A. RECTOR.

HEATING APPARATUS.

APPLICATION FILED NOV. 23, 1912.

1,143,553.

Patented June 15, 1915.

3 SHEETS—SHEET 1.

Fig. 1

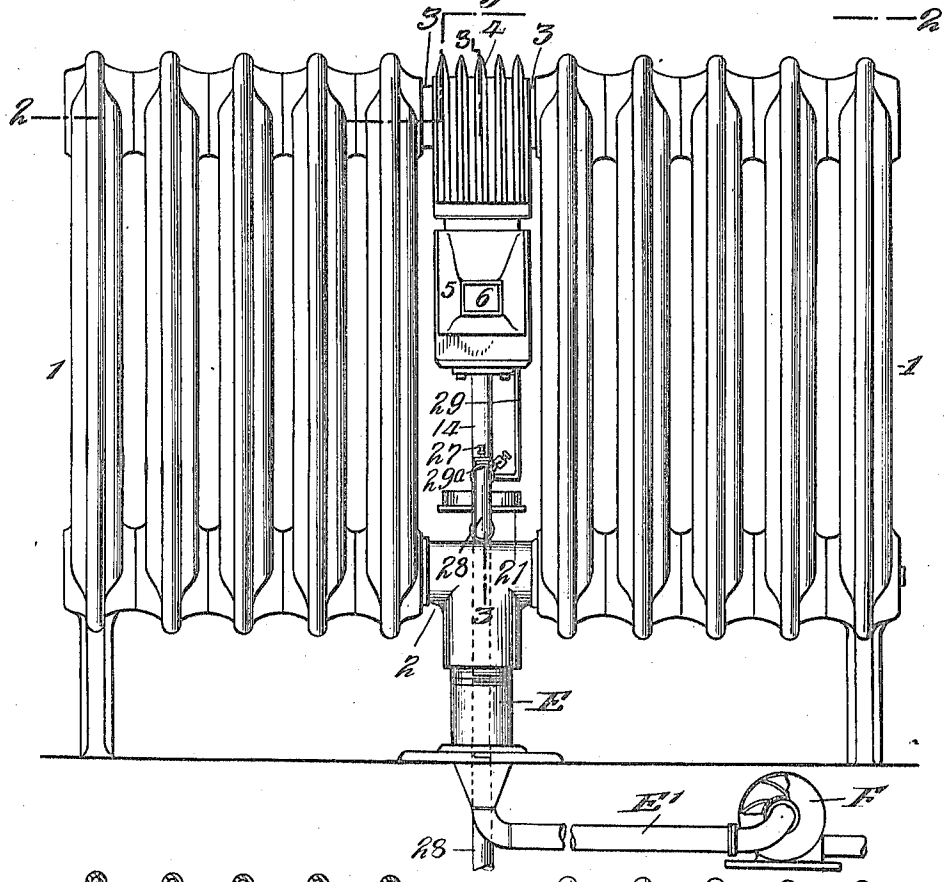


Fig. 2.

