

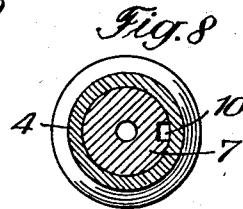
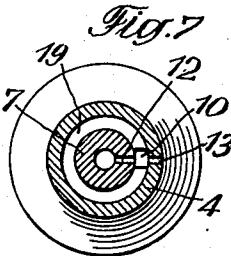
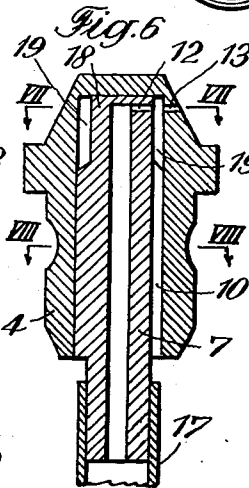
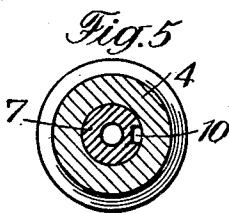
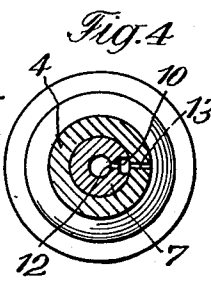
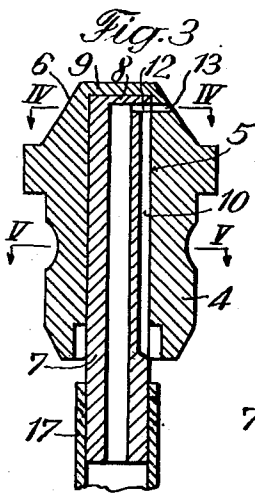
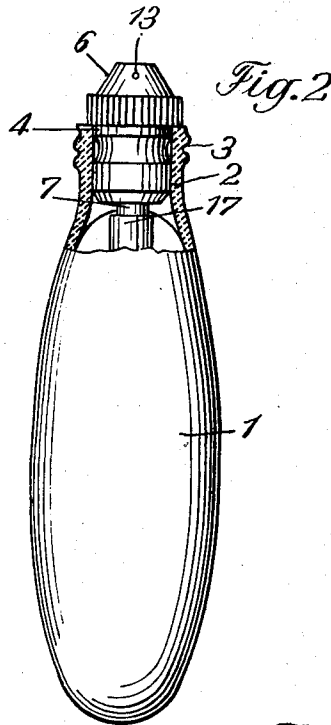
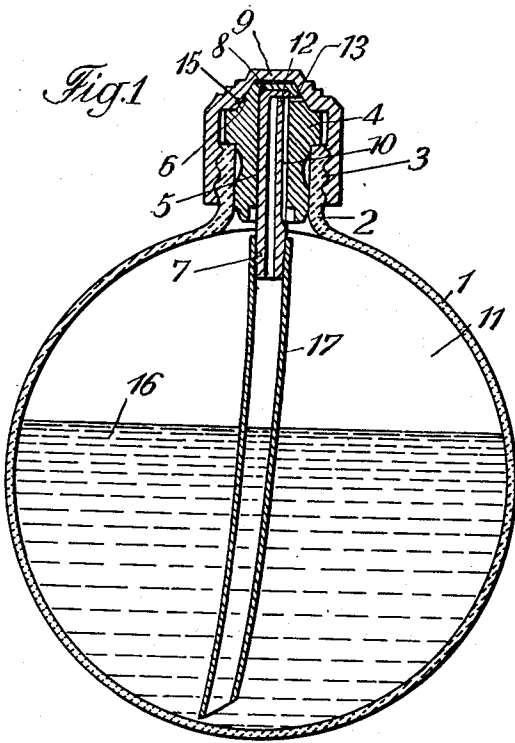
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ATOMIZER

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# UNITED STATES PATENT OFFICE

2,649,334

## ATOMIZER

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4 Claims. (Cl. 299—89)

This invention relates to atomizers which are particularly used for atomizing liquids such as for example perfumes or disinfectants, or also powder, talcum and the like.

