

[54] **SHOWER HEAD AND LIQUID AGENT DISPENSING ATTACHMENT**

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[51] Int. Cl. **B05b 7/30**

[58] Field of Search 239/310, 318

[56] **References Cited**

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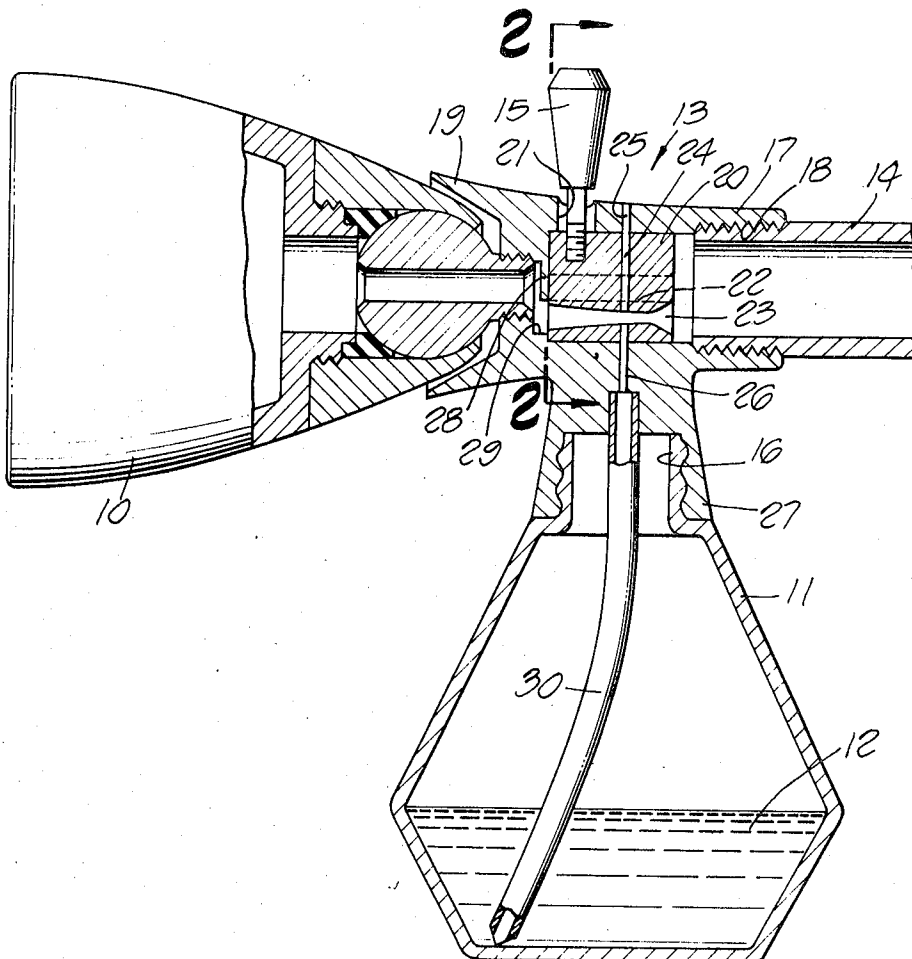
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[57] **ABSTRACT**

Valving apparatus interconnects a source of pressurized liquid and a spray dispenser having a single control positionable from one extreme, at which just the pressurized liquid is provided, to another extreme at which a mixture of the first liquid and liquid agent are provided, the liquid agent container also being interconnected with the valving apparatus. The valving apparatus includes an element having a pair of separate, axially extending channels which channels are in direct communication with the pressurized liquid. A smaller transverse orifice in the valving element, one end of which extends to the liquid agent, and the other end to the air, acts as a suction powered liquid agent inlet as pressurized water moves through the channel. The exit ends of the valving element channels are adjusted relative to an apertured plate from one extreme position in which both channels are open and in direct communication with the spray dispenser, to a further extreme in which the dispenser interconnects with both the pressurized water and liquid agent channels.

