March 5, 1968 E. J. FESER 3,371,370

DISHWASHING APPARATUS

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FIG. 13.

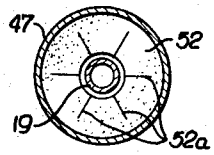


FIG. 1.

FIG. 2.

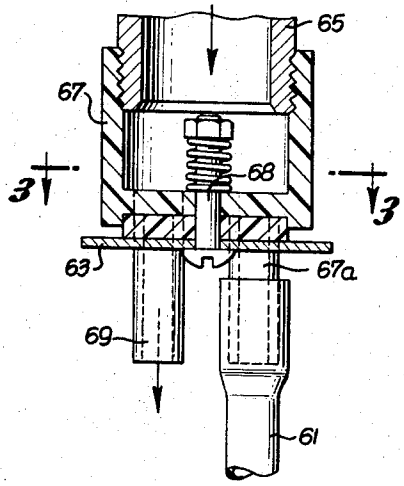


FIG. 12.

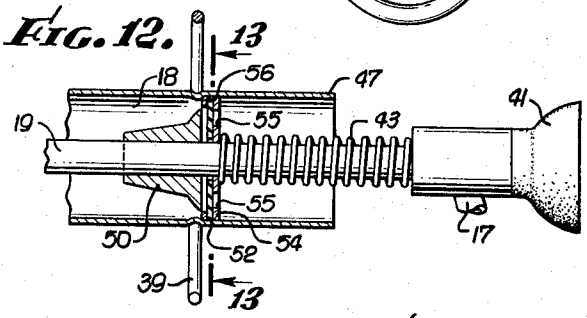


FIG. 14.

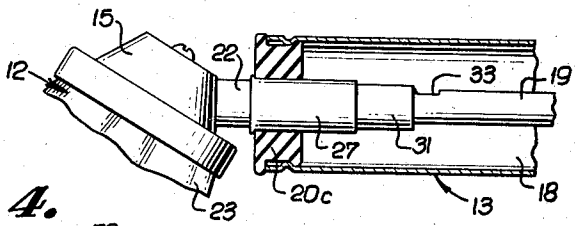


FIG. 3.

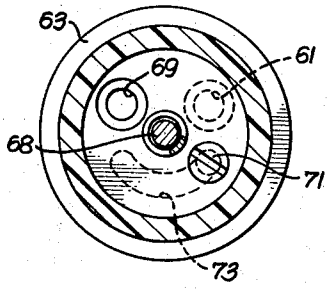
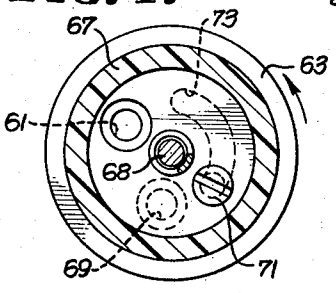


FIG. 4.



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DISHWASHING APPARATUS

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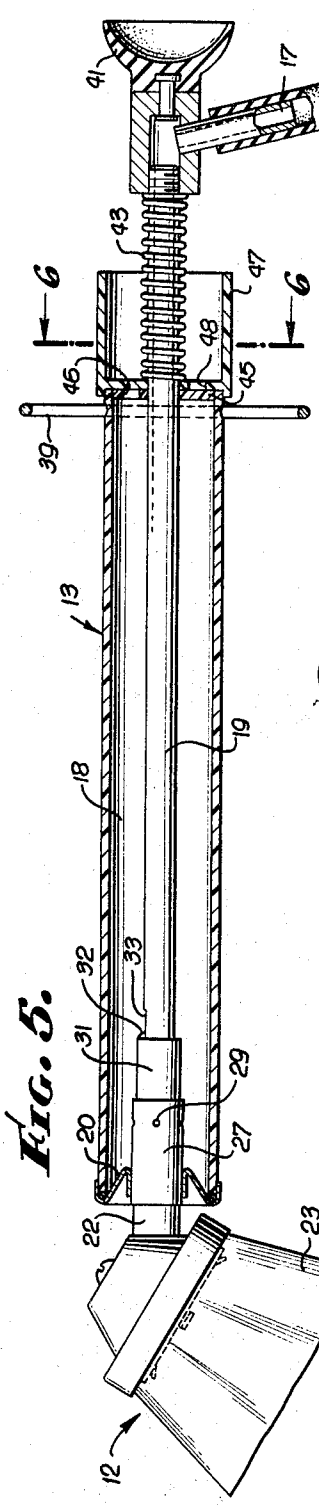


FIG. 5.

