

April 17, 1934.

R. M. SHERWOOD

1,955,518

AIR WASHER AND HUMIDIFIER

Filed April 3, 1931

2 Sheets-Sheet 1

Fig. 1.

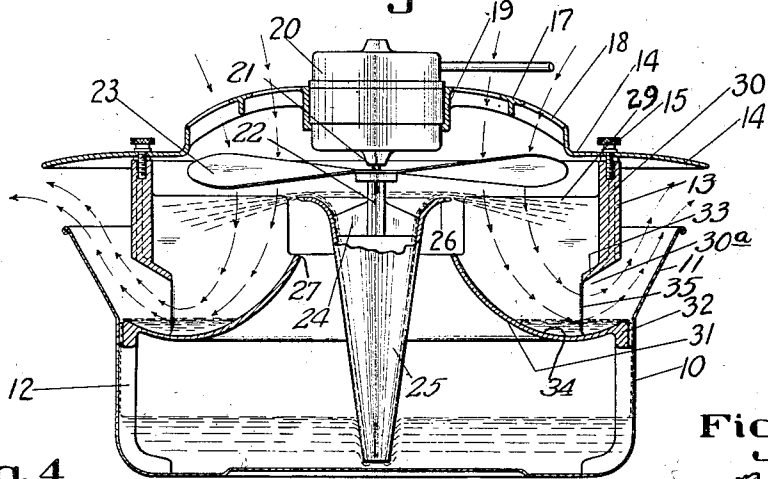


Fig. 4

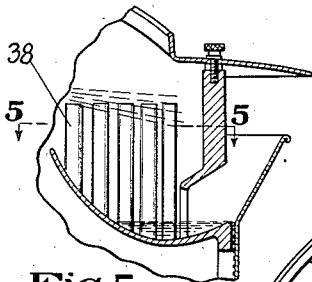


Fig. 5.

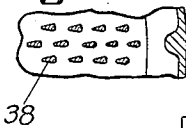


Fig. 2.

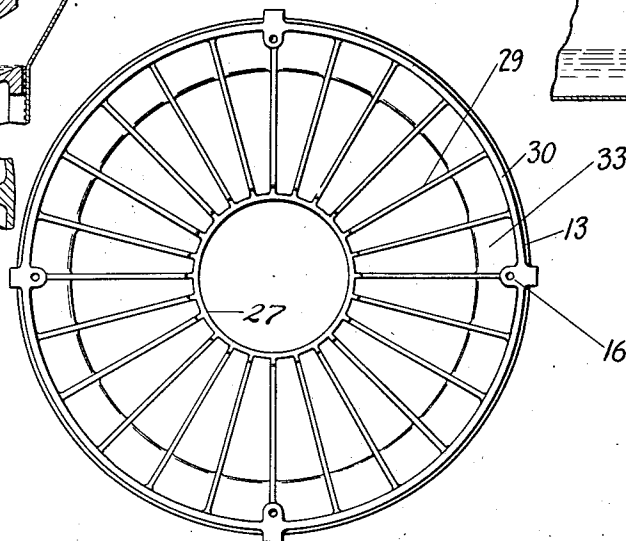
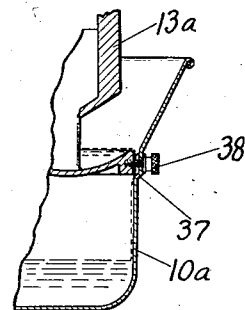


Fig. 3.



