

SPECIFICATION

SOAPSUDS REGULATOR DEVICE AND SOAP FOR USE THEREWITH

TECHNICAL FIELD

The invention relates to an improvement of a shower head, in particular, to a shower head which can be used with a normal soap to afford comparable washing effect to the use of a shampoo when washing the hair without impairing the hair or head skin. The invention also relates to a soapsuds regulator device other than a shower head which can be connected to a faucet in a shower room or in a hose which joins a shower head with the faucet, and the like. The invention additionally relates to a piece of soap which may be fitted into the soapsuds regulator device such as a shower head.

BACKGROUND OF THE INVENTION

A shampoo usually comprises a strong chemical detergent, which provides a strong washing effect, but which is likely to cause an impairment of the hair or head skin. The use of such shampoo in large quantities also resulted in a serious environmental problem as by causing a contamination of rivers.

The present invention provides a shower head which can be used with a normal soap while allowing a hair washing effect comparable to that provided by a shampoo without impairing the hair or head skin. The invention also provides a soapsuds regulator device, which is similar in construction to the shower head and which can be connected to a faucet in a

bath room or in a hose which joins a shower head with such a faucet. Finally, the invention provides a piece of soap which is suitable for use with such a soapsuds regulator device or shower head.

DISCLOSURE OF THE INVENTION

In accordance with the invention, a soapsuds regulator device comprises a body in which a first and a second flow path are formed, the first flow path having a soap chamber disposed therein in which a solid or gel-like soap is fitted, and flow path changeover means for allowing either the first or the second flow path to be selected as desired.

In one embodiment, the soapsuds regulator device comprises a shower head including a front end and a rear end, across which the first and the second flow path are disposed. Alternatively, the soapsuds regulator device may be connected to a faucet in a shower room or in a hose which joins a shower head with the faucet.

When the flow path changeover means is operated to allow a water flow to pass through the first flow path, the surface of a piece of soap fitted in the soap chamber thereof and disposed in contact with the water flow is abraded under the influence of a water stream, and abraded soap is dissolved into the water to provide soapsuds, which is then ejected through an outlet of the soapsuds regulator device or through the front end of the shower head. The soapsuds impinges upon the head skin, the hair or the other skins of a user for washing purposes. The pressure from the water stream adds to the proper detergency effect of the soapsuds to provide a washing effect, which is fully comparable to that obtained with a usual

liquid shampoo. Because the detergency effect of the soapsuds itself is reduced than a liquid shampoo, there is no impairment of the head skin, the hair or other skins. Avoiding the use of a liquid shampoo avoids an environmental nuisance.

When a piece of soap according to the invention is employed in the soapsuds regulator device, an axial through-bore formed therein allows the inner peripheral surface of the bore to be rubbed by the running water, thus regulating the soapsuds in an efficient manner.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a side elevation, partly in section, of a shower head according to one embodiment of the invention, also illustrating a water flow passing through a soap chamber;

Fig. 2 is a similar view to Fig. 1, but illustrating a water flow which does not pass through the soap chamber;

Fig. 3 (I) is an enlarged view of a rear end of the shower head shown in Fig. 1;

Fig. 3 (II) is a cross section taken along the line III-III shown in Fig. 3 (I);

Fig. 4 (I) is an enlarged view of the rear end of the shower head shown in Fig. 2;

Fig. 4 (II) is a cross section taken along the line IV-IV shown in Fig. 4 (I);

Fig. 5 is a cross section taken along the the line V-V shown in the shower head of Fig. 1;

Fig. 6 is a perspective view of the shower head shown in Fig. 1:

Fig. 7 is a cross section taken along the line VII-VII shown in the shower head of

Fig. 1;

Fig. 8 is a similar view to Fig. 1 illustrating another embodiment of the invention;

Fig. 9 is a similar view to Fig. 1 illustrating a further embodiment of the invention;

Fig. 10 is a fragmentary enlarged view, in elevational section, of a still another embodiment of the invention; and

Fig. 11 is an elevational section of a still further embodiment of the invention.

BEST MODES FOR CARRYING OUT THE INVENTION

Figs. 1 to 11 illustrate embodiments of applying the invention to a shower head.

In Fig. 1, there is shown a hollow shower head 10 having a front end 11 with an end plate 12 which is formed with a multitude of small apertures, not shown, which serve for water spraying purpose, and a rear end 13 which is extended by a sleeve 14 of a reduced diameter which is in turn connected through a flexible hose to a faucet of the water supply, not shown.

Intermediate its ends 11 and 13, the shower head 10 includes a straight tube section 15 which is rectangular in cross section, and a partition plate 16, which is shown to be horizontal in Figs. 1 and 2, extends

axially through the straight tube section 15, whereby the hollow interior of the tube section 15 is divided by the partition plate 16 into upper and lower chambers 18 and 20, as shown in Figs. 1 and 2.

