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W. I. NISSEN

2,539,155

POCKET ATOMIZER

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Fig. 1.

Fig. 2.

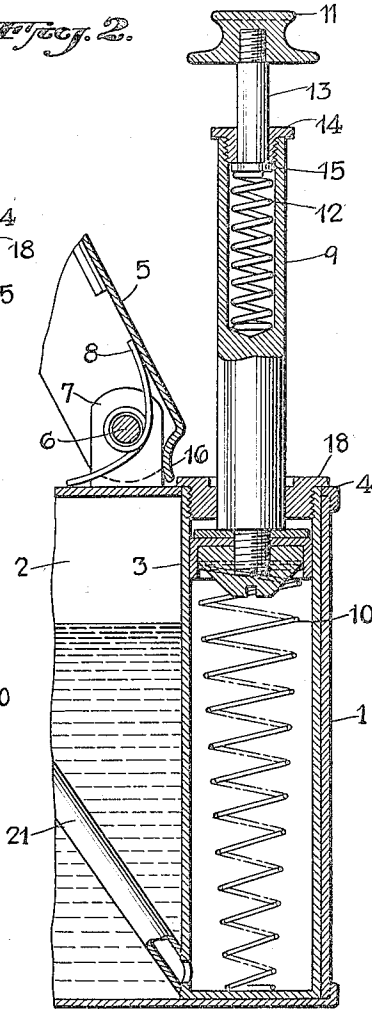
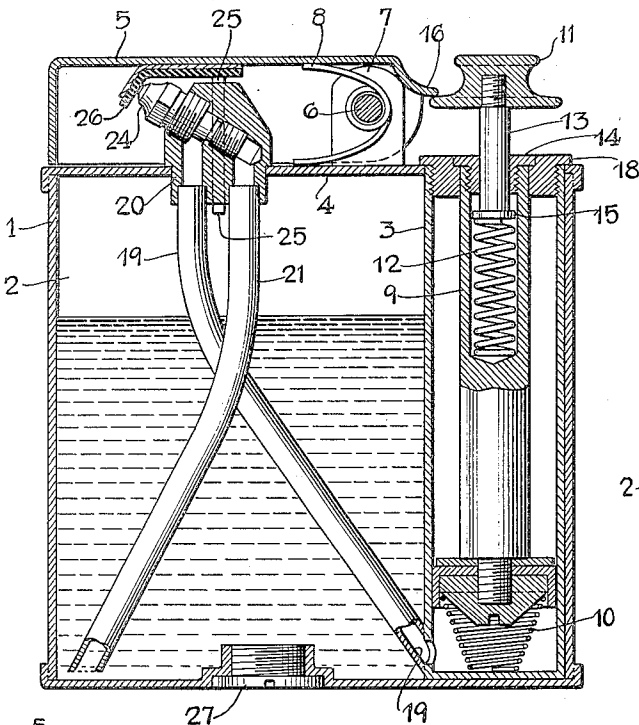


Fig. 3.

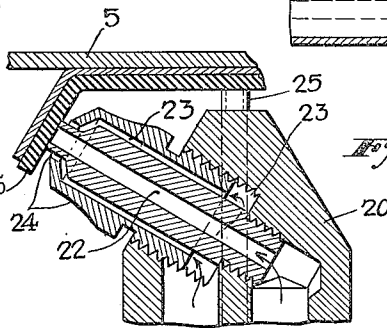
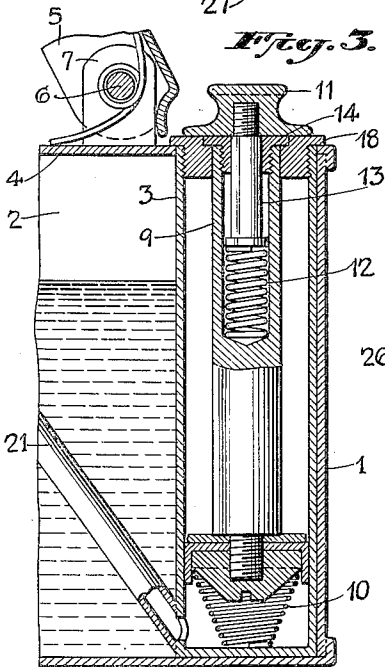


Fig. 4.

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POCKET ATOMIZER

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4 Claims. (Cl. 299—88)

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The invention relates to pocket atomizers for spraying perfume and the like and wherein, when the device is not in use, a manually operated pump plunger releasably locks in sealing position, a cap which overlies the orifices used in spraying; when the device is to be put in use, the pump plunger is manipulated to release the cap from sealing position, whereupon the cap swings open, the plunger being freed from engagement with the cap so that it may be manually reciprocated as needed to produce the sprays.

