

TITLE OF THE INVENTION

Shower Spraying Apparatus

FIELD OF THE INVENTION

The present invention relates to a shower spraying apparatus adapted to be used for heated water shower bathing, and the like.

BACKGROUND OF THE INVENTION

In the case of a shower spraying apparatus of the prior art provided with a heating source for delivering heated water and a showerhead for spraying the heated water delivered by the heating source, the showerhead is used as it is fixed to a holder mounted directly on a wall or the like structure. Also, with an apparatus having a post for supporting the holder, the post is usually constructed of an ordinary polymeric resin with an extrusion molding, so that varieties in color and shape are limited.

In addition, the apparatus does not give a satisfactory feeling when a flow rate of heated water is deficient, since it is so constructed that the heating source delivers only the heated water.

Accordingly, the foregoing shower spraying apparatus of the prior art has a problem of spoiling an interior appearance due to its inferiority in matching with a bathroom, when it is installed for use in the bathroom. A reason for the above is that the showerhead is adapted to be used in a way it is fixed to the holder mounted directly on the wall or on the post, whose color and shape have a limited number of variations, so as to lack an aesthetic balance with the relatively gorgeously made showerhead, thereby marring the harmony.

Also, since the heating source can deliver only the heated water, the apparatus necessitates a user to take a shower for a long period of time due to

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an insufficient washing effect when there is a limited flow of the heated shower water. Furthermore, it falls short of providing a comfortable feeling of taking shower due to a low pressure of the water sprayed from the showerhead.

SUMMARY OF THE INVENTION

In order to solve the above-cited problems, a shower spraying apparatus of the present invention comprises a heating source, a shower hose for conducting heated water delivered by the heating source, a showerhead attached to one end of the shower hose for spraying the heated water, a holder for holding the showerhead, and a post for supporting the holder. The post is constructed to contain gas in a form of bubbles.

The above structure of the present invention improves an attractiveness and an aesthetic balance with the relatively gorgeously made showerhead, because the post for supporting the holder to be used for mounting the showerhead contains gas in a form of bubbles. The post also improves an interior appearance of a bathroom, when it is mounted on a wall, etc. of the bathroom.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front view depicting a shower spraying apparatus of an exemplary embodiment of the present invention;

Fig. 2 is a side view depicting the same apparatus;

Fig. 3 is a systematic diagram of the same apparatus;

Fig. 4 is a graph representing a characteristic of flow rate against primary pressure in the same apparatus; and

Fig. 5 is a graph representing a characteristic of pressure against amount of delivered heated water in the same apparatus.

DETAILED DESCRIPTION OF THE INVENTION

An exemplary embodiment of the present invention will be described hereinafter by referring to the accompanied drawings.

In Fig. 1, a reference numeral 1 represents a heating source for delivering heated water, a reference numeral 2 represents a water inlet pipe for supplying water to the heating source 1, a reference numeral 3 represents a flow-rate adjusting knob for setting a flow rate of the water, a reference numeral 4 represents a water knob of a shut-off valve for turning on and off of the water, and a reference numeral 5 represents a water temperature adjusting knob for setting a temperature of the delivered water. Further, a reference numeral 6 represents an air bubble switch for actuating an air supply unit into operation for delivering air into the heated water, a reference numeral 7 represents a shower hose for conducting the heated water, and a reference numeral 8 represents a showerhead for spraying the heated water, so that the showerhead 8 sprays the heated water mixed with the air. Also, a reference numeral 9 represents a holder for holding the showerhead 8 inserted in it, and a reference numeral 10 represents a post for supporting the holder 9. The holder 9 fitted to the bar-shaped post 10 is vertically movable, so that it can be held at any suitable position. A reference numeral 11 represents a fixture for fixing the post 10 on a wall in the bathroom, etc., a reference numeral 12 represents a tray mounted on the post 10 for placing a soap and the like, and the foregoing components 9 through 11 constitute a supporting unit of the showerhead 8. The post 10 is constructed of an optically transparent polymeric resin containing gas 10a in a form of bubbles, in an attempt to imitate the bubble shower.

