Oct. 5, 1954 J. J. GOODRIE 2,690,717

WATER AND DETERGENT MIXER

Filed Jan. 16, 1951

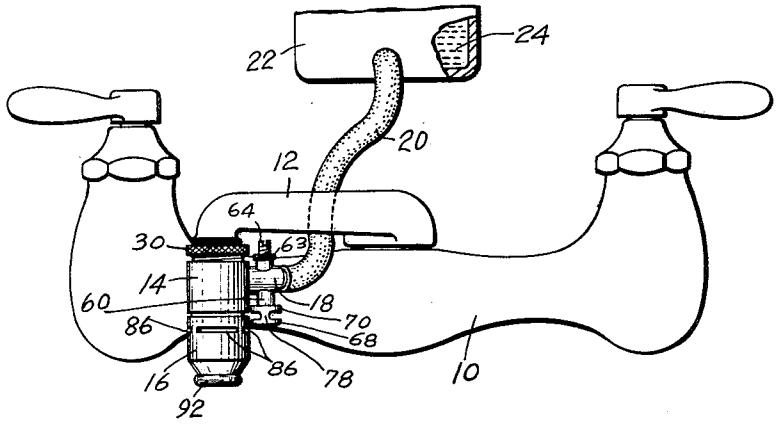
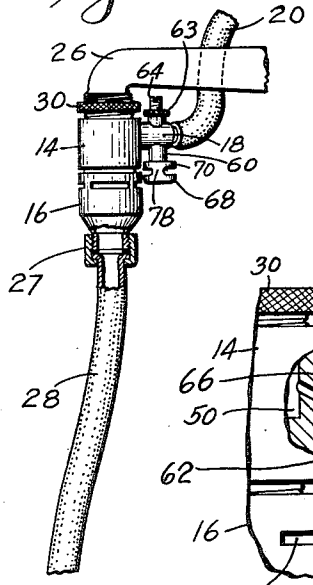


Fig. 1.

Fig. 2.



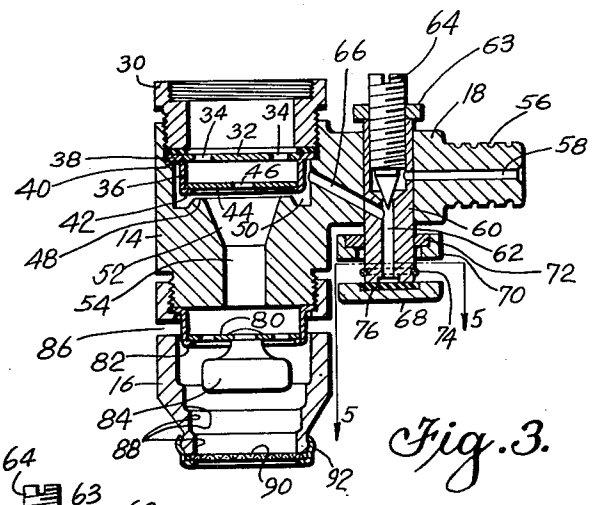


Fig. 3.

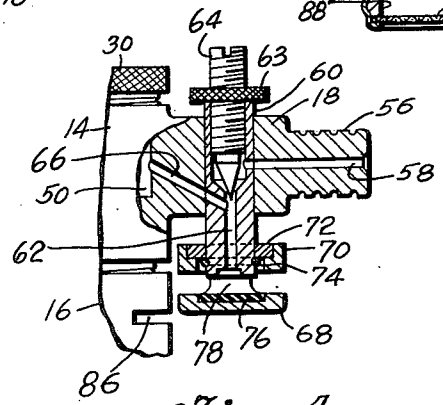


Fig. 4.

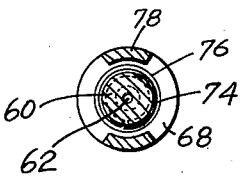


Fig. 5.

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WATER AND DETERGENT MIXER

Joseph J. Goodrie, Chicago, Ill.

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1 Claim. (Cl. 103—262)

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This invention relates to an improved water and detergent mixer and the present application is a continuation in part and discloses some improvements of my prior application for patent on a similar apparatus which is entitled fluid mixing device and which was filed September 21, 1950, Serial No. 186,096.

One of the important objects of this invention is to provide a means for mixing water with a detergent fluid in pre-determined quantities, particularly for various washing and cleaning operations, including household work. The mixed liquids are also aerated.

Another object of the invention is the provision of an apparatus for mixing a fluid detergent with water, including a vacuum breaking element whereby the flow of liquid detergent will be automatically shut off when the washing and cleaning operation is discontinued and wherein a subsequent initiation of the flow of water will not include a supply of detergent.

