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H. B. HILGER ET AL

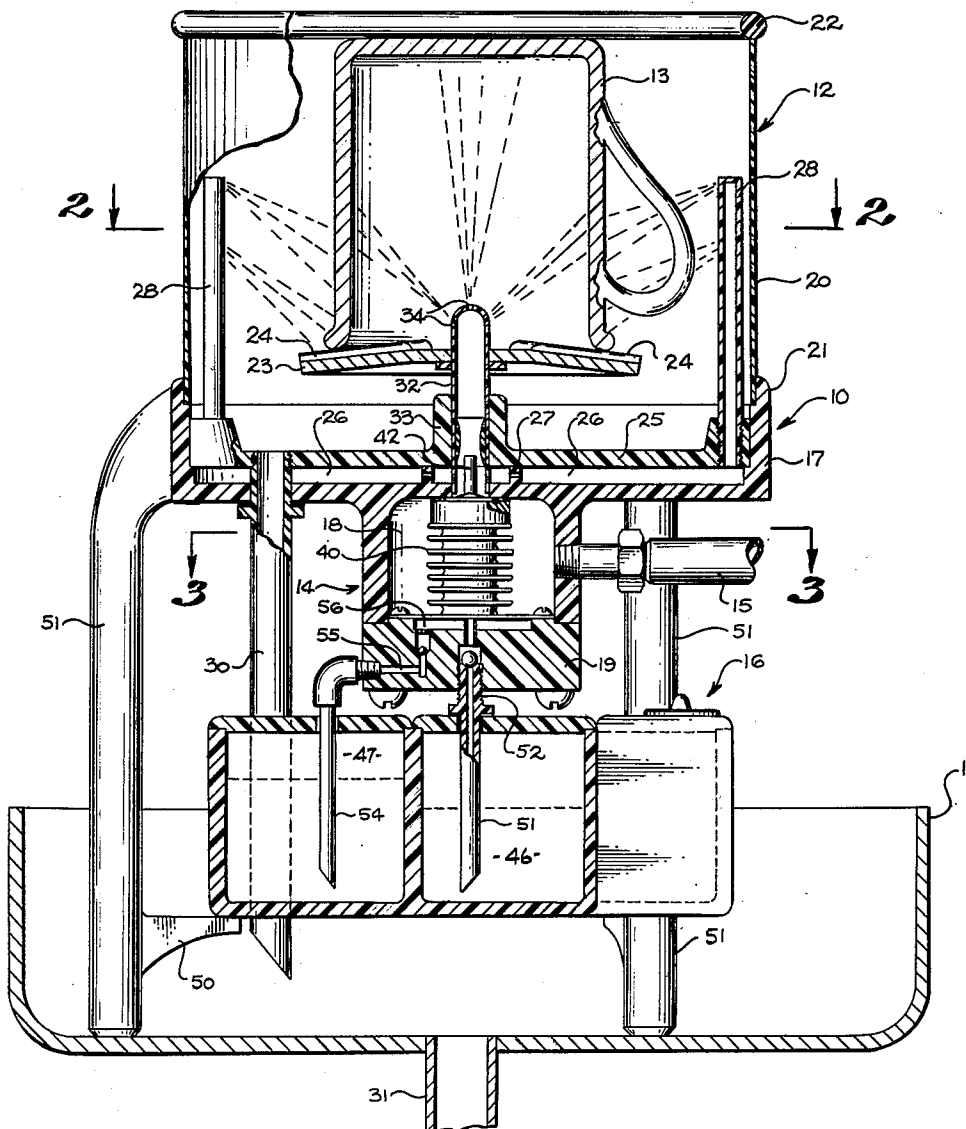
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WASHER FOR CUPS AND THE LIKE

