

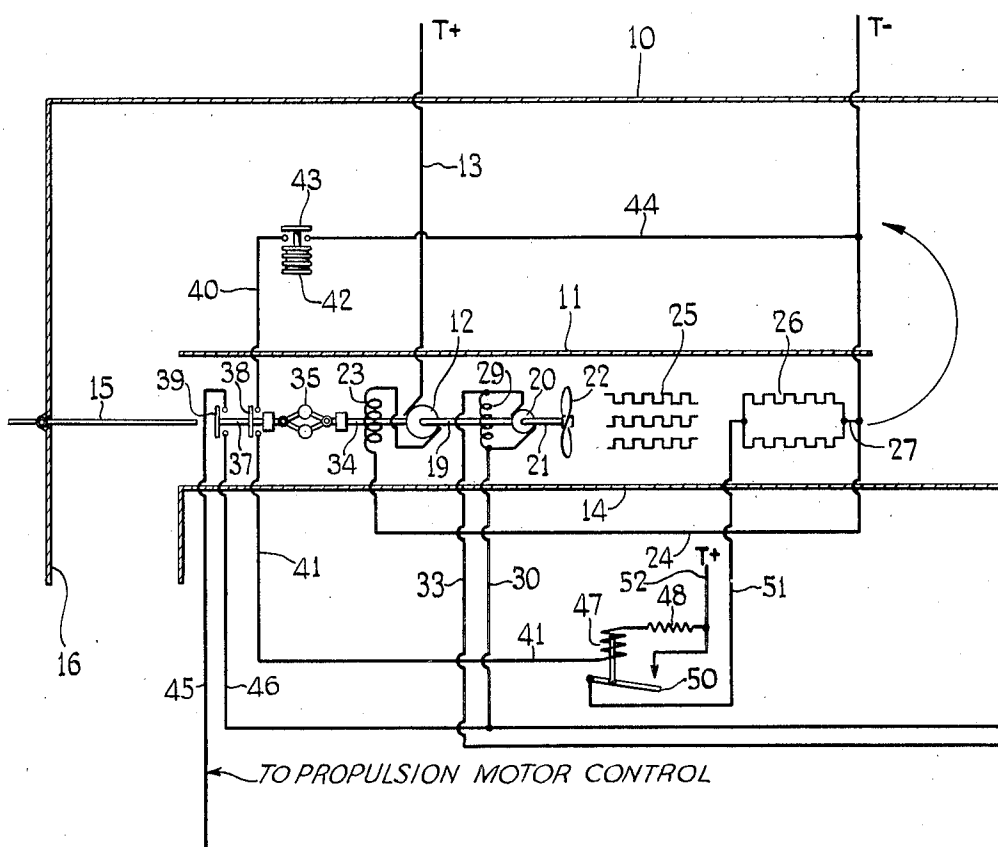
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HEATING AND VENTILATING SYSTEM

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HEATING AND VENTILATING SYSTEM

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4 Claims. (Cl. 219—20)

This invention relates to new and useful apparatus for heating and ventilating and has especial reference to heating and ventilating enclosures such as rooms, trolley cars, and the like, where the heating and ventilating is achieved by means of a fan blower and heating resistances associated therewith and is related to my copending application Serial Number 84,878, filed June 12, 1936.

10 The main object of this invention is to provide a simple and efficient mechanism wherein the heating resistances are not put into circuit until the fan blower is in motion and has reached a predetermined speed.

15 A further object is to provide mechanism whereby when the fan blower reaches a predetermined speed of rotation some of the heating resistances and the main power circuit will be closed and made effective but another resistance will remain ineffective until the heat in the enclosure to be heated has reached a predetermined minimum.

Further and more specific objects, features and advantages will more clearly appear when the specification hereinafter is considered and is taken in connection with the accompanying drawing which form part of the specification and will illustrate a present preferred form which the invention may assume.

30 Generally and briefly considered in its broader aspects, the invention involves a fan blower disposed in association with a plurality of heating resistances and adjacent an enclosure to be heated and ventilated. The enclosure is provided with a thermostat which is also in circuit with a relay, controlling at least one of said resistances. The fan blower is associated also with a speed governor of the centrifugal type preferably which when in motion operates and closes a series of switches whereby the main power circuit and the resistance circuits are governed and these circuits are made effective. Certain of the resistances are also governed by the thermostat so that when the governor closes the circuit of some of the resistance another portion of the resistance is not closed until and unless the heat in the enclosure to be heated has reached a predetermined minimum.

The invention as illustrated in the drawing by the single figure is a schematic diagram of the elements employed and their circuit connections.

