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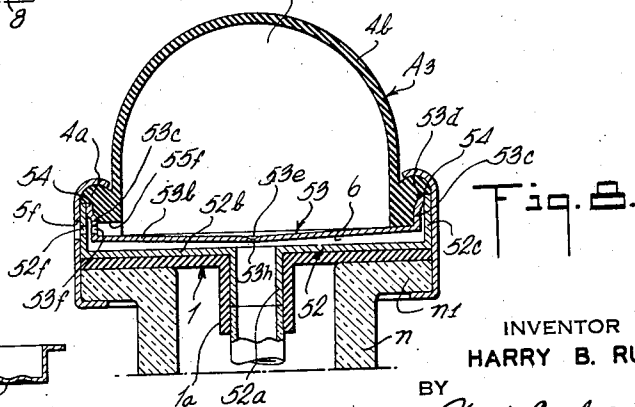
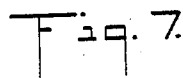
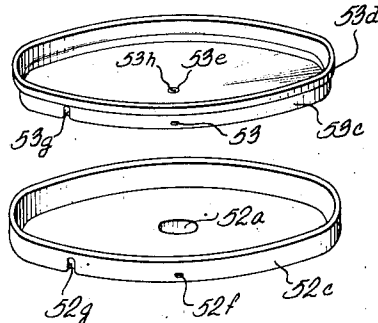
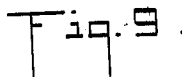
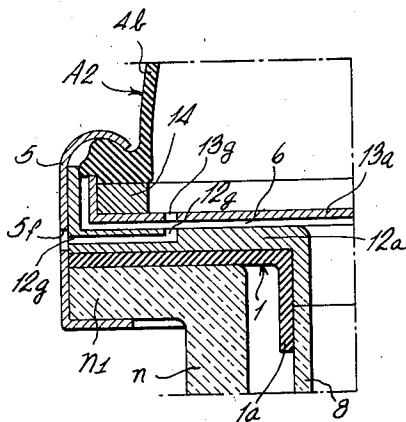
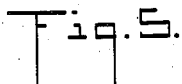
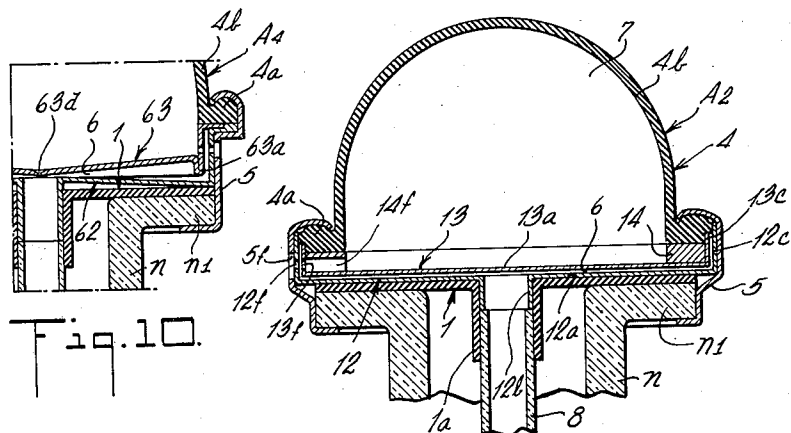
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2,465,274

ATOMIZING DEVICE

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2 Sheets-Sheet 2



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ATOMIZING DEVICE

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6 Claims. (Cl. 299—88)

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My invention relates to devices readily and conveniently operable for atomizing a liquid medium or for ejecting a liquid stream from a nozzle in non-atomized condition.

My invention, in one of its prominent aspects, relates to an atomizing device wherein a liquid medium is drawn into a chamber in response to movement of a wall of said chamber, the liquid medium being forced through an atomizing orifice communicating with said chamber either by reverse movement of the chamber wall, by passage of a jet of air through said atomizing orifice or by both of the actions last described.

My invention, in another important aspect thereof, relates to an atomizing device comprising a chamber in which a charge of a liquid medium is temporarily retained against the influence of gravity.

