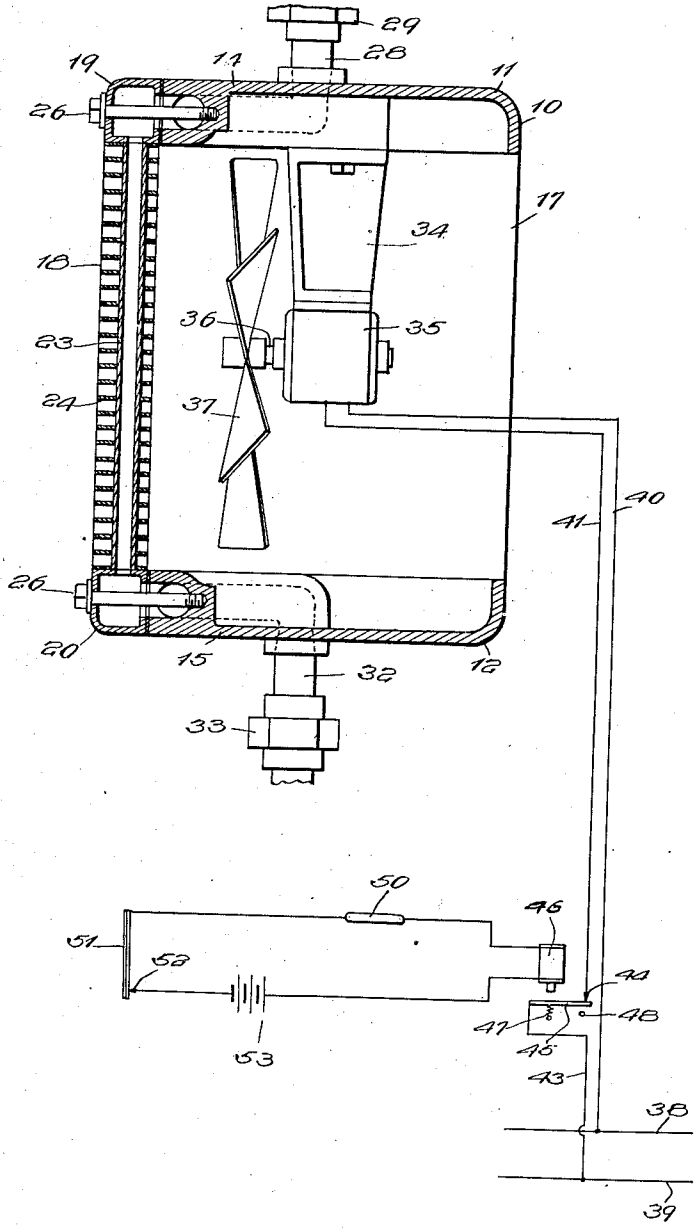
March 4, 1930. A. B. MODINE 1,749,499

AIR HEATING APPARATUS

Filed May 28, 1926



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UNITED STATES PATENT OFFICE

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AIR-HEATING APPARATUS

Application filed May 28, 1926. Serial No. 112,373.

My invention relates to heat exchange apparatus and particularly to heat exchange apparatus having automatic controlling means.

A particular object of the invention is to provide improved heat exchange apparatus having means for advancing a column of air and having means for controlling such air advancing means.

One form of the invention is embodied in a heating unit of the kind shown and described in my co-pending application, Serial No. 28,369, filed May 6, 1925, the heating unit preferably comprising a housing adapted to be suspended from a steam or hot water system and provided with a radiator core through which a column of air is advanced by a fan. The fan is driven by an electrical motor which is controlled by a thermostat so that the temperature of a room in which the heating unit is positioned is automatically regulated.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

The figure in the drawing is a section taken through a heating unit embodying a preferred form of the invention, a circuit forming part of the invention being shown diagrammatically in connection with the heating unit.

