June 17, 1941. A. W. PITTS 2,245,872

NEBULIZER

Filed March 19, 1940

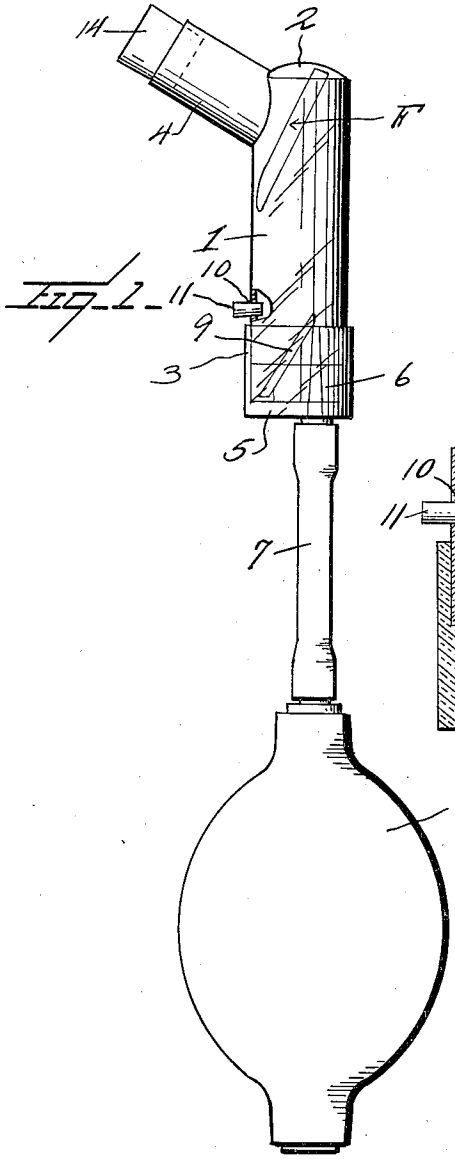


Fig. 1.

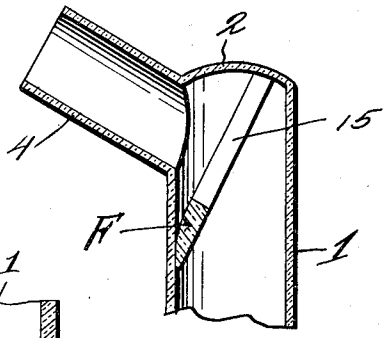


Fig. 2.

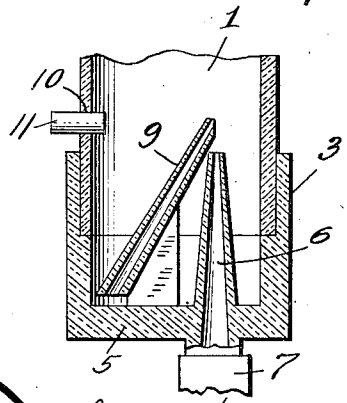


Fig. 6.

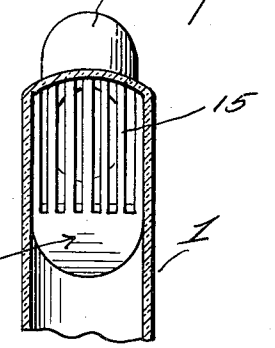


Fig. 3.

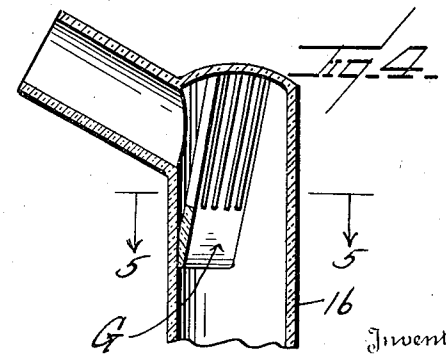


Fig. 4.

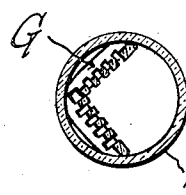


Fig. 5.

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NEBULIZER

Arthur W. Pitts, Tacoma, Wash.

Application March 19, 1940, Serial No. 324,866

1 Claim. (Cl. 128—194)

This invention relates to a nebulizer, and it is an object of the invention to provide a device of this kind which is particularly adapted for use in the spraying of a medicament within the oral cavity so that the vapor may be inhaled.

It is a particular object of the invention to provide a device of this kind which will throw a considerable volume of very fine vapor which can be readily absorbed into the system through the lungs and wherein is provided a filter intersecting the path of the vapor stream at a point closely adjacent to the discharge of such stream from the device, said filter operating to prevent the passing out with such stream of vapor large drops of the medicine or inhalant within the device which might otherwise be injurious and obnoxious to the patient as well as being wasteful.

