

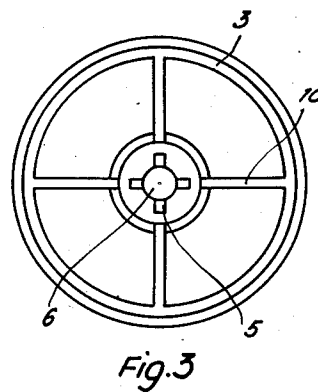
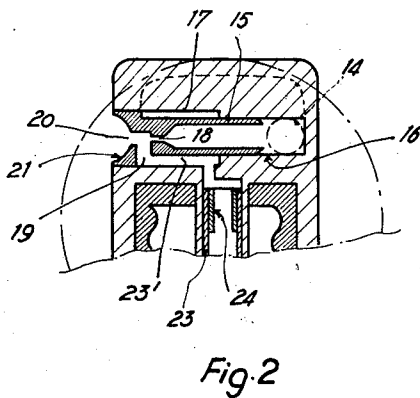
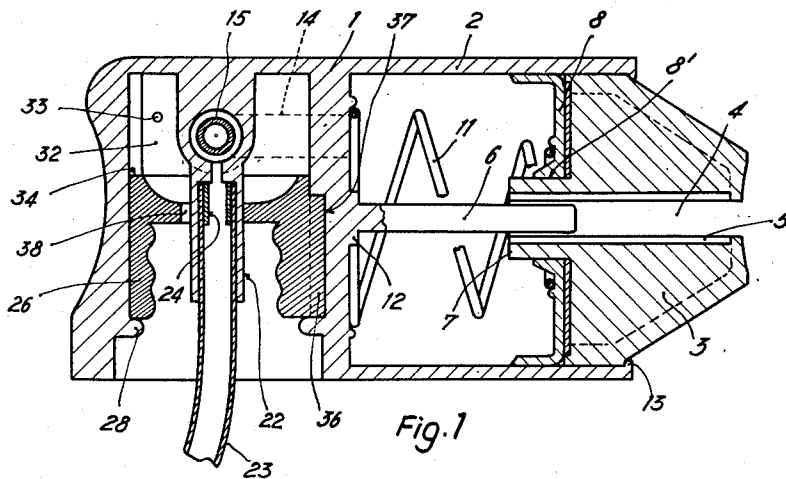
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ATOMIZERS

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ATOMIZERS

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8 Claims. (Cl. 239—361)

The present invention relates to a toilet atomizer made of molded non-rigid unbreakable plastic material, comprising two main parts, namely: the atomizer unit and the independent screw-cap adapted to be screwed on the threaded neck of a bottle.

The atomizer unit, in principle, is made of one piece or head rigid with a pump cylinder in which a piston is mounted for reciprocating movement in order, in one direction, to expell the atomizing air and which is moved in the opposite direction by a restoring spring. This piston is retained within the cylinder by a molded annular ridge.

The air blown out by the piston enters a bent canal provided in the head. An atomizing unit positioned at the outer end of this canal ensures sucking the liquid out of the bottle and atomizing it.

The screw-cap is preferably entrapped within the head while remaining independent therefrom.

In apparatus of this kind, it is difficult to obtain a perfect seal and leaks are often encountered when the user turns the bottle upside down.

According to the invention, the sealing property of the apparatus is obtained by virtue of a reserve chamber provided within the head and communicating, on one hand, with the outside, and, on the other hand, with the bottom of the screw-cap.

Other objects and advantages of the invention will be apparent to those skilled in the art, from a consideration of the following description of one specific embodiment of the invention, shown by way of example, in the accompanying drawings, in which:

Fig. 1 illustrates the atomizer in longitudinal section,

Fig. 2 is a fragmentary, somewhat sketchy, transverse section of the atomizer head, taken along the axis of the atomizing unit, and

Fig. 3 is a sectional detailed view of the piston.

