Nov. 4, 1952 T. J. HOLMES 2,616,762

MANUAL ATOMIZER

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Fig. 1

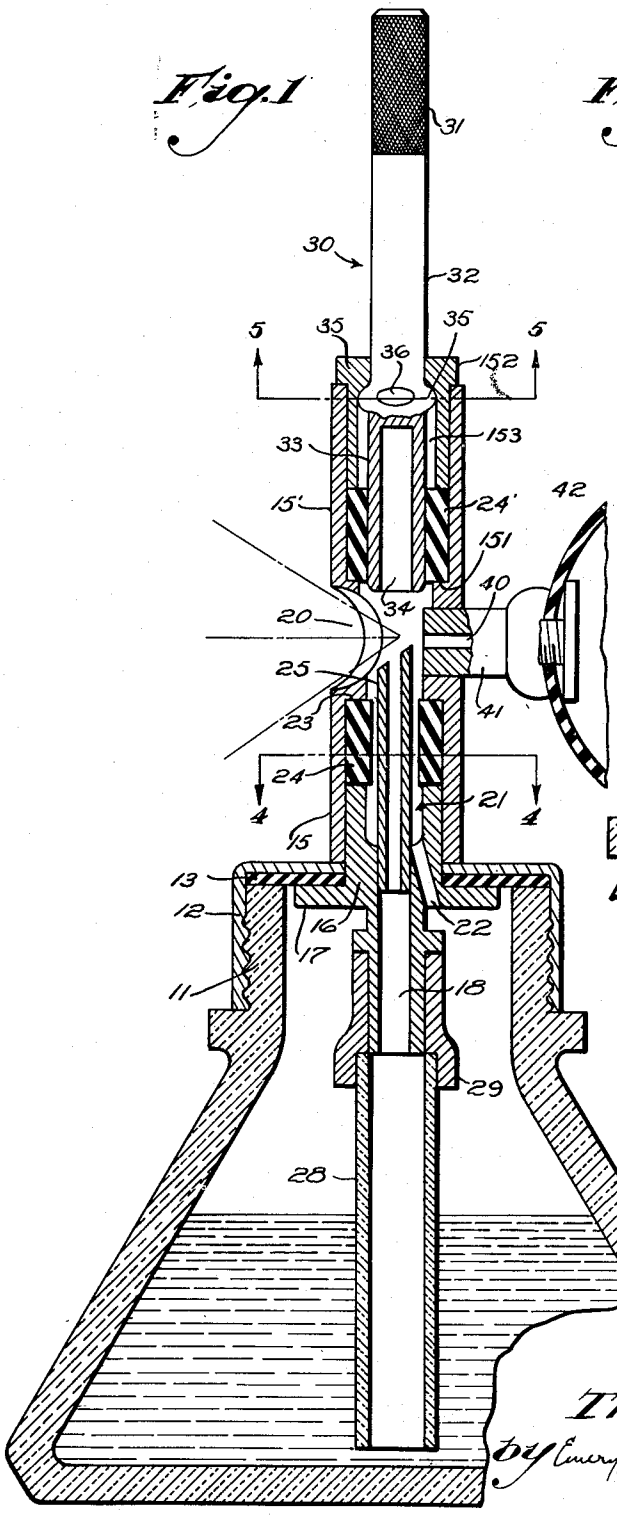
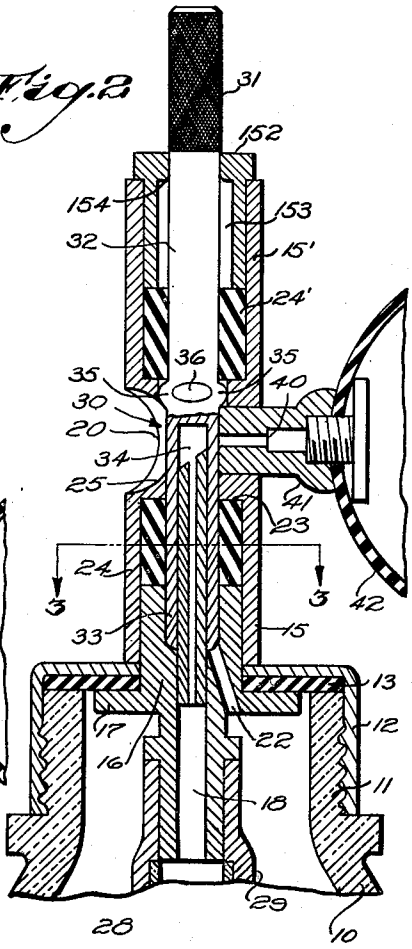


