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H. E. CURRY

2,274,669

ATOMIZER

Filed Sept. 18, 1939

Fig 1

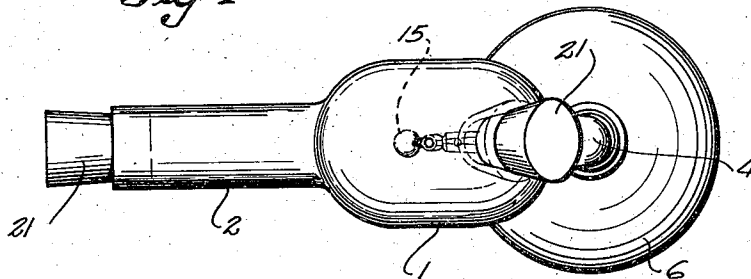


Fig 2

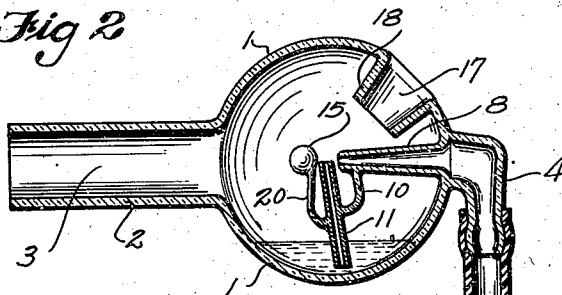
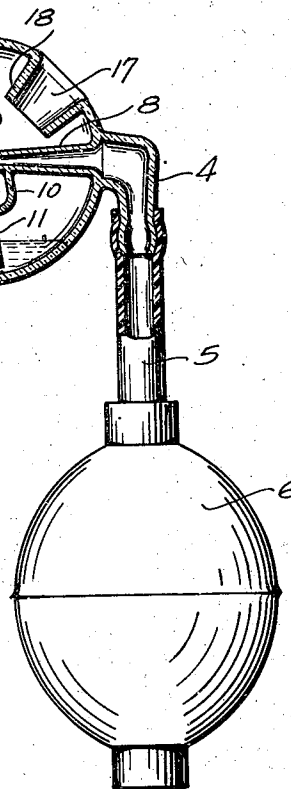
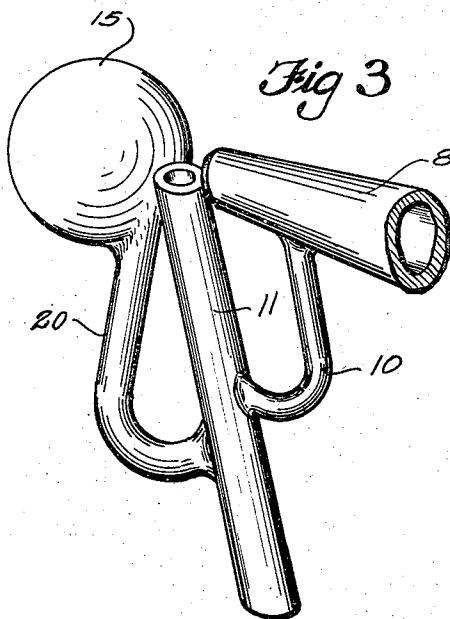


Fig 3



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UNITED STATES PATENT OFFICE

2,274,669

ATOMIZER

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Application September 18, 1939, Serial No. 295,435

1 Claim. (Cl. 299—88.5)

This invention relates to atomizers and has reference more particularly to atomizers designed for medical use; the present invention being an improvement upon the atomizer disclosed in an application for patent filed by me on August 28, 1935, under Serial No. 38,308, and which application matured into United States Patent No. 2,111,841, issued March 22, 1938.

The principal object of the present invention is to provide an improved type of atomizer, whereby a selected liquid may be finely atomized and delivered from the device as a true vapor which may readily be inhaled, and without the inclusion in the vapor of any large drops of the liquid.

It is also an object of this invention to provide an atomizer of the same general structure as that of the patent above mentioned, embodying the same principles of operation and use, but which has been simplified and improved in certain respects to provide a more practical and less expensive article, especially from the manufacturing standpoint, but without detriment to its utility.

More specifically stated, the objects of this invention reside in the details of construction of an atomizing baffle and its support, which is designed to serve additionally as a drainage element for the elimination of the formation of any large drops of liquid on the baffle and the possibility of their delivery from the device with the vapor.

Explanatory to the present invention, it will here be stated that the device of the above mentioned patent which has been issued to me, comprises a somewhat spherical container for a quantity of the selected liquid to be atomized, and from which, at one side, extends a radially directed and somewhat elongated tubular neck of substantial diameter. At the opposite side of the container, an air tube opens therinto; this tube being supplied with air, under pressure, by means of the well known rubber bulb. At the inside of the container, the air tube terminates in a radially directed nozzle arranged in coaxial alignment with the discharge tube or neck. A capillary tube is supported vertically in the vessel by a bracket connection with the nozzle. This capillary tube has its lower end disposed in position to be covered by the supply of liquid in the vessel, and its upper end is disposed in and directed toward the line of delivery of air from the nozzle, so that, incident to the delivery of air from the nozzle, outwardly through the discharge neck, a certain amount of suction will be cre-

ated whereby to produce a delivery of liquid to the air stream through the capillary tube for atomization.

In order to effect the desired atomization of this liquid, a flat surfaced baffle is supported from the tube by a connecting bracket or arm, and is disposed in the path of delivery of air and against which the liquid and air impinge in a manner to effect the desired atomization. The entrainment of this atomized liquid is the natural result of the discharge of air outwardly through the tubular neck.

