June 9, 1936. S. O. BERVEN 2,043,647

HUMIDIFIER

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FIG. 4

FIG. 6

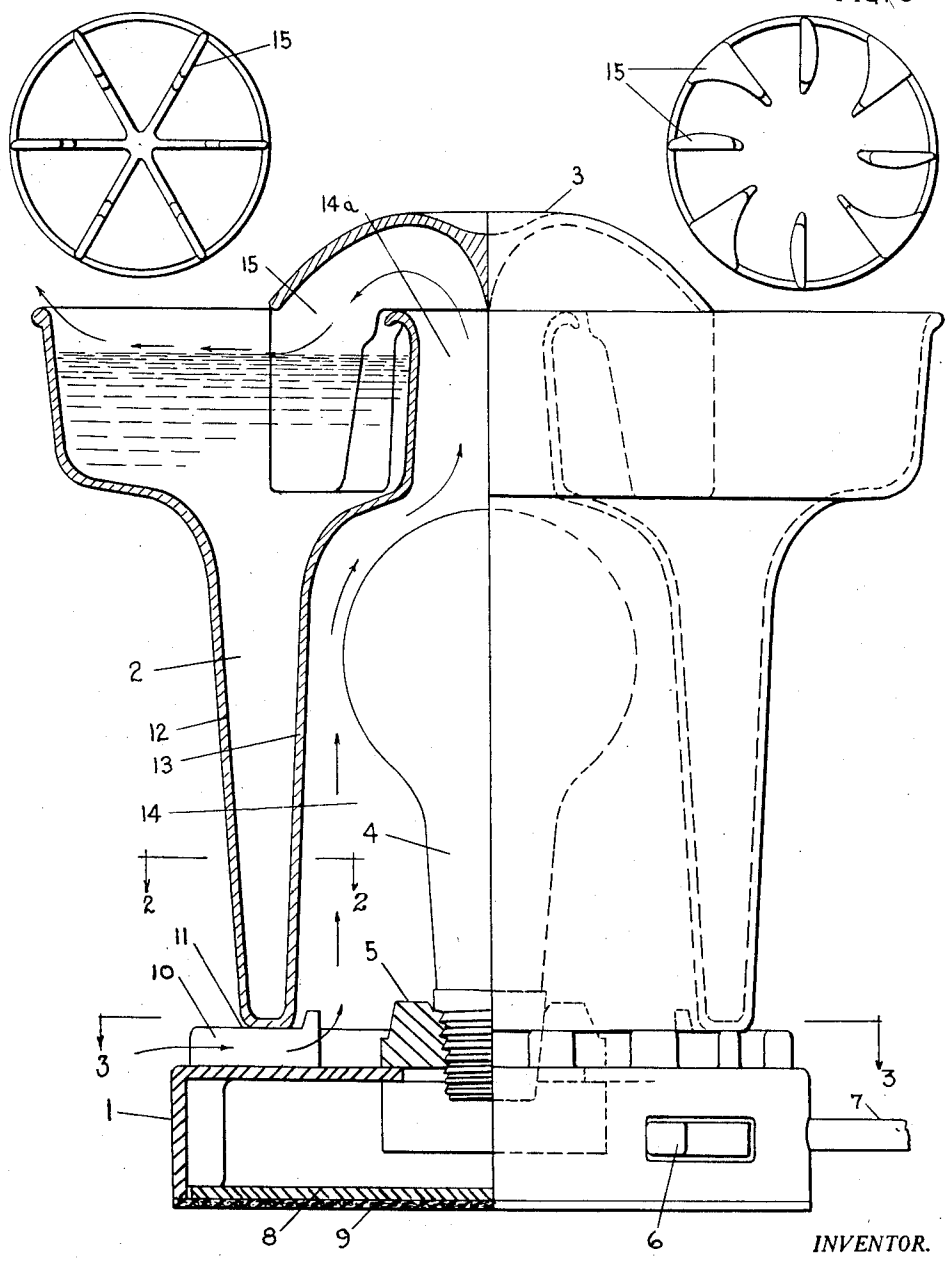


FIG. 1

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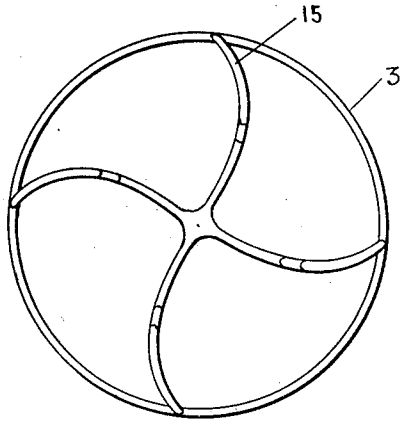