Fig. 2



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Fig. 3

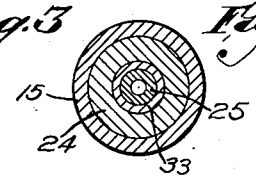


Fig. 4

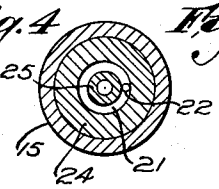


Fig. 5

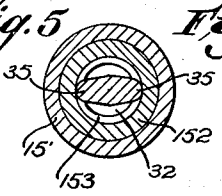


Fig. 6

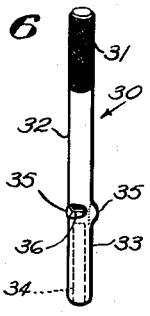
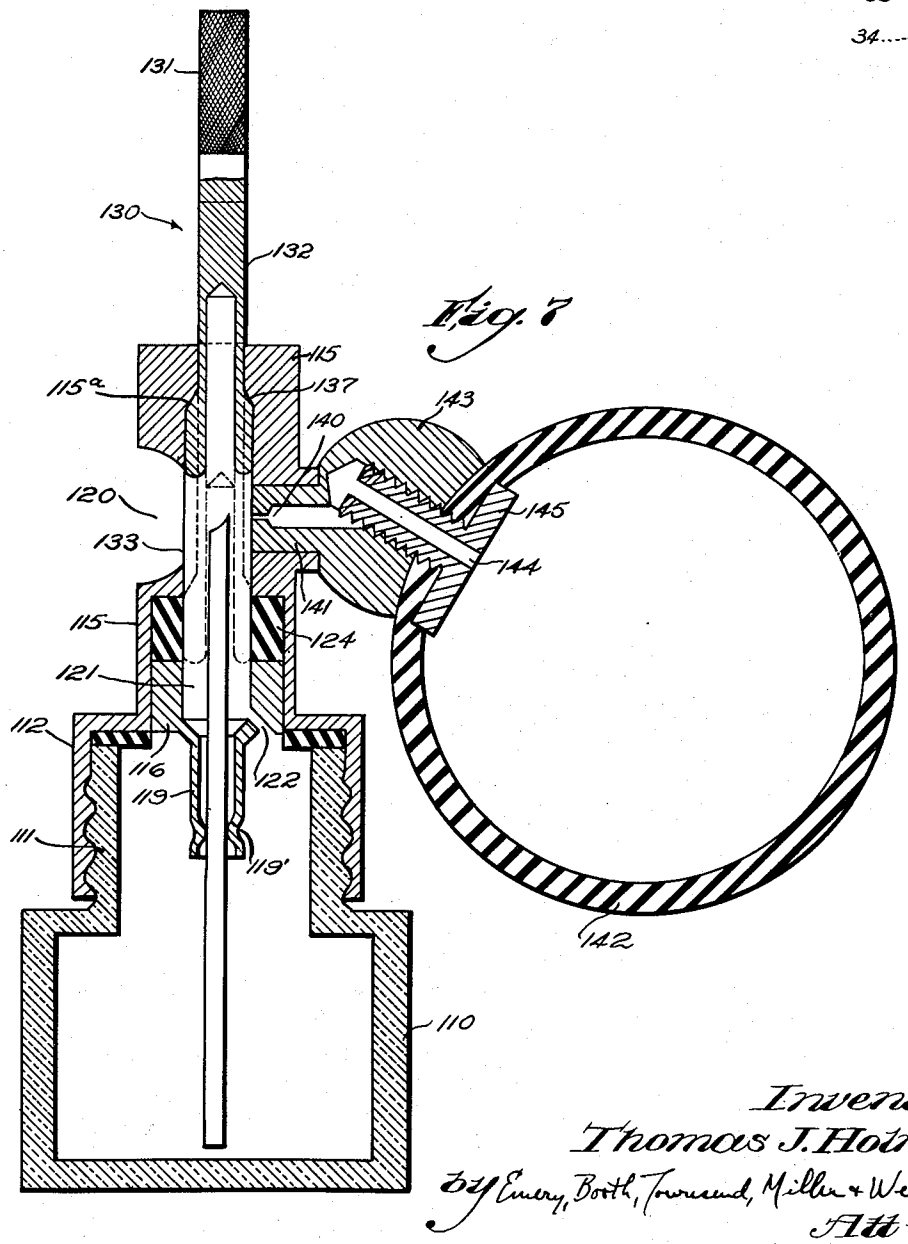