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*Fig. 1*



HARRY B. HILGER  
ROBERT S. HAMMETT  
INVENTORS

By *White and Haefliger*

ATTORNEYS

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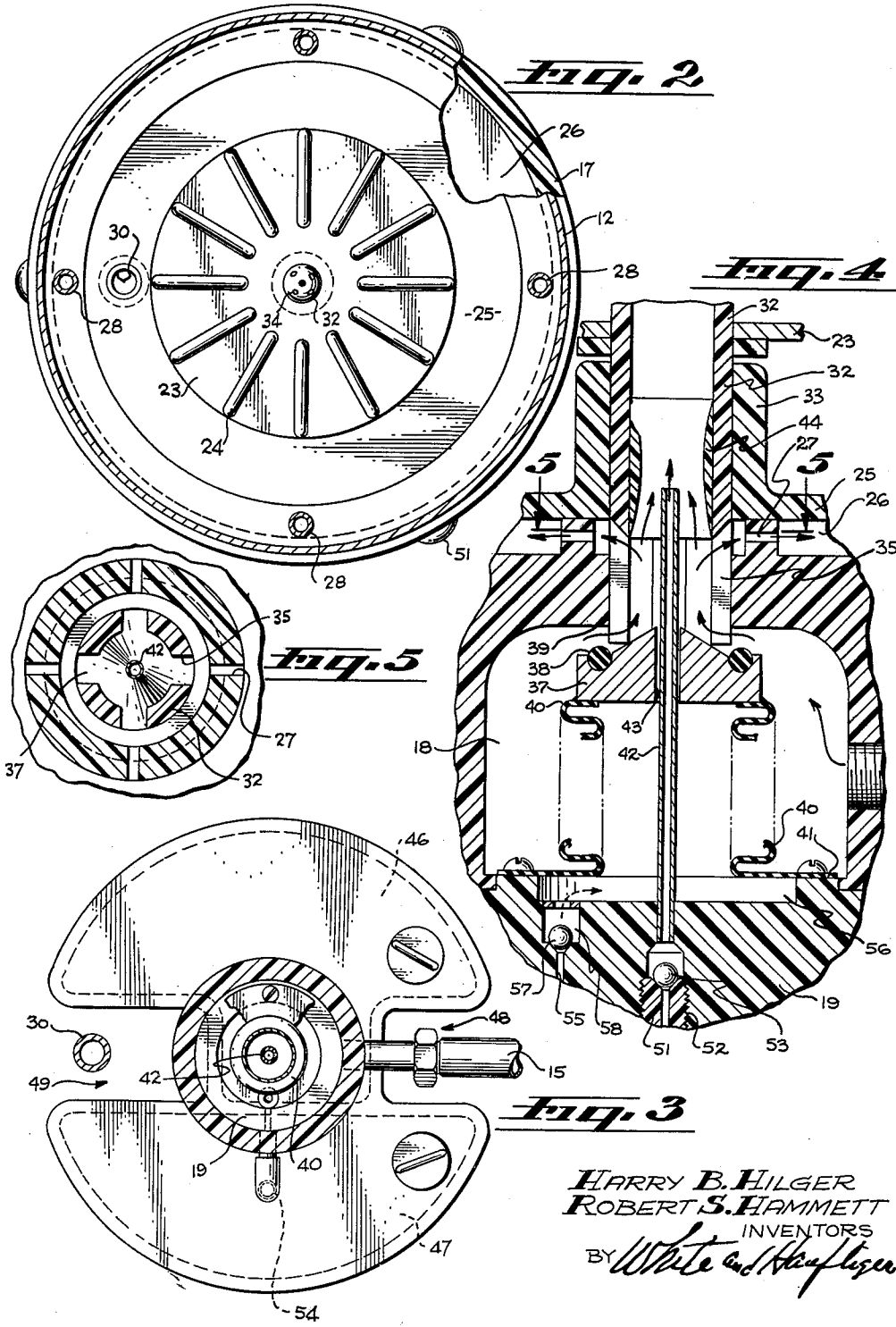
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HARRY B. HILGER  
ROBERT S. HAMMETT  
INVENTORS  
BY *White and Hoopes*

ATTORNEYS

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**WASHER FOR CUPS AND THE LIKE**

Harry B. Hilger, 3650 W. Slauson, Los Angeles, Calif.,  
and Robert S. Hammett, 2312 Manhattan Ave., Man-  
hattan Beach, Calif.

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This invention has to do generally with apparatus for washing objects such as cups and the like, and is directed particularly to a washer which we prefer to make in small, relatively inexpensive form adapted for the washing, and sterilization if desired, of a single cup.

Our general purpose is to provide a small washer operable to clean a drinking cup or glass in a short interval of time and by simple manipulation rendering the device desirable and practicable for use in many places, including plants providing for "coffee breaks," when an individual has a single cup to be cleansed. As will appear, the invention contemplates rapid, high velocity water washing supplemented by automatic feeding to the water of either or both a soap or detergent and a sterilizing agent.

More particularly, the invention contemplates a washer of this character employing an open top chamber containing a vertically movable support into which an inverted cup may be placed, and means controlled by hand pressure on the cup and resultant displacement of the support, to direct a high velocity washing spray against the cup.