Still another object of the invention is the provision in a device of the class described of means for simply and readily reinstating the flow of liquid detergent and the mixing of same with water whenever desired. A coherent non-splash jet is provided.

Yet another object of the invention resides in the provision of simple control means whereby the amount of liquid detergent supplied with the water can be conveniently regulated.

Other and still further important object of the invention is the provision in a device for automatically mixing a predetermined amount of liquid detergent for washing purposes, of means for preventing undesirable splashing when the mixed fluids are directed onto an object to be washed or cleaned.

The construction of the device of this invention is predicated upon some of my earlier patents relating to vacuum breakers and fluid mixing devices, for example, my U. S. Patent No. 2,134,182, granted October 25, 1938, entitled "Unitary Flush Valve Connection," and my Patent No. 2,151,200, granted March 21, 1939, entitled "Fixed Vacuum Breaker for Flush Valves." This invention is also based in part upon my two patents granted June 6, 1950, Nos. 2,510,395 and 2,510,396, entiled "Water and Air Mixing Device" and "Aerating Device," respectively; also, my Patent No. 2,565,554, dated August 28, 1951.

Other and further important objects of the invention will be apparent from the disclosures in the accompanying drawing and the following specification.

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The invention, in a preferred form, is illustrated in the drawing and hereinafter more fully described.

In the drawings:

Figure 1 is an elevation of an ordinary hot and cold water mixing faucet usually employed in household sinks and the like for dishwashing and similar purposes and which faucet has the improved water and detergent mixing device of my invention applied thereto.

Figure 2 illustrates the device of my invention mounted on a single faucet and with an attached hose for delivering the mixed water and detergent to a more remote point.

Figure 3 is an enlarged vertical section showing in detail the structure of my improved water and detergent mixer illustrating the same in fluid mixing position.

Figure 4 is a sectional view of a portion of the structure shown in Figure 3 but illustrating the same in "off" position whereby no detergent is mixed with the water flowing through the device.

Figure 5 is a horizontal section taken on the line 5—5 of Figure 3 looking in the direction indicated by the arrows as shown.

As shown in the drawings:

The reference numeral 10 indicates generally an ordinary hot and cold water mixing faucet as generally used in sinks for household work and with the delivery spout 12. It will be obvious that the apparatus of this invention can be used with other devices and in various embodiments.

The device itself is shown as including an upper body portion 14 and a lower body portion 16, the upper body portion having an extension 18 to which a length of hose or flexible pipe 20 is connected, this, in turn, leading to a tank 22 which contains a supply of fluid detergent or other similar material 24.

In Figure 2 the device 14—16 is shown as attached to a single pipe or water outlet 26 and provided with a connection 20 to a source of detergent. In this embodiment, the lower portion 16 of the apparatus is provided with a coupling 27, whereby a length of hose or the like 28 can be conveniently attached for the purpose of leading the mixed water and detergent to a desired spot somewhat remote from the faucet 26.

As best shown in Figure 3, the mixing device itself includes the upper body portion 14 having an extension 18 which is preferably integral therewith and the lower body portion 16 which is separable from the element 14.

The element 14 is surmounted by a screw-threaded coupling 30 which enables the ready

fastening thereof to a spout or faucet, such as those shown at 12 or 26, and this coupling 30 also serves to maintain in desired position a water breakup means which includes a disk 32 having a series of openings 34 about its periphery. This disk is positioned in a cylindrical holder 36 which has an integral upper flared rim 38 which fits upon an annular shoulder 40 formed in the interior of the body 14. The cylinder 36 is provided at its lower end with an inturned integral flange 42 upon which is fitted a disk 44 which has a single central opening 46 therein. This disk 44 and its supporting cylinder 36 are of such dimensions that the lower face of the disk 44 is spaced slightly away forming integral annular ridge 48 forming part of the body 14. This ridge 48 defines an outer channel 50 and an inner opening 52, the walls of which are tapered inwardly as shown and which terminate in a cylindrical opening 54.

Preferably integral with the body portion 14 is an extension 18 which includes a fitting 56 to which the hose 20 of Figures 1 and 2 can be attached. This fitting 56 is provided with a central longitudinal opening 58 forming a passageway for incoming fluid detergent. This passageway terminates in a bushing 60 fitted into the extension 18 and which is centrally bored to provide an air inlet 62 and a tapped recess for the introduction of a screw-threaded needle valve 64.

The lower end of the needle valve 64 operates against the upper end of the passageway 62, thereby providing a ready adjustment for the amount of detergent which is allowed to flow into the mixer. Fluid detergent passing the valve enters a conduit 66 which leads to the annular chamber or channel 50 defined by the ridge 48 and the exterior wall of the cylinder 36.