Fig. 7



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Fig. 8

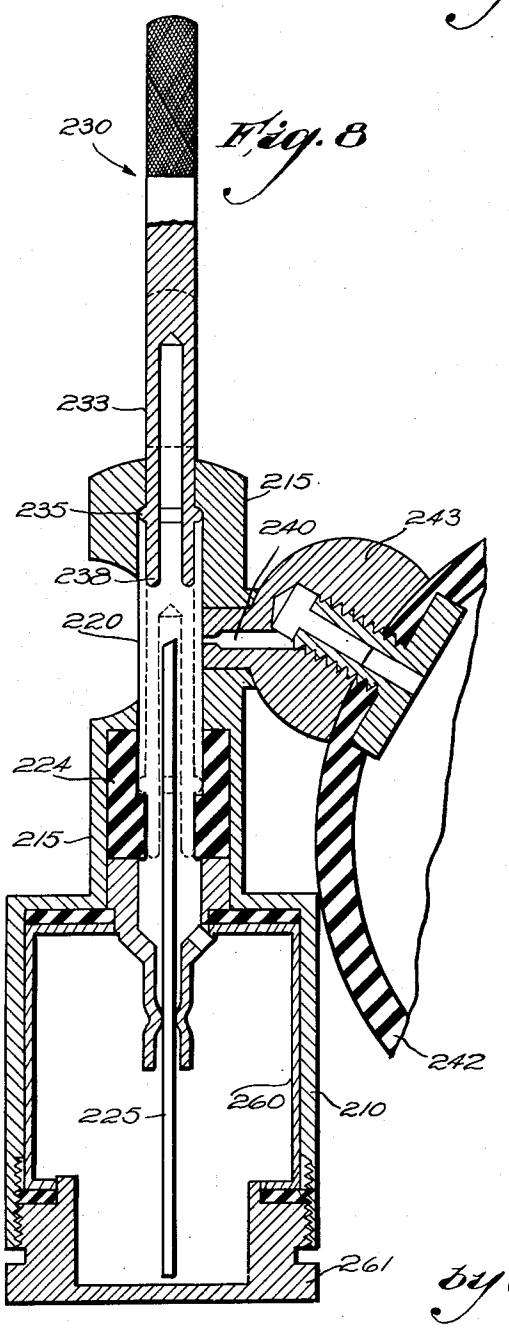
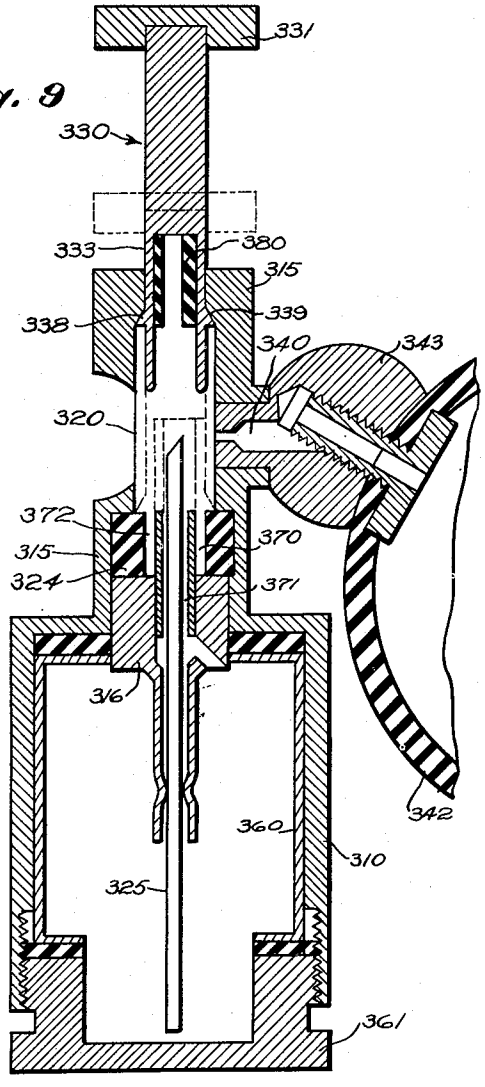


Fig. 9



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Patented Nov. 4, 1952 2,616,762

UNITED STATES PATENT OFFICE

2,616,762

MANUAL ATOMIZER

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Application July 6, 1949, Serial No. 103,216

13 Claims. (Cl. 299—89)

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This invention relates to manual atomizers for liquids such as perfumes, toilet preparations, germicides and others. It aims to provide a simple, compact and easily manufactured device of the class stated and in which the chance for leakage is reduced to a minimum, by rendering the atomizer substantially leak-proof and air-tight. While of general utility in the small portable or hand atomizer field the invention is especially pertinent to atomizers of the so-called vacuum type.

In the drawings illustrating by way of example certain embodiments of the invention:

Fig. 1 is a central vertical sectional view of an atomizer unit installed on a liquid container, in open position, for use;

Fig. 2 is a corresponding view in elevation with the atomizer closed and sealed as for storage and carrying;

Fig. 3 is an enlarged detail view in horizontal section as on the line 3—3 of Fig. 2;

Figs. 4 and 5 are enlarged sections as on the lines 4—4 and 5—5 of Fig. 1;

Fig. 6 shows the seal-closure members of Figs. 1 and 2 separately; and

Figs. 7, 8 and 9 illustrate modifications.

As stated, a main object of my invention is to produce a perfume atomizer that is leak-proof and air-tight, particularly in the vacuum type wherein the spray is created by forcing a blast of air from a small bulb or pump over the top of the liquid channel creating a partial vaccum or low pressure at this outlet while the liquid to be atomized is subject to atmosphere by means of a venting channel.

