over the plate and through the solution, and the plate 9 may be provided with an upwardly extending end wall 17 at the rear of the casing.

The endless series of transverse rows of pockets 3 are secured to the links of endless chains 7 having carrier rollers 8 coacting with tracks fastened to the opposite sides of the casing 2, the series being intermittently movable along these tracks by means of an oscillatory latch 14 which is cooperable with alternate rollers 8 so as to advance the series a distance equal to double the distance between successive rows, during each forward throw of the latch 14. As previously indicated, the lower run of the endless series of rows of pockets 3, is immersed and movable within the soaking solution in the basin 31, and the upper run of the series, is movable forwardly some distance above the lower run, but still entirely within the casing 2. Located within the casing 2 between the upper and lower runs of the series of pockets 3, is a set of auxiliary liquid drainage basins 18, 19, 41 adapted to catch liquid which drops from the inverted bottles during spray washing and rinsing thereof by the nozzles 24, 26, 29 respectively, and an inclined plate 20 for protecting the finally cleansed bottles 30 from fumes rising from the soaking basin 31. The basins 19, 41 are connected by a horizontal tube 41′ for permitting free drainage of liquid from the basin 41 into the basin 19.

The nozzles 24, 25, 26, which are shown diagrammatically only, may be of any of the well known types customarily used in machines of this character, and are adapted to deliver jets of cleansing fluid into the interiors of all of the bottles 30 being transported thereabove by the upper run of the conveyor.

Located above each set of spray nozzles 24, 25, 26 and above the upper conveyor run, is a series of spray devices 21, 22, 23, these devices being adapted to spray the exteriors of all of the bottles 30 being transported therebelow by the upper run of the conveyor. The final rinsing nozzles 29 cooperate with a set of external spray devices 28 disposed thereabove, to internally and externally rinse the bottles 30 being transported by alternate rows of pockets 3 of the series, prior to final delivery thereof from the machine. The complementary sets of spray devices 21, 23, 28 and nozzles 24, 26, 29, may be supplied with cleansing liquid from the basins 18, 19, 41 located directly therebeneath, and the liquid after leaving the bottles 30 will drain back into the respective basins for reutilization.

The scrubbing devices or brushes 27 are movable upwardly into the inverted bottles 30 only during their first transportation through the endless circuit, and after the first immersion thereof in the liquid of the basin 31. The brushes 27 are vertically reciprocable by means of one or more levers 39 operable by means of connections 42 driven from a suitable power source, and having adjustable counter balancing weights associated therewith. While the brushes 27 are cooperating with the interiors of the bottles from beneath, the bottles 30 are being held within their respective transporting pockets 3 by means of plungers 36 coacting with the upper ends of the bottles. These plungers 36 are resiliently restrained, and are operable by means of one or more levers 35, to automatically resiliently clamp the bottles within the pockets 3 when the brushes 27 are elevated, and to subsequently release the bottles when the brushes 27 are lowered. The brushes 27 may be rotated about their own axes while within the bottles, in order to enhance the scrubbing action, and cleansing liquid from the basin 19 may be injected into the bottles while the brushes are operating therein, by means of movable nozzles which are moved with the brushes by levers 38 and connections 37.

The dirty bottles 30 before being delivered

into the alternate rows of empty pockets 3 by means of an automatic loading mechanism 33, are pre-rinsed by means of fluid injection nozzles 32. The finally cleansed bottles 30 contained in the alternate rows of pockets 3, after having been subjected to final rinsing by the spray devices 28 and nozzles 29, are delivered from these pockets by means of push arms 15 carried by oscillatory arms 16. The push arms 15 unload the clean bottles 30 onto righting mechanism 34 which delivers the bottles to a transverse conveyor. The loading and unloading mechanisms which are located at the same end of the machine, are automatically operable by means of cam mechanism 5 driven through chain gearing from the same shaft which actuates the brushes 27. A single electric motor 4 may be utilized to drive gearing 11 for driving the loading and unloading mechanism, the brush mechanisms, and a crank 12 for imparting motion through a connecting rod 6 and arm 13 to the conveyor actuating latch 14 previously referred to.

During normal operation of the improved bottle washer, the dirty bottles 30 after having been pre-rinsed, are loaded into the alternate rows of empty pockets 3 as they are presented in line with the loading mechanism 33. The loaded pockets 3 are then submerged in the soaking liquid in the basin 31 thereby initially loosening the dirt. The bottles are eventually inverted and presented to initial external and internal spray and jet washing by the devices 21, 22, 23 and nozzles 24, 25, 26. The initially washed bottles are next subjected to internal scrubbing by the brushes 27, whereupon they are transported past the devices 28, the nozzles 29 and the unloading and loading mechanisms, and are returned to the soaking basin 31 for a second treatment therein.

After the second removal of the partially washed bottles 30 from the basin 31, they are again subjected to external and internal washing by the devices 21, 22, 23 and nozzles 24, 25, 26. Upon leaving the last set of devices 23 and nozzles 26, the bottles are transported past the brush mechanism without being subjected to scrubbing, and are next presented to external and internal final rinsing by the devices 28 and nozzles 29, whereafter the clean bottles are unloaded and the empty pockets immediately re-loaded with dirty bottles.

