Dec. 17, 1935. L. C. HYATT 2,024,364

AUTOMOBILE HEATER

Filed Feb. 8, 1930

FIG. 1

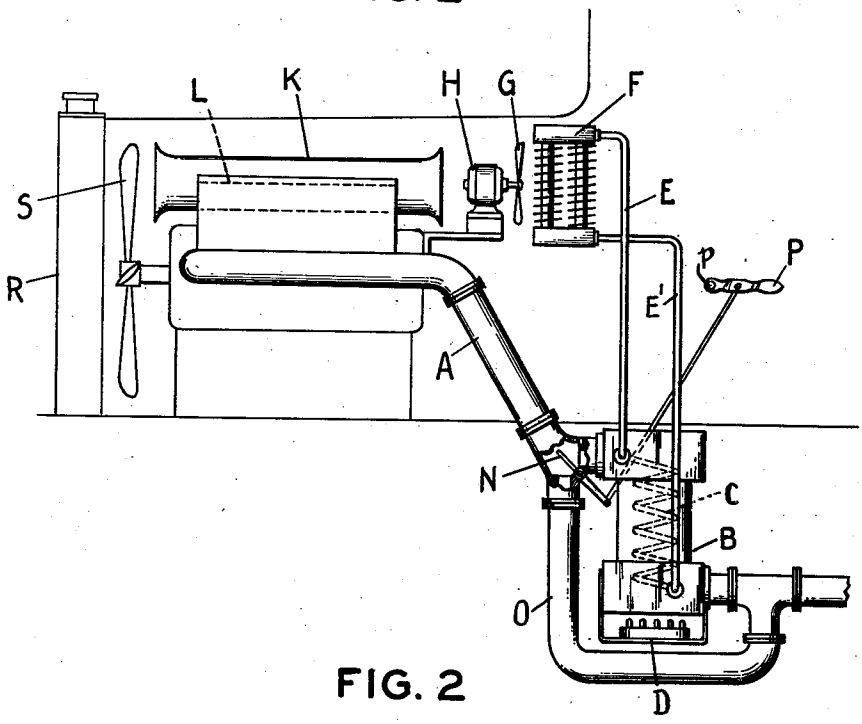
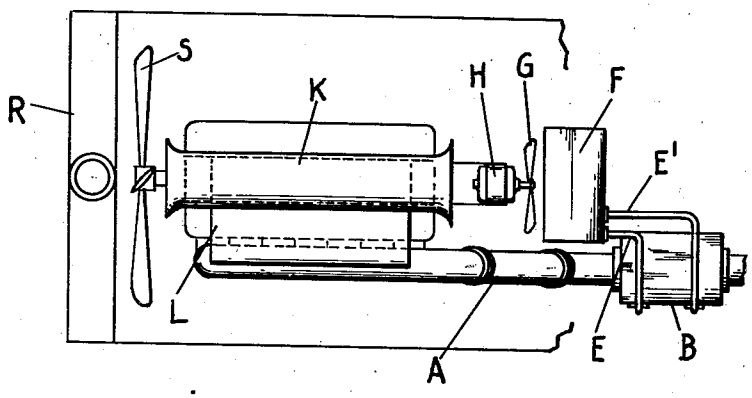


FIG. 2



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AUTOMOBILE HEATER

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3 Claims. (Cl. 237—12.3)

For a detailed description of the present form of my invention, reference may be had to the following specification and to the accompanying drawing forming a part thereof, wherein

Fig. 1 is a side elevation of the heater, and

Fig. 2 is a plan thereof.

My invention relates to a heating system suitable for vehicles, particularly buses that are propelled by an internal combustion engine.

It is my present purpose to present herein a heating system that will utilize the heat of the engine exhaust without the necessity and danger of admitting the exhaust gas itself to the vehicle. I employ the hot exhaust gas to generate, in a sealed container, vapor, such as steam, from a small and permanent body of vaporizable liquid in a vaporizer subjected to the hot gas. I will herein use the word steam as inclusive of any suitable vapor from any suitable liquid. From that vaporizer a steam pipe extends to a condensing radiator inside the vehicle, while from said radiator a pipe for the condensate leads back from the condenser to the vaporizer. It is important that the container of said vaporizer, together with the aforesaid pipes for steam and condensate, and the condensing radiator, should be permanently sealed to form a permanently closed chamber and without a control valve therein manipulated from outside and therefore requiring an operating rod or handle passing through the wall of the sealed chamber. I therefore seal the said chamber completely with a small body of water, say half a pound, inside it. Then I control the heating of the vehicle by diverting into the heat-box of said vaporizer any desired portion of the exhaust gas, permitting the remaining portion, if any, to go through a by-pass pipe into the atmosphere through the customary muffler.