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Inventor:
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by his attorney
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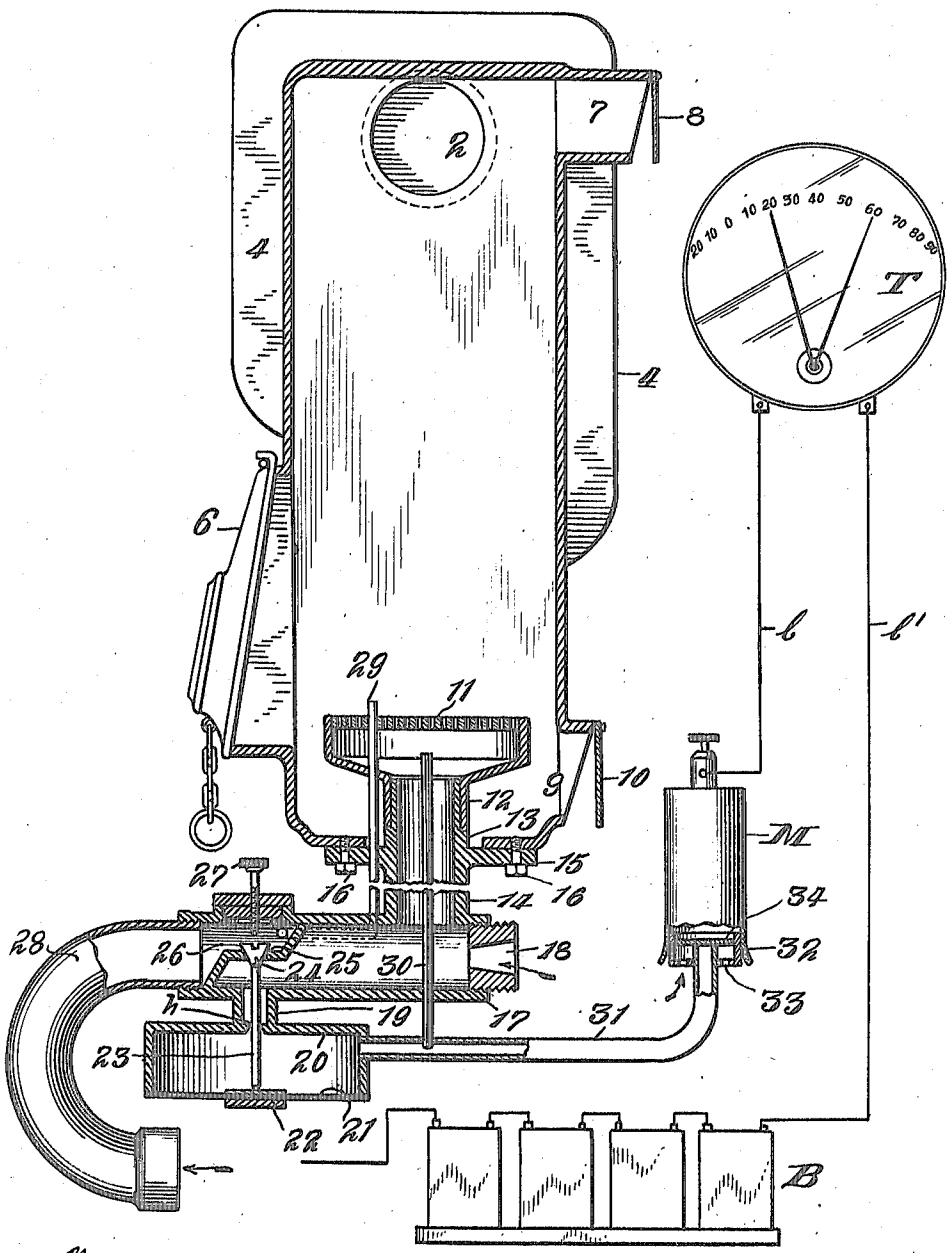
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3 SHEETS—SHEET 2.

Fig. 3.



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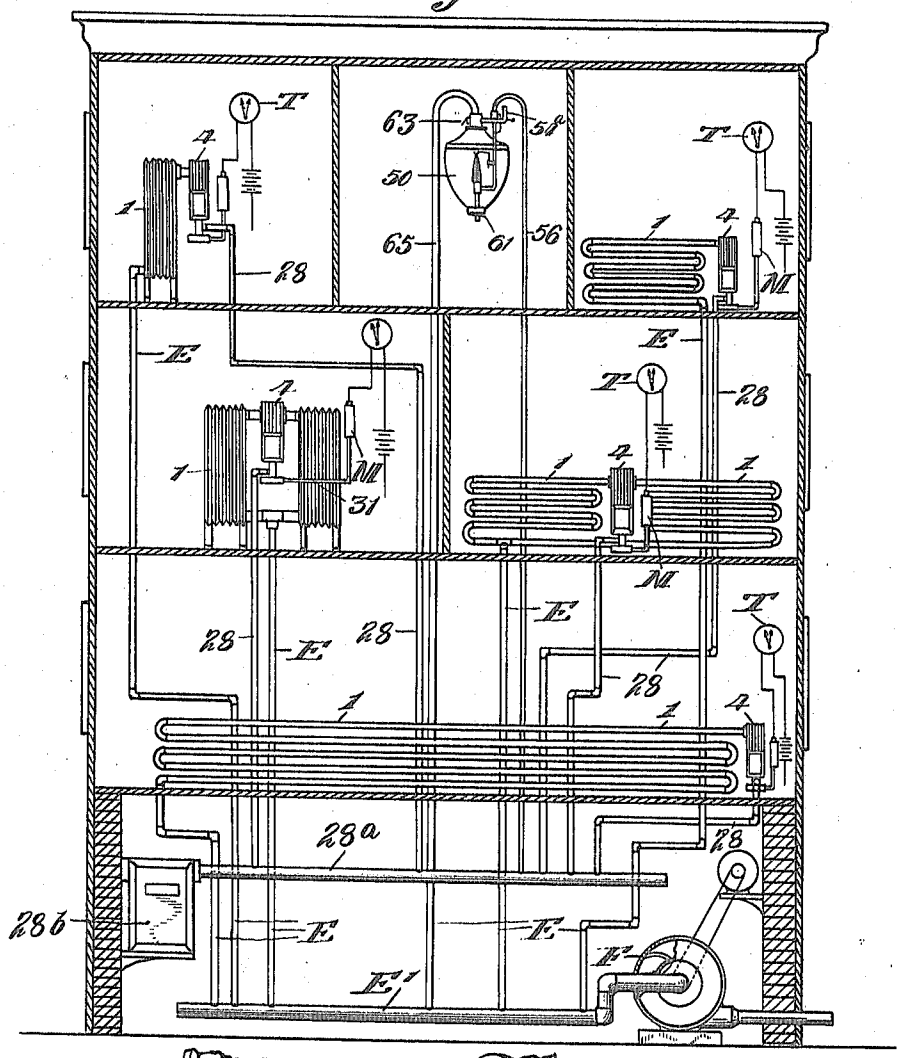
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1,143,553.

