Aug. 7, 1951 C. A. FORTIN 2,563,231

PERFUME ATOMIZER NOZZLE

Filed Dec. 17, 1947

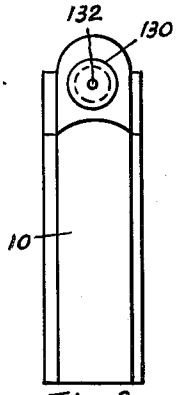


Fig. 3

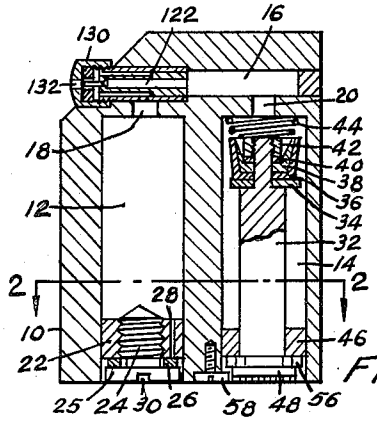


Fig. 1

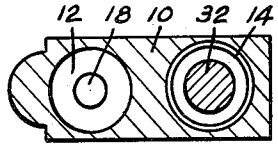


Fig. 2

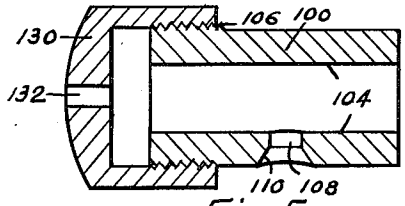


Fig. 5

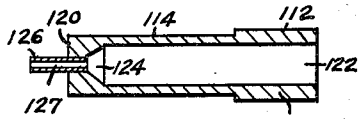


Fig. 6

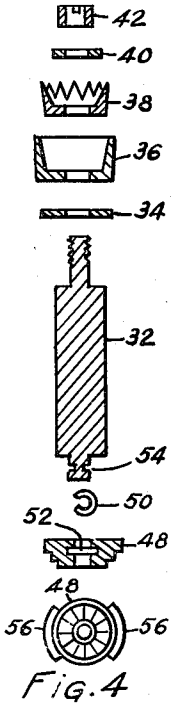


Fig. 4

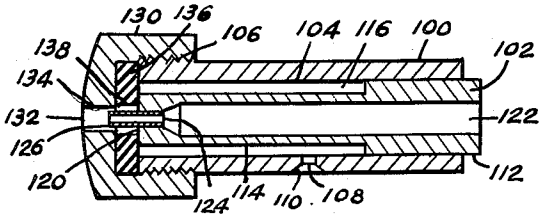


Fig. 7

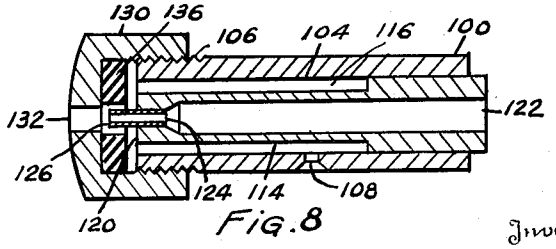


Fig. 8

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PERFUME ATOMIZER NOZZLE

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3 Claims. (Cl. 299—88)

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Introduction

This invention relates to atomizers and more particularly to improvements in the nozzle structure.

The atomizer nozzle structures customarily used in small portable atomizers for dispensing perfume or toilet water, such as that disclosed in United States Patent Application, Serial No. 684,426, filed July 18, 1946, by Albert J. Bruneau, are prone to leakage, when carried in a pocket or purse, this leakage sometimes being caused by rapid changes of temperature or agitation caused by the normal movements of the person carrying the atomizer. Further, it has been found that in the above-noted structure the supply of liquid to the nozzle is at times restricted or stopped, due to the lack of sufficient return of air passing into the fluid reservoir to compensate for the liquid dispersed.

Objects

The present invention deals fundamentally with these conditions, and its aim is to devise a thoroughly practical solution for them, as well as to provide a superior atomization of the fluid, at the same time preventing evaporization of the fluid when the atomizer is not in use.

