No. 815,411. PATENTED MAR. 20, 1906.

F. C. DORMENT.

ATOMIZER OR NEBULIZER.

APPLICATION FILED SEPT. 14, 1904.

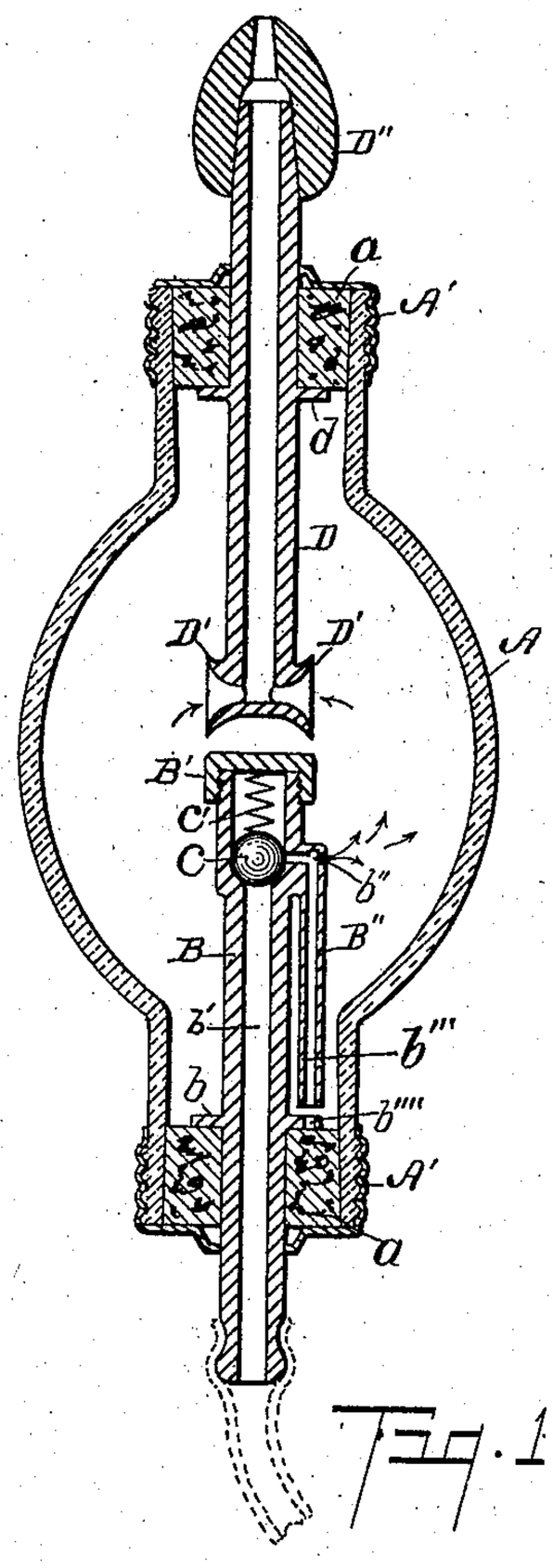

Fig. 1.

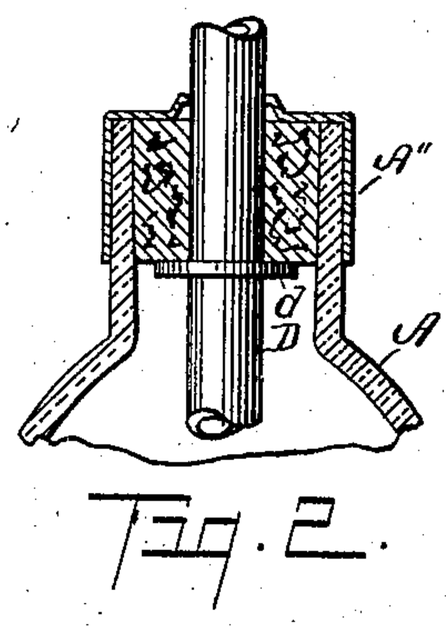

Fig. 2.

