

Oct. 6, 1931.

A. G. DECKER

1,826,508

APPARATUS FOR HUMIDIFYING AIR

Filed May 13, 1930

2 Sheets-Sheet 1

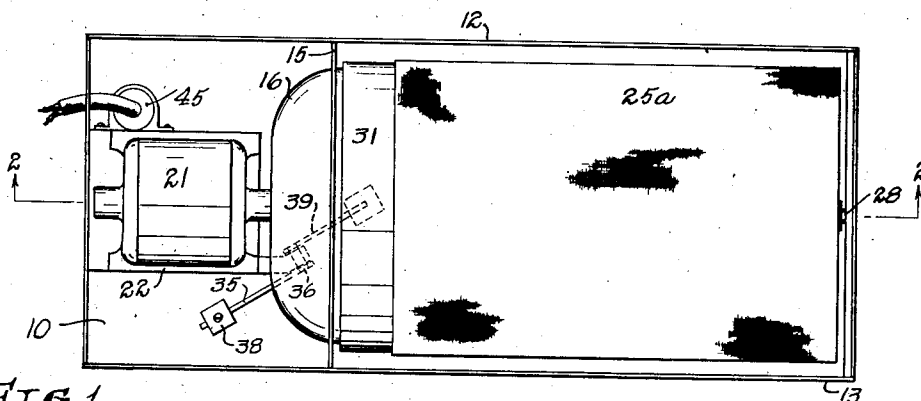


FIG. 1

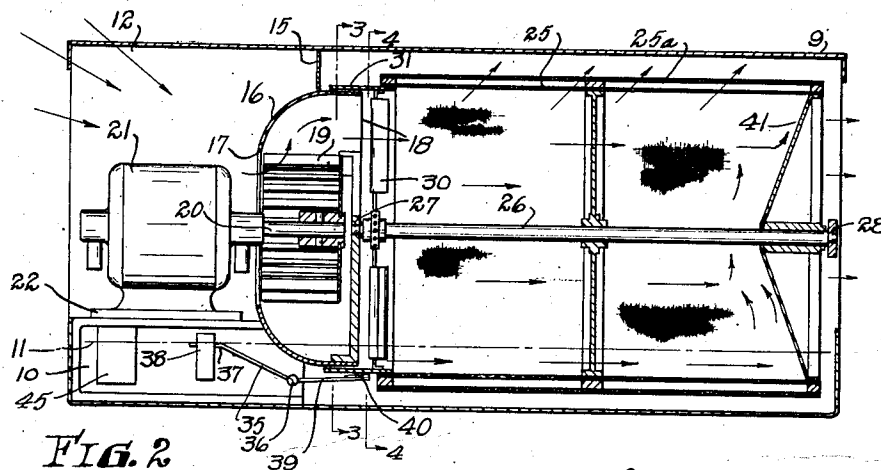


FIG. 2

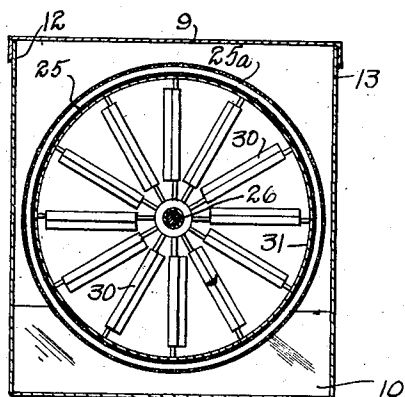


FIG. 4

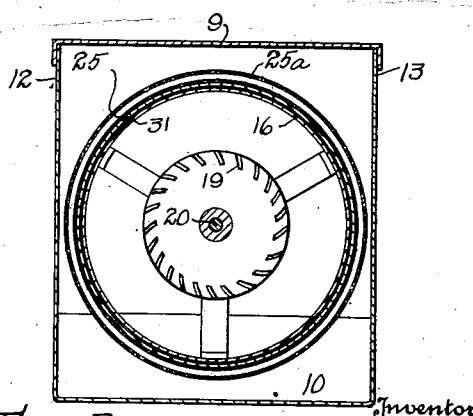


FIG. 3

Alonso G. Decker

By Bates, Dolrick & Teare
Attorneys

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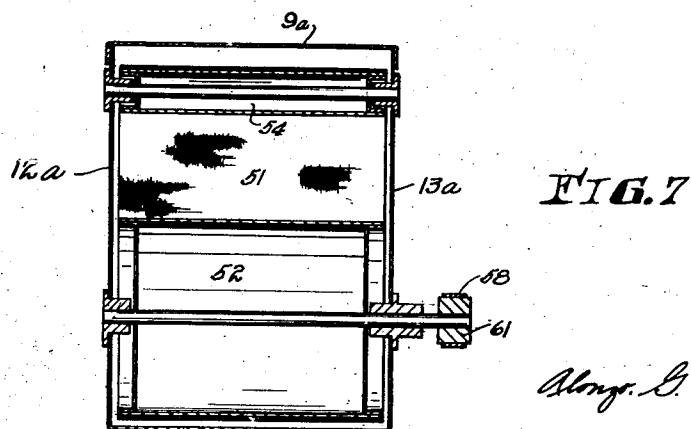
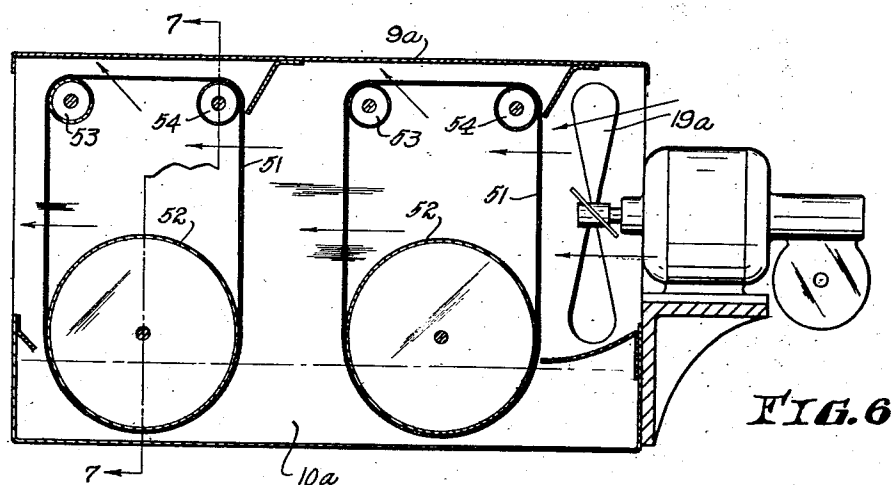
