March 6, 1951 A. J. BRUNEAU 2,543,829

PERFUME ATOMIZER

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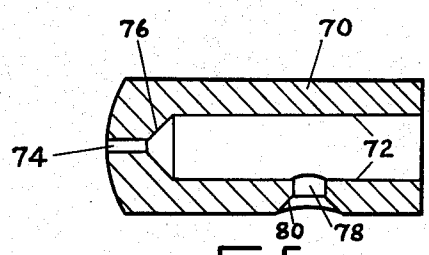

FIG. 5

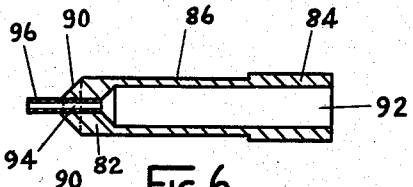

FIG. 6

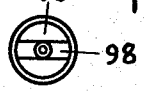

FIG. 7

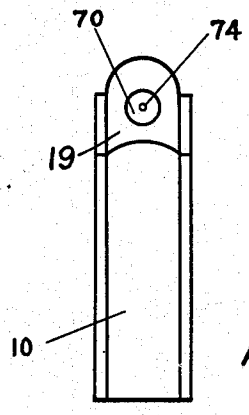

FIG. 3

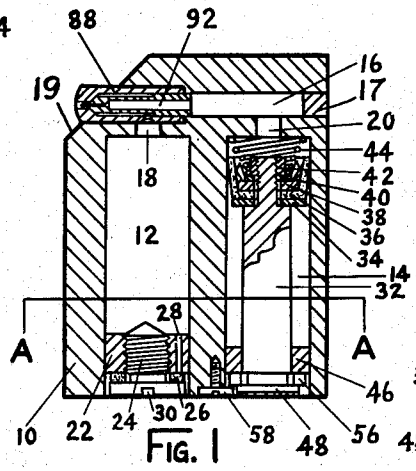

FIG. 1

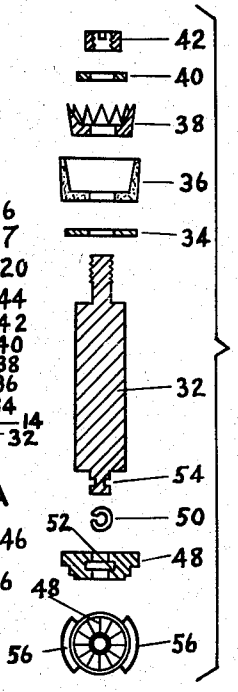

FIG. 4

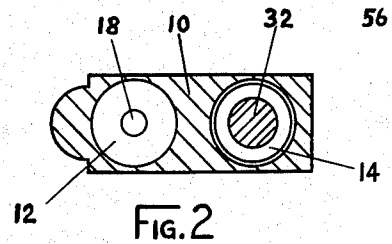

FIG. 2

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PERFUME ATOMIZER

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7 Claims. (Cl. 299—88)

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Introduction

The invention relates to atomizers, and more particularly to a portable atomizer for dispensing perfume.

The invention comprises an atomizing nozzle which is simple to manufacture and assemble as well as easy to maintain. The majority of pocket atomizers, which are adaptable for dispensing perfume, comprise, along with the fluid reservoir and pump, a tube connected with the fluid reservoir and another tube through which air is pumped. As the proper atomizer function depends upon the relative position of the ends of these tubes, proper adjustment is difficult to maintain, and as the tube connected with the fluid reservoir would permit free leakage of the fluid, it has been necessary to cover the end of this tube for atomizers which were to be carried in the pocket or purse.

As will be understood, the adding of movable parts likely to become deformed, makes continual maintenance necessary.

Objects

An object of this invention is the provision of an atomizing nozzle which is contained within the body of the atomizer, and which eliminates the use of any moving parts such as a cover.

A further object of this invention is the provision of a perfume atomizer which is simple in construction and simple in operation.