Fig. 2 is a side view depicting the heating source 1 and the supporting unit (9 through 11) installed on a wall or the like surface 36. The supporting unit is constructed in a way that it can retain and hold the showerhead 8 in a position convenient for taking a shower.

Details of a structure will be described next by referring to Fig. 3.

In the figure, a reference numeral 13 represents a flow-rate control valve for controlling an amount of water flow in connection with a manipulation of the flow-rate adjusting knob 3, a reference numeral 14 represents a detecting device for detecting the flow rate, a reference numeral 15 represents a water shutoff valve activated in conjunction to a manipulation of the water knob 4, and a reference numeral 16 represents a temperature adjusting potentiometer. A reference numeral 17 represents a tank constituting a heat exchanger within the heating source 1. An interior of the tank 17 is provided with a heater 18 for heating water supplied through the water inlet pipe 2 up to a temperature set by the temperature adjusting potentiometer 16. A reference numeral 30 represents a control circuit for controlling a water temperature and operation of an air supply unit 19 for supplying air to be mixed into the heated water in response to a manipulation of the switch and a detected signal. During operation of the air supply unit 19, the control circuit 30 supplies a signal to a notification device 20 so as to inform of an operating condition. A reference numeral 21 represents a thermister placed in the tank 17 for detecting a temperature of the heated water, and a reference numeral 22 represents an air hose connected to an air outlet of the air supply unit 19 so as to mix the air delivered by the air supply unit 19 into the heated water. A reference numeral 23 represents an air intake hose connected to an air inlet of the air supply unit 19, and its opening for taking air is disposed in vicinity of a lower corner of the heating source 1. The opening is provided with a filter 24.

The shower spraying apparatus constructed as above operates in a manner, which will be described hereinafter. Water drawn from the water inlet pipe 2 is supplied to the tank 17 containing the heater 18 by passing through the flow-rate control valve 13, the detecting device 14, and the water shutoff valve 15. The water is then delivered from the showerhead 8 by

passing through the shower hose 7 connected to a water outlet pipe 25 after being heated in the tank 17. A temperature for the heated shower water can be obtained by controlling a heating value of the heater 18 according to a temperature and a flow rate of the water. When a desired temperature is set with the water temperature adjusting knob 5 in order to obtain a comfortable heated shower water, the apparatus adjusts the shower water to the desired temperature by comparing a resistance value of the thermister 21 for detecting water temperature in the tank 17 with that of the temperature adjusting potentiometer 16, and controlling a duty factor of power supply to the heater 18 with the control circuit 30. The tank 17 is also provided with a safety device 26 for preventing an overheating under abnormal conditions, and it breaks the power to the heater 18 if the temperature increases excessively. The water outlet pipe 25 connected to an outlet side of the tank 17 and the shower hose 7 for delivering the heated water to the showerhead 8 are joined with a coupler 27. Also, the air hose 22 connected to an outlet opening of the air supply unit 19 is joined water-tightly to an appropriate position on the coupler 27. Further, the air hose 22 is inserted through an inside of the shower hose 7 near to an end part of the showerhead 8. The air delivered by the air supply unit 19 is then mixed into the water near the end part of the showerhead 8, so as to obtain uniformity of the mixture.

The apparatus begins to deliver heated water when the water knob 4 is pushed to turn on the water shutoff valve 15, and the air is then delivered when the air bubble switch 6 is depressed to an ON position, which causes the control circuit 30 to start the air supply unit 19 into operation. As a result, the air is mixed into the heated water, as has been described, and the heated water 28 is sprayed from the showerhead 8 in a form of mixture with the air 29.

