

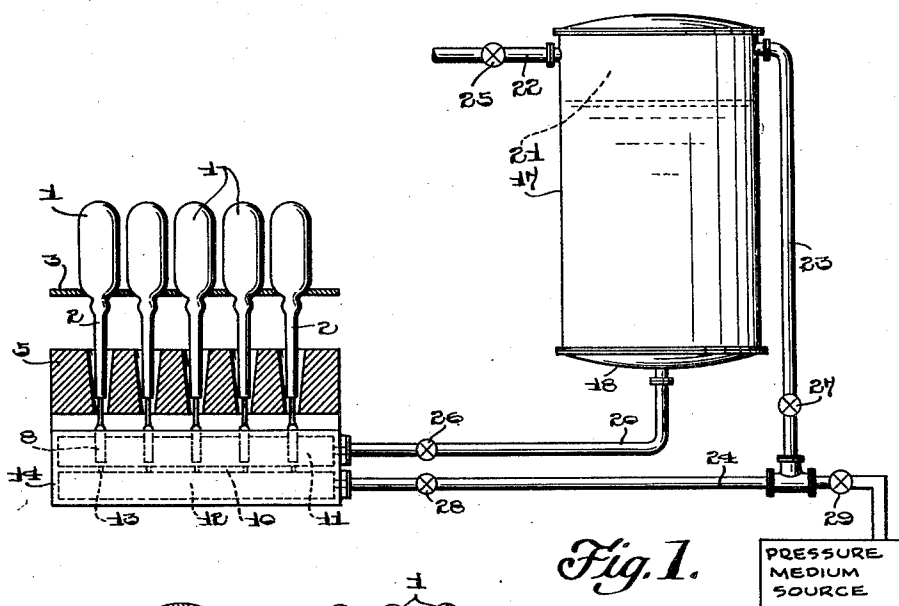
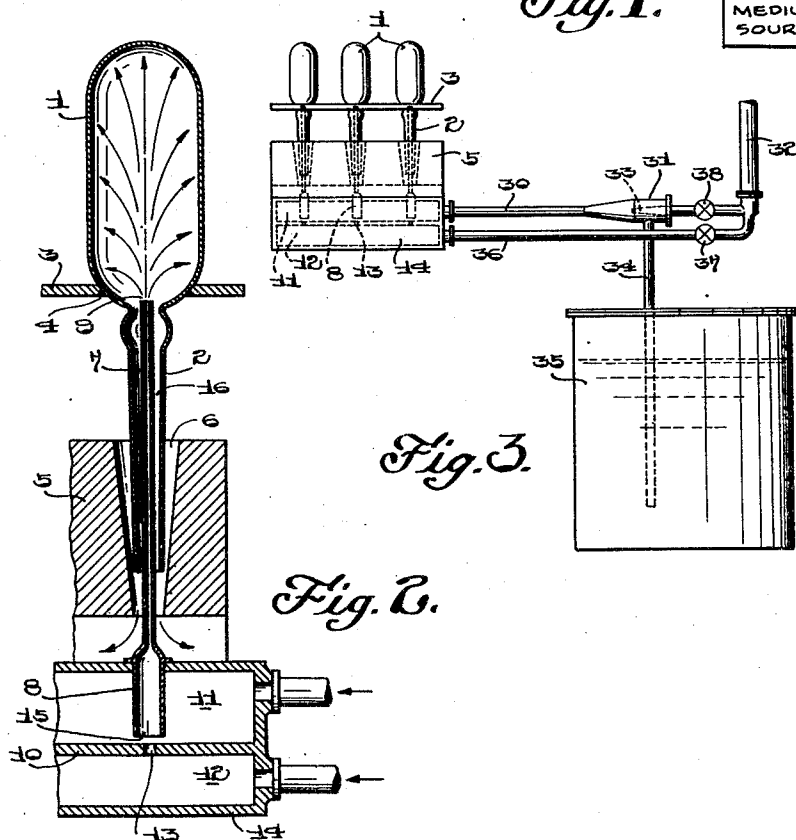
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APPARATUS FOR COMPLETE WASHING OF A CONTAINER

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APPARATUS FOR COMPLETE WASHING OF A CONTAINER

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5 Claims. (Cl. 134—102)

The present invention relates to devices for the complete washing, by ejector action, of liquid containers, and in particular, of glass bottles, ampoules and the like.

