

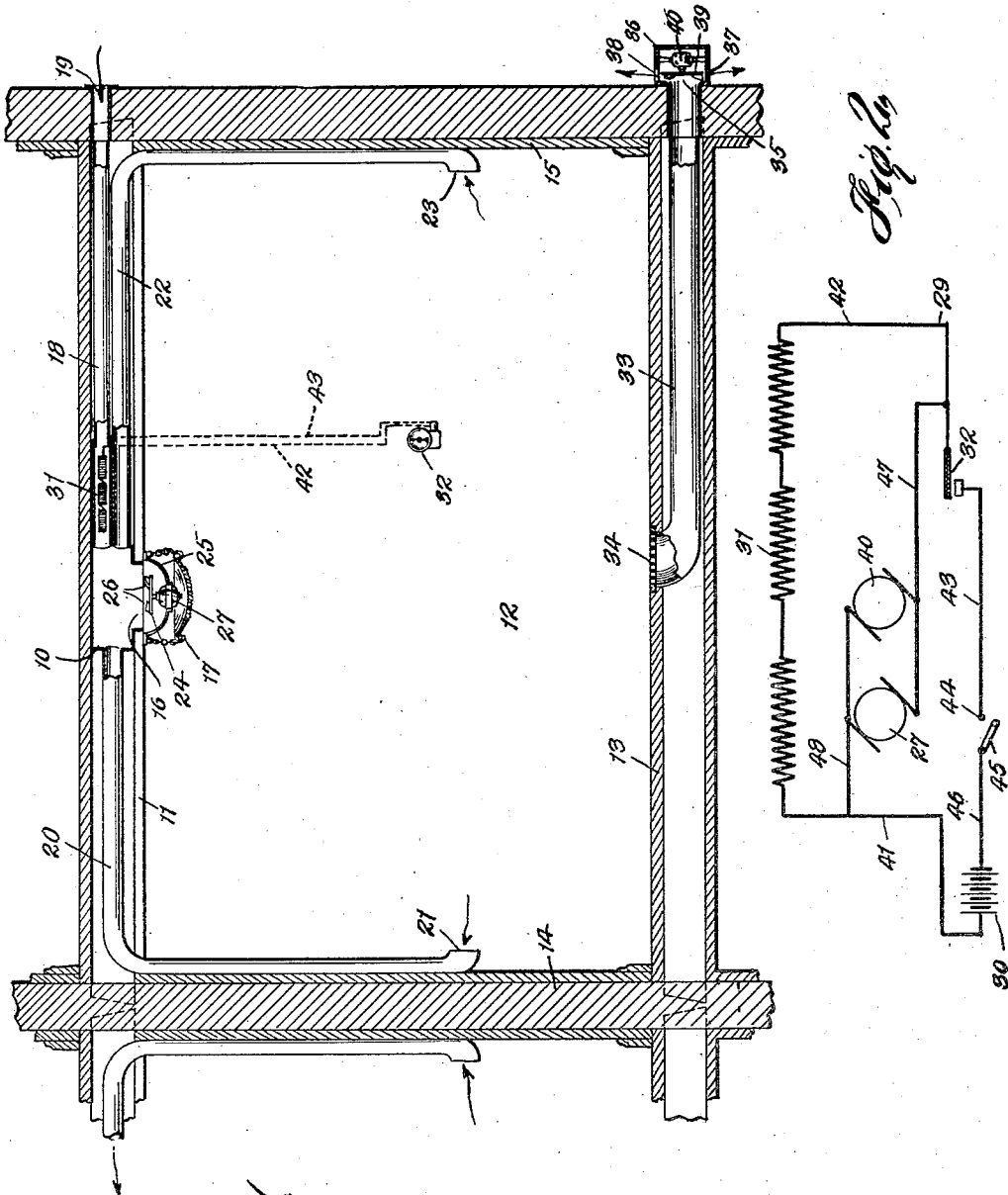
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HEATING SYSTEM

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*Fig. 1*

*Fig. 2*

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## HEATING SYSTEM.

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*To all whom it may concern:*

Be it known that I, ADOLPH F. ROTH, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in a Heating System, of which the following is a full, clear, and exact specification.

This invention relates more particularly to a class of heating apparatus.