It is an object of the invention to provide an atomizer of simple construction and operation without using a special operating mechanism, such as a piston, push member or other mechanical device for creating expulsion pressure within the receptacle containing the substance to be atomized.

According to the invention the atomizer comprises a resiliently compressible receptacle containing the substance to be atomized, a hollow plug being mounted in an opening of the receptacle and having inserted therein a tube reaching to the bottom of the receptacle, the outer end of the tube being closed and a longitudinal passage being formed between the outer wall of the tube and the inner wall of the hollow plug, said passage communicating with the air space in the receptacle above the substance to be atomized, the tube being provided near its outer closed end with a radial hole opening into said passage between the tube and the plug and aligned with the spray hole provided in the plug. In this manner, when the receptacle is compressed, air is forced outwards along said passage and arrives in front of said radial hole where the substance to be atomized is expelled from the tube and mingled with the air forced out through the spray hole in the plug.

The invention is described in detail in the following specification, reference being had to the accompanying drawings in which

Fig. 1 is a vertical section through an atomizer according to the invention;

Fig. 2 is a side view of the atomizer partly drawn in section and ready for use, the closure member of the atomizer plug being removed;

Fig. 3 is a section through the spray nozzle of the atomizer drawn to a larger scale;

Figs. 4 and 5 are transverse sections along the lines IV—IV and V—V of Fig. 3, respectively;

Fig. 6 is a section through a modified spray nozzle;

Figs. 7 and 8 are transverse sections along the lines VII—VII and VIII—VIII, respectively, of Fig. 6.

The atomizer represented in Figs. 1 to 5 comprises a receptacle 1 of resilient material, impermeable to liquids, for example of a suitable synthetic resin, such as a condensation or polymerisation product. The receptacle is formed with a neck 2 provided with a screw thread 3. A metallic plug member 4 is inserted into the neck 2. This plug member has an axial bore 5 extending from the inner end of the plug not quite to the upper or outer end thereof. The upper portion of the plug 4 is formed with a conical outer wall 6. A metallic tube 7 is inserted into and closely fitting the bore 5 in the plug 4. This tube is open towards the interior of the receptacle 1, but closed at its outer end by an end wall 8 abutting against the straight top wall 9 of the plug 4. The outer wall of the tube 7 is provided with a longitudinal groove 10 having its lower end communicating with the air space 11 within the receptacle 1, and extending until the upper end wall 8 of the tube. Immediately below the end wall 8 the tube 7 is provided with a radial hole 12 establishing communication between the central bore of the tube and the channel 10. The plug member 4 is provided with a spray hole 13 which is in radial alignment with the hole 12 in the tube 7.

When the atomizer is not in use, a closure member 14 is screwed to the screw thread 3 of the neck 2 of the receptacle. This closure member is provided with an internal conical surface 15 coating with the conical surface 6 of the plug 4 to provide a tight seal and prevent leakage of the liquid 16 through the spray hole 13 when the atomizer is not used. The lower end of the metal tube 7 is inserted into a rising tube 17 preferably made of celluloid, synthetic resin or the like and reaching near the bottom of the receptacle.

For using the represented atomizer, the closure member 14 is unscrewed and while the receptacle 1 is held between the fingers of a hand, the opposite walls thereof are squeezed together so as to create a pressure in the interior of the receptacle. Air from the passage 10 between the tube 7 and the plug 4 and expelled through the spray hole 13. At the same time liquid 16 is urged upwardly through the tube 17 towards the top of the tube 7 and is forced out through the radial hole 12 into the air passage 10 and is entrained together with the air and expelled through the spray hole 13. The compressed air passing through the channel 10 and discharging through the spray hole 13 is obliged to pass in front of the hole 12 through which liquid is discharged. The stream of air discharging through the hole 13 tends to create a depression or suction at the hole 12 ensuring in this manner a continuous discharge of liquid which mingles with the air to provide a steady atomizing spray as long as pressure is exerted on the receptacle. The provision of the radial hole 12 enables to

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correctly dose the discharged liquid so as to correspond to the air volume which is discharged, thereby providing a perfect atomization of the liquid.