The invention as illustrated in the drawing comprises an enclosure to be heated numbered 10 having a floor 11 beneath which is disposed

a motor 12 connected by wire 13 to a source of power which may be the trolley of a trolley car. Beneath the floor 11 is a wall 14 forming with the floor a duct within which the motor 12 and the associated apparatus is disposed. At the left end of the duct is a damper plate 15 which in the neutral position shown permits air to enter the duct both from the admission port 16 and from the overlying enclosure itself. When in its lower position the damper plate 15 will permit air into the duct from the enclosure only and when in its upper position it will permit air to enter the duct only from below or outside the car. The motor 12 operates a shaft 19 on which is mounted a generator 20 having a shaft 21 carrying a fan blower 22. The field coil 23 of the motor is connected by wire 24 to the negative side of the power line. In the duct near the fan blower is a resistance 25 which may be the resistance of the ordinary trolley car associated with its controller or may be an ordinary heating resistance and is connected in circuit in any suitable manner. A regular heating resistance 26 is also in the duct and is connected by wire 27 with the negative side of the power line.

The field coil 29 of the generator 20 is shunted across its terminals. The generator 20 is connected on one side by wire 30 to one side of a circuit containing a battery or other device. The other side of the generator 20 is connected by wire 33 to the other side of the same circuit. A rearward extension 34 of the motor shaft 19 is provided with a centrifugal device 35 of any desired type connected so as to move longitudinally the stub shaft 37 on which are supported bridging contacts 38 and 39 adapted respectively to connect wires 40—41 and 45—46. Wire 40 leads to a thermostat 42 having bridging contact 43 connecting, when closed, wire 40 with a wire 44 leading to the negative side of the trolley or power line. Wire 41 leads to a relay coil 47 and resistance 48 connected by wire 52 to the power line. The relay 47 actuates a switch element 50 which when closed connects wire 52 with a wire 51 leading to the negative side of the power line.

Wires 45 and 46 when closed by the bridge 39 govern, in any desired way, the controller for the propulsion motor, as that motor may not be operated unless bridge 39 connects wires 45 and 46.

In the operation of the device, when the trolley is placed on the power wire the motor 12 through wire 13 receives power and starts to rotate thus rotating shafts 19, 34, and 21 and thus rotates the governor 35 the generator 20 and the fan

blower 22. When the shaft 34 reaches a predetermined speed the governor 35 acts to close the bridges 38 and 39 and thus closes the above named circuits. When this happens, at once the resistance 25 is placed in circuit and some heating takes place and the other power devices in the circuit of wires 45 and 46 can function for whatever purpose that may be desired. However the resistance 26 is not placed operatively in circuit until and unless the bridge 43 of the thermostat 42 is closed and this is closed only when the heat in the enclosure to be heated has reached a predetermined minimum. When the minimum heat is reached however the bridge 43 is closed and this energizes the coil 47 lifting the switch element 50 and closing the circuit through the resistance 26 which then adds its heating effect to that of the ordinary or propulsion motor resistance 25 already in circuit.

It will thus be seen that I have provided a simple, efficient and compact apparatus for heating and ventilating an enclosure such as the interior of a trolley car. The heating resistances and the main power circuits including those containing the motor and relay etc. can not be closed for effective operation until and unless the fan blower is in operation at above a predetermined speed since the circuits of these devices are closed through contacts controlled by the governor which is under the dominance of the shaft of the fan blower. Also the full heating effect is not achieved unless the thermostat in the enclosure is in operative condition due to low heat in the interior thereby insuring that overheating of the interior is not possible.

Of course the motor 12 may be used with or without the generator 20.

While the invention has been described in detail with respect to the present preferred form thereof shown in the drawing, it is not to be limited to such details and forms since many changes and modifications may be made in the invention without departing from the spirit and scope of the invention in its broadest aspects. Hence it is desired to cover any and all forms and modifications of the invention which may come within the language or scope of any one or more of the appended claims.

What is desired to claim and secure by Letters Patent of the United States, is:

1. In combination an enclosure to be heated and ventilated, a fan blower, resistances associated therewith to heat the enclosure, and means associated with the fan blower to place the resistances in circuit only when the blower has reached a predetermined speed of rotation, a propulsion motor, a control device adapted to act as exclusive means to render said propulsion motor effective, and means by which said control device is actuated positively and exclusively by a rotating part of said blower.

2. In combination with a main energizing electrical circuit and a plurality of power circuits adapted to be energized therefrom, including at least a propulsion motor circuit and a fan blower energizing circuit, said last-named circuit being normally closed and said propulsion motor circuit being normally open, an enclosure to be heated and ventilated, a fan blower, resistances associated therewith to heat the enclosure, means associated with the fan blower to place the resistances in circuit only when the blower has reached a predetermined speed of rotation, a thermostat in the enclosure and means operated by the thermostat to place at least one of said resistances in circuit only when the heat in the enclosure has reached a predetermined degree; and means exclusively actuated positively by rotation of a part of said fan blower to render said propulsion motor circuit effective, subject to conventional control.

3. The combination as claimed in claim 1, in which is provided a thermostat in the enclosure and means operated by the thermostat to place at least one of said resistances in circuit only when the heat in the enclosure has reached a predetermined degree.

4. The combination as claimed in claim 1, in which is provided a thermostat in the enclosure and means operated by the thermostat to place at least one of said resistances in circuit only when the heat in the enclosure has reached a predetermined level, a relay in circuit with the thermostat, and switching means operated by the energization of the relay to close the circuit to said one of said resistances.

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