FIG. 5

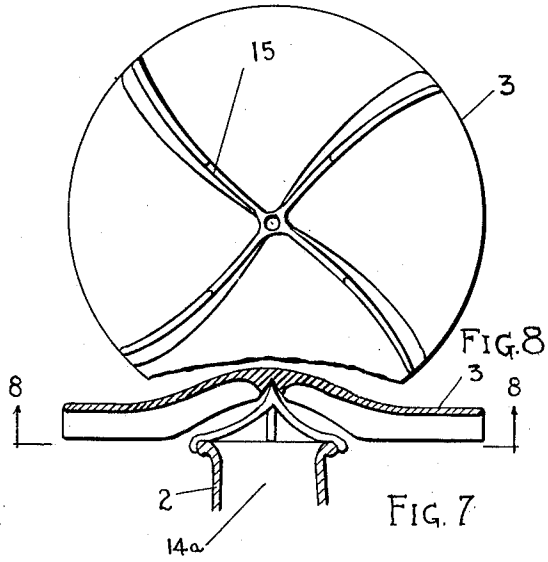


FIG. 8

FIG. 7

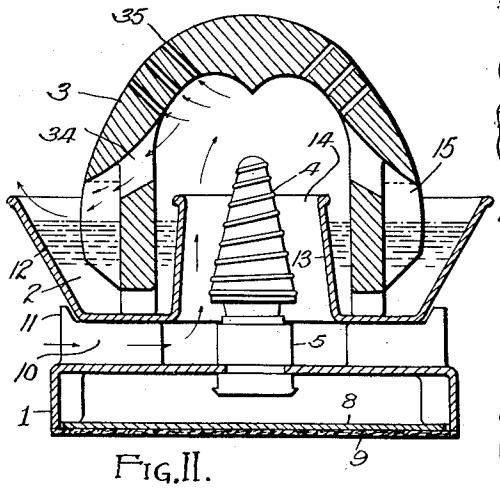


FIG. II.

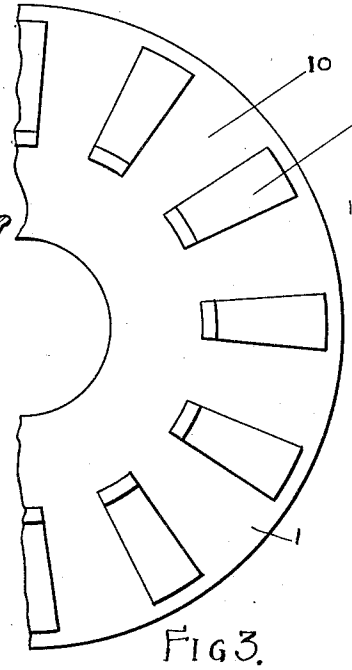


FIG 3.

