

Sept. 9, 1941.

E. HACKERD

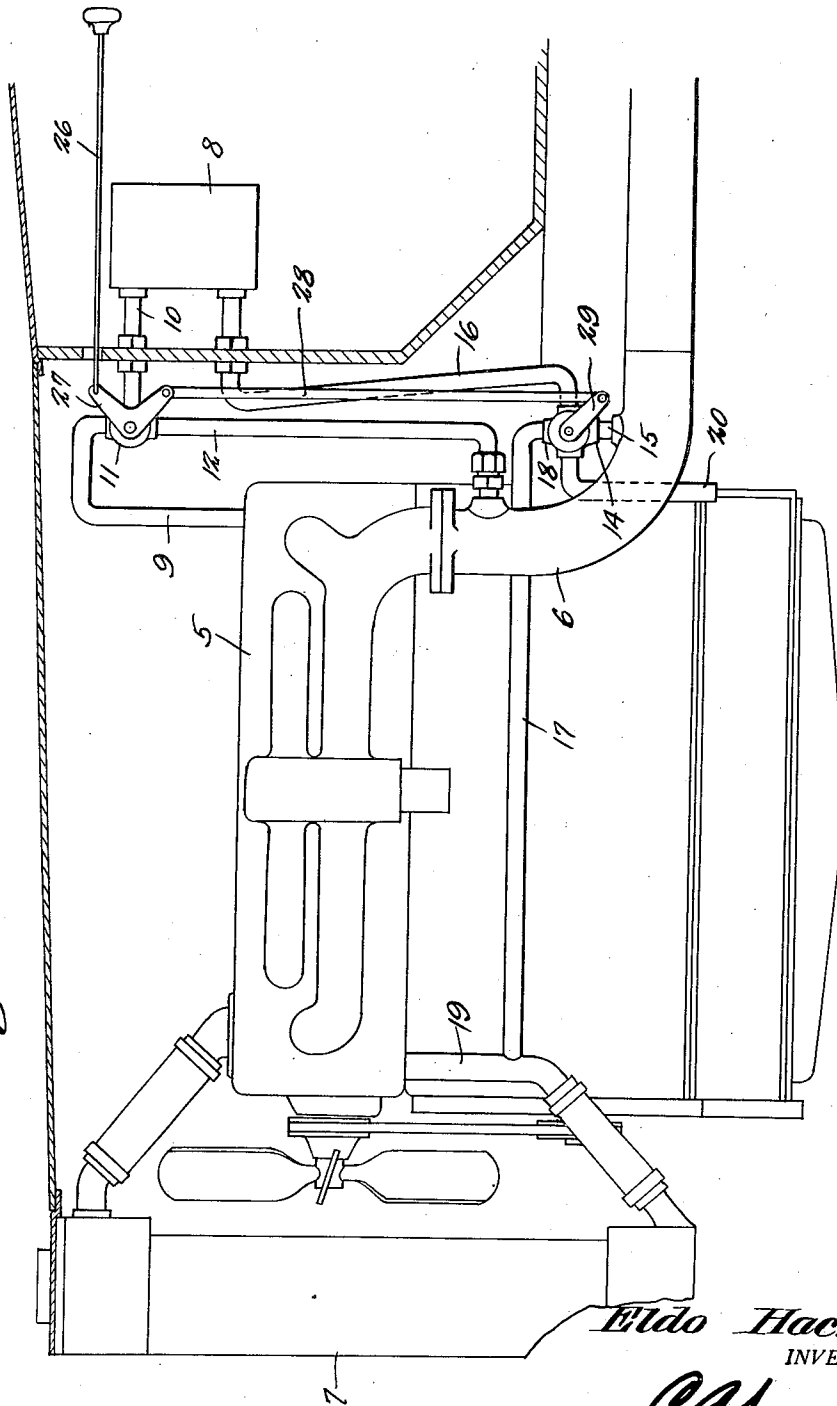
2,255,354

HEATING UNIT

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2 Sheets-Sheet 1

Fig. 1.