Another object of this invention is the construction of an atomizer body from a single billet of alloy material, impervious to perfume, which provides for cheaper manufacture.

Preferred structure

A preferred structure fulfilling the objects of this invention comprises a thin substantially rectangular casing, made from a solid billet of material, in which borings constitute a fluid chamber, a pump cylinder, and a recess which holds the atomizing nozzle in communication with fluid chamber and the pump cylinder. The atomizing nozzle, 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.

Detailed description

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

Figure 1 shows a vertical cross section of the assembled perfume atomizer.

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

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Figure 3 is an end elevation of the preferred structure described, embodying the invention.

Figure 4 is an exploded view of the piston construction in section.

Figure 5 is a sectional view of the primary casing member of the atomizing nozzle.

Figure 6 is a sectional view of the secondary insert member of the atomizer nozzle shown detached from the primary member of the nozzle.

Figure 7 is an end view of the secondary insert member showing the flats on the bevel face of this member.

Referring to Figure 1 of the drawing, the casing 10 is a solid billet of material in which the vertical boring 12 forms a fluid chamber and the vertical boring 14 forms a pump cylinder which are connected to a horizontal, transverse boring 16 by the passages 18 and 20. The transverse boring 16 is closed at its rear end by a plug 17 and opens at its opposite, forward end through an oblique edge surface 19 defining a relieved corner portion of the generally rectangular billet or casing 10. Forced, to a dry fit, into the opening of the chamber 12, is a collar 22. A boring in this collar is threaded to receive a closure 24, which is suitably sealed against leakage of fluid by a washer 26. 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 up 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 lateral groove 30 in the outside face of the closure 24 is provided so that the closure may be tightened or unscrewed by the use of an ordinary coin.

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 leather sealing ring 36 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 alternate quarters of the circumference of the wheel member 48, are caught under the flange head of a retaining screw 58 which is screwed into the body 10. As will be understood, a quarter turn of the head 48 will release the wings 56 from contact with the retainer screw 58, there-

by allowing the plunger to extend to an open position by force of the spring 44.

Atomizer nozzle assembly

The atomizer nozzle assembly shown in Figures 5, 6, and 7 comprises a primary body member (Figure 5) and a secondary insert (Figure 6). The primary body member consists of a cylindrical casing 70 having a partial central boring 72 and a continuation boring 74 of smaller diameter, completing the full length of the body member 70. Joining the two borings 72 and 74 is a reamed out beveled face joining the outside circumferences of the two bores as shown at 76. Through the casing to the boring 72 is a port 78 adapted to communicate with the boring 18 in the body member 10, when the casing 70 is forced into the open, enlarged end of the transverse passage 16. The portion of this port 78 which communicates with the fluid chamber 12 is countersunk at 80 to provide a globular formation to the fluid as it enters the boring 72.

The secondary insert consists of a cylindrical member, or hollow plug, 82 having a step-down diameter, that is the portion 84 is of a circumference adapted to fit into the circumference of the boring 72 in a dry fit sealing same. The diameter of the portion 86 is slightly smaller than the diameter of 72 or 84 so that when the hollow plug 82 is inserted into the boring 72 the difference in circumferences form a chamber 88 which is in communication in the fluid chamber 12 by the boring 18 and the port 78 which coincide. The end of the insert 82 adjoining the circumference 86 is machined down to form a bevel face 90 matching and fitting the bevel face 76 in the primary member. A central boring 92 through the secondary insert is connected with a smaller boring 94 completing the length of the insert. A tube 96 having a minute central orifice is inserted in the small boring 94. This tube 96 may be eliminated if the manufacturer finds that a boring of small enough circumference may be achieved any other way. Flats 98 are machined on the beveled surface 90, forming a communication from the chamber 88 to the clearance between the outside circumference of tube 96 and the boring 74.

With the atomizer nozzle, consisting of outer casing 70 and the inner cylindrical member 82 in assembled relation and disposed within the enlarged forward end of the transverse passage 16, the forward end of the nozzle projects through the oblique surface 19 of the block and lies within the relieved corner or, in other words within the space defined by projections of the side and edge faces of the casing or billet 10.

