FLUID MIXING AND DISPENSING APPARATUS

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ABSTRACT

The invention disclosed lends itself to bathroom use, more particularly, on the usual shower head wall. It is characterized by a partitioned manifold mounted in place of the customary shower head and is connected to the hot and cold water supply pipe by a vacuum breaker mechanism for blocking siphoning back of water into the plumbing system. The bottom of the manifold suspends a battery of individual containers for cleansing lotions, shampoos, rinses, oils and the like, each having a finger-tip control knob controlling a coordinated metering valve. These valves are selectively usable. When closed, plain shower water is sent through a depending discharge neck and, via a flexible hose, to an adjustable and detachable shower head connected to said hose. Any one of the valves can be opened in a manner to bypass water through a selected container in a manner to proportionally mix the contents with the outgoing bath water for shower cleanliness and added luxury.

6 Claims, 8 Drawing Figures
FLUID MIXING AND DISPENSING APPARATUS

SUMMARY OF THE INVENTION

This invention relates to certain new and useful improvements in plumbing equipment and appliances for use in a shower stall in a bathroom and pertains, generally speaking, to a shower wall attachment which can readily replace the removable shower head commonly used, which can be communicatively joined with the customary hot and cold water supply and delivery pipe, and which permits a flexible shower head hose of a type currently in use to be operatively joined thereto in a manner to achieve a new and improved result.

One aspect of the concept has to do with the overall combination, that is, a shower stall wall having an available suitable valued hot and cold water supply or delivery pipe, a special purpose selectively usable manifold operatively and communicatively connected to the pipe in place of the usual fixed shower head, a flexible hose or conduit with an intake end joined to a discharge neck at the bottom of the manifold and with its free end equipped with a handle-equipped shower head such as is preferably detachably but shiftably mounted on a support bracket pivotally mounted on the front cover of the manifold for convenient height and direction adjusting use.

A removable, combination filter and vacuum breaker arrangement is mounted between the inlet water line and the manifold for the dual purpose of preventing sediment from reaching the manifold valve mechanisms and possibly contaminating the associated conditioning and cleansing agents and also for blocking the return of water and/or other liquids into the plumbing system should the system encounter a drop in pressure. The manifold device also incorporates a plurality of simple but effective valve elements which provide individual control of the mixing of the various cleaning and conditioning agents in the associated containers.

The manifold device as herein disclosed provides an adaptation which lends itself to feasible and practical use in that the user can select and control the blending of bath water and can use it plain or blend it with a choice of body cleansing lotions, shampoos, rinses, body conditioning oils and the like. The device is designed to meet the requirement of community plumbing codes and is simple but rugged in use, low in manufacturing cost and esthetically pleasing.

Experimental use of the wall-mounted enclosed manifold of the invention has shown that contamination and deterioration of the chemical container-held compounds or preparations are prevented. It further provides a battery of depending closure-like collars or rings on the bottom of the manifold for readily attaching and removing the canisters. Then, too, the manifold revealed is adaptable to any system requiring the mixture by controlled metering of liquids, water for example, with compatible body lotions and compounds. Each contained compound for beauty and cleanliness results is finger-tip operated by selectively usable suitable identified valve controlling knobs. The filter contained in the vacuum breaker assembly can readily be removed for cleaning.

Briefly the wall attachment is characterized by a hollow elongated fluid intercepting and dispensing manifold which is hollow. The hollow chamber is provided interiorly with a central divider which partitions the chamber into elongated rearward and forward fluid compartments. The vacuum breaker assembly with contained filter is carried by a median portion of the rear wall of the reservoir and is communicatively connectable with the water supply and delivery pipe. A depending discharge neck at the center of the bottom wall permits the connection thereto of one end of a flexible hose, that is, a suitably elongated shower head. The bottom wall has a plurality of pairs of openings each mounted with a plug inlet, each pair of openings controlled concurrently by an associated knuckle valve rod, pivotally mounted for control by a selector knob on the front face of the mechanism.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the present invention may be had from a consideration of the following detailed description, taken in conjunction with the accompanying drawing, in which:

FIG. 1 is a perspective view of a fluid dispensing and mixing apparatus in accordance with the present invention, shown mounted on a wall;

FIG. 2 is a sectional top plan view with portions of the apparatus removed, taken along the line 2--2 of FIG. 1;

FIG. 3 is a front sectional view of the apparatus taken along the line 3--3 of FIG. 2;

FIG. 4 is a side view, partly in section, of the anti-siphon valve used with the apparatus of FIG. 1;

FIG. 5 is an exploded perspective view of the filter and seal used in the anti-siphon valve of FIG. 4;

FIG. 6 is a side sectional view of the apparatus of the invention taken along the line 6--6 of FIG. 2;

