

June 6, 1967

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3,323,784

HUMIDIFIER WITH THROW-AWAY RESERVOIR

Filed Nov. 5, 1964

2 Sheets-Sheet 2

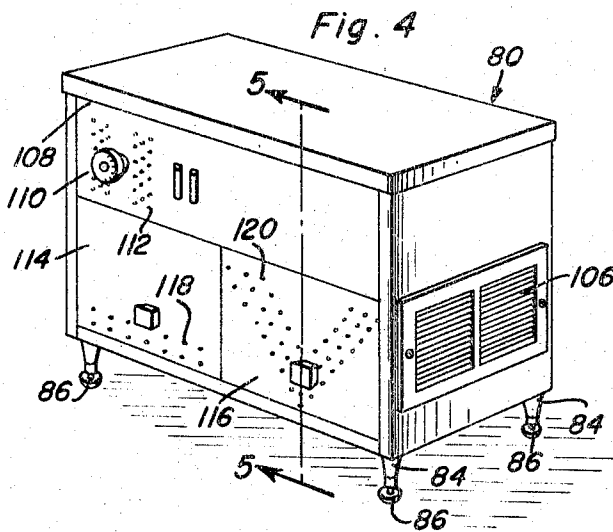
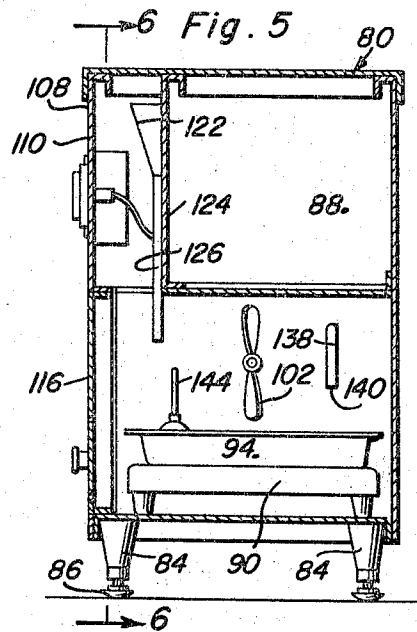


Fig. 6

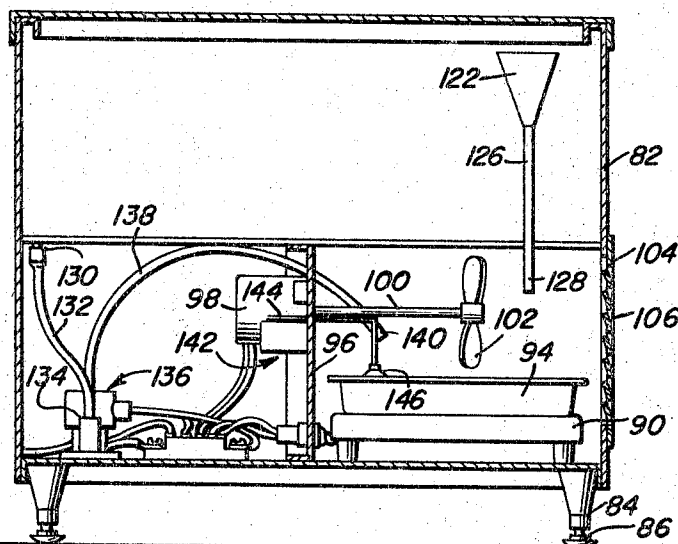
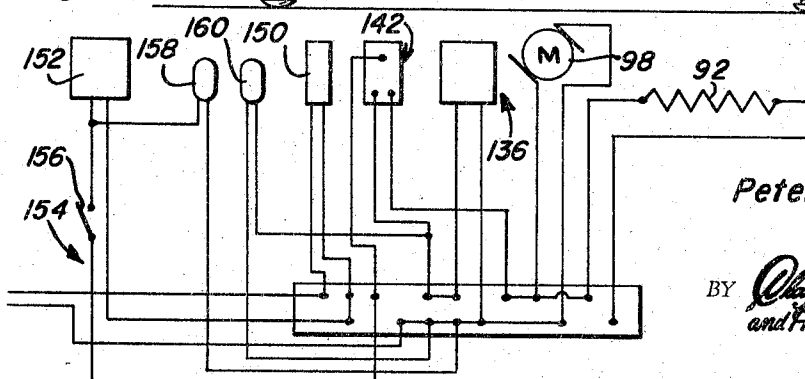


Fig. 7



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1

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HUMIDIFIER WITH THROW-AWAY RESERVOIR

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Filed Nov. 5, 1964, Ser. No. 409,221

8 Claims. (Cl. 261-130)

This invention relates to a novel and useful humidifier and more specifically to a humidifier including means for vaporizing water and a reservoir for containing the water which is to be vaporized that is constructed of inexpensive materials and that is of the disposable type in order that it may be thrown away and inexpensively replaced should it become excessively coated with scale in the form of an accumulation of minerals in the water being handled thereby.

