June 3, 1958 E. LIPMAN 2,837,374

ATOMIZER CAP

Filed Oct. 21, 1957

FIG. 2

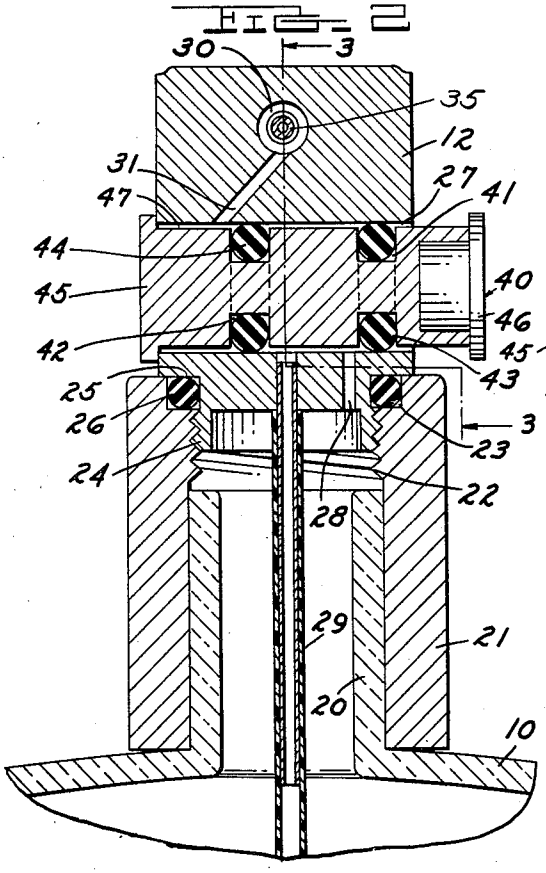
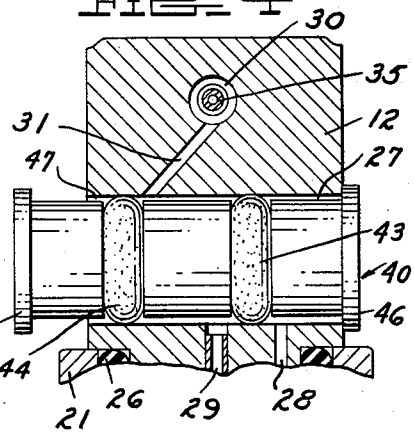


FIG. 4



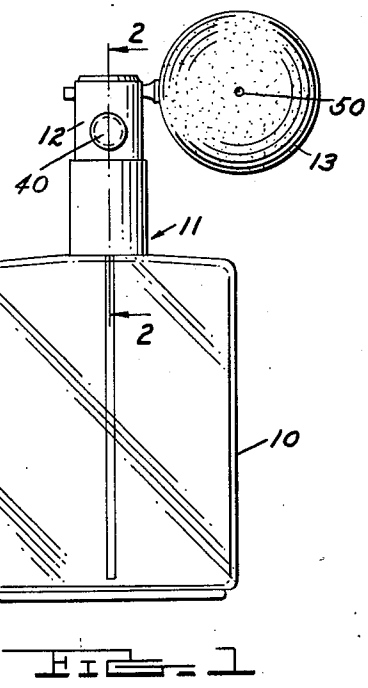
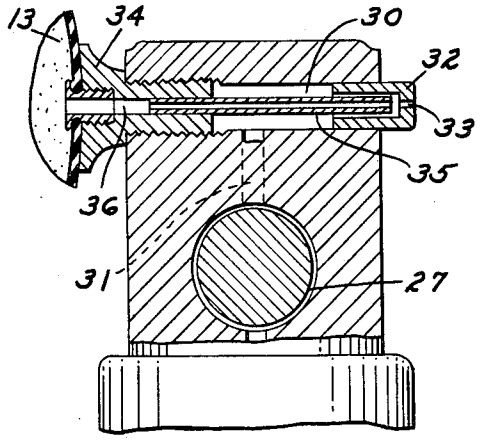


FIG. 1

FIG. 3



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ATOMIZER CAP

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4 Claims. (Cl. 299—88)

This invention relates to atomizer caps and more particularly pertains to a sealable atomizer cap for bottles.

Atomizer caps of the sealable type have been employed heretofore to facilitate sealing off the liquid contents of the bottle such as during travel to prevent spilling and while standing to prevent evaporation, however, the several devices of the prior art have not proven entirely satisfactory inasmuch as they are complicated in design and construction, expensive to manufacture, and unsatisfactory in use.

