

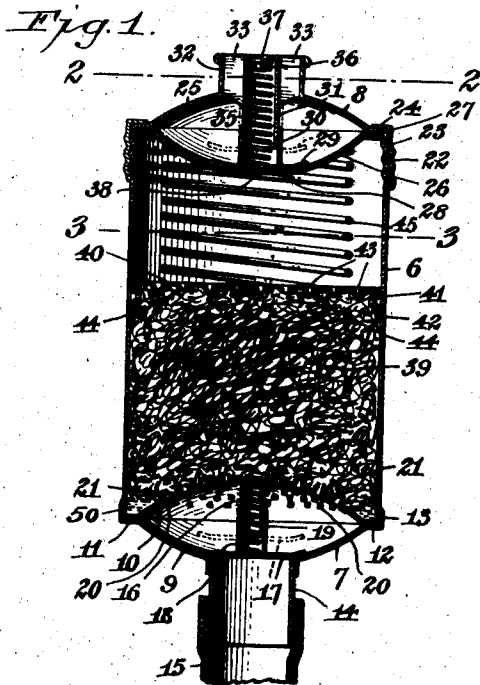
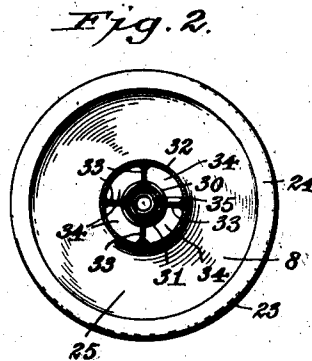
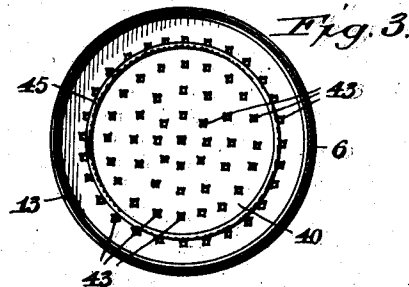
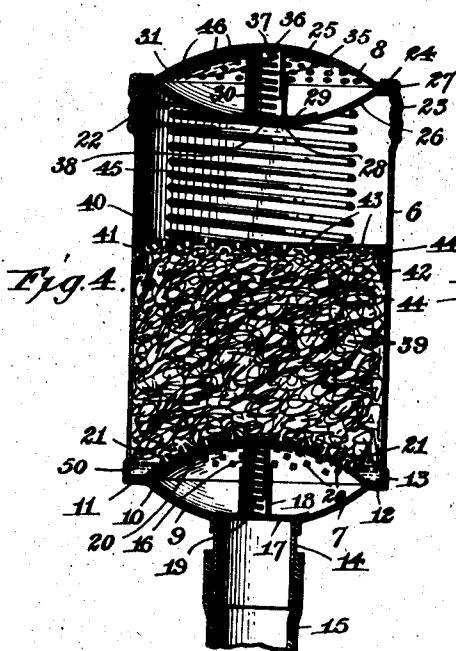
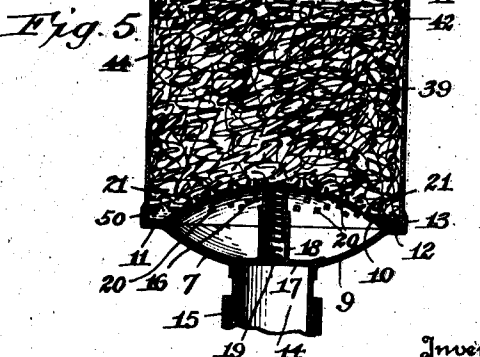
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J. DELLINGER

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AIR PURIFIER

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AIR PURIFIER.

Application filed November 26, 1921. Serial No. 518,076.

To all whom it may concern:

Be it known that I, JOHN DELLINGER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Air Purifiers, of which the following is a specification.

My invention relates to an air purifier, and its primary object is to provide a simple and inexpensive device of this kind which may be connected with a fan, or directly attached to the outlet of a vacuum cleaner.

Another object of my invention is the provision of a device of this kind which can be easily separated so that a pharmaceutical substance may be placed therein, or, if desired, absorbent material saturated with a pharmaceutical liquid substance.

The invention consists in the novel features of construction and in the arrangement and combination of parts to be hereinafter described and more particularly pointed out in the subjoined claims.