The invention

The invention, in its preferred form, consists of a new valve structure embodied in the type of atomizer set forth in United States Patent Application, Serial No. 684,426, Albert J. Bruneau, consisting of a thin substantially rectangular body having a pump chamber and a fluid reservoir. A transverse passage, having connecting passages with both the pump chamber and the fluid reservoir, is adapted to house the atomizing valve structure.

The atomizing valve, which will be more fully explained later, comprises two parts, namely a primary body member and a secondary insert. Borings and clearances within and between the primary and secondary members provide an air passage and a fluid passage, which, in conjunction with a piston workable in the pump cylinder, dispenses perfume in atomized or spray form.

A cap threadably attached to the primary body, is adapted to house a washer, both washer and cap being bored to supply an air passage co-axial with the air nozzle, said nozzle being an elongated tube having a reduced diameter projecting from the air passage. The inside circumference of the cap is of sufficient diameter to encompass

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the clearance around the second body which constitutes the fluid passage, forms a chamber surrounding the air nozzle, into which the fluid has free passage. In its closed position the washer is forced against the opening of the fluid passage blocking it, thus preventing leakage and evaporation of the fluid. In its open position, the chamber formed by the withdrawal of the washer from the fluid passage forms a turbulizing or mixing chamber.

On the intake or aspiration stroke of the piston, air is drawn into the pump cylinder and the mixing chamber, the sharp intake of air causing a turbulizing effect on the air and fluid in the chamber, thus breaking up the fluid into airborne particles.

On the exhaust or expiration stroke of the piston the stream of air forced out of the air nozzle syphons a portion of the air and fluid mixture out of the chamber and ejects it in the form of a finely broken up atomized spray. The drawing out of the mixture from the chamber allows further fluid to flow into the chamber from the reservoir, and the air entering the chamber, on the intake stroke of the piston, replenishes the displaced volume of fluid in the reservoir, by filtration.

The latter causes a free flow of fluid from the reservoir and the former causes finer atomization and more even mixture.

Detailed description

Still other features will be apparent in the course of the following detailed description in which reference is made to the accompanying drawing, wherein:

Figure 1 is a side sectional elevation taken substantially on the center-line of the perfume atomizer, embodying the invention.

Figure 2 is a cross section taken on the line 2—2, Figure 1.

Figure 3 is a front end elevation of the preferred structure.

Figure 4 is an exploded part sectional view of the air pump piston assembly.

Figure 5 is an enlarged side section of the primary member of the atomizing nozzle, embodying the invention.

Figure 6 is an enlarged side section of the secondary member of the atomizing nozzle.

Figure 7 is an enlarged side section of the assembled atomizing nozzle embodying the invention in closed position.

Figure 8 is an enlarged part side section of the assembled nozzle as shown in Figure 7, but in the open position.

Referring now more particularly to the drawings, the atomizer in its preferred form is constructed as follows, and consists of a main body portion 10 which is a solid billet of material having two longitudinal borings 12 and 14. The boring 12 constitutes a fluid chamber and the boring 14 a pump cylinder. These borings 12 and 14 are connected to a lateral boring 16 by means of passages 18 and 20. Forced into the opening of the chamber 12 and retained there by a dry fit, is a collar 22, this collar being threaded to receive a closure 24 which has a flanged head 25. A washer 26 is adapted to provide an air-tight seal to the chamber 12 by being compressed between the flanged head 25 and the collar 22 as the closure 24 is screwed home. A minute boring 28 in the collar 22 provides for the egress of air from the fluid chamber 12, which is displaced as the closure 24 is being screwed home to a point of ultimately sealing the chamber. Air may escape through the boring 28, up to the time of being sealed by the washer 26. A groove 30, cut transversely in the outside face of the flanged head portion 26 of the closure 24, is provided to adapt the closure 24 to be screwed home or loosened by the use of an ordinary coin which is inserted in the transverse slot 30.

