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MIXING ATTACHMENT FOR WATER FAUCETS

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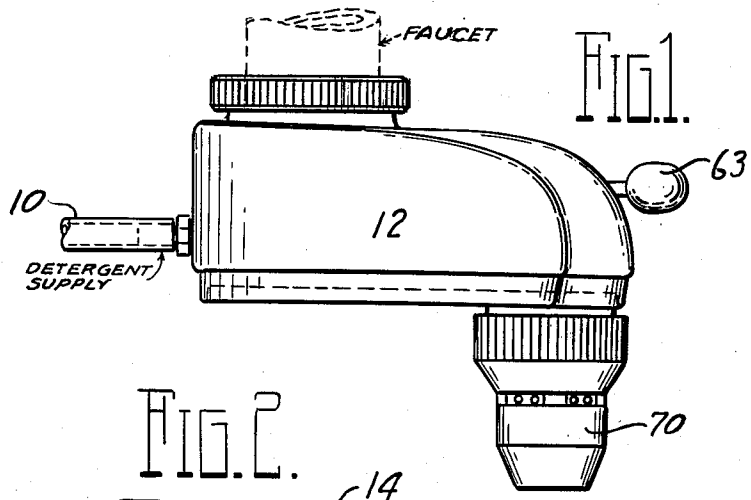
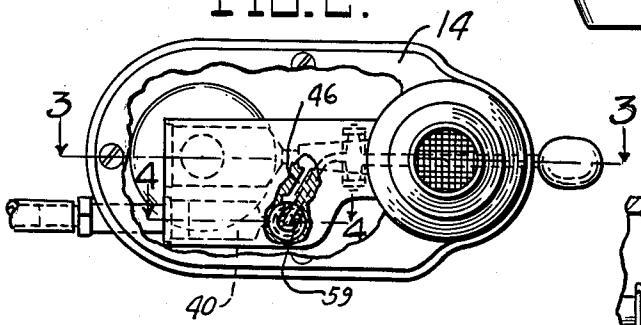


FIG. 1.

FIG. 2.



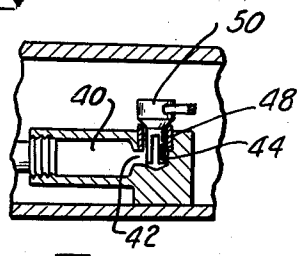


FIG. 4.

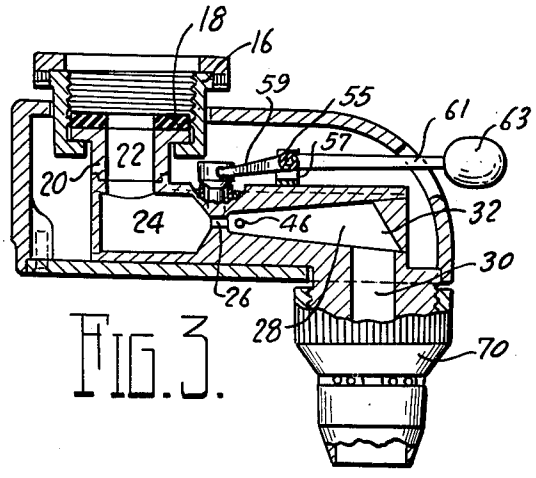


FIG. 3.

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MIXING ATTACHMENT FOR WATER FAUCETS

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3 Claims. (Cl. 137—604)

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This invention relates to an attachment for water faucets of the type that permits the selective introduction of detergents into the stream issuing from the faucet.

The primary object of the invention is to provide a simple and effective mechanism that can be easily attached to any existing faucet and which, when operated, introduces detergent into the water stream in one position and excludes detergent from the stream in another position, the parts being so arranged that the introduction of detergent requires a conscious movement on the part of the operator.

Another object of the invention is to provide a detergent mixing device in which the parts are so arranged that they are not likely to get out of order and require adjustment and repair.

Still another object of the invention is to provide a detergent mixing device in which a vent opening to the detergent line is controlled by a manually movable valve, which valve seats against a resilient seat so that it is unlikely to leak over a long period of time and after a large number of cycles of operation.

