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1,558,848

W. A. DOBLE, JR

HEATER

Filed March 13, 1922

FIG. 2.

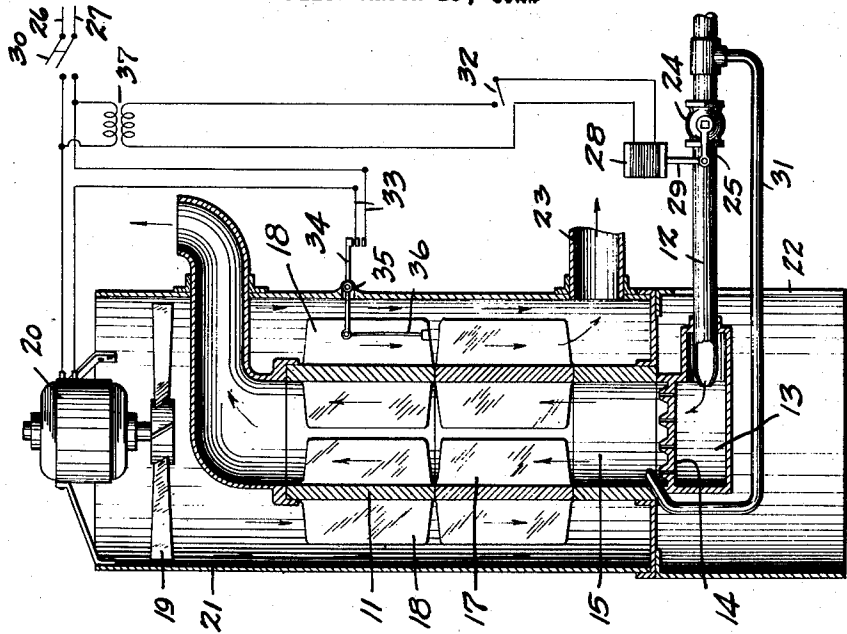
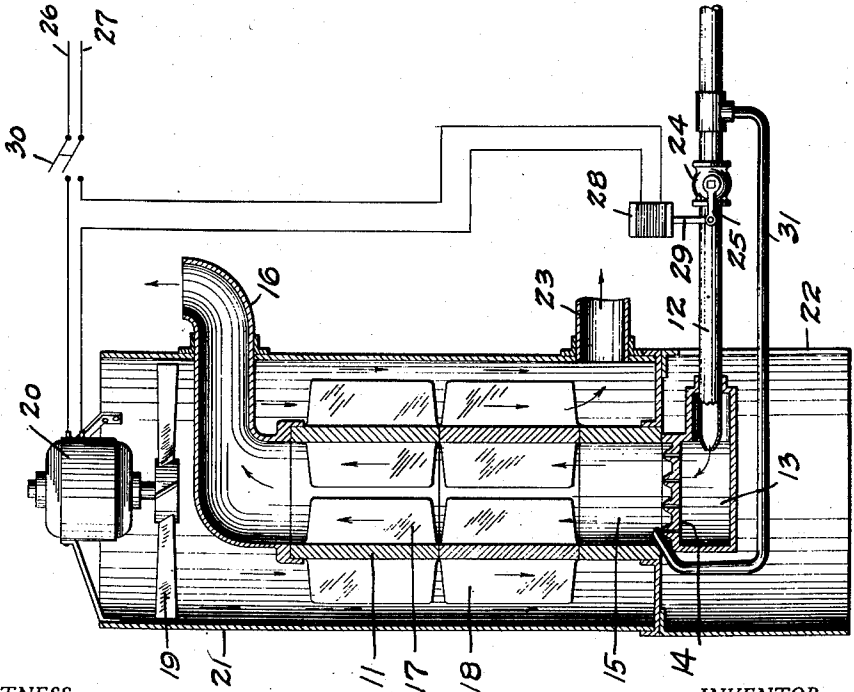


FIG. 1.



WITNESS
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UNITED STATES PATENT OFFICE.

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HEATER.

Application filed March 13, 1922. Serial No. 543,431.