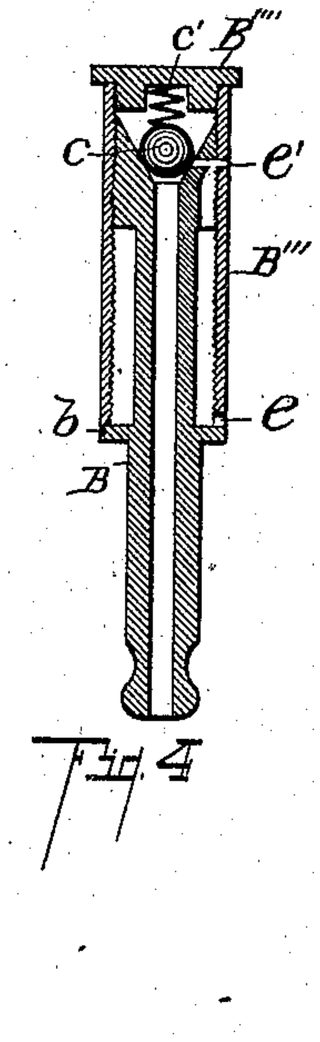

Fig. 4.

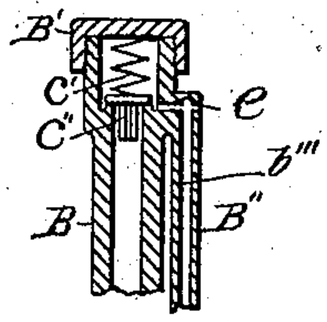

Fig. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

FRANK C. DORMENT, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO NATIONAL VAPORIZER COMPANY, OF KALAMAZOO, MICHIGAN.

ATOMIZER OR NEBULIZER.

No. 815,411. Specification of Letters Patent. Patented March 20, 1906.

Application filed September 14, 1904. Serial No. 224,408.

To all whom it may concern:

Be it known that I, FRANK C. DORMENT, a citizen of the United States, residing at the city of Kalamazoo, county of Kalamazoo, State of Michigan, have invented certain new and useful Improvements in Atomizers or Nebulizers, of which the following is a specification.

This invention relates to improvements in atomizers or nebulizers.

The objects of this invention are, first, to provide an improved atomizer or nebulizer in which the liquid medicament is retained in the flask no matter in what position it may be placed; second, to provide an improved atomizer or nebulizer which is simple and convenient to use; third, to provide an improved atomizer or nebulizer in which the parts are very simple and economical to produce and are readily assembled; fourth, to provide an improved atomizer or nebulizer which is readily disassembled for purposes of cleansing or the like and one which may be quickly reassembled by an inexperienced person.

Further objects and objects relating to structural details will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined, and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal sectional view thereof, a section of the air-supply tube being indicated by dotted lines. Fig. 2 is a detail longitudinal sectional view of a modified construction, the stopper-retaining cap A″ engaging the necks of the flask by friction instead of by screw-threads, as shown in Fig. 1. Fig. 3 is a detail longitudinal sectional view of the atomizing-tube, showing a modified construction of check-valve for the air-passage of the atomizing-tube. Fig. 4 is a longitudinal sectional view showing a modified form of the atomizer-tube.

In the drawings similar letters of reference refer to similar parts throughout the several views.

