Feb. 13, 1940. W. McKENNA 2,189,761

APPARATUS FOR WASHING HOLLOW VESSELS

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Fig. 1

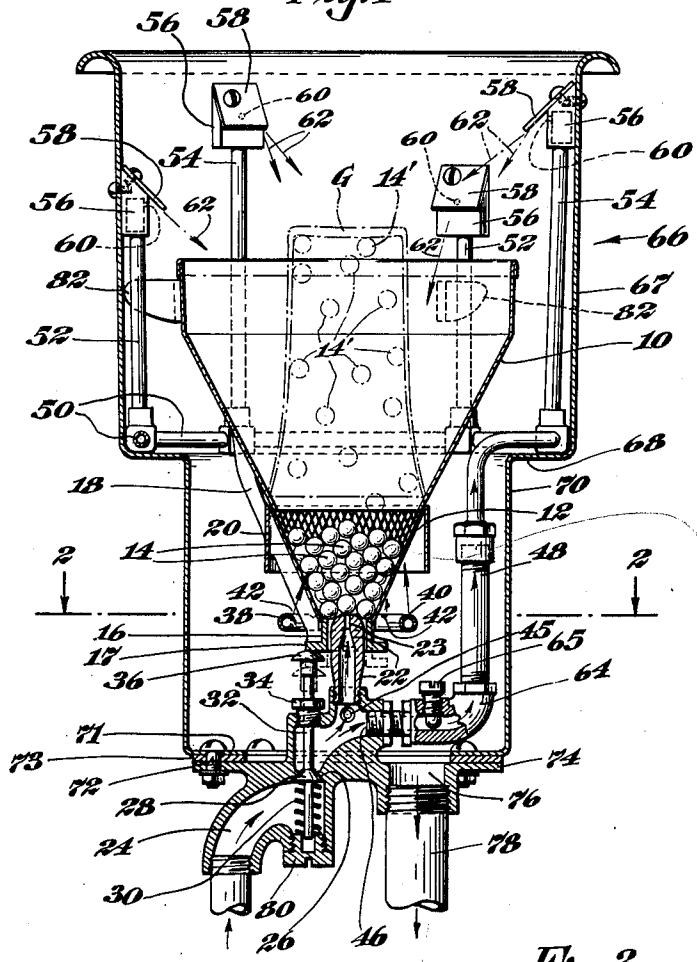


Fig. 2

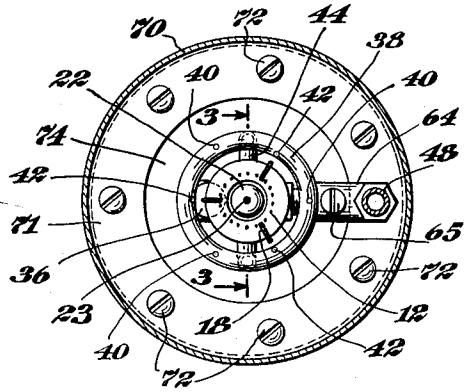
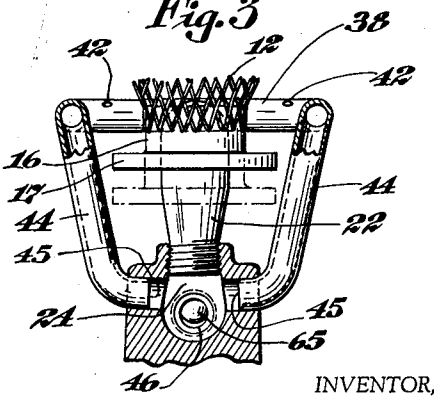


Fig. 3



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UNITED STATES PATENT OFFICE

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APPARATUS FOR WASHING HOLLOW VESSELS

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10 Claims. (Cl. 15—95)

This invention relates to a process for washing hollow vessels, and in one phase thereof to a process whereby the surfaces of such vessels are subjected simultaneously to a scouring, polishing and washing action. Coordinately therewith it relates to a device for effectively performing the operations involved in my process in all its phases.