To all whom it may concern:

Be it known that I, WILLIAM A. DOBLE, Jr., a citizen of the United States, and a resident of the city and county of San Francisco, in the State of California, am the inventor of a new and useful Heater, of which the following is a specification.

This invention relates to the control of air heaters, or of heaters heating any other medium than air, and more particularly to the control of heaters in which the air to be heated is forced past a heated element by artificial means, as by a fan.

In such heaters is is convenient to use some form of liquid or gaseous fuel, since then the control of the fuel is rendered less difficult. Heaters of this sort are described in an application entitled Heater, filed August 1, 1921 in the name of Warren Doble, having Serial No. 489,037. It is one of the objects of my invention to render it possible to control the operation of such heaters simply and easily. Especially is this advantageous, when the heater is to be controlled from a distant part of the building. The heater being usually placed in the cellar or basement, such control is desirable and it is entirely feasible with my invention to control its operation from any of the rooms.

In the application identified hereinbefore, there is described a scheme whereby the air is heated by contact with a metallic heated element, and a fan or the like is used for conducting the air past this heated element. When the heater is first started, it takes a short time before the heated element reaches its working temperature, due to the comparatively large mass of this element. During this short interval, it is best not to force the air past the element, because the passage of cool air past it would prevent the heated element from quickly reaching the required temperature and because this preliminary movement of the air would not be of any substantial benefit in heating. Furthermore, the movement of the air past the element may be advantageously carried on even after the heater is stopped from operating and until the heated element cools. It is another object of my invention to make it possible for the movement of the air to be started and stopped automatically at the proper times.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description, where I shall outline in full those forms of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. In the drawings I have shown an embodiment of my invention, but it is to be understood that I do not limit myself to the form shown, since the invention, as expressed in the claims, may be embodied in a plurality of forms.

Referring to the drawings:

Figure 1 shows one form of the control applied to a gas heater; and

Fig. 2 shows a modification.

In Fig. 1, an element 11, in the form of a cast, circular column, is adapted to be heated by combustion of fuel at its base. In the present instance, means are provided for using gas as the fuel, the gas being supplied through the pipe 12 to the burner chamber 13, the top 14 of which is perforated. The perforations open into a combustion chamber 15 upon which rests the heated element 11 in such a way that the products of combustion pass through it and out through the chimney 16, into a flue pipe or the like, following the course shown by the arrows. In order that a large surface of element 11 be presented to the heated gases passing within it, this element is provided with integrally cast fins 17, as described in the application hereinbefore identified. In the present instance the element 11 is made up of two sections placed one on top of another. The chimney 16 is supported upon the top section.

The element 11 is also provided with integrally cast fins 18 on its exterior so as to present a large heated surface with which the air to be heated may come in contact. To move the air past these fins, a fan 19 is provided, adapted to be driven by a source of power such as an electric motor 20. The fan and motor are appropriately supported at the top of the column 21 which serves as a housing for the various elements of the heater, as well as a means for guiding the air past the fins 18. This column is appropriately supported on the floor, as by means of the base 22, and is furthermore closed at the bottom except for the delivery pipe 23

which serves to carry the heated air to the required places. The passage of the air past the hot fins 18 causes it to be heated to the proper amount. The course of the air is indicated by the arrows near the outer portion of the column 21.

The description of the particular heater shown is here included to render the specification complete, but it is to be understood that my invention may be used with any other form of heater which requires that the air be moved by some controllable agency.

The supply of gas to pipe 12 is effected through a control valve 24, which may be operated by an arm 25. I provide means for simultaneously operating this valve and the fan 19. A convenient way in which the simultaneous operation may be effected is through the agency of an electric control circuit. Thus the mains 26, 27 which lead to any appropriate source of electrical energy, are arranged to cause current to be conducted both to the motor 20 and to a solenoid or electro-magnet 28. This magnet has a rod 29 which is operatively connected to the arm 25, so that when the magnet is energized, the gas valve 24 is opened. A double throw remote control switch 30, either manually or automatically operated, serves to connect, or disconnect, both motor 20 and electromagnet 28 to and from the source. Although these elements are shown as connected in series in the line, it is evident that other forms of connections may also be used. In order that it be unnecessary to light the fuel manually every time the gas is turned on at valve 24, I provide means for automatically igniting the fuel in the chamber 15. One convenient way in which this may be done is by the use of a pilot light fed from a thin pipe 31 back of the valve 24, so that it is always supplied with gas. Other means may, of course, be provided, either to supply a spark or a flame to the fuel jets.