5 Claims, 7 Drawing Figures



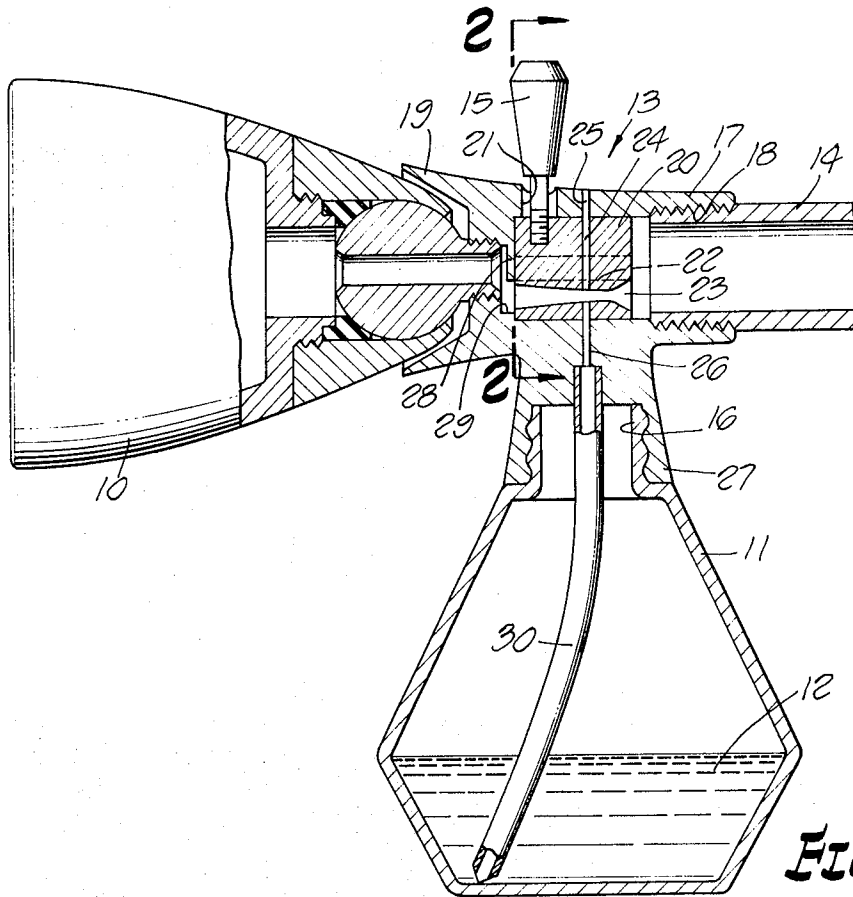


FIG. 1.

FIG. 2.

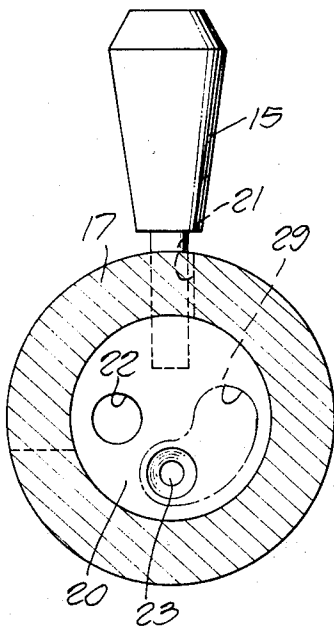


FIG. 3.

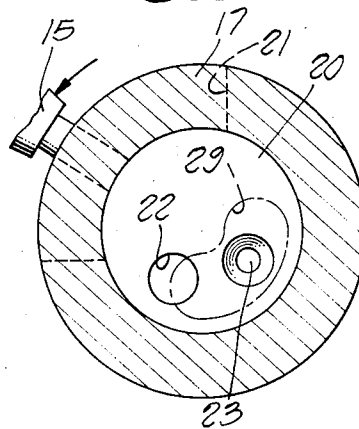
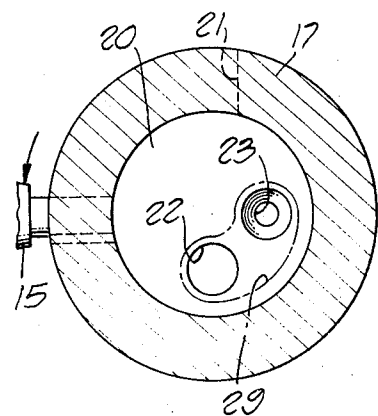


FIG. 4.



