Jan. 8, 1946. J. E. LONG 2,392,601

AIR CONDITIONING UNIT FOR WARM AIR FURNACES

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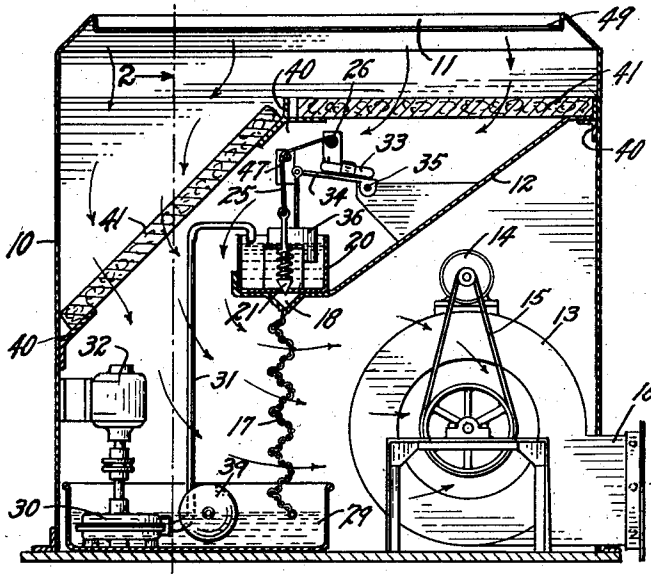


FIG. 1

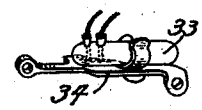
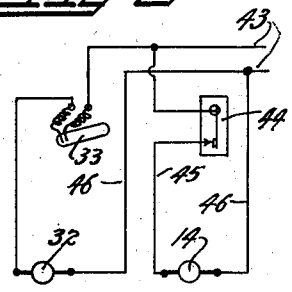


FIG. 3



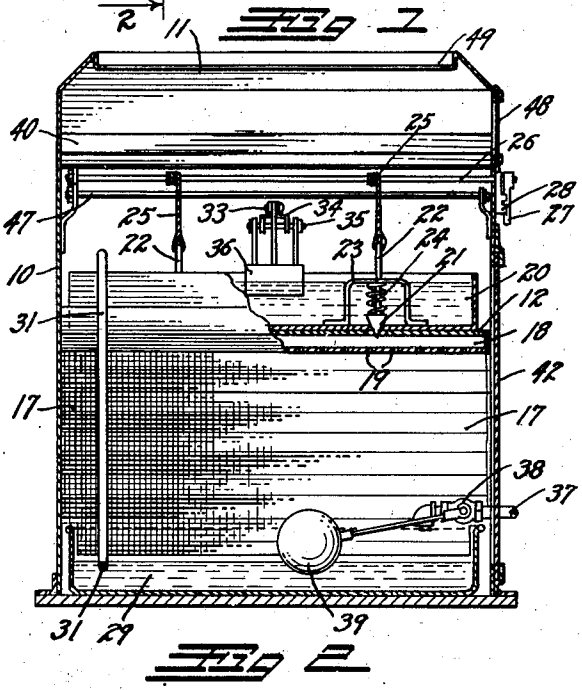


FIG. 2

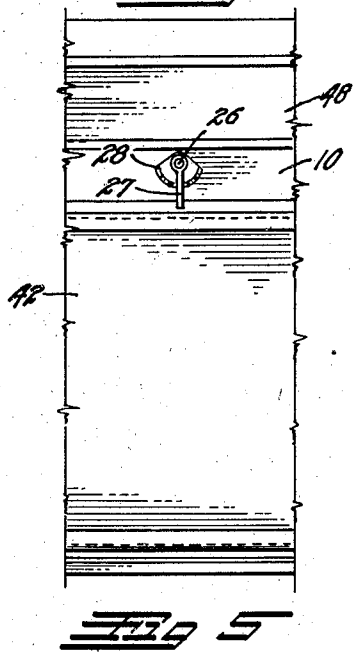


FIG. 4

FIG. 5

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AIR CONDITIONING UNIT FOR WARM AIR FURNACES

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Application May 22, 1944, Serial No. 536,685

1 Claim. (Cl. 183—19)

This invention relates to an air conditioning unit, and is more particularly designed to furnish the incoming air to a warm air furnace.

The principal object of the invention is to provide a highly efficient unit of this character which will filter the incoming air and impart a uniform and predetermined degree of humidity thereto.

Another object of the invention is to so construct the unit that it will be entirely automatic in its operation.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a vertical, longitudinal section through the improved unit showing the interior construction thereof;

Fig. 2 is a cross section, taken on the line 2—2, Fig. 1, with the filter pads removed;

Fig. 3 is a detail view illustrating the mercury switch employed in the unit;

Fig. 4 is a circuit diagram illustrating the electric connections to the various elements; and

Fig. 5 is a fragmentary, side view of the unit illustrating the position of the humidity control lever thereon.