One of the objects of my invention is a method and apparatus whereby all the surfaces of a vessel to be treated are simultaneously subjected to a cleansing action, and whereby the character of cleansing action is different on different portions of the surfaces of the vessel, in accordance with the requirements of the respective surface portions.

Among the general objects of my invention are a method for cleansing the surfaces of hollow vessels, which method may involve washing, or washing in combination with scouring and/or polishing, and further the provision of apparatus for effectively cleansing hollow vessels, which apparatus is simple and compact, and neat in appearance, efficient in operation, and low in manufacturing cost and cost of operation and maintenance.

I have illustrated the feature of my invention in an apparatus in which the cleansing operations take place only when the vessel to be cleaned is introduced into the same and are automatically started and stopped, and in which different portions of the apparatus are subjected to cleansing processes of different characteristics. It will be understood, however, that the various features of my invention can be employed in an apparatus started other than as above stated.

For the attainment of these objects and such other objects as will hereinafter appear or be pointed out I have illustrated one embodiment of my invention in the drawing, wherein:

Figure 1 is a sectional elevational view of my washer;

Figure 2 is a sectional view on the line 2—2 of Figure 1, looking in the direction of the arrows; and

Figure 3 is a detail view in elevation and partly in section on the line 3—3 of Figure 2, looking in the direction of the arrows, of parts of the lower portion of the device, the scale however being enlarged.

I will now proceed to describe my invention. Since the process aspect of my invention will become apparent in connection with the description of the apparatus I have devised for practicing it, it will not be necessary to give a separate exposition thereof and a description of the apparatus and its functioning will suffice.

Before proceeding to a detail description, I will premise that my machine in general comprises an outer receptacle within which is located a support for the vessel to be washed and into which it may be received in inverted position, and in which a valve may be opened so that fluid under pressure will be admitted into a series of channels terminating in openings directed appropriately to discharge jets of fluid. Associated with particular ones of said jets are pellets or balls having a polishing and scouring action on surfaces with which they are brought into contact while in motion.

Referring now to the drawing in detail, it will be observed that I show at 10 a member which may be of substantially inverted frustoconical shape and is adapted to receive a hollow vessel, such as a glass G, indicated in dotted lines in Figure 1, in inverted position. The member 10 is preferably made of rigid material, such as sheet metal of sufficient thickness so that it will move as a whole, without yielding when the glass or other vessel is pressed thereagainst, and at its lower end it has joined thereto a strainer member 12, coarse enough to retain therein a quantity of pellets 14 made of any material suitable for cleansing purposes by abrasive action when the pellets are impelled against the walls of the vessel by a fluid jet. I have found that pellets of globular shape made of soft rubber with which is incorporated a mild abrasive material are very effective for this purpose, as the pellets are sufficently light to be readily impelled by a jet of moderate force and are not heavy enough nor hard enough to crack glass or pottery vessels. The abrasive material will have a scouring effect, while the soft rubber will have a polishing action on the surfaces of the vessel.

The strainer 12 is shown as of inverted conical form, and this form, while it is shown by way of example only, has many advantages, well adapted for the attainment of the objects of my invention. At the lower end of the strainer 12, which is open, and forming a continuation thereof, is positioned a tubular member 16, shown as provided with a flange 17 at its base, and suitably supported from the member 10 by the ribs 18. A cylindrical ring or "splash apron" 20, through which the ribs are shown as passing, serves as a guard to prevent the lateral splashing of fluids passing through it and through the strainer 12 and into the member 10, and this ring is conveniently supported from the member 10, as shown.

Within the tubular member 16, and adapted to guide the same in its movements, as hereinafter described, is positioned a nozzle 22 adapted to receive fluid from the passage 24, which is in communication with a suitable source of fluid supply, and to discharge the same through its opening 23. At any suitable or preferred point in the passage 24 there is provided a valve seat 26, on which is shown seated a valve 28, normally kept closed by a spring 30, and having the stem 32 thereof extending upwardly through a stuffing box 34, and into contact with the aforementioned flange 17. The upper end of the valve stem 32 is shown as provided with a rounded head 36 adapted to rest against the lower portion of the flange 17, and the reaction for the spring is furnished by the screw 80 shown as threaded into the walls of passage 24, it being understood of course that precautions against leakage are desirable at this point, for which purpose a ground joint may be provided. The lower end of the valve stem 32 is shown as guided in a bore provided in the screw 80.