In one of its aspects the invention aims to provide a more effective releasable engagement between the pump plunger and cap for the above purposes, which will minimize leakage or premature delivery of the fluid through the spraying orifices, particularly when the pump plunger is being disconnected from the cap and before normal manual reciprocation of the plunger for spraying is begun. In another aspect the invention aims to provide a more efficient and satisfactory spraying nozzle construction for atomizers of the above type. Further objects and advantages of the invention will be in part obvious and in part specifically pointed out in the description hereinafter contained which, taken in conjunction with the accompanying drawings, discloses an atomizer of preferred form which is constructed to operate in accordance with the invention; the disclosure however should be considered as merely illustrative of the invention in its broader aspects.

In the drawings—

Fig. 1 is a vertical sectional view of an atomizer constructed to operate in accordance with the invention.

Figs. 2 and 3 are views similar to Fig. 1, but with certain parts cut away, and showing the pump plunger and cap in different relative positions.

Fig. 4 is an enlarged central section taken through the nozzle member shown in Fig. 1.

The invention is illustrated as applied to an atomizer having a container 1 which will usually be of general oblong cross section, and provided with a chamber 2 for containing the perfume or similar liquid to be sprayed, and a pump cylinder 3 which is located at one side of the chamber 2. A cap member 5 is mounted above the top wall 4 of the container, this cap being shown as pivotally carried by a spindle 6 which is supported between ears 7 extending upwardly from the top wall 4. The cap 5 is urged toward open position by a suitable spring 8. In its closed position the cap seals the liquid used in spraying, the sealing mechanism being preferably of the construction hereinafter described, and when released the cap swings upwardly under the action of spring 8 to expose the devices used in spraying.

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Within the cylinder 3 is reciprocably mounted a pump plunger 9 which need not be described in detail save for the features hereinafter specifically mentioned, it being understood that as the plunger 9 is manually reciprocated, it pumps a stream of air through a nozzle construction to deliver atomized liquid when the device is in use. The pump plunger 9 is urged toward the position shown in Fig. 2 by spring 10 which is light enough to permit the plunger to be manually reciprocated with a moderate amount of manual pressure.

The knob or fingerpiece 11 through which the manual pressure is applied to plunger 9 is not rigidly attached to the latter, but a spring 12 is interposed between these parts, this spring 12 being relatively stiffer than the spring 10. In the particular form of the invention which is illustrated, the fingerpiece 11 is screwed on to the upper end of an auxiliary plunger 13 which fit slidably in a threaded collar 14 at the upper end of plunger 9, the head 15 at the lower end of plunger 13 bearing against the spring 12. During normal pumping action of plunger 9 by periodic depression of the fingerpiece 11, spring 12 is very little deflected, in other words most of the expansion and contraction takes place in spring 10. However, when the fingerpiece 11 is to be interengaged with cap 5 to lock the latter releasably in closed position, the pump plunger 9 is first depressed to the full limit of its inward stroke, as shown in Fig. 3, then the cap 5 is manually depressed to the position shown in Fig. 1 so that a lip 16 thereon overhangs the annular flange 17 on fingerpiece 11, and then the manual pressure on fingerpiece 11 is released, whereupon the fingerpiece 11 and associated parts assume the position shown in Fig. 1. When the plunger 9 is depressed to the full limit of its inward stroke, and manual pressure is thereafter continued, the spring 12 is more fully compressed, and this extra compression is imparted before fingerpiece 11 moves down far enough to permit the lip 16 to clear the fingerpiece when cap 5 is being moved from the open position shown in Fig. 3 to the closed position shown in Fig. 1. Then when manual pressure on fingerpiece 11 is relieved, so that the fingerpiece moves up to the cap engaging position shown in Fig. 1, the extra energy stored in spring 12 as above described, presses the cap much more tightly into sealing position than could be done by spring 10, unless the latter were made stiffer than would be desirable for normal pumping action.

When the fingerpiece 11 is depressed from the cap sealing position shown in Fig. 1 to the cap releasing position shown in Fig. 3, no pumping action of the plunger 9 takes place since the plunger is already depressed to the full limit of its inward pumping stroke. Thus the premature

delivery of atomized liquid at a stage when it is not wanted, is avoided. In the illustrated form of the invention the threaded collar 14 seats against a stationary threaded collar 13 at the upper end of cylinder 3 to limit the inward travel of plunger 9, and at all times when the finger-piece is engaged with or being freed from cap 5, the plunger 9 remains substantially stationary at the inward limit of its stroke.