To avoid the difficulties inherent in using brushes for washing liquid containers such as glass bottles, ampoules and the like, there has been employed a known spouting method. The known method has, however, been defective in that the spouting apparatus limits the hydraulic pressure, and in that the spout merely washes a limited part of the inside wall of the container to be washed, with the remaining part being washed by discharged water so that complete and effective washing is impossible. Further, even with the water discharging from the lowered mouth of the container, dust is apt to remain around said mouth. This invention aims to remove these disadvantages and to attain the following objects.

One object of the invention is to strengthen the force of the spout cleaning water by making use of the washing water and compressed air or hot water vapor at the same time and to control the force and the volume of water by regulating adjustable valves of water and/or air pipes.

Secondly, an object of the invention is to provide an improved cleaning by giving the washed container a strong vibration through making both the compressed air and water particles impact against the inside wall of the container in order to remove mechanically the adhering dust with a relatively small quantity of water.

Thirdly, an object of the invention is to provide an improved cleaning by discharging water with dust out of the washed container so that no water remains inside of the container.

Fourthly, an object of the invention is to provide for the discharge of water so powerfully from the lowered opening of the container that it induces the water to wash the outside of the opening of the container.

Lastly, an object of the invention is to dry the ampoule quickly after washing.

Other objects will be seen in the following detailed description, together with the attached drawing in which:

Fig. 1 is a schematic view showing diagrammatically one embodiment of the invention,

Fig. 2 is a detailed sectional view of a part of the apparatus shown in Fig. 1, and

Fig. 3 is a schematic view of another embodiment of the invention.

With reference to the accompanying drawing, a glass bottle or ampoule 1 to be washed, with its nozzle or tube 2 down, is supported in a circular hole 4 of a horizontal plate 3. A carriage 5 arranged below the horizontal plate 3 defines under the circular hole 4, many conical apertures 6, each of which is slightly larger than the outside diameter of the tube 2. The tubes 2 of a number of ampoules are inserted in the apertures 6, so that the inserted ampoules can be held vertically.

Within the tube 2 of each bottle or ampoule to be washed, an injector tube 7 is inserted and the base 8 of tube 7 is projected into the upper chamber 11 of a wash-

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ing case 14 containing water. The upper chamber 11 is separated from a lower chamber 12 by a partition wall 10. The lower opening 15 of tube 7 faces aperture 13 formed in the partition plate 10.

Fig. 1 shows, for example, a pressure medium source such as an air compressor or a boiler (for hot vapors) connected with the lower chamber 12 of the washing case 14 through a pipe 24 and also through a pipe 23 with the upper air space 21 in a distilled water pressure tank 17, the bottom wall 18 of which opens to the upper chamber 11 of the washing case 14 through a conduit pipe 20. A water feed pipe 22 is provided at the upper side wall of the water pressure tank 17. These conduit pipes are provided with respective valves 25, 26, 27, 28 and 29.