Operation

The operation of this atomizer uses the same law which governs most types of atomizers, namely that of a stream of air passing an orifice containing liquid and in so doing drawing the liquid from its container, the pressure of the air vapourizing the liquid as it is drawn out. As will be noted, with reference to Figure 1, the air is forced from the pump cylinder through the borings 20 and 16 into the boring 92 of the secondary insert and thence through the minute opening in the tube 96 to the atmosphere. Perfume which has been allowed to enter the chamber 88 of the nozzle, by shaking or normal carrying of the atomizer in a pocket or purse, is distributed around the circumference 86. The passage of the air through the orifice in tube 96 causes the perfume to be drawn out past the flats 98 and to mix with the air in the opening 74 of the primary body member, the velocity of the pumped air causing the minute quantity of perfume to break up into particles and to emerge from the borings 74 with the air in an atomized form.

Advantages

As will be noted by the detailed description and the operation of this atomizer, the only moving part for the operation of the atomizer is the piston of the pump. The tube 96 of the secondary insert of the nozzle is protected by the somewhat rounded and blunt nose of the primary body member of the nozzle. Therefore, it will be seen that replacement or maintenance due to everyday use will be almost eliminated.

A further advantage of this type of atomizer is that the amount of perfume which may be dispensed at any one time is limited to the amount of perfume which is held in the chamber 88 in the nozzle assembly, therefore, there is no chance of having the air stream draw a large quantity of perfume from the reservoir and deposit it more or less in its solid form.

In the preferred form tested, the clearance between the circumference 86 and 72 is approximately $^{20}/_{1000}$ of an inch, therefore, limiting the amount of perfume contained within the chamber 88 to a very minute quantity.

A further advantage of this type of atomizer is that with the use of a solid billet forming the body, the collars 22 and 46 are driven tightly into the borings and the nozzle assembly is also assembled and fitted into the body by a dry fit, thus eliminating all soldering and cutting down on the time and cost factor in manufacturing.

It will be understood that, without departing from the scope of the claims, various modifications may be made in the specific expedients described. The latter are illustrative only, and not offered in a restrictive sense, it being desired that only such limitations shall be placed thereon as may be required by the state of the prior art.

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

I claim:

1. A pocket atomizer for perfume and like liquids comprising a unitary block of solid material having borings in the interior thereof, shaped to provide two parallel, vertical chambers constituting, respectively, a liquid reservoir and a pump cylinder extending from open ends at the bottom of the block toward the top, and a third boring at the upper ends of the first two constituting a horizontal transverse chamber communicating therewith, closed at the end adjacent the pump cylinder and opening at the other end adjacent the reservoir through the surface of the block, means for closing the open ends of the first two chambers, an air piston in the cylinder, and an atomizing nozzle in the transverse chamber overlying the communication with the liquid reservoir and projecting from the open end of the transverse chamber.

2. A pocket atomizer for perfume and like liquids, comprising a unitary block of generally rectangular shape in side elevation with an upper corner portion relieved and defined by an oblique edge surface, the interior of the block being shaped to provide two vertical chambers constituting, respectively, a liquid reservoir and a pump

cylinder, extending from the bottom of the block toward the top, and a third, transverse chamber communicating with the first two, closed at one end, adjacent the pump cylinder, and opening at the other end, adjacent the reservoir, through said oblique surface, an air piston in the cylinder, and an atomizing nozzle in the transverse chamber, projecting from the open end thereof through said oblique surface and having its end lying within the relieved upper corner.