The atomizer comprises a head 1 (Figs. 1 and 2) rigid with a pump cylinder 2. In this cylinder 2 is mounted a reciprocating piston 3 with an axial bore 4 formed with splines 5 adapted to slide on a stem 6 moulded solid with the cylinder 2 for guiding said piston. The piston 3 is formed with an axial boss extending inwardly so as to form an abutment 7 on which is mounted the compression seal 8 provided with a central bored hub 8' which ensures a correct positioning of said seal. A helical spring 11 restores the piston 3 after its active stroke back to its original position shown in the drawing. The piston, at the end of its compression stroke bears against the reinforcing portion 12 provided in the bottom of the cylinder 2 and, at the end of its return stroke, its rear peripheral edge bears against the annular moulded ridge 13 of the cylinder.

A passage 14 (shown in dotted lines in Fig. 1) leads the air to the atomizer unit 15 (Fig. 2) which is forcedly engaged with its rear and foremost into a bore 16 which is an extension of the passage 14 at right angles thereto, the head of the atomizing unit being positioned in the bore 17. The atomizer unit 15 has a throat 18, a suck-

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ing duct 19, an atomizing outlet 20 and a diverging cone 21. Engaged in a central nipple 22 is a flexible hose 23 for sucking the liquid which flows up through the duct 23' into the bore 17 in which the atomizer unit is accommodated. The flexible hose 23 is pressed against the inner wall of the central nipple by a rigid ring 24 forced into said hose (Figs. 1 and 2).

A screw cap 26 (Figs. 1 and 2), which is made of a hard material or of a material similar to that of the head, has a central bore through which extends the central nipple 22 and through which air may enter the bottle; said cap is housed within the head of the atomizer. It is retained by its lower end abutting against an annular ridge 28 (Figs. 1 and 2) moulded with the head.

In the head 1, is a reserve chamber 32 which communicates with the atmosphere through an orifice 33 positioned approximately half-way up the chamber 32.

The threaded cap 26 has its upper face bearing against shoulders 34 of the head. The cap has one or more lateral dovetailed ribs 36 housed in corresponding grooves 37 of the head, whereby the screw cap is prevented from rotational movement within the head.

On the peripheral edge of the orifice of the cap fitted over the central nipple 22 is a passage 38 for the air constituted for instance by a very small V-shaped notch, which, however may have any other suitable form.

The operation is as follows: the user presses his thumb against the middle of the piston 3 whereby the orifice of the bore 4 is obturated, the air contained in the cylinder 2 escapes through the passage 14, then through the bore 16 and out of the atomizing unit 15 where it suddenly accelerates by passing the throat 18. When passing the sucking duct 19, the air stream creates an underpression and sucks the liquid contained in the bottle through the sucking duct and hose 23. The liquid is immediately fed into the atomizing outlet 20 whence it is discharged and atomized and then spread out by the diverging cone 21. The pressure of the thumb is then released and the piston which was bearing against the reinforced portion 12 is now brought back to its original position under the action of the restoring spring 11 until its peripheral rear edge bears against the annular ridge 13. Since the orifice of the bore 4 is now opened, air immediately flows into the pump cylinder along the splines 5. During its reciprocating movement, the piston is guided by the wall of the pump cylinder 2, and, centrally, by the stem 6 which slides in the bore 4. The piston, therefore, is maintained with its compression seal 8 in a plane at right angles to its axis, which is the best condition for securing correct operation.

The atomizer is mounted on the bottle by screwing engagement thereon. As the cap 26 is independent from the head 1 of the atomizer, though it is housed within said head, it is possible, once the atomizer is tightly screwed, to further effect the rotating movement in the direction of screwing the head on the bottle.

When the bottle is turned upside down during use, the liquid having a tendency to flow out the air passage 38 along the nipple 22, is repelled by the air which enters through the orifice 33 and which is necessary for the operation of the apparatus. If, however, some liquid leaks into the reserve chamber 32 along the nipple 22, it is retained within said reserve chamber and drips back into the bottle through the air passage 38 as soon as the bottle is set back into upstanding position.

As many changes could be made in the above construction, and many widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

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What I claim is:

1. An atomizer of non-rigid and unbreakable material adapted to be mounted on a screw threaded bottle, comprising a hollow head open at one end and closed at the other end thereof, a pump cylinder rigid with said head, a piston reciprocally mounted within said pump cylinder and provided with a bore open to the atmosphere and adapted to be obturated when said piston is pushed into said cylinder, guiding means for said piston, resilient restoring means for said piston, a passage in said head communicating with said pump cylinder, a spraying unit positioned in said passage and open to the atmosphere, a screw threaded cap located within said head and fixedly attached thereto, said cap being adapted to be mounted on the bottle and having a top wall extending transversely through the interior of said head and dividing the interior into an open chamber and a reserve chamber comprising the closed end of said head, a sucking hose communicating with the spraying unit and extending through the top wall of said cap, a small orifice provided through said top wall and communicating with said closed chamber, said reservoir chamber being formed at a predetermined distance from said closed end of said head with a hole opening to the atmosphere.