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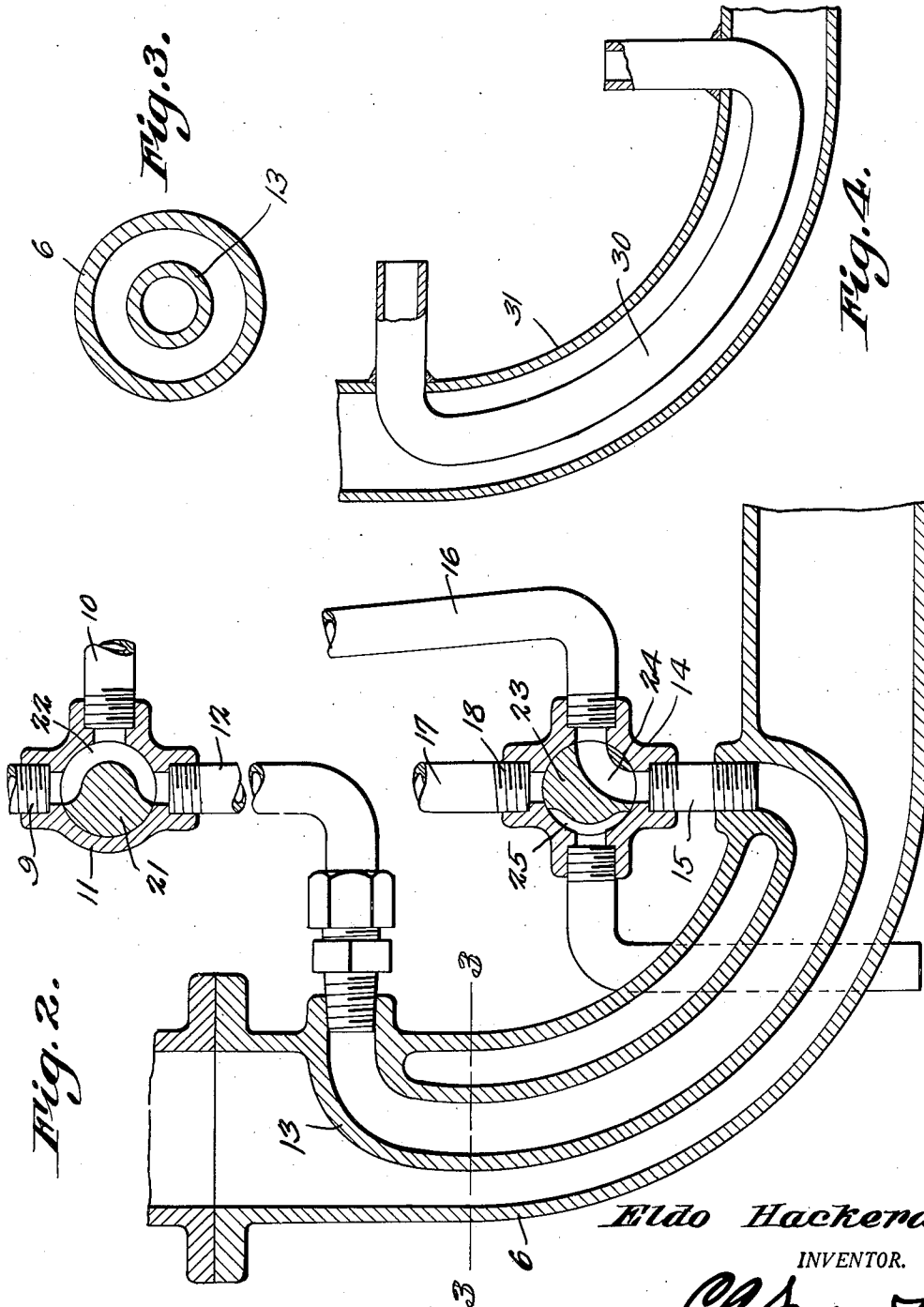
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UNITED STATES PATENT OFFICE

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HEATING UNIT

Eldo Hackerd, Frankfort, Ind.

Application May 16, 1939, Serial No. 273,991

1 Claim. (Cl. 237—12.3)

This invention relates to motor vehicle heaters, and more particularly to that type of motor vehicle heater wherein the hot water of the cooling system of the motor is circulated through a radiator mounted within the vehicle body.

The important object of the invention is the provision of means for utilizing the wasted heat of the exhaust gases, to increase the heat of the water circulating through the radiator, thereby increasing the heating capacity of the radiator to the end that an exceptionally large radiator may be used to facilitate the heating of buses or the like.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein described, may be made within the scope of what is claimed, without departing from the spirit of the invention.

Referring to the drawings:

Figure 1 is an elevational view illustrating a motor vehicle equipped with a radiator, and illustrating the system, forming the essence of the invention.