My invention, in another important aspect thereof, relates to an atomizing device of the character described wherein an atomizing orifice communicates with the liquid-containing chamber, this orifice being traversed by a jet of atomizing air having sufficient velocity to overcome the capillary effect tending to retain the liquid medium in said chamber.

Various other objects, advantages and features of my invention will become apparent from the following detailed description.

My invention resides in the atomizing devices, arrangements and combinations of the character hereinafter described and claimed.

For an understanding of my invention and for an illustration of some of the many forms thereof, reference is to be had to the accompanying drawings, in which:

Figure 1 is an elevational view showing my novel atomizing device associated with a liquid-containing receptacle;

Fig. 2 is a vertical sectional view, partly in elevation, taken on the line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is a perspective view showing parts of the atomizing device in disassembled relation;

Fig. 4 is a diagrammatic view illustrating the operation of the atomizing device;

Fig. 5 is a vertical sectional view, partly in elevation, showing an atomizing device of a modified form;

Fig. 6 is a vertical sectional view, partly in elevation, showing an atomizing device of another modified form;

Fig. 7 is a vertical sectional view, partly in elevation, showing a modified diaphragm utilizable in accordance with my invention;

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Fig. 8 is a vertical sectional view, partly in elevation, showing an atomizing device of a modified form;

Fig. 9 is a perspective view showing parts of the atomizing device of Fig. 8 in disassembled relation; and

Fig. 10 is a fragmentary, vertical sectional view showing an atomizing device of another form.

In general, my invention relates to devices utilizable for atomizing any desired liquid substance whether a perfume, an antiseptic agent, a cleaning agent, a coating medium, or otherwise as may be desired, liquid materials of this and equivalent character being hereinafter generically referred to as a "liquid" or as a "liquid medium." The liquid or liquid medium to be atomized may be contained in a bottle, receptacle, container, or equivalent, container structures of this character being hereinafter generically referred to as a "bottle."

Referring to Fig. 1, I have illustrated a liquid-containing bottle B having a neck *n* with which is associated an atomizing device A as constructed in accordance with my invention.

As shown in Figs. 2 and 3, the atomizing device A comprises a washer 1, a pair of cup-shaped members 2 and 3, an actuating bulb 4 and a shell or housing 5.

The washer 1 is formed from a circular piece of soft rubber, or equivalent, the diameter of which corresponds with the diameter of the circular flanged section *n1* of the bottle neck *n*, Fig. 2, upon which said washer is adapted to seat as hereinafter described. Centrally thereof, the washer 1 is provided with a depending tubular section 1*a* defining a vertical passage extending through said washer 1. The washer 1 further comprises, on its upper surface, a groove 1*b* which, preferably, is concentrically related to the passage through the tubular section 1*a*. A passage 1*c* extends from the groove 1*b* downward through the washer so as to place the space interiorly of the bottle B in communication with the atmosphere as hereinafter described.

As stated, the washer 1 is adapted to seat upon the bottle flanged section *n1* and, in turn, the cup-shaped member 2 is adapted to seat upon the washer 1 which has a diameter corresponding with that of said cup-shaped member 2. Centrally thereof, the member 2 is provided with a depending tubular section 2*a* substantially shorter than the washer tubular section 1*a* and defining a vertical passage extending through said member 2. The external diameter of the tubular section 2*a* is slightly greater than the internal

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diameter of the tubular section 1a and, accordingly, when the tubular section 2a is disposed within the upper part of the rubber tubular section 1a, Fig. 2, the latter snugly embraces said tubular section 2a. In this manner, the washer 1 and the cup-shaped member 2 are assembled prior to the time that they are associated with the bottle B.

The cup-shaped member 2 comprises a plane, horizontal section 2b terminating in an upstanding, circular section 2c which, in turn, terminates in a circular, horizontal ledge section 2d provided, preferably, with an upper circular depression 2e. As illustrated in Fig. 2, the upstanding section 2c comprises a small fluid discharge passage 2f and, on the interior surface thereof, said upstanding section 2c comprises the vertical positioning lugs 2g disposed in predetermined relation with respect to the passage 2f and spaced from each other, preferably, by an angle of less than 180 degrees. Further, as shown in Fig. 2, the lower surface of the horizontal section 2b of the cup-shaped member 2 comprises a groove 2h which communicates with the groove 1b of the washer. The groove 2h extends from the groove 1b to the extreme edge of the horizontal section 2b, the outer end of said groove 2h preferably, being directly beneath the passage 2f. Still further, as shown in Fig. 3, the outer surface of the ledge section 2d comprises a slot 2i positioned in predetermined relation with respect to the passage 2f and utilizable as hereinafter described.