When the exertion of pressure on the receptacle ceases, this latter takes its normal shape again and air is sucked in through the spray hole 13 and the passage 10 into the space 11 and the device is ready again for a new atomizing operation. Owing to the particular disposition of the air passage 10, the radial discharge hole 12 opening into the air passage, and the spray hole 13 aligned with the hole 12, not only liquids, but for example also face powder, talcum and the like may be atomized with the described apparatus.

The modification according to Figs. 6 to 8 is similar to the described example. The top portion 18 of tube 7 is of reduced diameter so as to provide an annular recess 19 into which opens the radial hole 12 which is again in alignment with the spray hole 13 in the plug 4.

I claim:

1. An atomizer having a resiliently compressible receptacle provided with an opening therein, a spray nozzle mounted in said opening, said nozzle having an axially extending central bore open towards the interior of the receptacle and closed at the top of the nozzle, and having a radially directed spray hole near the top of the nozzle, a metal tube inserted into said nozzle bore, said tube having its outer wall provided with a longitudinal groove to form a passage-way between the tube and the wall of the nozzle bore establishing communication between the interior of the receptacle and said spray hole in the nozzle top, a rising tube connected to the inner end of said metal tube and reaching towards the bottom of the receptacle, said metal tube having its outer end abutting against the closed top of the nozzle and having a radially directed hole provided in proximity to its closed outer end, said hole opening into said passage-way between the tube and the wall of the bore in the nozzle and being in alignment with said spray hole in the top of the nozzle.

2. An atomizer as claimed in claim 1, wherein said atomizer nozzle is provided with a conical wall portion, said spray hole discharging in the area of said conical wall portion, and a closure member having a complementary conical internal wall portion screwed to the receptacle over said nozzle to seal the spray hole when the atomizer is not in use.

3. An atomizer having a resiliently compressible receptacle provided with an opening therein, a spray nozzle mounted in said opening, said nozzle having an axially extending central bore open towards the interior of the receptacle and closed at the top of the nozzle, and having a radially

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directed spray hole near the top of the nozzle, a metal tube inserted into said nozzle bore, said tube having its outer wall provided with a longitudinal groove to form a passage-way between the tube and the wall of the nozzle bore establishing communication between the interior of the receptacle and said spray hole in the nozzle top, a rising tube connected to the inner end of said metal tube and reaching towards the bottom of the receptacle, said metal tube having its outer end abutting against the closed top of the nozzle and having a radially directed hole provided in proximity to its closed outer end, said hole opening into said passage-way between the tube and the wall of the bore in the nozzle and being in alignment with said spray hole in the top of the nozzle, and said metal tube being of reduced diameter at its top portion to provide an annular recess communicating with said radially directed hole, said latter in alignment with said spray hole.

4. In an atomizer, the combination of a spray nozzle with a receptacle provided with an opening, said spray nozzle being mounted in said opening and having an axially extending central bore open towards the interior of the receptacle and closed at the top of the nozzle, and having a radially directed spray hole near the top of the nozzle, a metal tube inserted into said nozzle bore, said tube having its outer wall provided with a longitudinal groove to form a passage-way between the tube and the wall of the nozzle bore establishing communication between the interior of the receptacle and said spray hole in the nozzle top, a rising tube connected to the inner end of said metal tube and reaching towards the bottom of the receptacle, said metal tube having its outer end abutting against the closed top of the nozzle and having a radially directed hole provided in proximity to its closed outer end, said hole opening into said passage-way between the tube and the wall of the bore in the nozzle and being in alignment with said spray hole in the top of the nozzle, and said metal tube being of reduced diameter at its top portion to provide an annular recess communicating with said radially directed hole, said latter in alignment with said spray hole.

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