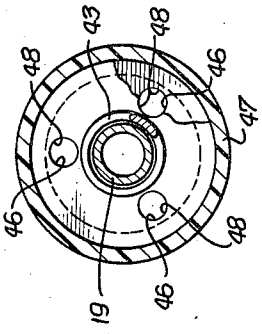


FIG. 7.

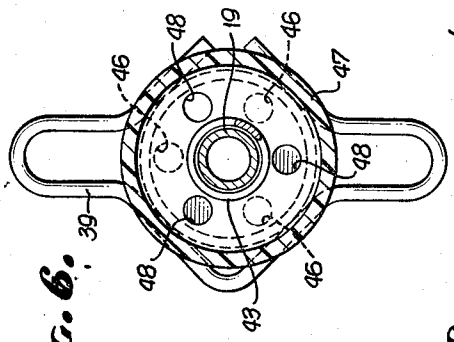


FIG. 6.

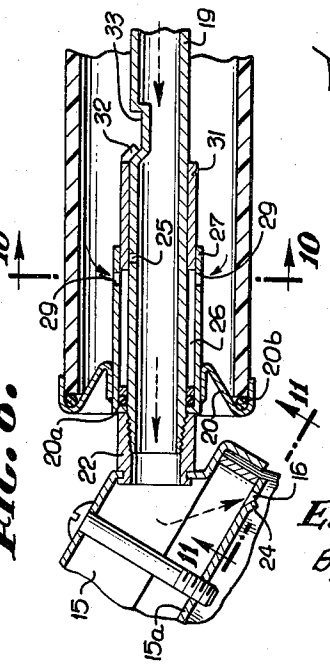


FIG. 8.

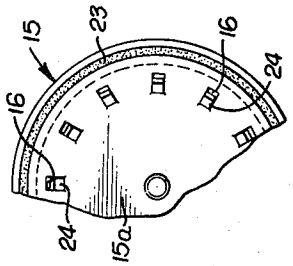


FIG. 11.

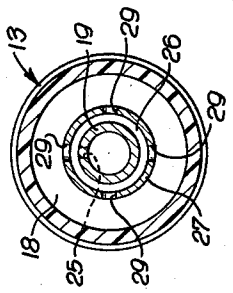


FIG. 10.

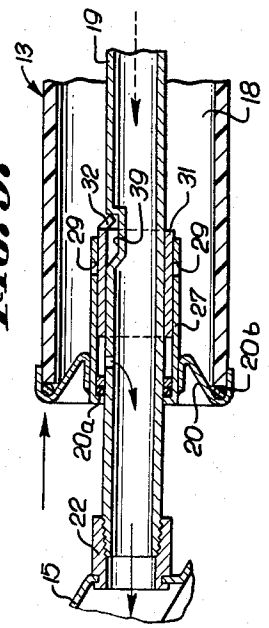


FIG. 9.

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United States Patent Office 3,371,370
Patented Mar. 5, 1968

3,371,370

DISHWASHING APPARATUS

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Filed Oct. 22, 1965, Ser. No. 501,730
6 Claims. (Cl. 401—46)

ABSTRACT OF THE DISCLOSURE

A hand operated dishwashing apparatus which is adapted to be attached to a source of water and which includes a reservoir of detergent. The apparatus further includes manual control means for positioning within the apparatus and discharging a predetermined amount of detergent into a stream of water adjacent a brush portion of the dishwashing apparatus.

This invention relates to a dishwashing apparatus which can be readily attached to an ordinary faucet, and more particularly a dishwashing apparatus that contains an integral detergent reservoir and manually operable means for releasing a metered amount of detergent.

Prior to my invention dishwashing apparatuses were often comprised of complicated and expensive equipment. Such equipment required special installation and large amounts of detergent, and was both expensive to install and to use. On the other hand, simple brushes did not provide effective mechanically assisted means for washing dishes.