The cup-shaped member 3 comprises a plane, horizontal section 3b terminating in an upstanding, circular section 3c which, in turn, terminates in a circular, horizontal ledge section 3d adapted to seat in the aforesaid circular depression 2e of the ledge section 2d, Fig. 2. The dimensions of the cup-shaped member 3 compared to those of the cup-shaped member 2 are smaller to such degree that, when the cup-shaped member 3 is seated within the cup-shaped member 2, a chamber 6 is formed between the horizontal section 2b and its upstanding section 2c on the one hand, and the horizontal section 3b and its upstanding section 3c on the other hand. The upstanding section 3c comprises a small air discharge passage 3f adapted to be disposed in horizontal alinement with the aforesaid passage 2f of the upstanding section 2c. In order that this alinement of the passages 2f and 3f may readily be accomplished during the assembling operation, the upstanding section 3c is provided with vertical grooves 3g which are disposed in the same predetermined relation with respect to the passage 3f as are the aforesaid lugs 2g with respect to the passage 2f, the grooves 3g also being spaced from each other in the same angular relation as exists with respect to the spacing of the lugs from each other.

The manner in which the washer 1 and the cup-shaped member 2 are assembled has been hereinbefore explained. With this arrangement, the cup-shaped member 3 may be assembled by seating the ledge section 3d in the depression 2e and causing the respective lugs 2g to enter the grooves 3g. By so doing, the passage 3f is properly alined with the passage 2f. Of course, it will be understood that the cup-shaped members 2 and 3 may be assembled first and thereafter associated with the washer 1.

The bulb 4, hereinbefore referred to, is formed from relatively soft rubber readily deformable by finger pressure although inherently tending to assume the position shown in Figs. 1 and 2. The

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bulb 4 comprises a circular base section 4a adapted to seat upon the interfitting ledge sections 2d and 3d of the respective cup-shaped members 2 and 3. Extending upwardly from the base section 4a and formed integrally therewith is the deformable bulb proper 4b which, preferably, is substantially hemi-spherical in shape.

When the shell or housing 5 is formed during the manufacturing operation, it comprises a flanged section 5a, an upstanding tubular section 5b and a depending tubular section 5c, these tubular sections being indicated by the dotted lines in Fig. 2. Further, during the manufacturing operation, the vertical wall of the shell 5, below the flanged section 5a thereof has formed therein a discharge orifice 5f positioned with respect to a lug 5i formed on the shell flanged section 5a in the same general relation as is the spacing between the hereinbefore described passage 2f and slot 2i of the cup-shaped member 2. Accordingly, after the washer 1 together with the cup-shaped members 2 and 3 have been assembled in the manner hereinbefore described, this assembly may be associated with the shell 5 by seating the lower surface of the ledge section 2d upon the flanged section 5a of the shell 5 in such manner that the shell lug 5i is received in the slot 2i of the cup-shaped member 2, Fig. 2. When this has been done, the shell discharge orifice 5f is positioned properly in horizontal alinement with the alined discharge passages 2f and 3f of the respective cup-shaped members 2 and 3. It will be noted that the shell discharge orifice 5f is substantially larger than the discharge passages 2f, 3f and that the groove 2h communicates with the atmosphere through said orifice 5f, Fig. 2.

Thereupon, the base section 4a of the bulb 4 may be seated upon the inter-engaging ledge sections 2d, 3d and the upper end of the shell tubular section 5b folded or crimped over the upper surface of the bulb base section 4a as shown at 5d. In so doing, the joint between the ledge sections 2d and 3d is sealed in a highly efficient manner as will be understood from a consideration of Fig. 2. Likewise, an efficient seal is formed between the bulb base section 4a and the shell 5. It results, therefore, that the bulb 4, the upper surface of the horizontal section 3b and the interior surface of the circular section 3c form an air chamber 7 which is entirely sealed except for the passage 3f which opens to the atmosphere.