With the foregoing in view, the primary object of the instant invention is to provide a sealable atomizer top for bottles which is simple in design and construction, inexpensive to manufacture, and which is extremely inexpensive.

An object of the invention is to provide a head having a two-positioned slide plunger valve which in one position permits atmospheric venting for the bottle and communication to the atomizing portion of the head, and a second position which closes off the bottle both to the atomizing head and to atmospheric venting.

An object of the invention is to provide O-ring seals on the valve slide plunger defining a closed pocket therebetween for blocking both the vent and liquid tube to close off the bottle in the sealing position and, in the open position the pocket communicating with both the liquid tube and the atomizing channel for permitting atomizing of the liquid contents and with the vent communicating with atmosphere to facilitate withdrawing the liquid from the bottle.

An object of the invention is to provide an O-ring seal between the head and the bottle so as to eliminate a compression type seal.

These and other objects of the invention will become apparent by reference to the following description of a bottle atomizer head embodying the invention taken in connection with the accompanying drawing in which:

Fig. 1 is a side elevational view of a perfume bottle showing the inventive atomizer head in actual size.

Fig. 2 is an enlarged cross-sectional view of Fig. 1 taken on the line 2—2 thereof showing the internal construction of the head, with the slide plunger valve in the sealing position.

Fig. 3 is a cross-sectional view of Fig. 2 taken on the line 3—3 thereof showing the channel from the valve to the atomizing portion of the head; and

Fig. 4 is a view similar ot Fig. 2 showing the slide plunger valve in the open atomizing position.

Referring now to the drawing wherein like numerals refer to like and corresponding parts throughout the several views, the atomizer head and bottle disclosed therein to illustrate the invention comprises a bottle 10 equipped with a neck attaching assembly 11, a sealable atomizing head 12, and a bellows bulb 13 for forcing air through the head 12.

More particularly, the bottle 10 is equipped with a neck 20 and a collar 21 sealably secured thereto having an internally threaded portion 22 above the neck 20 and

an O-ring seat 23 above the threaded portion 22. The head 12 has an externally threaded stem 24 mating with the collar threaded area 22, an O-ring retaining seat 25 above the stem threaded portion 24, and an O-ring 26 disposed in the seat 25 adapted to cooperate with the collar seat 23 to seal the head 12 relative to the collar 21.

The head 12 is provided with a transverse valve chamber 27 and axially offset atmospheric vent orifice 28 communicating between the interior of the top of bottle 10 and the chamber 27, and an axially disposed liquid tube 29 leading to the bottom of the bottle 10 and communicating with the transverse valve chamber 27 at its upper end. Head 12 is also provided with a transverse atomizing chamber 30 disposed at 90° to the valve chamber 27 and an axially off-set communicating channel 31 between the valve chamber 27 and the atomizing chamber 30. The nozzle 32 is secured at one end of the atomizing chamber 30 and is equipped with a jet orifice 33 while the bellows bulb 13 and fitting 34 are threaded in the other end of the atomizing chamber 30 with the tube 35 disposed between the fitting 34 channel 36 and the nozzle 32 jet orifice 33 so that air expelled through the channel 36 from the bulb 13 travels through the tube 35 and is ejected adjacent the nozzle orifice 33 thereby creating a lowered pressure in the chamber 30 so as to permit atmospheric pressure to force liquid to the orifice 33 via the vent 28 for atomizing purposes as hereinafter more fully described.

The valve slide plunger 40 is loosely disposed in the valve chamber 27 so as to permit communication between the plunger 40 and the side walls of the head defining the chamber 27; the plunger 40 is equipped with spaced circumferential O-ring seats 41 and 42 which receive and retain the O-rings 43 and 44 which are in bearing sealing contact with both the slide plunger 40 and the walls of the head 12 defining the chamber 27 so that while the end areas of the plunger 40 outside the O-rings 43 and 44 are not in sealing contact, the area of the plunger 40 between the O-rings 43 and 44 is sealed off in a sealed pocket for blocking the vent 28 and tube 29 in the closed position Fig. 2 and for providing communication between the tube 29 and the channel 31 in the open position Fig. 4 with the vent 28 outside the pocket communicating with atmosphere. The slide plunger 40 is provided with a cap flange 45 on one end thereof for contacting the head 12 to limit travel in one direction and an attachable cap flange 46 on the other end thereof for contacting the head 12 to limit travel of the plunger 40 in the opposite axial direction.