In the drawings:—

Fig. 1 is a central longitudinal section through my improved air purifier, in what I now consider the preferred construction.

Fig. 2 is a transverse section taken on line 2—2, Fig. 1.

Fig. 3 is a transverse section taken on line 3—3, Fig. 1.

Fig. 4 is a central longitudinal section of a slightly modified form of my invention.

Fig. 5 is a central longitudinal section of a still further modified form of my invention.

The device comprises a casing having a cylindrical wall 6 and a double head 7, 8 at each end thereof. The head 7 closes the inlet end of the cylindrical wall and comprises two separable parts 9, 10, each part being concavo-convex and arranged with their concaved faces in opposition so as to form a hollow interior for the head. The part 10 is provided with a flat marginal rim 11 which is adapted to bear against the inlet end of the cylindrical wall 6, while the part 9 has a similar rim 12 provided with a circumferential flange 13 adapted to surround the cylindrical wall at its inlet end, said flange snugly fitting said cylindrical wall so that it will be firmly retained thereon; but, if desired, suitable fastening means may be provided for this purpose or the flange may be soldered to said cylindrical wall.

In a broader sense, the part 9 may be considered one of the heads of the casing, while the part 10 may be considered a transverse wall spaced from said head. The part 9 has an axial opening in which an inlet tube 14 is secured, and this tube is adapted for connection with any suitable source of air-current; for example, by means of a hose 15 leading from the outlet of a vacuum cleaner. The transverse wall or part 10 is provided with a short tube 16, and closing the inner end of the tube 14 or the inlet of the casing, as it may be termed, is a self-closing inlet valve 17 having a tube 18, which surrounds the free end of the tube 16 forming part of the wall 10. Within the tubes, which are arranged to telescope, is a coil spring 19, one end thereof bearing against the valve 17 and the other end bearing against the center of the part or wall 10. The part or wall 10 is provided with perforations 20 through which the air entering through the inlet tube 14 is adapted to pass, said perforations being preferably formed by stamping the metal of the part or wall 10 inwardly so as to provide prongs 21. The opposite or outlet end of the cylindrical wall is spirally grooved or threaded, as at 22, and applied thereto is a threaded clamping ring 23 which has an inwardly extending flange 24 adapted to bear against the marginal portion of the double head 8. This double head comprises a concavo-convex outer wall 25 and a concavo-convex inner wall 26, said inner wall having a flat rim 27 surrounded by the marginal portion of the outer wall 25. In this manner the inner and outer walls of the double head 8 are joined together and are removable as a unit. The inner wall has an axial outlet opening 28 closed by a self-closing valve 29 within the space between the two walls 25, 26, said valve having an outwardly-extending tube 30 which surrounds the inner end of a tube 31 retained centrally within an outlet tube 32 formed on the outer wall 25 of the double head 8. The tube 31 is somewhat smaller than the outlet tube 32 and is retained centrally within said outlet tube by means of radial centering wings 33 extending therefrom and soldered or otherwise fastened to the inner surface of the outlet tube 32. Thus the tube 31 is held centrally against movement within the tube 32, and the wings 33 form four segmental air-outlets 34.

Within the tubes 30 and 31 is a spiral spring 35, one end of which bears against the valve 29 and the other end against a valve 36 which normally closes a liquid inlet-opening 37 in the outer end of the tube 31. The valve 29 is also provided with an axial opening 38, for a purpose to appear hereinafter.

Within the casing formed by the cylindrical wall 6 and the double heads 7 and 8, absorbent cotton or other absorbent material 39 is placed, said absorbent material being packed against the cylindrical wall and the inner wall 10 of the double head 7 by a follower 40, said follower being in the form of a flat disk having a cylindrical flange 41 to which a felt or leather packing 42 is secured, which bears against the inner surface of the cylindrical wall 6.

The follower 40 is provided with perforations 43 stamped therefrom to provide prongs 44, said prongs extending toward the wall or part 10, which is similarly perforated, and the prongs of this wall and those of the follower lie in firm contact with the absorbent material 39. The follower 40 is pressed toward the inlet end of the device by means of a spiral spring 45 which bears with one end against the inner wall 26 of the double head 8 at the outlet end of the device, and with its other end against the follower, said spring serving to compress the absorbent material which may be saturated with a suitable liquid disinfectant, sterilizer, or deodorant; or lump material, such as camphor balls or the like, may be substituted for the absorbent material, in which case the lump material will be held in packed condition between the follower and the inner wall of the double head 7, and while being consumed so as to occupy smaller space, the packed condition thereof will be maintained, due to the follower being crowded toward said inner wall by the spring 45.

