N. L. SHATEN.

HEATER AND VENTILATOR FOR AUTOMOBILES.

APPLICATION FILED MAR. 21, 1916. RENEWED FEB. 14, 1918.

1,273,007. Patented July 16, 1918.

2 SHEETS—SHEET 1.

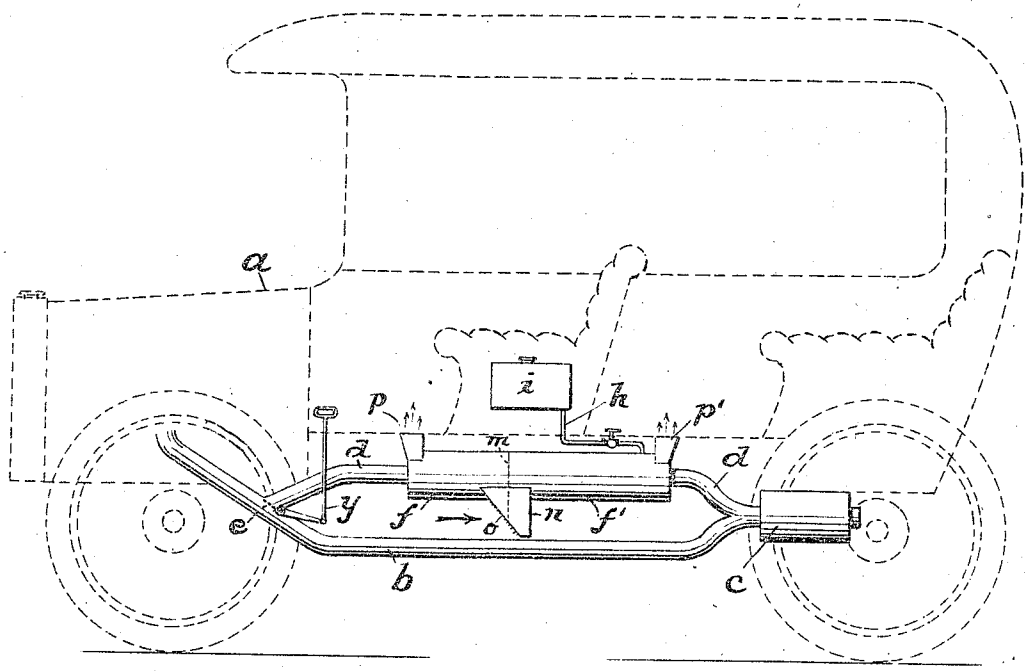


FIG. 1.

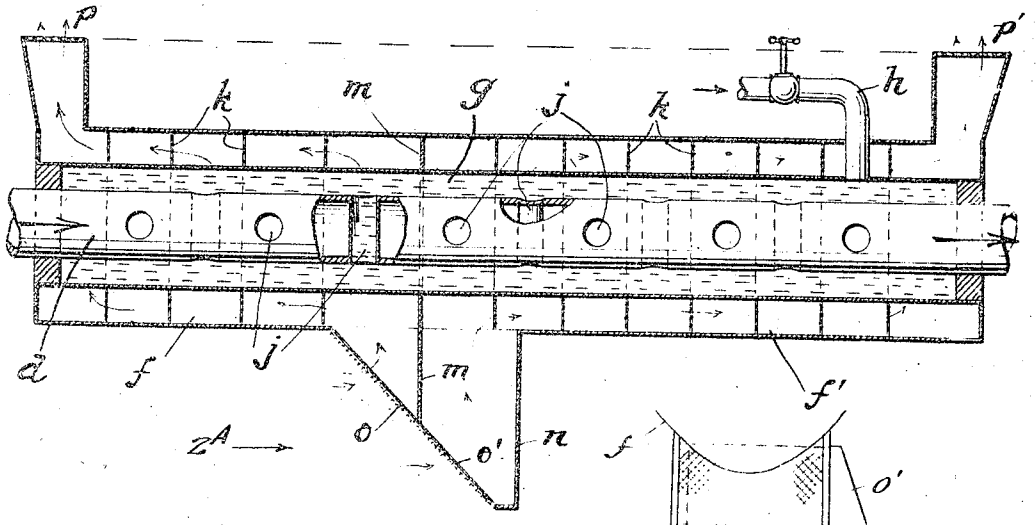


FIG. 2.

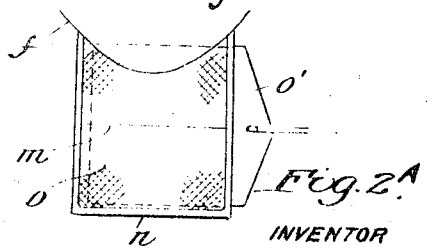


FIG. 2^A

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2 SHEETS—SHEET 2.

FIG. 3.