Vacuum atomizers generally have three main passages associated with the atomizer head. These are an air blast passage from the manually deformable bulb or other source, a liquid delivery passage and a vent passage communicating between the liquid reservoir and atmosphere. For many uses, especially as a perfume dispenser and toilet article it is preferable that the atomizer spray be delivered laterally of the head, with the center line of the spray substantially at right angles to the vertical axis of the device. Heretofore objectionable leakage during transport of the filled device, by reason of the plurality of passages mentioned, has militated against such lateral spray delivery for a vacuum atomizer.

Prior efforts to avoid leakage generally have resorted to threaded parts, with washers, springs, and inclined surfaces for metal engagement. In accordance with the present invention threaded parts, springs, flat washers or inclined surfaces are avoided. Closure of outlets, whether for liquid, for venting or for air blast is had otherwise

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than be the pressing of flat washers to these outlets. Hence there is no danger at any time of these outlets becoming clogged by material from the washers. So far as I am aware no satisfactorily leak-proof lateral-spray atomizer of the vacuum type has heretofore been provided. In accordance with my invention this is accomplished in the exemplary embodiments of the drawings by novel construction and arrangement wherein the liquid passage is central within a concentrically surrounding passage providing for atmospheric venting and both passages together also with the air blast passage are simultaneously sealable by a single means.

Referring first more particularly to Figs. 1 to 6, the atomizer head or assembly unit is shown removably associated with a container 10 for which it supplies a closure. The container may be of any type and material. That selected for illustration is a glass bottle as appropriate for perfumes and other liquids, having an externally threaded neck 11 upon which the atomizer unit as a whole is mounted by means of a supporting screw cap or base 12. An annular washer 13 preferably is disposed between the lip of the container and the base 12.

The atomizer proper comprises an upright tubular body or head carried on the base 12 and including an upper external part or sleeve 15 with a longitudinally continuous central bore, and an axially aligned lower tubular part or mounting collar 16 extending through the base 12 and down into the container 10. These upper and lower head parts 15, 16 are tightly interfitted in mutual longitudinal extension. The lower part 16 has a lateral anchor flange 17 received flatwise against the bottle-seated washer 13 referred to, the entire head being installed on the screw-cap base 12 and by the latter onto the container 10 in tight fitted sealed relation.

At an intermediate level the side wall of the upper or outer head part 15 is apertured to provide a laterally facing discharge orifice 20 preferably flared to afford the desired spread for the spray; see Fig. 2.

Centrally within the atomizer head 15, 16 and spaced as at 21 from the inner wall of the bore thereof for a considerable distance below the discharge orifice 20 is the needle-like liquid discharge tube 25 having a substantially capillary axial channel. The lower end of this liquid tube 25 communicates with and is fitted and sealed into the lower head part 16, herein by coaxial insertion in the central liquid passage 18 thereof. The delivery end of this liquid tube 25 stands in horizontal line with the center of the discharge orifice 20 and with a diametrally opposite

lateral air blast passage 40 in a nipple 41 fixed in an aperture in the side wall of the head. The nipple 41 carries at the projecting outer end a flexible bulb 42 for creating the operative air blast.

As best seen in Fig. 2 the circumferential spacing between the liquid tube 25 and the inner wall of the head 15, 16 presents an elongated annular passage or chamber 21 extending down from the region of the discharge orifice 20. In the open or use status of Fig. 1 this chamber 21 forms part of a vent passage for communication between atmosphere and the interior of the container. In the inactive or storing status the same chamber 21 defines a seat for a depressible closing and sealing element or pin 30 to be further described.

The atmospheric vent further comprises a vertical and slightly inclined channel 22 in the lower body part 16, leading from the bottom of the central bore of the latter and longitudinally through the wall thereof and through the flange 17 to the interior of the container 10. It will be particularly noted that the upper end of this container-entering vent channel 22, see also Fig. 4, is contained within the circumference of the chamber 21 of the head.

For cooperation with the sealing element 30 the upper head part 15 has a concentric bore enlargement 23 of substantial vertical extent, herein from an upper level adjacent the discharge orifice 20 down to the upper end of the lower head part 16. Within this bore enlargement 23 is installed a tubular packing sleeve and retainer element 24 of a resilient composition such as neoprene or other rubberous material. The diameter of the axial opening through this retainer sleeve 24 in the free condition is somewhat less than that of the chamber 21, so that in the normal or non-compressed status the inner wall of this resilient retainer projects laterally into said chamber 21. This affords a yieldable but firm gripping engagement with the sealing pin 30 when inserted as in Fig. 1.

At the lower end of the head, within the container 10, the head part 16 is integrally or otherwise extended to a position adjacent the bottom of the container. In the example of Figs. 1 and 2 such extension comprises a glass tube 28 received in a connective bushing 29 fitted on the lower end of the body part 16.