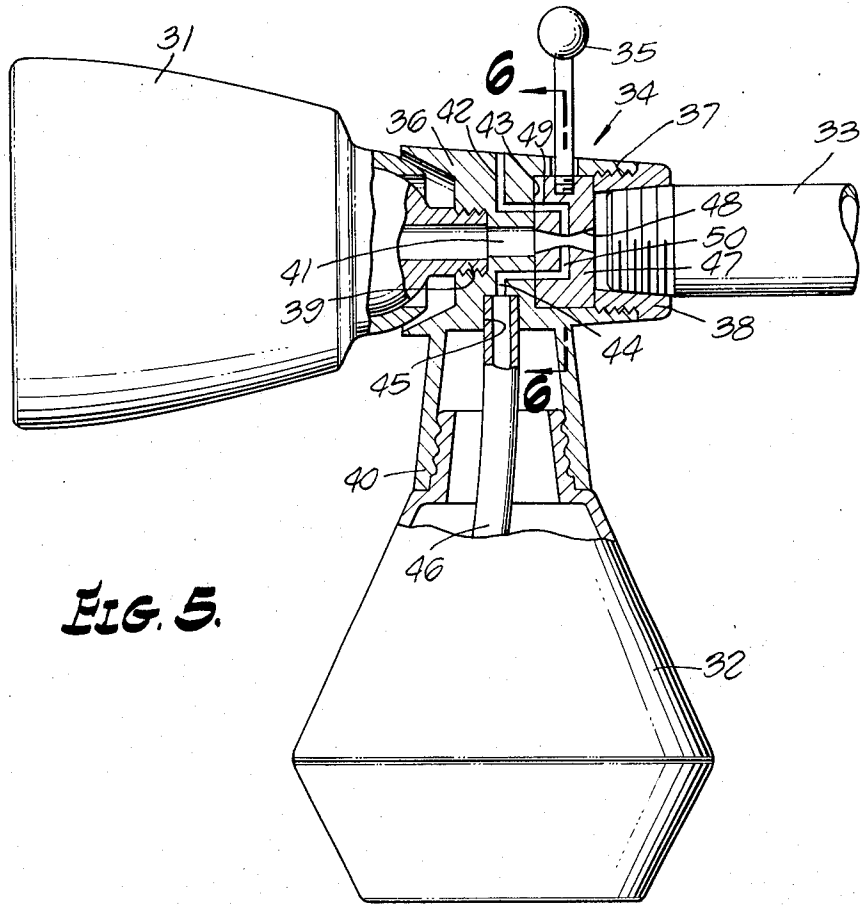


FIG. 5.

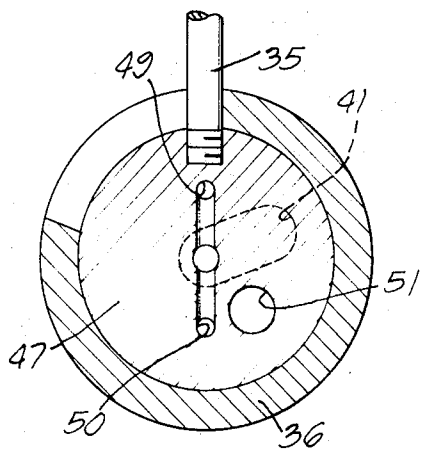


FIG. 6.

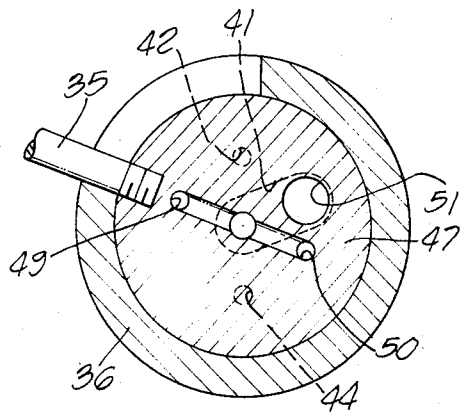


FIG. 7.

SHOWER HEAD AND LIQUID AGENT DISPENSING ATTACHMENT

The present invention relates generally to a shower head construction, and, more particularly, to such a construction including an additive attachment for selectively dispensing a liquid agent admixed with water.

BACKGROUND OF THE INVENTION

Conventional bathing techniques in the usual shower stall are accompanied with certain difficulties and inconveniences which it is a primary purpose of the present invention to overcome. For example, a not unusual occurrence is for the bather to have difficulty locating and retaining bar soap, which can fall from a receptacle onto the floor of the shower stall, not only making it difficult to find, but also hazardous to the bather. Another frequent occurrence is that the bar soap may be allowed to reside in a receptacle also containing water which wastes the soap.

Similarly, containers for other bathing materials such as shampoo and conditioners are not infrequently left on the floor of the shower creating a hazard for the bather.