The humidifier additionally includes water supply and dispensing means for dispensing water into the reservoir and also heater means supported in good heat transfer relation relative to the reservoir for heating the water therein and assisting in evaporation of the water. Still further, the humidifier includes control means for actuating the water dispensing means and the heater means and the control means includes means for actuating the heater means in response to an increase of the water level in the reservoir above a predetermined level and terminating actuation of the heater means in response to a drop in the water level below the predetermined level. The control means also includes means responsive to a drop in the water level to a second predetermined level above the first mentioned predetermined level for actuating the water dispensing means and terminating actuation of the water dispensing means in response to a rise in the water level above the second predetermined water level.

A second liquid supply and dispensing means is also provided and is adapted to meter small quantities of a deodorizing agent or medicated liquid into the water to be vaporized. In this manner, the humidifier may be utilized to humidify an entire home, if operatively connected to a forced hot air heating system of the home and also to humidify one or two rooms in the home if the portable form of the humidifier is utilized. It will of course also follow that the entire home or one or two rooms serviced by the humidifier can also be deodorized or humidified with water having a medicated liquid therein.

The main object of this invention is to provide a humidifier of the type including an inexpensive throw-away reservoir whereby the reservoir may be changed with little effort when it has been excessively coated with minerals.

Still another object of this invention, in accordance with the immediately preceding object, is to provide a humidifier constructed in a manner whereby it may be readily incorporated into the construction of a portable humidifier adapted to be plugged into any readily available household electrical current and yet which is also particularly well adapted for manufacture as an addition to an existing forced hot air heating system.

Still another object of this invention is to provide a humidifier including means by which deodorizing or medicated liquids and the like may be accurately metered into the water which is to be vaporized thereby enabling the humidifier to also deodorize or medicate the building area serviced thereby.

A final object of this invention to be specifically enumerated herein is to provide a humidifier in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other objects and advantages which

2

will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of one form of the humidifier of the instant invention which is specifically adapted to be utilized in conjunction with a forced hot air heating system;

FIGURE 2 is an enlarged vertical sectional view taken substantially upon a plane passing through the center of the humidifier illustrated in FIGURE 1;

FIGURE 3 is a diagrammatical view of the control system of the humidifier;

FIGURE 4 is a perspective view of the second form of humidifier which is portable in nature and adapted to be moved from one room to another inside a building;

FIGURE 5 is an enlarged transverse vertical sectional view taken substantially upon a plane indicated by section line 5-5 of FIGURE 4;

FIGURE 6 is a longitudinal vertical sectional view taken substantially upon the plane indicated by section line 6-6 of FIGURE 5; and

FIGURE 7 is a diagrammatical view of the control system of the portable form of humidifier.

Referring now more specifically to the drawings the numeral 10 generally designates one form of the humidifier of the instant invention which is illustrated in FIGURES 1-3 of the drawings and adapted to be utilized in conjunction with a forced hot air heating system.

The humidifier 10 includes a casing or housing generally referred to by the reference numeral 12 including a removable top 14 having an outlet opening 16 formed therein to which one end of an outlet pipe 18 is secured.

The humidifier 10 includes a support frame 20 which supports an electrical resistance type heating element 22. The frame 20 defines a table top 24 on which there is disposed a removable and inexpensive throw-away type reservoir 26. The bottom 28 of the reservoir 26 is disposed in good heat transfer relation with the heating element 22 and thus the water 30 within the reservoir 26 may be readily heated upon actuation of the heating element 22.

One side wall 32 of the housing 12 has a solenoid actuated water control valve assembly generally referred to by the reference numeral 34 mounted thereon by means of a support bracket 36. The control assembly 34 includes a water inlet 38 to which the outlet end of a water supply line 40 is secured and an outlet 42 to which one end of a supply conduit 44 is secured. The supply conduit 44 projects through the side wall 32 and terminates at 46 above the reservoir 26. The control valve assembly 34 includes an electric solenoid 48 which opens the control valve assembly 34 upon its actuation and closes the control valve 34 upon its termination of operation.

A microswitch assembly generally referred to by the reference numeral 50 is also supported from the side wall 32 and includes a switch actuating arm 52 on whose free end a plastic float member 54 is secured, the free end of the arm 52 projecting through the wall 32 and being disposed above the reservoir 26.