The sealing element already referred to comprises a rod or pin designated generally at 30. It includes a knurled finger piece 31, an intermediate portion 32 which may be solid and a lower tubular sheathing portion or skirt 33. The latter is longitudinally recessed inward from the lower end to provide a concentric sheathing chamber 34 adapted to receive and pass downwardly around a major upper portion of the liquid tube 25, in the closed and sealing position of Fig. 2. The sheathing recess 34 of the closure pin 30 desirably is proportioned to afford clearance over the top of the liquid tube 25 whereby any remaining drop of liquid at the delivery end of the tube may drain back to the container by the vent 22. The outer diameter of the pin skirt portion 33 and the wall thickness adapts it for sliding reception in the annular chamber 21 of the head, around the liquid tube 25, and for snug resilient gripping reception in the neoprene retainer sleeve 24. In the closed position of Fig. 2 a longitudinally extensive area of circumferential surface engagement is established between the outer wall of the skirt portion 33 of the pin and the inner wall of the resilient sealing sleeve 24. This insures accurate guiding and retention of the pin 30 in sealing relation both as to the liquid passage and the atmospheric vent passage. Simultaneously the upper portion of the pin skirt 33 extends vertically across and in sealing relation to the air blast passage 40. Thus in the closed position nothing can reversely enter the bulb 42.

In the illustrated embodiment of Figs. 1 and 2 the unitary sealing means 30 is permanently installed in the atomizer head with capacity for sliding movement between the open and the closed positions of Figs. 1 and 2 at the will of the user. For thus retaining and guiding the closure pin the upper head part 15 is extended as at 15' and formed with an axial bore corresponding in diameter to that for the resilient retainer sleeve 24 already described, at the lower portion of the head. A second resilient neoprene or other retainer sleeve 24' is centrally disposed in said bore of the head extension 15' where it is seated on an internal shoulder 151. It is held against upward movement by a sleeve bushing 152 fitted into the upper end of the head extension 15' and itself centrally apertured for guided sliding movement of the unitary sealing element or pin 30. The resilient sleeve 24' is radially dimensioned for similar gripping action with the pin skirt as previously described in connection with the lower sleeve 24. Thus the pin is releasably held in the open or raised position of Fig. 1 during periods of use and pending deliberate closure by the user.

At a level calculated with reference to the desired vertical movement or stroke for the closure pin 30 the latter is provided with stop means preventing unintentional withdrawal of the pin. As shown such means is at or near the juncture of the intermediate and the skirt portions 32, 33. There the pin 30 is provided with one or more radial protuberances or nubs of which two are herein shown at 35, 35, at opposite sides of the pin, see particularly Fig. 6. These may be formed by flattening or indenting the pin as at 36 thereby forcing the metal outwardly at the nubs or shoulders 35, after installation of the pin upwardly through the top bushing 152.

The nubs 35 are proportioned and located to provide upper limit stops for the opening movement of the pin 30, by abutment with the end wall of the bushing 152. They are radially dimensioned to move freely in the bore of the top extension 15' and to pass vertically through the resilient retainer sleeve 24' in opening and closing movement of the pin 30. In the down, closed position of Fig. 2 these stop members 35 abut a projection in the bore of the head part 15' herein furnished by the inner end of the bulb nipple 41. By reason of the resiliency of the sleeve 24' the stop nubs 35 are enabled to pass through it without disturbing the firm gripping capacity thereof with respect to the lower chambered sheathing portion 33 of the pin. Thus the relatively light-weight unitary closure element 30 is releasably held in the open elevated position of Fig. 1 during use of the atomizer, while in the closed position the same lowered chambered portion 33 of the pin has sealing reception and retention in and by the lower resilient sealing and holding sleeve 24. Hence the single movable means 30 in conjunction with the associated parts provides for secure leak-proof sealing closure and for ready opening for use of the atomizer, and the open status is automatically maintained at the will of the operator, without necessary bodily removal of any part.

The top bushing 152 which provides an upper limiting stop for the pin 30 and in which it is slidably guided has below the top wall a bore enlargement 153 accommodating the larger diameter of the stop nubs 35, 35. The latter have a relatively flat curvature, noting particularly Fig. 6, and the nubs generally may project but a few thousandths of an inch. Hence they readily pass through the upper resilient retainer sleeve 24'. In the locked or closed position of Fig. 2 said upper retainer sleeve resiliently engages the intermediate portion of the pin and acts in unison with the lower resilient sleeve 24 to hold the pin in the locked position, which action is aided by the nubs 35 having passed below the upper sleeve 24'. Holding of the pin in the open position may further be aided by provision of a slight downward flare for the smaller upper portion of the bore of the top bushing 152, at the underface of the top wall of this bushing, as at 154, Fig. 2. This permits the nubs to be frictionally engaged within the bore, in the Fig. 1 position, thereby aiding the resilient sleeve 24' in holding the pin 30 up in the open or operating position.