My invention has for its object primarily to provide a simple and efficient system or apparatus designed to be employed for heating the rooms or chambers of buildings, cars, boats and elsewhere in a manner whereby the volume of heat units will be circulated in the lower part of the chamber by preventing tendency of the heat units to rise to the upper part of the chamber, in order to avoid waste of heat units as well as accomplishing an effectual heating of the habitable portion of the chamber prior to the heating of its upper part. The invention also contemplates exhausting in part the heated atmosphere in the chamber at intervals for enabling the temperature to be maintained at a desired degree of heat and which provides a proper circulation of atmosphere in the chamber. These advantages are accomplished by means providing a flue or duct adapted to be arranged in the upper part of the chamber, and the duct has an inlet for intake of air as well as having an outlet for delivery of air into the upper part of the chamber. A normally open electric circuit leads to part of the duct, and interposed in the circuit are resistance coils serving a means for heating when the circuit is closed, the air flowing through the duct from its inlet to its outlet. In the duct between its inlet and outlet is a fan adapted to be disposed in the upper part of the chamber, and this fan is operable with the closing of the circuit for causing the heated air in the chamber to circulate downwardly toward the lower part thereof so that the volume of heat units will first collect in this portion of the chamber instead of collecting in its upper part.

Other objects of the invention are to provide means for regulating the current delivered to the resistance coils whereby the heat units from the coils may be controlled; to provide a flue or duct adapted to be arranged in the lower part of the chamber for

serving as an air outlet; and to provide a second fan which is operative with the closing of the circuit to exhaust the heated air in the lower part of the chamber at desired intervals.

With these and other objects in view, the invention will be hereinafter more fully explained with reference to the accompanying drawing forming a part of this specification in which similar characters of reference indicate corresponding parts in all the views, and will then be pointed out in the claims at the end of the description.

In the drawing, Figure 1 is a fragmentary view showing a detail section, partly broken away, taken through the room or chamber of a building or elsewhere with an illustrative form of my heating system applied thereto, and

Fig. 2 is a diagrammatic view of the electric circuit which may be used in the system.

The heating system has a mixing chamber or casing 10 which may be of any desired shape and size to permit of being mounted above the central part of the ceiling, as 11, of a room or compartment or chamber, as 12, of a building, car or boat and elsewhere, the room having a floor, as 13, and walls, as 14, 15. In the lower part of the mixing chamber 10 is an opening 16 which serves as an outlet leading into the room 12, and suspended from and spaced below the ceiling 11 may be a dome, as 17, of an ornamental design for screening the outlet 16 of the mixing chamber 10. Above the ceiling 11 of the room or chamber 12 and leading into the mixing chamber 10 from and through the side wall 15 of the room is an air feed flue or duct 18 preferably in the form of a pipe having its end at the exterior of the side wall serving as an inlet 19 for intake of air for passage into the mixing chamber 10 through the flue or duct or pipe. From an opening in part of the mixing chamber 10 opposite to the duct or pipe 18, and above the ceiling of the room 12, leads an air delivery or circulating flue or duct 20 in the form of a right angled pipe having its elbow part extending through an opening in the ceiling so that the second end of this delivery flue or pipe terminates with an inlet, as 21, at the central part of the side wall 14 within the room. Also leading from the interior of the mixing chamber 10 above the ceiling 12 and under the air feed flue 18 may

be another air delivery or circulating flue or duct 22 in the form of a right angled pipe having one of its arms extending to the side wall 15 of the room 12. The elbow portion of the delivery flue or duct 22 is disposed through an opening in the ceiling so that the second end of this delivery flue terminates with an inlet, as 23, at the central part of the side wall 15 of the room 12. This arrangement of the feed flue 18 and the delivery flues 20 and 22 in conjunction with the mixing chamber 20 permits air to be admitted from the exterior of the room through the flue 18 into the mixing chamber 10 as well as permitting air to be delivered from the central parts of the interior of the room through the flues 20 and 22 into the mixing chamber.

The air is delivered to the mixing chamber 10 through the ducts through the medium of a suctional fan, as 24, which may be of any suitable type, though the form of the fan I prefer to employ is disclosed in my pending application for a patent, serially numbered 642,522, filed May 31, 1923, and this fan is bracketed, as at 25, to the ceiling of the room so that its blades, as 26, are disposed at or within the outlet 16 of the mixing chamber between the ceiling and the dome 17. The fan 24 is preferably driven by a suitable motor, as 27, having the fan keyed on its shaft, and the motor is of a form adapted to be driven by the current of an electric circuit, as 29. The circuit 29 may derive its current from any suitable source of electrical energy, as 30, and in the feed duct 18 is a resistance coil 31 of an appropriate type which is interposed in the circuit for heating the air fed into the mixing chamber from the exterior of the room through the duct 18. The heated air delivered into the chamber from the duct 18 will also be mixed with the air delivered through the ducts 20 and 21 by the operation of the fan 24 when the fan is driven, as will be hereinafter more fully explained. Interposed in the circuit 29 and arranged on a suitable part of one of the walls interiorly of the room 12 may be a thermostat, as 32, of any well known or preferred make for operating to regulate the electric current for controlling the heat units of the resistance coils 31, in order to regulate the heating of the air in the mixing chamber so that the air when delivered into the room will be at a proper temperature.