It is possible, as shown in Figs. 1 and 2, to supply the tank 17 with compressed air or aqueous vapor under pressure through pipe 23 by opening the valves 26, 27, 28 and 29 and by closing the pipe 25. Distilled water will then be fed into the upper chamber 11 and the compressed air or pressure vapor will be fed into the lower chamber 12 and subsequently injected into the base 8 of the injector tube 7 through the aperture 13 of the partition plate 10. The injected compressed air or vapor accompanied by water from the upper chamber 11 is so powerfully ejected out of the top of the nozzle 7 that many water particles will impact on the whole surface of the inside wall of the ampoule 1, making said ampoule vibrate finely yet intensely, so as to remove all the dust adhering to said ampoule 1. After washing of the inside wall of the ampoule 1 has been efficiently effected, the waste water descends swiftly down through the space 16 between the tube 2 and the injector tube 7 to stream out from the lowest opening in a manner which displays full ejector action so that it activates the water around the outside surface of the tube 2 to wash its outside wall and flows out in the direction as indicated by the arrow. It is most advantageous for disinfecting purposes that hot water be used as the washing fluid in the tank 17. If alkaline solutions or antiseptic fluids are employed, a further cleansing is obtained.

When the valve 26 is closed after the washing of the ampoule 1, hot vapor and/or air are sent to the lower chamber 12 through the pipe 24 and subsequently blown into the ampoule 1 by way of aperture 13, base 8 and jet tube 7, so that the ampoule 1 will be quickly dried.

In Fig. 3, a nozzle 33 coupled to a pipe 32 which connects with a pressure source (not shown) is inserted in the head 31 of a pipe 30 connected to the upper chamber 11 of the washing case 14. The inside of this head 31 also has a connection to a washing water tank 35 via a conduit 34. The lower chamber 12 of the case 14 is connected with the pipe 32 through the adjustable valve 37 by a conduit 36.

On the opening of valves 37 and 38, aqueous vapor under pressure is ejected through pipe 32 from the nozzle 33 into the head 31 of the connecting pipe 30. The aqueous vapor together with water drawn from the tank 35 proceeds to the upper chamber 11 and at the same time the aqueous vapor under pressure passes to the lower chamber 12 through the pipe 36, so that the ampoules 1 can be effectively washed in the same manner as has been described.

What is claimed is:

1. Apparatus for washing containers, such as, glass bottles, ampoules and the like; comprising a single horizontal, relatively thin plate having a plurality of holes therein each adapted to receive a container therein with the latter opening downwardly and supported solely by said plate, a washing casing disposed below said plate and having a horizontal partition therein dividing the interior of the casing into an upper water chamber and a lower pressure chamber, said casing having a plurality of open-

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ings in the top thereof and in said partition aligned vertically with each other and with the holes of said plate, and a plurality of one-piece injector tubes each having a base portion fitted in a related one of said openings in the top of the casing and terminating at its lower end above said partition in axial alignment with the related one of said openings in said partition and a stem portion extending upwardly from said base portion above said casing into the container received in the related hole of said plate.

2. Apparatus according to claim 1; further comprising a carriage disposed between said plate and the top of said casing and having a plurality of downwardly tapering apertures therein aligned with said holes of the plate and dimensioned to receive the downwardly opening ends of the related containers with clearance around the latter.

3. An apparatus according to claim 2; further comprising a tank for containing washing water, a pressure source, and conduit means having adjustable valves therein connecting said upper and lower chambers of the casing to said tank and source, respectively.

4. An apparatus according to claim 2; further comprising a tank for containing washing water, a pressure

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source, valved conduits connecting said source to said lower chamber of the casing and to the top of said tank above the washing water in the latter, valved conduits connecting the bottom of said tank to said upper chamber of the casing, and valved conduits opening into the top of said tank for supplying washing water to the latter.

5. An apparatus according to claim 2; further comprising a tank for containing washing water, a pressure source, valved conduits extending from said source to said lower chamber of the casing, an injector nozzle, a pipe depending from said injector nozzle into said tank, a valved pipe extending from said source to said injector nozzle, and a pipe extending from said injector nozzle into said upper chamber of the casing.

References Cited in the file of this patent

UNITED STATES PATENTS

1,142,083	Dodge	June 8, 1915
1,724,639	Burch	Aug. 13, 1929
1,952,675	Keyes	Mar. 27, 1934
1,978,721	Perkins	Oct. 30, 1934
2,658,011	Price	Nov. 3, 1953
2,691,381	Strunck	Oct. 12, 1954