Referring to the drawing, the reference character 10 designates generally a housing which in this instance comprises upper and lower housing members 11 and 12, respectively, the housing members 11 and 12 being provided with passages 14 and 15, respectively. The housing 10 also comprises side plates 17 which are secured to the housing members 11 and 12. Secured to the housing members 11 and 12 is a radiator core 18 comprising upper and lower tanks 19 and 20, respectively. The tanks 19 and 20 communicate with the passages 14 and 15, respectively, and communicate with each other through a plurality of thin walled tubes 23 which are preferably provided with fins 24. It will be noted that the means for securing the radiator core 18 to the housing 10 comprises portions 26 extending through the tanks 19 and 20 and screw-threaded into the housing members 11 and 12. A nipple 28 screw-threaded into the housing member 11 communicates with the passage 14 and is preferably provided with a pipe union 29 whereby it may be operatively connected to a pipe forming part of a steam or hot water system. Screw-threaded into the housing member 12 and preferably coaxially disposed with respect to the nipple 28 is a nipple 32 which communicates with the passage 15 and is preferably provided with a pipe union 33 whereby the nipple may be connected to the drain or return pipe of a steam or hot water system. Obviously, the housing 10 together with the parts carried thereby may be angularly adjusted around the coincident axes of the nipples 28 and 32. Rigidly secured to the upper housing member 11 and depending therefrom is a bracket 34 to which an electrical motor 35 is secured, the shaft 36 of the motor being provided with a fan 37 adapted to advance a column of air through the radiator core 18 when the motor is in operation.

The above described details of construction are more fully shown and described in the aforementioned co-pending application and the present invention is limited to these details only to the extent indicated in the appended claims.

The electrical motor 35 may be connected to any suitable source of electrical energy such as for instance mains 38 and 39, suitable conductors 40, 41 and 43 being preferably provided for this purpose. In this instance, the conductor 40 connects one terminal of the motor 35 with the main 38 and the conductor 41 connects the other terminal of the motor 35 to a contact 44 engageable by an armature 45, the armature 45 forming part of a relay which also comprises an electro-magnet 46, or the equivalent. A spring 47 normally tends to hold the armature 45 against a stop 48 so that it is disengaged from the contact 44. One

terminal of the winding of the electro-magnet 46 is connected to one terminal of a switch 50, the other terminal of the switch being connected to one end of a thermostatic device 51. The thermostatic device is illustrated diagrammatically but preferably comprises a bi-metallic member having one end free to engage a contact 52 which is connected to one terminal of an electrical battery 53, the other terminal of the battery 53 being connected to the other terminal of the winding of the electro-magnet 46. When the bi-metallic member of the thermostatic device engages the contact 52, electrical current flows as follows: From the battery 53 through the winding of the magnet 46, the switch 50, the armature 51 and through the contact 52 back to the battery. When the magnet 46 is so energized it attracts the armature 45 and causes it to engage the contact 44 whereupon the electrical motor 35 is set in operation and the fan 37 advances a column of air through the radiator core 18. The arrangement is such that when the temperature of the room rises to a predetermined value, the bi-metallic element of the thermostatic device 52 will be disengaged from the contact 52 and the magnet 46 will be deenergized. This permits the spring 47 to retract the armature 45 and the motor 35 is disconnected from the source of electrical energy. Obviously, when the temperature of the room falls to a predetermined value, the motor 35 will again be set in operation.

It will be readily understood that when a column of air is being advanced through the core 18 there is an efficient exchange of heat between the heating fluid flowing through the tubular members 23 and the air passing around the tubular members, which exchange of heat will quickly cause the temperature of the room to rise. Then, when the thermostatic device 51 functions to disconnect the motor 35 from the source of electrical energy, the fan 37 will cease to advance a column of air through the radiator core and while there will be a transfer of heat from the heated fluid to the air, the efficiency of the heating apparatus will be less at this time than when the fan 37 is in operation. This permits the temperature of the room to be regulated.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. Heating apparatus comprising a housing, tubular means for suspending said housing from a pipe, a radiator core carried by said housing and adapted to communicate with said pipe through said tubular means, means carried by the housing for advancing a column of air through said radiator core, and thermostatic means for controlling said air advancing means.

2. Heating apparatus comprising a radiator core, means for supporting said radiator core to permit angular adjustment thereof around an axis of rotation, electrically driven means constrained to move bodily with the radiator core for advancing a column of air therethrough, an electric circuit connected to said air advancing means, a relay in said circuit, and a thermostat in said circuit for controlling said relay.

In testimony whereof, I have hereunto signed my name.

ARTHUR B. MODINE.