3. A pocket atomizer for perfume and like liquids, comprising a unitary block of generally rectangular shape in side elevation with an upper corner portion relieved and defined by an oblique edge surface, the interior of the block being shaped to provide two vertical chambers constituting, respectively, a liquid reservoir and a pump cylinder, extending from the bottom of the block toward the top, and a third, transverse chamber communicating with the first two, closed at one end, adjacent the pump cylinder, and opening at the other end, adjacent the reservoir, through said oblique surface, an upwardly acting air piston in the cylinder, a spring urging the piston downwardly, a plunger operatively connected to the piston and extending below the bottom of the block when the piston is urged downwardly, means engageable with the plunger for resisting the force of the spring and for holding the end of the plunger flush with the bottom of the block when the atomizer is not in use, and an atomizing nozzle in the transverse chamber, projecting from the open end thereof through said oblique surface and having its end lying within the relieved upper corner.

4. A pocket atomizer for perfume and like liquids, comprising, a unitary body formed with a passageway from one end thereof to near the other constituting a liquid reservoir, said body being formed with another passageway from one end to near the other and constituting a pump chamber, said body being formed with a passageway transverse to, and communicating with, said reservoir and said pump chamber and extending across the body close to one end thereof, said transverse passageway being closed on the end nearest the pump chamber and opening from the body at the end adjacent the perfume reservoir, an atomizing nozzle within said transverse passageway at the end adjacent said reservoir, reciprocal pumping means within said cylinder including a piston, adapted on its positive stroke to force air into said transverse passage and through said nozzle whereby perfume is aspirated from said reservoir and dispensed through said nozzle, and on its return stroke to draw air into said air chamber, and a spring normally urging the piston in an outward or return direction, said pumping means including a plunger connected to said piston and adapted to project from the cylinder under the urge of said spring, catch means for retaining said piston in inward position when the atomizer is not in use, said piston adapted to be operated, by reciprocating the plunger, in a positive stroke against the action of the spring, and in a return stroke by the spring.

5. A pocket atomizer for perfume and like liquids comprising a unitary block of solid material having borings in the interior thereof, shaped to provide two parallel, vertical chambers constituting, respectively, a liquid reservoir and a pump cylinder extending from the bottom of the block toward the top, and opening through the bottom thereof, and a third boring at the upper ends of

the first two constituting a horizontal transverse chamber communicating with the first two chambers, the transverse chamber being closed at the rear end adjacent the pump cylinder and opening at the other, forward and through the surface of the block, means for closing the open ends of the first two chambers, an air piston in the cylinder arranged to project air into the transverse chamber for flow therethrough toward the forward end, an elongated casing, sealed in the transverse bore at the open end thereof, said casing having an open rear end, an orifice at its forward end and an aperture in its side wall registering with the communication to the reservoir, and a hollow plug in the casing having a rear portion of its side wall in sealing contact with the interior of the casing and a forward portion of its side wall spaced from the interior thereof and forming a passage leading from the aperture to said orifice, the interior of said plug constituting a conduit for the flow of air from the transverse passage to the orifice.

6. A pocket atomizer for perfume and like liquids comprising a unitary block of material having cavities in the interior thereof, shaped to provide two parallel, vertical chambers constituting, respectively, a liquid reservoir and a pump cylinder extending from openings at the bottom of the block toward the top, and a third cavity at the upper ends of and overlying the first two chambers, and constituting a horizontal transverse chamber communicating therewith, and open at the end adjacent the reservoir through the surface of the block, means for closing the bottom openings of the first two chambers, an air piston in the cylinder, and an atomizing nozzle in the transverse chamber overlying the communication with the liquid reservoir and communicating therewith.

7. A pocket atomizer for perfume and like liquids comprising a unitary block of material having cavities in the interior thereof, shaped to provide two parallel vertical chambers constituting respectively a liquid reservoir and a pump cylinder, and a third cavity at the upper ends of and overlying the first two chambers and constituting a horizontal transverse chamber communicating therewith and open at the end adjacent the reservoir through the surface of the block, said vertical chambers being open at their lower ends, means closing the lower end of the liquid reservoir chamber, a pump element reciprocably mounted in the pump cylinder and extending through the lower end thereof, and an atomizing nozzle in the transverse chamber.

A. J. BRUNEAU.

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