Another object of the invention is to provide a device of this kind which is particularly advantageous for use in the treatment of asthma, hay fever and other allergic conditions.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved nebulizer whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawing, wherein—

Figure 1 is a view in side elevation of a nebulizer constructed in accordance with an embodiment of my invention with a portion broken away;

Figure 2 is a fragmentary longitudinal sectional view taken through the upper portion of the device as illustrated in Figure 1;

Figure 3 is a fragmentary sectional view taken longitudinally through the portion of the device as illustrated in Figure 2 with the filter in elevation;

Figure 4 is a fragmentary view partly in section and partly in elevation of the upper portion of the flask of the nebulizer and embodying another form of the invention;

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 4.

Figure 6 is a fragmentary view taken through the lower portion of the flask, as illustrated in Fig. 1, with an adjacent portion of the tube in fragment.

In the embodiment of my invention as illustrated in Figures 1 to 3 inclusive, the improved nebulizer comprises an elongated flask 1 herein disclosed as cylindrical in form and having its upper end 2 permanently closed while its lower end is closed by a cap 3 cemented or otherwise securely held in applied position. The flask 1 adjacent to its upper or closed end 2 has in communication therewith a laterally disposed discharge nozzle 4 having its longitudinal axis directed on such an angle with respect to the longitudinal axis of the flask 1 to have the outer end portion of the nozzle 4 extending beyond the adjacent closed end 2 of the flask 1. This nozzle 4 has a bore of a material diameter although of a diameter less than the interior diameter of the flask 1.

The cap 3 has extending through the head 5 thereof an air injection tube 6. This tube 6 extends outwardly beyond the head 5 of the cap a desired distance so that an end portion of the flexible tube 7 may be readily and effectively coupled thereto. This flexible tube 7 is also suitably coupled to a hand pump 8 herein disclosed as a conventional bulb. Within the cap 3 and suitably anchored to the head 5 thereof is a capillary tube 9 in angular relation to the inner end of the air injection tube 6. The capillary tube 9 has its discharge end portion disposed in contiguous relation with the discharge end of the air injection tube 6.

Upon operation of the hand pump 8 the air discharging within the flask 1 from the air tube 6 will draw off therewith through the capillary tube 9 a portion of the liquid inhalant or medicament which has previously been poured within the cap 3. This combined air and inhalant or medicament will pass out through the discharge nozzle 4 in the form of a vapor. This vapor is preferably discharged within the oral cavity and, of course, the closed end 2 of the flask 1 should be upwardly disposed. In order to obtain the best results the hand pump or bulb 8 should be vigorously squeezed.

The flask 1 in the lower portion of its side wall or at a point closely adjacent to the applied cap 3 has an opening 10 therethrough which is normally closed by a plug 11. If, in the use of the device, more volume is required, the plug 11 is removed. The inhalant or medicament is poured into the device through the nozzle 4. This nozzle 4 is closed, when the device is not in use, by a suitable plug 14 indicated by broken lines in Figure 1 of the drawing.

Positioned within the flask 1 at the upper or

closed end 2 thereof is a filter F. This filter F has a marginal configuration to allow the same to snugly engage within said end portion of the flask 1 from a point below the nozzle 4 and disposed on such an incline in a direction away from the nozzle 4 to intersect the bore of the flask 1. The upper portion of this filter F is formed to provide a plurality of substantially parallel elongated teeth 15 with adjacent teeth in relatively close proximity. The filter F, therefore, constitutes a comb-like structure and in the use of the nebulizer the vapor passes between the teeth 15 before the vapor stream is discharged out through the nozzle 4. This is of particular advantage and importance as it holds back any large drops of the medicament or inhalant thus preventing waste of such medicament or inhalant and at the same time preventing the vapor as received within the oral cavity being injurious or obnoxious to the patient.

In the form of the invention as illustrated in Figures 4 and 5, the nebulizer is of a structure the same as hereinbefore described in connection with the first embodiment of the invention but the filter G from its transverse center is disposed laterally in divergence whereby the filter G in cross section approximates a broad and shallow V. This structure results in the filter G at all points being closely adjacent to the side wall of the flask 16. Aside from its particular cross sectional configuration the filter G is constructed in the same manner as the filter F hereinbefore referred to.

From the foregoing description it is thought to be obvious that a nebulizer constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:

In combination with a nebulizer comprising an elongated cylindrical flask closed at one end and a laterally disposed discharge nozzle adjacent to the closed end thereof, a filter within the closed end portion of the flask, said filter being of a configuration to snugly fit within the flask and extend from a point below the nozzle on an incline in a direction away from the nozzle to intersect the bore of the flask, the upper portion of the filter constituting a plurality of substantially parallel elongated teeth with adjacent teeth in close proximity.

ARTHUR W. PITTS.