The unit is enclosed in a housing 10 formed with an air intake opening 11 at its top. An inclined partition plate 12 divides the housing into an intake compartment and a fan compartment. A suitable fan 13 is mounted in the fan compartment, and is driven from a fan motor 14 through the medium of a suitable V-belt drive 15. The fan intakes from the fan compartment, and discharges through a discharge conduit 16, extending through the wall of the cabinet 10. The discharge conduit is arranged for connection with the cold air intake of a typical warm air furnace of any desired type.

A humidifying screen 17 is positioned between the intake compartment and the fan compartment so that all air flowing to the fan must pass through this screen. The upper edge of the screen is secured along the bottom of a V-shaped water trough 18 containing spaced apart perforations 19 through which water drips to the screen 17.

Water is supplied to the trough 18 from a water reservoir 20 carried on a shelf formed on the lower extremity of the partition plate 12. The bottom of the water reservoir contains water ports, each of which is controlled by a tapered plug valve 21. The valves 21 are mounted on the valve stems 22 which are maintained in alignment with the ports by means of suitable valve stem guides 23. Compression springs 24, positioned between the guides 23 and the valves 21, constantly urge the latter toward the ports.

The valves 21 are suspended from flexible members 25 which may be chains, cables or cords. The upper portions of the flexible members are secured to, and wrapped about, a control rod 26 which terminates on the exterior of the housing 10 in a humidity control lever 27. The control lever can be locked in any desired position in a suitable notched quadrant 28. A guide rod 47 aligns the flexible members with the valves 21.

It will be noted that, as the lever 27 is rotated in one direction, it will coil the flexible members 25 to lift the valves 21 and when rotated in the other direction will release the flexible members to allow the springs 24 to force the valves toward their seats.

Water is supplied to the water reservoir 20 from a feed tank 29 in the base of the housing, through the medium of a water pump 30 and a riser pipe 31. The pump 30 is driven from a suitable electric pump motor 32 which is in circuit with a mercury switch 33. The mercury switch is mounted on a tilting switch arm 34, one extremity of which is hingedly mounted on a fixed hinge pin 35, and the other extremity of which is connected to a float 36. Thus, as the level of the water rises in the reservoir 20, the switch 33 will be tilted to cause the mercury therein to flow away from the switch contacts, breaking the circuit to the motor 32.

Water is supplied to the feed tank 29 from a feed pipe 37 controlled by a float valve 38 and a float 39. Thus, as the level of the water in the tank 29 lowers the float 39 will also lower to open the valve 38 to admit water from the feed pipe 37.

Filter supporting members 40 extend across the housing 10, and support suitable filter pads 41 in the path of the air flowing to the screen 17. The pads may be of mineral wool, spun glass, shredded fiber or any other desired filtering material. The air opening 11 is surrounded by a shoulder flange 49 for receiving the lower extremity of a typical cold air duct. One side of the housing is provided with a lower removable panel 42 which allows removal of the various water containers, screen, etc. and with an upper remov-

able panel 48 which allows removal of the filter pads 41.

In Fig. 4, a typical wiring diagram is illustrated in which the electrical supply mains are indicated at 43. One of these mains leads to the mercury switch 33 and from thence to the pump motor 32. This main is also connected to a suitable thermostat 36 which is operable by the changes in temperature of the warm air furnace to which the unit is connected. From the thermostat 44, a conductor 45 leads to the fan motor 14. Ground conductors 46 extend from both motors 32 and 14 to the other feed main 43.

It can be readily seen that as the temperature in the furnace lowers the thermostat 44 will close the circuit to the motor 14 starting the fan 13, as the level of the humidifying water in the reservoir 20 lowers, the switch 33 will close the circuit to the motor 32 starting the pump 30, and as the level of the water in the feed tank lowers the float 39 will admit additional water. Thus the device is entirely automatic in operation.

The screen 17 is of relatively fine mesh so that the water dripping from the orifices 19 will spread thereover by capillary attraction. This allows the water to be readily picked up by the air in a highly dispersed state. It will be noted that the lower extremity of the screen hangs in the water of the feed tank 29. This prevents the air from by-passing the screen and also allows any excess water to return from the screen to the feed tank for recirculation.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claim, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

An air conditioning unit for warm air furnaces comprising: a housing having an entirely open top; two oppositely positioned end walls in said housing; a partition plate extending inwardly and downwardly into said housing from the first end wall and terminating in spaced relation to the second end wall; a V-shaped trough in the lower extremity of said plate extending transversely of said housing and having perforations in its bottom; a humidifying screen suspended from said trough below said perforations and extending across and to the bottom of said housing; a water reservoir supported by said partition plate over said trough; vertically opening valves in the bottom of said reservoir; means for opening said valves from the exterior of said reservoir; a feed tank in said housing below said screen; a motor-driven pump elevating water from said feed tank to said reservoir; a blower in said housing below said partition plate discharging through said first end wall and receiving its air through said screen; and filter means positioned in the path of the air between the open top of said housing and said humidifying screen.

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