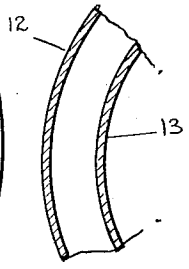


FIG. 2

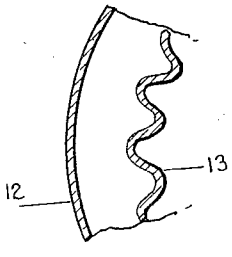


FIG. 2A

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HUMIDIFIER

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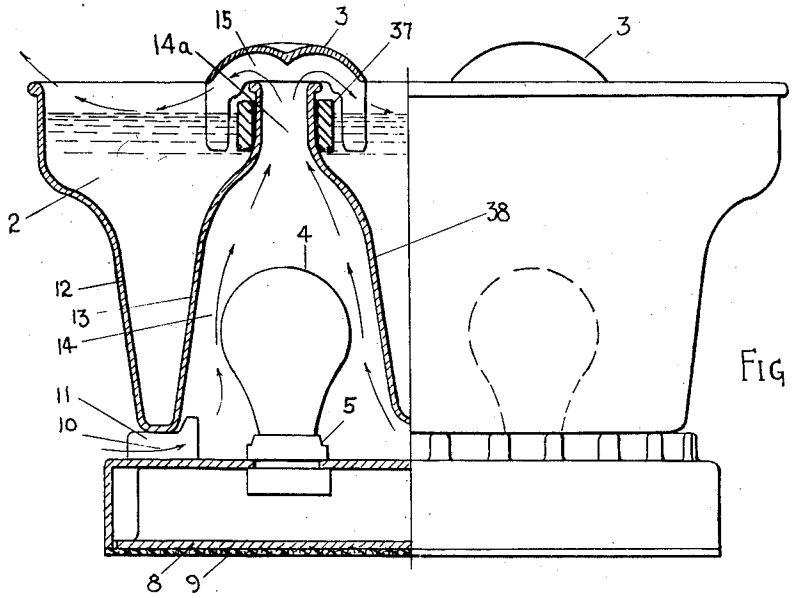


FIG. 10

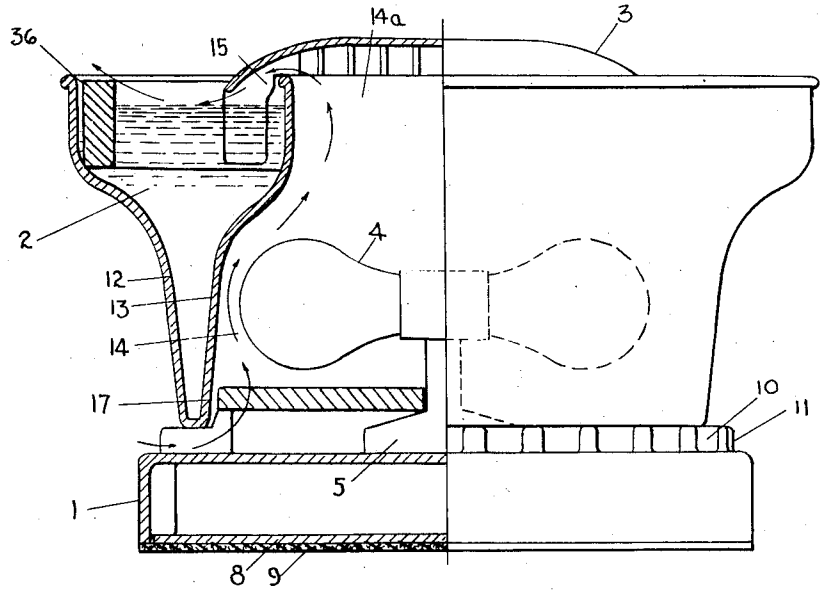


FIG 9

INVENTOR.

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HUMIDIFIER

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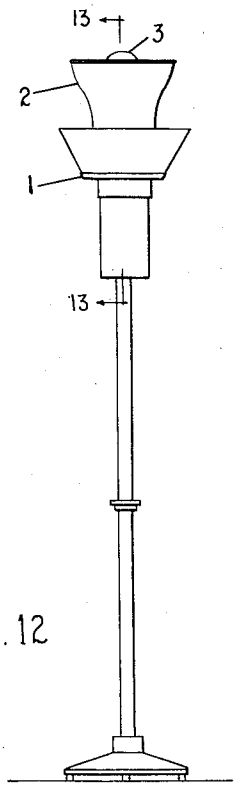