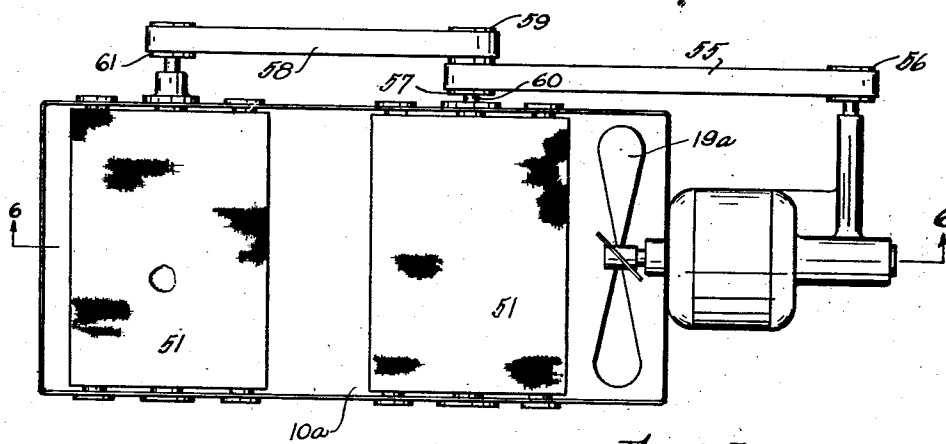
A. G. DECKER

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APPARATUS FOR HUMIDIFYING AIR

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2 Sheets-Sheet 2



Inventor

Alonge, G. Decker

34 Bates, G. & T. & Co.

Attorney

UNITED STATES PATENT OFFICE

ALONZO G. DECKER, OF TOWSON, MARYLAND, ASSIGNOR TO THE BLACK AND DECKER MANUFACTURING COMPANY, OF TOWSON, MARYLAND, A CORPORATION OF MARYLAND

APPARATUS FOR HUMIDIFYING AIR

Application filed May 13, 1930. Serial No. 452,080.

