E. J. SMITH.

HEATING APPARATUS.

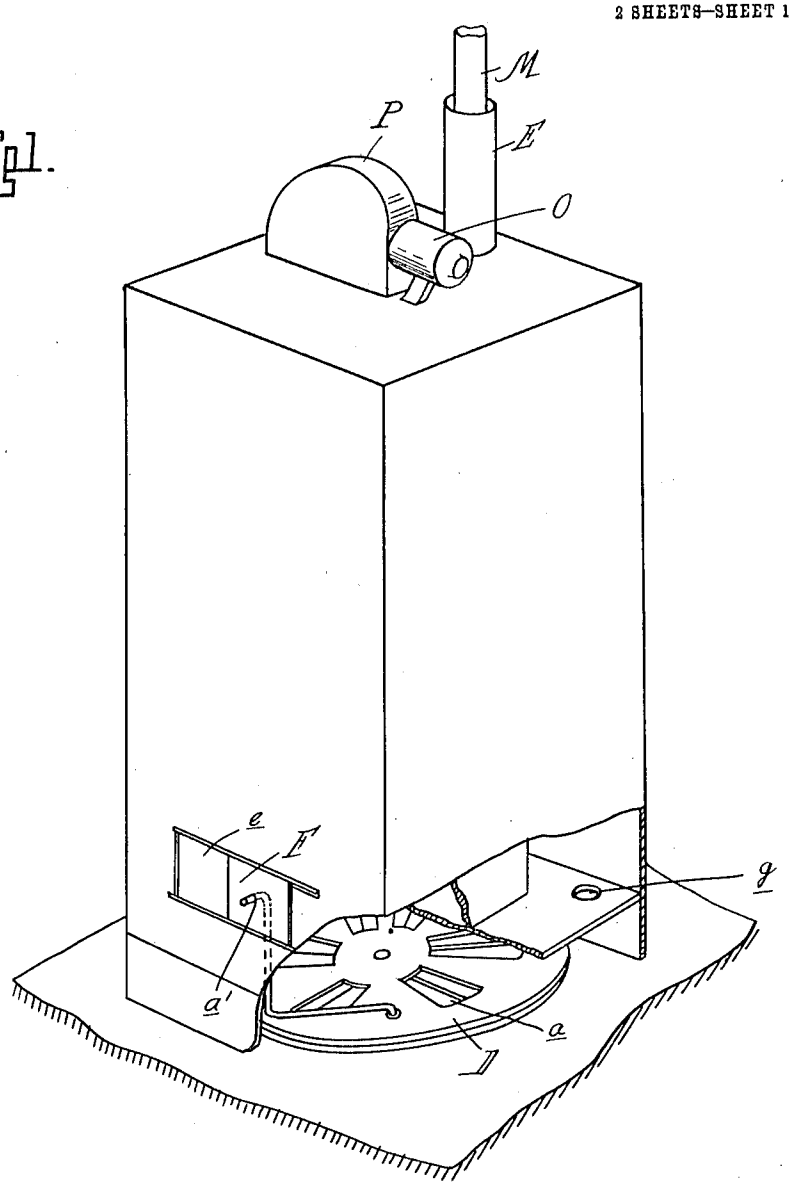
APPLICATION FILED FEB. 4, 1911.

1,089,728.

Patented Mar. 10, 1914.

2 SHEETS—SHEET 1.

Fig 1.



Witnesses

H. E. Ford

Chas. E. Belknap

Inventor

Elmer J. Smith

By Whittemore Hulbert & Whittemore

attys

E. J. SMITH.

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2 SHEETS—SHEET 2.

Fig. 4.

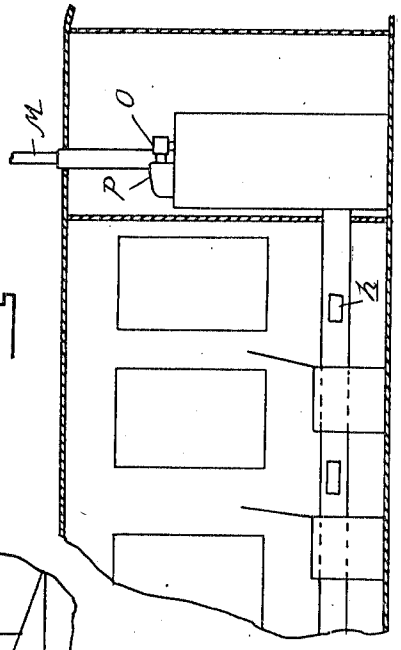


Fig. 3.