FIG. 12

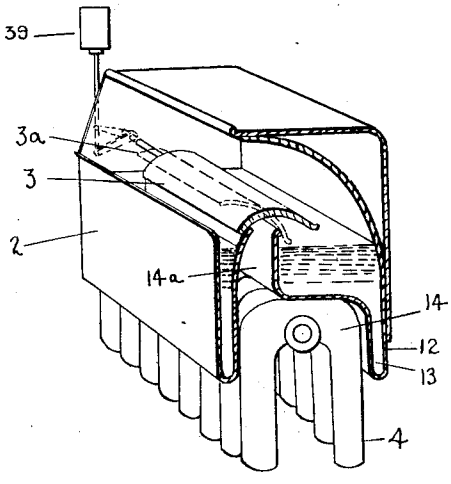


FIG. 14

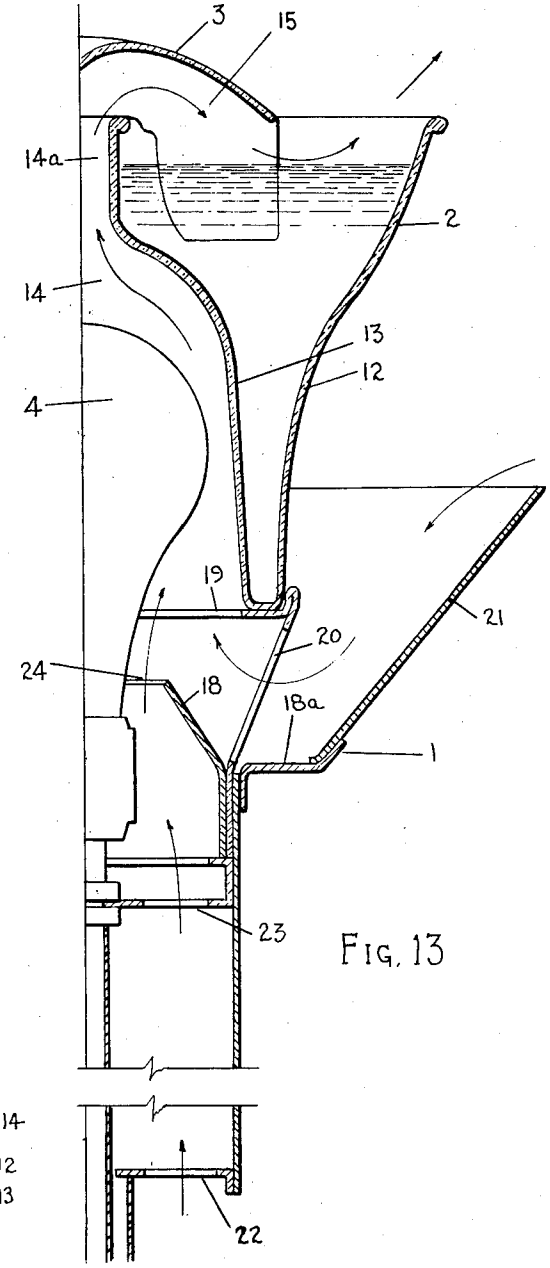


FIG. 13

INVENTOR.

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Patented June 9, 1936

2,043,647

UNITED STATES PATENT OFFICE

2,043,647

HUMIDIFIER

Sigurd O. Berven, Brooklyn, N. Y.

Application May 14, 1934, Serial No. 725,475

8 Claims. (Cl. 261—14)

It is a well known fact that if air is heated its capacity for absorbing moisture is increased and that water evaporates faster if it is heated. It is also a fact that if an air current is passed over the surface of water the rate of evaporation is increased. It is evident, therefore, that a heated air current directed over the surface of heated water will produce ideal conditions for rapid evaporation and the absorption of moisture by the air.

In my invention I have utilized all these facts to bring about the greatest possible humidification of the air in the household.

In a preferred construction, which I have illustrated in the accompanying drawings, I have further endeavored to design a humidifier that is of a pleasing design and inexpensive both in construction and in operation so that it will be within the means of a great many people that otherwise would be deprived of the healthful atmosphere of humidified air. My humidifier will make the dry winter air in a room of the most primitively built apartment pleasant and healthful.

In this preferred construction I have employed a light bulb as a heating medium thus making my humidifier also serve as a source of light. In this manner during the dark hours of the day when artificial light is essential the humidification of the air becomes only incidental and is at no expense.

In the accompanying drawings which form part of this specification

Fig. 1 is a view partly in elevation and partly in section of a humidifier of a preferred construction designed in accordance with my invention.

Fig. 2 is a section along line 2—2 of Fig. 1.

Fig. 2*a* is a fragmentary section along line 2—2 of Fig. 1 showing a modified construction of the inner wall.

Fig. 3 is a view taken along line 3—3 of Fig. 1 partly broken off showing the top of the base.

Fig. 4 is a bottom view of a construction of the deflector.

Figs. 5 and 6 are bottom views of modified constructions of the deflector.

Fig. 7 is a sectional view of a construction of the deflector.

Fig. 8 is a bottom view taken along line 8—8 of Fig. 7.