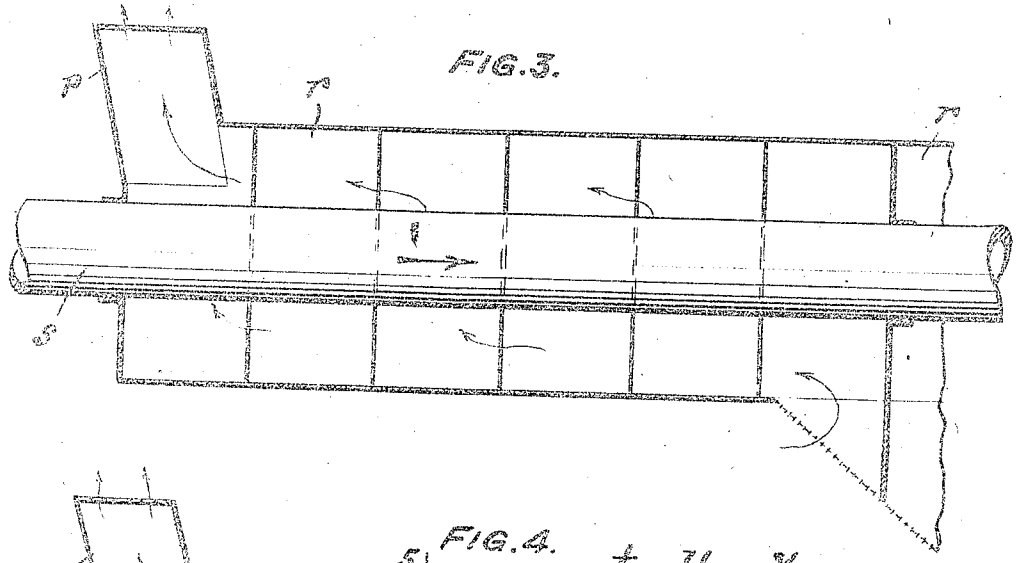


FIG. 4.

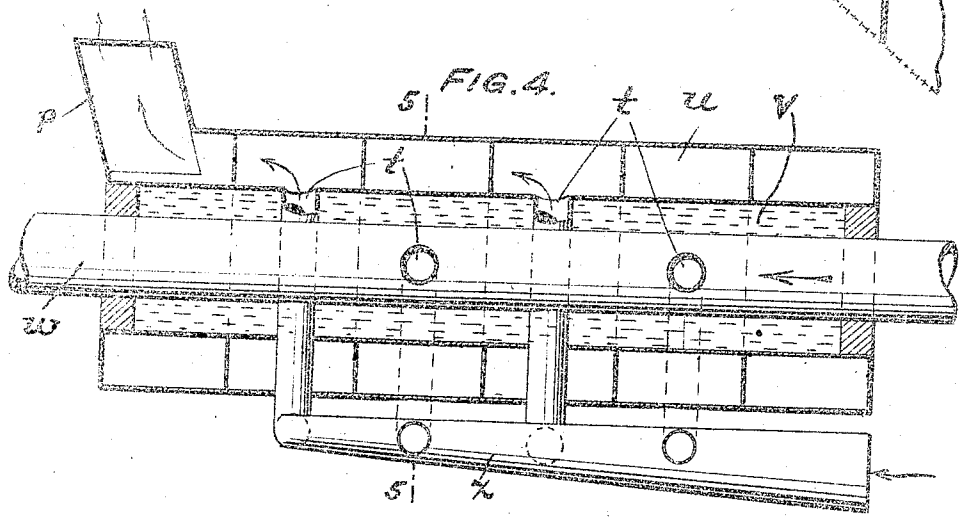
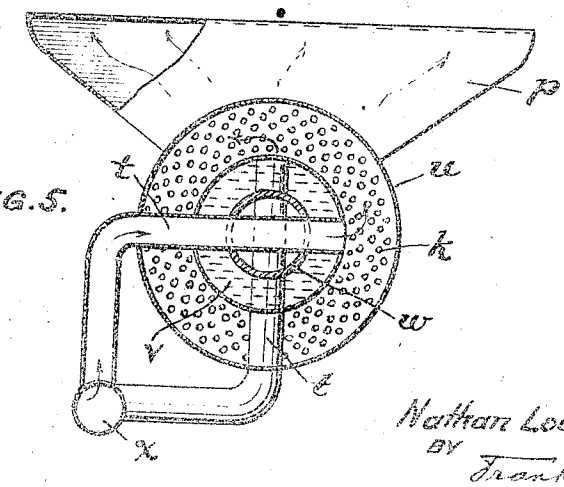


FIG. 5.



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HEATER AND VENTILATOR FOR AUTOMOBILES.

