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AIR HEATER

Filed April 17, 1937

Fig. 1.

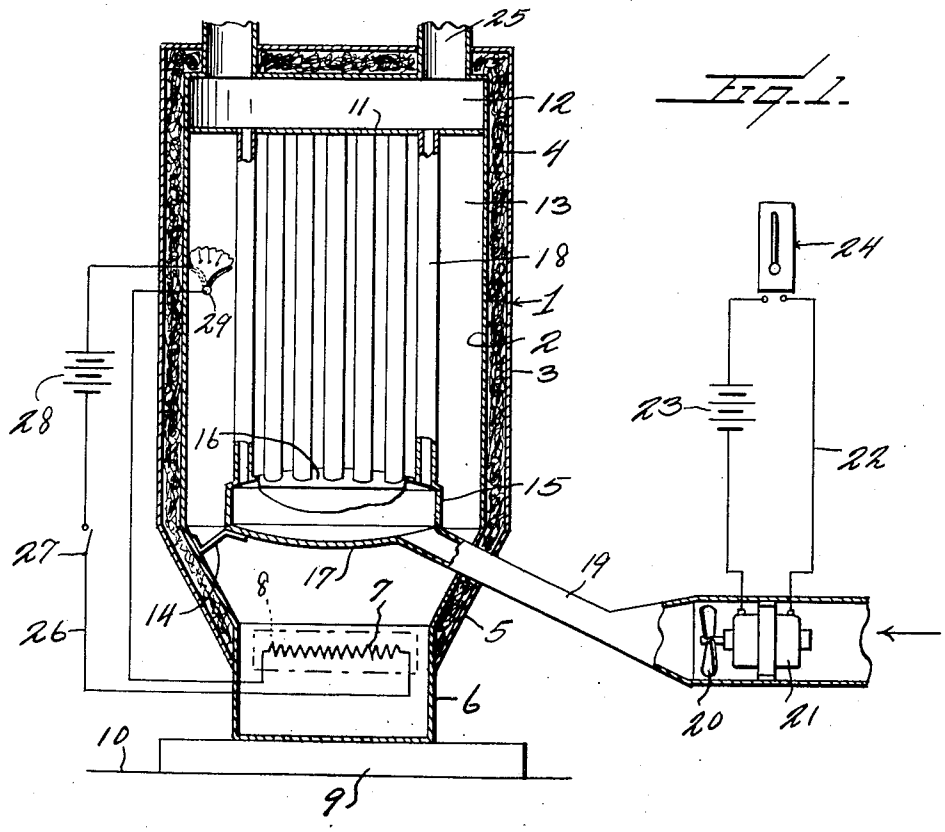
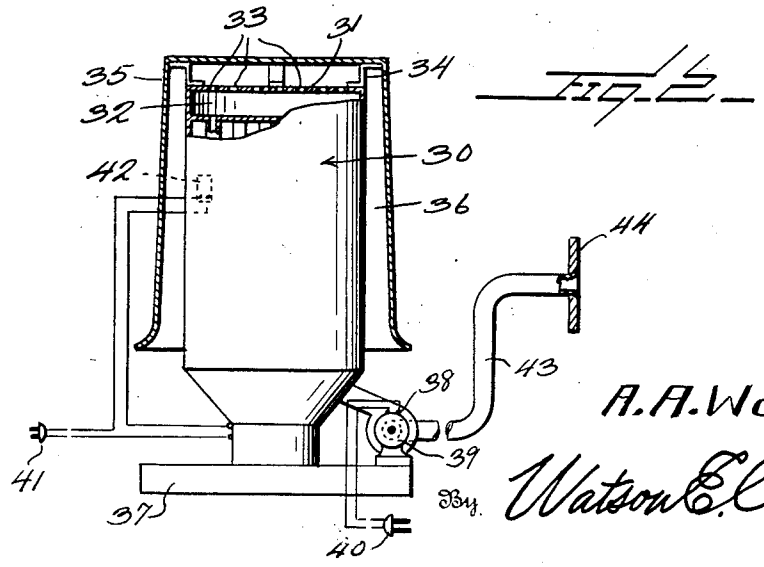


Fig. 2.



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AIR HEATER

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1 Claim. (Cl. 219—39)

This invention relates to improvements in heating structures and pertains particularly to improvements in air heaters.

The primary object of the present invention is to provide a novel type of heating structure employing an electrical heating unit wherein the unit is disposed in a closed housing and means is provided for passing air through the housing to the points of distribution so that in its passage through the housing it will be heated to the desired temperature.