Referring to the drawing, A represents the exhaust pipe of the propelling internal-combustion engine. In this pipe is interpolated an enlarged tubular section B through which the outgoing hot gases from the engine may flow. In section B is a coiled tube C which will not obstruct the stream of hot exhaust gas through section B and may serve as a boiler for a small and permanent body of water or other vaporizable liquid. From boiler C a tube E leads to a condensing radiator F located in a suitable position back of the engine. A second tube E^1 conducts the condensate from the radiator back into the boiler C. It is the coiled-tube boiler C, the two tubes E and E^1 and the radiator F which constitute the sealed chamber aforesaid. A fan G driven by an electric motor H serves to direct a stream of air over the radiator F which air will receive heat from the radiator and be blown back into the portion of the vehicle to be heated, thereby condensing the steam therein. The condensate will flow back, by means of tube E^1, into the boiler C of the vaporizer where it will be evaporated once more by the heat of the exhaust gas in A. This cycle will continue indefinitely, the liquid in the boiler being converted into steam by the heat of the exhaust gases, it being perfectly safe to employ this type of heat for vehicle heating purposes. Moreover, the steam-containing chamber formed by boiler C, tubes E and E^1, and radiator F is not perforated by a valve stem, or valve-operating rod, requiring a stuffing box that is subject to leakage. Its walls, on the contrary, remain intact without chance of leakage at any point thereof. Such a sealed steam-containing chamber is an important factor in the practical success of my system, largely because I employ only a small body of water that only functions as a medium for producing steam and not as a conveyor of heat to the radiator.

It is the steam which, in my system, serves the heat-conveying function. By the continuously repeated evaporation of the water an adequate amount of heat-conveying steam is produced. To that repeated cycle of conversions from steam to vapor and vapor to steam a leak may easily prove fatal by allowing the small body of water or a material percentage thereof to escape. Eight ounces of water will, by this cycle of conversions, afford sufficient steam heat for a large bus, yet a minute leak at a stuffing box might quickly draw off all or a material portion of that eight ounces of water and the operation of the system becomes impossible. Any desired degree of heating may be secured by increasing the rapidity of this cycle of conversions, as distinguished from controlling the steam flow by a stop cock. I accomplish this control of cycle rapidity by changing the rate of steam production at the vaporizer C. I provide a by-pass tube O connecting at one end with the inflow point of the heat-box section B and at its other end with the outflow point thereof leading to the muffler. At the inflow end I place a damper N operated by a handle P pivoted at *p*, to a fixed element (not shown) of the motor vehicle. This damper can shut off completely or partly the admission of the exhaust gas to the by-pass tube O, or its admission to heat-box section B. Thereby I can operate the boiler C at a temperature much higher than

that which I expect to maintain at radiator F and so speed up the rapidity of circulation of the small but highly heated body of steam to the radiator, that any desired temperature of the radiator may be maintained. This regulation of the heating effect at the point of heat production avoids the necessity of perforating the walls of the aforesaid steam-containing chamber to regulate the flow therein.

To insure an adequate amount of original heat at the vaporizer I may also supply thereto a flame heater D, located outside of the heat-box section B. This heater may be started in severe weather and will supplement the heat of the engine exhaust.

For ventilation purposes, I provide a horizontal tube K above the engine and enclosing a portion of a plate or fin L projecting from the exhaust pipe A. At its left hand end this tube K receives external air which has been drawn through the engine radiator R by the fan S. At its right hand end tube K delivers its air to the bus heater with the assistance of fan G.

In the accompanying drawing, for purposes of illustration, the vehicle is diagrammatically shown as conforming to the conventional contour of a motor vehicle with the radiator F located in the space which is normally back of the rear partition of the chamber in which the engine is located. It is to be understood, however, that the radiator may be located at any desired position within the vehicle body.

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

1. In a heating system, the combination with the exhaust pipe of an internal combustion engine, said pipe having two outlet branches, of a vertically disposed heat box having an inlet connected at one end to one of said branches, a discharge conduit connected with the outlet of the heat box, a by-pass pipe connecting the other branch of the exhaust pipe with said discharge conduit at a position between the outlet branch of the heat box and said discharge conduit, a closed vapor system consisting of a helical coil extended longitudinally within the heat box, a condensing radiator connected with said vaporizer by supply and return branches, a valve located at the junction of the branches of the exhaust pipe and so constructed and arranged as to selectively direct the exhaust gases through said heat box or through said by-pass pipe, and an auxiliary heating means supported beneath the lower end of said heat box.

2. The combination with the exhaust pipe of an internal combustion engine, of a heat box so connected with said exhaust pipe that the exhaust gases will pass therethrough, a closed vapor system consisting of a vaporizer within the heat box and a condensing radiator connected with said vaporizer by supply and return branches, means for controlling the volume of exhaust gases passing through said heat box, a fin projecting from said exhaust pipe, and a ventilating tube enclosing a portion of said fin and so positioned as to discharge air against said radiator in such manner that the air is heated thereby.

3. The combination with the exhaust pipe of an internal combustion engine, of a heat box so connected with said exhaust pipe that the exhaust gases will pass therethrough, a closed vapor system consisting of a vaporizer within the heat box and a condensing radiator connected with said vaporizer by supply and return branches, means for controlling the volume of exhaust gases passing through said heat box, a ventilating tube so positioned as to discharge air against said radiator in such manner that the air is heated thereby, supporting means for said ventilating tube, said supporting means being provided with means for conducting heat from the exhaust pipe to said ventilating tube, and a fan interposed between said radiator and the discharge end of said ventilating tube, and so constructed and arranged as to direct air over said radiator as said air leaves said ventilating tube.

LOUIS C. HYATT.