

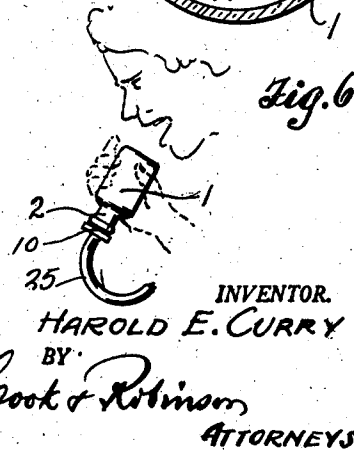
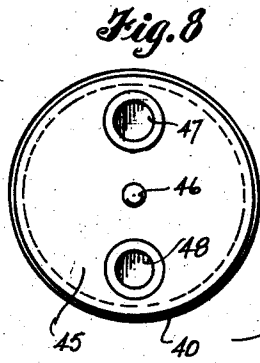
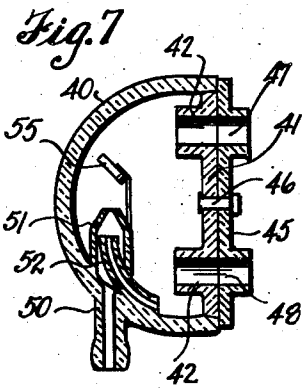
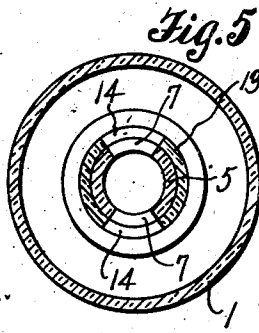
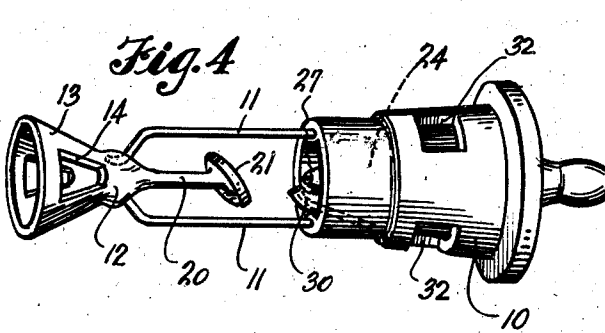
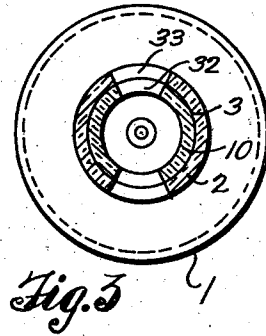
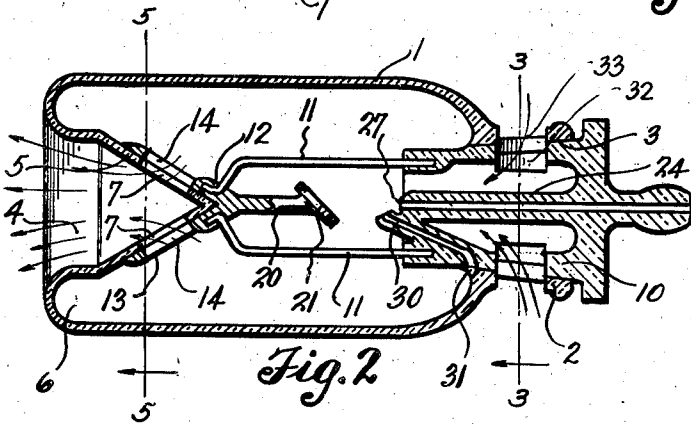
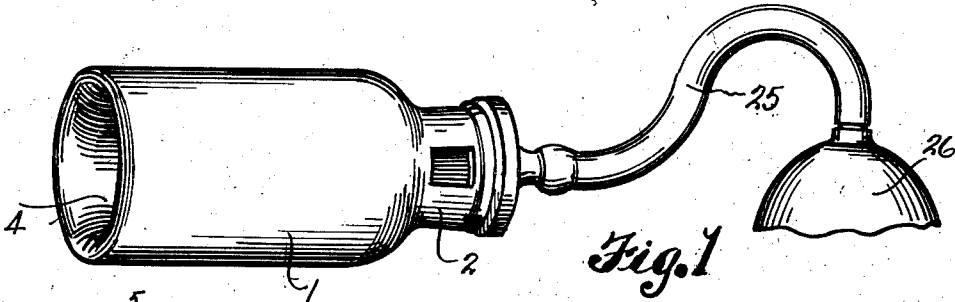
Sept. 3, 1946.