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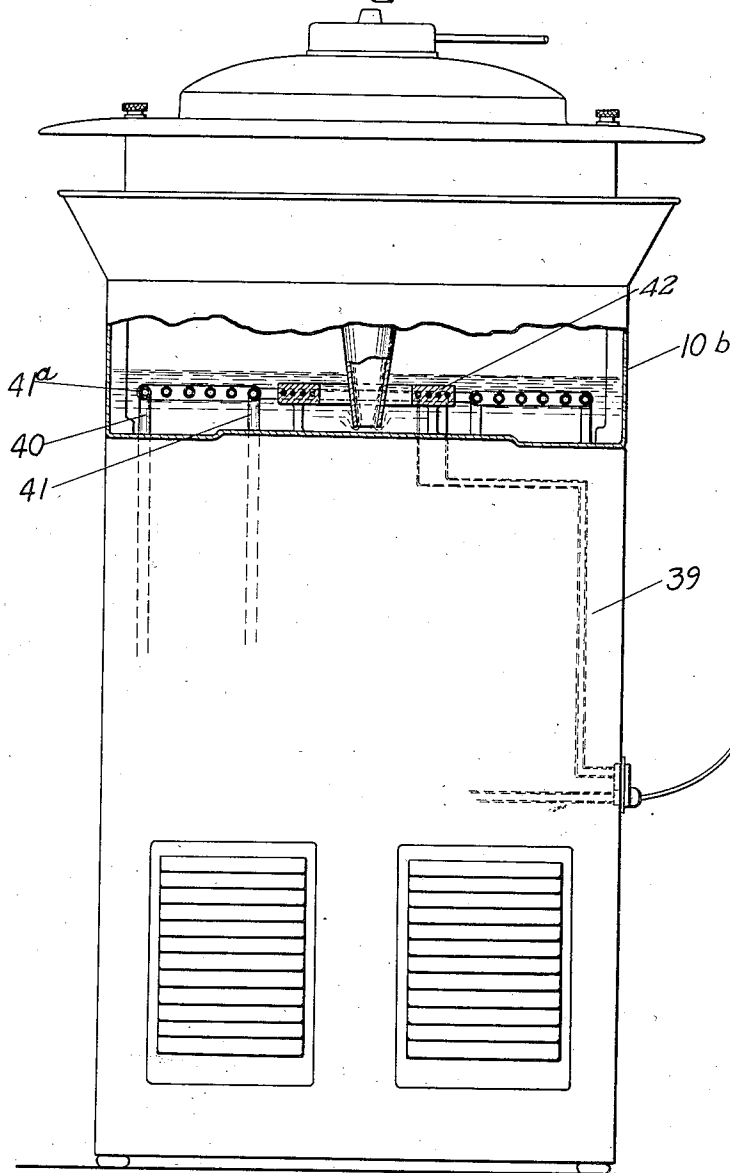
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Fig. 6.



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1,955,518

AIR WASHER AND HUMIDIFIER

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Application April 3, 1931, Serial No. 527,407

6 Claims. (Cl. 261—91)

This invention relates to air washers or humidifiers of the type which distribute moisture into the air of a room or other space in which controlled humidity is desired, and more particularly to a small portable device of this character adapted for use in residences, offices, etc.

An object of the invention is to provide an air washer and humidifier which will deliver a maximum quantity of moisture to the air, and for that purpose is provided with a plurality of surfaces to which moisture will adhere so that as the current of air passes through the device the moisture content of the air will be materially increased.

Another object of the invention is to provide an apparatus of the above character in which the air passes through one or more defined curvilinear paths containing moisture, so that not only will the air be propelled with a minimum of friction, but as discharged the air will be properly humidified.

A further object of the invention is to provide an air washer and humidifier in which the temperature of the air-conditioning liquid may be controlled as desired, rendering the apparatus usable to advantage in weather which is hot or cold.

Further objects and advantages will herein-after appear, and embodiments of the invention are shown by way of illustration, but not of limitation, on the accompanying drawings, in which:

Fig. 1 is a vertical sectional elevation of an air washer and humidifier construction in accordance with this invention;

Fig. 2 is a top plan view of a part of the cylinder shown in Fig. 1 through which the air currents are forced, and to which moisture is delivered;

Fig. 3 is a fragmentary vertical sectional view of a modified form of apparatus in which the cylinder is supported by the side walls of the receptacle;

Fig. 4 is a fragmentary vertical sectional view of a modified form in which a series of rods are employed in place of the fins;

Fig. 5 is a transverse sectional view on the line 5—5 of Fig. 4; and

Fig. 6 is a front elevation of an air washing and humidifying unit in which provision is made for the control of the temperature of the conditioning liquid.

The illustrated embodiment of the invention comprises an open top receptacle 10 for liquid

having an outwardly flared upper edge portion 11. Supported by legs 12 shaped to conform to the inner wall of the receptacle 10 is a cylinder 13, which extends above the rim of the receptacle 10. On the upper edge of the cylinder 13 is mounted a cover 14, which is secured in place by screws 15 fastened to lugs 16 on the cylinder 13. The rim 14' of the cover projects beyond the sides of the receptacle to prevent the air which has been treated from being immediately drawn back into the apparatus.