The assembly comprising the washer 1, cup-shaped members 2 and 3, the bulb 4 and the shell 5 is now in condition to be associated in operative relation with respect to a bottle B containing the liquid to be atomized. When this is to be done, the upper end of a tubular member 8 of glass or equivalent material is telescoped within and tightly gripped by the lower end of the washer tubular section 1a. Thereupon, relative movement is effected between the described assembly and the bottle B, the tubular member 8 entering the bottle and the lower end thereof, when the atomizing assembly is properly seated, terminating just short of the bottom of the bottle. During continued relative movement of the assembly with respect to the bottle, the tubular shell section 5c passes downwardly along the exterior surface of the bottle section n1 and immediately thereafter the washer 1 seats upon the upper surface of said bottle section n1. Finally, the shell tubular section 5c is folded or crimped around said bottle section n1 as shown at 5e.

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to thereby securely associate the atomizer assembly with the bottle in fixed, operative relation.

It shall be understood that, within the purview of the invention, the various parts or elements of my novel atomizing device may be assembled otherwise than as described above in such suitable manner as may be desired.

The hereinbefore described cup-shaped members 2 and 3 together with the shell 5 are constructed of any material suitable for the intended use. Thus, for example, the cup-shaped member 2 and the shell 5 may be formed, for example, from nickel-plated brass having suitable thickness for the intended purpose. The horizontal section 3b of the cup-shaped member 3, in effect, is a diaphragm which, as hereinafter described, is deformable in response to change in air pressure in the chamber 7. Therefore, the cup-shaped member 3, particularly the diaphragm section 3b thereof should be formed from suitable elastic material such, for example, as Monel metal, nickel, phosphor bronze, stainless steel or the like, the thickness of this diaphragm section 3b being small and dependent principally upon the volume of liquid to be elevated by each stroke of the bulb 4b.

With an atomizing device A associated with a liquid-containing bottle B as shown in Fig. 1, the liquid stands in the tubular member 8 at the same level as in the bottle B. The person performing the atomizing operation holds the bottle B in one hand and, by finger or thumb action of the same hand, alternately depresses and releases the bulb 4b. When the bulb 4b is first depressed, a substantial amount of the air therein is forced to the atmosphere by way of the discharge passage which comprises the aligned passages 2f and 3f, the diameter or transverse dimension of each of which should be small and dependent principally upon the volume of air to be ejected therethrough on each stroke of the bulb 4b. When the bulb 4b is depressed and the pressure thereon released, said bulb section 4b, inherently, returns immediately to its normal position and, in so doing creates a partial vacuum in the chamber 7. At this time, air from the atmosphere is entering the chamber 7 through the discharge passage but, due to the small diameter of the passage 2f and 3f, the air pressure within said chamber 7 does not immediately return to atmospheric value. Accordingly, when the bulb section 4b returns to normal position as stated above, the diaphragm section 3b, by reason of the reduced air pressure in the chamber 7, is displaced or moves to a position somewhat as illustrated in Fig. 4, for example. As a result, liquid from the bottle B is drawn upwardly through the tubular member 8 and into the chamber 6 which is now enlarged substantially from the illustration thereof appearing in Fig. 2 by reason of the upward movement of the diaphragm section 3b, the wall surfaces defining the chamber 6, by capillary action, retaining a substantial part of the liquid in said chamber 6. The chamber 6 communicates with the supply of liquid by way of the tubular member 8. Except for the small passage 2f, the chamber 6 is sealed from the atmosphere and, hence, said chamber 6 has substantially sealed access to the supply of liquid. In normal operation of the atomizer, the bulb section 4b is depressed again immediately after it returns to normal position. In response to such depression of the bulb section 4b, the air therein is compressed and a jet of air is caused to emerge

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through the shell discharge orifice, this jet of air and the movement of the diaphragm section 3b withdrawing the liquid from the chamber 6 and atomizing the same.