The washing action derives from a spray nozzle received inside the cup and from which water is discharged at such high velocity as to require only a period of seconds for adequate cleansing and sterilization. Provision also is made for cleansing and sterilizing the exterior of the cup by circularly arranged spray means similarly controlled, and operating to direct the water against at least the lower surfaces of the inverted cup.

Structurally, the invention contemplates a simple and effective water and cleansing agent control, comprising a bellows or the equivalent, axially displaceable in response to movement of the cup support to open a valve which passes water to the spray means. As will appear, the bellows functions additionally in controlling the delivery to the water stream of either or both liquid detergent and a sterilizing solution during the water delivery to the washing chamber.

The invention has various additional features and objects, all of which will be fully understood from the following detailed description of an illustrative embodiment shown by the accompanying drawings, in which:

FIG. 1 is a view showing the washer in vertical axial cross section;

FIG. 2 is a plan view of the washing chamber with the cup removed;

FIG. 3 is a cross section of line 3-3 of FIG. 1;

FIG. 4 is a fragmentary sectional enlargement of the water control valve and associated cleansing agent supply means; and

FIG. 5 is a fragmentary cross section on line 5-5 of FIG. 4.

Referring first to FIG. 1, the washer generally indicated at 10, and shown to be placed in a sink 11 or other suitable drainage receptacle, comprises an open top chamber 12 containing the object to be washed and typified by cup 13, and valve means 14 operable to control the delivery of water to the chamber 12 from an inlet line 15, and also the supply of one or more cleansing agents from containers at 16.

In the typical embodiment illustrated, the washer comprises a body portion 17 forming a hollow valve chamber 18 closed by head 19 and receiving water from the supply line 15. Shell 20 received within the body flange 21 and

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having a top rubber or other protective rim 22, forms the washing chamber which openly receives the cup 13 for placement on a sloping support 23 having surface ribs 24 to permit drainage from within the cup into the bottom of the chamber. As illustrated, the chamber bottom is formed by a disc 25 press fitted within flange 21 and spaced at 26 from the body below, to provide for the passage of water through apertures 27 into circularly arranged spray tubes 28 from which water is directed at high velocity, generally downwardly against the lower exterior of the cup. The liquid drains from the bottom of the washing chamber through tube 30 into the sink 11 and thence through its drain pipe 31.

The cup support 23 is carried by a tubular spray nozzle 32 slidable vertically within the central bearing portion 33 of disc 25, the nozzle containing apertures 34 through which the aqueous cleanser is projected at high velocity against the inner surfaces of the cup 13. Referring to FIG. 4, the lower extent of the nozzle tube 32 is slotted at 35 to provide for the passage of water from chamber 18 through the slots into both the nozzle and also through orifices 27 and passages 26 to the spray tubes 28, when the cup support 23 and nozzle 32 are in the displaced position of FIG. 4.

The water delivery from chamber 18 to the washing chamber is controlled by a valve 37 carrying a seal ring 38 which normally seats upwardly against the top of the chamber at 39 to close off the water delivery. The valve 37 is attached to the top of an axially expandible and contractible bellows 40, the bottom of which is fixed at 41 to the head 19 so that the valve and bellows assembly is removable from chamber 18 upon detachment of the head from the body. The head also carries a tube 42 extending upwardly through the valve 37 with clearance at 43 to terminate within a venturi 44 in the tube 32.

The cleansing agent receptacle means generally indicated at 16, is shown to comprise a pair of integrally formed containers 46 and 47, see FIG. 3, recessed at 48 below the water line 15, and oppositely at 49 to pass or accommodate the drain tube 30. Chambers 46 and 47 may be supported in any suitable manner, as upon brackets 50 extending inwardly from the body legs 51 which rest in the sink 11. These chambers contain liquid additives, i.e. liquids to be added to the water for cleansing and sterilizing the cup. Chamber 46 may contain a cleansing agent such as liquid soap or synthetic detergent and chamber 47 a sterilizing agent such as an aqueous solution of a bactericide such as any of various silver components known for their bactericidal properties. As shown in FIGS. 1 and 4, chamber 46 communicates with tube 42 by way of riser tube 51 threaded at 52 into the head 19 and having its upper end closed against down-flow by ball check 53. Chamber 47 is communicable with the interior of the bellows 40 by way of riser tube 54, passage 55 in head 19, and space 56 directly below the bellows and peripherally closed thereby. Down-flow of liquid through tube 54 is prevented by ball check 57 in the counterbore 58. FIG. 5 shows the riser tube 54 to be positioned within chamber 47 forwardly or at the near side of a vertical axial plane intersecting pipes 15 and 30. For clarity of illustration in the general view of FIG. 1, tube 54 and that portion of chamber 47 appearing in cross section, have been rotated into the above-mentioned axial plane.