Furthermore, in the patented device, a drainage whisker is extended from the forward edge of the baffle, down into the supply of the liquid to cause the drawing back of liquid that collects on the baffle, thus to prevent the formation of or blowing of large drops into the discharge spout by the air stream.

The objection to the above construction has been that the flat baffle was not entirely satisfactory for the atomization and necessarily had to have the drainage whisker in addition to the provision of the supporting bracket. This complicated the construction and rendered the device not only expensive, but difficult to make and to assemble.

In the present instance, I have improved the atomizing effect, and have eliminated the drainage whisker as used in the previous patent, by changing the character of the baffle and by utilizing the supporting bracket in the additional capacity of the drainage whisker.

In accomplishing the various objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawing, wherein—

Fig. 1 is a top view of an atomizer embodying the present invention.

Fig. 2 is a central vertical section of the same.

Fig. 3 is an enlarged perspective view showing the baffle, the air delivery nozzle and the capillary tube for supplying liquid to the air stream and also showing the drainage support for the baffle.

Referring more in detail to the drawing—

1 designates a flask, or container, in which the liquid to be atomized is adapted to be contained, as indicated in Fig. 2. The flask preferably is made of glass, because of the constructional advantages of this material as well as its chemical inactivity, and its convenience in use. In the present instance, the container is somewhat of spherical form, flattened at opposite

sides, and at another side has a radially directed discharge neck 2 of substantial diameter forming an outlet or passage 3 for an easy outflow of the atomized liquid along with the stream of atomizing air, as presently will be understood.

Opening into the container at a point diametrically opposite the entrance into the neck 2 is an air supply tube 4 that is connected at its outer end, through the mediacy of a rubber tube 5, with a rubber bulb 6 of the well known type adapted to be hand compressed to cause the delivery of air under pressure into the flask through the tube 4. At the inside of the container, the air tube 4 leads into a nozzle 8. The nozzle is tapered toward its discharge end, is axially in alinement with the discharge tube 2, and terminates substantially at the center of the spherical container, as will be seen by reference to Fig. 2.

Depending from the nozzle, at a location near the inner end thereof, is a bracket or arm 10 which is fixed to and supports a short length of capillary tube 11. This tube is open, and is supported with its lower end close to the bottom wall of the container, so as to be immersed in the supply of liquid, and with its upper end close to and directly in the path of discharge of air from the inner end of the nozzle, thus to cause liquid to be drawn up through the tube and picked up by the stream of air as delivered from the nozzle toward and into the neck passage 3.

For the atomization of the liquid that is delivered into the air stream from tube 11, I have provided a baffle 15 comprising a small glass ball, supported directly in the path of the stream of air as delivered from the nozzle across the upper end of the liquid supply tube. The air stream, after passing across the upper end of the tube 11, and picking up the liquid supplied thereby, impinges against the spherical baffle with the result that the liquid is caused to be finely atomized and deflected therefrom in a fan-like spray, appearing as a fog in the container to be carried out through the neck 2 with the outflow of air.

To facilitate the outflow of the air, and thus the easy delivery of the fog of vapor to a point of application, or to where it can be used, I have provided a vacuum relief port 17 in the top wall of the container from which an inwardly directed tubular neck 18 extends. The axial line of this tubular neck is directed toward the center of the container, or toward that area where there will be a tendency toward vacuum incident to use of the device. Thus, any tendency toward vacuum that might otherwise be created will be relieved and there will be an easy outflow of the vapor insured and without causing any swirling of the air in the container.

By reason of the direct discharge of air from the nozzle against the spherical baffle, some of the liquid carried in the air stream is bound to find its way to and cling to the back side of the ball; that is, the side next to the outlet 2, and unless some means is provided to prevent it,

this liquid will ultimately form in relatively large droplets to finally be carried out with the air stream. To overcome this undesirable result, I have provided a support 20 for the baffle which comprises a very slender glass arm or bracket which is integral with the baffle and extends downwardly and has a fixed connection with the lower end portion of the tube 11. This support, due to its slender form, will have a capillary property that will draw and lead the liquid which collects on the baffle downwardly to the supply, and thus no such amount is permitted to collect on the baffle that would result in the formation of droplets.

It has also been found that a better atomizing effect is produced by reason of the spherical form of the baffle than was possible with the flat disk-like form of baffle that was disclosed in the prior patent. The spherical baffle is located directly in the path of the discharged air from the nozzle, and therefore receives the liquid that is supplied by the tube 11 directly against the surfaces with the result of a spray in all directions.

In the use of the device for treatment of the throat or lungs, the user places the elongated neck portion of the container in the mouth, then by manipulating the rubber bulb, causes a fog or vapor to be emitted from the device, and this vapor is breathed into the mouth and throat, or may be taken into the lungs, in the way intended for the particular treatment being given.

When the device is not in use, the mouth of the neck, and the vacuum relief port may be closed by the use of corks 21, as indicated in Fig. 1.

The particular advantage to be gained by the present device is that a better atomization is effected, the formation of droplets is avoided, and a more practical and economical device is produced.

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

An atomizer of the character described comprising a substantially closed container for a supply of liquid to be atomized and having an outlet at one side, a supply tube for air under pressure opening through the container wall and terminating in a nozzle so disposed as to deliver a stream of air therefrom directly toward said outlet, a capillary tube supported with its lower end to receive liquid from the supply and with its upper end in the path of the air stream as discharged from the nozzle tip to supply liquid to the air stream, and a spherical baffle disposed directly in the line of discharge of air, beyond the delivery end of the capillary tube and having a supporting member extending downwardly from its lower side and attached to the capillary tube and affording quick drainage of liquid from the baffle.

HAROLD E. CURRY.