The operation of the control illustrated in Fig. 1 is a very simple matter. If it be desired to start the heater, the switch 30 is thrown to its active position. This renders it possible for the fan 19 to be operated and the valve 24 to open and admit fuel to the chamber 13. Opening switch 30 stops the operation of the heater.

It is often advantageous not to start the fan until after the fins 18 are heated to the operating temperature. The modification of the system shown in Fig. 2 is adapted to produce this effect. In this figure the same type of heater is represented as in Fig. 1, and it is not necessary to describe it further. In this instance however, the energization of electromagnet 28 is dependent upon switch 32, the latter being in series with the electromagnet 28. In the present instance it makes no difference whether this electromagnet is energized from the same source

as the motor 20, but for convenience it is represented as fed in shunt to the motor 20, through a step down potential transformer 37. The switch 30 may be left closed, the control of the furnace being left to the switch 32. The completion of the motor circuit is dependent upon the temperature of the fins 18. The opening and closing of this circuit in response to this temperature is effected at the spring contacts 33 which are shown as being normally open. A lever 34, pivoted at 35, is arranged to close the contacts by a clockwise rotation. This rotation in the present instance is shown as directly caused by the expansion of an element due to heat imparted to it by contact with one of the fins 18. This element may be in the form of a rod 36, which has a large coefficient of expansion, although it may take other forms as long as its length alters sufficiently upon the desired increase in temperature. The lower end of the rod 36 is fixed to the fin and the upper end to the lever 34. The arrangement is such that when the temperature of the fin 18 is sufficiently great, rod 36 serves to force lever 34 to connect contacts 33 and start the fan. Upon opening of switch 32 to shut off the supply of fuel, the fins gradually cool, causing the thermostat to separate the contacts 33 and open the fan circuit. The switch 32 may be manually or automatically operated in any well known manner, and if switch 30 is continually closed, the entire heater control is localized at switch 32. This control insures that the operation of the fan takes place only when it may result in a useful effect.

It is to be understood that the temperature of the air in the heater or discharged from the heater is dependent on the temperature of the fins, and that the thermostatic element may be heated by the air as well as by conduction from the fins. Since the temperature of the air is dependent on the temperature of the fins, I have considered the thermostatic element as being responsive to the temperature of the fins, since the fins are the source of the heat that is transferred to the air.

I claim:

1. In an air heater having an element which is heated by the combustion of fuel, means for supplying fuel to the heater, a fan for driving air past the heated element, a motor for driving the fan, a circuit for the motor and means operated solely by an increase in temperature of the element to a predetermined magnitude for closing said circuit.

2. A heater comprising an element adapted to be heated, means for controlling the passage of air past the heated element and means operative solely by an increase in temperature of the heated element to a pre-

determined magnitude for actuating the control means to cause the passage of air past the heated element. 15

3. A heater comprising an element adapted to be heated, means for controlling the passage of air past the heated element, means operative solely by an increase in temperature of the heated element to a predetermined magnitude for actuating the control means to cause the passage of air past the heated element and means for controlling the supply of heat to the heater. 20

4. In an air heater having an element

which is heated by the combustion of fuel, means for supplying fuel to the heater, a fan for driving air past the heated element, a motor for driving the fan, a circuit for the motor and means operative solely by variations in temperature of the element for closing the circuit at a predetermined maximum temperature of the element and for opening the circuit at a predetermined minimum temperature of the element.

In testimony whereof, I have hereunto set my hand.

WILLIAM A. DOBLE, JR.