Hence, there was not available a satisfactory, easily installed, dishwashing apparatus that was self-contained and yet was not a complicated mechanism requiring separate installation and large amounts of detergent to be used during its operation. Therefore, people who did not wish to install a permanently affixed, complicated mechanism, generally had no suitable apparatus for mechanically washing dishes, and had to resort to ordinary scrub brushes.

It is a primary object of my invention to alleviate these and other disadvantages in the prior art by providing a dishwashing apparatus comprising a combination brush having an integral, controllable detergent reservoir and a means for spraying washing fluid adjacent to the bristles of the brush.

Another object of this invention is to provide dishwashing apparatus which is easy to use, and which does not require complicated installation for its operation.

Still another object of this invention is to provide dishwashing apparatus containing an integrally supported detergent reservoir which can be attached to existing faucets by means of a simple coupling attachment.

A further object of this invention is to provide dishwashing apparatus consisting of a brush with a hollow handle that has a detergent reservoir and means by which the detergent can be supplied in metered quantities.

Other objects and advantages of my invention will become apparent from the following illustrative description.

In the drawings, where like numbers refer to like parts thereof:

FIGURE 1 is a plan view of the dishwashing apparatus in accordance with this invention;

FIGURE 2 is an enlarged fragmented cross-sectional view of the adaptor and selector portion of the dishwashing apparatus;

FIGURE 3 is a partial sectional end elevational view of the selector valve taken through 3—3 in FIGURE 2;

FIGURE 4 is another partial sectional end elevational view of the selector valve as illustrated in FIGURE 3;

FIGURE 5 is a longitudinally sectional view of the dishwashing apparatus;

FIGURE 6 is a cross-sectional view of the dishwashing apparatus taken through 6—6 in FIGURE 5, showing the filling valve and finger bar;

FIGURE 7 is another cross-sectional view of the filling valve illustrated in FIGURE 6;

FIGURE 8 is a fragmented enlarged sectional view of the detergent pump portion of the dishwashing apparatus in accordance with this invention;

FIGURE 9 is another fragmented enlarged sectional view of the detergent pump portion of the dishwashing apparatus illustrated in FIGURE 8, wherein the pump portion is in a different position;

FIGURE 10 is a cross-sectional view taken through 10—10 of FIGURE 8, showing detergent admission and loading ports in the detergent cylinder;

FIGURE 11 is a partially fragmented end view of the spray outlets;

FIGURE 12 is a partially fragmented sectioned view of a modification of the filling portion of the apparatus;

FIGURE 13 is a cross-sectional view of a split valve disk taken on line 13—13 in FIGURE 12; and

FIGURE 14 is a partial fragmented sectional view of a modification of the end of the detergent reservoir near the spray outlets.

Generally, my dishwashing apparatus includes a brush, a hollow handle element communicating with said brush, and a detergent reservoir formed in said handle element. Remote from the brush, a fluid inlet is provided on the handle element, to which is attached a flexible water conduit. The conduit extends to a valve connected to a water faucet. The valve is preferably adjustable so that water can either be directed through the conduit to the handle element and brush, or through a bypass outlet to a sink.

The handle element also includes a slidable piston movable from a detergent loading position to a detergent mixing positon. The piston pumps fluid detergent from the reservoir in metered amounts to the brush for intermixing with water for the washing operation.

Referring more particularly to the drawings, the brush element is generally designated **12**, and the elongated hollow handle element is designated **13**.

The brush element **12** includes a mixing chamber **15**, having a bottom plate **15***a*, with spray outlets **16**. An outside portion of hollow handle **13** defines the periphery of cylindrical detergent reservoir **18**. It surrounds a separate inner hollow portion that includes rigid tube **19**. Tube **19** provides a passageway through which washing fluid can flow from fluid inlet **17** to spray outlets **16**. Detergent reservoir **18** is closed at its end adjacent brush **12** by muzzle ring **20**, and at its other end by a filling valve to be subsequently described. Junction ferrule **22** connects the end of rigid tube **19** near muzzle ring **20** to mixing chamber **15**. Fluid leakage is prevented by resilient annular seal **20***a* surrounding tube **19**, and seal **20***b* peripherally located on muzzle ring **20**. Spray outlets **16** from mixing chamber **15** are preferably arranged in a circle and, in turn, are encircled by bristles **23**. By means of suitable deflection tabs **24**, which restrict spray outlets **16**, sprayed fluid from outlets **16** can be directed onto adjacent bristles **23**.