In addition, a limit switch 56 and a humidistat 58 are supported from the side wall 32. With attention now directed more specifically to FIGURE 3 of the drawings it may be seen that the humidistat 58, limit switch 56, microswitch assembly 50, solenoid 48 and heating element 22 are all disposed and electrically connected within an electrical circuit generally referred to by the reference numeral 60. In addition, the electrical circuit 60 includes a main control switch 62 and if it is desired supplemental air pump means generally referred to by the reference numeral 64 may also be disposed within the housing 12

and electrically connected to the electric control circuit 60 by means of the conductors 66 and 68.

It is to be noted that the humidistat 58 is of the adjustable type and therefore as long as the safety switch is closed and the microswitch assembly 50 electrically connects the safety limit switch 56 with the heating element 22, a drop in the humidity adjacent the humidistat 58 below the setting of the humidistat 58 will cause the heating element 22 to be actuated and also the air pump means 64 if the latter is provided. However, operation of the heating element 22 is also dependent on the level of the water 30 inasmuch as a drop in the water level within the reservoir 26 will cause the microswitch assembly 50 to terminate electrical connection between the safety limit switch 56 and the heater element 22 and establish electrical connection between the safety limit switch 56 and the solenoid 48 for adding water to the reservoir 26. Additionally, it is to be understood that the heating element 22 could be of the type requiring higher voltage than that which is provided by the electrical circuit 60 and in this instance the heating element 22 would be connected to a suitable source of high electrical potential (not shown) by means of a control circuit having a relay operated control switch therein. Such a relay operated control switch may of course be actuated by means of a transformer disposed in the electrical circuit 60.

A small supplemental liquid reservoir 70 is secured to the outer surface of the side wall 32 and includes an outlet tube or pipe 72 at its lower end which passes through the side wall 32 and terminates as at 74 above the reservoir 26. The tube 72 is of a restricted diameter in order that liquid within the reservoir 70 may be slowly metered into water 30 disposed within the reservoir 26. The liquid within the small reservoir 70 may be a medicating liquid or a deodorizing liquid thereby enabling the air passing over the heated water to be also medicated or deodorized as desired.

With attention directed now more specifically to FIGURES 4 through 7 of the drawings it will be seen that a modified form of the invention generally designated by the reference numeral 80 including a portable housing 82 including depending legs 84. The depending legs 84 are provided with adjustable feet portions 86 which may be replaced by caster wheels if desired. The housing 82 defines a water receiving reservoir 88 and also includes a support frame 90 which corresponds to the frame 20. The frame 90 includes an electrical heating element 92 corresponding to the heating element 22 and a replaceable reservoir 94 is supported from the frame 90 including heat transfer relation relative to the heating element 92.

A partition wall 96 is provided in the housing 82 and supports an electric motor 98 including an output shaft 100 having a fan blade 102 mounted thereon. The side wall 104 of the housing 82 is louvered as at 106 and the side wall 108 of the housing 82 includes an upper removable panel 110 which is suitably apertured as at 112 and a pair of lower sliding door panels 114 and 116 which are suitably apertured as at 118 and 120 respectively.

In addition, a small liquid reservoir 122 is supported from the side wall 124 of the reservoir 88 and includes a metered outlet tube 126 whose outlet end terminates as at 128 above the reservoir 94.

The reservoir 88 includes an outlet 130 to which one end of a conduit 132 is connected and the outlet end of the conduit 132 is secured to the inlet 134 of a pump assembly generally referred to by the reference numeral 136 including an outlet to which a conduit 138 is connected, the outlet end of the conduit 138 terminating as at 140 above the reservoir 94. The pump 136 corresponds to the solenoid actuated water control valve assembly 34 and in fact may be replaced by a similar solenoid actuated water control valve assembly for dispensing water to the reservoir 94 by means of gravity. Otherwise, if the pump 136 is utilized, actuation of the latter in the manner to be herein-

after more fully set forth will result in water being dispensed from the reservoir 88 into the reservoir 94.

A microswitch assembly generally referred to by the reference numeral 142 and corresponding to the microswitch assembly 50 is supported from the partition or partition wall 96 and includes an actuating arm 144 corresponding to the arm 52. The arm 144 projects through the partition 96 and has a float member 146 mounted on its free end corresponding to the float member 54.

With attention now directed more specifically to FIGURE 7 of the drawings it may be seen that the humidifier 80 also includes a limit safety switch 150 which corresponds to the limit safety switch 56 and a humidistat 152 which corresponds to the humidistat 58. Still further, the control circuit for the humidifier 80 comprises the electrical circuit generally referred to by the reference numeral 154 and the latter may be seen to include a control switch 156 corresponding to the control switch 62. Still, further, the control circuit 154 includes first and second indicator lights 158 and 160.