This invention relates to a method and apparatus for humidifying and cooling the air in a room or building, and is particularly adapted for use as a small portable device, which can be moved from place to place within a residence for varying the humidity in any particular room. Heretofore, efforts to vary the humidity in a residence have been confined largely to relatively large complicated apparatus, which forms an auxiliary equipment to the heating system. Such apparatus has necessarily been expensive and is not adapted for use except in connection with forced air ventilation systems.

The principal object of the present invention is to provide a method for varying the temperature and humidity in a building or in any one room thereof independently of the character of heating system utilized therein. In addition, my invention contemplates the construction of a device, which is adapted for use either as a portable unit or as a unitary part of a forced air heating system.

I carry out these objects by causing a moving current of air to flow through a moving film of water, whereby a large percentage of moisture is picked up by the air and is ejected into the room or chamber in which the unit is located. I have shown different forms of apparatus for carrying out my method and I have illustrated it in connection with a portable device, which may be made sufficiently small to rest upon a radiator cover or upon a wide window sill.

Referring to the drawings, Fig. 1 is a top plan view of a device embodying my invention; Fig. 2 is a vertical section taken on the line 2—2 in Fig. 1; Figs. 3 and 4 are sections taken on planes indicated by the correspondingly numbered lines in Fig. 2 and showing the removable cover in place; Fig. 5 is a top plan view of a modified form of my device with the cover removed; Fig. 6 is a vertical section taken on the line 6—6 in Fig. 5 and Fig. 7 is a section taken on the line 7—7 in Fig. 6.

Considering first the arrangement shown in Figs. 1 to 4, 10 indicates a reservoir in which an adequate supply of water may be maintained, the normal level of the water be-

ing indicated at 11. The reservoir is in the nature of a relatively shallow pan having side portions 12 and 13, which extend upwardly, and provide a conduit through which the air may flow. A partition 15 extends across the conduit and supports a cowl 16, which is shown as an annular cup shaped member having a relatively small circular opening 17 at one end thereof, and a relatively large circular opening 18 at the other end thereof. A blower fan 19 is disposed within the cowl and is shown as being fixed to the armature shaft 20 of an electric motor 21. The motor in turn is supported on a base 22 within the conduit and adjacent one end thereof. When the motor is in operation, the air is caused to enter the opening 17 and thence to pass through the fan and to be directed axially by the cowl through the opening 18. A removable cover 9 cooperates with the sides 12 and 13 to provide a conduit through which the air may flow. When the cover is removed, the air passes out the top and when the cover is in place, the air passes out the end of the conduit.

My method for humidifying or cooling the air contemplates an arrangement whereby the moving current of air is caused to pass through a film of water. To this end, I may utilize a cylinder 25, of woven wire fabric. The cylinder is supported on a shaft 26, which in turn is journaled at 27 and 28 on an axis, which is substantially coincident to the axis of the armature shaft, but mechanically disconnected therefrom. Thus, the cylinder is free to rotate independently of the motor actuated fan. The diameter of the cylinder is slightly less than the distance between the walls 12 and 13, as is shown in Fig. 2, and yet is so placed that it dips into the water within the reservoir.

To effect rotation of the cylinder when the fan is in operation, I may utilize a pneumatic couple by providing fan blades 30, which are shown as extending radially across the inlet end of the cylinder. Thus, as a moving current of air flows into the cylinder through the blades 30, it causes the cylinder to rotate slowly. The speed of rotation is previously determined by the shape of the blades

and the size of the parts, but I have found that satisfactory results can be obtained by utilizing a blower fan, which rotates three thousand revolutions per minute and a cylinder which rotates three revolutions per minute.

The inlet end of the cylinder is shown, as having a drum 31, which extends over the cowl and cooperates therewith to direct air into the cylinder. In addition, it provides a brake drum against which pressure may be exerted to control the speed of the cylinder. One form of apparatus for accomplishing this, comprises an arm 35 which is pivotally mounted as at 36 on a bracket within the reservoir. One end 37 of the arm carries a float 38, and the other end 39 carries a brake shoe 40, which is adapted to engage the drum. Thus, as the water level in the reservoir drops, the tendency for the speed of the cylinder to increase is counteracted by additional pressure which is exerted on the drum by the shoe.