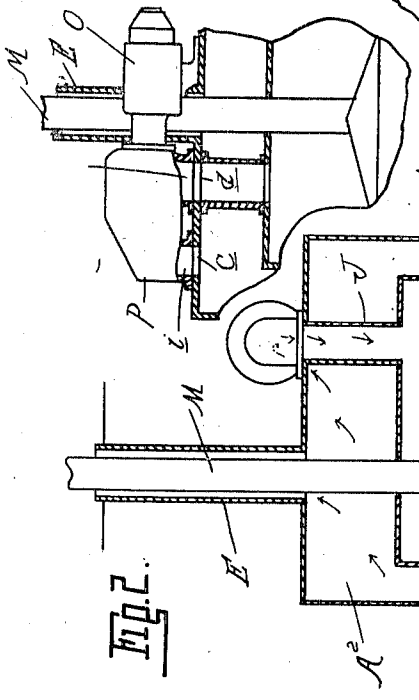


Fig. 2.

Witnesses

F. B. Ford

J. W. Belknap

Inventor

Elmer J. Smith

By Whittemore Hulbert & Whittemore

Atty's

UNITED STATES PATENT OFFICE

ELMER J. SMITH, OF DETROIT, MICHIGAN, ASSIGNOR TO PETER SMITH HEATER COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

HEATING APPARATUS.

1,089,728. Specification of Letters Patent. Patented Mar. 10, 1914.

Application filed February 4, 1911. Serial No. 606,550.

To all whom it may concern:

Be it known that I, ELMER J. SMITH, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates generally to a heating mechanism, and more particularly to an apparatus of the hot-air type, especially designed in the present instance for use in connection with street railway cars, but as will be obvious from the following description is susceptible of other analogous uses.

The invention comprehends a construction that will allow the air supply to be taken either from the exterior or interior of the compartment to be heated, as for instance the car, or partially from each source, according to the temperature of the atmosphere, it being frequently desirable in extremely cold weather to provide an air supply for the apparatus that has been heated or partially heated, whereby better heating results and economy in fuel consumption is obtained.

The invention further comprises various details of construction, and their peculiar arrangements and combinations, as will be more fully hereinafter set forth and claimed.

In the drawings,—Figure 1 is a sectional perspective view of an embodiment of my invention; Fig. 2 is a vertical central section, illustrating the interior construction of the apparatus; Fig. 3 is an enlarged sectional view, showing a detail of construction; and Fig. 4 is a sectional view, showing the application of the apparatus to a street railway car.

In its preferred form, the apparatus consists of an external casing A resting upon a suitable support B, which in car heating may be the car flooring. The casing bottom C is provided with a circular series of apertures *a* adapted to register with corresponding vertical openings *b* in the flooring, constituting fresh air inlets. Controlling these openings is a circular damper D, pivoted centrally for rotation in a horizontal plane. For a purpose hereinafter set forth, a vent stack E is provided for the casing at its top, and openings *c d* are formed in said top. Within one of the sides, as *f*, of the casing is formed an air inlet opening *e* adapted to receive its supply from the interior of the car or compartment that is to be heated. F is a slide damper controlling this inlet, and G is a connection between the latter damper and the bottom damper D, the construction and arrangement of parts being such that the movement of either damper will cause a corresponding shifting of the other, the dampers being so arranged however that when one is closed the other will be entirely opened. The connection referred to is preferably in the form of a bent rod pivoted to the circular damper D, having a transverse portion *a'* extending through the slide damper and projecting some distance therebeyond, forming a handle or operating member, by means of which both dampers may be actuated.

Projecting across the outer casing near its bottom portion is a transverse partition H formed with a plurality of openings *g*, arranged preferably in the partition near the corners, as indicated in Fig. 1. Mounted upon this horizontal member is an inner casing I, arranged concentrically within the outer casing and spaced therefrom, forming an outer annular air chamber A^2 and an inner chamber I' inclosed by the outer. A conduit J leads from the top of the inner casing to the discharge opening *d*, establishing communication between the inner air chamber and the conduit included in the air propelling mechanism shortly to be described. From the bottom portion of the inner casing the main discharge conduit K leads, projecting through the outer casing as shown and adapted to carry heated air from the inner chamber within the car or compartment to be heated. This discharge conduit is of any desired length, and in car heating may be formed with a plurality of openings, as *h*, through which the heated air may be uniformly distributed within the car interior.