A modification of the detergent reservoir end sealing means is shown in FIGURE 14, where a rubber bushing **20***c* is substituted for muzzle ring **20** and annular seal **20***b*.

In tube **19**, between fluid inlet **17** and spray outlets **16**, is a detergent admission port **25** that opens into annular detergent cylinder chamber **26**. Detergent cylinder chamber **26** is defined by the space between the opposing peripheral surfaces on the exterior of tube **19** and interior of cylindrical member **27**. Cylindrical member **27** extends axially inwardly from muzzle ring **20** into detergent reser-

voir **18** and surrounds tube **19**. It contains detergent loading ports **29** which provide openings through which fluid detergent in detergent reservoir **18** can flow into detergent cylinder chamber **26**.

Cylindrical detergent piston **31** is slidably supported within detergent cylinder chamber **26** and seals the end thereof remote from muzzle ring **20**. Piston **31** surrounds rigid tube **19** and is axially slidable thereon. Its movement is limited by tongue **32** which extends inwardly from an end of piston **31** remote from cylinder chamber **26** into recess **33** in rigid tube **19**. A sealed slidable fit is provided between detergent piston **31** and detergent cylinder chamber **26** within which it is fitted.

Piston **31** is slidably responsive to fluid pressure changes within cylinder chamber **26**. It moves within cylinder chamber **26** from a detergent loading position, as shown in FIGURE 8, where detergent cylinder chamber **26** only communicates with detergent reservoir **18**, through detergent cylinder chamber loading ports **29**, and a detergent ejection position, as shown in FIGURE 9, where detergent cylinder chamber **26** only communicates with rigid tube **19** through detergent admission port **25**. Thus, movement of cylindrical member **27** toward inlet **17** will cause fluid pressure to increase within detergent cylinder chamber **26**, and piston **31** to move in response thereto. The relative location of piston **31**, detergent admission port **25** and loading ports **29**, is such that piston **31** blocks detergent admission port **25** in the detergent loading position, as shown in FIGURE 8, and blocks detergent loading ports **29** in the detergent ejection position, as shown in FIGURE 9.

Finger bar **39** projects from opposite sides of hollow handle **13** close enough to hand heel suction cup **41** that it can be gripped by the fingers of a person's hand, the heel of which is placed on suction cup **41**. Since increased squeezing of the finger grip **39** and suction cup **41** will cause detergent reservoir **18** to slide axially along hollow handle **13**, these elements will be referred to as a plunger means. Detergent reservoir **18** is slidably urged toward spray outlet end of hollow handle **13** by resilient spring **43** to the position shown in FIGURES 5 and 8.

Located on the end of detergent reservoir **18**, remote from ring **20**, is a filling valve which includes a disc **45** having filling ports **46**. Adjacent to disc **45** is funnel **47**, which can be rotated around tube **19**. Funnel **47** has a plurality of filling ports **48** in its bottom portion, which can be turned so as to coincide with filling ports **46** in adjacent disc **45** of detergent reservoir **18**, as shown in FIGURE 7, or by rotating funnel **47**, close filling ports **46** by covering them with solid portions in the bottom of funnel **47**.

In another embodiment of this invention shown in FIGURE 12, the filling valve is comprised of an elastomeric valve closing cup **50** tightly fitted around rigid tube **19** within detergent reservoir **18**, and adjacent thereto is an elastomeric split valve disc **52** (which is a solid piece of material fitted around tube **19** from which radial splits **52***a* extend, as shown in FIGURE 13) and perforated valve disc **54**. The valve discs **52** and **54** are in the bottom of funnel **47**. Filling ports **55** are provided in valve disc **54**, which is in turn resiliently urged by abutting spring **43** toward the junction of funnel **47**, and adjacent closing cup **50**. In the closed position, split valve disc **52**, in combination with annular washer **56**, forms a fluid-tight seal between closing cup **50** and filling ports **55** of valve disc **54**. When this filling valve is opened by squeezing finger bar **39** and suction cup **41** together, closing cup **50** is separated from split disc **52**, so that detergent under pressure can be forced through filling ports **55** between the splits **52***a* into detergent reservoir **18**. That is, when pressure is released from resilient split valve disc **52**, by separating closing cup **50** therefrom, the splits can be bent to increase their size so that an unobstructed passageway between the members is provided.