Certain prior art apparatus have been provided to inject liquid soap (or other liquid agent) into the stream of water coming from a shower head, providing direct application of soap to the entire body. Thus, in accordance with certain known apparatus of this character a container of liquid soap is interconnected with the fixture supplying water to a shower head. An on/off valve enables the liquid soap to be entrained within the shower water at will. Where the adjustability of the shower head efflux is provided for at all in such known apparatus, this is an individual adjustment on the shower head and is not connected or associated with the control of the liquid agent. Also, a significant pressure loss is attendant certain known systems wherein the total flow of material is directed through a venturi passage utilized to draw liquid agent into the water stream.

OBJECTS AND SUMMARY OF THE PRESENT INVENTION

It is, accordingly, a primary aim and object of the present invention to provide valving apparatus interconnecting a source of pressurized water and a supply of liquid agent to a shower head by which one control adjustment accomplishes proportioning, mixing and aeration of the fluid.

A further object is the provision of a shower head valving device for inducing liquid soap or other liquid agent into the water stream for the shower head in which the liquid mixture passes through a restricted opening prior to emission from the shower head whereas when water alone is emitted, it passes through a larger opening prior to the shower head.

A still further object is the provision of a soap and rinse shower head with valving means for establishing a low flow rate of water with maximum aeration during soaping mode.

Yet another object of the invention is the provision of shower head valving means having a single control for optionally providing liquid agent induced into water, or water alone with adjustable flow rate where the water is obtainable from the shower head throughout its full range of adjustment without aeration and without pressure loss during rinsing.

In accordance with the practice of this invention, valving means interconnects a source of pressurized water and a conventional shower head having a single control positionable from one extreme, at which just water is provided, to another extreme at which a mixture of water and liquid agent are provided, the liquid agent container also being interconnected with the valving means. The valving means includes an element having a pair of separate, axially extending channels which channels are in direct communication with a supply of pressurized water. A smaller transverse opening or orifice is provided in the valving element, one end of which extends to the supply of liquid agent, and the other end is exposed to the air, thereby acting as a suction powered liquid agent inlet as pressurized water moves through the associated channel. The exit ends of the valving element channels are adjusted through rotation thereof relative to an apertured plate from one extreme position in which both channels are open and in direct communication with the shower spray head, to a further extreme in which the spray head interconnects with both the pressurized water and liquid agent channels.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional, elevational view taken through the shower head, valving means and liquid agent container.

FIG. 2 is a sectional and elevational view taken along line 2—2 of FIG. 1.

FIGS. 3 and 4 depict the valving means of FIG. 2 shown in two different fluid conducting orientations.

FIG. 5 is a sectional, elevational view, similar to that in FIG. 1, of another form of the invention.

FIG. 6 is a sectional, elevational view taken along line 6—6 of FIG. 5.

FIG. 7 is a view similar to FIG. 6 except showing the valving means in the rinse position.

DESCRIPTION OF A PREFERRED EMBODIMENT

With reference now to FIG. 1 of the drawings, there is shown there a shower spray head 10, a container 11 for including a supply 12 of a liquid agent, and a mixing and proportioning means 13, the latter being threadably connected to a pipe 14 which supplies pressurized water. In a way that will be specifically described in the ensuing paragraphs, adjustable positioning of control lever arm 15 provides at the spray head either: 1. An aerated water-liquid agent mixture; or 2. Selectively variable pressure water which is not aerated.

The shower spray head 10 can take any one of a number of different commercially available forms, either of fixed or adjustable output, with exact construction not being critical to the present invention.

Container 11 may be of any convenient size or shape and made of glass or a suitable plastic. Preferably, its single open end 16 is furnished with threads for removable receipt within a similarly threaded opening in the mixing and proportioning means 13.

Although liquid agents of various kinds may be advantageously used for admixing with water to be emitted via shower head 10 (e.g., shampoo, skin conditioner, bath oils, and the like), in the usual case the agent will be liquid soap. Accordingly, when the liquid soap is mixed with the water in the manner of this invention, an aerated, frothy, soap-water mixture is made

available via the spray head for ready application to the different parts of the bather's body.

The mixing and proportioning means 13 includes a generally hollow tubular body 17 having a threaded entrance end 18 for receipt onto the end of water supply pipe 14, and an exit end 19, also threaded, for removable connection to the shower spray head 10. Carried within the bore of the tubular body 17 is a cylindrical valving means 20 which is rotatable about the bore axis under manipulative control of the lever arm 15 that extends through an opening 21 in the body wall. The valving member includes a first axially extending opening 22 of generally uniform cylindrical shape and a second axially extending opening 23, the latter having a restricted central portion. A relatively small bore opening 24, as compared to that of openings 22 and 23, extends transversely of the valving member, and at one axial orientation is collinear with both an orifice 25 passing through the outer body wall and a further orifice 26 in the fitting 27.