FIG. 7 is a plan view of a valve element used in the apparatus; and

FIG. 8 is a front partial sectional view of the apparatus manifold taken along the line 8--8 of FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, there is shown in FIG. 1 a fluid dispensing and mixing apparatus 10 constructed in accordance with principles of the invention. The apparatus includes a generally elongated, shaped apparatus housing 14 which is mounted or otherwise secured to the wall 167 of a tub or shower enclosure. A shower outlet pipe 18 provides a water inlet to an anti-siphon valve 22 of the apparatus. A discharge neck 24 extends from the lower central portion of the housing 14 and is connected by a flexible hose 26 to a shower spray head 28. The shower spray head 28 includes a nozzle 30 which is interconnected to the flexible hose by a handle 32 enabling the shower nozzle to be hand held and directed to portions of the body.

A support bracket 36 extends from the front wall 38 of the housing 14 and can be used to hold the shower spray 28 in a relatively rigid position, if desired. A plurality of containers 39 extend downwardly from the bottom of the housing. These containers each contain different lotions, oils, shampoos and creams in a gel form for dissolving in water at a controlled rate. A fingertip control knob 40 is mounted on the housing front wall 38 adjacent each container. The knobs 40 are used to select and control the mixture of the container contents with incoming water so that a desired combination is dispensed at the shower spray nozzle 30.

Referring now to FIG. 2, the support bracket 36 is shown as having a ball 42 in a socket 44. The socket 44 is secured at its closed end to the housing wall 38. A
shaft 46 extends from the ball 42 surface and is connected to an open mounting ring 48. The mounting ring 48 is formed of a pair of spaced apart curved jaws 49, 50 which are interconnected by a flat surface 52 on the interior of the ring. A collar 54 (FIG. 1) at the base of the shower spray handle 32 presents a mating flat surface 56. When the shower spray 28 is secured to the bracket 36, as indicated by the dotted line in FIG. 1, the mounting ring flat surface 52 is juxtaposed with the shower spray collar flat surface 56, forming a relatively rigid connection. In this position the shower spray 28 is positioned similarly to that of a conventional shower head and can be used as such.

A manifold 58 is positioned within the housing 14 and is illustrated in FIG. 2 with its top wall removed. The manifold 58 comprises a front wall 59 and a rear wall 60 which are joined at their ends by curved end walls 64 and 66. A pair of brackets 67 extend from the manifold front wall 59 and provide the desired spacing between the manifold and the housing front wall 38.

A central wall 68, intermediate to and parallel with the manifold front and rear walls 59 and 60, divides the manifold into an inlet cavity 72 and an outlet cavity 74. A first fluid outlet aperture 76 and a second fluid outlet aperture 78 are positioned in the center of the manifold bottom wall 82 on opposite sides of the central wall 68. The outlet apertures 76 and 78 enable fluid from the inlet and outlet cavities 72 and 74 to flow into the discharge neck 24 (FIG. 3).

Referring now to FIG. 4, the anti-siphon valve 22 is shown in greater detail and comprises a stepped cylindrical housing 102 typically made of plastic material. The housing 102 includes a reduced diameter, cylindrical inlet portion 104 whose free end 106 is normally secured to the shower water outlet pipe 18 either by adhesive attachment (e.g. plastic “welding”) or by a threaded coupling member (not shown). A central intermediate diameter housing portion 108 interconnects the reduced diameter inlet portion 104 with an enlarged diameter portion 112. The portions 104, 108 and 112 of the cylindrical housing 102 are normally integrally molded from plastic.

The bottom surface of the central intermediate diameter portion 108 adjacent the reduced diameter inlet portion 104 contains an air inlet aperture 118. The air inlet aperture 118 provides an inlet passageway allowing air to enter the housing 102 during reduced water inlet pressure conditions as will be explained hereinafter. A water outlet aperture 122 is also formed in the bottom surface of the central intermediate diameter portion 108 adjacent the enlarged diameter portion 112. The outlet aperture 122 provides a water outlet passageway into an outlet pipe 124. The outlet pipe 124 axis extends perpendicular to the axis of the housing portions 104, 108 and 112 and its ends are integrally formed with the top wall 126 of the manifold and the cylindrical housing 102, respectively. An opening 132 in the manifold top wall 126 enables water in the outlet pipe 124 to flow into the inlet cavity 72 of the manifold. The outlet pipe 124 contains a centrally positioned, reduced outer diameter section 134 which enables the pipe to slidably fit into a slot 136 formed in the top wall of the housing (FIG. 1) and correctly position the manifold 58 in the housing 14.