Air under pressure is forced into the inlet tube 14, causing the valve 17 to rise and assume a position approximating that shown in dotted lines in Fig. 1. The air thus enters the hollow interior of the double head 7 and is forced through the perforations 20 of the inner part or wall 19. The air then passes through the absorbent material, being humidified by taking up a quantity of the absorbed liquid disinfectant. This humidified, or disinfected, or otherwise chemically treated air escapes through the perforations 43 in the follower 40 and the pressure created to open the inlet valve 17 will also serve to open the outlet valve 29, thus allowing the so treated air to enter the hollow interior of the outlet head 8, from whence it escapes through the four segmental shaped passages 34 in the outlet tube 32, the so treated air being directed

against clothing or other articles, or into a room to disinfect, sterilize, or deodorize the same.

When bulk material is used within the casing for disinfecting, sterilizing, or deodorizing the air, the latter becomes saturated therewith and passes out of the casing in the manner described; the material, although gradually consumed, retains a packed condition within the casing by reason of the spring-pressed follower 40 keeping the material pressed against the inlet head 7.

When absorbent material is used within the casing to be saturated with liquid sterilizer disinfectant, or deodorant, it is simply necessary to depress the valve 36 and then pour liquid substance into the axially-disposed tube 31 through the liquid substance inlet opening 37, the liquid passing through said tube and entering the telescoping tube 30 of the valve 29, from which last-mentioned tube it passes through the axial opening 38 in said valve and enters the casing. This liquid finally passes through the perforations 43 in the follower and becomes absorbed by the absorbent material 39 within the casing.

When bulk material, such as camphor balls or the like, are used, it will be necessary to remove the outlet head of the casing by detaching the clamping ring 23 therefrom, after which the spring 45 and the follower 40 must be removed from the casing. This leaves the casing open its full width at the outlet end so that the desired quantity of bulk material can be placed therein, after which the parts are re-assembled and retained in place by the clamping ring 23.

A device of this kind can be placed within a bath room and a fan connected therewith so that a constant current of air will be passed through the device while the fan is in operation, which may be conveniently accomplished by connecting an electric motor with the fan.

In Fig. 4 I have shown a slightly modified form of outlet head; and in this modification the outlet tube 32 shown in Figs. 1 and 2 is dispensed with and in lieu thereof the outer concavo-convex wall 25 of the double head 8 is provided with numerous perforations 46 through which the air forced into the hollow interior of the double head escapes. In other respects the device may be constructed as described with reference to Figs. 1 and 3, with the exception that the tube 31 extends inwardly directly from the outer wall 25.

In Fig. 5 I have shown a still further modified form of my invention, and in this instance the inner wall 26 of the double head 8 is shown separate from the outer wall, said inner wall having an obliquely-

disposed flange 47 at its marginal portion and the wall itself bears against the spirally grooved or threaded outlet end of the casing 6. The outer wall is provided with an integral circumferential flange 48, which is spirally grooved or threaded to conform to the spirally grooved or threaded outlet end of the casing 6 and adapted to be threaded thereon. In this instance the outer wall is provided with perforations 46, as described with reference to Fig. 4, and it is adapted to bear against the obliquely-disposed flange 47 and clamp the inner wall against the outer end of the casing 6, as at 49.

In the modifications, as well as in the preferred construction shown in Figs. 1 to 3, the inner wall 10 or the inlet head by reason of its concavo-convex formation provides an annular trough 50 at the inlet end of the casing which, when the device is used in the position shown in the drawings, will retain any surplus liquid not absorbed by the absorbent material within the casing; and as the liquid becomes gradually consumed, the surplus liquid shown at 50 will be absorbed by the absorbent material. Since the perforations 20 in the inner wall 10 are arranged in the central portion of said wall, there is no possibility of leakage of the liquid into the valve chamber formed between the inner wall 10 and the outer wall 9 of the double head at the inlet end of the casing.