As the liquid is thus withdrawn from the chamber 6, the diaphragm section 3b resumes its normal position or substantially so as shown in Fig. 2. Accordingly, when the bulb section 4b again returns to normal position when the pressure thereon is released, as described above, the diaphragm section 3b again moves upwardly to recharge the chamber 6 with another supply of liquid which is atomized, in the manner described, when the bulb section 4b is again moved downwardly by thumb or finger pressure.

In view of the foregoing, it will clearly appear that each downward excursion of the bulb section 4b (in response to finger or thumb pressure thereon) causes the atomized liquid to be ejected from the shell discharge orifice, and each upward excursion of said bulb section 4b (when the pressure thereon is released) causes a renewed supply of the liquid destined for atomization to be charged into the chamber 6. In normal operation, these cycles of movement follow each other in rapid succession and, therefore, the atomized liquid is ejected intermittently from the atomizing orifice in a frequently recurring manner entirely satisfactory for ordinary requirements.

It will be understood that the pressure on the surface of the liquid in the bottle B remains at the atmospheric value at all times. This is true because the bottle is able to "breathe" along the open path to the atmosphere defined by the passages 1c, 1b and 2h.

In Fig. 5, I have illustrated an atomizing device A2 of a modified form. In lieu of the cup-shaped members 2 and 3 of Figs. 2 and 3, the device of Fig. 5 comprises the cup-shaped members 12 and 13 formed, respectively, of the same kind of material as said cup-shaped members 2 and 3.

The member 12 is of circular configuration and comprises a plane section 12a resting upon the washer 1, this section 12a, centrally thereof, having a depending tubular section 12b telescopically related to the tubular section 1a of the washer 1. At its periphery, the section 1a terminates in a flanged section 12c.

The member 13, likewise, is of circular configuration and comprises a plane section 13a movable in diaphragm fashion substantially the same as does the hereinbefore described cup section 3b. At the periphery thereof, the section 13a terminates in a flanged section 13c.

The cup-shaped members 12 and 13 are substantially similar although, as clearly appears, the cup-shaped member 13 is dimensionally somewhat smaller than the cup-shaped member 12 so that the former may be nested within the latter to provide the desired liquid-containing chamber 6. In order to properly maintain the two cup-shaped members 12 and 13 in spaced relation as shown, it may be desirable or necessary for one or the other of the plane sections 12a, 13a thereof to have formed thereon a plurality of spaced lugs, not shown, which project toward and engage the other plane section.

Immediately adjacent its flanged section 13c, the cup-shaped member 13 carries a spacing ring 14 which is engaged by the base section 4a of the bulb 4.

The spacing ring 14 is provided with a passage 14f disposed in alinement with the discharge pas-

sages 13f and 12f formed in the respective flanged sections 13c and 12c.

The shell or housing 5 conforms generally with the similar shell or housing shown in Fig. 2 and is provided with a large discharge orifice 5f disposed in alinement with the discharge passages 12f, 13f.

It will be understood that the atomizing device A2 should comprise the various other detailed features illustrated in Fig. 2 and described in connection therewith. Further, it will be understood that the operation of said atomizing device A2 is substantially the same as has been hereinbefore described in connection with the atomizing device A.

In Fig. 6, I have illustrated an atomizing device A2 which corresponds generally with the device of Fig. 5. However, in Fig. 6, the discharge passage is constructed in a manner somewhat different from that shown in Fig. 5. Thus, in Fig. 6, the jet of atomizing air passes from the chamber 7 by way of the restricted passage 13g formed in the plane wall section 13a. Disposed beneath the passage 13g is a passage 12g formed in the plane wall section 12a, the passage 13g extending vertically downward, then horizontally, and opening to the atmosphere through the shell discharge orifice 5f.

In Fig. 7, I have illustrated a cup-shaped member 43 which may be substituted for the cup-shaped member 3 of Fig. 2. The cup-shaped member 43 is formed from the same kind of material as is the cup-shaped member 3 and the plane section 43a thereof is provided with corrugations 43b, preferably circular. With a diaphragm construction of this character, greater amplitude of movement is produced per unit of energy than with the diaphragm construction of Fig. 2. Hence, with the corrugated diaphragm construction, a greater quantity of liquid is drawn into the chamber 6 on each stroke of the diaphragm.

