

TITLE: An improved moveable valve structure for perfume atomizers.

BACKGROUND OF THE INVENTION

The present invention relates to an improved movable valve structure for perfume atomizers and particularly to one which can be actuated by a rather slight downward pressure.

Referring to Fig. 1 which is a partial longitudinal cross-sectional view of a perfume bottle of U.S. patent No. 4, 025, 046. The perfume mainly comprises a hollow piston (1) in which a valve member (2) is disposed. The valve member (2) includes a rod (20) and a sleeve (21) wherein the upper half (201) of the rod (20) is received in the hollow piston (1) while the lower half (202) thereof is associated with a spring (3) and is located in a valve seat (4). The sleeve (21) is provided at its lower end with an inward projection (210). In operation, firstly press an atomizer head (5) downward which in turn may drive the hollow piston (1) together with the rod (20) downward such that the sleeve (21) can move downward along the outer wall (40) of the valve seat (4).

By the fluidtight contact between the projection (210) of the sleeve (21) and the outer wall (40) of the valve seat (4), the communication between the inside and the outside of the valve seat (4) is terminated. At the instant, the piston (1) continuously moves downward thereby the liquid perfume contained in the outside of the valve seat (4) is compressed and the pressure generated by the pressurized liquid can only be applied to the shoulder (211) of the sleeve (21). As soon as the liquid pressure overcomes the compression force provided by the spring (3), the sleeve (21) will be forced downward to disengage a valve (203) from a top

opening (10) of the hollow piston (1) so that the liquid perfume can be sprayed out from the perfume bottle through the top opening (10) and a nozzle (not shown) of the atomizer head (5). After the liquid perfume contained in the outside of the valve seat (4) is sprayed out from the perfume bottle, the pressure therein is reduced so that the spring (3) will force the valve member (2) upward to its original position and meanwhile the liquid perfume contained in the lower storage chamber thereof will be sucked into valve seat (4) for the user's ready use.

However, the disadvantage of the aforesaid structure is that the user has to heavily press the atomizer head (5) downward to actuate the valve member (2) because the shoulder (211) of the sleeve (21) of the valve member (2) fails to respond to the increasing liquid pressure promptly.

It is, therefore, an object of the present invention to obviate and mitigate the above-mentioned drawback.

SUMMARY OF THE INVENTION

It is the primary object of the present invention to provide an improved movable valve structure for perfume atomizers wherein a movable valve can be easily actuated by slightly forcing an atomizer head downward.

It is another object of the present invention to provide an improved moveable valve structure for perfume atomizers which is practical for use.

According to the present invention there is provided a movable valve assembly for a liquid atomizer, comprising a piston body which includes a lip portion, a

portion of said piston body being receivable in a cylindrical housing a movable valve body receivable by a portion of said cylindrical housing, said valve body movable by said piston body within said housing, said movable valve body including a sleeve portion receivable by said cylindrical housing, said sleeve portion including, a shoulder, extending substantially normal to the direction of intended movement of the valve member, receiving said lip portion of said piston assembly and forming a path for liquid flow therebetween, and a projection extending outwardly from said sleeve portion, said outward projection being capable of forming a sliding contact with said housing, wherein said shoulder further includes a plurality of recesses or protruding ribs.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a partial longitudinal cross-sectional view of a conventional perfume bottle structure;

Fig. 2 is a partial longitudinal cross-sectional view of a preferred embodiment of the present invention; and

Fig 3 is a similar view as shown in Fig " wherein a movable valve is forced to disengage from an opening of a piston body.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Fig. 1, the sleeve (21) of the conventional structure has tapered shoulder (211) so that when the high pressure liquid perfume is applied to said tapered shoulder (211), the vertical downward force thus obtained is quite small. Therefore, the sleeve (211) will not be forced downward until the pressure provided by the pressurized liquid is increased to a predetermined level which normally is quite high.

Referring to Fig. 2, a preferred embodiment of the valve assembly of the present invention mainly comprises a piston body (B) and a movable valve (A). The shoulder (A10) of the middle portion (namely the sleeve) (A1) of the movable valve body (A) is flattened in such a manner that the outer edge of the flattened shoulder (A10) is formed with a projection (A11). The sleeve (A1) is provided at its lower end with an out projection (A13) having an inverted triangular shape which is opposed to an inner projection (A12). The flattened shoulder (A10) of the sleeve (A1) is furnished with a plurality of recesses (A100) or protruding ribs (44). The piston body (B) is provided with a v-shaped lip portion 42 having a plurality of protruding ribs (B1) which respectively correspond to the recesses (A100) of the shoulder (A10).

In use, firstly press an atomizer head (c) downward,

and this in turn may drive the moveable valve body (A) downward such that the inner projection (A12) of the sleeve (A1) will move downward along the outer side of a valve.

seat (D) of cylindrical housing F the communication between the inside and the outside of the valve seat (D). At this instant, the sleeve (A1) continuously moves downward, therefore the liquid perfume contained in the outside of the valve seat (D) (namely the liquid perfume received in the inside of the piston body (B)) is compressed and the pressure generated by the pressurized liquid can only be applied to the flattened should (A10) of the sleeve (A1). In this way, the downward force (which is generated by the pressurized liquid perfume) applied onto the flattened shoulder (A10) can certainly be larger than that applied onto the conventional tapered shoulder (211). In addition, the pressurized liquid can also be applied onto the outer projection (A13) of the sleeve (A1) to further help a valve area (A14) of the movable valve body (A) to disengage from the opening (B2) of the piston body (B) so that the liquid perfume can be sprayed out from the perfume bottle, as shown in FIG. 3.

In view of th above, we can clearly see that the features of the present invention include the flattened shoulder (A10) of the sleeve (A1). This arrangement can efficiently utilize the pressure generated by the pressurized liquid perfume to overcome the compression force provided by a spring (E). Therefore, it may facilitate the disengagement of the movable valve body (A) from the piston body (B).



CLAIMS

1. A movable valve assembly for a liquid atomizer, comprising:

a piston body which includes a lip portion, a portion of said piston body being receivable in a cylindrical housing;

a movable valve body receivable by a portion of said cylindrical housing, said valve body movable by said piston body within said housing, said movable valve body including a sleeve portion receivable by said cylindrical housing, said sleeve portion including,

a shoulder, extending substantially normal to the direction of intended movement of the valve member, receiving said lip portion of said piston assembly and forming a path for liquid flow therebetween, and

a projection extending outwardly from said sleeve portion, said outward projection being capable of forming a sliding contact with said housing, wherein said shoulder further includes a plurality of recesses or protruding ribs.

2. The valve assembly described in Claim 1, wherein said lip portion of said piston body and said shoulder portion of said movable valve body include complementary recesses.

3. The valve assembly according to Claim 1 or 2, wherein said lip portion of said piston body is U-shaped.

4. The valve assembly according to Claim 1, 2 or 3 wherein said flattened portion and said upward projection of said sleeve portion together form a U-shape.



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5. The valve assembly according to any one of Claims 1 to 4, wherein said piston body lip further includes a plurality of recesses or protruding ribs.

6. A valve assembly according to any one of Claims 1 to 5, wherein the valve assembly is suitable for use with an atomizer.

7. An atomizer comprising a valve assembly according to Claim 6.

8. The atomizer according to Claim 7 further comprising a cylindrical housing, wherein said cylindrical housing includes a sleeve receiving portion which receives said outward projection of said sleeve portion.

9. A valve assembly substantially as hereinbefore described with reference to, and as shown in, Figure 2 of the accompanying drawings.
