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NOZZLE FOR WASHING BOTTLES

1,978,721

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Fig. 1.

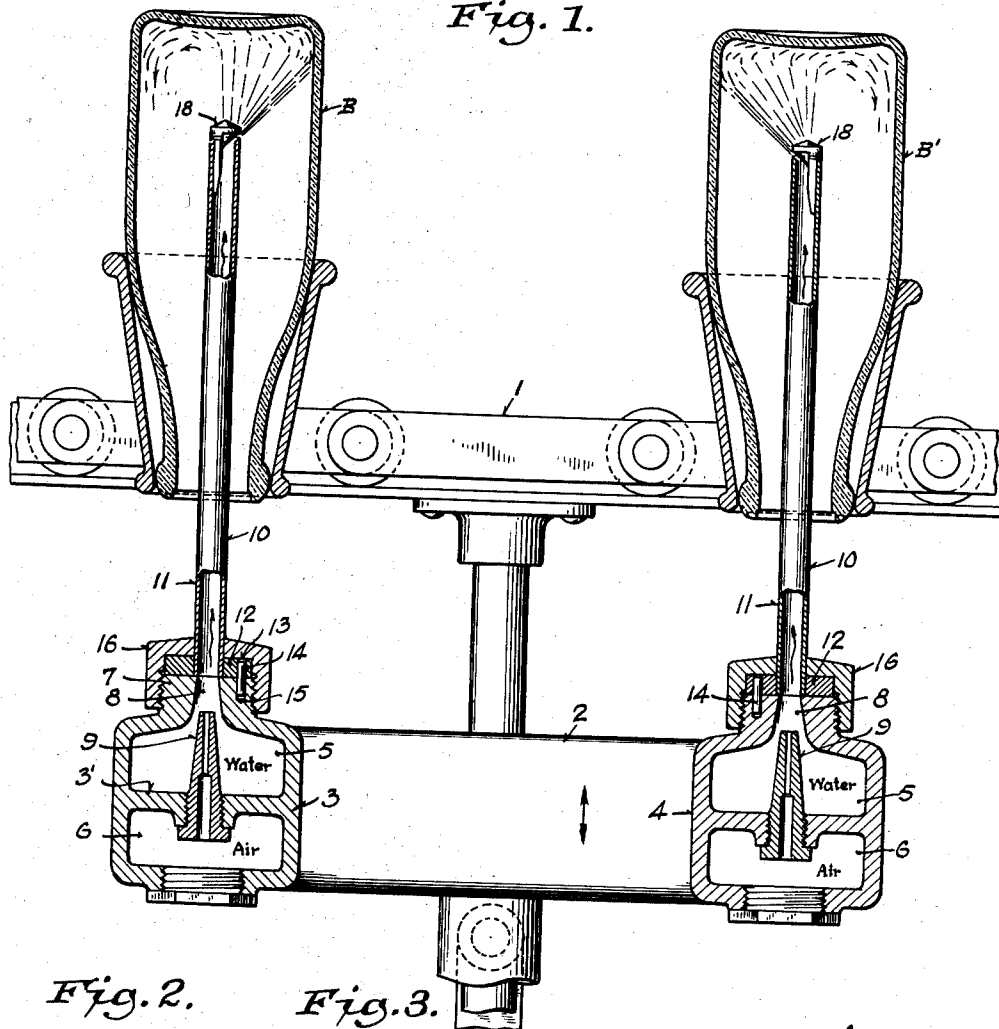


Fig. 2.

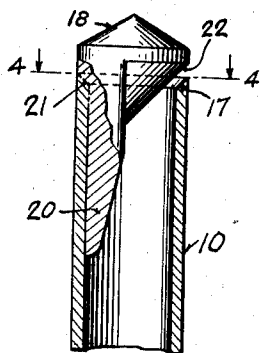


Fig. 3.

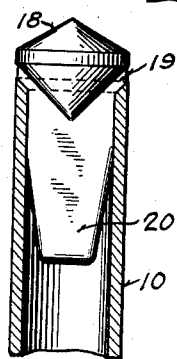
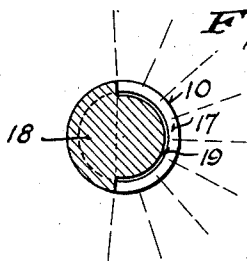


Fig. 4.



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UNITED STATES PATENT OFFICE

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NOZZLE FOR WASHING BOTTLES

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2 Claims. (Cl. 299—18)

This invention relates to a method of and machine for washing bottles or the like.

Bottle washing machines usually have some means for soaking the bottles consisting in general of a tank and a conveyor which carries the bottle slowly through the soaking tank. After leaving the tank the bottles are passed through a series of brushes which scrub their exterior and are then carried by a conveyor over a washing head equipped with some form of means for washing the interior of the bottles. One of the best types of washing heads heretofore devised employed sprays of water under pressure, formed by nozzles provided on the washing head.

