April 22, 1941. W. H. GREENFIELD 2,239,038

CONDITIONER FOR CIRCULATING FLUID

Filed Oct. 29, 1938

Fig. 1.

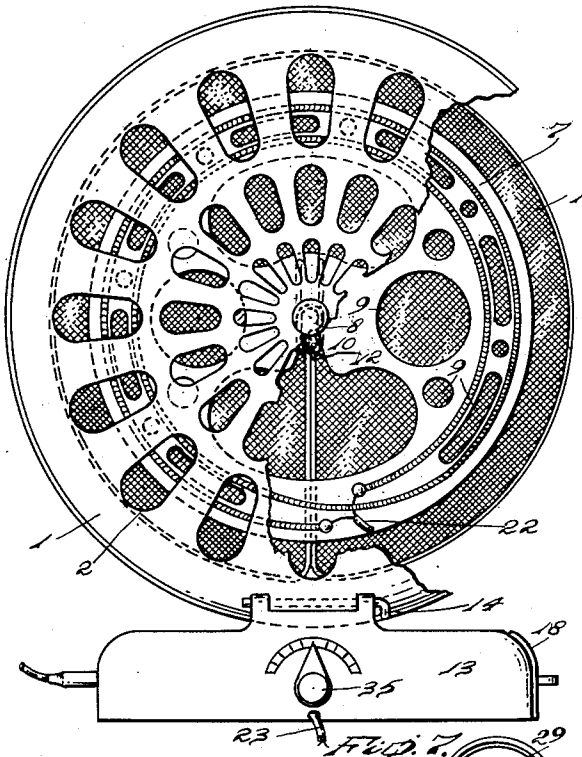


Fig. 2.

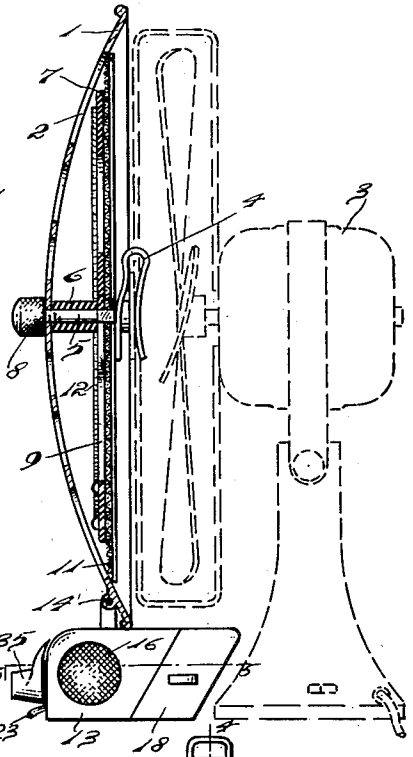


Fig. 7.

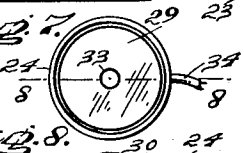


Fig. 3.

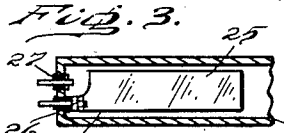


Fig. 8.

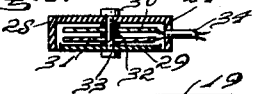


Fig. 4.

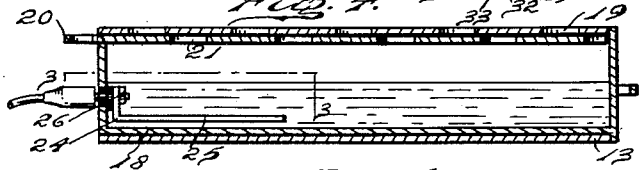


Fig. 5.

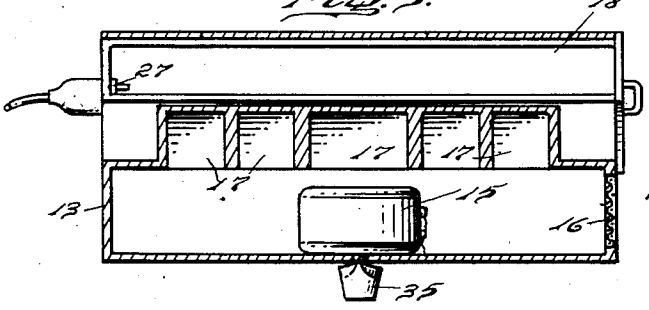
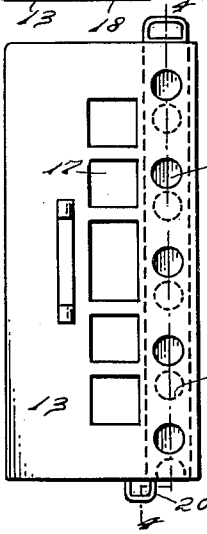


Fig. 6.