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3 SHEETS—SHEET 3.

Fig. 4.



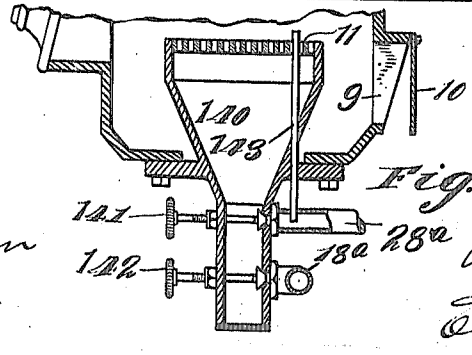


Fig. 5.

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UNITED STATES PATENT OFFICE.

ALCORN RECTOR, OF NEW YORK, N. Y., ASSIGNOR TO RECTOR GAS LAMP COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

HEATING APPARATUS.

1,143,553. Specification of Letters Patent. Patented June 15, 1915.

Application filed November 23, 1912. Serial No. 733,176.

To all whom it may concern:

Be it known that I, ALCORN RECTOR, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to apparatus for heating. As shown, it is provided with thermostatic control, but this may be dispensed with.

In the accompanying drawings,—Figure 1 is a front elevation of one form of apparatus embodying my invention, portions of the apparatus being made up of radiator sections, and other portions of combustion apparatus. Fig. 2 is a view, partly in top plan elevation and partly in horizontal section, at line 2—2 of Fig. 1. Fig. 3 is a transverse vertical elevation at line 3—3 of Fig. 1, and shows the combustion-chamber, burner and various parts connected therewith. The view also shows a thermostat, battery and magnet for automatic control of the heat generated in the combustion chamber. Fig. 4 is a sectional elevation of a building equipped with my new apparatus. Fig. 5 shows a burner substitutable for the burner shown in the other figures when the thermostat is not desired.

In the drawings, 1, 1 are radiator sections spaced apart and connected at the bottom by the horizontal member 2 of a T. At the top the radiator sections are connected by pipes 3 with a combustion-box 4 which is interposed in the space between the radiator sections and above the head 2 of the T.

The upper portion of the combustion-box 4 is preferably corrugated as shown, its lower portion 5 having a flap door 6 for entrance to the combustion chamber. At its upper rear portion, the combustion-box has an outwardly-opening flue 7 controlled by a flap-door 8; at its lower rear portion it is provided with a rearwardly-opening flue 9 controlled by a flap-door 10. A burner 11 having a hollow shank 12 is mounted upon the annular shoulder 13 of an upright T-tube 14 which is provided with a flange 15, this flange being clamped at 16 to the lower end-wall of the combustion-box. This end-wall is provided with an opening through which the tube 14 passes to support the burner within the combustion-chamber. The lower end of tube 14 extends forwardly and rearwardly, the rear end being provided with an air-intake 18, whereby air is supplied to the gas adjacent to the burner. The front end of tube 14 is provided with a bottom annulus 19, the lower end of which carries a cup-shaped diaphragm-holder 20, the under end of which is covered by a diaphragm 21 that centrally supports a weight 22. The annulus 19 communicates with the cup-shaped diaphragm-holder 20 through an opening or hole *h*, the sides or wall of which are knife edged as shown in Fig. 3. From the center of the weight, a valve-stem 23 extends upwardly through and closely fits the hole *h* in the dividing wall between the chamber thus formed and the annulus 19, the hole *h* being provided with knife edged sides or wall as shown in Fig. 3. The upper end of said valve stem is provided with an upwardly-opening valve 24 having a seat in the transverse diaphragm 25 of the chamber of the front end portion of the tube 14. Upward movement of the valve 24 is limited by a regulating-screw 27.