Attached to fluid inlet **17** of hollow handle **13** is flexible connector tube **61**, which provides a conduit for directing fluid from a fluid source such as water faucet **65**. Adapter valve **67**, secured to the faucet **65**, includes a connection nipple **67***a*, to which the end of connector tube **61** is secured.

Fastener **68** provides the pivotal point for axial rotation of the valve **67** to move the valve to allow water to pass into conduit **61** or a bypass **69**. Selector plate **63** contains a bypass outlet **69**, through which water from water faucet **65** can be diverted by turning selector plate **63** to the position shown in FIGURE 3. The turning movement of selector plate **63** is limited by movement of stud **71**, which projects through curved slot **73**. When turned to the position shown in FIGURE 4, water can flow from the attached water faucet **65** through conduit or tube **61**. Water from bypass **69** is absolutely detergent free.

In operation, the detergent reservoir **18** is filled with a suitable amount of fluid detergent through filling valve **45**, which is opened by turning funnel **47** in the embodiment shown in FIGURES 5, 6 and 7, or by squeezing the plunger means in the embodiment shown in FIGURE 12.

Faucet **65** is turned on and selector plate **63** is opened so that water will flow down conduit **61**, through rigid tube **19** within hollow handle **13**, and be sprayed out spray outlets **16**. Water of desired temperature and quantity is controlled through faucet **65**.

By gripping the device so that suction cup brace **41** is seated in the heel of a hand, and the fingers of the hand grasp finger bar **39**, a person can squeeze the plunger means so as to cause detergent reservoir **18** to slide axially along hollow handle **13**. As the plunger means is squeezed, piston **31** moves within detergent cylinder chamber **26**, causing detergent admission port **25** to open, detergent loading ports **29** to close, and fluid detergent contained within detergent cylinder chamber **26** to be ejected through detergent admission port **25** into rigid tube **19**. The fluid detergent is mixed with water flowing through rigid tube **19** into mixing chamber **15**, and is sprayed out spray outlets **16** adjacent bristles **23** for the washing operation. Releasing the plunger means causes spring **43** to urge detergent reservoir **18** to slide back toward mixing chamber **15**, piston **31** to move from detergent cylinder chamber **26**, detergent admission port **25** to close, and detergent loading ports **31** to open so that fluid detergent within detergent reservoir **18** can flow into and fill detergent cylinder chamber **26**.

When the plunger means is squeezed, the amount of fluid detergent ejected into rigid tube **19** is limited to the amount carried in detergent cylinder **26**. Thus, a metering system is provided for the fluid detergent. Each time the plunger means is squeezed, additional quantities of detergent are ejected in increments equal to the capacity of the detergent cylinder chamber **26**. When the plunger means is released, detergent cylinder chamber **26** is filled with detergent which flows from detergent reservoir **18**.

The dishwashing apparatus herein described can be made from a wide variety of materials so long as they are sufficiently durable to withstand the abuse of normal usage. It is deemed preferable, however, to make the exterior of the detergent reservoir of a clear plastic so that it can be visually ascertained when it needs to be refilled with fluid detergent. The parts of the apparatus which are in sliding engagement with each other should preferably be made of sturdy, relatively smooth material to lessen frictional drag, and the sealed portions should provide fluid-tight engagement of the associated members.

In operation closing cup **50** is so positioned on tube **19** that it opens port **55** in disc **54** when bar **39** and cup **41** are squeezed together. A dual function is therefore accomplished in that the ports **55** are opened to permit filling and the detergent admission port **25** is closed during this operation to prevent passage of water into the detergent reservoir **18**.

The dishwashing apparatus when normally used in an inclined position, with the brush down, prevents detergent

spillage from the apparatus and also permits easy gravity loading of the reservoir with liquid detergent.

Though preferred embodiments of this invention have been shown and described herein, the invention is not intended to be limited thereto, but to co-extend with the scope and spirit of the following appended claims.