In Fig. 8, I have illustrated an atomizing device A3 which operates on a different principle than the atomizing devices hereinbefore discussed. This atomizing device A3 comprises a lower cup-shaped member 52 having a depending tubular section 52a corresponding generally with the tubular section 2a of the cup-shaped member 2, said tubular section 52a being disposed within and snugly embraced by the tubular section 1a of the washer 1, Fig. 8. The cup-shaped member 52 further comprises a plane, horizontal section 52b terminating in an upstanding, circular section 52c, Fig. 9.

The atomizing device A3 further comprises a cup-shaped member 53 having a plane horizontal section 53b, terminating in an upstanding, circular section 53c, Fig. 9, having a flanged surface 53d on the exterior thereof, the flanged surface 53d being adapted to be associated in sealed relation by a crimping or other forming operation as indicated at 54, with the adjacent section of the cup-shaped member 52.

As with the forms of my invention previously described, the atomizing device A3 comprises a bulb 4 and a shell 5, the bulb circular base section 4a, in this instance, seating upon the upper, outer surface of the horizontal section 53b and serving to reinforce the seal previously established at the formed section 54. As shown in Fig. 8, the base section 4a comprises a passage 55f disposed in alinement with the discharge passages 52f, 53f formed in the respective cup-shaped members 52 and 53, the discharge passage formed by these

passages being in alinement with the shell discharge orifice 5f.

In accordance with the invention, the cup-shaped members 52 and 53 are formed from nickel-plated brass, or equivalent so that, during the atomizing operation while the bulb 4b, alternately, is being depressed and released, neither of the sections 52b and 53b, particularly the latter, act as a diaphragm to draw liquid upwardly from the bottle into the chamber 6, the area or capacity of which, therefore, remains constant at all times or substantially so.

In lieu of diaphragm action of the aforesaid sections 52b, 53b on the liquid in the bottle, I provide, in the horizontal section 53b of the cup-shaped member 53, a passage 53h which is small compared to the discharge orifice, the passage 53h being disposed in any suitable area of the section 52b, for example, above the passage leading into the liquid-containing bottle. The passage 53h should be relatively small, as of the order of 0.002 to 0.005 of an inch, more or less for an ordinary perfume-containing bottle and, preferably, said passage 53h is formed by the use of a suitable tool which produces a thin section 53c, the latter, thereafter, being pierced to produce the passage 53h. As indicated, the horizontal section 53b preferably, is dished so that it slopes downwardly in all directions toward the center thereof.

With the arrangement of Figs. 8 and 9, it is desirable that a positioning slot 52g be formed inwardly on the exterior surface of the upstanding section 53c of the member 53, and that a positioning lug 52g be formed on the interior surface of the upstanding section 52c of the member 52, this slot 52g and lug 52g being so related that, when interengaged, the passages forming the discharge passage and the discharge orifice are in alignment. In view of the foregoing, it will be understood that the top surface of the lug 52g engages the top surface forming the slot 53g to thereby properly position the members 52 and 53 in nested relation.

It will be understood that the shell 5 of Fig. 8 should be properly associated with the assembly comprising the cup-shaped members 52 and 53, as by the lug-and-slot arrangement shown in Figs. 2 and 3.

When, with the form of the invention shown in Fig. 8, the bulb section 4b is depressed and then released, the liquid in the liquid-containing bottle, by a suction effect applied through the passage 53h and without diaphragm action by the section 53b, rises through the tubular member 3, through the tubular section 52a and enters the chamber 6, a small amount of this liquid probably passing into the chamber above the horizontal section 52b of the cup-shaped member 53 by way of the passage 53h. Thereafter, when the bulb section 4b is depressed, the increased air pressure therein causes a jet of atomizing air to pass first through the passage 55f and then through the discharge orifice. This jet of atomizing air effects withdrawal of liquid from the chamber 6 and also from the chamber above the section 53b provided that there is liquid in said last-named chamber. Thus, by alternate depression and release of the bulb section 4b, a spray of atomized liquid is ejected from the discharge orifice of Fig. 8.