H. E. CURRY

2,406,997

ATOMIZER

Filed Dec. 26, 1944



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2,406,997

ATOMIZER

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Application December 26, 1944, Serial No. 569,782

8 Claims. (Cl. 299—88.5)

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This invention relates to atomizers, and it has reference more particularly to atomizers for the administration of a medicine by inhalation, and which are for the same purposes and of the same general character as those of my United States Letters Patent Nos. 2,111,841, issued March 22, 1938 and 2,274,669, issued March 3, 1942; such atomizers being characterized by a relatively large flask or bulb-like container for the atomization of liquid therein, and having a relatively large discharge neck projecting from one side of the flask, and an air inlet at the opposite side, and there being means between the air inlet and discharge neck for the atomization of liquid, which may be drawn from a supply held in the flask, and for effecting its discharge in a fog-like vapor cloud from the flask neck so that it may be breathed in by the user.

It is the principal object of this invention to provide an atomizer of the character and for the purposes above stated, wherein improved means is provided for a controlled opening and closing of the passages for the outflow of the cloud or fog-like atomized liquid. Furthermore, to provide novel valve mechanisms for the air inlet and discharge passages, and to connect these mechanisms for simultaneous adjustment. Furthermore, to provide means whereby the inlet and outlet passages may be completely closed to thereby seal the flask when it is not in use.

It is also an object of this invention to provide an atomizer of the kind above stated wherein the liquid atomizing means and valve devices are constructed as a unit that may be bodily withdrawn from the flask for the complete draining of the latter and as a means of facilitating the cleaning of the flask and the parts comprised by the removable unit.

Another object of the invention is to provide an atomizer flask from which the liquid of the supply therein cannot spill out should the device be carelessly handled.

Still further objects of the invention reside in the details of construction and combination of parts, and in their mode of use, as will hereinafter be fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawing, wherein—

Fig. 1 is a perspective view of an atomizer with improvements embodied by the present invention.

Fig. 2 is a central, longitudinal section of the atomizer flask and its contained parts.

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Fig. 3 is a cross section taken on line 3—3 in Fig. 2, particularly illustrating the air inlet valve control means.

Fig. 4 is a perspective view of the removable unit comprising valve devices and atomizer, shown removed from the flask.

Fig. 5 is a cross section taken on line 5—5 in Fig. 2 illustrating the valve device for the flask outlets.

Fig. 6 is a view illustrating the normal mode of use of the atomizer.

Fig. 7 is a central, cross-sectional view of an atomizer of an alternative form, embodying some of the features of the present invention.

Fig. 8 is a face view of the same.

Referring more in detail to the drawing—

First describing the device of Fig. 1: This comprises a bottle-like flask 1 of cylindrical form, having a somewhat reduced neck portion 2 extending therefrom at one end that is formed with a slightly tapered neck opening or seat 3 therein. At its end which is opposite the neck 2, the flask has a concentrically located, inturned wall 4 terminating in a conical portion 5 that is coaxial of the flask and directed toward the neck opening 3, as clearly shown in Fig. 2. This wall 4 provides an annular space 6 of trough-like character between it and the flask wall.

Formed in opposite sides of the conically tapered portion 5 are openings or passages 7—7 for the discharge of the atomized liquid from the flask, as will hereinafter be more fully described.