Figure 2 is a sectional view through the exhaust manifold of the motor, illustrating a pipe, through which hot water circulates, as formed integral therewith.

Figure 3 is a sectional view taken on line 3—3 of Figure 2.

Figure 4 is a sectional view through an exhaust manifold, illustrating a pipe as positioned therein.

Referring to the drawings in detail, the reference character 5 designates an internal combustion engine which is provided with the usual exhaust manifold 6 and radiator 7 through which the cooling liquid of the internal combustion engine circulates, to maintain the engine cool.

The reference character 8 designates a heater, which is in the form of a radiator, mounted within the vehicle body, the radiator being supplied with hot water from the cooling system of the internal combustion engine, through the pipe 9 which is tapped into the water jacket of the internal combustion engine. A pipe 10 connects with the pipe 9, through the valve housing 11. Connected with the valve housing 11, is a flow pipe 12 that extends downwardly and connects with one end of the water-heating pipe 13 which is formed integral with the exhaust manifold 6.

One end of the pipe 13 is connected with the valve housing 14, through the pipe 15. This valve housing 14 is in communication with the exhaust end of the radiator 8, through the return pipe 16.

The reference character 17 designates the return pipe of the system, and as shown, connects with the valve housing 14 at 18, the opposite end of the pipe 17 being connected with the return pipe 19 of the engine cooling system.

The reference character 20 designates a drain pipe which is also connected with the valve housing 14, whereby the cooling liquid may be drained from the system. The valve operating in the valve housing 11, is indicated by the reference character 21, and is provided with a groove or passageway 22 so that the valve may be moved to establish communication between the radiator 8, pipe 12 and pipe 9, so that the cooling liquid may pass through the pipe 13 to be heated by the exhaust gases passing through the exhaust manifold. The plug 23 of the valve operating in the valve housing 14, is provided with a passageway 24 and a passageway 25. The construction of this plug 23 is such that it may be moved to establish communication between the pipe 13 and radiator, through the pipe 16, or it may be rotated to a position to cut off the flow of cooling liquid through the pipe 13, should it be desirable to decrease the heat. In this way it will be seen that the circulation will be through the cooling system of the motor, through pipes 9, 16, 17 and the radiator 8.

The valves are controlled by means of the control rod 26 that extends to a point in proximity to the operator's seat, whereby the operator may have easy access thereto. The rod 26 connects with the bell crank lever 27 that connects with the valve operating in the valve housing 11, the bell crank lever 27 being connected with the rod 28, that in turn connects with the arm 29 of the valve plug 23. Thus it will be seen that by operating the rod 26, the valves may be moved to establish circulation between the radiator 8, water jacket of the motor vehicle, and return pipe 17, independently of the pipe 13. If it is desired, the rod 26 may be operated to establish communication between the pipes 9 and 13 to the end that in addition to the cooling liquid being heated by the heat of the cylinders, the water will be heated by the exhaust gases passing through the manifold 6, to a higher degree of temperature prior to the passage of the water through the radiator 8, thereby greatly increasing the heating capacity of the radiator 8.

As shown by Figure 4 of the drawings, the pipe which is indicated by the reference character 30, is one which has been positioned in the usual exhaust manifold, which is indicated at 31. It will of course be understood that in using a pipe of this character, the pipe is used to convert the usual exhaust manifold for use with applicant's system. The pipes 12 and 15 will be connected with the ends of the pipe 30, in the same manner as shown by Figure 2 of the drawings.

What is claimed is:

The combination with the water cooling system and exhaust pipe of a motor vehicle internal combustion engine; of a heating system comprising a radiator mounted in the vehicle; a water heating pipe within the exhaust pipe, the ends thereof extending through the wall of the exhaust pipe; a first supply pipe and a first return pipe connecting the ends of the water heating

pipe with the cooling system; a second supply pipe connecting the radiator with the first supply pipe at the junction of the first supply pipe and the water heating pipe; a second return pipe connecting the radiator with the first return pipe at the junction of the first return pipe and water heating pipe; a valve at the first mentioned junction arranged to provide communication between the first supply pipe, the water heating pipe and the second supply pipe in one position, and between the first supply pipe and second supply pipe only in another position of the valve; and a valve and drain pipe at the second mentioned junction, arranged to provide communication between the second return pipe and the water heating pipe only in one position, and independent communication between the first and second supply pipes, and the water heating and drain pipes respectively in the other position of the valve.

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