2. An atomizer unit adapted to be mounted on a container comprising, in combination, a hollow head having an open end adapted to be fluid-tightly connected to said container and a closed end closed by an end wall of said hollow head; a wall extending transversely through the interior of said hollow head intermediate said open and said closed ends thereof so as to form a reserve chamber adjacent said closed end of said head; pump means connected to said head for providing compressed air; atomizing means located in said head and communicating with said pump means for sucking fluid when compressed air is provided by said pump means from said container and for spraying the fluid in an atomized state into the atmosphere; first air passage means formed in said head intermediate said end wall and said transverse wall thereof for providing communication between the atmosphere and said reserve chamber at a location spaced from said end wall; second air passage means formed in said transverse wall for providing communication between said reserve chamber and said open end of said hollow head, whereby even if the unit is used in inverted position air may flow through said first and said second air passage means into said container while liquid may seep from the container through said second air passage means into said reserve chamber to be contained therein without seeping through said first air passage means to the outside of the unit.

3. An atomizer unit adapted to be mounted on a container comprising, in combination, a hollow head having an open end adapted to be fluid-tightly connected to said container and a closed end closed by an end wall of said hollow head; a wall extending transversely through the interior of said hollow head intermediate said open and said closed ends thereof so as to form a reserve chamber adjacent said closed end of said head; pump means having a cylinder integrally formed with said head for providing compressed air; atomizing means located in said head and communicating with said pump means for sucking fluid when compressed air is provided by said pump means, from said container and for spraying the fluid in an atomized state into the atmosphere; first air passage means formed in said head intermediate said end wall and said transverse wall thereof for providing communication between the atmosphere and said reserve chamber at a location spaced from said end wall; second air passage means formed in said transverse wall for providing communication between said reserve chamber and said open end of said hollow head, whereby even if the unit is used in inverted position air may flow through said first and said second air passage means into said container while liquid may seep from the container through said second air passage means into said reserve chamber to be

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contained therein without seeping through said first air passage means to the outside of the unit.

4. An atomizer unit adapted to be mounted on a container comprising, in combination, a hollow head having an open end and a closed end closed by an end wall of said hollow head; a cap located in said hollow head and having a top wall extending transversely through the interior of said head intermediate said open and said closed end thereof so as to form a reserve chamber adjacent said closed end of said head; pump means connected to said head for providing compressed air; atomizing means located in said head and communicating with said pump means for sucking fluid, when compressed air is provided by said pump means, from said container and for spraying the fluid in an atomized state into the atmosphere; first air passage means formed in said head intermediate said end wall thereof and said top wall of said cap for providing communication between the atmosphere and said reserve chamber at a location spaced from said end wall of said hollow head; second air passage means formed in said top wall of said cap for providing communication between said reserve chamber and said open end of said hollow head, whereby even if the unit is used in inverted position air may flow through said first and said second air passage means into said container while liquid may seep from the container through said second air passage means into said reserve chamber to be contained therein without seeping through said first air passage means to the outside of the unit.

5. An atomizer unit adapted to be mounted on a container comprising, in combination, a hollow head having an open end and a closed end closed by an end wall of said hollow head; a screw threaded cap located in said hollow head and being adapted to be fluid-tightly connected to said container, said cap having a top wall extending transversely through the interior of said head intermediate said open and said closed end thereof so as to form a reserve chamber adjacent said closed end of said head; pump means connected to said head for providing compressed air; atomizing means located in said head and communicating with said pump means for sucking fluid, when compressed air is provided by said pump means, from said container and for spraying the fluid in an atomized state into the atmosphere; first air passage means formed in said head intermediate said end wall thereof and said top wall of said cap for providing communication between the atmosphere and said reserve chamber at a location spaced from said end wall of said hollow head; second air passage means formed in said top wall of said cap for providing communication between said reserve chamber and said open end of said hollow head, whereby even if the unit is used in inverted position air may flow through said first and said second air passage means into said container while liquid may seep from the container through said second air passage means into said reserve chamber to be contained therein without seeping through said first air passage means to the outside of the unit.

