United States Patent [19]

Wunderlin

[11] **3,723,707**

[45] **Mar. 27, 1973**

[54] HUMIDIFIER

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[52] **U.S. Cl.** **219/276,** 219/314, 219/332, 219/362, 219/363, 319/386, 219/518, 261/DIG. 34, 261/DIG. 65

[51] **Int. Cl.**.....**F22b 1/28**

[58] **Field of Search**.....219/271, 272, 276, 314, 332, 219/362, 363, 366, 385, 386, 518; 261/DIG. 34, DIG. 46, DIG. 65, 129, 139, 142; 236/44 R; 126/113; 237/1 R

[56] **References Cited**

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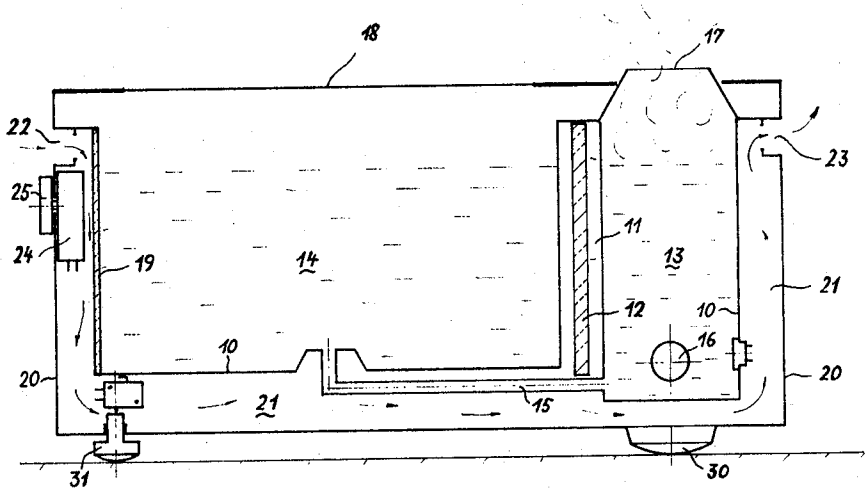
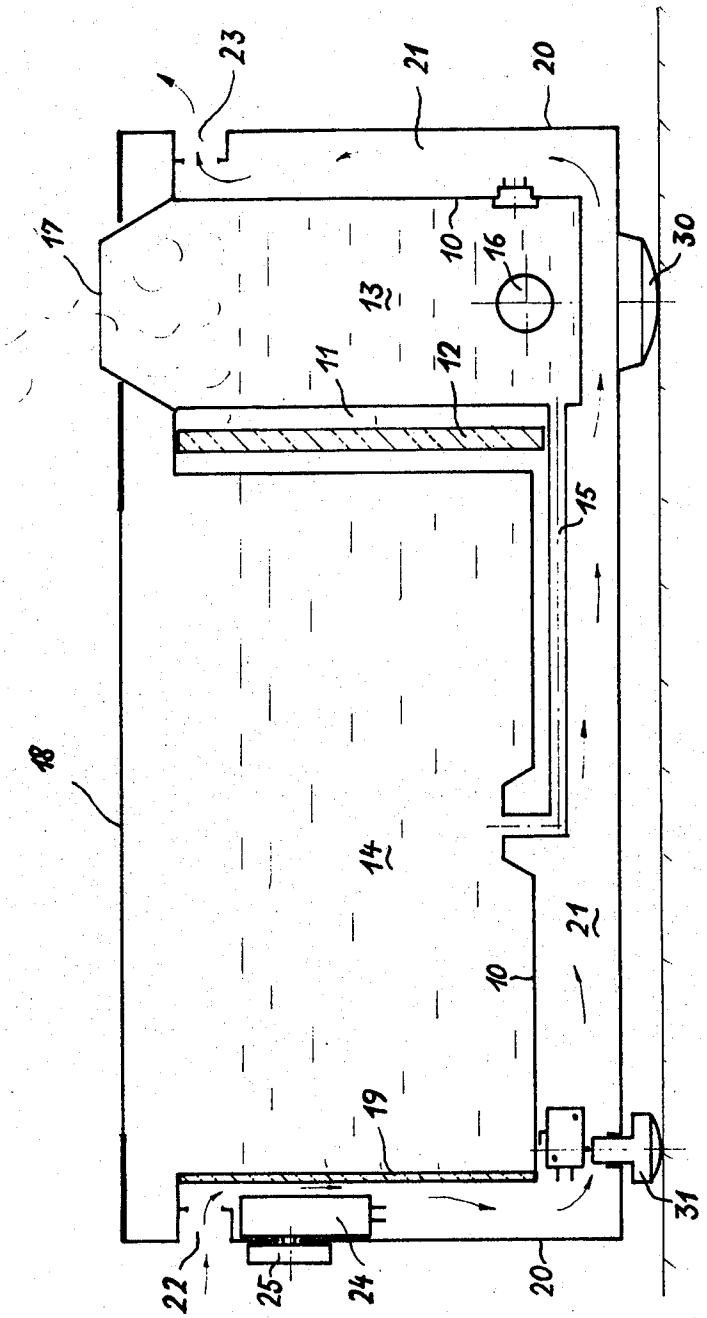
[57] **ABSTRACT**