A gas-supply pipe 28 leads from any desired source of gas into the front end of tube 14. Valve 24 is the gas-supply valve of the heater and gas entering through conduit 28 and passing valve 24 will flow through the chamber of tube 14 to burner 11.

A pilot-burner pipe 29 has its burner end at burner 11 and its lower end is carried through diaphragm 25 where it opens directly into the chamber 26 above the gas-supply valve, and there it is continuously supplied with gas.

Centrally of the burner there is provided a vacuum tube 30 which extends from below the burner surface through tube 14 and has its bottom entering a tube 31, one end of which enters the diaphragm casing 20 and is in communication with the chamber thereof. The other end of tube 31 enters a casing 32 which is attached to a magnet M. The lower end of casing 32 has atmospheric-air inlets 33; and the end of tube 31 which communicates with chamber 32 is closable by an armature 34 that is controlled by the magnet M from which a lead *l* ex-

tends to a thermostat T, a lead l' extending from the thermostat to a battery B.

The flaps 8 and 10 automatically close the flues 7 and 9, when the suction apparatus is in operation. These flaps, if open, permit outside air to enter the combustion-chamber and support the combustion of the pilot when the rarefaction apparatus is not in operation, the flaps then hanging in vertical suspension from their hinges, and the outer ends of the flues slanting downwardly and inwardly.

The gas-valve 24 is lifted by the difference of pressure above and below the diaphragm and weight, thereby carrying the gas-supply valve off its seat. To cut off the heat, the thermostat should be set at the desired temperature; and the current from battery B through lead l', the thermostat, the lead l, the magnet M, energizes the latter and causes it to pull the armature 34 off the inlet end of the air-supply pipe 31; whereupon air at atmospheric pressure rushes through the inlet ports 33 of chamber 32 into pipe 31 and destroys the vacuum or low-pressure condition in the diaphragm chamber, causing the weight to fall and thereby to permit the valve 24 to gravitate to its seat and close off the gas supply from burner 11.

The upper portion of the radiator where one section connects with another in the group is provided with a heat equalizer 40 in the form of a tube that is closed at its outer end 41; and, between that end and its open end where it passes through pipe 3 into the upper portion of the combustion-chamber, it is provided with perforations 42 that communicate respectively with the chambers of the radiator sections. The perforations may be of any size or number to equally distribute the heat to the different sections; but while I show only two perforations or ports 42 in the end sections of the group, I show four in the intermediate sections; this is to keep the outer or end sections comparatively cool when it is so desired, because frequently the ends of this radiator form of heater come next to furniture or the like. A suction fan F, or other artificial exhaust apparatus, is used in connection with exhaust-pipe E. If thermostatic control is not used, a burner, such as shown in Fig. 5, may be substituted for the burner 11. The burner of Fig. 5 is indicated by 140 and is supplied with gas from the main 28^a and with air through the air-intake 18^a. Valves 141 and 142 control and regulate the intake of gas and air, respectively, and the pilot-light pipe 143 leads to the main 28^a.

Preferably, but not necessarily, the air admitted through the intake 18 or 18^a is taken from the room in which the radiator is installed; hence ventilation and improved hygienic conditions result.

As the combustion-box of each radiator in the preferred form of the invention is a constituent of the radiator, the heat of the combustion products drawn through the radiator from the combustion-box is wholly utilized in one or more rooms, where a radiator or radiators are installed; and in my system as many radiators as may be desired, each preferably having its own combustion-box, are installed in communication with one artificial exhaust apparatus. This is shown in Fig. 4, in which different well-known types of radiators are severally shown, each with a combustion-box and a thermostatic control, and each being in communication with the exhaust-pipe E. Each gas-supply pipe 28 for each combustion-box connects with a gas main 28^a shown leading from a meter 28^b; and each exhaust-pipe E of each radiator is shown in communication with a branch E′, which communicates with the exhaust-fan casing F.