From the foregoing description with reference to the drawings it will be apparent that in the embodiment of Figs. 1 to 6 the atomizer means associated with the container comprises a head with a central vertical cylindric chamber 21 within which the discharge tube 25 is centrally located with its outlet laterally opposite the lateral discharge orifice 20; also that the air-blast passage 40 is in line with the outlet of the liquid tube 25 and with the horizontal center line of discharge orifice 20, and is spaced from the axis of the liquid tube 25 by a distance equal merely to the radius of the head chamber 21. Further the annular portion of the chamber 21 between the liquid tube 25 and the inner wall of the head members 15, 16 together with the vent passage 22 at the base of the chamber 21 provides around the central liquid passage in the tube 25 an immediately surrounding air venting passage contained wholly within the radius of the chamber 21 and within a radius from the axis of the discharge tube 25 not greater than the radial distance between said axis and the adjacent terminus of the air-blast passage 40. In association with and largely by reason of this novel arrangement of concentric liquid, venting and air-blast passages the unitary closure pin element 30 is adapted for commonly closing off and sealing all three of these passages in a leak-proof fashion.

Figs. 7, 8 and 9 illustrate modifications of container-mounted manual atomizer means similarly embodying the inventive principle of the device of Figs. 1 to 6. In these views generally corresponding parts are given similar reference numerals as in the earlier figures with the prefixed numbers 1, 2 and 3 respectively. In these modified forms the similar concept is adapted especially to relatively small perfume or other liquid containers in the nature of vials which may have a capacity of as little as one or a few drams of perfume. It will be understood that the drawings herewith including Figs. 1 to 6 are on the order of at least twice scale of the average commercial size.

Referring to Fig. 7, the device as a whole comprises a vial 110 of glass or other material with threaded neck 111 receiving the threaded base 112 integral with the outer or upper sleeve or

head part 115, with interposed vial sealing washer 13. The lower tubular head part 116 is fitted and secured at its upper end within the main head part 15 and includes a reduced lower tubular portion 19 centrally disposed within the vial neck 111.

The liquid tube 125 in this instance is formed entirely of a section of small substantially capillary metal tubing, preferably stainless steel, such as used for hypodermic needles, generally similar in this respect to the tube 25 of Figs. 1 to 6. In the Fig. 7 example, also in those of Figs. 8 and 9, this needle-like liquid tube 125 is extended integrally to a level adjacent the bottom of the container 110. It is held in position centrally within the head 115 as by crimping of the lower head part 119 as at 119'. The chamber 121 provided by the central bore of the head parts 115, 116 again affords, in the open or use position of an atomizer, access for atmosphere to the interior of the container in association with a vent channel 122 communicating through the part 116 with the container interior at the base of the chamber 121 and taking off therefrom within the chamber radius. The spray discharge orifice 120 again is laterally directed from its center line at the level of the discharge terminus of the tube 125 and of the air blast passage 140. The latter is provided in a nipple 141 disposed radially of a globular mounting connection 143 for the flexible bulb 142. The mount 143 has a further radial passage 144 disposed at an angle to the discharge portion 140 of the air-blast passage and receiving a tubular anchor bushing 145. By reason of this angular air passage arrangement the bulb 142 is loctaed nearer the base of the container 110, lowering the center of gravity of the device as a whole and enabling it to stand erect.

The leak-proof sealing closure means comprises a unitary element generally similar to the pin 30 of the preceding figures, adapted to provide common sealing closure for the liquid, the vent and the air-blast passages. In this instance the closure element or pin indicated as a whole at 130 has its lower tubular skirt portion 133 received in the closed position, shown dotted in Fig. 7, within a single resilient sealing and retaining sleeve 124 of neoprene or other rubberous material. In this example the sealing pin 130 has the lower tubular hollow skirt portion 133 of larger diameter than the intermediate and finger portions 132, 131. Correspondingly the upper end of the head member 115 has the central bore formed of two diameters, a larger one receiving the pin skirt portion 131 in the elevated full line position of Fig. 7. The upper smaller-diametered bore portion slidably receives the reduced portion 132 of the pin. The junction between the two bore sizes within the head 115 is upwardly tapered as at 115a and the skirt element 133 of the pin is formed with a correspondingly or slightly less tapered shoulder as at 137 whereby on upward retraction of the pin 130 to the open full line position of Fig. 7 it is frictionally held by gripping engagement between the flared shoulder and bore portions.

With reference to the modifications of Figs. 8 and 9, parts not otherwise referred to may be understood to be generally similar as in the example of Fig. 7. In these latter examples the side wall portion 210, 310 respectively for the container or vial are formed integrally with the main tubular head elements 215 and 315 respectively, these being of any suitable metal as for example stainless steel or other alloy. These outer metal

container portions are provided with glass or other inverted liners **260**, **360** held in place by a threaded bottom closure or removable plug **261**, **361**, preferably with washers above and below the liner elements. The liquid eduction tubes **225** and **325** of Figs. 8 and 9 are similarly arranged and held as in Fig. 6. Also the air-blast passages **240** and **340**, ball mounting connections **243** and **343** and bulbs **242**, **342** are of the angularly channelled and low-hung arrangement as in Fig. 6.