Located within the inner air chamber is a heater L, here shown in the form of a stove resting upon the partition H and having a smoke pipe M extending upwardly through the vent stack E, the pipe and stack being of different diameters so as to provide an annular air space leading outwardly from the upper part of the outer air chamber.

Mounted upon the top of the outer casing is an air propelling mechanism of any suitable construction, including a motor O and a fan of any approved type adapted to be operated thereby, the casing P of which is provided with an intake *i* connecting with the opening *c* in the casing top and with a discharge section *j* having communication with the duct J. As will be obvious, the intake pipe or duct and the discharge section form in connection with the fan casing a conduit connecting the inner and outer air chambers.

When used for street car heating, the apparatus may be applied as shown in Fig. 4, all of the apparatus with the exception of the discharge conduit being located in the vestibule, while the main discharge pipe leads therefrom within the car and positioned in proximity to the flooring so as to distribute the heat uniformly through the car interior. The heater may be so arranged that the slide damper F opens into the vestibule, receiving its air supply from that source and where it can be under the supervision of the motorman or conductor.

In most instances, the apparatus in operation has the bottom damper D entirely open, so as to receive a supply of cold air, and the slide F closed. By this arrangement, outside air is drawn by the fan upwardly through the outer air chamber around the inner, and thus partially heated; through the fan casing, and is then forced downwardly through the inner air chamber about the heater proper, where it is still further heated, and is finally discharged within the car. In extremely cold weather, when it is desired to supply heated air to the apparatus the dampers are reversed, the slide being opened by the operator, which compels the closing movement of the bottom damper. The direction of the air currents through the apparatus is as before pointed out, merely the source of supply being changed. By opening the slide part way, a mixture of heated air from the car and cold air from the outside will be supplied. Thus, the desired temperature of the air supply may be regulated to a nicety to suit the conditions of the weather.

In the majority of cases, the cars before making the run stand in the sheds or barn some little time, and, while waiting, the heater is in operation to maintain the proper temperature, but the air propelling mechanism is not operated. In the absence of a forced draft through the mechanism, there is great tendency of over-heating, with consequent damage to the car and apparatus. To guard against this I have so constructed the mechanism that a current of air will pass preferably between the two casings through the outer air chamber and be discharged outside of the car, this serving to vent the outer air chamber and thereby cool the latter and at the same time exert a cooling effect upon the inner chamber and the heater therein. In the present form of apparatus, the cooling is effected through the agency of the stack E in connection with the damper-controlled intakes of the mechanism. When the air propelling means is operating, very little if any air will pass out through the vent stack. When the motor is inactive, a current of air is induced through either the bottom or slide damper, passes upwardly within the outer air chamber, and then outwardly through the stack. In this manner the over-heating of the apparatus is prevented, and preferably the means for effecting this result is automatic in its operation.

What I claim as my invention, is—

1. In a heating apparatus, the combination with an outer casing, of a vent stack communicating therewith, an inner casing having an air inlet at its top and an air outlet at its base, a heater in the inner casing, a flue leading therefrom through the stack, and an air propelling means adjacent the stack for causing air to pass through the outer casing into the top of the inner casing and out from the lower part of the inner casing whereby the suction of the air propelling means when the latter is in operation will influence the passage of the air inwardly through the stack and will permit the passage of heated air outwardly through the stack when idle.

2. In a heating apparatus, the combination with a casing having a vent stack communicating therewith, of a heater having a flue extending through the stack and of a diameter less than that of the stack to form an air space therebetween, an inner casing surrounding the heater, and an air forcing means communicating with the outer and the inner casing and arranged to create a suction within the said vent stack, when said air forcing means is in operation, and permitting the escape of heated air through said stack when the said air propelling means is at rest.

3. In a heating apparatus, the combination with an inner and an outer casing, a vent stack communicating with the upper

part of the outer casing, and air forcing means operatively associated with the casing and the vent stack whereby a pressure less than that of the atmosphere is created within the outer casing, thereby preventing the escape of heated air through the vent stack during the operation of the air propelling means, but permitting the escape of heated air through the said stack when the said air propelling means is at rest.

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

ELMER J. SMITH.

Witnesses:

JAMES P. BARRY,

WILLIAM PAGEL.