Still another object of the invention is to provide a simple and efficient biasing means for the detergent control valve.

Other objects and advantages will become apparent from the following description of a preferred modification, reference being had to the accompanying drawings in which:

Fig. 1 is a side elevational view of a mixing device embodying our invention;

Fig. 2 is a bottom view thereof with parts broken away;

Fig. 3 is a longitudinal sectional view taken on line 3—3 of Fig. 2; and

Fig. 4 is a fragmentary sectional view taken on line 4—4 of Fig. 2.

Referring to the drawings, the mixing device of the present invention is adapted to be attached to a faucet indicated in dotted lines in Fig. 1 and to be connected to a detergent supply through a tube 10, the supply container itself being not shown in the drawings. In practice the supply container may conveniently comprise a drum located at a point remote from the faucet. It has been found that the drum need not even be on the same floor as the mixing device since the device is capable of drawing detergent from a drum at a level of 15 or 20 feet below the unit.

The mixing device comprises a body or housing 12 having a floor plate 14 which may be removed to give access to the inner parts hereinafter described. At its top the housing surrounds a

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coupling 16 of any suitable form by which connection can be made to an existing water faucet. In the form shown the coupling is threaded and is provided with a washer 18 which seats against the mouth of the faucet to prevent leakage.

The washer 18 seats against the top of a flow body 20 which forms or carries substantially all of the operative parts of the mixing device comprising the invention. The flow body comprises a body of non-corrodable material having a water passage and a detergent passage therein as hereinafter described, and fixed to floor plate 14 against movement within housing 12.

The water passage through the body 20 commences with a downwardly directed portion 22 from the faucet which discharges into a somewhat enlarged horizontally directed chamber 24, the forward wall of which is tapered to terminate in a highly restricted orifice 26 through which the water from the faucet must pass at greatly increased velocity. The water stream expands and reduces its velocity in a tapered chamber 28 which joins a downwardly directed discharge passage 30. If desired, the flow characteristics may be somewhat improved by tapering the outer end wall of chamber 28 as at 32 in order that the water impinging against this end wall will have imparted thereto a component of motion downwardly toward passage 30.

It will be seen that the restricted orifice 26 and the passage 28 of increasing diameter form a Venturi tube which has an area of great pressure reduction immediately adjacent the orifice 26.

The body 20 also includes a detergent supply conduit which communicates with supply tube 10, the conduit itself including a detergent chamber 40 as indicated in Figs. 2 and 4. The detergent chamber 40 terminates in a restricted passage 42 which connects chamber 40 with a vertical bore 44 from which a lateral detergent passage 46 is formed which empties into the water passage 28 closely adjacent the orifice 26. Since the detergent in passage 46 joins the water stream at that portion of the water passage which is at the lowest pressure the Venturi action in orifice 26 and passage 28 tends to draw detergent from chamber 40 through passage 42, the vertical bore 44, and the lateral passage 46.

The vertical bore 44 is normally open at its top and forms a part of a detergent passage venting device. For the purpose of closing the vent so formed the bore carries a somewhat resilient valve seat 48 as shown in Fig. 4. Seat 48 may project somewhat above the level of the upper

surface of body 20 and may conveniently be made of a short length of plastic tubing cemented or otherwise fixed in the vertical bore 44. The valve seat cooperates with a vent control valve 50 which latter, when in its seated position, closes the vertical bore 44 with an air-tight connection and thus permits the flow of detergent from chamber 40 through the several passages to the lateral passage 46 which empties into the water supply adjacent orifice 26. It will be apparent that when valve 50 is raised or opened the vertical bore 44 is vented to atmosphere and the bore 44 and lateral passage 46 will draw air around the under surface of valve 50 rather than detergent from chamber 40 and the detergent supply.