Turning now also to FIGS. 2 through 4, the exit end of the mixing and proportioning means 13 is contained by an end wall 28 that is integral with the tubular body 17 except for an elongate arcuate opening 29 therein, the latter being so dimensioned and located that rotation of the valving member 20 can move the openings 23 and 24 into and out of registry therewith. More particularly, with the lever arm 15 in its uppermost position (FIG. 2) the opening 23 is in registry with the opening 29 while opening 22 is covered by the wall 28. Also, when the valving member is positioned as in FIG. 2, the orifices 24, 25 and 26 are aligned and intercommunicating for a purpose that will be described.

Positioning the lever arm counterclockwise to approximately ten o'clock (FIG. 3) uncovers part of opening 22 while opening 23 remains uncovered or that is, in registry with opening 29. Further counterclockwise positioning of the lever arm to its maximum in that direction (FIG. 4) brings both openings into registry with opening 29. It is also to be noted that for all positions of adjustment other than that illustrated in FIG. 2, the orifices 25 and 26 are blocked off by the valving member body that communication of the valving member opening 23 with the interior of container 12 and with the external air is only accomplished at the one adjustment position, namely, that of FIG. 2.

In operation, and assuming the mixing and proportioning means 13 set to the FIG. 2 position, the pressurized water moves from the pipe 14 through opening 23 and outwardly of opening 29 to the spray head 10 where it is emitted in the usual manner. As the water passes through the restricted orifice portion of opening 23, its velocity increases substantially and by virtue of a well-known physical phenomenon produces a reduced air pressure in the orifice 26 which serves to draw the liquid agent 12 upwardly through tube 30 and orifice 26 where it is mixed with the water in opening 23. Also, by the same venturi action, a reduced air pressure condition is created in orifice 24 which draws external air through the orifices 25 and 24 for aerating the water-liquid agent mixture in opening 23 prior to its emission via the spray head. Accordingly, with the means 13 adjusted as depicted in FIG. 2 the shower spray head provides a frothy soap-water mixture.

On advancement of the lever arm to the position in FIG. 3, communication between the orifices 24 and 26 is broken so that no liquid agent is mixed with the water

passing through the opening 23 for emission via the spray head. Also, since communication is broken between orifices 24 and 25, no aeration of the water is effected. In regard to this latter feature, although a frothy (aerated), low pressure soap-water mixture is considered desirable for the soaping phase, and for applying other liquid agents as well, when water alone is dispensed from a shower spray head it is usually considered desirable not to aerate the water. Moreover, it is also generally desirable to have relatively high-pressure water for the rinsing phase, and, therefore, when the apparatus is adjusted to the rinsing phase, it can deliver a total amount of water per unit time to the spray that is considerably in excess of that delivered during soaping mode.

An alternate form of the present invention is depicted in FIGS. 5-7. As shown there it comprises generally a spray head type of liquid dispenser 31, a container 32 including a supply of liquid agent, both of which are interrelated to pipe 33 carrying pressurized water by a valving means 34. Similarly, as with the first described embodiment, adjustably positioning a lever arm 35 provides either an aerated water-liquid agent mixture of relatively low pressure or a continuous range of rinsing water pressures.

The valving means 34 includes a generally T-shaped body 36 having a threaded fitting 37 and threaded retaining collar 38 for connection with the pipe 33. Another fitting 39 accommodates the spray dispenser 31 and a still further fitting 40 removably interconnects with the liquid agent container 32. An axially extending conduit 41, having its ends in fluid communicating relation with the fittings 37 and 39, respectively, is elongated in cross-section (see FIGS. 6 and 7). A first L-shaped orifice 42 has one end opening into the air and the other end terminating on the inwardly directed flat surface 43 of the body 36. A further L-shaped orifice 44 has one end at the surface 43, and the other end emptying into a larger opening 45 which receives a length of tubing 46 that extends downwardly into the liquid agent in container 32.

A cylindrical pluglike valving plate 47 is received within the fitting 37 and retained in sliding relation against the surface 43 by the collar 38. A channel 48 extends axially through the plate 47 and includes a restricted throat section or venturi. A pair of L-shaped orifices 49 and 50 are formed in the valving plate, each of which has one end terminating in the venturi section of channel 48 and the other end at the valving plate surface which is flush against surface 43.