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CONDITIONER FOR CIRCULATING FLUID

William H. Greenfield, Philadelphia, Pa.

Application October 29, 1938, Serial No. 237,600

6 Claims. (Cl. 219—39)

The object of this invention is to devise a novel conditioner for circulating fluid.

A further object of the invention is to devise a conditioner which may be used as a heater, a cooler, an ozonizer, humidifier, filter and many of such uses may be combined in the same device.

A further object of the invention is to devise a novel device having the foregoing characteristics which can be disposed in the path of an air current or attached to the current creating means and readily and quickly detached therefrom without the use of tools.

In one embodiment of the invention as herein disclosed, it is in the form of a device having graduated openings, attachable to and detachable from a fan, and which breaks up the current of air in such a manner that a draftless air circulation is provided.

The device may have an electric or other type of heating unit embodied in it to effect the heating of the circulating air. It may also have embodied in it means for receiving ice, or dry ice to effect the cooling of the circulating air. It may also have an ozonizer embodied in it to effect the sterilization of the circulating air.

It may also have means to humidify the circulating air.

It may also have embodied in it, means to filter and collect foreign impurities in the circulating air.

With the above and other objects in view as will hereinafter clearly appear, my invention comprehends a novel conditioner for circulating fluid.

Other novel features of construction and advantage will hereinafter more clearly appear in the detailed description and the appended claims.

For the purpose of illustrating the invention, I have shown in the accompanying drawing typical embodiments of it, which, in practice, will give satisfactory and reliable results. It is, however, to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and my invention is not limited to the exact arrangement and organization of these instrumentalities as herein set forth.

Figure 1 is a front elevation, partly broken away, of an air conditioner embodying my invention.

Figure 2 is a side elevation, partly in section.

Figure 3 is a section on line 3—3 of Figure 4.

Figure 4 is a section on line 4—4 of Figure 6.

Figure 5 is a section on line 5—5 of Figure 2.

Figure 6 is a top plan view of the casing in detached position.

Figure 7 is a plan view of a portable vaporizing unit.

Figure 8 is a section on line 8—8 of Figure 7.

Similar numerals indicate corresponding parts.

Referring to the drawing:

In its simplest form my invention comprises an upright member 1, preferably in the form of a disc or with its rear wall curved or recessed, and having openings 2, graduated in size between its central and outer marginal portions throughout the area of the disc.

The member is positionable in the path of an air current such as for example that created by an electric fan 3, and may if desired, be provided with securing means 4 of a type which will enable one to quickly attach it to or detach it from the fan without the use of a screw driver, wrench or other working tool. A threaded bolt 5 passes through the central unapertured portion of the disc and carries an insulating sleeve 6 against which an electric heating unit 7 is positioned. The bolt 5 has a nut 8. The heating unit is provided with openings 9 and has a slot 10 extending from its central portion to one of the openings, so that the heating unit can be quickly secured in position or detached from the bolt. The bolt also carries a filter 11 of asbestos cloth or similar heat resisting material, and this filter is quickly attachable or detachable from the bolt in the same manner as the heating unit due to the provision of an opening 12 near its center. The filter is preferably of greater diameter than that of the heating unit, and is stiffened at its marginal portion by a metal or other type of reinforcements.

The securing means 4 for suporting the air conditioner unit on a fan may be of any desired type, quickly attachable to and detachable from the fan housing or its guard. As illustrated, the securing means is in the form of a wire bent to U shape formation to be fixed to the bolt 5, and having its free ends deflected to form a spring hook which can have a slip connection on the central portion of the fan guard. The air conditioner unit as above described may be used either with or without the heating unit, and either with or without the filter.

The member 1 has an ozonizer and a container removably connected with it. The casing 13 is secured to the member 1 by a removable rod 14 and has built in it an ozonizer 15 having an air inlet 16 and a desired number of outlets 17. The ozonizer is provided with a control 35 which can be set to operate at any desired point within the range for which the ozonizer is built.

The casing 13 has a container 18 in the form of a pan slidably mounted in it, and above the container the casing has openings 19 which are controlled by a slide valve 20 having openings 21 which can be brought into or out of registry with the openings 19. This container 18 is adapted to receive a liquid for humidifying the air stream and may contain medicinal preparations. The container 18 is also adapted to receive artificial, natural or dry ice to enable one to cool the air being distributed by the air circulating means.

A conductor 22 from the heating unit is provided with a conventional electric plug, and a conductor 23 from the ozonizer is provided with a conventional plug.