The atomizer is provided with a tube 19 leading from the cylinder 3 to a fitting 20 (Fig. 1) fixed to the top wall 4 of chamber 1, to deliver air under pressure for atomization. A further tube 21 leads from a point beneath the liquid level in chamber 2 to the fitting 20, and preferably a nozzle construction is employed wherein the air under pressure as delivered from chamber 3 through tube 19, flows in an annular column surrounding tube 21. In the illustrated form of the invention, the tube 21 delivers into a capillary tube 22, which fits tightly but removably into the fitting 20, and the tube 19 delivers into an annular chamber 23 in the fitting 20, which chamber surrounds the tube 22. A threaded nozzle tip 24 is positioned at the mouth of chamber 23 and it will be noted that the tube 22 projects through and outwardly beyond the mouth of the nozzle tip 24; thus the annular stream of air under pressure which passes through the mouth of nozzle tip 24 when the above described pump is actuated, aspirates and atomizes the liquid which passes upwardly through tube 22. The fitting 20 also carries a vent pipe 25 (Fig. 1) which maintains atmospheric pressure in chamber 2 when the device is in use. When the cap 5 is in closed position, a sealing block 26 of somewhat elastic material, is pressed against the outer end of tube 22, leaving the mouth of nozzle tip 24 unsealed; thus the possibility is eliminated of liquid being drawn from tube 22 into nozzle tip 24 or tube 19, while cap 5 is closed, and the pump cannot draw back liquid into tube 19 since the mouth of nozzle tip 24 is at all times vented to the air. The above described nozzle construction is advantageous both with and in the absence of the special features of the pump as above described. Heretofore it has been customary to provide atomizers of the above described character with separate nozzles delivering exteriorly of the liquid chamber and which were separately sealed. It is found that the preferred type of nozzle construction, as above described, operates more satisfactorily to atomize heavy perfumes without clogging, and also there is one less orifice to seal, and the members 22 and 24 are readily removable for cleaning or adjustment if necessary. The chamber 2 may be refilled with liquid by removing the threaded plug 27.

This application is a continuation in part of my copending application Serial Number 712,003 filed November 23, 1946, entitled "Pocket Atomizer," now abandoned.

While the invention has been disclosed as carried out by an atomizer of the specific construction above described, it should be understood that changes may be made therein without departing from the invention in its broader aspects, within the scope of the appended claims.

I claim:

1. An atomizer of the character described, including a chamber for liquid to be atomized, an air pumping cylinder disposed adjacent said chamber, a nozzle mechanism connected respectively to said chamber and pumping cylinder, a cap member mounted to move between positions

wherein it respectively covers and exposes said nozzle mechanism, a pump plunger working in said cylinder, a spring urging said plunger toward the outer limit of its stroke, an operating fingerpiece for said plunger, said fingerpiece having a part movable therewith which is engageable with said cap to hold the latter in closed position when the plunger is at the inner end of its stroke, and spring means acting between said fingerpiece and plunger to urge said fingerpiece toward cap engaging position.

2. An atomizer of the character described including a container having a chamber for liquid to be atomized, a pumping cylinder adjacent said chamber, a nozzle mechanism connected to said chamber and cylinder, a cap movable between positions wherein it respectively covers and exposes said nozzle mechanism, a pump plunger working within said cylinder, a spring urging said plunger toward the outer limit of its stroke, a manual operating member for said plunger having means engageable with said cap to hold the latter in nozzle covering position, and spring means interposed between said manual operating member and said plunger, said last mentioned spring means yieldably urging said operating member into engagement with said cap when the latter is in nozzle covering position.

3. An atomizer of the character described, including a container having a chamber therein for liquid to be atomized, a pumping cylinder adjacent said chamber, a pump plunger working in said cylinder, a spring urging said plunger toward the outer limit of its stroke, a fingerpiece telescopically mounted upon said plunger, and a spring interposed between said fingerpiece and plunger, a nozzle mechanism carried by said container, a cap pivotally mounted upon said container to move between positions wherein it respectively covers and exposes said nozzle mechanism, said fingerpiece having a shoulder movable therewith which is positioned to press said cap toward its nozzle covering position when said plunger is at the inner end of its stroke.

4. An atomizer of the character described including a container having a chamber therein for liquid to be atomized, a pumping cylinder adjacent said chamber, said container having mounted therein an air supply conduit leading from said cylinder and a liquid supply conduit leading from said chamber, a nozzle member having its discharge passageway surrounding said liquid supply conduit, said air supply conduit delivering into said nozzle member and said liquid supply conduit having its outer end exposed at the mouth of said nozzle member, a cap member mounted on said container and means mounting said cap member for movement between positions wherein it respectively seals and exposes the outer end of said liquid supply conduit whereby the passage of liquid from said liquid supply conduit into said air supply conduit is prevented when said cap is closed.

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