The central portion 17 of the cover 14 is dome shaped, and formed therein is a plurality of air inlet openings 18. Centrally of the dome portion 17 is an integral sleeve 19, which projects inwardly of the cover, and in which is secured an electric motor 20 having a depending spindle 21, to which is secured a stem 22 carrying a fan 23. Extending radially from the member 22 are webs 24, which are secured at their outer ends to the upper portion of a frusto-conically shaped spray former 25, which is open at both ends. The upper end of the spray former is provided with an outwardly extending flange 26, which is rotatable within a central opening 27 in the cylinder 13.

The lower end of the spray former 25 extends into the receptacle 10 and terminates adjacent the bottom thereof. Rotation of the spray former causes the liquid within the receptacle to travel up the side walls thereof and be discharged radially in spray form at the upper end. The spray from the rim or flange 26 of the spray former is forced into the path of the air currents drawn into the apparatus through the openings 18 by the fan 23.

The cylinder 13 is preferably an integral casting having the central opening 27 from which extend radially a plurality of fins or webs 29. The fins 29 are connected at their outer ends to an outer annular wall or rim 30, which has its upper edge spaced above the upper edges of the fins 29. Disposed between adjacent fins 29 are air outlets 30^a and providing a bottom surface for the cylinder 13 is a downwardly and outwardly curved or inclined surface or wall 31, which terminates in an annular flange 32 spaced outwardly a slight distance from the periphery of the rim 30. It should be noted that the upper edge of the inclined surface 31 is spaced below the upper edges of the fins 29.

It is apparent that the curved wall 32 substantially merges into the flared outer wall of the receptacle 10, although with the exception of the legs 12 a slight space is left between the outer edge of the wall 32 and the inner wall of the re-

ceptacle. In accordance with this construction a curvilinear path is provided for the passage of the air currents forced through the apparatus by the fan blades 23. Projecting downwardly and inwardly from the outer wall 13 between adjacent fins 29 are flanges 33 which direct the liquid thrown against the wall 30 by the spray former 25 downwardly into the troughs 34 formed by adjacent fins 29 and bottom wall 31. The lower portions of the fins 29 terminate at the inner end of the flanges 33 to provide a freer outlet for the air.

In operation, the air is drawn by the fan blades 23 through the openings 18, and is initially washed by the liquid spray created by the conical member 25. Some of the liquid from the spray impinges against the sides of the fins 29 and the outer wall 30, and then trickles down into the troughs 34 where pools are formed which overflow into the receptacle. The humidity of the air, which is forced over these moistened surfaces, will become materially enhanced in addition to being cleansed of impurities. The pools of water formed in the troughs 34 also serve as a liquid baffle for impinging and retaining dust and other foreign particles deposited by inertia from the passing air stream.

An important feature of the invention resides in the defined curvilinear paths which the air currents take through the apparatus. Due to this arrangement the resistance to the air travel is materially decreased so that the power required to operate the fan 23 is kept to a minimum, thereby enabling the apparatus to operate at the highest efficiency and treat a large volume of air at a low cost.

A further advantage of this construction is that it provides a series of troughs in which liquid collects, and over which the air currents are forced so that the air is not only passed through a curtain of liquid spray, and over fins and the outer wall or rim 30, but in addition, over pools of liquid which further enhance the humidity therein. In the troughs and receptacle will collect the dirt and other foreign particles washed from the air, and the parts should be occasionally cleaned. The fins and wall 30 are constantly being washed by the liquid trickling thereover, so that these parts are automatically kept clean.

As shown in Fig. 3, instead of employing legs 12 a ridge 37 may be formed in the wall of the receptacle 10^a and screws 38 are provided for detachably supporting the cylinder 13^a.

The fins 29 may be replaced by a series of vertical pins 38, which, as shown in Fig. 5, are mounted on the bottom wall 31 in staggered relation. The pins are preferably substantially wedge or stream line shaped in cross section to provide a minimum resistance to the passage of the air currents. The pins provide surfaces on which liquid collects so that the moisture content of the air passing thereover may be increased. A relatively large number of pins may be used so that the air discharged from the apparatus will be thoroughly treated.

The above described air washer and humidifying unit, as shown in Fig. 6, may be mounted on a housing 39 having a suitable refrigerating unit, from which extends an inlet refrigerant conduit 40 and outlet conduit 41 connected respectively to the ends of a spiral refrigerating coil 41^a arranged in the receptacle 10^b. The refrigerating unit may be of any well known construction, such as used in water cooling or household refrigerating units. By this means the temperature of the liquid within the receptacle 10^b may be lowered

to the desired extent so that in hot weather the apparatus will discharge air which is not only washed and treated, but cooled.

