

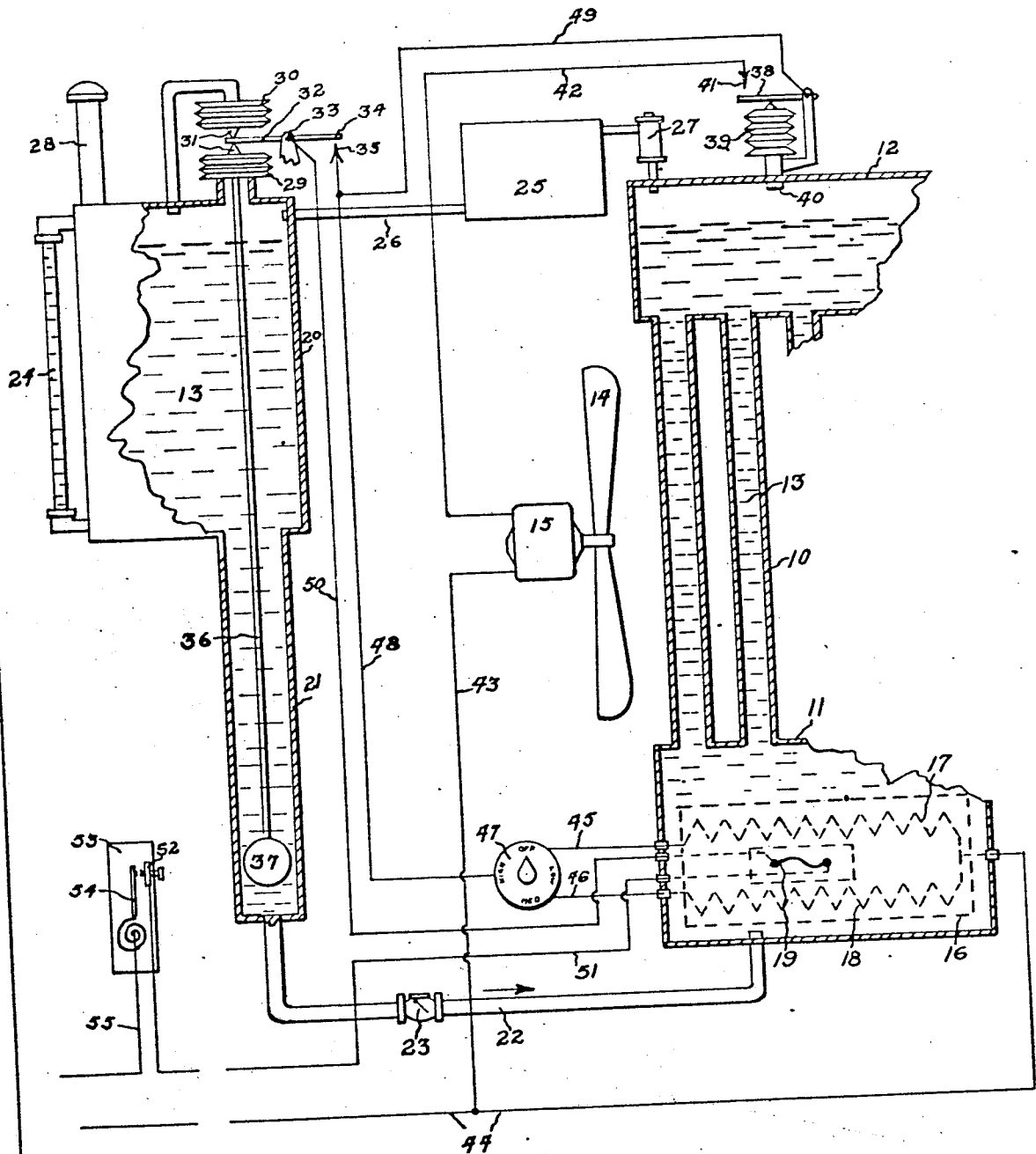
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ELECTRIC HEATER

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ELECTRIC HEATER

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1 Claim. (Cl. 219—39)

This invention relates generally to electric heating appliances and particularly to a new form of electric heater.

The main object of this invention is to construct an improved form of electric hot water heater which will efficiently deliver volumes of warm air without overheating any portion of the air.

The second object is to construct a heater which will be quick to operate at its full capacity and which will be automatically protected against overheating as well as against over pressures due to accumulated steam pressure and also against losses of water from evaporation due to the overheating thereof.

The third object is to so relate the various elements which enter into this heater that each of the elements performs its natural function to the best advantage and at the same time correlates these functions with those of the other elements in order to produce an efficient electric heater.

The drawing illustrates somewhat schematically a heater of the class shown in my United States Patent No. 2,151,140 and my United States Patent No. 2,244,172, over which the heater shown herein is an improvement.