The operation of the various electrical components of the humidifier 80 is substantially identical to the operation of the humidifier 10 and it may be seen that when the control switch 156 is closed and the humidity drops below the setting of the humidistat while the safety switch 150 is closed the fan motor 98 and the heater 92 will be actuated. Should the water level within the reservoir 94 drop below a predetermined level, the microswitch 142 will terminate operation of the fan motor 98 and the heater 92. In addition, should the water level drop below a predetermined level above that level at which the operation of the fan motor 98 and the heater 92 is terminated, the solenoid or pump 136 will be actuated to increase the supply of water within the reservoir 94. Then, as the water level in the reservoir 94 reaches a higher predetermined level, the microswitch assembly 142 will operate to terminate actuation of the solenoid or pump 136. Should the water level within the reservoir 94 drop below the predetermined level at which the solenoid or pump 136 is actuated, the indicator light 160 will also be actuated and whenever the humidistat 152 calls for operation of the humidifier 80, the indicator light 158 will also be actuated.

Operation of the fan motor 98 will cause air to be drawn into the lower portion of the housing 82 disposed below the reservoir 88 through the aperture 120. The air entering the housing 82 will then be passed over the reservoir 94 having the heated water therein and certain quantities of the heated water will then be vaporized and carried out of the housing 82 through the louvers 106. The small reservoir 122 will of course continuously operate to dispense small metered quantities of a deodorizing or medicated liquid into the water within the reservoir 94 whereby the humidified air passing outwardly through the louvers 106 will also carry medicating or deodorizing vapors.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A humidifier comprising a support frame, an evaporation reservoir supported from said frame, heater means operative to heat the water in said reservoir, water supply and dispensing means for dispensing water into said reservoir, control means for actuating said water dispensing means and said heater means, said control means including means for actuating said heater means in response to an increase of the water level in said reservoir above a first predetermined level and terminating actuation of said heater means in response to a drop in said water level below said predetermined level and means responsive to a

5

drop in said water level to a second predetermined level above the first mentioned predetermined level for actuating said water dispensing means and terminating actuation of said water dispensing means in response to a rise in said water level above said second predetermined level, said humidifier including air pump means for causing a flow of air over the water in said reservoir, said control means including means for actuating said air pump means upon and for the duration of actuation of said heater means.

2. The combination of claim 1 including a main control defining a humidistat operatively connected to said control means for rendering said control means operative to actuate said dispensing means and said heater means only in response to a drop in the humidity at said humidistat below the setting of said humidistat.

3. The combination of claim 1 wherein said humidifier includes a second reservoir including vertical outlet means therefor operable to dispense the liquid in said second reservoir into the water disposed in the first mentioned reservoir.

4. The combination of claim 1 including a main control defining a humidistat operatively connected to said control means, said control means including indicator means for indicating when said humidistat is not satisfied.

5. The combination of claim 1 wherein said control means includes indicator means for indicating when said water level drops to said second predetermined level.

6. The combination of claim 5 wherein said humidifier includes air pump means for causing a flow of air over the water in said reservoir, said control means including means for actuating said air pump means during actuation of said heater means.

7. A humidifier comprising a support frame, an evaporation reservoir supported from said frame, heater means operative to heat the water in said reservoir, water supply and dispensing means for dispensing water into said reservoir, control means for actuating said water dispensing means and said heater means, said control means including means for actuating said heater means in re-

6

sponse to an increase of the water level in said reservoir above a first predetermined level and terminating actuation of said heater means in response to a drop in said water level below said predetermined level and means responsive to a drop in said water level to a second predetermined level above the first mentioned predetermined level for actuating said water dispensing means and terminating actuation of said water dispensing means in response to a rise in said water level above said second predetermined level, said humidifier including a second reservoir including vertical outlet means therefor operable to dispense the liquid in said second reservoir into the water disposed in the first mentioned reservoir, said support frame being disposed within a portable housing, said housing including air pump means for causing a flow of air over the water in the first mentioned reservoir, said control means including means for actuating said air pump means during actuation of said heater means.

8. The combination of claim 7 including a main control defining a humidistat operatively connected to said control means for rendering said control means operative to actuate said dispensing means and said heater means only in response to a drop in the humidity at said humidistat below the setting of said humidistat.

References Cited

UNITED STATES PATENTS

1,389,804	9/1921	Wrenn	126—113
2,776,553	1/1957	Williamson.	
2,804,067	8/1957	Elgin.	
2,993,107	7/1961	Fichtner	126—113 X
3,181,844	5/1965	Glaze	261—142 X
3,209,125	9/1965	Morrissey	219—272
3,215,416	11/1965	Liben	261—142

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