Fig. 4 also illustrates a heating apparatus combined with a lighting apparatus, one of a number of which is shown. The translucent globe 50 forms a combustion chamber and is held at the top by a casing. An incandescing mantle is located in this combustion chamber in a suitable holder which may be provided with any desired number of mantles. Mixed air and gas are provided for the burner or mantle through a tube 54^a which leads through the casing and bends upwardly for delivery to the mantle. Gas is admitted to the tube through a pipe 56 leading from the gas-supply main 28^a. The bottom of the globe is closed by hinged flap 61 which when open, gravitates against a stop pin on the stud. There is also provided at the upper part of the lamp casing a swinging flap 63 which may hang open. When the suction apparatus is started and the air is exhausted from the globe, the flaps 61 and 63 automatically close so that the vacuum is not interfered with. When the suction apparatus is shut off, the flaps automatically open, thus supporting the pilot light when used. The combustion chamber of the lamp communicates by pipe 65 with the exhaust main E′ and when the artificial exhaust is operating, the products of combustion from the lamp are drawn continuously out of the lamp.

The form of the apparatus in whole or in part may be varied without departure from this invention.

The valve stem 23 where it passes into the diaphragm chamber engages with a knife edged wall of the hole h and this construction practically prevents gas under pressure from entering the diaphragm chamber and also practically prevents the flow of air from the diaphragm chamber upwardly past the gas valve to the gas main or to the gas going to the burner after passing the main.

The door 6 may be either solid or transparent so that the combustion box may be considered as a heater or lamp either or both.

The essential elements are an automatic valve for the fuel supply main, artificial means of exhaust, said artificial means of exhaust being an integral part of the apparatus and absolutely necessary to its proper functioning and to the control of one or more of its elements, such as the valve, the gas control and the heat radiator.

What I claim, is,—

1. In combination a combustion chamber, a burner therefor, means for supplying fuel to the burner, an exhaust conduit communicating with the combustion chamber, artificial means of exhaust operable to forcibly move the products of combustion from the combustion chamber through the exhaust conduit and also to control the said means for supplying fuel.

2. In combination a combustion chamber, a burner therefor, means for supplying fuel to the burner, means for lighting the fuel, an exhaust conduit communicating with the combustion chamber, artificial means of exhaust operable to forcibly move the products of combustion from the chamber through the conduit and also to control the said means for supplying fuel and the said means for lighting the fuel.

3. A heating apparatus, comprising a combustion chamber, a burner therefor, means for supplying fuel to the burner, means for lighting the fuel, an exhaust conduit communicating with the combustion chamber, artificial means of exhaust operable to forcibly move the products of combustion from the chamber through the conduit and to control the said means for supplying fuel and the said means for lighting the fuel and a thermostatic mechanism and coöperating devices operable to control the fuel supply when the said artificial means of exhaust is in operation.

4. An apparatus comprising a radiator; a combustion chamber structure; a burner therefor; a valve controlling the fuel supply for the burner; an exhaust conduit in communication with the combustion structure through the radiator; artificial means operable to forcibly move the products of combustion from the combustion structure through the radiator, and means to effect the seating of the valve upon the stopping of the said artificial means.

5. An apparatus comprising a radiator; a combustion chamber structure; a burner therefor; a valve controlling the fuel supply for the burner; an exhaust conduit in communication with the combustion structure through the radiator; artificial means operable to forcibly move the products of combustion from the combustion structure through the radiator, and means to effect the seating of the valve upon the stopping of the said artificial means, and the unseating of the valve upon the starting of the said means, and the lighting of the gas upon the unseating of the valve.

6. An apparatus comprising a radiator; a combustion chamber structure; a burner therefor; a valve controlling the fuel supply for the burner; an exhaust conduit in communication with the combustion structure through the radiator; artificial means operable to forcibly move the products of combustion from the combustion structure through the radiator, and means to effect the seating of the valve upon the stopping of the said artificial means, and the unseating of the valve upon the starting of the said means, and the lighting of the gas upon the unseating of the valve; and a thermostatic mechanism and coöperating devices operable to stop and start the fuel supply when the artificial means are in operation.

