Jan. 30, 1951 R. E. WEBER 2,540,064

WATER AND DETERGENT MIXER

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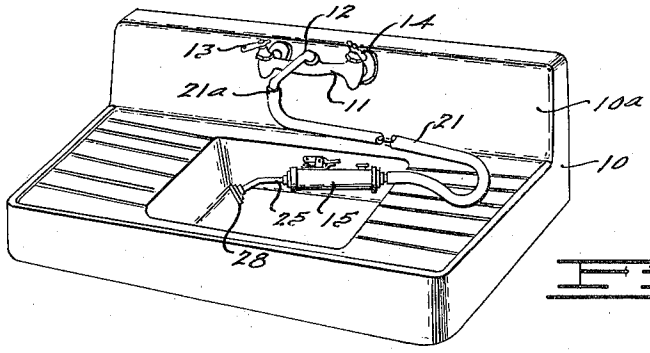


Fig. 1.

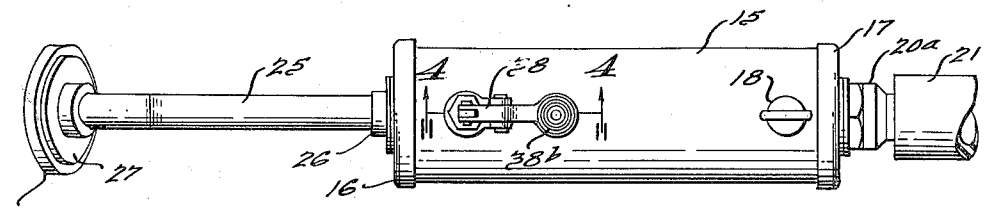


Fig. 2.

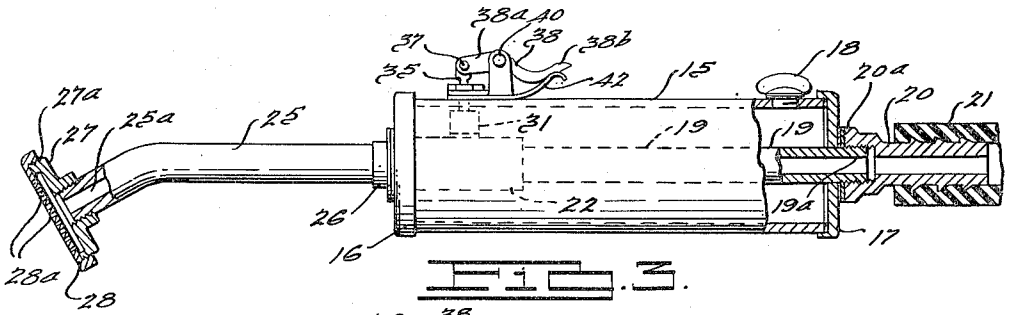


Fig. 3.

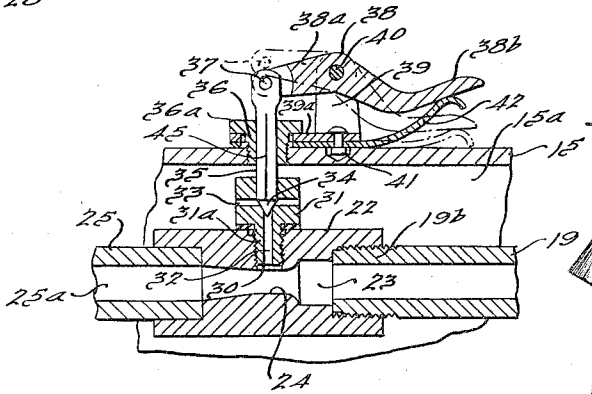


Fig. 4.

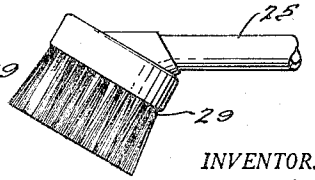


Fig. 5.

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WATER AND DETERGENT MIXER

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2 Claims. (Cl. 299—84)

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This invention relates to dish washers and particularly to a device of this general character which may be manipulated to wash or clean dishes and other articles, the device terminating in a distributor head, fountain brush or the like to which clear water or a predetermined mixture of water and foam producing detergent or equivalent substance may be supplied under pressure.

An object of the present invention is to provide a manually operable dish washing device or the like of the foregoing kind having a reservoir or chamber containing a supply of liquid detergent communicating with a Venturi passage interposed in a water or other liquid pressure supply conduit, whereby the detergent may be drawn as desired into the supply conduit by suction or negative pressure in accordance with the setting of a valve conveniently arranged for manual operation.

A further object of the invention is to provide a dish washing device having a flexible conduit adapted to be connected to a source of water under pressure and terminating in a distributor head, brush or other cleaning member, the device including a reservoir containing liquid foam producing detergent and a valve controlled duct or conduit leading from the reservoir to a Venturi whereby either a predetermined mixture of water and detergent or clear water may be discharged from the device as desired.

