June 14, 1938. R. D. DELAMERE 2,120,601

AIR CONDITIONING APPARATUS

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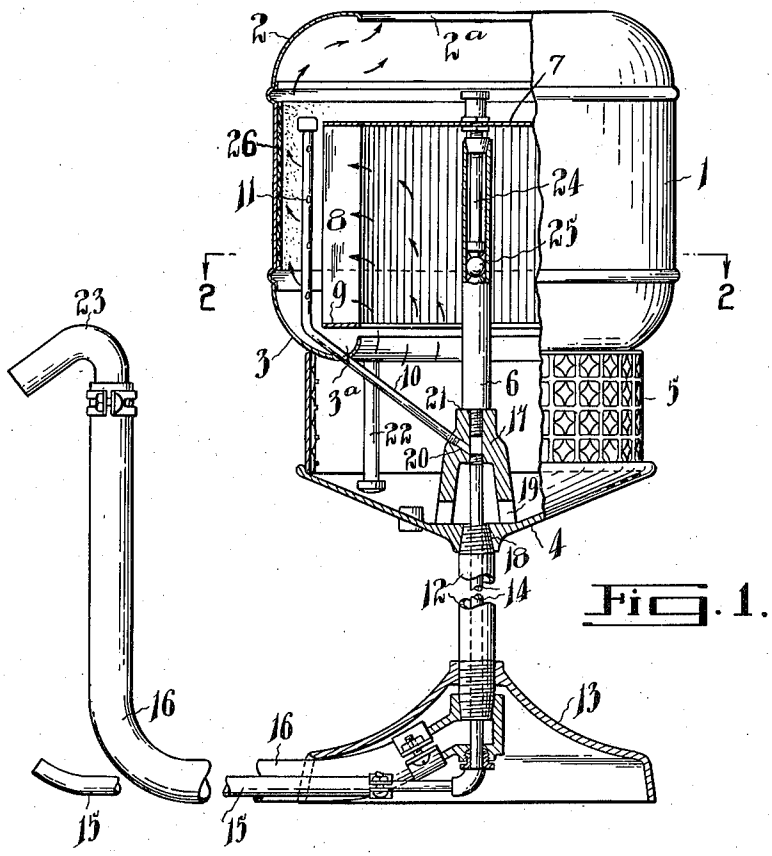


Fig. 1.

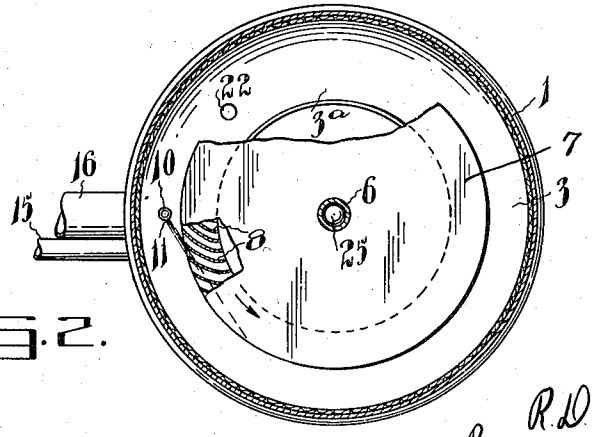


Fig. 2.

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AIR CONDITIONING APPARATUS

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5 Claims. (Cl. 261—89)

This invention relates generally to apparatus for the transfer of heat, moisture, or impurities between a liquid and a gas, and particularly to apparatus for the conditioning of air in the rooms of buildings.

Apparatus for this purpose is already known, but the object of the present invention is to devise apparatus in which the air is caused to travel over water-covered surfaces in such a way as to secure a very efficient transfer of heat or impurities from the air to the water, and a further object is to devise apparatus which may be constructed at reasonable cost, and which will be comparatively inexpensive to operate.

The objects are attained by means of the constructions hereinafter described and illustrated in the accompanying drawing in which

Fig. 1 is a side elevation, partly broken away, of the improved apparatus; and

Fig. 2 a section on the line 2—2 in Fig. 1.

In the drawing like numerals of reference indicate corresponding parts in the different figures.

The apparatus comprises a cylindrical open-ended casing 1, the upper end 2 of which is preferably slightly inwardly curved as shown, and provided with a downwardly directed lip 2^a as shown. The lower end 3 is inwardly and upwardly curved to form an annular liquid receiving recess 3^a. This casing is supported above and in spaced relation to a drip pan or drainage basin 4. The gap between the lower end of the casing and the basin 4 may be enclosed by a perforated metal or other screen 5 through the openings of which air may pass. The bottom of the liquid recess 3^a may be perforated to allow liquid to escape to the basin, although I show a drainage pipe 22. On a standard 6 extending up from the basin 4 is rotatably mounted the atomizer or spreader, which is provided with a closed head 7 from which depend an annular row of spreader blades 8, the lower ends of which are connected together by an annular band 9.

As will be seen from Fig. 2, these blades are curved or arc shaped in cross section, their inner ends being directed towards the axis of the spreader and their outer ends directed rearwardly, having reference to the direction of rotation of the spreader as indicated by arrow in Fig. 2.

10 is a water supply pipe, which is provided with outlets or nozzles 11 arranged, as shown in Fig. 2, to discharge against the rear surfaces of the spreader blades 8. While I show four such nozzles, it will be apparent that a greater or lesser number may be employed.