In the lower part of the room 12 may be provided a flue or duct, as 33, so that part of the air in the room may be exhausted at desired intervals. The duct 33 is preferably in the form of a pipe having its inlet end 34 leading from the room through an opening in the central part of the floor 13. The duct or pipe 33 may be disposed under the floor so that it extends through an opening

in the side wall of the room, and the second end of this duct provides an outlet 35 exteriorly of the room. On the outlet end 35 may be a box or casing, as 36, having openings, as 37, 38, in spaced parts of its wall, and in the casing 36 is mounted a fan 39 which is preferably of a form similar to the fan 24, above referred to, for being adapted when operated to suctionally exhaust air from the lower part of the room. The fan 39 is mounted on the shaft of a motor 40 arranged within the casing so that the fan is disposed for causing discharge of the air through the openings 37, 38 of the casing 36.

The motor 40 is interposed in the electric circuit 29 which may consist of a wire 41 leading from the source of electrical energy 30 to the resistance coils 31, and also from the resistance coils is a wire 42 leading to one pole of the thermostat 32. From the second pole of the thermostat is a wire 43 leading to one pole, as 44, of a suitable switch, as 45, and from the second pole of the switch is a wire 46 leading to the source of electrical energy 30. Connected to the wire 42 is one end of a wire 47 leading to one of the terminals of both of the motors 27 and 40, and connected to the wire 41 is a wire 48 leading to the second terminals of the motors. When the switch 45 is closed on the pole 44 the circuit will be closed from the source of electrical energy over the wires 41, 48 to the motors 27, 40, and to the resistance coils 31. The circuit will also be closed from the source of electrical energy over the wire 46, through the switch 45, over wire 43, through the thermostat 32, over wire 42 to the resistance coils and over wire 47 to the second terminals of the motors. Switches, not shown, may be provided on the motors for cutting-in and cutting-out either of the motors from the circuit at desired intervals, and with the driving of the motors the fans 24 and 29 will be operated whereby the fan 24 will suctionally force fresh air through the duct 18 into the mixing chamber, and this air will be heated by the resistance coils 31. Air from the interior of the room 12 will also be suctionally forced through the ducts 20 and 22 into the mixing chamber so that all the heated air will pass through the outlet 16 of the mixing chamber into the upper part of the room. With the operation of the fan 39 air from the lower part of the room will be suctionally forced through the duct 33 for exhausting the air through the outlet 35 of this discharge duct.

The fan 39 may be of a form having somewhat a stronger suctional action than the fan 26 in order that the power of the fan 39 will not alone exhaust the cold air from the lower part of the chamber, but will also suctionally force the heated air from the

upper part to the lower part of the chamber. Meanwhile the suctional action of the fan 26 will through the medium of the flues 21 and 23 further cause the air to circulate, and with a constant replenishing of fresh air through the inlet pipe 18 together with a determined exhaustion in the process by proper regulation of the fans a thorough circulation and uniform temperature will be maintained in all parts of the chamber without waste of heat units.

In the foregoing description, I have embodied the preferred form of my invention, but I do not wish to be understood as limiting myself thereto, as I am aware that modifications may be made therein without departing from the principle or sacrificing any of the advantages of this invention, therefore, I reserve to myself the right to make such changes as fairly fall within the scope thereof.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. A heating system for a chamber, comprising means providing a flue adapted to be arranged in the upper part of the chamber and having an air intake as well as having an outlet for delivery of air into the upper part of the chamber, a normally open electric circuit, heat emitting means interposed in the circuit for heating the air flowing through the flue from its inlet to its outlet when the circuit is closed, and a fan in the upper part of the chamber operable with the closing of the circuit for causing the heated air in the chamber to circulate downwardly toward the lower part thereof.

2. A heating system for a chamber, comprising means providing a flue adapted to be arranged in the upper part of the chamber and having an air intake as well as having an outlet for delivery of air into the upper part of the chamber, a normally open electric circuit, heat emitting means interposed in the circuit for heating the air flowing through the flue from its inlet to its outlet when the circuit is closed, a fan in the upper part of the chamber operable with the closing of the circuit for causing the heated air in the chamber to circulate downwardly toward the lower part thereof, and means interposed in the circuit for regulating the current transmitted to the heating means.