Loosely mounted on the lower end of the sleeve or cylinder 60 is a detergent flow regulating element in the form of an opening cap 68 as best shown in Figures 3, 4 and 5. This upper end of this cap is provided with a shoulder 70 into which is fitted a washer 72 which loosely surrounds the sleeve 60. A fastening ring 74 is fitted into a groove adjacent the lower end of the sleeve 60, whereby accidental falling off of the cap 68 is prevented. A flat gasket 76 is fitted in a corresponding recess in the lower inner face of the cap 68, which gasket acts against the lower end of the sleeve 60 sealing the opening 62 when the cap is in raised position as shown in Figure 3.

The cap is in two portions 68 and 70 which are connected by integral uprights 78 as best shown in Figures 2 and 5. The spacing of these uprights permit a ready access of air to the tube 62 in the sleeve 60 when the cap is in lowermost position as shown in Figure 4. The needle valve 64 can be locked in adjusted position by means of a locking nut 63.

When water is allowed to flow through the spout 12 or 26, it passes into the body 14 and is broken up by the perforated disks 32 and 44. The passage of the water through these disks and through the openings 52 and 54 creates an aspirating effect which has a tendency to pull a vacuum in the passageways 58, 62 and 66. However, when the cap 68 is in its lowermost position as shown in Figure 4, air will enter the channel 62 and no vacuum will exist in the passageway 58. Consequently no detergent fluid will be drawn through the hose 20 from the container 22.

In order to instigate a flow of detergent fluid, it is only necessary for the operator to push upwardly on the cap 68, whereupon the gasket 76 will fit against the lower end of the sleeve 60 sealing the opening or passageway 62. As soon as this is done, the vacuum created by the aspirating effect of the water flowing through the body 14 will cause a suction in the channels 58 and 66, whereby liquid detergent 24 will be impelled through the passageways and past the needle valve 64. The amount of liquid detergent thus flowing is regulated by the positioning of the needle valve.

This condition will remain until such time as the cap 68 is manually moved downwardly or until the flow of water through the spout 12 or 26 is shut off. When this occurs, the aspirating effect through the passageways 58 and 66 will immediately cease and no more liquid detergent will flow.

When the flow of water through the spout 12 or 26 is resumed, no detergent will be drawn from the container 22 until such time as the cap 68 is again moved upwardly to close the passageway 62. In this manner, the mixture of detergent and water can first be used for washing and cleansing purposes and an instantaneous stoppage of the flow of water, followed by an immediate resumption of the flow, will provide a source of clean rinsing water free from detergent.

It has been found that some undesirable splashing of the mixed water and detergent occurs if the body 14 with its extension 18 are solely employed for the supply of mixed water and detergent. In order to remedy this situation, an anti-splashing attachment is fitted onto the screw-threaded lower end of the body 14, this anti-splashing attachment being indicated by the reference numeral 16 and comprising an aerator substantially as disclosed in one or both of my two prior patents granted June 6, 1950, as hereinabove described.

This anti-splash fitting or aerator includes a perforated disk 80, a cylindrical holder therefor 82, and in the center of the perforated disk 80 is positioned a water and air mixing plug 84 substantially as shown and described in my prior patents.

Air inlets 86 are provided in the body 16, these being adjacent to the outer facing of the cylindrical holder 82 and tapered shoulders 88 are formed in the inner lower face of the body 16. A screen 90 held in position by a flange retainer 92 is mounted on the lower end of the body 16 for providing a more coherent jet, this being employed, however, only when the device is used with the faucet illustrated in Figure 1 as distinguished from the hose connection shown in Figure 2.

It will be evident that herein is provided a mixing device for water and a fluid detergent, which, in addition to providing a thorough desired combination of the two fluids for washing and cleaning purposes, will practically automatically also provide a source of clean rinsing water while, at the same time, including an anti-splashing means which produces a coherent jet of water mixed with air and at desired times with detergent, whereby highly satisfactory cleaning operation results.

I am aware that many changes may be made and numerous details of construction varied throughout a wide range without departing from the principles of this invention, and I, therefore, do not propose limiting the patent granted hereon otherwise than as necessitated by the prior art.

I claim as my invention:

In a mixing attachment for water faucets comprising a body, having a water passage therethrough, a portion of said water passage forming a Venturi tube and a detergent passage in said body communicating with said water passage adjacent the upper end of said Venturi tube, the improvement comprising an atmospheric vent in said detergent passage, a valve in position to close said vent when pushed upwardly and to open said vent when allowed to drop by gravity, said valve having upper and lower faces respectively exposed to the atmosphere and the area of the atmospheric vent with respect to the valve area being such that when the valve is moved to closed position during operation, the the interior suction will overcome the force of gravity on the valve.

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