A humidifier having automatic control means respective to the degree of moisture in the air of the space to be humidified is provided with a hygrostatic switch located directly on the humidifier, thus dispensing with wiring connections between the humidifier and a hygrostatic switch located at a distance therefrom. A current of air from the space to be humidified is drawn past the hygrostatic switch as a convection current caused by disposing the air inlet, into an outer casing surrounding a cold water container and a heated water container, at a point adjacent the cold water container and disposing the air outlet at a point distant from the air inlet and adjacent the heated water container.

5 Claims, 1 Drawing Figure

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HUMIDIFIER

CROSS REFERENCES TO RELATED APPLICATIONS

Applicant claims priority from corresponding Austrian Pat. application No. 9 A 7631/70, filed Aug. 21, 1970.

BACKGROUND OF THE INVENTION

Field of the Invention

For humidifying of the air in homes and offices, various types of known air humidifiers are used nowadays, in which water is either atomized, evaporated or vaporized. If it is desired to have automatic control of the moisture in the room, then a hygrostatic switch, required for this purpose, must be arranged at some distance from the humidifier so that it will be exposed to the actual moisture values in the room, and it must be connected by cables with the heating arrangement of the humidifier. Since in the case of known humidifiers the air around them is not or is only insufficiently circulated, a hygrostatic switch disposed directly on the humidifier would respond to the immediate moisture and temperature around the device, which do not correspond to the actual conditions inside the whole room.

SUMMARY OF THE INVENTION

The invention consists in providing a humidifier with automatic control of moisture with a hygrostatic switch so located that no cable connection to the humidifier will be required. This objective can be achieved by using a humidifier already known, with a container subdivided into two communicating spaces, the heating arrangement being disposed in the smaller space and a supply of cold water in the larger space, so that the container will have a hot and a cold zone, and if one utilizes the convection current occurring between two air spaces in the case of a temperature difference, for the purpose of bringing the air in the room, which is to be measured in regard to its moisture value, by means of ejector action to a hygrostatic switch disposed on the humidifier.

To achieve this, the humidifier, with a container subdivided into two communicating spaces and intended for the reception of the water that is to be evaporated by means of a heating arrangement disposed in the one space, according to the invention is characterized by the fact that the container is surrounded by a housing, part of which is spaced at a distance from the container, and the areas of the container and housing spaced at a distance one from the other define an air path which connects an air inlet, provided in the housing adjacent to the cold water space, with an air outlet, provided in the housing adjacent to the hot water space, and in the air path and close to the air inlet a hygrostatic switch acted upon by the air, streaming in from the outside because of the convection, has been disposed. The convection current is optimal whenever the air inlet and the air outlet openings are provided in the housing at those places having the largest temperature difference. When, in a preferred embodiment of the humidifier, the container has a rectangular outline and its two communicating spaces are located one beside the other, then effectively the air inlet and the air outlet openings are provided in the housing at opposite sides of the container and at those locations which, in each case, are the farthest distant from the separating wall between the two spaces, so that there will be either no, or the least possible, heat conduction from the hot water space to the cold water space. One or more insulating walls are provided as separating walls for practical purposes between these two cpaces, and in the same way the cold water space of the container can be effectively separated by an insulating wall from the adjoining air space, and the hygrostatic switch close to the air opening disposed in said air space.

