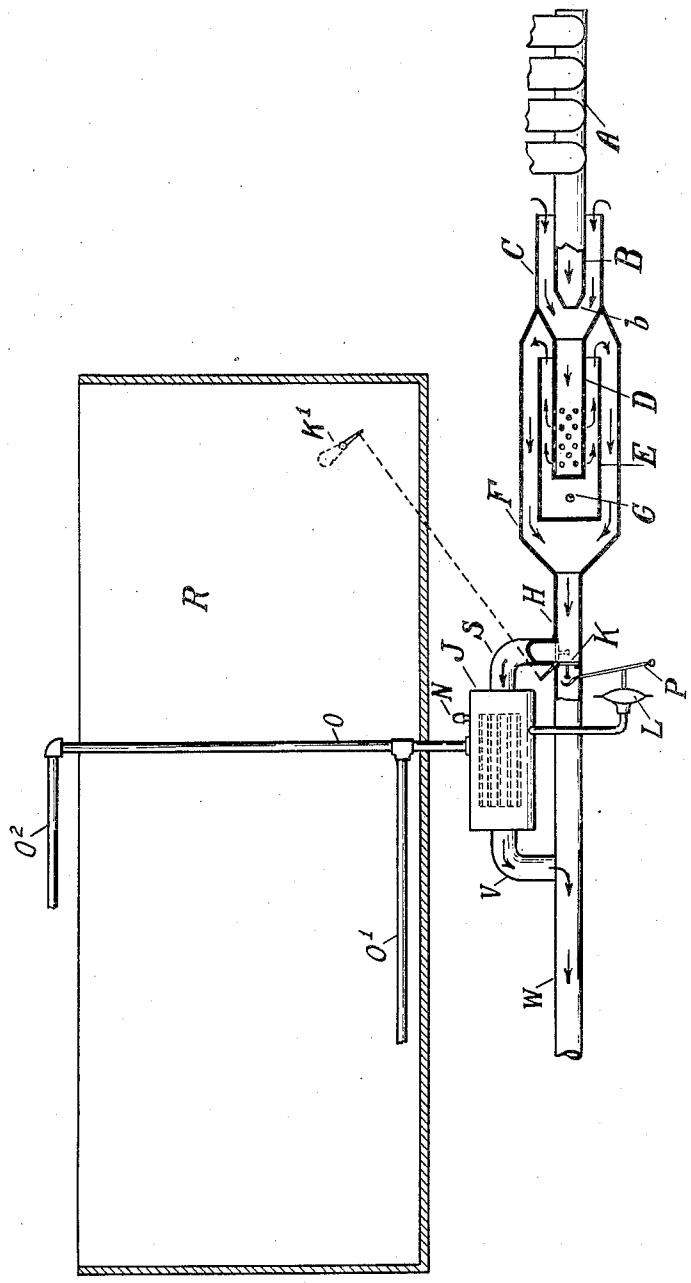
May 12, 1931. L. P. HYNES 1,804,875

BUS HEATING SYSTEM

Filed Feb. 2, 1926



Inventor

LEE P. HYNES

By his Attorney

E. M. Bentley

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UNITED STATES PATENT OFFICE

LEE P. HYNES, OF ALBANY, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CONSOLIDATED CAR-HEATING COMPANY, INC., OF ALBANY, NEW YORK, A CORPORATION OF NEW YORK

BUS HEATING SYSTEM

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The invention will be hereinafter fully set forth and particularly pointed out in the claims.

My invention is shown diagrammatically in the accompanying drawing.

My invention relates to means for heating vehicles, particularly busses, which are equipped with hydrocarbon engines. The source of heat which I employ is that derived from the re-combustion of the exhaust from the aforesaid engine, and, in the present case, I utilize that heat in a steam boiler wherefrom steam pipes convey the steam to suitable radiators on both the lower and upper decks of a bus, or other place where heat is desired in a railway car, boat or other vehicle.