It will now be observed that if the member 10, together with the flange 17, is depressed, as when a glass G is placed therein and pressed downward, the flange 17 will move into the dotted line position indicated in Figure 1 and the head 36 will be correspondingly depressed into the dotted line position also shown in Figure 1 with the result that the valve 28 moves from its seat, and fluid is admitted into the nozzle 22 and discharged upwardly through the opening 23, thereby carrying with it the pellets 14, and both fluid and pellets will impinge against the inner walls of the glass G. This movement of the pellets is indicated by the dotted line positions 14' of the pellets. In addition to their bodily movement the pellets will be caused to spin or rotate by the jets, whereby their scouring and polishing action will be greatly enhanced.

After the force of the fluid jet is spent both pellets and fluid drop downward and the fluid runs out through the strainer, 12, while the pellets are retained therein, ready to be again thrown upwardly.

In order to prevent the pellets from assuming positions at the sides of the strainer 12, where they would not be reached and actuated by the jet from opening 23, I have shown at 38 a tubular spray ring. This ring is shown as provided with two sets of apertures 40 and 42 directed at different angles so as to discharge jets or sprays through the sides of the strainer 12, and thereby force the pellets 14 toward the center of the strainer and into the path of the central jet.

The spray ring 38 is shown enlarged in Figure 3 and therein is also indicated a convenient manner of support therefor. It will be observed that it is shown as supported on a pair of tubular arms 44, which, besides supporting the ring, serve also to conduct fluid from the passage 24 into the ring. In Figure 1 the opening of one of these tubular supports is indicated at 45.

Branching off from the passage 24 is a passage 46 communicating with a tube 48 through which fluid may pass into a tubular distributing ring 50, from which it is led into two sets of tubes 52 and 54, each terminated by a head 56 carrying an inclined splash plate 58, the latter serving to receive, on its lower surface, the discharge from the opening 60, and to spread and direct it downwardly in a shower against the outer walls and the bottom of the glass G as indicated by the arrows 62. The tubes 52 are shorter than the tubes 54, so that the discharges occur at different levels.

In order to permit of regulation of the force of the jets or sprays just described, a valve 64 may be provided in the system just described. By adjusting the control screw 65 thereof, the end of which projects into the channel of the valve 64, the flow of fluid through the conduit 46 and the tubes 52 and 54 may be regulated.

The entire construction so far described is enclosed by the shell or casing 66, which may conveniently be made of two cylindrical sections, the upper one 67 enclosing the spray heads 56, and being of sufficient depth to receive within it the glass or other vessel to be washed, and the lower section 70 of which is somewhat narrower, so that a shoulder uniting the two sections may be formed at 68, which serves conveniently as a seat for the distributing ring 50, besides strengthening the shell, and this strengthening effect is enhanced by the reinforcing effect of the ring 50.

The lower flanged end 71 of the lower portion 70 of the shell 66 is shown as suitably secured, as by bolts 72, to a flange 74 shown as forming an extension for the walls of the conduit 24, a gasket 73 being interposed to prevent leakage.

Within the flange 74 is also provided an opening 76 through which all the spent fluid collected in the lower portion 70 of the shell 66, may run off into the discharge tube 78.

It will be observed that the member 10 in its movement is centered and guided by the nozzle 22, and to still further provide for its guidance it carries on its upper portions a set of lugs 82, that engage the walls of the upper part 67 of the shell 66, and together with the nozzle 22, assure smooth motion of the member 10.

While I have herein disclosed one embodiment of my invention it will be understood that I do not intend such disclosure to be construed in a limiting sense as to its various details, and that my invention may be embodied in many other forms, as will be obvious to those skilled in the art, without departing from the spirit thereof, and that I do not limit myself in any way other than as called for by the prior art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is:

1. In a washing device, means for supporting a hollow article to be cleaned, means for discharging a fluid jet against the inside walls of said article, abrasive pellets positioned in the path of said jet and adapted to be moved thereby against the inside walls of the article to be cleaned, means for collecting the spent pellets and for reintroducing them into the path of said jet, auxiliary jet discharging means for directing jets of fluid towards the axis of said first jet cooperating with said collecting means to urge said pellets into the path of said jet, and jet discharging means positioned at different levels and adapted to direct fluid jets against the outer walls of the article to be cleaned.