Another object of the invention is to provide a dish washing device of the foregoing kind in which the flexible conduit may be detachably connected at one end to the spout of a hot and cold water mixing unit associated with a kitchen sink and the Venturi together with the detergent reservoir communicating therewith is carried by a handle disposed in the length of said conduit.

Still another object of the invention is to provide a flexible conduit through which water under pressure is adapted to be supplied to a washing or cleaning element at the discharge end thereof, and Venturi means for mixing a foam producing detergent or similar substance with said water to produce a foam or suds effect at said discharge end, the amount of such mixture of water and detergent being conveniently controlled by a valve in the handle of the device located proximate to the Venturi.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a perspective view of a conventional kitchen sink and a hot and cold water mixing valve unit to which is connected a dish washing device constructed in accordance with one embodiment of the present invention.

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Fig. 2 is a plan view of a portion of the dish washing device shown in Fig. 1.

Fig. 3 is a side elevation, partly in section, of the structure shown in Fig. 2.

Fig. 4 is an enlarged fragmentary section taken substantially through lines 4—4 of Fig. 2 looking in the direction of the arrows.

Fig. 5 is a fragmentary view illustrating a fountain brush attached to the discharge end of the device.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

In the drawings there is illustrated, by way of example, one embodiment of the invention as applied to a dish washing device adapted to be used for washing or cleaning dishes or the like in any conventional sink, such as that illustrated at 10 in Fig. 1. Associated with the sink is a hot and cold water mixing unit 11 which may be mounted on the splashback 10a of the sink, as shown, or in any other well known manner at the back of the sink, this unit having the usual swinging delivery spout 12 and hot and cold water supply valves controlled by handles 13 and 14.

The present washing device comprises a cylindrical reservoir 15 which in the present instance forms a handle or hand grip which may be grasped for manipulating the device. Fixed to the front and rear ends of the reservoir cylinder 15 are closure caps 16 and 17, respectively, these caps being secured in such manner to the cylinder as to seal the chamber 15a within the cylinder against leakage of liquid therefrom. Threaded into a tapped hole in the top of the reservoir cylinder 15, such as at the rear end thereof, is a filler cap 18 which may be removed in order to introduce into the chamber 15a a supply of liquid foam producing detergent. Any suitable liquid detergent, well known on the market, may be utilized or the liquid detergent may be prepared by dissolving a small quantity of detergent powder in water and then introducing the same into the reservoir cylinder 15.

Extending into the cylinder 15 and secured within a hole in the end cap 17 is an inlet tube 19, the rear end 19a of the tube projecting through the cap or closure 17 and being threaded for the attachment thereto of the enlarged end 20a of a coupling member or nipple 20 which receives the outer end of a flexible tube or rubber hose 21. The tube or hose 21 may be of any desired length and has its inner end 21a constructed

so as to permit its ready attachment to the spout 12 by forcing it over the discharge end of the spout, as shown in Fig. 1.

The inner end 19b of the inlet tube 19 is threaded for the attachment thereto of a tubular member 22 which is herein termed, for convenience, a Venturi coupling, this coupling having a passage 23 communicating with the passage through the tube 19 and being provided with a tapped counterbore into which the end of the tube 19 is threaded. The cylindrical passage 23 in the Venturi coupling 22 communicates with a Venturi passage 24 formed within the coupling and this Venturi passage flares out for communication with a central passage 25a in the outlet or distributor tube 25 having a press fit within a hole in the coupling 22 and extending through a hole in the end cap 16, being attached to the latter by means of a coupling 26. Suitable gaskets are interposed between the couplings 20 and 26 and the end caps 17 and 16 in order to prevent leakage of liquid from the reservoir cylinder 15.

The distributor tube 25 forms with the reservoir cylinder 15 a rigid unit which may be manipulated by using the cylinder 15 as a hand grip, for washing or cleaning dishes or the like. The outer end of the tube 25 is threaded for the attachment thereto of the base 27 of a two-part distributing head. The base 27 has an annular threaded flange 27a to which is detachably connected a distributor disk or head 28 which is foraminous or perforated in order to provide a multiplicity of small discharge orifices or holes 28a having a total area as great as the cross sectional area of the passage 25a, thus permitting an unrestricted flow of liquid under pressure through the distributor head. In using a distributor head 27, 28 of the general type illustrated in Fig. 3 either a spray of pure water or a foam producing mixture of water and detergent may be discharged from the head. However, it will be understood that the perforated discharge member 28 may be replaced, as illustrated in Fig. 5, by means of a fountain brush 29 or any other suitable cleaning or scrubbing device.

The Venturi coupling 22 is provided at the locality of the Venturi 24 with a hole 30 extending preferably at right angles to the longitudinal axis of the coupling. This hole is tapped to receive the threaded reduced end 31a of a valve member 31 having a small passage or duct 32 opening into the Venturi passage 24. In the present instance the upper portion of the valve member 31, which lies within the chamber 15a, is drilled to provide a longitudinal passage or duct 33 communicating with the duct 32 and also with the liquid within the chamber 15a. The upper end of the duct 32 at its juncture with the duct 33 is machined to provide a tapered valve seat engageable by a tapered or conical valve 34 carried by a valve stem 35 slidable vertically within a hole in the valve member 31. The valve stem 35 has a sliding fit in a hole in a plug 36 which has a reduced threaded end screwed into a tapped hole in the cylinder 15.