Toward the front end 11, the upper chamber 18 of the shower head is provided with a soap chamber 22, which is delineated by a top plate 26, forming part of a top plate 24 for the straight tube section 15 of the shower head 10, both lateral sidewalls 28, 30 (see Fig. 5) of the straight tube section 15 and the partition plate 16 mentioned above. Together with sidewalls 28' and 30', forming part of the both lateral sidewalls 28 and 30 of the tube section 15, the top plate 26 defines a closure 31 which is channel shaped in section. An opening and closing of the closure is enabled by a hinge 35. When the closure 31 is opened, a soap to be described later can be fitted into or removed from the soap chamber. A net 33 is disposed across a forward end of the soap chamber 22 located toward the front end of the shower head, and prevents the soap from being expelled out of the soap chamber by the water stream.

The lower surface of the top plate 26 and the upper surface of the partition plate 16 are both waved or corrugated to define axially extending paths 27, 29 of a reduced size to permit a water passage therethrough.

A rectangular-shaped piece of soap 32 is fitted into the soap chamber 22, and is formed with three through-bores 34 extending axially of the shower head 10 to permit a water passage therethrough. The piece of soap may comprise a solid piece of soap, a charge of powder soap or gel-like soap.

Flow path changeover means 40 is rotatably mounted in the

space between the rear end 13 of the of the shower head 10 and the sleeve 14, and includes an operative pin 42 and a disc 43 having a semi-circular opening 44 formed therein.

When the flow path changeover means 40 is turned, the upper chamber 18 and the lower chamber 20 of the shower head 10 can be selectively brought into communication with the sleeve 14 (see Figs. 1 and 3). Specifically, when the opening 44 assumes its upper position, the upper chamber 18 communicates with the sleeve 14, whereby the water flow finds its way into the upper chamber 18 to reach the soap chamber 22 as guided by a guide member 46.

The guide member 46 is in the form of a rectangular block through which three through-openings 46a, 46b and 46c which are aligned with each other in the horizontal direction extend in the axial direction. Each of the through-openings has a large rectangular opening as shown at 47 in Fig. 7, at its right end as viewed in Fig. 6 or at the rear end 13 of the shower head, and has a smaller circular opening as shown at 48 in Fig. 7, at its left end as viewed in Fig. 6 or toward the front end of the shower head, and thus is tapered therebetween. It is to be noted that these three circular openings 48 are aligned with the through-bores 34 formed in the soap 32, whereby the water flow which finds its way into the through-openings 46a, 46b and 46c in the guide member 46 in the upper chamber 18 is accelerated as it passes through the through-bores 34 in the soap 32.

Referring to Fig. 7, the top plate 24 of the shower head is formed in its inner surface, in a region 24a located above the guide member 46, with five through-openings 51 in alignment with the five paths 27 (which are not

shown in Fig.6 for brevity of the illustration). Each of the through-openings 51 has a large rectangular opening at its end toward the rear end 13 of the shower head (see 53 in Fig. 7) and has a semi-elliptical opening at its end toward the front end of the shower head (see 57 in Fig. 7), and thus is tapered therebetween. In this manner, a portion of the water flow entering the upper chamber 18 which finds its way into each through-opening is accelerated to pass through the path 27, in contact with the upper surface 50 of the soap 32.

Similarly, referring to Fig. 7, similar through-openings 51 are formed below the guide member 46 (although not shown in Fig. 6 for brevity of the illustration), thereby accelerating the water flow in the upper chamber 18 as it passes through the downwardly located through-opening 51 and through the paths 29 in contact with the lower surface 52 of the soap 32.

In this manner, a rapid water stream passes in contact with the upper and the lower surface 50, 52 and the inner peripheral surface 39 of the through-bores 34 of the soap, causing it to be abraded, whereby the soap becomes dissolved into the water at locations where it is in contact with the water stream to provide the soapsuds, which is then sprayed externally through the multitude of small apertures formed at the front end of the shower head 10.

When the flow path changeover means 40 blocks the upper chamber 18, the water from the rear end of the shower head 10 enters the lower chamber 10 and passes therethrough (see Figs. 2 and 4).

When the shower head is used to wash the hair (see Figs. 1 and 3),

the flow path changeover means 40 is operated to allow the water flow to pass through the upper chamber 18. The soapsuds is then sprayed through the apertures 12 at the front end of the shower head 10 to impinge upon the hair and the head skin of the user under a high pressure. Consequently, a washing effect which is nearly comparable to that obtained by liquid shampoo is achieved, with the aid of a mechanical pressure due to a rapid spraying of the water stream, even though the washing effect of the soapsuds itself is reduced as compared with the liquid shampoo.