What is claimed is:

1. Dishwashing apparatus comprising: a brush having a fluid passageway therethrough terminating in fluid spray outlets; a hollow handle with said brush mounted on an end thereof, an inner tubular portion of said hollow handle having a fluid outlet communicating with the passageway through the brush and said fluid inlet in the end of the hollow handle remote from the brush so that fluid entering the fluid inlet can flow through the hollow handle and out the spray outlets; an integral detergent reservoir forming the periphery of said hollow handle; a detergent cylinder within said detergent reservoir that communicates both with the detergent reservoir and the inner tubular portion of said hollow handle; said hollow handle, detergent cylinder and detergent reservoir having a common, longitudinal axis, ejection means for directly controllably releasing fluid contained within the detergent reservoir into the detergent cylinder and from the detergent cylinder into the inner tubular portion of the hollow handle; said ejection means including a piston slidably supported within said detergent cylinder and having a common longitudinal axis therewith, which is movable between a detergent loading position where the detergent cylinder only communicates with the detergent reservoir and a detergent mixing position where the detergent cylinder only communicates with the inner tubular portion of the hollow handle; and manually controllable plunger means which can actuate said piston within the detergent cylinder so as to move it between the detergent loading position and the detergent mixing position.

2. Dishwashing apparatus comprising: a brush including a fluid chamber and spray outlets, a hollow handle means mounted on said brush, said hollow handle including an inner tubular portion slidably mountable and extending coaxially therethrough and affixed at one end to said brush fluid chamber, the other end of said inner tubular portion being fitted to receive water so that water may flow through said inner tubular portion to said brush spray outlets, said hollow handle means forming a detergent reservoir around said inner tubular portion, ejection means for controllably releasing fluid detergent in said reservoir to said inner tubular portion for mixing with said water and delivery to said brush, said ejection means including an annular sleeve surrounding said inner tubular portion and spaced therefrom, forming a detergent cylinder chamber therebetween, a piston slidably mounted on said inner tubular portion and adapted to move in said chamber between a detergent loading position where there is only communication between said reservoir and said chamber and an extended detergent mixing position where there is only communication between said chamber and the inner tubular portion whereby the detergent in said chamber will be evacuated into said water for mixed delivery to said brush, and exterior manual hand means for activating said ejection means.

3. Dishwashing apparatus as defined in claim 2, wherein bristles of the brush encircle the spray outlets and the spray outlets are oriented so as to deflect fluid flowing therefrom against said bristles.

4. Dishwashing apparatus as defined in claim 2, in combination with a connector tube wherein one end of said connector tube communicates with the fluid inlet of the hollow handle and the other end communicates with a source of fluid, said connector tube having adjustable valve means for controlling the amount of fluid flowing through said connector tube from the source of fluid to the hollow handle.

5. Dishwashing apparatus as defined in claim 2, wherein movement of the piston within the detergent cylinder toward the detergent mixing position forces detergent contained therein into the inner tubular portion of the hollow handle.

6. Dishwashing apparatus comprising: a brush with circularly arranged bristles, said brush having a passageway therethrough which terminates in a plurality of spray outlets adjacent said circularly arranged bristles, said spray outlets being oriented so as to spray fluid adjacent said bristles; a tubular member upon which said brush is mounted having a fluid inlet on the end remote from the fluid spray outlets, a fluid outlet end communicating with the brush passageway, and a detergent admission port intermediate the fluid inlet and fluid outlet, a cylindrical detergent reservoir surrounding said tubular member at least around the portion thereof having the detergent admission port, said detergent reservoir having closable detergent filling inlets; a detergent cylinder supported within said detergent reservoir, said detergent cylinder opening into the detergent reservoir through detergent loading ports and opening into the tubular member through the detergent inlet; a piston slidably supported within said detergent cylinder movable between a loading position where the detergent cylinder only communicates with the detergent reservoir and a detergent mixing position where the detergent cylinder only communicates with the tubular member; manually controllable plunger means for moving said piston from the detergent loading position to the detergent mixing position where it is capable of simultaneously forcing fluid detergent contained within the detergent cylinder into the tubular member; a connector tube attached between the fluid inlet of the tubular member and a source of fluid, said connector tube having adjustable valve means for controlling the amount of fluid flowing through said connector tube from the source of fluid to the fluid inlet of the tubular member; and wherein the detergent filling inlet for the detergent reservoir includes a filling valve which is opened by moving the controllable plunger means and associated piston to the detergent mixing position.

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