The upper projecting end of the valve stem 35 projects within the bifurcated end 38a of a lever 38 and is pivoted thereto at 37. The lever extends between the spaced upright sides of a U-shaped bracket 39 and is pivoted thereto at 40 intermediate the ends of the lever. The bracket 39 has a base 39a secured by means of a bolt 41 to the cylinder 15. This base of the bracket is overlapped by the head 36a of the plug 36

which assists in holding the same rigidly in place. The rear end of the lever 38 terminates in a finger piece 38b which is engaged at its underside by the outer end of a leaf spring 42, the inner end of this spring being confined between the base 39a of the bracket 39 and the cylinder 15 and clamped in place by means of the bolt 41.

The spring 42 engaging the rear end of the lever 39 functions to hold the lever normally in the position shown in Fig. 4, thereby forcing or urging the valve stem 35 downwardly with the valve 34 fully seated within the valve member 31 and, hence, closing off communication between the chamber 15a and the passage or duct 32 in the valve member. Thus, when the valve is seated, as shown in Fig. 4, water under pressure flowing through the Venturi passage 24 from the inlet tube 19 to the outlet tube 25 will not withdraw or entrain therewith any liquid detergent from the chamber 15a. Hence, under these conditions clear water under pressure will be discharged from the distributor head 28 or fountain brush 29. When it is desired to entrain liquid detergent with the water flowing through the Venturi coupling 22 the finger piece 38b is pressed down by the thumb thereby raising the valve 34 from its seat and opening communication between the duct 32 and the duct 33 leading into the chamber 15a. Under these conditions water flowing under pressure through the Venturi passage 24 will by suction or the creation of negative pressure within the Venturi passage withdraw liquid detergent from the chamber 15a through the ducts 33 and 32. This liquid detergent will be entrained with the water flowing through the Venturi passage and a foamy discharge will be produced at the discharge end of the nozzle.

I prefer to provide means not only for air venting the reservoir chamber 15a but also for permitting air to be drawn along with the detergent into the stream flowing through the nozzle tube 25. As a consequence, the foamy discharge will be aerated and increased in volume thus reducing the amount of detergent used without impairing the cleaning action. The foregoing is accomplished, by way of example, by machining a small air bleed groove or channel 45 on the outside of the valve stem, the lower end of the groove terminating at the valve 34 and the upper end being open to the atmosphere. When the valve is seated by the action of spring 42 no air will be drawn through the groove past the valve into the Venturi passage. However, upon lifting the valve from its seat air as well as detergent will be drawn into the Venturi passage and entrained with the water flowing therethrough.

Although the cylinder 15 serves in the present instance the dual purpose of a handle and a reservoir for detergent, it will be understood that the detergent may be contained in a reservoir remotely located which in turn may be connected by a conduit to the duct 33 in the needle valve member 31.

I claim:

1. In a manually operable fountain type dish washing device, a flexible conduit adapted to be connected with a source of water under pressure and having a discharge opening, a reservoir for a fluid detergent, a Venturi passage in said conduit, a detergent supply duct in communication with said reservoir and opening into said Venturi passage, a manually controlled needle valve within said duct for adjustably regulating

the flow of detergent therethrough and having the shank thereof extending from the duct to the atmosphere, and means to aerate the detergent flowing through the duct comprising a small air bleed conduit extending longitudinally within the shaft and opening at one end into the duct, the other end of the air bleed duct opening to the atmosphere.

2. In a manually operable fountain type dish washing device, a flexible conduit adapted to be connected with a source of water under pressure and having a discharge opening, a reservoir for a fluid detergent, a Venturi passage in said conduit, a detergent supply duct in communication with said reservoir and opening into said Venturi passage, a valve seat for a needle valve within said duct, a needle valve having a tapered end adapted to seat against said valve seat to close said duct and having a slender shank extending from the tapered end through the wall of the duct to the atmosphere, means to aerate the detergent flowing through the duct comprising an air bleed groove in the sidewall of said shank extending longitudinally thereof from the atmosphere through the sidewall of the duct, reciprocating finger actuated control means operatively connected with said shank and adjustably movable in one direction by finger pressure to move the tapered end from said seat, thereby to adjustably regulate the flow of detergent through the duct, and spring means yieldingly urging the tapered end to the seated position to close the valve upon release of the finger pressure.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
931,757	Harmer	Aug. 24, 1909
1,079,721	Pungs	Nov. 25, 1913
1,082,141	Sites	Dec. 23, 1913
1,441,678	Goldsby	Jan. 9, 1923
1,490,510	Gooley	Apr. 15, 1924
1,633,800	Wilcox	June 28, 1927
2,376,565	Williams	May 22, 1945

FOREIGN PATENTS

Number	Country	Date
188,852	Great Britain	Nov. 23, 1922