When it is desired to rinse the hair after washing it with the soapsuds, the flow path changeover means 40 is turned to block the upper chamber 18 while allowing the water supply through the lower chamber 20 (Figs. 2 and 4).

It is possible to locate the flow path changeover means 40 at a position intermediate between the two positions mentioned above which are shown in Figs. 1 and 2, respectively, whereby a mixture of the soapsuds and the plain water may be sprayed. While the washing effect obtained by the soapsuds is reduced in this instance, the water pressure is enhanced to achieve a substantially similar washing effect as before.

Since the flow path changeover means can be turned in a stepless manner, the water stream can be adjusted in a stepless manner, and the concentration of the soapsuds can be changed at will.

In the embodiment shown, the flow path changeover means is shown as being rotatable, but it may be constructed to be slidable either in the vertical direction or in the lateral direction, while this is not illustrated in the drawings.

While not shown, it is contemplated that the upper chamber 18 be constructed as a pair of adjacent axially extending chambers, one of which is fitted with a piece of soap in the manner mentioned above, while the other chamber is fitted with a solid rinsing agent. In this instance, a pair of flow path changeover means are provided. One of the flow path changeover means is used for switching between the lower chamber (which passes only plain water) and the upper chamber (which permits a changeover between the shampoo path and the rinse path), and the other flow path changeover means is used to provide a changeover between the shampoo path and the rinse path. The latter flow path changeover means may be constructed to be diametrically reciprocable.

A piece of soap which is used with the shower head of the invention is not limited to a commercially available solid soap, but may comprise a water soluble solid detergent such as a solid bath agent sold in the name of "Bath Clean" (trademark). Alternatively, it may comprise a gel-like detergent.

Fig. 8 shows a modification of the above embodiment. In this instance, an opening 44 formed in a disc 43 of the flow path changeover means 40 is formed to be slightly greater than in the embodiment mentioned above. Accordingly, when the opening 44 assumes its upper position, the lower edge of the opening is located below the partition plate 16. Under this condition, the water flow primarily passes through the upper chamber 18, but part thereof passes through the lower chamber 20. In this manner, the flow velocity of the entire water flow is maintained if the primary portion of the water flow passes through the upper chamber 18.

Fig. 9 shows a further embodiment where an inner sleeve 54 is disposed within the straight tube section 15, and a piece of soap 32 having a centrally located axially extending bore 34 formed therein is disposed inside the inner sleeve 54 in a detachable manner. An annular space 55 exists between the inner sleeve 54 and the straight tube section 15. By operating the flow path changeover means 40, the water flow can be selectively passed through the bore 34 in the soap 32 and the annular space 55. When the water flow passes through the bore 34 in the soap 32, the soapsuds can be sprayed from the shower head. When the water flow is passed through the annular space 55, plain water is sprayed from the shower head.

The above function is achieved by the following construction. Specifically the changeover means 40 is integrally provided with a rotatable plate 56, which is formed with a plurality of small apertures, not shown, at a suitable circumferential spacing toward the outer periphery thereof and is also centrally formed with a plurality of small apertures 17 disposed at a suitable spacing on an imaginary circle. A stationary plate 58 is fixed with respect to the straight tube section 15, and is formed with a plurality of small apertures 59 at a suitable circumferential spacing toward the outer periphery thereof and is also centrally formed with a plurality of small apertures 60 at a small spacing on an imaginary circle, in the similar manner as the rotatable plate 56.

In the condition shown in Fig. 9, the small apertures, not shown, disposed toward the outer periphery of the rotatable plate 56 are not aligned with the small apertures 59 disposed toward the outer periphery of the stationary plate 58, and accordingly, a water flow as indicated by arrows

shown in dotted lines cannot occur. In other words, the water flow cannot enter the annular space 55. However, the small apertures 57 disposed toward the center of the rotatable plate 56 are aligned with the small apertures 60 disposed toward the center of the stationary plate, whereby the water flow is allowed to find its way into the central bore 34 formed in the soap 32 which is disposed inside the inner sleeve 54 following arrows shown in solid lines. Consequently, the soapsuds is sprayed from the shower head.

When the rotatable plate 56 is rotated through the changeover means 40 from the condition shown in Fig. 9, the small apertures, not shown, disposed toward the outer periphery of the rotatable plate 56 can be brought into alignment with the small apertures 59 disposed toward the outer periphery of the stationary plate 58, whereby the water flow find its way into the annular space 55 following the arrows shown in dotted lines. At this time, the small apertures 57 disposed toward the center of the rotatable plate 56 are not aligned with the small apertures 60 disposed toward the center of the stationary plate 58, and accordingly the water flow cannot find its way into the central bore 34 in the soap 32 which is disposed inside the inner sleeve 54. Thus plain water is sprayed from the shower head.