It will be apparent that since valve 50 controls the flow either of air or detergent to be mixed with the water stream it is only necessary for the operator to control the position of this valve either to draw a mixture of detergent and water from the device or to exclude the detergent and draw only clear water from the discharge passage 30. The position of valve 50 may be conveniently controlled by a lever fulcrumed at 55 in the bight of a U-shaped member 57 fixed to the upper surface of the body 20. The lever has one arm extending rearwardly as at 59 to connect to the head of valve 50 and has its other arm extending forwardly as at 61 to carry a relatively heavy head or button 63. The weight of button 63 being at the relatively long end of the lever biases valve 50 to the open position, overcoming the weight of the valve itself at the end of lever arm 59. The proportions of weight and lever arms are such that when gravity alone acts on the lever system the valve stands in the open position but when the atmospheric pressure is exerted on the outer face of the valve 50 while the inner face is subjected to the reduced pressure in the detergent system brought about by the flow of water through orifice 26 and passage 28 the valve 50 will remain closed. Thus the vacuum on the under side of valve 50 or the air pressure on the top of valve 50 is sufficient to overcome the weight of the button or handle 63 at the end of lever arm 61.

In operation, the user turns on the water supply and permits water to flow from the faucet in the normal manner, and, if no detergent is required in the water stream, can simply draw clear water from the discharge passage 30. However, if a mixture of detergent and water is desired button or handle 63 is moved upwardly to seat valve 50 against its resilient seat 48 closing the vent in the detergent line. The valve will remain in its seated position by reason of the pressure differential on its upper and lower surfaces. Detergent then flows from the supply passage 10 through supply chamber 40, vertical bore 44 and lateral passage 46 to join the water stream expanding in passage 28. The flow of detergent and water mixture will continue either until the operator manually opens valve 50 by depressing button 63 or until the flow of water is shut off. When the water flow is shut off there is no longer a pressure differential existing on the inner and outer faces of valve 50 and the weight of the button 63 is again sufficient to move the valve to open position. It is thus not possible for the operator to leave the device in such a condition that the water and detergent mixture will flow from the discharge passage 30 as soon as the water is turned on. Only clear water will issue from this passage until the operator makes a conscious effort to raise button 63 and cause the introduction of detergent.

Auxiliary devices may, of course, be incorporated and it has been found that an aerator unit designated 70 is of some assistance in causing the intimate mixture of detergent and water with some entrained air. With the aerator unit in place the mixed stream has the appearance of heavy cream as it issues from the discharge passage.

While the invention has been disclosed in conjunction with a particular form and disposition of the parts it should be expressly understood that numerous modifications and changes may be made without departing from the spirit and scope of the appended claims. It will be appreciated that, while the specification and claims of this application are specifically directed to the introduction of detergent materials into the water stream, the mixing device is equally useful for the introduction and mixing of other liquid materials such as disinfectant. The word "detergent," then, should be broadly interpreted to include such other materials.

What we claim is:

1. 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 throat of said Venturi tube, the improvement comprising, an atmospheric vent in said detergent passage, and normally open valve means for closing said vent, said valve means including a valve seat surrounding said vent and a valve body closeable in said seat, said valve body having inner and outer faces respectively exposed to said passage and the atmosphere when said valve body is closed against said seat, said surfaces being proportioned and arranged so that said valve body is held closed by atmospheric pressure when water flow in said Venturi tube causes a pressure reduction in said detergent passage on the opposite side of said valve means.

2. 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 throat of said Venturi tube, the improvement comprising, an atmospheric vent in said detergent passage, a valve in position to close said vent, a lever fulcrumed adjacent said body, one end of said lever being attached to said valve, a weight at the opposite end of said lever, said weight biasing said valve to open position, said valve having upper and lower faces respectively exposed to the atmosphere and the interior of said passage when the valve is closed the area of said valve faces being such that the pressure difference on the upper and lower faces of said valve when in closed position during operation is sufficient to overcome the biasing force of said weight.

3. 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 throat of said Venturi tube, the improvement comprising, an atmospheric vent in said detergent passage, a resilient valve seat surrounding said vent, a valve in position to close said vent, said valve having inner and outer faces respectively exposed to the interior of said de-

tergent passage and the atmosphere when said valve is closed, a lever fulcrumed adjacent said body, one end of said lever being attached to said valve, a weight at the opposite end of said lever, said weight biasing said valve to open position, the area of said valve proportioned and arranged with respect to one another and the bias effected by said weight and lever that the pressure difference on the upper and lower faces of said valve when in closed position during operation is sufficient to overcome the biasing force of said weight.

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HAROLD L. BINLEY.

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