While I have illustrated and described the casing as being cylindrical, it is of course to be understood that it may be given any other cross sectional formation, and I desire it to be understood that while the double heads formed, for instance by the walls 25 and 26, or by the walls 9 and 10, are highly desirable, owing to the convenience in disassembling the parts of the device and for other apparent reasons, the inner wall of each head, in its broader sense merely serves as a transverse wall spaced from the outer wall to form a valve chamber which, in the embodiments shown and described, enable the valve chambers and the valves thereof to be removed from the cylindrical wall when removing the outer wall of the double head therefrom. It is, however, apparent that this may be otherwise arranged without departing from the spirit of my invention, even though less convenient in assembling the parts.

Where in the claims the term "pharmaceutical substance" is used, it is intended to mean any sterilizing, disinfectant or deodorizing agent whether in liquid, powder, granular or lump form, or absorbent material saturated with such substance, and where the term "pharmaceutical liquid substance" is employed, it is intended to mean any liquid having the qualities of disin-

fecting, sterilizing, or deodorizing the air or any objects with which the air passing through the device is brought in contact with.

Having thus described my invention, 70 what I claim is:—

1. An air purifier, comprising a casing having a self-closing inlet valve normally closed, a self-closing outlet valve normally closed, a pharmaceutical substance within 75 the casing, and means within the casing to retain said substance in packed condition within the casing.

2. An air purifier, comprising a casing, an inwardly-opening self-closing inlet 80 valve within said casing, an outwardly-opening self-closing outlet valve within said casing, and a spring-pressed follower within said casing adapted to retain a pharmaceutical substance at one end of said casing. 85

3. An air purifier, comprising a casing, an inwardly-opening self-closing inlet valve at one end of said casing, an outwardly-opening self-closing outlet valve at the other end of said casing, a follower within 90 said casing adapted to pack a pharmaceutical substance against the inlet end of said casing, and a spring between said follower and the outlet end of said casing.

4. An air purifier, comprising a casing 95 having an inlet head at one end, an outlet head at the other end, a wall spaced from said inlet head, a self-closing valve between said inlet head and said wall, a wall spaced from said outlet head, a self-closing outlet 100 valve between said outlet head and said last-mentioned wall, a follower between said walls and between which and one of said walls a pharmaceutical substance is confined, and a spiral spring between said fol- 105 lower and the other wall.

5. An air purifier, comprising a casing, an inlet head at one end thereof and an outlet head at the other end thereof, said inlet head having an inlet opening and said outlet 110 head having an outlet opening, a perforated wall spaced from said inlet head, a spring-pressed valve closing the inlet opening of said inlet head and guided from said perforated wall, a wall spaced from said outlet 115 head having an outlet opening, a spring-pressed valve closing said outlet opening and guided for movement from said outlet head, a perforated follower within said casing between which and said perforated wall a pharmaceutical substance is packed, and a spring 120 between said follower and the wall spaced from said outlet head.

6. An air purifier, comprising a casing having an inlet head equipped with an in- 125 let opening, an outlet head equipped with an outlet opening and a guide tube disposed axially within said outlet opening, an inwardly-opening valve normally closing said inlet opening, a wall spaced from said 130

outlet head having an axial outlet opening therein, an outwardly closing valve normally closing the outlet opening of said wall and having a tube telescoped over the tube with-

5 in the outlet opening of said outlet head, and a spiral spring within said last mentioned tube and the tube of said valve and adapted to retain said outwardly-closing valve in closed condition.

10 7. An air purifier, comprising a casing having an outlet head provided with an outlet opening and an inlet head provided with an inlet opening, a transverse wall within the inlet end of said casing spaced from said

15 inlet head and having an axial tube extending outwardly from said transverse wall, a valve closing the inlet opening of said inlet head and provided with an axial tube telescoped over the tube of said transverse wall, and a spiral spring within said tubes and bearing with one end against said transverse wall and with its other end against said valve.

20 8. An air purifier, comprising a casing having a cylindrical wall, a double inlet head having a concavo-convex inner wall and a concavo-convex outer wall in opposed relation to provide a hollow interior for said head, said inner wall having an axial tube

30 extending toward said outer wall and said outer wall having an axial inlet opening, a valve within the hollow exterior of said head closing said inlet opening and provided with an axial tube telescoped over the tube of said inner wall, a spiral spring with said tubes and bearing with one end against said inner wall and with its other end against said valve, an outlet head removably applied to the outlet end of said cylindrical wall, an

40 outlet valve for said outlet head, a perforated follower surrounded by said cylindrical wall, absorbent material packed between said perforated follower and the inner wall of said inlet head, and a spiral

45 spring between said perforated follower and said outlet head.