Fig. 10 shows a fragmentary modification of the embodiment shown in Fig. 1. In this modification, the partition plate 16 shown in Fig. 1 is extended to the left, and the arrangement shown in Fig. 9 is disposed in the region thus extended. A check valve 64 is pivotally mounted on the left end of the extended partition plate 16. A cylindrical insert 66 is disposed

inside the left end of the straight tube section 15, as viewed in Fig. 10, thus reducing the internal diameter of the tube section 15. The free end 65 of the check valve 64 abuts against either the upper end or the lower end of the insert 66.

When the flow path changeover means 40 is operated to pass the water flow through the lower chamber 20 as indicated by arrows, the water pressure acts to urge the check valve 64 upwards as shown in solid line in Fig. 10, whereby the upper chamber 18 is closed to prevent a back flow of the water flow passing through the lower chamber 20 into the upper chamber 18. Conversely, when the changeover means 40 is operated to pass the water flow through the upper chamber 18, the water pressure acts to urge the check valve 64 to its lower position shown in dotted lines in Fig. 10, thus blocking the lower chamber 20. Again, a back flow of the water flow exiting the upper chamber 18 into the lower chamber 20 can be prevented.

It should be understood that the principle of the invention is applicable not only to a shower head, but may be embodied as a soapsuds regulator device which may be directly connected to a faucet in a bathroom or in a hose which joins a shower head with the faucet of the bathroom. Fig. 11 shows such an example of soapsuds regulator device 70 which is directly connected to a faucet in a bathroom. In Fig. 11, the device 70 is illustrated in its horizontal position, but will be used in vertical position in practice.

The device 70 includes a cylinder body 71, the bottom of which (as considered when it is used in an vertical position) is provided with a portion

72 of a reduced diameter on which changeover means 73 is rotatably mounted. Changeover means 73 is cylindrical in configuration, and is connected through means, not shown, to a faucet in a bathroom in a water tight manner. A stationary plate 54 is fixed to the portion 72 of the cylinder body 71, and is formed with a plurality of small apertures 75 at a suitable circumferential spacing toward the outer periphery thereof and also centrally formed with a plurality of small apertures 76 at a suitable circumferential spacing. Changeover means 73 includes a rotatable plate 83 which is formed with a plurality of small apertures 77 at a suitable circumferential spacing toward the outer periphery thereof and is also centrally formed with a plurality of small apertures 78 at a suitable circumferential spacing, in the similar manner as the stationary plate 74.

By rotating changeover means 73, the water flow from the faucet can be selectively passed through the through-bore 34 formed in the soap 32 which is disposed inside an inner sleeve 80 or around the outer periphery of the inner sleeve 80. In the condition shown, the small apertures 75 and 77 which are disposed toward the outer periphery are aligned with each other as are the small apertures 76 and 78 disposed toward the center, whereby the water flow passes through the through-bore 34 in the soap 32 and around the outer periphery of the inner sleeve 80. When there is water flow passing through the inner sleeve 80, the soapsuds is sprayed through an upper neck in the cylinder body 71. When there is a water flow around the outer periphery of the inner sleeve 80, plain water is sprayed through the upper neck 82. A hose, not shown, is attached to the upper neck 82, whereby the soapsuds or plain water is sprayed from a shower head, not

shown, through the hose. Check valves 79 acting in the same manner as illustrated in Fig. 10 are also provided.

INDUSTRIAL USE

A soapsuds which is dissolved in the water is sprayed from a shower head to apply a shower pressure which adds to the washing effect of the soapsuds, thereby achieving a washing effect which is comparable to the use of a usual shampoo. Because the detergency effect of the soapsuds itself is reduced as compared with a shampoo, a shampooing operation is allowed which avoids an impairment of the hair or headskin.

When the invention is applied as a soapsuds regulator device other than a shower head, the soapsuds regulator device can spray dissolved soapsuds, which achieves an enhanced washing effect due to the pressure of the water stream which is added to the washing effect of the soapsuds. Accordingly, when the water sprayed from the soapsuds regulator device is led to a shower head, an impairment of the hair or the head skin can be avoided.



WHAT IS CLAIMED IS:

1. A soapsuds regulator device comprising a body in which a first and a second flow path are formed, the first flow path having a soap chamber disposed therein in which a solid or gel-like soap is fitted, and flow path changeover means for allowing either the first or the second flow path to be selected as desired.
2. A soapsuds regulator device according to Claim 1 in which the soap suds regulator device is constructed as a shower head having a front end and a rear end, across which the first and the second flow path are disposed.
3. A soapsuds regulator device according to Claim 1 or 2 which is connected to a faucet in a shower room or connected in a hose which joins a shower head with a faucet.
4. A piece of soap for use with a soapsuds regulator device according to one of Claims 1 to 3 in which the piece of soap is formed with an axially extending through-bore.