3. A heating system for a chamber, comprising means providing a flue adapted to be arranged in the upper part of the chamber and having an air intake as well as having an outlet for delivery of air into the upper part of the chamber, a normally open electric circuit, heat emitting means interposed in the circuit for heating the air flowing through the flue from its inlet to

its outlet when the circuit is closed, a fan in the upper part of the chamber operable with the closing of the circuit for causing the heated air in the chamber to circulate downwardly toward the lower part thereof, means interposed in the circuit for regulating the current transmitted to the heating means, and means in the lower part of the chamber providing an air outlet.

4. A heating system for a chamber, comprising means providing a flue adapted to be arranged in the upper part of the chamber and having an air intake as well as having an outlet for delivery of air into the upper part of the chamber, a normally open electric circuit, heat emitting means interposed in the circuit for heating the air flowing through the flue from its inlet to its outlet when the circuit is closed, a fan in the upper part of the chamber operable with the closing of the circuit for causing the heated air in the chamber to circulate downwardly toward the lower part thereof, means interposed in the circuit for regulating the current transmitted to the heating means, means in the lower part of the chamber providing an air outlet, and a second fan operable in said air outlet means with the closing of the circuit for suctionally exhausting determined volume of the heated air from the lower part of the chamber.

5. A heating system for a compartment, comprising a mixing chamber adapted to be arranged in the upper part of the compartment and having an outlet leading into the compartment, a duct leading into the mixing chamber from the exterior of the compartment for feeding air into the chamber, ducts leading from the central part of the interior of the compartment to the mixing chamber for delivery of air from the compartment also to the mixing chamber, a normally open electric circuit, a fan in the mixing chamber operable with the closing of the circuit for causing air to be suctionally transmitted into the mixing chamber simultaneously through all of the ducts and for discharging the mixed air through the outlet of the mixing chamber into the compartment, and heat emitting means interposed in the circuit for heating the air passing through the feeding duct into the mixing chamber.

6. A heating system for a compartment, comprising a mixing chamber adapted to be arranged in the upper part of the compartment, and having an outlet leading into the compartment, a duct leading into the mixing chamber from the exterior of the compartment for feeding air into the chamber, ducts leading from the central part of the interior of the compartment to the mixing chamber for delivery of air from the compartment also to the mixing chamber, a normally open electric circuit, a fan

in the mixing chamber operable with the closing of the circuit for causing air to be suctionally transmitted into the mixing chamber simultaneously through all of the ducts and for discharging the mixed air through the outlet of the mixing chamber into the compartment, heat emitting means interposed in the circuit for heating the air passing through the feeding duct into the mixing chamber, and means interposed in the circuit for regulating the current transmitted to the heating means.

7. A heating system for a compartment, comprising a mixing chamber adapted to be arranged in the upper part of the compartment and having an outlet leading into the compartment, a duct leading into the mixing chamber from the exterior of the compartment for feeding air into the chamber, ducts leading from the central part of the interior of the compartment to the mixing chamber for delivery of air from the compartment also to the mixing chamber, a normally open electric circuit, a fan in the mixing chamber operable with the closing of the circuit for causing air to be suctionally transmitted into the mixing chamber simultaneously through all of the ducts and for discharging the mixed air through the outlet of the mixing chamber into the compartment, heat emitting means interposed in the circuit for heating the air passing through the feeding duct into the mixing chamber, means interposed in the circuit for regulating the current transmitted to the heating means, and a duct in the lower

part of the compartment providing an air outlet.

8. A heating system for a compartment, comprising a mixing chamber adapted to be arranged in the upper part of the compartment and having an outlet leading into the compartment, a duct leading into the mixing chamber from the exterior of the compartment for feeding air into the chamber, ducts leading from the central part of the interior of the compartment to the mixing chamber for delivery of air from the compartment also to the mixing chamber, a normally open electric circuit, a fan in the mixing chamber operable with the closing of the circuit for causing air to be suctionally transmitted into the mixing chamber simultaneously through all of the ducts and for discharging the mixed air through the outlet of the mixing chamber into the compartment, heat emitting means interposed in the circuit for heating the air passing through the feeding duct into the mixing chamber, means interposed in the circuit for regulating the current transmitted to heating means, a duct in the lower part of the compartment providing an air outlet, and a second fan operable in said air outlet duct with the closing of the circuit for suctionally exhausting determined volumes of the heated air from the lower part of the compartment.

This specification signed and witnessed this 27 day of August A. D. 1923.

ADOLPH F. ROTH.