7. An apparatus comprising a radiator; a combustion chamber structure; a burner therefor; a valve controlling the fuel supply for the burner; means for admitting air to the fuel; an exhaust conduit in communication with the combustion structure through the radiator; artificial means operable to forcibly move the products of combustion from the combustion structure through the radiator, and means to effect the automatic seating of the gas valve upon the stopping of the said means; and means for equalizing the heat in the radiator.

8. The combination with a combustion structure of a burner therefor; a fuel supply main to the burner; an artificial suction device communicating with the combustion structure; the structure being provided with an automatically opening and closing valve or flap, which automatically opens when the said device is not in operation, and which automatically closes when said device is in operation.

9. The combination with a combustion structure having an air port in communication therewith of a burner therefor; an artificial suction device communicating therewith; a cover for said port which automatically opens when the suction device is not in operation, and normally covers said port when the suction device is in operation.

10. A heating apparatus comprising a combustion chamber structure; a burner therefor; means for supplying fuel to the burner; automatic means for stopping the fuel supply; and exhaust conduit, an artificial exhaust device communicating with the exhaust conduit and operable to draw the products of combustion from the combustion structure through the exhaust conduit and to open the combustion structure to atmospheric conditions when the exhaust device is not in operation.

11. A heating apparatus comprising a combustion chamber structure; a burner therefor; means for supplying fuel to the burner; automatic means for stopping the fuel supply; and exhaust conduit, an artificial exhaust device communicating with the exhaust conduit and operable to draw the products of combustion from the combustion structure through the exhaust conduit and to open the combustion structure to atmospheric conditions when the exhaust device is not in operation and to close the combustion structure to atmospheric conditions when the exhaust device is in operation.

12. A heating apparatus comprising a combustion chamber structure; a burner therefor; means for supplying fuel to the burner; automatic means for stopping the fuel supply; an exhaust conduit, an artificial exhaust device communicating with the exhaust conduit and operable to draw the products of combustion from the combustion structure through the exhaust conduit and to open the combustion structure to atmospheric conditions when the exhaust device is not in operation and to close the combustion structure to atmospheric conditions when the exhaust device is in operation; and automatic means for lighting the fuel.

13. The combination with a combustion chamber structure of a burner therefor; a fuel supply main to the burner; an artificial device communicating with the combustion chamber structure and operable to move forcibly the products of combustion from the chamber; an automatically seatable valve for the fuel supply main; and means for automatically unseating the valve on operation of the artificial device, said means comprising a diaphragm having a side exposed to the atmosphere, the other side forming a wall of a chamber communicating with the combustion chamber.

14. The combination with a combustion chamber structure of a burner therefor; a fuel supply main to the burner; an artificial device communicating with the combustion chamber and operable to move forcibly the products of combustion from the chamber; a valve for the fuel supply main; a diaphragm forming a side of a chamber communicating with the combustion chamber; and the valve contacting with the diaphragm; the diaphragm being responsive to changes of pressure and being operatively associated with the valve through said contact.

15. A heating apparatus comprising a combustion chamber; a burner therefor; an exhaust conduit communicating with the chamber; radiating means interposed between the chamber and the conduit; an artificial suction device communicating with the conduit and operable to draw the products of combustion through said radiating means and means to open the apparatus to atmospheric conditions when said suction device is not in operation.

16. A heating apparatus comprising a combustion chamber; a burner therefor; an exhaust conduit communicating with the chamber; radiating means interposed between the chamber and the conduit; an artificial suction device communicating with the conduit; and operable to draw the products of combustion through said radiating means and means to open the apparatus to atmospheric conditions when said suction is not in operation; means for equalizing the heat in the radiating means.

17. A heating apparatus comprising a combustion chamber, a burner therefor; an exhaust conduit communicating with the chamber; radiating means interposed between the chamber and the conduit; an artificial suction device communicating with the conduit and operable to draw the products of combustion through said radiating means and means to open the apparatus to atmospheric conditions when said suction is not in operation; and a thermostatic mechanism and coöperating devices operable to control the fuel supply.

18. A heating apparatus comprising a place for the combustion of fuel; means for supplying fuel; radiating means; artificial means of exhaust operable to move forcibly the products of combustion through the radiating means and means to effect the stopping of the fuel supply upon the stopping of the said artificial means.

In testimony whereof I have affixed my signature in presence of two witnesses.

ALCORN RECTOR.

Witnesses:
EDWARD E. BLACK,
M. E. SILLIMAN.