Referring in detail to the drawing, there is shown a plurality of heat radiating tubes 10 which are connected at the lower ends to the heater manifold 11 and at the upper ends by means of the steam manifold 12. The tubes 10 may be of any desired type, but are preferably finned or provided with fins of radiating quills through which heat from the water 13 can be drawn by the fan 14, which is driven by the motor 15.

Within the manifold 11 is placed an immersion type of heating element 16 having the two coils 17 and 18. Incorporated in the heater 16 is a fuse 19 adapted to protect the element against over temperatures.

Associated with the members 10, 11 and 12, is an elevated auxiliary reservoir 20 having a water column 21 which is connected by a tube 22 to the manifold 11. The tube 22 has incorporated therein a check valve 23 adapted to permit the flow of water from the column 21 into the manifold 11 but not in a reverse direction.

The reservoir 20 is provided with a water glass 24 whereby the supply of water in the device can be visibly checked.

A condenser 25 is connected between the manifold 12 and the reservoir 20 by means of a pipe 26 which includes the pressure actuated valve 27 adapted to open during over pressures within the

manifold 12, thereby permitting steam therefrom to pass through the condenser 25 and to be returned as water to the reservoir 20. A common form of safety valve 28 is provided for the reservoir 20.

At the top of the reservoir 20 are mounted a pair of opposed diaphragms 29 and 30 of the bellows type, both of which are connected to the interior of the reservoir 20.

Between the points 31 of the bellows 29 and 30 is mounted a switch arm 32 which is pivoted on the fulcrum 33 causing its contact end 34 to make and break contact with the point 35.

Attached to the bellows is a rod 36 whose lower end projects into the water column 21 and has secured thereto a float 37.

On the manifold 12 is mounted a pressure actuated switch arm 38 which rests upon the bellows 39 into which steam can enter through the pipe 40 which communicates with the interior of the manifold 12.

Associated with the switch arm 38 is a contact point 41 which is connected by means of a lead wire 42 to one side of the fan motor 15, the opposite side of which is connected by means of a lead 43 to the line wire 44 which is connected to a pair of ends of the coils 17 and 18; the coils 17 and 18 are connected by the leads 45 and 46 to the three-way switch 47 which is connected by the lead 48 to the contact point 35 and through the lead 49 to the switch arm 38.

The lead 50 connects the fulcrum 33 of the arm 34 to one side of the fuse 19 from the other side of which extends a lead 51 which is connected to the contact point 52 of the room thermostat 53 whose bimetallic element 54 is connected by means of the lead 55 to the power line.

The operation of the heater is as follows:

Assuming that there is a supply of water 13 which passes downwardly through the water column 21 and the check valve 23 into the manifolds 11 and 12 and the radiator 10 until the level of the water in the manifold 12 equals the level of the water in the reservoir 20, and that the switch 47 is turned to the high position, and also assuming that the temperature at the thermostat is subnormal and that the circuit is closed at that point, current would flow through the lead 44 and elements 17 and 18 through the switch 47 and lead 48 and the normally contacting member 34 and 35 through the lead 50 and fuse 19 back to the lead 51 and thermostat 53 and thence to the lead 55.

This action will cause heat to be generated within the element 18 but no current will flow

to the fan 13 by reason of the fact that the members 38 and 41 are not in contact. That is, there is no pressure within the manifold 12 and the bellows 39 permits the members 38 and 41 to remain apart. However, as heat builds up within the manifold 11, it flows upwardly to warm the water in the manifold 12 and form a steam pressure therein. This pressure enters the bellows 39 and closes the members 38 and 41 causing the operation of the fan 14 and the automatic delivery of warm air to the surrounding atmosphere.

If the fan 14 is not capable of carrying away the heat and the temperature of the element 16 becomes excessive, the fuse 19 melts and interrupts the flow of current through the device.

If, for any reason, the moisture escapes from the device and the level thereof is objectionably low, then the float 37 will descend and separate the contacts 34 and 35 thereby stopping the generation of heat within the manifold 11.

It can be seen from the foregoing that the heater is entirely automatic and should it be entirely neglected, it will simply stop functioning without in any way damaging the device.

It will be noted that the apparatus herein described constitutes a closed system, the purpose being to prevent the escape of water therefrom.

Actually, the float controlled switch arm 32 and its associated parts are only of a protective nature and insure against damage to the apparatus in the event there should be any leakage therefrom.

As previously stated, numerous changes may be made in the details of the construction without departing from the spirit of this invention. It is my intention to cover those elements which are essential to the successful operation of the device in which I claim:

In a heater of the class described, the combination of an upright radiator having an electric heating element in the bottom thereof, a closed elevated auxiliary reservoir associated with said radiator, the lower ends of said radiator and reservoir being connected and controlled by a check valve adapted to permit liquid to flow toward said radiator, an electric fan for carrying heat away from said radiator, a switch responsive to conditions within said radiator adapted to close the circuit through said fan when the heat stored in said radiator reaches a predetermined maximum, means for returning condensed steam from said radiator to said reservoir, and a thermostat for controlling the flow of heat to said heating element.

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