In considering the operation of the apparatus, the cup 13 to be washed is placed in the FIG. 1 position on support 23 and pushed down to depress the nozzle tube 32 and open valve 37 to the FIG. 4 position, at which water is admitted from chamber 18 through tube 32 to the spray orifices 34, and admitted also through orifices 27 and passage 26 to the exterior spray tubes 28. The

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water flow upwardly through venturi 44 induces a flow of the liquid detergent or cleansing agent up through tubes 51 and 42 into the water stream, the detergent delivery continuing for the duration of the water flow to the nozzles. Axial contraction of the bellows 40 which results from opening of the valve displaces sterilant solution from inside the bellows upwardly through the clearance space 43 into the water stream, it being understood that previous similar actuations of the bellows with its intake, as well as discharge pumping effect, will have induced upward flow of the sterilant solution through tube 54 past check 57 to fill the bellows chamber.

We claim:

1. Washing apparatus of the character described, comprising an open top chamber, a support within said chamber for an object to be washed and movable in response to hand applied force, a water inlet, water flow control means beneath said chamber including a valve operable in response to movement of said support to pass water from the inlet for direction against said object, an additive liquid container beneath said chamber and control means, and means for elevating liquid from the chamber to mix with the water being so directed, the last mentioned means comprising means responsive to repeated movements of said support to communicate elevating suction to the liquid in the container.

2. Apparatus according to claim 1, in which said liquid elevating means comprises means for inducing a flow of the additive liquid into and by virtue of the flow of the water stream while the valve is open.

3. Apparatus according to claim 1, in which said liquid elevating means comprises additive liquid pumping means actuated by movements of said support.

4. Apparatus according to claim 1, comprising also a second liquid additive container beneath said chamber and control means, and means responsive to repeated movements of said support to communicate elevating suction to the liquid in said second container.

5. Apparatus according to claim 4, in which one of said means for communicating elevating suction induces a flow of additive liquid from the first mentioned container into and by virtue of the flow of the water stream while the valve is open.

6. Apparatus according to claim 5, in which the other of said means for communicating elevating suction comprises pumping means receiving additive liquid from the second container and actuated by movements of said support.

7. Apparatus usable to wash a cup, comprising an open top chamber, a support in said chamber adapted to receive an inverted cup and movable vertically in response to hand pressure on the cup, a water inlet, a nozzle carried by and movable with the support and positioned to direct

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high velocity water against the inside of the cup, water control means below said chamber connected to said support, said control means comprising a normally closed valve for passing water from said inlet to the nozzle and an axially expansible and contractable bellows connected to the valve so that depression of the support opens the valve and contracts the bellows, and means responsive to opening of the valve and contraction of the bellows for delivering cleansing liquid additive to the water flowing to the nozzle.

8. Apparatus according to claim 7, in which said means for delivering liquid additive comprises a container, and means for delivering said cleansing fluid to the nozzle through said bellows.

9. Apparatus according to claim 7, in which said means for delivering liquid additive comprises a detergent liquid container, and a delivery tube extending from said container through the bellows to an outlet in the path of water flowing to the nozzle.

10. Apparatus according to claim 7, in which said means for delivering a liquid additive comprises a sterilizing liquid container communicable with the interior of said bellows, and means for dispensing said sterilizing liquid from the container into the water flowing to the nozzle by the displacement action of the bellows upon its contraction.

11. Apparatus according to claim 7, comprising also circularly arranged second nozzle means in said chamber adapted to spray water against the outside of the cup and supplied with water controlled by said valve.

12. Apparatus according to claim 11, in which said additive fluid supply means comprises a cleansing liquid container, said liquid delivery means comprises means for inducing liquid flow from said container through the bellows into and by virtue of the water stream flow at the discharge side of said valve.

13. Apparatus according to claim 11, in which said liquid additive supply means comprises separate detergent and sterilizing liquid containers, and means responsive to opening of said valve and contraction of the bellows for delivering liquids from said containers through the bellows into the water stream at the discharge side of the valve.

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