Fitted in the neck opening 3 of the flask and also seated against the conically tapered wall 5, is the removable unit. The parts embodied by this unit are best illustrated in Fig. 4 which shows the unit independent of the flask. The removable unit comprises a hollow stopper 10, tapered externally in accordance with the taper of the seat 3 of the neck, and adapted to be rotatably seated thereagainst. At its inner end, the stopper has two rods 11—11 fixed therein and extended to a valve member 12 for its support and turning.

The valve member 12 comprises a conically formed cap 13 adapted to be seated over and against the conical wall 5. The cap has openings 14 therethrough at opposite sides and these are adapted, by rotation of the cap, to be registered with the openings 7 in the wall 5. In Fig. 5, the openings 14 and 7 are shown as being registered as for the discharge of the atomized liquid from the flask.

The rods 11—11 have ends embedded in the

inner end of the stopper at diametrically opposite sides of its axial line, and have their other ends turned toward each other and embedded in the vertex end of the conical cap and valve member 12. These rods support the cap 13 coaxial of the axial line of the stopper so that rotation of the stopper can be effected for the opening or closing of the air inlet passages in the neck, and at the same time the cap 13 will be rotated to control the opening and closing of the outlet passages 14.

Extended from the vertex of the cap 13 in the axial line, is a stem 20 and on this is a baffle 21 for use in the atomizing operation.

Extending through the stopper, in its axial line and through its closed outer end, is a tube 24 which, at its outer end, is equipped for the attachment of a rubber tube 25, or the like, extended from a rubber bulb 26 of that kind used for effecting a forced discharge of air through the tube. The inner end of tube 24 terminates even with the inner end of the stopper in an air jet 27. Leading from a side wall of the stopper and having an open end terminating just below or adjacent the air jet, so that air from the jet will pass across its outlet, is a capillary tube 30. The other end of the capillary tube terminates in the side wall of the stopper 10 and registers with an opening 31 in the inner end of the valve seat 3 in the neck of the flask, so that by holding the bottle in proper position, for example in the position shown in Fig. 6, liquid in the bottle will cover the opening 31. Then, a stream of air delivered from the jet 27 upon compression of the bulb 26 will cause liquid from the supply to be drawn into the capillary tube and to be taken up by the air jet and forcibly impinged against the baffle for atomization as has been fully explained in the patents above mentioned.

The atomized liquid forms a fog-like mist in the flask and this is discharged through the openings 14 in the wall 5. This outflow is facilitated by reason of the air openings in the stopper which permits air to enter and to be entrained by that flowing out. These openings in the stopper are designated at 32 in Figs. 2 and 3, and by rotation of the stopper in the bottle neck, they can be brought into and from registration with openings 33 in the bottle neck.

When the atomizer is not in use, the stopper is rotated in the bottle neck to move the air passages therein out of registration with those of the neck. This not only closes that end of the flask but the rotation of the stopper also rotates the valve cap and causes the openings of cap 13 to be moved out of registration with those of wall 5 and the latter to be closed.

Should it be desired to drain the flask, the valve unit is completely withdrawn from the flask. This not only provides for complete draining of the flask through the neck passage, but also facilitates cleaning of both the flask and the various parts of the valve unit.

In Figs. 7 and 8, I have shown an alternative form of construction wherein the flask is in the form of a semi-spherical container 40, closed by a flat wall 41 formed at top and bottom sides with openings 42 and 43. Fitted over this flat wall is a disk 45 held by a pivot 46 at its center. The disk has openings 47 and 48 adapted, by rotation of the disk, to be moved from and into registration with the openings 42 and 43.

Entering the semi-spherical wall is an air tube 50 equipped for connection at its outer end with an air pressure bulb. At its inner

end, the air tube terminates in a tapered jet opening 51. A capillary tube 52 is arranged in the flask to supply liquid from the container to the vicinity of the jet as has been fully explained previously, and in the patents mentioned. A baffle 55 is supported from the jet in the line of air discharge and against which the liquid is blown for atomization.