The form of atomizing device A4 illustrated in Fig. 10 is substantially the same in principle as the form shown in Figs. 8 and 9. However, Fig. 10 illustrates the use of non-diaphragm cup-

shaped members 62 and 63 in lieu of the cup-shaped members 52 and 53 of Figs. 8 and 9.

As shown, the cup-shaped member 62 slopes downwardly from its center throughout the entire periphery thereof and the cup-shaped member slopes upwardly from the passage 63d thereof, this passage corresponding with the hereinbefore described passage 53h, and the sloping wall of the member 63, preferably at the outer periphery thereof, comprising a depending, circular flange 63a adapted to extend into the liquid collected in the chamber formed by the member 62. With a construction of this character, the capacity of the chamber 6 is larger and, moreover, the liquid therein tends to collect in the lower outer channel of the cup-shaped member 62 from which it passes to the discharge orifice along a path beneath the flange 63a in response to the atomizing operation and by action of gravity. Otherwise, the operation of the form of my invention shown in Fig. 10 is substantially the same as the form thereof shown in Figs. 9 and 10.

With all forms of my invention except the form shown in Fig. 10 and even with that form to some extent, the chamber 6 is of such limited depth that the liquid which passes thereto in response to upward movement of the bulb section 4b remains to a great extent in said chamber by capillary action. Therefore, during use of the atomizing devices of my invention, they need not be maintained vertically or even approximately vertically.

It will be noted that the housing 5 of Fig. 8 differs from the other housings principally in that the flanged section 5a is omitted. With the atomizing devices of Fig. 8, the assembly seats on the bottle flange although it will be understood that an equivalent of the flanged section 5a may be provided if desired. It will be understood that, without departing from the invention, various mechanical changes may be made in the constructions herein disclosed. Thus, for example, and if desired, the circular depression 2e shown in Figs. 2 and 3 may be omitted, the ledge section 3d seating on and above the ledge section 2d. Obviously, the positioning lug-and-slot arrangements may be different from those described and, further, the space interiorly of the bottle B may be left at atmospheric pressure in any suitable manner other than as disclosed.

As regards those forms of my invention wherein a diaphragm is moved alternately in opposite directions, the atomizing operation is effected by movement of the diaphragm toward a position wherein the volume of the liquid-containing chamber is decreased and by ejection of air through the atomizing orifice. Under some circumstances, it may be desirable to provide an arrangement wherein the chamber formed in part by the bulb 4 does not communicate with the discharge orifice. If so, the liquid is ejected as a non-atomized liquid stream solely by action of the movable diaphragm section.

While the atomizing apparatus has been hereinbefore described as formed from metallic members and a rubber bulb, it shall be understood that suitable plastic material may be used in lieu of said metallic members for the housing parts, diaphragm, etc.

While the invention has been described as relating to the atomization of liquids, it will be understood that the invention is also adapted for other uses as, for example, an action similar in principle to the liquid-atomizing action on dry powder contained in the bottle B.

While the invention has been described with respect to certain particular preferred example which give satisfactory results, it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. In an atomizing device, a pair of cup-shaped members disposed in nested relation to form a liquid-receiving chamber, the cylindrical wall of each of said cup-shaped members having a small passage extending therethrough, said passages being alined and constituting a discharging passage, the flat wall of the inner cup-shaped member being a movable diaphragm, a bulb associated with said cup-shaped members to form a chamber, and means for retaining said cup-shaped members and said bulb in assembled relation, said means comprising a shell having a discharge orifice therein alined with said discharge passage and having a flange upon which one of said cup-shaped members seats, the upper section of said shell being crimped around the base of said bulb.

2. In an atomizing device, a pair of cup shaped members arranged in nested relation and having adjacent surfaces thereof spaced apart to form a liquid receiving chamber, a compressible bulb having an air receiving cavity therein substantially closed on one side by one of said cup shaped members, the other cup shaped member having means for providing communication between said liquid receiving chamber and a source of liquor to be atomized, means for securing said members and bulb together as a unit and provided with a discharge orifice, and means forming discharge passages leading from said cavity and chamber to a point adjacent said discharge orifice, the member adjacent said bulb being flexible and movable in response to compression and expansion of said bulb to vary the volume of said liquid receiving chamber in the same manner and simultaneously with changes in the volume of said cavity on compression and expansion of said bulb.