2. In a device as in claim 1, said supporting means being movable, and valve means for simultaneously controlling all the said jet discharging means by the movement of said supporting means.

3. In combination in a washing device, a member adapted to receive an article to be cleaned, means for discharging a fluid jet against said article, pellets of solid material positioned in the

path of said jet and adapted to be moved thereby against the walls of the article to be cleaned, and means for collecting the spent pellets and for reintroducing them into the path of said jet, and jet means directed toward the axis of said first jet and cooperating with said collecting means to urge said pellets into the path of the first mentioned jet.

4. In a device as in claim 3, control means for said jet discharging means and associated with said member, said jet discharging means and said cooperating means, whereby movement of said member by pressing said article thereagainst will activate said jet discharging means and said cooperating means.

5. In a washing device, a plurality of scouring and polishing pellets, fluid means for activating said pellets so as to cause them to impinge against a surface to be cleaned, and means for collecting said pellets so as to resubject them to the action of said fluid means, and said pellet activating means comprising a plurality of fluid jets, one of which is positioned centrally in relation to said collecting means, while the others are positioned in spaced relation thereto and are directed toward the axis of said centrally positioned jet.

6. In washing apparatus a compartment adapted to receive an article to be washed, said compartment being substantially conical in contour or configuration and tapering downwardly and having a lower portion provided with openings to permit the escape of water therefrom, jet means positioned so as to direct a jet axially into said receptacle and auxiliary jet means adapted to project jets through said openings into said receptacle and said auxiliary jets being positioned at an angle to said first mentioned jet and a cylindrical extension extending down from the walls of said receptacle so as to provide a shield for said portions having the opening therein.

7. In a washing machine, a conical chamber having reticulated walls, means for directing a jet of fluid along the axis of said chamber, and means positioned laterally to said first mentioned jet for discharging fluid jets through the reticulated walls of said chamber and toward the axis thereof, so as to intersect said first mentioned jet, and abrasive pellets positioned in said chamber and adapted to be entrained by said jets and to be given a spinning motion thereby.

8. In a washing machine, a receptacle adapted to enclose the working parts thereof on all sides except the top, the lower portion of said receptacle being of lesser transverse dimension than the upper portion and being joined thereto by a step, and said lower portion being closed by a member having openings therein for the entrance of washing fluid into, and the discharge of washing fluid from said receptacle, a loop shaped fluid conduit of such shape as to lie on the aforesaid step so as to reinforce the walls of said receptacle at said step, a passage connecting said loop shaped conduit with said entrance opening whereby the washing fluid enters said receptacle, and fluid jet means connected with said loop shaped conduit by a plurality of tubes extending upwardly and in adjacency to the walls of said receptacle.

9. In a washing machine, a stepped cylindrical receptacle adapted to enclose the working parts thereof, on all sides except the top, the lower portion of said receptacle being of lesser diameter than the upper portion and being joined thereto by a step, and said lower portion being closed by a member having openings therein for the entrance of washing fluid into, and the discharge of washing fluid from said receptacle, a loop shaped fluid conduit of such shape as to lie on the aforesaid step so as to reinforce the walls of said receptacle, a passage connecting said loop shaped conduit with said entrance opening whereby fluid enters said receptacle, and fluid jet means connected with said loop shaped conduit by a plurality of tubes.

10. In washing apparatus, an inner receptacle adapted to receive the article to be washed and positioned within an outer receptacle enclosing the working parts of the apparatus, said inner receptacle being movable in relation to the outer receptacle, and said inner and outer receptacles having means therebetween at a plurality of spaced points for holding the walls of said receptacle in spaced relation to each other and for guiding said inner receptacle in its movements in relation to said outer receptacle.

WILLIAM McKENNA.