Another object of the invention is to provide a novel electrically operated heating structure in which a thermostatic control is disposed within the heating unit inclosing housing so that when the temperature within the housing reaches a desired maximum, the heating unit will have the current supply automatically reduced and as the temperature within the housing drops, the current supply to the heating unit will be automatically increased.

A still further object of the invention is to provide in a heating structure wherein an electric heating unit is inclosed in a housing with a control thermostat, air tubes extending through the inclosed area with means, thermostatically controlled from a remote point, for forcing air to flow through the tubes to be heated, a novel feature of the construction residing in the fact that the initial flow of air through the tubes will bring about a reduction in temperature in the heater inclosing casing to effect the operation of the heater thermostat so as to increase the current supply to the heater.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claim.

In the drawing:—

Figure 1 is a view in vertical section through a heater constructed in accordance with the present invention and showing diagrammatically the electric circuits and thermostatic control units forming a part thereof, with the current flow producing means and heating units in the circuits.

Figure 2 is a view of a modified form of the heater which is designed for use as a single room heater and can be shifted about.

Referring now more particularly to the drawing, wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 1 generally designates the housing or outer casing of a heating structure constructed in accordance with the present invention and designed for heating an entire house and, therefore, intended to be placed in a cellar or some other suitable location from where heat distributing pipes may lead to various rooms to be heated. This housing is preferably of cylindrical cross section but, of course, need not be restricted to such a form and is of double wall construction as illustrated, the inner and outer walls being indicated respectively by the numerals 2 and 3. These inner and outer walls are in spaced relation and have packed between them a heat insulation material 4 of a suitable nature such as rock wool or the like.

The top of the housing 1 is closed as illustrated, and the lower part of the housing tapers, as indicated at 5, to a base chamber forming casing which is indicated generally by the numeral 6 and in which the electrical resistance heating unit 7 is disposed. The specific construction of the heating unit has not been illustrated as the same forms no part of the invention. Any suitable heating unit may be employed and the same may be supported in any suitable manner in the chamber 6, the usual porcelain or other body of electrical insulation material in which the heating unit may be carried, being indicated in dotted outline and identified by the numeral 8.

A suitable supporting base 9 may be provided for maintaining the structure in the proper vertical position upon the floor 10. Within the upper part of the housing structure 1 there is secured in spaced relation with the top of the inner wall 2, the transverse partition plate 11, thus forming a relatively shallow top chamber 12 which constitutes a hot air chamber and a lower chamber 13 which is entirely closed and in the lower part of which the heating element is inclosed.

In the lower portion of the heating chamber 13 there is supported upon suitable supporting brackets 14 which are connected with the inner wall of the casing as illustrated, the air heating drum 15 which preferably has the same circumferential design as the structure 1 and which is provided with the outwardly bowed or convex top and bottom walls 16 and 17 respectively.

Extending upwardly from the top wall 16 of the drum 15 are air conducting pipes 18 which open through the partition 11 into the chamber

12, thus establishing a communication between the interior of the drum 15 and the chamber 12. The drum 15 and pipes 18 are closed against communication with the interior of the heat chamber 13 so that the latter chamber has no air outlet.

Opening through the bottom wall of the drum 15 is an air supply pipe 19 which passes through the double wall of the casing 1 and has its other end disposed to receive air from the outside of the building in which the heater is placed, to be conducted into the drum. Within the pipe 19 an air circulating fan 20 is disposed and connected with an electric motor 21 so that upon energization of the latter, air will be drawn in through the pipe and forced into the drum and through the tubes 18 into the chamber 12. This motor 21 is placed in the circuit 22 which includes any suitable source of electric potential 23 and the thermostat unit, which is diagrammatically illustrated and generally indicated by the numeral 24. This unit may be placed in one of the rooms of the building which the heating structure is intended to warm so that when the room temperature drops below the desired point, the motor 21 will be energized to start the fan and circulation of air through the heating tubes or pipes of the structure.

The top of the structure is provided with any suitable number of air outlet and distributing pipes 25 according to the number of rooms which the structure is intended to heat and these pipes open directly through the top of a hot air chamber 12.