In some cases it is desirable to vaporize the liquid in the container 18, especially if a medicinal preparation is used in such liquid. For this purpose, an electric vaporizing unit 24 may be used and such unit may be fixed or removable.

If such vaporizing unit is to be fixed and permanent, a metal plate 25, spaced from the bottom of the container 18, is fixed to an electrode 26 insulated from the wall of the container, while the other electrode 27 is electrically connected with the wall of the container so that the liquid forms the electric connection between the plate and the electrode 27. The electrodes are connectible with a source of electric supply.

In the form shown of the vaporizer in Figures 7 and 8, the electric vaporizing unit 24 is removable, and consists of a flanged insulating member 28, an insulating disc 29, two conducting plates 30 and 31, spaced by insulating washers 32, and assembled by a fastening device 33. The plates 30 and 31 are electrically connected with a conductor 34 connectible with a source of electric supply. When the liquid between the plates evaporates, the electric circuit is automatically opened. The conducting plates 30 and 31 are concealed by the annular flange of the insulating member 28 and the insulating disc 29 is of less diameter than that of such annular flange.

If the air conditioner, in the form of a disc with the graduated openings, is placed in a current of air, a portion of such current will pass through the openings 2 to form a muitiplicity of air currents, and the portion of the air current which does not pass through the openings 2 will be deflected by the rear curved face of the disc and will pass outwardly at the sides of the disc without producing a draft.

If the filter is present, the air will be filtered as is apparent.

If the electric heating unit is present and connected with a source of electric supply, heated air will be circulated without producing a draft.

If the ozonizer is connected with a source of electric supply, the ozone passing from the ozonizer will be entrained in the current of air from the air circulating means to sterilize the air.

If it is desired to humidify the air being circulated, water is placed in the container 18 and is entrained through openings 19 with the current of air.

If the air being circulated is to be cooled, natural, artificial or dry ice is placed in the container 18.

If desired, liquid in the container 18 can be vaporized by placing therein a removable electric vaporizing unit 24 as already described and connecting it with a source of electric supply.

It will be apparent from the foregoing, that I have devised a compact, portable air conditioner which can be placed in a current of circulating air, for example a fan or an open window, which will provide a draft-free circulation of air, which can be filtered, heated, cooled, sterilized or humidified as may be desired.

Provision is also made for vaporizing a medicinal preparation or any desired liquid so that it will be entrained in the circulating air current.

The air conditioning unit can be quickly attached to or detached from any type of fan or other air circulating means or can be placed in the current of air emanating from any desired source of supply.

The electric heating unit 7 has its heating element disposed around its outer marginal portion, and has openings between and inwardly of the heating element so that the heating element is not exposed directly to the air being circulated. One of the openings which merges into the slot 10 is of sufficient size to permit the heating unit being assembled over the securing means 4. The fabric of the filter may have an opening or be slit to provide for its placement on the bolt 5.

The openings in the electric heating unit are graduated to provide for the proper flow of air to the disc.

The disc is preferably in the form of a sheet metal stamping and can be advantageously formed from aluminum or its alloys so that it will be of light weight.

The casing may be of any desired contour and if desired may form a support for, or receive the air circulating means.

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

1. In a device of the character described, a perforated disc, a liquid container beneath and connected with the disc, and having an opening, an electric heater in rear of said disc and carried thereby, and securing means on said device to provide for its quick attachment to or detachment from means to create an air current.

2. In a device of the character described, an air conditioning unit comprising a member having graduated openings and positionable in an air current, an electric heating unit having a quick detachable connection with said member, a filter having a quick detachable connection with said member, and a container beneath said member having an opening through which fluid is entrained by said air current.

3. In a device of the character described, an air conditioning unit comprising a member having graduated openings and positionable in an air current, an electric heating unit having a quick detachable connection with said member, a filter having a quick detachable connection with said member, a container beneath said member having an opening through which fluid is entrained by said air current and an ozonizer having its outlet in proximity to said member.

4. In an air conditioning unit, a member having graduated openings, an electric heating unit having graduated openings supported in rear of said member, a filter in rear of said member, a humidifier carried by said member, having an outlet, and means to control the effective area of said outlet.

5. In an air conditioning unit, a member having graduated openings, an electric heating unit having graduated openings supported in rear of said member, a filter in rear of said member, a humidifier carried by said member, having an

outlet, means to control the effective area of said outlet, and means to heat liquid in said humidifier.

6. In a device of the character described, the combination with a fan, of an air conditioning unit having openings constructed and correlated to graduate air flow through them, an electric heating unit supported in rear of said openings, and a securing means for quickly attaching and detaching said unit relatively to the fan to position it in the path of the air current created by said fan.

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