Also mounted within the receptacle 10^b is an electric heating unit 42, which enables the apparatus to be used to advantage in cold weather to emit air which is not only washed and treated, but which is also warm. Thus, it will be seen that an exceptionally simple apparatus may be employed for thoroughly treating the air within a room regardless of the season of the year, and by merely operating a suitable switch either warm or cold air may be obtained. It will also be apparent that the heating unit 42 will vaporize the liquid, and thereby materially increase the humidity of the air passing through the apparatus.

As an alternate form, the surfaces of the cylinder 13, against which the liquid impinges, may be provided with electrical heating wires embedded or otherwise associated therewith in order to heat the liquid which is thrown thereagainst in the operation of the apparatus. For example, the cylinder may be formed of some insulating material, such as bakelite, with the wires or heating elements embedded therein.

While the liquid used is preferably water, other liquids, or combinations of liquids, may be employed without departing from the scope of the invention. It is further to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention, especially as defined in the appended claims.

What I claim is:

1. An air washer and humidifier comprising a receptacle for containing a liquid, means for creating air currents toward said receptacle, means operable on the liquid in said receptacle for forming a curtain of spray in the path of the air currents, a member in said receptacle having a plurality of downwardly and outwardly curved surfaces over which the air currents pass to the outside, a plurality of vertical surfaces in the region of said curved surfaces to which liquid adheres and over which the air currents pass, a wall closing the outer side of said member except for a plurality of outlets registering with said curved surfaces, and means in said receptacle for regulating the temperature of the liquid contained therein.

2. In a humidifier, a liquid containing receptacle, means for creating a current of air flowing downwardly toward the receptacle, means to carry the liquid into the path of said air current so as to form a spray, air guiding means including a downwardly and outwardly inclined wall positioned to deflect said air current outwardly and terminating in an upwardly and outwardly inclined wall, said walls forming between them a trough adapted to collect liquid from said spray to form a pool against which said air current will impinge, a baffle wall spaced upwardly from said downwardly and outwardly inclined wall, and disposed so as to intercept outwardly moving portions of said spray and to drip the same into the trough, and a hood extending outwardly from said baffle wall and serving to deflect said air current outwardly to prevent direct recirculation thereof back into the humidifier.

3. In a humidifier, a liquid containing receptacle, means for creating a current of air flowing downwardly toward the receptacle, means to carry the liquid into the path of said air current so as to form a spray, air guiding means in-

cluding downwardly and outwardly inclined wall positioned to deflect said air current outwardly and terminating in an upwardly and outwardly inclined wall, said walls forming between them a trough adapted to collect liquid from said spray to form a pool against which said air current will impinge, a wall of said receptacle being extended sufficiently above the outer edge of the trough to guide any liquid that may overflow said trough, back into the receptacle, and being continued upwardly and outwardly to deflect the air current upwardly after passing over the trough, and a hood extending outwardly from and over said receptacle wall and serving to deflect said air current outwardly to prevent direct recirculation thereof back into the humidifier.

4. An air washer and humidifier comprising a receptacle for containing a liquid, means for creating air currents toward said receptacle, means operable on the liquid in said receptacle for forming a curtain of spray in the path of the air currents, a member in said receptacle having a plurality of downwardly and outwardly curved surfaces over which the air currents pass to the outside, a plurality of vertical surfaces in the region of said curved surfaces to which liquid adheres and over which the air currents pass,

and a wall closing the outer side of said member except for a plurality of outlets registering with said curved surfaces.

5. In a humidifier, a liquid-containing receptacle, air-guiding means spaced from the bottom of the receptacle and including a downwardly and outwardly inclined wall providing a trough adapted to collect liquid to form a pool against which air current will impinge, said pool being adapted to overflow into said receptacle, means to draw liquid upwardly from said receptacle and to form a spray in the region of said air-guiding means, and means disposed above said downwardly and outwardly inclined wall for creating a current of air through said air-guiding means.

6. In a humidifier, a liquid-containing receptacle, air-guiding means spaced from the bottom of the receptacle and including a downwardly and outwardly inclined wall providing a trough adapted to collect liquid to form a pool against which air currents will impinge, means to draw liquid upwardly from said receptacle to form a spray in the region of said air-guiding means, and means disposed above said downwardly and outwardly inclined wall for creating a current of air through said air-guiding means.

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