9. An air purifier, comprising a casing having a cylindrical wall, a hollow inlet head formed of a perforated concavo-convex

50 inner wall provided with a flat rim and a concavo-convex outer wall reversed from said inner wall and provided with a flat outer rim and a circumferential flange fitted onto the inlet end of said cylindrical wall, an inlet valve within said hollow head, an outlet head removably applied to the opposite end of said cylindrical wall, a follower within said casing between which and the perforated inner wall of said inlet head a

55 pharmaceutical substance is packed, and a spiral spring between said follower and said outlet head.

10. An air purifier, comprising a casing having a cylindrical wall, an inlet head, an

60 inlet valve at said inlet head, an outlet head

having a concavo-convex outer wall and a concavo-convex inner wall opposed to said outer wall and provided with an axial outlet opening, said inner wall having a flat marginal rim and said outer wall having an

70 outlet opening and an axial tube and having its marginal portion bent around the flat rim of said inner wall, a clamping ring for removably retaining said outlet head on said cylindrical wall, a valve within said outlet head normally closing said outlet opening and having a tube telescoped over said first-mentioned tube, and a spiral spring within said tubes exerting force against said valve to maintain the same in closed position.

11. An air purifier, comprising a casing having an inlet valve at one end, a head at its other end provided with an axial outlet tube, a second and smaller tube centrally within said outlet tube and spaced from the latter by radial wings providing a plurality of separated outlet passages, a wall within the outlet end of said casing spaced from said outlet head and having an axial opening therein, a valve for closing said

80 outlet opening provided with a tube telescoped over the inner end of said second or smaller tube, and a spiral spring axially within said tubes exerting force against said valve to maintain the same in closed position.

12. An air purifier, comprising a casing having a cylindrical wall, an inlet head provided with an inwardly opening valve and secured to the inlet end of said cylindrical wall, an outlet head formed of two concavo-convex members having their concaved surfaces opposed one to the other and being marginally connected together, the marginal portion of said head bearing against the

100 outlet end of said cylindrical wall, a clamping ring threaded onto the outlet end of said cylindrical wall and having an inwardly-directed flange bearing against the marginal portion of said outlet head, the outer concavo-convex member of said outlet head having an axially disposed outlet tube, a second or smaller tube positioned within said outlet tube and having a liquid inlet at its outer end and a valve therein for closing said liquid inlet, the concavo-convex inner member of said outlet head having an axial outlet opening, a valve closing said opening and having an axial opening therein and an outwardly extending tube telescoped over the inner end of said second or smaller tube, and a spiral spring between the valve within said second or smaller tube and the outlet valve of said inner member and adapted to keep both valves in closed

110 position.

13. An air purifier, comprising a casing having a cylindrical wall threaded at one end, an inlet head at the other end provided with an inlet valve, an outlet head at the

125 130

threaded end of said cylindrical wall, a transverse wall within the outlet end of said cylindrical wall spaced from said outlet head, a tube carried by said outlet head and disposed axially thereon, said tube having a liquid inlet at its outer end and a valve therein for closing said liquid inlet, said transverse wall having an axial inlet opening, a clamping ring threaded onto the threaded outlet end of said cylindrical wall and holding said outlet head and the transverse wall spaced therefrom against the outlet end of said cylindrical wall, a valve closing the outlet opening of said transverse wall and having an opening therein and a tube extending outwardly and telescoped over the inner end of the axially disposed tube carried by said outlet head, and a spiral spring within said tubes for holding both valves normally closed.

14. An air purifier, comprising a casing having double inlet and outlet heads, an inwardly-opening valve in said inlet head, an outwardly-opening valve in said outlet

head, means permitting the introduction of a pharmaceutical liquid substance through said outlet head and said outwardly-opening valve, a follower within said casing, absorbent material between said follower and said inlet head adapted to be saturated with said liquid substance, and a spiral spring between said follower and said outlet head.

15. An air purifier, comprising a casing having an inlet head at its lower end and an annular trough within said casing at its lower end, an outlet head at its upper end, a spring-pressed follower between its heads, and absorbent material between the follower and the head at the lower end of the casing adapted to be saturated with a pharmaceutical liquid substance, said annular trough being adapted to receive any surplus liquid substance not absorbed by said absorbent material.

In testimony whereof I affix my signature.

JOHN DELLINGER.