When the bottles come over the nozzles of a washing head, the conveyor carrying the bottle is stopped, and at this time the washing head and the nozzles carried thereby are elevated slowly so that the nozzles pass into the bottles through their lower open end. As the nozzles travel up into the bottle a jet of air and water is expelled from the nozzle and against the interior of the bottle. In prior constructions of this type the jet was sprayed around the entire circumference or periphery of the bottle and the spray was angled outwardly and upwardly. At first, the spray impinged against the inner wall of the bottle but the water from the spray would rise up in the bottle and, of course, would have to descend and it would do this along the wall of the bottle so that as the nozzle moved up into the bottle its spray would impinge not on the wall of the bottle, but on the down flowing water which was falling under the influence of gravity and which was eventually discharged from the bottle. This greatly impaired the cleansing action of the spray as the force of the jet would be absorbed by the discharging water and this force would not be exerted to break down deposits or accumulations of dirt or the like that may have adhered to the inner wall of the bottle. As a result it was found that some bottles would not be entirely cleaned, but nevertheless this was the best known way of washing the bottles by machine. An example of such a bottle washing machine is shown in Patent 1,729,123, granted to Henry F. Stock, September 24, 1929.

The present invention proposes to overcome this disadvantage by introducing into the art of washing bottles an entirely new method and principle which consists in washing the interior of the bottle in two successive operations, approximately one-half of the bottle being subjected to the action of a traveling jet or spray of water in the first operation and the other half of the in-

terior of the bottle being subjected to the action of a traveling jet in the other operation. More particularly the method involved in the present invention consists in first subjecting one-half of the interior of an inverted bottle to a spray of air and water beginning at the neck of the bottle and progressing upwardly to adjacent the bottom thereof while leaving the other half of the bottle clear to permit of the discharge of the air and water which travels up the side of the bottle being sprayed, then across the base and finally down the other side thereof, and next subjecting the other half of the bottle to an oppositely directed spray while leaving the cleansed half of the bottle free of direct spray and hence unobstructed to permit of the discharge of the air and water.

Another object of the invention resides in the provision of the novel nozzle construction whereby to produce an upwardly and outwardly directed spray of air and water having an angular extent only slightly greater than one-half of a circle.

A further object is to provide a nozzle construction of this character which is simple and durable in construction, reliable and effective in operation and easy and comparatively inexpensive to manufacture.

Another object is to provide a novel organization of a plurality of such nozzles with an otherwise conventional washing head cooperatively related in the usual manner to the conventional bottle conveyor so that the washing head will be effective to successively subject first one half portion of the interior of each bottle and then the other half portion thereof to the action of a spray having an angular extent of approximately half a circle, one set or row of the nozzles of each head being oppositely directed with respect to the other set or row in order to completely wash the entire interior of the bottle in two operations.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawing forming a part of this specification, and in which:

Figure 1 is a view partly in central longitudinal vertical section and partly in elevation showing a washing head and nozzle construction embodying the present invention;

Figure 2 is an enlarged fragmentary view of the upper end of one of the nozzles shown in Figure 1;

Figure 3 is a view in elevation looking toward

the left in Figure 2, and showing the tube of the nozzle in vertical cross section; and

Figure 4 is a view in horizontal section taken on line 4—4 of Figure 2.

Referring to the drawing, more particularly to Figure 1, a conventional conveyor is designated at 1, travels through the washing tank and is intermittently driven in the conventional manner. Below the upper run of the conveyor 1 a washing head 2 is disposed and is periodically raised and lowered in accordance with the usual practice. For a full disclosure of the conveyor and its drive and of the washing head and its mounting and raising and lowering means, reference is made to Patent 1,729,123, granted to Henry F. Stock, September 24, 1929.

On the washing head, spaced washers designated at 3 and 4 are provided and are spaced apart a distance equal to a step of the movement of the conveyor 1. Each of the washers 3 and 4 are partitioned internally to provide a chamber 5 to which water is supplied and a chamber 6 to which air under pressure is supplied. The chamber 5 is provided with an externally threaded nipple 7 having a tapering bore or opening 8. A partition 3' has an internally threaded opening aligned with the opening of the nipple 7 and into which an air jet or tip 9 threads, the air jet of tip 9 projecting into the tapered opening of the nipple 7.

A nozzle designated generally at 10 is provided and is secured to the nipple 7 and receives the jet of air and water formed therein. Preferably the nozzle 10 comprises an elongated tube or hollow body portion 11 having a collar 12 brazed or otherwise suitably secured to its lower end. To facilitate proper assembly of the nozzles with their washers, the collar 12 of each nozzle is formed with a locating opening 13 which receives a locating pin 14 also fitted in an opening 15 provided in the outer end of the nipple 7, whereby the proper angular position of the nozzle is insured. A flanged nut 16 has threaded engagement with the nipple 7 and has its flange bearing on the collar 12 and clamping it to the nipple.