The piston which forms a movable part of the pumping mechanism comprises a solid stem 32 which is threaded at one end to receive a washer 34. This washer 34 forms a base for a sealing ring 36 of leather or other like material which has an upwardly extending collar, which is forced outwardly by a metal crown-like washer 38 having upwardly and outwardly extending spurs. A washer 40 and a nut 42 complete the upper structure of the piston. A spiral spring 44 which is seated on the washer 40 and against the main body 10 provides resilient outward action to the piston. A collar member 46 provides a bushing for the motion of the stem 32. A rotatably mounted, thumb-engaging head consisting of a fluted wheel member 48 is retained on the lower end of the stem 32 by a snap ring 50 which is engaged in the detents 52 on the wheel and 54 on the stem 32. Protruding wing members 56 which are formed on alternative quarters of the circumference of the wheel member 48 are caught under the flanged head of a retaining screw 58 which is screwed into the body 10. As will be understood, a quarter turn of the head 38 will release the wings 56 from contact with the retainer screw 58, thereby allowing the plunger to extend to an open position by force of the spring 44.

The apparatus described thus far in the detailed description is essentially that disclosed in United States Patent 2,543,829, granted on March 6, 1951, to Albert J. Bruneau.

Atomizer valve assembly

The atomizer valve assembly as illustrated consists of the primary body member 100 (Figure 5) and a secondary body member 102 (Figure 6). The primary body member 100 consists of a cylindrical body having a central passage 104 throughout the entire length of the member. One end of the outside periphery of this member 100 is threaded at 106, the balance of the periphery being of a size to fit snugly within the larger portion of the transverse boring 16 in the body member 10. The threaded portion 106 extends outwardly free of the body 10. A countersunk hole 108 bored through the body of this member 100, and is adapted to connect the passage 104 with the passage 18 leading to the fluid reservoir. The countersunk portion 110 of the hole 108, is adapted to provide a globular formation to the fluid as it clings to the opening 108 before passing through into the passage 104.

The secondary insert consists of the cylindrical member 102 having a stepped down outside diameter, that is, the portion 112 is of a circumference adapted to fit into the circumference of the boring 104 in a dry fit, thus sealing the boring. The diameter of the portion 114 is slightly smaller than the diameter of 104 or 112 so that when the insert 102 is inserted into the boring 104, the difference in circumferences forms a chamber 116 which is in communication to the fluid reservoir 12 by the boring 18 and the hole 108 which are adapted to coincide. The nose or end portion of the small diameter is flat at 120. A central passage 122 in the secondary member 102 is decreased in diameter at 124 to form a nozzle for the passage 122. A cylindrical sleeve 126 is fixed in the passage 122 at 124 to form an air nozzle extending beyond the flat face 120 of the secondary piece 102.

A cap member 130 is adapted to engage the cylindrical primary member 100. The preferred method consists of a threaded engagement as illustrated, but a snug sliding fit is also adaptable, and the sliding action of the cap 130 on the primary member 100 could be controlled by a spring-urged ball catch. In the preferred embodiment a cap member 130 is adapted to threadably engage the cylindrical primary member 100 by the threaded portion 106. A central boring 132 in the face portion of the cap 130 is adapted to coincide with the sleeve member 126 leaving an annular clearance 134 between the outside periphery of the member 126 and the inside periphery of the boring 132. The length of the sleeve member 126 is such that it will at least enter the boring 132 but shall not extend beyond the limits of the boring. A resilient washer 136 held into the cavity portion of the cap by a close fit is provided with a central opening 138 of sufficient diameter to clear the outside periphery of the nozzle or sleeve member 126. The clearance between the sleeve member 126 and the washer, which is governed by the size of the opening 138, is preferably larger than the clearance 134 between the cap and the sleeve. The screwed connection between the cap 130 and the primary member 100 is of sufficient length to draw the washer 136 into sealing contact with the flat face 120, thus sealing or blocking of the fluid chamber 116 is achieved when the cap member 130 is screwed home upon the primary member 100. In the reverse condition, the threaded connection between the cap 130 and the primary member 100 is of sufficient length so that by unscrewing the cap member 130 the washer 136 is drawn away from the face 120 to a distance at least equal or more than the clearance between the washer 136 and the sleeve member 126.