Due to the use of an odd number of rows of pockets 3, and mechanism which advances the rows double the distance between successive rows, during each advancement, all bottles admitted to the machine, must travel twice around the circuit and be subjected to all of the foregoing cleansing steps. All varieties of dirt and filth are thus effectively removed, and the bottles are discharged in perfectly clean and sterile condition. The machine is obviously extremely compact and has thoroughly demonstrated its ability to thoroughly cleanse a large number of bottles in a minimum period of time without danger of breakage of the bottles. The advantages of both the spray and brush types of machines, are secured in a single machine which occupies no greater floor space than either of the prior types, and the invention can obviously be applied to machines in which loading and unloading is effected either at the same or opposite ends of the washer. The entire operation of the machine is automatic and requires minimum expenditure of power.

It should be understood that it is not desired to limit the invention to the precise details of construction of the machine herein shown and described, for obvious modifications may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:—

1. In combination, an intermittently driven endless conveyor having an odd number of successive rows of bottle carrier pockets forming superimposed oppositely moving stretches along which bottles are successively transportable, a casing forming a liquid basin through which the bottles are carried by the lower conveyor stretch, brush means cooperable only with alternate pocket rows during periods of rest of the conveyor for scrubbing the interior of some of the bottles while traversing the upper conveyor stretch, spray means cooperable during the same conveyor cycle only with the intermediate pocket rows during periods of rest of the conveyor for delivering liquid against the interior of others of the bottles while traversing another portion of the upper conveyor stretch, and means for actuating said conveyor to successively advance said pockets by steps equal to twice the distance between rows so as to subject the bottles to initial soaking within said basin, to the action of said brush means, to final soaking within said basin, and to the action of said spray means.

2. In combination, an intermittently driven endless conveyor having an odd number of successive rows of bottle carrier pockets forming superimposed oppositely moving stretches along which bottles are successively transportable, a casing forming a liquid basin through which bottles are carried by the lower conveyor stretch, spray means cooperable with all pocket rows for delivering washing liquid against the interior of all bottles while traversing one portion of the upper conveyor stretch, brush means cooperable during each conveyor cycle only with alternate pocket rows during periods of rest of the conveyor for scrubbing the interior

of some of the bottles while traversing another portion of the upper conveyor stretch, other spray means cooperable during the same conveyor cycle only with the intermediate pocket rows during periods of rest of the conveyor for delivering rinsing liquid against the interior of other bottles while traversing still another portion of said upper conveyor stretch, and means for actuating said conveyor to successively advance said pockets by steps equal to twice the distance between rows so as to subject the bottles to initial soaking within said basin, to the action of said washing spray means and brush means, to final soaking within said basin, and to the action of said washing spray means and rinsing spray means.

3. In combination, an intermittently driven endless conveyor having an odd number of successive rows of bottle carrier pockets forming superimposed stretches along which bottles are successively transportable in opposite directions, a casing forming a liquid basin through which the bottles are carried in upright position by the lower convenor stretch, brush means cooperable only with alternate pocket rows during periods of rest of the conveyor for scrubbing the interior of some of the bottles while inverted and disposed upon the upper conveyor stretch, spray means cooperable during the same conveyor cycle only with the intermediate pocket rows during periods of rest of the conveyor for delivering liquid against the interior of others of the bottles while inverted and disposed upon another portion of the upper conveyor stretch, and means for actuating said conveyor by steps equal to twice the distance between rows so as to successively subject the bottles while at rest to initial soaking within said basin, to the action of said brush means, to final soaking within said basin, and to the action of said spray means.

4. In combination, an intermittently driven endless conveyor having an odd number of successive rows of bottle carrier pockets forming superimposed oppositely moving stretches along which bottles are successively transportable, a casing forming a liquid basin through which the bottles are carried in upright position by the lower conveyor stretch, spray means cooperable with all pocket rows for delivering washing liquid against the interior of all of the successive bottles while inverted and disposed upon one portion of the upper conveyor stretch, crush means cooperable during each conveyor cycle only with alternate pocket rows during periods of rest of the conveyor for scrubbing the interior of some of the bottles while inverted and disposed upon another portion of the upper conveyor stretch, other spray means cooperable during the same conveyor cycle only with said intermediate pocket rows during periods of rest of the conveyor for delivering rinsing liquid against the interior of other bottles while inverted and disposed upon still another portion of said upper conveyor stretch, and means for actuating said conveyor step by step and by increments equal to twice the distance between rows so as to successively subject the bottles while at rest to initial soaking within said basin, to the action of said washing spray means and brush means, to final soaking within said basin, and to the action of said washing spray means and rinsing spray means.

5. In combination, an intermittently driven endless conveyor having an odd number of successive rows of bottle carrier pockets forming upper and lower oppositely moving stretches along which bottles are successively transportable, a casing having therein a liquid basin through which the bottles are carried by the lower conveyor stretch, brush means cooperable with alternate pocket rows during periods of rest of the conveyor for scrubbing the interior of the bottles carried by said alternate rows while traversing the upper conveyor stretch, spray means cooperable during the same conveyor cycle with the intermediate pocket rows during periods of rest of said conveyor for delivering liquid against the interior of the bottles carried by said intermediate rows while traversing another portion of the upper conveyor stretch, and means for actuating said conveyor to successively advance said pockets by steps equal to twice the distance between successive rows so as to subject the bottles to initial soaking, to the action of said brush means, to final soaking, and to the action of said spray means.

In testimony whereof, the signatures of the inventors are affixed hereto.

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