It is to be particularly noted that at only one position of adjustment, i.e. as shown in FIGS. 5 and 6, the valving plate terminations of orifices 49 and 50 are aligned with the respective ends of orifices 42 and 44 on the surface 43. That is, when the valving plate is so adjusted open communication exists from the air through 42 and 49 to the channel 48, and from the channel through 50, 44 and tubing 46 to the liquid agent.

The valving plate 47 also includes a further channel 51 parallel to channel 48 and of generally uniform cross-section dimensions exceeding those of 48. Adjustment of lever arm 35 from the position of FIG. 6 to that of FIG. 7 increases the degree of communication between channel 51 and exit opening 41.

In operation, with the adjustment lever arm 35 in the FIG. 6 position water is only able to pass through the restricted opening of channel 48 to exit through open-

ing 41 and spray dispenser 31. Also when in this position, air is induced into the water moving along channel 48 via orifice 42 and 49. Moreover, liquid agent is drawn upwardly through tubing 46, orifice 44, and orifice 50 to be mixed with the aerated water in 48. Accordingly, as in the first described embodiment, when so adjusted the spray dispenser provides a frothy, relatively low-pressured liquid agent-water mixture.

Changing the lever arm adjustment from that of FIG. 6 blocks off the various orifices thereby stopping the aeration and admixing of liquid agent with the water. Also, depending on the degree of adjustment change effected, additional water is transmitted via channel 51 through opening 41 which increases the water pressure from the spray dispenser.

What is claimed is:

1. Apparatus for selectively mixing and proportioning liquid agent with pressurized liquid, comprising in combination:

- a hollow enclosure having first and second openings at opposite sides thereof and a smaller diameter orifice extending through said body generally transversely of the axis of the first and second openings;
- a valving member rotatably received within said body and including a first channel extending through said valving member generally parallel to the axis of said body openings and a second channel opening having a restricted portion extending parallel to said first channel opening;
- lever arm means connected to said valving member for rotating the same;
- wall means within said body member having an elongated opening therein so located that said second channel opening has an end in communication with said elongated opening throughout the full range of valving member rotation and one end of the first channel interconnects with the elongated opening only throughout a restricted range of rotation of the valving member;
- a source of supply of the liquid agent connected to the body member over one of the orifices outer ends for communicating with the supply of liquid agent;
- said valving member including an orifice extending transversely therethrough and passing through said second channel such that at one position of valving member rotative adjustment a through communication is achieved from the liquid agent, orifices, the second channel and the external air whereby at this position of adjustment pressurized liquid flowing through the second channel in aerated and liquid agent is admixed therewith.

2. Soaping-rinse apparatus, comprising in combination:

- a spray head;

a supply of liquid soap;

a supply of pressurized water; and

selectively adjustable valving means interconnected with said pressurized water supply, said liquid soap supply and said spray head, said means being adjustable to provide selectively, an aerated liquid soap-water mixture or water over a variable range of emitted pressure.

3. Soaping-rinse apparatus as in claim 1, in which a single lever arm extending externally of said valving means is manipulable to provide full adjustment of said valving means.

4. Apparatus for selectively mixing and proportioning a first liquid with a pressurized second liquid, comprising:

wall means defining a hollow enclosure having first and second openings in said wall means opposite sides thereof for connection to receive the pressurized liquid and to serve as an outlet, respectively; a fitting on said wall means for connection to a supply of said first liquid;

said wall means including an internal wall surface with an opening therein communicating with said second opening in said wall means, a first orifice in said wall means having one end terminating in the air and the other end terminating in said internal wall surface, and a second orifice in said wall means having its two ends terminating in the fitting and internal wall surface, respectively;

a valving plate received within the hollow enclosure and having a surface in flush contacting relation with the internal wall surface of said wall means; said valving plate including a first channel there-through from the surface contacting the internal wall surface to the opposite, a second channel larger than said first channel and also extending from the surface contacting the internal wall surface to the side opposite, and a pair of orifices extending from said surface contacting the internal wall surface to the first channel and disposed from one another on said surface contacting the internal surface at the same spacing as the orifices in said wall means; and

means connected to said valving plate for moving said plate in the plane of contact with said internal wall surface throughout a range in which the plate orifices are aligned with the wall means orifices at one position and said second channel communicating with said wall surface opening for a portion of said range and said first channel being in continuous communication over said full range.

5. Apparatus as in claim 4, in which the enclosure first opening includes a collar removably retaining said valving plate within said enclosure.

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