The bottle sealing position of the plunger 40 is shown in Fig. 2 in solid lines with the cap 45 abutting the head 12 with the O-ring 43 lying outside of the atmospheric vent orifice 28 and with the O-ring 44 lying outside the liquid tube 29 so that both the vent 28 and tube 29 communicate with the closed pocket thereby sealing off the interior of the bottle 10 and it is to be noted that the atomizing channel 31 is disposed outside the O-ring 44 out of communication with the closed pockets and communicating with atmosphere via the space 47 between the plunger 40 and the head walls of the cap 12 defining the chamber 27 so that operation of the bellows bulb 13 merely creates atmospheric circulation.

In the other axial or use position of the slide plunger 40 shown in Fig. 4, the O-ring 43 lies inwardly of the vent orifice 28 permitting communication with atmosphere via the space between the chamber 27 walls and the plunger 40 so as to provide atmospheric pressure communication to the bottle 10 interior; O-ring 43 lies outside the tube 29 so that the tube 29 communicates with the closed pocket between the O-rings 43 and 44 and the O-ring 44 lies outside the atomizing channel 31 and confines the communication of the channel 31 to the

closed pocket between the O-rings 43 and 44 and therefore in communication with the tube 29 via the closed pocket between the O-rings 43 and 44 so that operation of the bulb 13 draws liquid from the bottle 10 via the tube 29, the closed pocket between the O-rings 43 and 44, the atomizing channel 31, and the atomizing chamber 30 to the jet nozzle 32.

In operation, the user merely pushes the slide valve plunger 40 to the position seen in Fig. 2 to seal off the contents of the bottle and when it is desired to use the contents of the bottle, the slide plunger 40 is pushed to the position of Fig. 4 and the bellows bulb 13 pressed between the thumb and forefinger with the thumb closing the orifice 50 in the pressing position and opening the orifice 50 in the released position so as to permit air to enter the bulb and to be ejected from the bulb through the fitting 34 and tube 35 to force air past the end of the tube 35 through the jet orifice 33 thereby withdrawing the liquid from the bottle as previously described and atomizing it to atmosphere. Upon the user finishing with the atomizing operation, the slide valve 40 is merely pushed back to the solid line position of Fig. 2 thereby sealing off the bottle contents against evaporation such as during hot weather and against leakage such as during travelling. While the sealing-atomizing cap has been described in conjunction with perfume bottles, it is equally adaptable to other types of sprays such as insecticides, repellents, antiseptics, and other liquids where the bottle is preferably sealed when not in use. The device of the instant invention is extremely inexpensive and can be sold for far less than the devices on the market which are presently selling for amounts between $5.00 and $37.50 and with the use of the instant device sealable atomizing heads can be sold together with bottles in the chain stores as well as in the exclusive shops as it appears that the instant atomizing head is not only extremely inexpensive but also performs better than the expensive heads now on the market.

The inventive atomizing head with these features constitutes a compact, durable, and neat appearing mechanism, easily operated and used, and it is to be noted that the device seen in Fig. 1 is the actual size so that the device can be made extremely small and suitable for the delicate use in conjunction with perfumes and toiletry.

Although but a single embodiment of the invention has been shown and described in detail, it is obvious that many changes may be made in the size, shape, detail, and arrangement of the various elements of the invention within the scope of the appended claims.

I claim:

1. A sealable atomizer cap for bottles such as for perfume comprising a bottle having a neck, a collar fixed on said neck having an internally threaded portion above said neck and an O-ring seat above said threaded portion, a head having a threaded stem threaded in said neck threaded portion and an O-ring retaining seat above said stem threaded portion, an O-ring in said stem seat sealably contacting said collar O-ring seat so as to seal said head on said bottle; said head having a transverse valve chamber, an axially off-set atmospheric vent orifice communicating between said bottle top interior and said valve chamber, and an axial liquid tube communicating between said bottle bottom interior and said valve chamber; said head also having an atomizing chamber above said valve chamber and a channel off-set opposite to said vent orifice communicating between said atomizing chamber and said valve chamber; a slide valve plunger loosely disposed in said valve chamber having spaced circumferential O-ring seats, O-rings in said plunger seats sealing against said head and defining a sealed valve plunger pocket area therebetween; said plunger being slidable in said valve chamber in one direction to a first bottle sealing position with said plunger pocket out of communication with said channel to said atomizing chamber and with said plunger pocket in communication with both said liquid tube and said vent orifice so as to close off said bottle; said plunger being slidable in the other direction to a second bottle opening position with said plunger pocket out of communication with said vent orifice permitting bottle to atmosphere communication from said vent to the space between said plunger and said plunger chamber and with said pocket in communication with both said tube and said atomizing channel; and flanges on said valve plunger. adapted to contact said head to limit movement of said plunger relative to said head to position said plunger relative to said head in the sealed position in axial travel in one direction and in open position in the opposite direction of axial travel.