A removable insert 142 is positioned within the intermediate diameter portions 108 and the enlarged diameter portions 112 of the housing 102. The insert 142 contains a rear section 144 whose outer surface is threadably secured to the inner surface of the enlarged diameter portion 112. A groove 146 on the insert rear section 144 outer surface adjacent an insert end cap 147 contains a water seal O-ring 148. The insert 142 with attached seals may be readily removed from the housing 102 by simply grasping the end cap 147 and unscrewing from the housing 102. As positioned relative to the apparatus 10 (FIG. 1), the end cap 147 is readily accessible for such removal. With the insert 142 removed, the interior of the housing 102 is open for easy removal of the filter and seal elements for cleaning or replacement as necessary. Reassembly of the anti-siphon valve 22 is easily accomplished.

The insert 142 further contains a front section 152 which is integral with the rear section 144 but whose outer surface is spaced from the inner surface of the housing intermediate diameter portion 108. The insert front section 152 contains a traverse wall 154 having a central opening 156 formed approximately in the center of the intermediate housing portion 108. The insert central opening 156 is formed along the axis of the housing 102 and enables water from the free end 106 to pass through into the chamber 158 defined by the insert rear section 144. The traverse wall 154 further contains a conical-shaped surface 159 which extends from the central opening 156 toward the inlet portion 104 and terminates at an edge 160, spaced from the insert 142 inner surface.

A pair of opposed openings 162 and 163 are formed in the cylindrical wall of the insert front section 152. The opening 162 is adjacent the water outlet aperture 122, enabling water to pass from the chamber 158 through the openings 162 and 163 and into the water outlet aperture 122. A second annular groove 164 is formed in the central outer surface of the insert front section 152. An O-ring 166 in the groove 164 prevents fluid exiting the openings 162 and 163 from traveling toward the housing free end 106. A third annular groove 168 is positioned on the outer surface of the sleeve front section 152 adjacent the housing inlet portion and contains an O-ring seal 172.

An air passageway 174 is formed in the insert front section 152 adjacent the housing air inlet aperture 118, enabling air entering the passageway 118 to pass through to the interior of the insert front section 152 at the insert conical surface 160 and into the housing inlet portion 104 at reduced inlet pressure conditions. An inwardly extending flange 176, integrally formed with the insert front section 152, is positioned in a plane transverse to the insert axis. The insert flange 176 is intermediate the air passageway 174 and the free end of the sleeve front section 152. A flange 178 is integrally formed with the housing 102 in a plane transverse to the housing axis and adjacent the conical surface 159.

A filter and anti-siphon sealing arrangement are positioned between the housing flange 178 and the insert flange 176. The filter and sealing arrangement is shown in exploded perspective view in FIG. 5. A water filter 190 comprises a central filter screen 192 whose edges 194 are integrally meshed with a washer 196. The filter screen 192 extends into the housing inlet portion 104 and one surface of the washer 196 abuts the housing flange 178. A deflector 198 is positioned directly behind the filter screen washer. The deflector 198 has a plurality of openings 202 equally spaced on a radius from the center thereof. A cone 204 whose apex extends towards the free end 106 is formed in the center of the deflector 198. An O-ring 206 is positioned be-
hind the deflector 198. A flexible rubber diaphragm 208 having a central opening 212 is positioned intermediate the O-ring and the insert flange 176. The outer diameter of the washer 196, and the deflector 198, the O-ring 206 and the flexible diaphragm 208 are approximately equal to the inner diameter of the insert front section 152.

In normal operation, water entering the anti-siphon valve 22 through the inlet portion 104 passes through to the water outlet pipe 124. The water path includes the filter screen 192, the deflector radially spaced openings 202 and the flexible diaphragm central opening 212. The water flow under normal pressure forces the flexible rubber diaphragm 208 against the transverse wall edge 160, preventing air flow from entering the interior of the insert 142. The water then passes through the transverse wall opening 156 into the chamber 158. Water in the chamber 158 passes through the insert openings 162 and 163 to the outlet pipe water outlet aperture 122. Should the inlet water pressure drop, the diaphragm 208 retracts to the position shown in FIG. 4 and permits air at atmospheric pressure to enter the insert 142 interior through the aperture 118 and the passageway 174, preventing siphoning of the downstream water back into the mains.

Referring now to FIGS. 6 through 8, a valve element 230 for controlling the flow of water from the manifold inlet cavity 72 to each of the containers 39 is shown in greater detail. For each container 39, a first opening 232 and a second opening 234 are formed in the manifold bottom wall 82 on opposite sides of the manifold central wall 68. A collar 236 surrounds the openings 232 and 234 and extends downwardly from the manifold bottom wall 82. The collar interior surface 238 is threaded for securing the open end of the container 39 thereto. Valve seats 242 and 244 are positioned in the manifold bottom wall openings 232 and 234, respectively. The end of the valve seats 242 and 244 in the cavities 72 and 74 contain a concave surface 246 and 247 at the end of passageways 248 and 244, respectively.