In the example of Fig. 8 the portion of the head **215** below the discharge orifice **220** contains within the bore thereof a single neoprene or other resilient tubular sleeve sealing and retaining element **224**, in this instance having a central passage of two different diameters including a smaller lower portion and a relatively larger upper portion. These cooperate respectively with the lower end **238** of the hollow tubular skirt portion **233** of the unitary sealing pin **230** and with a more or less continuous annular stop enlargement or bead **235** at an intermediate level along the pin skirt **233**. In the full line open position of Fig. 8 the stop protuberance **235** engages and frictionally grips a flared portion of the bore of the head **215**, thereby holding the closure pin in the open raised position. In the dotted line closed position the bottom skirt portion **238** enters into sealing relation within the lower portion of the neoprene sleeve **224** while the stop element **235** seats on the shoulder formed at the juncture of the larger and smaller diameters of said resilient retainer **224**.

The example of Fig. 9 is generally similar to that of Fig. 8 and illustrates another form of unitary sealing means. In this instance a short metal sleeve **370** is inset centrally into the lower head member **316**. This sleeve **370** has an internal diameter sufficiently large to provide an annular passage **371** surrounding the liquid tube **325**, for admission of atmospheric pressure. The outer diameter of this central sleeve **370** is proportioned to provide an annular space **372** between it and the inner wall of the neoprene or other rubberous sealing sleeve **324**.

The pin-like closure element **330** of Fig. 9 having a finger piece **331** at the upper end is formed with a hollow tubular skirt portion **333** with somewhat enlarged bore as compared with that of the previous figures, sufficient to receive within it at the upper end a neoprene or other rubberous sealing sleeve **380** adapted to fit over and additionally seal the outlet of the liquid tube **325**. The lower end of the skirt portion **333** is proportioned to enter downwardly into the annular space **372** within the resilient retainer **324**, in sealing relation to it, and encompassing the metal sleeve **370**, the latter serving as guiding and positioning means and further facilitating the sealing action. Downward closing movement of the pin **330** is halted by an annular shoulder **338** on the skirt portion **333** adapted to abut and stop against the upper end of the resilient retainer sleeve **324**, as shown in dotted line in Fig. 9. The closure shoulder **338** is upwardly tapered as at **339** for frictional gripping engagement in a down-flared portion of the bore at the upper end of the head **315**, similarly as in the earlier embodiments.

My invention is not limited to the particular embodiments thereof illustrated and described herein, and I set forth its scope in my following claims:

1. An atomizer head comprising an external sleeve having a lateral discharge orifice and a radially opposite airblast passage, a mounting base concentric with and connected in downward extension of the sleeve, a liquid discharge tube held coaxially within and projecting below said base for immersion in liquid and extending centrally within the sleeve to the level of the discharge orifice, the upper portion of the discharge tube standing in radially spaced relation to the sleeve wall to define therewith an annular chamber, an atmospheric vent opening within the circumference of and extending from said chamber downwardly through said base, a coaxial sealing closure element longitudinally movable between on and off positions including a tubular skirt receivable in said annular chamber and having an upper portion guidable in the sleeve above the discharge orifice, and elongate resilient tubular means fixed concentrically within the sleeve in circumferential sealing and retaining relation to the skirt of the closure element, the latter when longitudinally moved to off position commonly closing off the discharge tube, the atmospheric vent and the airblast passage.

2. In an atomizer for perfume and other liquids, a tubular head with means to support it on a container, a lateral spray discharge orifice on the head above the support means, a lateral airblast passage on the head opposite to the discharge orifice, a liquid discharge tube coaxially fixed in the head in radially spaced relation to the wall of the bore thereof so as to provide an elongated concentric annular chamber between the tube and the head wall, said tube extended downwardly for liquid immersion and having at the upper end an outlet centrally between the airblast passage and the discharge orifice of the head, atmospheric venting means communicating between the bottom of said annular chamber and the exterior of the liquid tube below the support means, and a central pin-like unitary closure slidably mounted centrally in the upper portion of the head and having a lower hollow tubular skirt insertable into the annular chamber and retractible therefrom to a position above the discharge orifice.

3. An atomizer according to claim 2 wherein the tubular head has formed integrally with it a cylindrical bottom opening container shell, the latter having a threaded bottom closure plug.

4. An atomizer according to claim 2 wherein the liquid discharge tube is formed of a continuous length of hypodermic-needle-like metal tubing.

5. An atomizer according to claim 2 wherein the pin-like closure includes an upwardly tapered shoulder and the upper bore portion of the head is correspondingly formed for clamping engagement therewith to retain the closure in retracted position.

6. An atomizer according to claim 2 wherein the annular chamber contains a resilient retaining sleeve for the skirt of the closure, said sleeve having a bore of two diameters providing a lateral shoulder between them and the pin-like closure has a lateral stop projection to abut the shoulder.