Referring to the drawings, the medicament-flask A is open at each end and is provided with outwardly-extending threaded necks. Tapered stoppers *a* are provided. These stoppers are retained in position by threaded caps A′, which engage the outer ends of the stoppers. One of the stoppers *a* serves as a support for the atomizing-tube B, which is arranged centrally therethrough. The tube B is provided with a flange *b*, which engages the inner end of the stopper for retaining it in position therein. The atomizer-tube B is provided with a longitudinal air-passage *b*′. The inner end of the tube B is chambered to receive the ball check-valve *c* for the air-passage *b*′. This valve is held normally in its seat by the coiled spring *c*′, one end of which bears against the ball *c* and the other against the cap B′ for the inner end of the tube B. When the valve *c* is in its seat, it also closes the laterally-opening delivery-passage *b*″ of the air-passage *b*′. This delivery-passage *b*″ opens across the upper end of the medicament-passage *b*‴. The medicament-passage *b*‴ is preferably bored from the lower end, a hole *b*⁗ being bored through the flange *b* in line therewith, so that the medicament-passage is accessible for cleaning.

With the parts arranged as I have illustrated and described the air delivered through the air-passage *b*′ lifts the valve *c* from its seat, thereby opening the air-delivery passage *b*″. The delivery of the air under pressure across the upper end of the medicament-passage draws the medicament therethrough and delivers it against the wall of the flask, thereby atomizing the same.

The delivery-tube D is carried by the other stopper *a*. This tube is provided with a flange *d*, corresponding to the flange *b* of the atomizer-tube B, for retaining the tube in position in the stopper. The inlet-ports for the delivery-tube D are formed longitudinally through the laterally-projecting arms D′. These arms are flared at their outer ends and serve as a trap to prevent the delivery of the liquid or medicament through the tube D. A suitable tip D″ is provided for the tube D.

When it is desired to remove either the atomizing-tube or the delivery-tube for the purpose of cleansing the device or filling or the like, the caps A′ are loosened and the stoppers withdrawn. The stoppers are pref-

erably made of cork, as they thus effectively hold the atomizing and delivery tubes in position and also effectively seal the flask. The economy thereof is evident.

In the modified construction shown in Fig. 2 the screw-threads are omitted from the necks of the flask and the retaining-cap A″ is retained merely by friction. The valve *c* prevents the liquid medicament being drawn through the air-passage *b′*, as sometimes occurs when the air bulb or pump works improperly. It also prevents any seepage of the liquid medicament therethrough when not in use.

In the modified construction of valve shown in Fig. 3 a stem-valve *c″* is provided. The form illustrated in Fig. 1 is, however, preferred, as it not only effectively seals the air-passage *b′*, but also the delivery-passage *b″* therefor.

The particular style of medicament-trap for the delivery-tube D is very effective and economical to produce. Variations thereof will, however, appear to those skilled in the art.

In the modified construction of atomizer-tube shown in Fig. 4 the upper end of the tube B is externally threaded to receive the threaded sleeve B‴. This sleeve is screwed down upon the tube B until it rests upon the flange *b*. A perforation *e* is formed for the admission of the medicament. This tube or sleeve B‴ forms the medicament-passage of the atomizer-tube. A perforation is formed through the sleeve or tube B‴, adapted to be brought into registry with the air-delivery passage *e′*. The cap B⁗ is in this structure threaded into the end of the outer tube or sleeve B‴. The valve *c* is arranged to close the air-passage and also the delivery-passage.

With the parts of my improved atomizer arranged as is illustrated and described they are very economical to produce and are quickly and easily disassembled for purposes of cleaning and the like and may be reassembled and adjusted without any liability of the parts becoming disarranged. It is also very compact and convenient to use. The instrument with the medicament therein may be placed in any position without spilling the same, and it may, if desired, be set up ready for use in shipping and the medicament placed therein, if desired.

I have illustrated and described my improved atomizer or nebulizer in the form preferred by me on account of its structural simplicity and economy, although I am aware that it is capable of considerable variation in structural details without departing from my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a medicament-flask open at each end, having outwardly-expanding threaded necks; tapered stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube having inlet-ports formed longitudinally through laterally-projecting flaring arms thereon, carried by the other of said stoppers; and threaded caps for retaining said stoppers in position, for the purpose specified.