2. A sealable atomizer cap for bottle such as for perfume comprising a head adapted to be sealed on a bottle; said head having a transverse valve chamber, an axially off-set atmospheric vent orifice for communicating between a bottle top interior and said valve chamber, and an axial liquid tube for communicating between a bottle bottom interior and said valve chamber; said head also having an atomizing chamber above said valve chamber and a channel off-set opposite to said vent orifice communicating between said atomizing chamber and said valve chamber; a slide valve plunger loosely disposed in said valve chamber having spaced circumferential O-ring seats, O-rings in said plunger seats sealing against said head and defining a sealed valve plunger pocket area therebetween said plunger being slidable in said valve chamber in one direction to a first bottle sealing position with said plunger pocket out of communication with said channel to said atomizing chamber and with said plunger pocket in communication with both said liquid tube and said vent orifice so as to close off a bottle; said plunger being slidable in the other direction to a second bottle opening position with said plunger pocket out of communication with said vent orifice permitting bottle to atmosphere communication from said vent to the space between said plunger and said plunger chamber and with said pocket in communication with both said tube and said atomizing channel; and flanges on said valve plunger adapted to contact said head to limit movement of said plunger relative to said head to position said plunger relative to said head in the sealed position in axial travel in one direction and in open position in the opposite direction of axial travel.

3. A sealable atomizer cap for bottles such as for perfume comprising a head adapted to be sealed on a bottle; said head having a transverse valve chamber, a vent orifice for communicating between a bottle top interior and said valve chamber, and a liquid tube for communicating between a bottle bottom interior and said valve chamber; said head also having an atomizing chamber adjacent said valve chamber and a channel communicating between said atomizing chamber and said valve chamber; a slide valve plunger loosely disposed in said valve chamber having spaced circumferential O-ring seats, O-rings in said plunger seats sealing against said head and defining a sealed valve plunger pocket area therebetween; said plunger being slidable in said valve chamber in one direction to a first bottle sealing position with said plunger pocket out of communication with said channel to said atomizing chamber and with said plunger pocket in communication with both said liquid tube and said vent orifice so as to close off a bottle; said plunger being slidable in the other direction to a second bottle opening position with said plunger pocket out of communication with said vent orifice permitting bottle to atmosphere communication from said vent to the space between said plunger and said plunger chamber and with said pocket in communication with both said tube and said atomizing channel; and flanges on said valve plunger adapted to contact said head to limit movement of said plunger relative to said head to position said plunger relative to said head in the sealed position in axial travel in one direction and in open position in the opposite direction of axial travel.

4. A sealable atomizer cap for bottles such as for perfume comprising a head adapted to be sealed on a bottle;

said head having a transverse valve chamber, a vent orifice for communicating between a bottle top interior and said valve chamber, and a liquid tube for communicating between a bottle bottom interior and said valve chamber; said head also having an atomizing chamber adjacent said valve chamber and a channel communicating between said atomizing chamber and said valve chamber; a slide valve plunger loosely disposed in said valve chamber having spaced circumferential O-ring seats, O-rings in said plunger seats sealing against said head and defining a sealed valve plunger pocket area therebetween; said plunger being slidable in said valve chamber in one direction to a first bottle sealing position with said plunger pocket out of communication with said channel to said atomizing chamber and with said plunger pocket in communication with both said liquid tube and said vent orifice so as to close off a bottle; said plunger being slidable in

the other direction to a second bottle opening position with said plunger pocket out of communication with said vent orifice permitting bottle to atmosphere communication from said vent to the space between said plunger and said plunger chamber and with said pocket in communication with both said tube and said atomizing channel.

References Cited in the file of this patent

UNITED STATES PATENTS

1,553,113	Rutt	Sept. 8, 1925
2,755,132	Croce	July 17, 1956

FOREIGN PATENTS

323,619	Great Britain	Jan. 9, 1930
482,843	Great Britain	Apr. 6, 1938
615,974	Great Britain	Jan. 14, 1949