While I have shown the cylinder, as comprising a single layer of screen, I may if desired, use a plurality of cylindrical screens, which are concentrically arranged and spaced a slight distance apart. An arrangement having two of such screens is shown at 25a in Fig. 2. To force air through the screen, I have illustrated a cone-shaped baffle 41 at the end remote from the blower fan. The outer periphery of such baffle may be utilized as a form upon which the screen may be mounted.

If desired, an electrically operated heating element 45 may be arranged to extend into the reservoir for heating the water to facilitate evaporation thereof. This will then operate effectively to increase the humidity at a faster rate.

A modification of my invention is shown in Figs. 5 to 7, wherein the reservoir is shown at 10a, the sides at 12a and 13a respectively, the cover at 9a, and the fan at 19a. In this modified form, the screen comprises endless belts 51, each of which is arranged to pass around a drum 52 and over guide sheaves 53 and 54. The drums extend below the level of the water and so a film is picked up by the belts as they pass around the drums. To operate the belts while the fan is in motion, I have shown a mechanical connection between the motor and the drums. This may take the form of a belt 55, which connects a driving pulley 56 to a driven pulley 57. The armature shaft of the motor may be suitably geared by reduction gearing to the driving pulley. Similarly, a belt 58 may be used for operatively connecting a pulley 59 on the drum shaft 60 to a pulley 61 on the drum shaft for the second drum. With this arrangement, the moisture carrying belts are caused to move transversely to the path of

air flow, and the air is caused to pick up moisture as it moves through the conduit.

From the foregoing description, it will be apparent that I have provided a method, which is applicable for use not only in connection with a small portable device that can be moved conveniently from place to place, but which is also adapted for use as a unitary part of a hot air heating system. As applied to a portable device, the apparatus possesses advantages of simplicity coupled with lightness in weight, and a high degree of operating efficiency.

Having thus described my invention, I claim:

1. A device of the character described, comprising in combination, a reservoir having water therein, a motor driven fan arranged to cause a moving current of air to flow across the water in the reservoir, means disposed in the path of the current of air and adapted to be moved through the water when the fan is in operation, and mechanism for automatically maintaining a uniform degree of movement of said means notwithstanding variations of the level of the water in the reservoir.

2. In a device of the character described, the combination with a reservoir having water therein, of a motor driven fan for causing a moving current of air to flow across the water, a hollow member rotatably mounted above the reservoir, and adapted to extend into the water therein, and to be rotated when the fan is in operation, whereby a film of water is raised from the reservoir, and float actuated means acting upon said member to maintain a substantially uniform rate of rotation thereof, consequent upon variations in the level of the water in the reservoir.

3. In a device of the character described, the combination with a reservoir having water therein, of a motor driven fan arranged to cause a moving current of air to flow across the water, a cylindrical screen mounted for rotation above the reservoir when the fan is in operation, and float actuated brake mechanism acting upon the cylinder to maintain a substantially uniform rotative speed of the cylinder consequent upon variations of the level of water in the reservoir.

4. In a device of the character described, the combination of a reservoir having water therein, a cylindrical screen rotatably mounted above the reservoir so that a portion of the screen is immersed in the water, a fan for causing a current of air to flow through the cylindrical screen, a pneumatic couple between the fan and screen adapted to rotate the screen at a predetermined speed when the fan is run at a constant speed and means to substantially maintain the predetermined speed of the screen, with the fan speed remaining constant, notwithstanding variations in the level of the water in the reservoir, said

means comprising a brake drum in fixed relation with said screen, a pivoted member, a brake shoe adapted to act against said brake drum, the brake shoe being secured to one end of said pivoted member and a float secured to the opposite end of said pivoted member, whereby, as the water in the reservoir drops, due to evaporation, the float drops with it, causing by means of the pivoted member and brake shoe a braking action upon the screen drum, equal to the amount of the resistance the evaporated water would have caused to the rotation of the cylindrical screen.

In testimony whereof, I hereunto affix my signature.

ALONZO G. DECKER.

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