Fig. 4 shows an amount of water-flow Q_1 and an amount of airflow Q_2 corresponding to a primary pressure P . Reference numerals 31 and 32

represent domains of the water-flow amount Q_1 and the airflow amount Q_2 respectively. A composite amount of flow 33 delivered from the showerhead 8 becomes a total of the domain of airflow amount Q_2 added to the domain of water-flow amount Q_1 . If a primary pressure is P_a , for example, an amount of water-flow becomes Q_a . Since the apparatus can deliver only this small amount of heated water, in the case of taking a shower with the heated water only, it provides low washing potential and an unsatisfactory feeling of taking shower. However, if air is mixed, a composite amount of flow equivalent to $Q_a + Q_b$ can be attained due to an additional amount of the air Q_b . Since it can provide an effect equivalent to an amount of water Q_c corresponding to P_b , i.e. a primary pressure in the case of delivering heated water only, a sufficient washing potential and a comfortable feeling of taking shower can be achieved even with the limited amount of water flow.

Fig. 5 shows a water pressure P_1 and an air pressure P_2 corresponding to an amount of water flow Q . Reference numerals 34 and 35 represent domains of the water pressure P_1 and the air pressure P_2 respectively. A composite pressure 36 of the heated water sprayed from the showerhead 8 fits in a pressure domain derived by an addition of the air pressure P_2 to the domain of water pressure P_1 . Like the preceding case of water flow, a spray pressure from the showerhead 8 can be increased by mixing air, even when delivering the heated water in low pressure, so as to achieve a comfortable feeling of taking shower.

When the air bubble switch 6 is depressed again into an OFF position, the control circuit 30 functions to terminate the operation of the air supply unit 19, which in turn stops mixing of air into the heated water. This causes the showerhead 8 to deliver only heated water, so as to make it possible to serve as an ordinary shower.

In addition, if the air bubble switch 6 is left in the ON position, and the temperature adjusting potentiometer 16 is turned into an OFF position, the

showerhead 8 sprays unheated water mixed with air, while the power supply to the heater 18 is disconnected. In a ward, the apparatus can be used also for showering unheated water mixed with air.

As has been described, the shower spraying apparatus of the present embodiment comprises the post constructed of an optically transparent polymeric resin containing gas in a form of bubbles, for supporting the holder to be used for mounting the showerhead. Accordingly, it can maintain an aesthetic balance with the relatively gorgeously made showerhead, improves an interior appearance of a bathroom, if it is mounted on a wall, etc. of the bathroom, and produces a cool appearance as a shower spraying apparatus.

Also, the shower spraying apparatus of the present invention mixes air into heated water from an upper stream of the showerhead by the air supply unit, and it can deliver from the showerhead either of heated or unheated water only, and a mixture of water with air. As the result, it can deliver water and air in a state of an exceptionally uniform mixture, thereby making the effect of mixing air substantially remarkable. In other words, the apparatus is expected to provide an effect of water conservation by gaining a sufficient washing effect with a small amount of heated water, and a comfortable feel of taking shower as well as a massaging effect by increasing a spraying pressure attained by an addition of air pressure to the heated water of even a low pressure. Moreover, the invention substantially improves utility of the apparatus, as it can be used properly according to the intended usage.

According to the foregoing, the shower spraying apparatus of claim 1 is provided with the post, which supports the holder to be used for mounting the showerhead, constructed to contain gas in a form of bubbles. Therefore, it can maintain an aesthetic balance with the relatively gorgeously made showerhead, and improves an interior appearance of a bathroom, if it is mounted on a wall, etc. of the bathroom. In addition, since the post

containing gas in a form of bubbles is constructed of an optically transparent polymeric resin, it can produce a cool appearance, and improve the image of bubble-shower spraying apparatus.

Also, the shower spraying apparatus of claim 2 can realize an effect of water conservation by gaining a sufficient washing effect with a small amount of heated water and a comfortable feel of taking shower by increasing a spraying pressure attained by an addition of air pressure to the heated water of even a low pressure.



What is claimed is:

1. A shower spraying apparatus comprising:
 - a heating source;
 - a shower hose for conducting heated water delivered by said heating source;
 - a showerhead attached to one end of said shower hose;
 - a holder for holding said showerhead at a desired position; and
 - a post for fitting and stationarily supporting said holder at the desired position,wherein said post is constructed of an optically transparent polymeric resin containing gas in a form of bubbles.
2. The shower spraying apparatus according to claim 1, wherein said heating source comprises an air supply means for mixing air into the heated water delivered by said heating source.