The electric heating unit 7 is connected in the electric circuit 26 in which may be placed a control switch 27, together with a suitable source of electric potential, which is here indicated by the numeral 28, as a battery. It will, of course, be obvious that the heating unit 7 may be connected with the regular commercial current supply lines of the building in which the structure is placed, therefore it is to be understood that the invention is not limited to the use of batteries for operating the heater 7 or the electric motor 21. In circuit with the heater 7 is a suitable thermostat, which is generally designated 29, and which is disposed within the chamber 13. This thermostat is so designed that a reduction of temperature within the chamber 13, such as will result when the fan 20 is started so as to circulate cold air through the tubes 18, will turn on the full supply of current to energize the heating unit 7 and after the temperature has risen in the chamber 13 to a desired point, the thermostat will operate to cut down the supply of current flowing to the heater so that the temperature within the chamber can be maintained at a desired maximum. Thus, when the temperature has risen in the chamber 13, the thermostat will operate to gradually cut off the current supply until a minimum amount of current supply is passing through the heater and as the heat from the chamber is dissipated by the air passing through the tubes 18, the thermostat will react to supply more current to the heater as may be necessary to maintain the chamber temperature to the degree desired. After the temperature in the room where the thermostat 24 is located, has risen to the desired point, the motor 21 will be shut off and the heated condition of the chamber 13 will operate over a long period to maintain the thermostat 29 in the position where the minimum amount of current will flow through the heater. The heater will be maintained operative, however, at all times that the switch 27 is closed.

Figure 2 illustrates a modified form of the heater structure described, which is for portable use and, therefore, is constructed and here illustrated upon a reduced scale. In this modified construction, the heater is generally designated by the numeral 30 and is of the same construction as that shown in Figure 1, with the exception that the top wall 31 over the hot air chamber 32 which is formed in the upper part of the structure, is provided with a series of heated air outlet openings 33, instead of distributing pipes, such as those indicated in Figure 1 by the numeral 25. Supported upon suitable brackets 34 or in any other suitable manner, is a hood structure 35, which is of materially greater diameter than the heater 30 and which completely incloses the upper part of the latter and is maintained in spaced relation with the top of the same by the brackets 34. The lower part of this hood is open, as shown, so that the area 36 which exists between the sides and top of the hood and the sides and top of the heater will permit the escape of heated air downwardly around the base of the heater so that the same can be effectively distributed through a room instead of being permitted to rise directly to the ceiling as it would do if the hood were not employed.

The supporting base 37 for the portable form of the heater may be of any suitable design to facilitate moving the heater about and a suitable fan or blower 38 may be supported upon this base to effect the desired forced circulation of air through the structure.

For the operation of the fan 38, which may have an electric motor 39 associated therewith, and the heating unit (not shown) suitable electrical coupling units in the form of outlet receptacle plugs 40 and 41 may be connected by suitable wires, with the motor 39 and with the resistance heating element and control thermostat in the heating structure 30 which is indicated in dotted outline and designated 42. The inlet for the fan structure 38 has coupled therewith a suitable flexible tube or pipe 43 which may have its inlet end secured to and opening through a panel or board 44 which is designed to be placed in a window and held in position by the sash thereof so that the necessary fresh air can be drawn in for passage through the heating structure. It will, of course, be obvious that after the portable heater is placed in position in a room it can be set into operation by coupling the plugs 40 and 41 with a suitable current supply receptacle and when it is desired to stop the circulation of air, the plug 44 may be removed from the receptacle and the heater allowed to function under the control of the thermostat unit 42.

From the foregoing, it will be readily apparent that there has been herein disclosed a simple but novel type of electrically operated air heater which will function automatically to maintain a desired room temperature.

While the portable form of the heater has been illustrated as being of single wall construction, it is, of course, to be understood that the same may be provided with a double wall having insulation therein, as in the structure shown in Figure 1.

I claim:

An air heater of the character described, comprising a drum structure having a top provided with heated air outlets, a partition wall secured transversely of said drum to form a heated air

chamber in the upper part thereof which communicates with said outlets, said drum below said wall being completely closed against communication with the outside atmosphere and forming a heating chamber, a hollow air receiving body in the lower part of said chamber, an air conduit leading through the wall of the drum to and communicating with said hollow body for carrying air from the outside of the drum into said body, air conducting tubes forming air passageways between the hollow body and said casing, an electric heating unit within the lower part of said chamber beneath said body, an electric current conducting means for carrying electric current to said heating unit, and a combined thermostat-rheostat within said closed chamber and connected in series in said current conducting means for regulating the supply of electric current to said unit in accordance with the temperature within said closed chamber.

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