3. An atomizing device comprising two members, one of which is cup-shaped and has an annular ledge extending about the periphery thereof, the other member having a marginal portion resting upon said annular ledge and having a central portion spaced from the adjacent surface of the cup-shaped member so as to cooperate therewith in defining a liquid receiving chamber, a compressible bulb having an air receiving cavity therein substantially closed by said other member, means securing said members and bulb together and formed with a discharge orifice therein, means forming a conduit for conducting liquid to said chamber from a source of liquid to be atomized, said cup-shaped member having a discharge passage therein communicating with said atomizing orifice, and means forming a discharge passage extending from the cavity in said bulb to said liquid receiving chamber to cause air and liquid to be forced from said chamber through said discharge orifice in atomized form when said bulb is compressed and to cause liquid to be drawn into said chamber from said source when said bulb expands.

4. An atomizing device comprising two cup

shaped members arranged in nested relation and having central portions which are spaced apart and cooperate to define a liquid receiving chamber, a compressible bulb having an air receiving cavity therein, one of said members being cor-
 5 rugated and flexible and positioned so as to substantially close said cavity whereby compression and expansion of said bulb will cause said cor-
 10 rugated member to be flexed in response to changes in pressure of the air in said cavity to vary the volume of said chamber, means secur-
 15 ing said members and bulb together and formed with a discharge orifice therein, means forming a conduit for conducting liquid to said chamber
 20 from a source of liquid to be atomized, said chamber having a discharge passage therein com-
 25 municating with said discharge orifice, and means forming a discharge passage extending from the cavity in said bulb to said discharge orifice where-
 30 by compression of said bulb will cause air to be forced from said cavity through said discharge orifice while simultaneously causing said cor-
 35 rugated member to be flexed in a direction to decrease the volume of said chamber and force liquid from the chamber through said orifice to be atomized by air being expelled from the bulb, whereas expansion of said bulb will cause air to be drawn into the bulb and will at the same time cause the corrugated member to move in a direc-
 40 tion to increase the volume of said chamber and draw liquid into the chamber from said source.

5. An atomizing device comprising upper and lower members having portions thereof spaced apart and cooperating to define a liquid receiving chamber, the lower one of said members being cup shaped and having an opening in the base thereof communicating with means for supplying liquid to be atomized to said chamber and having a discharge passage in the wall portion thereof, the upper member being supported adjacent its periphery in spaced relation with respect to the lower member and having a central portion in-
 45 clined toward the base of the lower member, said upper member being formed with two openings therein one of which is centrally located in said inclined portion and the other of which is located near the periphery of the upper member and ad-
 50 jacent the discharge passage in the wall portion of the cup shaped member, a compressible bulb having an air receiving cavity therein substan-
 55 tially closed by the upper member, and means for securing said members and bulb together and formed with a discharge orifice therein aligned

with the discharge passage in the wall portion of the cup shaped member whereby compression of said bulb will cause air to be expelled from said cavity through the opening near the pe-
 5 riphery of the upper member to said atomizing orifice and will at the same time cause air to be expelled through the central opening in the upper member into the liquid receiving chamber to force liquid from said chamber through said
 10 discharge passage to the discharge orifice whereas expansion of said bulb will tend to draw air into said bulb and to draw liquid into the liquid receiving chamber.

6. In an atomizing device, a rubber washer
 15 having a depending tubular section, an outer cup shaped member having a tubular section telescoped within said first named tubular section, an inner cup shaped member nested within
 20 said first named cup shaped member, the cylindrical wall of each of said cup shaped members having a small passage extending therethrough, said passages being aligned and constituting a
 25 discharge passage, the inner cup shaped member having a bottom wall wholly spaced from the upper surface of the bottom wall of the outer cup shaped member and forming a chamber
 30 therewith, the bottom wall of the inner cup shaped member being a movable diaphragm, a bulb associated with said cup shaped members to form a chamber, and a shell for holding said
 35 cup shaped members and said bulb in assembled relation, said shell having a discharge orifice aligned with the discharge passage in said nested cup shaped members.

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