Figs. 9 and 10 are views partly in elevation and partly in section of modified constructions of the humidifier.

Fig. 11 is a sectional view of a modified construction of a humidifier.

Fig. 12 is a view of the humidifier showing a construction adapted for indirect lighting.

Fig. 13 is a half section in elevation on line 13—13 of Fig. 12.

Fig. 14 is a sectional perspective view of a humidifier adapted to be used in connection with a radiator.

In the drawings like characters have been used to designate like parts in different views:

In the drawings the numeral 1 indicates the base of the humidifier, 2 the liquid receptacle, 3 the deflector and 4 the heating element, which in Figs. 1, 9, 10, 12 and 13 are electric light bulbs, 5 a socket for the light bulb, 6 a switch regulating the current to the light bulb, 7 wires supplying current to the light bulb, 8 is a plate closing the bottom of the base and 9 is a felt cushion. 10 are apertures formed in the base by walls 11.

The receptacle 2 has a double wall: an outside wall 12, and inside wall 13 between which the liquid is contained. The walls are close together at the lower part of the receptacle so that a small amount of liquid is held in this portion and the walls in the top part of the receptacle are widened to form a basin that gives the liquid a large surface. The inner wall forms a bell shaped compartment 14 and inside this is placed the bulb 4.

When the receptacle 2 is filled with water and the current switched on, the heat from the light bulb will heat the water in the receptacle and an upward current starts in the water. The heat will also start an air current through the apertures 10 passing the heating element 4, where it will be heated and leaving through the opening 14*a* at the top of the receptacle where the air is deflected by the deflector 3 through the vanes 15 of the deflector towards the water, brushing its surface.

The surface of the water is agitated by the upward convection current in the water as well as by the air current striking this surface. This intensifies the agitation while the further friction between the air and the water atomizes it, and this atomized water is absorbed and carried away by the air together with the moisture resulting from the natural evaporation of the water.

The inside wall 13 may be smooth as indicated in Fig. 2 or corrugated to give a larger heating surface and to diffuse the light as indicated in Fig. 2*a*.

It is understood that although I have described and shown various embodiments of my invention, it is not to be construed as being

limited thereto, for various modifications in the shape, form, arrangement etc. that are obvious to those skilled in the art may be made without departing from the spirit of my invention, and all such fall within the scope of my invention. Moreover, water solutions or other liquids, may be used in lieu of water.

Thus, the shape of the receptacle illustrated in the preferred construction Fig. 1 as being cylindrical may be square, oval, polygonal etc. and the construction and shape of the base may also be varied.

The vanes **15** of the deflector **3** may be straight radially as shown in Fig. 4 or curved as shown in Fig. 5 to give the air a longer travel over the surface of the water and also to set the water in rotating motion around the center of the receptacle, or the vanes may have alternately straight and curved shapes to create more conflicting currents in the surface of the water as illustrated in Fig. 6.

Figs. 7 and 8 illustrate another variation of the deflector **3**. Here the deflector is rotatingly supported by the receptacle **2** and the vanes **15** are elongated and curved.

As the air current when leaving through the opening **14***a* is deflected over the surface of the water, it will set the deflector in motion and the vanes **15** will fan the surface of the water and intensify the evaporation.

The deflector may be made of solid dense, transparent, or translucent material or of a porous material that will draw the water to the top of the deflector where it will evaporate.

Fig. 11 illustrates a humidifier embodying my invention and having a porous deflector. In addition to air being deflected over the water's surface through the apertures **34**, air will also escape through the holes **35** and thus increase the rate of evaporation of the water drawn up in the wall of the deflector **3** by capillary action.

The receptacle **2** may also be in whole or in part of porous, dense or translucent or transparent material and the humidifier will then also serve as a lamp during the dark hours, and the water may be colored to tone the light to individual tastes. A volatile air refreshing substance may also be added to the water.

A humidifier of a construction shown in Fig. 1 has by experiment proved itself to be of a capacity large enough for an ordinary size room, but a larger unit may be built along the same lines to serve larger rooms. Fig. 9 illustrates such a humidifier where the size is increased and two or more light bulbs may be used. **17** indicates an air filter or an air purifying element. Fig. 10 shows a modification where the light bulbs are separated by a water jacketed wall **38** to give more heating surface for the water.