The basin 4 is preferably mounted on a stand comprising a hollow post 12 extending up from a base 13. Within the post 12 is positioned a water pipe 14 for supplying water to the pipe 10. The post 12 is also used as a drain pipe to carry off water from the basin 4. Suitable means are provided, such as the hose 15 for supplying water to the pipe 14, while other means, such as the hose 16 may be provided for carrying off the drainage water. The hose 16 is provided with a fitting 23 which may be hooked over the rim of a sink, basin or other receptacle.

17 is a support provided centrally of the basin 4 which is provided with an opening 18 in its bottom to receive the upper end of the post 12, drainage openings 19 in its side communicating with the basin 4, a passage 20 to one end of which the water pipe 10 is connected and to the other end of which the water pipe 14, and a threaded opening 21 in its top in which is screwed the standard 6.

To reduce friction in the rotation of the atomizer or spreader, I show the upper end of the standard 6 of tubular construction and into this extends a pin 24 depending from the head 7, the end of the pin engaging a ball bearing 25 within the standard 6.

The operation of the device is as follows. Water is supplied under pressure to the pipe 10, and escapes through the jet or jets 10, and impinges against the outer parts of the adjacent spreader blades 8. The spreader or atomizer, is, through the force of the impinging water, caused to rotate, bringing other blades into the path of the water jets. As the atomizer rotates, the blades serve to break up the water, which is caused to travel in a thin film over the entire surfaces of the blades, and eventually is thrown outwardly against the inside of the casing wall. The rotation of the atomizer causes an air circulation, the air entering the casing through its lower end passing between the blades 8 and then passing upwardly and out through the top opening of the casing. To reduce the noise of the impact of the water against the interior of the container 1, the latter is preferably lined with felt 26 or other suitable material.

It will be apparent that if the water supply be cold, the temperature of the air in the room will gradually be reduced by contact with the water, and at the same time any dust or dirt in the air will be taken up by the water and led to the drain. It will also be apparent that if the water is hot, the air will become warmed. It will also be apparent that in case the air in the room

is dry, the device may be used as a humidifier, while on the other hand, if the dew point of the air in the room is above the temperature of the water, the device will act as a dehumidifier.

It will be noted that the inwardly curved lower end 3 of the casing 1 serves a further purpose, as its inner edge is positioned to cause substantially all the inwardly travelling air to enter the space within the annular series of parallel blades, thus forcing the air to pass between the blades in order to escape from the open upper end of the casing. It will be seen that as the air treating water is used to drive the atomizer or spreader the device is very inexpensive to operate, but it will be understood that if desired the atomizer may be independently driven by other means, for example by an electric motor, and the water merely discharged against the blades of the atomizer, for the purpose of increasing the efficiency of the air and water intermingling or contact.

Though the apparatus has been devised particularly for the conditioning of air, it will be apparent that it is also useful in the treatment of other liquids or gases.

The apparatus above described is very effective in "spreading" a comparatively small amount of liquid over a large surface and in securing a very intimate air and water contact, so as to obtain very efficient results for the amount of liquid employed.

It will be understood, however, that I do not desire to restrict myself to the details of the particular construction shown. For example, in some cases it may be desirable to have the vaporizer or spreader stationary, and the water jets may be arranged to move relative to the spreader. The casing 1, in some cases may be dispensed with, as its primary purpose is to prevent the liquid under centrifugal action from being distributed over too great an area.

What I claim as my invention is:—

1. In apparatus of the character described, the combination of a casing open at its upper and lower ends; a spreader in said casing mounted for rotary movement on a vertical axis, said spreader comprising a frame having a series of blades arranged in an annular vertical series; means above said blades to direct upwardly travelling air or gas between the blades; an annular liquid collecting channel at the lower end of said casing; and means for discharging liquid against said blades as the spreader revolves; the inner edge of said channel being positioned to direct air or gas entering the casing into the space within the annular series of blades.

2. In apparatus of the character described, the combination of a casing open at its upper and lower ends; a spreader in said casing mounted for rotary movement on a vertical axis, said spreader comprising an imperforate header having a series of blades depending therefrom and arranged in an annular vertical series about a central air or gas space; means for discharging liquid against said blades from without the blades; and an annular flange on said casing below the blades adapted to direct air or gas into the central space within the series of blades.

3. In apparatus of the character described, the combination of a casing open at its upper and lower ends; a spreader in said casing mounted for rotary movement on a vertical axis, said spreader comprising an imperforate header having a series of blades depending therefrom and arranged in an annular vertical series about a central air or gas space; means for discharging liquid against said blades from without the blades; and an annular flange on said casing below the blades adapted to direct air or gas into the central space within the series of blades, said casing having an inner liner of sound absorbing material opposite the sides of the spreader.

4. In apparatus of the character described, the combination of a casing open at its upper and lower ends; a spreader in said casing mounted for rotary movement on a vertical axis, said spreader comprising an imperforate header having a series of blades depending therefrom and arranged in an annular vertical series about a central air or gas space; means for discharging liquid against said blades from without the blades; and an annular flange on said casing below the blades adapted to direct air or gas into the central space within the series of blades; and a liquid receptacle below but spaced from the lower edge of the casing.

5. In apparatus of the character described, the combination of a casing open at its upper and lower ends; a spreader in said casing mounted for rotary movement on a vertical axis, said spreader comprising an imperforate header having a series of blades depending therefrom and arranged in an annular vertical series about a central air or gas space; means for discharging liquid against said blades from without the blades; and an annular flange on said casing below the blades adapted to direct air or gas into the central space within the series of blades; the upper edge of said casing having an inwardly curved flange extending partly over but in spaced relationship to the header.

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