7. An atomizer according to claim 6 wherein the upper bore portion of the head is adapted for gripping engagement with the stop projection of the closure to hold it in retracted position.

8. An atomizer according to claim 2 wherein the skirt of the closure contains a resilient tubular sleeve adapted to encompass the upper end of the liquid tube when the closure is inserted to closed position.

9. An atomizer according to claim 2 wherein an intermediate metal guide tube is fixed coaxially in the head around and in laterally spaced relation to the liquid tube and within the annular chamber, together with resilient sleeve means surrounding and in radially spaced relation to the guide tube, the lower skirt portion of the pin-like closure having internal guided relation to the guide tube and being receivable between the latter and the resilient sleeve means.

10. In an atomizer unit for use with a liquid container, an elongate vertical tubular head having a basal attaching portion, the tubular wall of the head forming a cylindric chamber having at an intermediate level a lateral spray orifice and a diametrally opposite air admission passage, tubular conduit means for liquid coaxially held in the chamber in spaced relation to the tubular wall thereof and having an upper outlet opening at the level of the air admission passage, said tubular conduit means depending below the head, said chamber also providing a longitudinal air passage along and around the liquid conduit means between the latter and the tubular head wall and said chamber having an air channel communicating between said longitudinal air passage and the region external to said conduit means below the head, and an axially slidable sealing closure element concentrically mounted in the head and having a tubular skirt shaped and dimensioned for slidably guided reception between the tubular head wall and the liquid conduit means and longitudinally slidably movable between on and off positions opening and closing the spray orifice, the air admission passage and the longitudinal air passage, and longitudinal tubular sealing and retaining means for the closure element disposed circumferentially between it and the head wall.

11. In an atomizer, a central upright liquid conduit tube having a lateral discharge opening at the upper end portion, a tubular enclosing head having a vertical bore dimensioned to provide a cylindric chamber around the liquid tube, an air admission passage in the head wall at the level of the discharge opening of the liquid conduit, the head having a spray discharge orifice laterally opposite said air admission passage, supporting means for the head and the conduit tube including a top wall portion for a liquid container, the liquid discharge tube including an extension below said supporting means for immersion in the liquid of such container, an atmospheric vent through the cylindric chamber having communication through said supporting means, single tubular valve means adapted to sheathe the discharge portion of the liquid conduit tube and slidably carried coaxially in the head for vertical sliding movement between on and off positions with respect to the spray discharge orifice and said air passages, and tubular elastomeric sealing means in the head and having circumferential sealing relation to the valve in the on position thereof.

12. A lateral-discharge atomizer unit for assembly with a liquid container, comprising an elongate upright sleeve-like head having a main tubular wall for closed communicative positioning on such container, a laterally directed discharge orifice intermediately disposed on said tubular head wall, an air inlet passage on said wall in angularly spaced relation to the discharge orifice, a liquid conducting tube coaxial with the tubular head wall and including an upper portion disposed in and of markedly smaller diameter than the inner diameter of the head wall and a lower portion depending below the head, said upper portion of the liquid tube having an opening toward the discharge orifice and being held in radially spaced relation to the tubular head wall to provide within the latter an axially extensive cylindric slidably guiding and valving chamber providing also for longitudinal passage of air externally around the liquid tube, an elongate tubular sleeve-form valve longitudinally slidably mounted and guided coaxially within said cylindric chamber for vertical reciprocating movement between on and off positions and having a manipulating finger piece projecting above the head, and elongate tubular sleeve-form elastomeric packing and retaining means disposed concentrically within the tubular head wall and circumferentially with respect to the valve and in sealing and retaining relations thereto whereby the valve and said means cooperate in the off position of the valve to seal the discharge orifice, the air inlet and the longitudinal air passage around the liquid tube and in the on position to open the same, under sliding adjustment of the valve in the axial direction.

13. In an atomizer for perfume and other liquids, a tubular head with means to support it on a container, a lateral spray discharge orifice on the head above the support means, a lateral air admission passage on the head opposite to the discharge orifice, a liquid discharge tube coaxially fixed in the head in radially spaced relation to the wall of the bore thereof so as to provide an elongated concentric annular chamber between the tube and the head wall, said tube extended downwardly for liquid immersion and having at the upper end an outlet centrally between the air admission passage and the discharge orifice of the head, an air channel means communicating between the bottom of said annular chamber and the exterior of the liquid tube below the support means, a central pin-like unitary closure slidably mounted centrally in the head and having a lower hollow tubular skirt insertable into the annular chamber and retractible therefrom to a position above the discharge orifice, adapted to close and to open the discharge orifice and the air passage and channel and having an upextending finger piece for so longitudinally moving it between closing and opening positions, and neoprene sleeve means concentrically disposed in the annular chamber in position axially slidably to receive and sealingly retain said pin-like closure, said sleeve means including a portion above the discharge orifice in gripping relation to the closure.

THOMAS J. HOLMES.

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