The upper or discharge end of each nozzle is open and is formed with a bevel 17. A deflecting head 18 is provided at the upper end of the tube 11 of each nozzle. The head 18 is formed with a beveled seat 19 extending partway, preferably approximately half way, around its under portion, the seat 19 engaging approximately half of the beveled upper end 17 of the tube. Below the beveled seat 19 a downwardly projecting extension 20 is integrally formed with the head and has its outer surface conforming in contour to the portion of the tube to which it is presented. At the juncture of the extension and the seat 19 the head is brazed to the tube as indicated at 21 in Figure 2, the tube being recessed, if desired, to facilitate this brazing. The extension 20 has the tapering form shown in Figures 2 and 3. Between the extension 20 and the head 18 a spray forming wall or member 22 is formed and preferably is integral with the head and with the extension and is so formed as to incline upwardly and outwardly and yet curve to present a surface that is parallel to the beveled portion 17 of the upper end of the tube to which it is adjacent. The spray forming member 22 has an angular extent just slightly in excess of one-half of the circumference of the tube and of the head and the remaining portion of the upper end of the tube is blocked by the extension 20 and the seat 19

formed on the head. However, the spray forming member 22 and the portion of the beveled end 17 of the tube 11 that is opposed thereto coact to define a curved semiannular spray opening having upwardly and outwardly inclining walls.

As shown to advantage in Figure 1 the nozzle of one washer is oppositely arranged with respect to the nozzle of the other so that the nozzle of the washer 3 projects its spray to the right as viewed in Figure 1, while the nozzle of the washer 4 projects its spray to the left as viewed in the same figure.

With this construction, when the bottles are brought over the washing head, the washing head is elevated and the air and water then supplied to the chambers 5 and 6 mixes in the opening 8 and tube 10 and passes up through the tube 11 and out through the spray forming opening. The spray thus formed has an angular extent slightly greater than that of half a circle and is directed upwardly and outwardly so that it impinges against one-half of the inner wall of the bottle as the nozzle rises into the bottle and travels first up the portion of the inner wall against which it strikes, then across the bottom of the bottle, and finally down the other half of the inner wall and out through the neck of the bottle. As there is nothing to interfere with the free discharge of the water on one half of the bottle the water does not interfere with the direct action of the jet on the inner surface of the bottle throughout the range of action of the jet. The bottle B having had its right half cleaned in this manner is next moved over to the position occupied by the bottle B' where the bottle B is subjected to the action of the washer 4 which completes the washing of the bottle by subjecting the left hand half thereof to the cleansing action of the spray. The bottle B' shown in Figure 1 as subjected to the action of the nozzle of washer 4 has previously been subjected to the action of the nozzle of the washer 3.

From the foregoing it will be understood that the present invention involves a novel method of washing bottles which consists broadly in successively subjecting portions only of the interior of a bottle to the action of a spray of cleansing fluid and leaving, during each spraying operation, an unobstructed discharge path within the bottle through which the cleansing fluid discharges from the bottle while any portion thereof is being sprayed. More particularly the method consists in washing inverted bottles, or the like, by successively subjecting approximately half portions only of the interior wall of each bottle to the action of a spray of water and air under pressure traveling lengthwise of the bottle and directed upwardly and outwardly at an angle and impinging directly against and flowing upwardly along approximately one-half portion of the interior wall of the bottle and across the bottom thereof and then downwardly along the other half portion of the interior wall of the bottle. Direct impingement of the spray or jet of air and water against the interior wall of the bottle is insured and the full force of the spray or jet is effective to dislodge dirt or any foreign substance that may have adhered to the interior wall of the bottle.

What I claim is:

1. A nozzle for use in a bottle washing machine and comprising a tube having its outer end open and inwardly beveled around the periphery of said opening, a deflecting head having a beveled surface around approximately half of its lower

portion, said beveled surface engaging said beveled outer end of the tube, whereby to block approximately half of the outer end of the tube, said head having a spray forming member paralleling the remainder of the beveled outer end of the tube and coacting therewith to form an outwardly and upwardly directed spray of curved form, and means for securing the head to the tube.

including means for mixing air and water and delivering the mixture to an outlet, a tube, a collar fixed to one end of said tube and abutting said outlet, means for locating the collar in proper angular relation to the outlet, means for securing the collar to the outlet, and means at the discharge end of the tube for forming a fan-shaped spray having an angular extent of less than 360°.

10 2. In a bottle washing machine, a washing head

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