

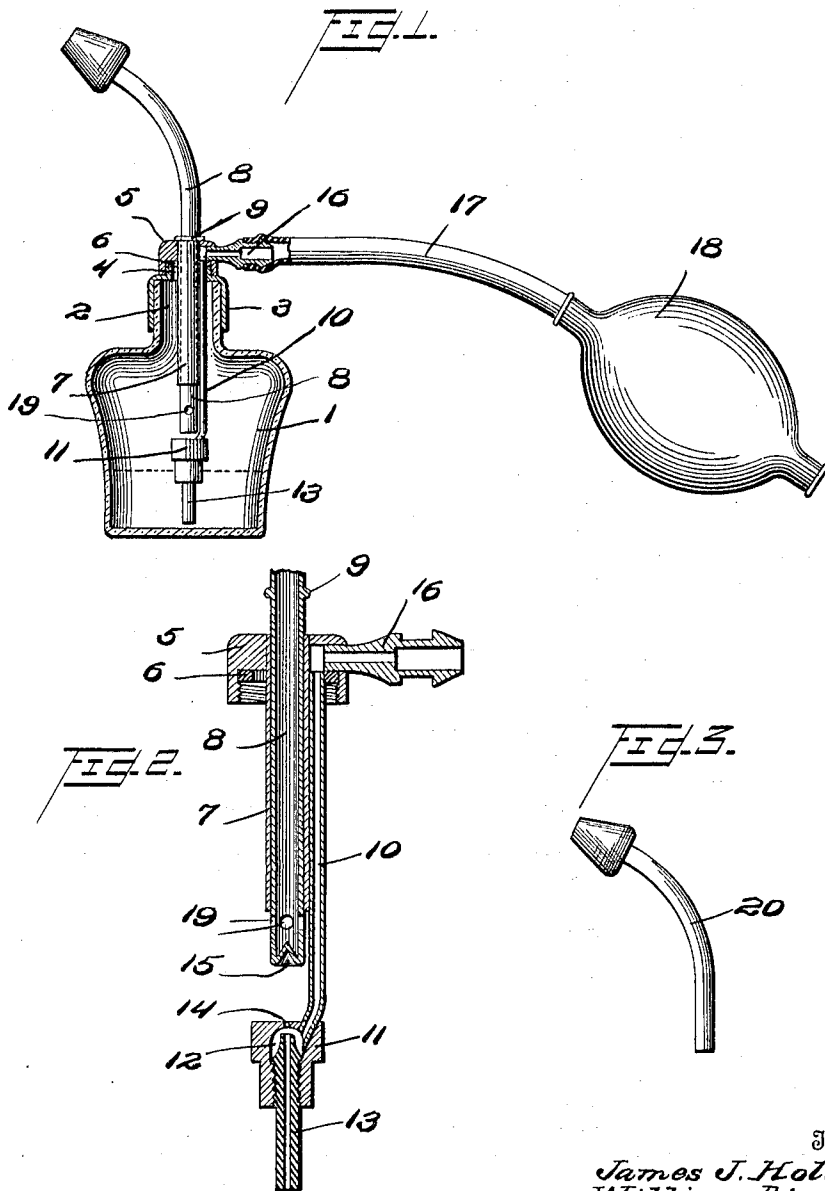
J. J. HOLLAND & W. DISCHER.

NEBULIZER.

APPLICATION FILED MAY 22, 1912.

1,051,587.

Patented Jan. 28, 1913.



Witnesses

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, JAMES J. HOLLAND and WILLIAM DISCHER, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, and Toledo, county of Lucas, and State of Ohio, respectively, have invented certain new and useful Improvements in Nebulizers, of which the following is a specification.

Our invention relates to improvements in nebulizers, the object of the invention being to provide a nebulizer from which an exceeding dry vapor may be discharged, the heavier particles of the liquid or vapor being deflected back into the body of the liquid and prevented from entering the discharge tube.

A further object is to provide an improved nebulizer in which a discharge tube is employed having a conical closed end, and openings in its side walls, the conical closed end being in line with the ejector and serving to deflect the heavier particles of the vapor downwardly, while only the liquid impregnated air enters the openings in the sides of the tube, and an extremely dry vapor is forced out of the nebulizer.

A further object is to provide a nebulizer with a tube of this character which may be adjusted longitudinally to regulate the vapor and which may be removed and replaced by an ordinary tube when a heavy spray is desired.

With these and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings: Figure 1, is a view in longitudinal section partly in elevation illustrating our improvements. Fig. 2, is a view in longitudinal section on an enlarged scale illustrating the ejector, the discharge tube, and the mounting for both, and Fig. 3, is a view in elevation of a discharge tube which may replace our improved discharge tube when a heavy vapor is desired.

1, represents a liquid receptacle which is preferably of glass and designed to contain any ordinary medicated or other liquid. This receptacle 1 has a restricted neck portion 2 on which a metal collar 3 is secured, and this metal collar has an externally

screw-threaded extension 4 to receive an internally screw-threaded cap 5.