Fig. 12 illustrates a construction adapted to indirect lighting, the construction being shown in larger detail in Fig. 13 which is a half section taken on line **13—13** of Fig. 12. The deflector **3** and the wall **13** are in this construction both made of transparent material while the wall **12** has a reflecting inner surface. The base has light reflecting surfaces **18** and **18***a* and openings **19** and **20** and is surrounded by one or more reflectors **21**. The light rays from the light bulb will be sent to the ceiling both direct through the deflector **3** and the wall **13** and be deflected to the ceiling by the wall **12**, and the light rays will also through the openings **19** and **20** strike the reflecting surfaces **18**, **18***a* and **21** and be deflected to the ceiling.

The air will be drawn into the humidifier through the openings **22**, **23**, **24**, **20** and **19**, past the lamp **4** out through the opening **14***a* and deflected by the deflector **3** over the surface of the water.

Fig. 14 shows a construction of the humidifier suitable to be used on a radiator. The deflector **3** may in this case be adjustable to regulate the direction of the air current so that it may be deflected away from the water's surface. This position of the deflector is indicated by dotted lines **3***a*.

By connecting the deflector to a humidistat **39** this adjustment may be done automatically.

I also want to point out that various other modifications of the humidifier may be made as previously mentioned. The humidifier may be constructed to be built in or hang on the wall above or in front of a hot air register, the latter then serving as a heating element, or a humidifier with individual heating units may be built in or hung on the wall or ceiling. The heating element may be lighting units giving direct or indirect lighting.

The deflector may also be built of composite materials promoting capillary action and various capillary acting materials **36** or **37**, see Figs. 9 and 10, may be introduced in the receptacle to draw the water above its natural level to further the evaporation.

In view of the foregoing description of my invention taken in connection with the accompanying drawings it is thought that any further explanations as to the objects of the invention are unnecessary.

What I claim as new and desire to secure by Letters Patent is:

1. A humidifier having a base, a double walled container of transparent or translucent material and adapted to contain a liquid, the inner wall forming an air duct open at top and bottom, one or more light bulbs placed in or at the duct, and a deflector supported by said container and extending over the top of the duct so as to deflect the air ascending in said air duct downwards into contact with the liquid in said container to be evaporated.

2. A humidifier having a base, a double walled container of transparent or translucent material and adapted to contain a liquid, the inner wall forming an air duct open at top and bottom, one or more lightbulbs placed in or at the duct, and a deflector over the top opening of the duct, the deflector having means for guiding the air current along the surface of the liquid in the container.

3. A humidifier having a double walled container adapted to contain a liquid, its transparent or translucent inner wall forming a duct open at top and bottom, one or more lightbulbs in or at the duct, supports for the container and the lightbulbs, openings formed in the supports to direct air into the duct, and a deflector over the top of the duct to direct the air over the surface of the liquid in the container.

4. A humidifier having a double walled container adapted to contain a liquid, its walls being formed of transparent or translucent material forming a duct open at top and bottom, one or more lightbulbs in or at the duct, supports for the container and the lightbulbs, one or more reflectors around and below the container, openings formed in the supports to allow rays from the lightbulbs to strike the reflectors and other openings to admit air into the duct, and a deflector

over the top of the duct to direct the air over the surface of the liquid in the container.

5. A humidifier comprising in combination an upright double-walled open container adapted to contain a liquid and shaped to form an inner compartment open both at the top and bottom, a heating element for said compartment forming air channels with it, and a deflector provided over the open top of said compartment so as to deflect the ascending air currents downwards into contact with the liquid in said container to be evaporated.

6. A humidifier as specified in claim 5, wherein said heating element is an electric bulb, and including a base, a switch in said base for regulating the supply of current to said bulb, and a plurality of radially disposed supporting partitions on said base forming between them apertures for the admission of air to said compartment.

7. A humidifier comprising in combination an upright double-walled open container adapted to contain a liquid and shaped to form an inner compartment open both at the top and bottom, a heating element for said compartment forming air channels with it, a deflector provided over the open top of said compartment so as to deflect the ascending air currents downwards into contact with the liquid in said container to be evaporated, and a means movably supporting said deflector.

8. A humidifier as specified in claim 5, including a solid capillary element provided in the top of said container and projecting above the liquid level therein.

SIGURD O. BERVEN.