BRIEF DESCRIPTION OF THE DRAWING

Further characteristics, details and advantages of the invention will be apparent from the description which follows in conjunction with the drawing, in which

FIG. 1 diagrammatically illustrates an embodiment of the invention purely by way of example.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The humidifier has a tank **10** for the reception of the water that is to be evaporated and which is subdivided by means of a separating wall **11**, with an insulation **12**, into two communicating spaces **13** and **14**, the connection of the communicating spaces being formed by a channel in the shape of a hose or pipe **15**. The heating arrangement in the form of a cartridge **16** is disposed in the smaller space **13**. The steam emerges at the top from an opening **17** from the space **13** containing the water that is to be evaporated, in order to humidify the air in the room or office. The larger cold water space **14** has an upper filling opening **18** for filling it with water. The wall of the cold water space **14**, opposite the adjacent hot water space **13**, has been equipped with an insulation **19** forming the wall.

The entire container **10** comprising both spaces **13** and **14** surrounded by a housing **20**, at least a part of which is spaced from the container and the housing, spaced one from the other, define an air path **21**, which connects an air inlet opening **22**, provided in the housing adjacent to the cold water space **14**, with an air outlet opening **23** provided in the housing **20** adjacent to the hot water space **13**. In order to form the air path leading from one side of the humidifier to the opposite side of it, the housing must not be widely spaced from the entire outside surface of the container, but a certain zone extending along the entire container from one side to the other will be sufficient, in which the air path is formed as a result of this spacing of the container from the housing. Near the inlet opening **22** for the air, a hybrostatic switch **24** has been disposed in the air path **21**, that is to say, between the container and the housing, which can be operated from the outside with an adjusting knob **25**.

Since the air in the air space **21**, heated by the hot water space **13**, escapes through the air outlet opening, air from the room will be sucked in through the air inlet opening **22** and flow around the hygrostatic switch disposed below said opening, so that the latter will be capable of control based on the actual moisture values inside the living space. So that at least a slight convection current will be maintained in air space **21** whenever the desired value of the moisture has been

achieved in the living space, the heating arrangement can be automatically switched over to a reduced heating performance, so that the hot water space will transmit sufficient radiant heat to the air space below the air exit opening.

The humidifier stands on several legs **30** and an additional leg **31**, which has been developed as a switch counteracting, by way of spring action, the weight of the water in the container, which switch automatically interrupts the supply of current to the heating device upon reaching a minimum water level in the container and in consequence of the release of the spring occurring thereby. In order to transport the humidifier, the two air inlet and air outlet openings are developed and dimensioned on the upper edge in such a way as to provide hand holds.

I claim:

1. A humidifier comprising a container having two communicating chambers, a heating device mounted in one chamber for vaporizing water supplied to said chamber from the second chamber disposed side by side to said one chamber and including cold water, a housing surrounding the container so as to form an air channel between the housing and the container extending across opposite side walls and the bottom wall of the container, the housing having an air inlet opening adjacent to the cold water chamber and an air outlet opening therein adjacent said chamber for vaporizing water, said inlet opening and outlet opening being connected by said air channel, the ends to the air channel being of different temperature and due to convection causing a flow of air from the exterior into the channel and through the channel, and a hygrostatic switch mounted in the air channel adjacent said air inlet opening and acted upon by the flow of air from the exterior, so as to control the heating device upon the humidity of the surrounding air decreasing below or increasing above a predetermined value.

2. A humidifier according to claim **1**, characterized in that the communicating chambers of the container are separated by at least one separating wall of insulating material.

3. A humidifier according to claim **1**, characterized in that the cold water chamber of the container is separated from the adjacent air channel and the hygrostatic switch at the air inlet opening by a separating wall of insulating material.

4. Humidifier according to claim **1**, characterized in that the air inlet and the air outlet openings are located in the housing close to its upper edge and are of a size suitable to form hand holds in order to carry the humidifier.

5. A humidifier according to claim **1**, characterized in that upon reaching an intended value for the moisture, the hygrostatic switch will switch the heating device to a reduced heating performance in order to maintain a convection current.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,723,707 Dated March 27, 1973

Inventor(s) Max Wunderlin

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

FOREIGN APPLICATION PRIORITY DATA

[30] August 21, 1970 Austria 9 A 7631/70

Signed and sealed this 16th day of April 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.

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