The valve element 230 contains an extension 254 which passes through the front wall 59 of the manifold. The extension 254 also passes through the housing front wall 38 and the control knobs 40 can be secured to the extension as shown in FIG. 1. An O-ring 256 surrounds an annular groove 257 of the extension 254 passing through the manifold front wall 59 and prevents leakage of fluid from the outlet cavity 74 to the manifold exterior. A valve element first convex knob 258 and second convex knob 262 (FIG. 7) each are positioned adjacent the valve seat concave surfaces 246 and 247, respectively, to prevent fluid travel between the container 39 and the manifold inlet and outlet cavities. The valve knuckles are interconnected by a rod 264 which passes through the manifold central wall 68.

When it is desired to mix the inlet water in the inlet cavity 72 with the fluid in one of the containers 39, the control knob 40 associated with the selected container 39 is rotated, enabling the passageway interconnecting the container 39 and the inlet cavity 72 and the outlet cavity 74 to be simultaneously opened. Water from the inlet cavity 72 passes through the valve seat passageway 248, mixes with a portion of the gel-form conditioning agent in the container and then exits through the valve seat passageway 249 to the outlet cavity 74. The conditioner and water mixture then passes through the manifold second fluid outlet aperture 78 (FIG. 2) to the discharge neck 24 and thence to the shower spray 28. It should be noted that fluid from the inlet cavity 72 can pass through one or more of the containers 39 simultaneously by simultaneously rotating more than one knob 40.

When it is desired to use the shower spray 28 only as a conventional shower, the control knobs 40 are kept in the closed position and water exits the inlet cavity 72 through the first outlet aperture 76. It should be noted that a certain amount of water is discharged through first outlet aperture 76 even when a water-conditioner mixture is discharged through the second outlet aperture 78.

Although there has been described above one specific arrangement of a fluid mixing and dispensing apparatus in accordance with the invention for the purpose of illustrating the manner in which the invention may be used to advantage, it will be appreciated that the invention is not limited thereto. Accordingly, any and all modifications, variations or equivalent arrangements which may occur to those skilled in the art should be considered to be within the scope of the invention as defined in the appended claims.

What is claimed is:

1. Apparatus for mixing and dispensing a selected conditioning agent in a shower bath spray comprising:
a housing;
a manifold positioned in said housing and having an inlet and an outlet;
outlet means for coupling said manifold outlet to a shower spray head;

inlet means for coupling a water inlet pipe to said manifold comprising an anti-siphon valve, said anti-siphon valve having an air inlet passageway for preventing water in said manifold from flowing back into said water inlet pipe when the pressure in said water inlet pipe falls below the water pressure in said manifold, and a flexible diaphragm movable between a first position blocking said air inlet passageway when said inlet water pressure is greater than said manifold pressure and a second position enabling air to flow toward said inlet pipe and prevent reverse flow of water from said manifold when said manifold water pressure exceeds said water inlet pressure, said anti-siphon valve further including a deflector having a closed central conical portion and at least one radially-spaced opening, said diaphragm having a central opening adjacent said deflector central conical portion, said deflector opening and said diaphragm central opening defining a water flow path directing the diaphragm to said first position when the water inlet pressure exceeds the manifold water pressure.

2. Apparatus in accordance with claim 1 wherein the anti-siphon valve further includes a fixed housing and a removable insert threadably mounted therein, said insert having means defining the air inlet passageway and a separate water flow passageway downstream of the flexible diaphragm, the water flow passageway communicating with the manifold inlet.

3. Apparatus in accordance with claim 2 wherein said defining means comprises partition means separating the air inlet passageway and the water flow passageway, the partition means including a central aperture adjacent the central opening of the diaphragm and a sealing surface adjacent the diaphragm and surrounding the central aperture for co-acting with the diaphragm in
said first position to seal the air inlet passageway.

4. Apparatus in accordance with claim 3 further including a plurality of sealing means between the interior of the fixed housing and the removable insert for sealing the air inlet housing and the water flow passageway respectively.

5. Apparatus in accordance with claim 1 further including a bracket having a ball mounting support pivotally mounted within a mating socket attached to said housing; a shaft extending from said ball and having a mounting ring integrally formed therewith; said shower spray head including a handle; a portion of said handle having means for removably positioning said spray head on said housing mounting ring for enabling said spray head to be fixed relative to said bracket; said bracket being pivotable relative to said housing at said ball and socket.

6. Apparatus in accordance with claim 5 wherein said mounting ring includes a flat surface which is juxtaposed with a corresponding handle flat surface when said handle is positioned on said bracket.

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