Referring to the drawing, R represents the body of a vehicle to be heated. A represents the exhaust manifold of a hydrocarbon engine of the internal combustion type and B the exhaust pipe leading therefrom and terminating at *b* in a suitable nozzle for determining the velocity of the outflow. C is a sleeve surrounding tube B but of larger diameter into which atmospheric air is drawn for the re-combustion. The sleeve C is continued by a tube D which is closed at its left end, but is perforated by a multiplicity of holes which give the effect of a wire screen, permitting the outflow of gas but preventing the entry of the flame. Outside of tube D is a baffle tube E closed at its left end but open at its right, while outside of the tubes D and E is the casing F from the left end of which the hot gases emerge through the tube H. In operation the exhaust which supplies fuel for the re-combustion is delivered from B into D, being at the same time mingled with the air that is sucked in from C. On emerging from the perforations in D, the mingled gases burn inside of E, being ignited by a spark plug G, or a permanent flame. The burning gases then pass leftward outside of E and enter the pipe H. Owing to the nature of the re-combustion which takes place at very high temperature and other conditions I do not enclose the re-burner in a steam boiler, but after the re-combustion products have left the burner I divert them from pipe H into a branch pipe S, from which I pass them into the flues of a tubular boiler J. After the heat has been abstracted by the water in the boiler the waste products pass by pipe V into the final exhaust pipe W. At the junction of pipes H and S I place a damper K by means of which the products may be diverted wholly or partly into pipe S or the exhaust pipe W. This damper K may be manually controlled by a lever K^1 on the instrument board of the vehicle, but in the event of an undesired steam pressure in the boiler a diaphragm located within a diaphragm chamber L subject to the steam pressure acts through lever P to close damper K against pipe S, as shown by dotted lines, thereby diverting the hot products from the boiler and into the exhaust pipe W. While the damper may be operated by the hand lever K^1 independently of diaphragm L, so long as the diaphragm is more or less inactive, the full force of the steam upon the diaphragm will close the damper by moving the hand-lever backwards. By this means the boiler is adequately protected against surplus pressure, although an ordinary safety-valve N may be added if desired. From boiler J a steam pipe O rises from which branch pipe O^1 may go to the heat-distributing radiators on the lower deck of the vehicle and, if desired, a second pipe O^2 may lead to similar radiators on the upper deck. Both O^1 and O^2 will drain back into the boiler.

What I claim as new and desire to secure by Letters Patent is:

1. In a heating system, the combination with a boiler provided with a heating chamber, and a radiator located in the space to be heated and connected with said boiler, of a device for reburning exhaust gases of an internal combustion engine, an exhaust pipe for said reburned gases, a duct joining said exhaust pipe and leading to the heating chamber of said boiler, a damper located at the junction of the duct with the exhaust pipe to selectively control delivery of reburned gases to said boiler or to said exhaust pipe, and means connected with the boiler for actuating said damper.

2. In a heating system, the combination

with a boiler provided with a heating chamber, and a radiator located in the space to be heated and connected with said boiler, of a device for reburning exhaust gases of an internal combustion engine, an exhaust pipe for said reburned gases, a duct joining said exhaust pipe and leading to the heating chamber of said boiler, a damper located at the junction of the duct with the exhaust pipe to selectively control delivery of reburned gases to said heating chamber or to said exhaust pipe, means connected with the boiler for actuating said damper, and means for manually operating said damper independently of the first mentioned actuating means.

3. In a heating system, the combination with a boiler provided with a heating chamber and a steam generating chamber, and a radiator located in the space to be heated and connected with said steam generating chamber, of a device for reburning exhaust gases of an internal combustion engine, an exhaust pipe for said reburned gases, a duct leading from said exhaust pipe to the heating chamber of said boiler, a damper located at the junction of said duct with the exhaust pipe to selectively control delivery of reburned gases to either, and means controlled by the pressure in said steam generating chamber for automatically operating said damper.

Signed at Albany, county of Albany, State of New York, this 30th day of Jan., 1926.

LEE P. HYNES.