Operation and advantages

The atomizing action of the atomizer detailed, being universally understood, will not be dealt with in any great length, with the exception that the majority of atomizers utilize a separate air inlet in order to replenish the air supply to the pump on the intake stroke. In the applicant's structure, the intake stroke of the pump piston draws air through the same opening 132 as it is forced out of in the exhaust stroke. This has one feature of eliminating extra structure neces-

sary to provide for the second air inlet to the pump piston. A further advantage is that the air being drawn back by the intake stroke of the pump piston causes a turbulent motion of the air within the chamber formed by the cap 130. This turbulence is instrumental in stirring up and mixing air with the fluid which is in the chamber, thus providing better atomization as the current of air is reversed by the exhaust stroke of the piston.

As the washer 136 is instrumental in blocking off the fluid passage to the orifice 132, it is also instrumental in governing the amount of fluid, which is drawn by the air stream from the fluid passage 104, by the degree of clearance between the washer 136 and the face 120. This clearance between the washer 136 and the face 120 is adjusted, by the user, by unscrewing the cap 130 to any degree desired.

The sub-titles used throughout the specification are merely to simplify reference thereto and should otherwise be disregarded.

I claim:

1. An atomizer nozzle, comprising, a tubular insert-piece adapted for insertion into an atomizer body, a tube within said insert-piece, said tube having a minor portion at its rear end of a size to fit snugly within said insert-piece and a major portion of a size to leave a clearance space constituting a perfume passage between its outside wall and the inside wall of the insert-piece, an opening of reduced size in the forward end of the tube and a tubular tip inserted in said opening of reduced size, the insert-piece and the tube having forward ends extending to the same point, the internal bore of the tube extending from the rear thereof to the tip and adapted to constitute an air passage, the insert-piece having an opening in the side thereof leading to said perfume passage, a cap mounted on the insert-piece and having a cover portion and side flange portions overlapping the insert-piece, said cap being adapted for limited movement towards and from the insert-piece, a resilient washer in said cap and adapted to bear against the ends of said insert-piece and tube thereby to seal off the end of said perfume passage, said cap and washer including a centrally disposed opening in register with said tube tip, whereby movement of the cap away from the ends of the insert-piece and tube is adapted to form a transverse passage leading from the perfume passage towards the opening in the cap so as to allow aspiration of the perfume from the perfume passage by the action of the air passing through said tip.

2. An atomizer for dispensing atomized liquid, comprising in combination, an external tube and an internal tube forming separate concentric passageways, the members terminating in coextensive ends, a cap mounted on the external tube for limited movement to and from said ends, a hole in said cap forming a dispensing opening registering with the end of the internal passageway, a resilient washer in said cap adapted to engage the ends of said tubes thereby to close the end of said external passageway completely, the washer including an opening registering with the opening in the cap, the external tube being provided with an opening constituting a liquid inlet to said external passageway, the internal tube having an opening constituting an air inlet, and means between said inlets separating the said passageways.

3. An atomizer structure comprising a tubular passage forming member having a dispensing opening at one end; a tube mounted within said member with one end disposed in said opening and having a major portion of its length spaced from the interior of the member, to form a liquid passage leading into said opening, said tube having at its opposite end an enlarged portion fitting the interior of said member in sealing contact; a tip projecting beyond the first mentioned end of said tube and having a restricted passage leading from the interior thereof; a centrally apertured cap mounted for axial movement on the first mentioned end of the passage forming member; a washer in said cap in axial alignment with the open end of said liquid passage and having a central opening registering with said tip and disposed in axial alignment with the aperture in said cap, whereby axial adjustment of the cap and washer varies the clearance between the dispensing opening and the opening in the washer, to regulate the flow of liquid from said liquid passage; an inlet to the liquid passage; and an air inlet to the end of said tube remote from the dispensing opening.

C. A. FORTIN.

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