A washer 6 is interposed between the cap and the extension to form an air tight joint. In the cap 5, a sleeve 7 is secured and constitutes a frictional support for our improved discharge tube 8 which fits snugly in the sleeve and normally extends above and below the same, an annular flange 9 being provided on tube 8 to limit its inward movement. The cap 5 also supports an air tube 10 which is secured to sleeve 7, and this tube 10 communicates with and supports at its lower end, an ejector 11. This ejector 11 is provided with the chamber 12 into which a tube 13 projects. This tube 13 is screwed into the ejector and has a nozzle at its upper end in the chamber. The tube 10 communicates with one side of the chamber and as the air is forced upwardly through the orifice 14 in the top of the ejector, the liquid is drawn up tube 13 and discharged against the closed end 15 of the discharge tube 8.

The air tube 10 communicates at its upper end with a nipple 16 for the attachment of a hose 17 through which the air is forced to the nebulizer. This, of course, may be done in various ways, and I have shown an ordinary bulb 18 for the purpose.

The discharge tube 8 is provided near its closed end 15 with a circular series of openings 19 through which the vapor passes, and as seen most clearly in Fig. 2, the closed end 15 is conical in form. When the liquid impregnated air is discharged upwardly against the conical end 15, this conical end acts as a deflector, deflecting the heavier particles of the liquid downwardly, while only the dry vapor enters the tube 8 through the openings 19. This may be adjusted by moving the tube 8 longitudinally in sleeve 7. Fig. 1 shows the tube in its lowest position, and Fig. 2 in a higher position. As the closed end 15 is moved away from the ejector 11, the vapor becomes heavier. If a very heavy spray is desired, the tube 8 is removed entirely and replaced by an ordinary tube 20 illustrated in Fig. 3. This tube 20 is forced into the sleeve 7, and the heavy vapor from the ejector is discharged directly through the tube 20. By closing the end of the tube 8, none of the heavy vapor can be discharged into the tube by the ejector and further by making this end conical in form, such heavy particles of vapor cannot pass around the

side of the tube, but must fall backwardly into the liquid.

Various slight changes might be made in the general form and arrangement of parts described without departing from our invention, and hence we do not limit ourselves to the precise details set forth, but consider ourselves at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A nebulizer, comprising a discharge tube having a closed end, and an opening in the side thereof, and means for forcing liquid impregnated air against said closed end, substantially as described.

2. A nebulizer, comprising a discharge tube having a conical inner end forming a deflector, means for directing liquid impregnated air against said deflector, and said tube having an opening therein above the deflector, substantially as described.

3. A nebulizer, comprising a receptacle for liquid, a discharge tube projecting into the receptacle having a closed inner end, and an opening in the side thereof, an ejector adapted to discharge liquid impregnated air against the closed end of said tube, and an air supply pipe communicating with the ejector, substantially as described.

4. A nebulizer, comprising a receptacle for liquid, a discharge tube projecting into the receptacle having a closed inner end, and an opening in the side thereof, an ejector adapted to discharge liquid impregnated air against the closed end of said tube, an air supply pipe communicating with the ejector, said closed end of the tube conical in form, whereby the liquid impregnated air will be deflected downward thereby, substantially as described.

5. A nebulizer, comprising a discharge tube having a closed end and an opening in the side thereof, means for forcing liquid impregnated air against said closed end, and a fixed sleeve in which said tube is frictionally supported whereby said tube may be adjusted longitudinally, substantially as described.

6. A nebulizer, comprising a discharge tube having a conical inner end forming a deflector, means for directing liquid impregnated air against said deflector, said tube having an opening therein above the deflector, and a fixed sleeve in which said tube is frictionally supported whereby said tube may be adjusted longitudinally, substantially as described.

7. A nebulizer, comprising a receptacle for

liquid, a discharge tube projecting into the receptacle having a closed inner end, and an opening in the side thereof, an ejector adapted to discharge liquid impregnated air against the closed end of said tube, and an air supply pipe communicating with the ejector, and a fixed sleeve in which said tube is frictionally supported whereby said tube may be adjusted longitudinally, substantially as described.

8. A nebulizer, comprising a receptacle for liquid, a discharge tube projecting into the receptacle having a closed inner end, and an opening in the side thereof, an ejector adapted to discharge liquid impregnated air against the closed end of said tube, an air supply pipe communicating with the ejector, said closed end of the tube conical in form, whereby the liquid impregnated air will be deflected downward thereby, and a fixed sleeve in which said tube is frictionally supported whereby said tube may be adjusted longitudinally, substantially as described.

9. A nebulizer comprising a receptacle for liquid, a cap removably secured on the receptacle and closing the same, a sleeve secured in the cap and projecting down into the receptacle, an air supply communicating with the cap and projecting to the receptacle, an ejector on the lower end of the said tube discharging through said sleeve, a discharge tube fitting in the sleeve and extending below the same, a closed end on said tube, and said tube having openings in the side thereof below the sleeve, substantially as described.

10. A nebulizer comprising a receptacle for liquid, a cap removably secured on the receptacle and closing the same, a sleeve secured in the cap and projecting down into the receptacle, an air supply communicating with the cap and projecting to the receptacle, an ejector on the lower end of the said tube discharging through said sleeve, a discharge tube fitting in the sleeve and extending below the same, a closed end on said tube, and said tube having openings in the side thereof below the sleeve, said end of conical form whereby the liquid impregnated air is deflected downwardly and said discharge tube frictionally held in the sleeve and adapted to be adjusted longitudinally therein, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JAMES J. HOLLAND.
WILLIAM DISCHER.

Witnesses:

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