6. An atomizer unit adapted to be mounted on a container comprising, in combination, a hollow head having an open end and a closed end closed by an end wall of said hollow head; a screw threaded cap located in said hollow head and being adapted to be fluid-tightly connected to said container, said cap having a top wall extending transversely through the interior of said head intermediate said open and said closed end thereof so as to form a reserve chamber adjacent said closed end of said head; means in said head engaging said cap for preventing movement of said cap relative to said head; pump means connected to said head for providing compressed air; atomizing means located in said head and communicating with said pump means for sucking fluid, when compressed air is provided by said pump means, from said container and for spraying the fluid in an atomized state into the atmosphere; first air passage means formed

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in said head intermediate said end wall thereof and said top wall of said cap for providing communication between the atmosphere and said reserve chamber at a location spaced from said end wall of said hollow head; second air passage means formed in said top wall of said cap for providing communication between said reserve chamber and said open end of said hollow head, whereby even if the unit is used in inverted position air may flow through said first and said second air passage means into said container while liquid may seep from the container through said second air passage means into said reserve chamber to be contained therein without seeping through said first air passage means to the outside of the unit.

7. An atomizer unit adapted to be mounted on a container comprising, in combination, a hollow head having an open end and a closed end closed by an end wall of said hollow head; a screw threaded cap located in said hollow head and being adapted to be fluid-tightly connected to said container, said cap having a top wall extending transversely through the interior of said head intermediate said open and said closed end thereof so as to form a reserve chamber adjacent said closed end of said head; means integrally formed with said head and engaging said cap for preventing movement of said cap relative to said head; pump means having a cylinder integrally formed with said head for providing compressed air; atomizing means located in said head and communicating with said pump means for sucking fluid, when compressed air is provided by said pump means, from said container and for spraying the fluid in an atomized state into the atmosphere; first air passage means formed in said head intermediate said end wall thereof and said top wall of said cap for providing communication between the atmosphere and said reserve chamber at a location spaced from said end wall of said hollow head; second air passage means formed in said top wall of said cap for providing communication between said reserve chamber and said open end of said hollow head, whereby even if the unit is used in inverted position air may flow through said first and said second air passage means into said container while liquid may seep from the container through said second air passage mean into said reserve chamber to be contained therein without seeping through said first air passage means to the outside of the unit.

8. An atomizer adapted to be mounted on a container comprising, in combination, a hollow head having an open bottom end and a closed top end closed by an end wall of said hollow head, said head formed with an in-

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ternal enlarged portion having a recess transversal of the head and having a downward extension communicating with said recess and also formed with an air duct leading laterally from said recess; a screw threaded cap located in said hollow head and adapted to be fluid-tightly connected to said container, said cap having a top wall extending transversely through the interior of said head intermediate said open and said closed end thereof so as to form a reserve chamber adjacent said closed end of the head, in which said transversal recess and said air duct are substantially located, with said tubular extension extending downwardly through the top wall of the cap; means in said head engaging said cap for preventing movement of said cap relative to said head; pump means having a cylinder integrally formed with said head extending laterally therefrom and communicating with said lateral air duct in said head for providing compressed air thereto; an atomizing unit press-fitted into said transversal recess of the head and so constructed and arranged as to communicate with said air duct and pump as well as with said downward tubular extension and to draw fluid from said bottle through said tubular extension into the atomizing unit when compressed air is provided by said pump means for spraying said fluid in an atomized state into the atmosphere; first air passage means formed in said head intermediate said end wall thereof and said top wall of said cap for providing communication between the atmosphere and said reserve chamber at a location spaced from said end wall of said hollow head; second air passage means formed in said top wall of said cap for providing communication between said reserve chamber and said open end of said hollow head, whereby even if the unit is used in inverted position air may flow through said first and said second air passage means into said container while liquid may seep from the container through said second air passage means into said reserve chamber to be contained therein without seeping through said first air passage means to the outside of the atomizer.

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