In this latter device, the turning of the disk will operate to simultaneously cover or open the openings 42 and 43 and in use of the device, the opening 42 serves for the outflow of the fog of atomized liquid and the other admits air for entrainment to facilitate the outflow of the fog.

It is anticipated that the closure wall 41 may be removably fitted in place and that it be removed for cleaning the flask or container 40.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

1. An atomizer of the character described comprising a container of flask-like form adapted to contain a supply of liquid to be atomized and forming a chamber in which said liquid may be atomized to produce a fog-like vapor; means in the chamber for the atomization of liquid drawn from the supply, to produce said fog-like vapor; said container having, at one end, an open neck portion for easy draining of the chamber of its supply of liquid and the neck wall having an air port therein, and at its other end, having a wall formed with a discharge port for easy outflow of the fog-like vapor from the chamber, and a stopper rotatably fitted in the neck portion of the container, having a valve passage therein that is movable from and into registration with said neck wall port.

2. An atomizer as in claim 1 wherein the means to produce the fog-like vapor is incorporated in the stopper and is removable from the container with the stopper.

3. An atomizer of the character described comprising a hollow, flask-like container, adapted to retain a supply of liquid for atomization, and forming a chamber therein in which liquid drawn from the supply may be atomized to produce a fog-like vapor in the chamber; said container, at one end, having an open neck portion for the easy draining of liquid from the container, and the wall of said neck having an air passage therein; and at its other end, having a wall formed with an outlet port for the easy outflow of the fog-like vapor from the chamber, and a valve unit removably applicable to the container through the neck portion and comprising individual valve members for controlling the said air passage and said outlet port, and means incorporated in the said removable unit for the fog-like atomization of the liquid in the chamber.

4. An atomizer of the character described comprising a hollow, flask-like container for a supply of liquid and forming a chamber for the fog-like atomization therein of liquid drawn from said supply; and means for effecting such atomization of liquid in the chamber; said chamber having an open neck portion at one end through which the chamber may be easily drained of its supply of liquid; said neck wall having air passages therein, and said container having at its other end a conical end wall portion formed with ports for easy outflow of the fog-like vapor, and a valve unit removably applicable to the container through the neck and comprising valve members adapted to seat, respectively, in the neck and against said conical wall, and having openings

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therein adapted by rotation of the unit, to be moved into and from registration with said ports and passages.

5. An atomizer as recited in claim 4 wherein the said valve unit includes therewith the means for the atomization of liquid in the container.

6. An atomizer as recited in claim 4 wherein the neck passage forms an inwardly tapered valve seat, and said valve unit has a part thereof fitted against said seat as a stopper for the container.

7. An atomizer of the character described comprising a cylindrical, flask-like container for a limited supply of liquid to be atomized and forming a hollow chamber for the atomization of liquid therein; said container having an open neck portion extending from one end, for easy draining of the chamber and having at its other end an inwardly directed conical outer end wall coaxially alined with the neck; said neck wall having laterally opening air ports therein, and said conical wall having discharge ports therein, and a valve unit removably applicable to the chamber through the neck passage and comprising a hollow stopper which forms a valve member for seating in the neck passage and a valve

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member for seating over the conical wall; said stopper having passages for registration with the ports of the neck wall and conical wall and adapted by rotation of the unit to cover or uncover said ports; said stopper including means therein for the drawing of liquid from the supply in the chamber, and for its fog-like atomization in the chamber, and its discharge through the said discharge ports.

8. An atomizer of the character described comprising a flask-like container for a supply of liquid to be atomized therein to produce a fog-like vapor; said container having a discharge passage at one end for easy outflow of the fog-like vapor and having an opening at its other end for easy draining of all liquid from the chamber when said opening is uncovered, a valve unit removably applied to the said opening to retain the liquid, and having an air passage for admittance of entrained air to the chamber; said unit carrying means thereon for the atomization of liquid in the chamber, and other means for the individual control of the said discharge passage and said air passage.

HAROLD E. CURRY.