2. The combination of a medicament-flask open at each end, having threaded necks; stoppers therefor; an atomizing-tube, having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube, having inlet-ports formed longitudinally through laterally-projecting flaring arms thereon, carried by the other of said stoppers; and threaded caps for retaining said stoppers in position, for the purpose specified.

3. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube, having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube, having inlet-ports formed longitudinally through laterally-projecting flaring arms thereon, carried by the other of said stoppers; and flanges on said tubes engaging the inner ends of said stoppers, for the purpose specified.

4. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; and a delivery-tube having inlet-ports formed longitudinally through laterally-projecting flaring arms thereon, carried by the other of said stoppers; for the purpose specified.

5. The combination of a medicament-flask open at each end having threaded necks; stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; a medicament-trap for said delivery-tube; flanges on said tubes engaging the inner ends of said stoppers; and threaded caps for retaining said stoppers in position, for the purpose specified.

6. The combination of a medicament-flask open at each end, having threaded necks; stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; a medicament-trap for said delivery-tube; and threaded caps for retaining said stoppers in position, for the purpose specified.

7. The combination of a medicament-flask open at each end, having threaded necks; stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube carried by the other of said stoppers;

flanges on said tubes engaging the inner ends of said stoppers; and threaded caps for retaining said stoppers in position, for the purpose specified.

8. The combination of a medicament-flask open at each end, having threaded necks; stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; and threaded caps for retaining said stoppers in position, for the purpose specified.

9. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; a medicament-trap for said delivery-tube; and flanges on said tubes engaging the inner ends of said stoppers, for the purpose specified.

10. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; and a medicament-trap for said delivery-tube, for the purpose specified.

11. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; and flanges on said tubes engaging the inner ends of said stoppers, for the purpose specified.

12. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube having an air-passage and a medicament-passage, carried by one of said stoppers; and a delivery-tube carried by the other of said stoppers, for the purpose specified.

13. The combination of a medicament-flask open at each end, having threaded necks; stoppers therefor; an atomizing-tube carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; a medicament-trap for said delivery-tube; flanges on said atomizing and delivery tubes engaging the inner ends of said stoppers; and threaded caps for retaining said stoppers in position, for the purpose specified.

14. The combination of a medicament-flask open at each end having threaded necks; stoppers therefor; an atomizing-tube carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; flanges on said atomizing and delivery tubes engaging the inner ends of said stoppers; and threaded caps for retaining said stoppers in position, for the purpose specified.

15. The combination of a medicament-flask open at each end, having threaded necks; stoppers therefor; an atomizing-tube carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; a medicament-trap for said delivery-tube; and threaded caps for retaining said stoppers in position, for the purpose specified.

16. The combination of a medicament-flask open at each end, having threaded necks; stoppers therefor; an atomizing-tube carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; and threaded caps for retaining said stoppers in position, for the purpose specified.

17. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; a medicament-trap for said delivery-tube; and flanges on said atomizing and delivery tubes engaging the inner ends of said stoppers, for the purpose specified.

18. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; and flanges on said atomizing and delivery tubes engaging the inner ends of said stoppers, for the purpose specified.

19. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube having air and medicament passages carried by one of said stoppers; a delivery-tube carried by the other of said stoppers; and a medicament-trap for said delivery-tube, for the purpose specified.

20. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube having air and medicament passages carried by one of said stoppers; and a delivery-tube carried by the other of said stoppers, for the purpose specified.

21. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube arranged through one of said stoppers; a delivery-tube arranged through the other of said stoppers; flanges on said tubes engaging the inner ends of said stoppers; and caps having central openings through which said tubes project, for retaining said stoppers in position, for the purpose specified.

22. The combination of a medicament-flask open at each end; stoppers therefor; an atomizing-tube arranged through one of said stoppers; a delivery-tube arranged through the other of said stoppers; and caps having central openings through which said tubes project, for retaining said stoppers in position, for the purpose specified.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FRANK C. DORMENT.

Witnesses:
BESSIE K. OWENS.
OTIS A. EARL.