1,273,007. Specification of Letters Patent. **Patented July 16, 1918.**

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To all whom it may concern:

Be it known that I, NATHAN LOUIS SHATEN, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Heaters and Ventilators for Automobiles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The main object of my invention is to provide a new and improved means for heating automobiles. Other objects of the invention are: to so construct the heating contrivance that the same may be utilized as a ventilator in warm weather; to extract the heat from the gas exhaust pipe from the engine in such manner as not to throttle, divert or obstruct the flow of exhaust gas so that it may react harmfully upon the engine; to insure the proper and equal distribution of heat to the several registers; to regulate the volume of air admitted to the heater and the rate of its flow therethrough; to bring the heated fluid into temperature-exchange relation with the largest practicable area of the gas exhaust pipe; to apply, or cut off the supply of, exhaust gas to the heater at will without affecting the exhaust of the gas relatively to the engine; to simultaneously control either the temperature of a plurality of heaters or the rate of flow of air therethrough; and finally, to improve and simplify the construction and operation of the heater.

Preferred embodiments of the invention are shown in the drawings, in which—

Figure 1 is a side elevation of the heater on a small scale, showing its application to a car. Fig. 2 is a longitudinal sectional view of the heater. Fig. 2^A is a front view of the air inlet and valve looking in the direction of the arrow, Fig. 2. Fig. 3 is a partial longitudinal sectional view of the heater modified by the omission of the water chamber. Fig. 4 is a similar view showing another modification in which atmospheric air is differently admitted. Fig. 5 is a section on the line 5—5 of Fig. 4.

On the car body a is the main exhaust pipe b from the engine. d is a pipe branching off from the pipe b and reunited thereto in front of the usual muffler c. A valve e, located at the forward junction of pipe d with pipe b, may be manipulated by an arm and lever y to divert the exhaust gases partly or wholly from the main exhaust b through the branch exhaust d.

Applied to the branch pipe d is an annular air chamber f, f', which, in the construction shown in Figs. 1 and 2, is spaced from the pipe d by an intermediate annular water chamber g. The water chamber g may be connected through a valved pipe h with any suitably located water reservoir i.

Extending across the interior of pipe d are a number of pipes or tubes j opening at opposite ends into the water chamber g.

Arranged across the air chamber are a number of perforated plates k surrounding the exhaust pipe and adapted to conduct and radiate the heat. The plates permit, and at the same time retard, the passage of the air. The air passes through the air chamber relatively slowly and is heated by the radiation from the plates and by the plates themselves, as well as by the exhaust pipe.

I prefer to divide the air chamber by a partition m, into two separate chambers f, f', having separate inlets and outlets. I prefer to arrange both air inlets in a single casing n, triangular in cross section, in open communication with the air chamber and with an inclined bottom o facing forwardly, the partition m rising from the bottom about half way between its upper and lower edges. Thus each air chamber receives its air supply independently of the other and the air to be heated is forced, by the partition m, to divide and flow toward the respective outlets; thereby avoiding the tendency that might otherwise exist for the bulk of the air to flow toward one outlet. The bottom o is preferably a screen provided with a slide valve o' which is manipulatable to govern the volume of air admitted to the air chambers, it being important to admit no more air than can be effectually heated to the desired temperature.

Communicating with the respective air

chambers are the outlets leading to registers p, p'. These outlets should be located at opposite ends of the heating apparatus so that the air entering each air chamber will be compelled to flow the length of said chamber before escaping by way of the register. These registers are preferably located in front of the rear and front seats respectively and extend crosswise of the car.

It will be understood that the hot exhaust from the engine maintains the water at a relatively high temperature, that the heat is abstracted from the water by the air flowing through the air chambers, and that the heated air issues from the registers and warms the interior of the car.

It will be noticed that the flow of exhaust gas from the engine is substantially unobstructed and is moreover not diverted from a direct path of escape, thus avoiding the interference with the proper operation of the engine that would arise from choking the engine exhaust. The parts should be so proportioned with reference to the volume of the water space and to the volume of the air space and the rate of flow of the air, as to give the maximum heating effect; this being reducible to the extent desired by operating the shutter valve e.

In Fig. 3 an embodiment of the invention is shown wherein the water chamber is omitted, the air chambers r and r' (corresponding to the air chambers, f and f' of Fig. 2) being directly applied to the branch gas exhaust pipe, which in this figure is lettered s. It will be understood that in this form of the invention the air is heated directly by the exhaust gas, which is advantageous in that the air may be more speedily heated but is disadvantageous in that the application of heat to the air ceases after stopping the engine, whereas in the form shown in Figs. 1 and 2 the heated water will continue to heat the inflowing air for some time after the engine is stopped.

In Fig. 4 the arrangement is the same as in Fig. 3 except that the air is admitted through pipes or tubes t passing transversely through one side of the air chamber u, and through the water chamber v and exhaust branch pipe w, into the other side of the air chamber. The pipes or tubes t may connect with a tapered header x into which the atmospheric air is admitted. The water chamber in Fig. 4 may be omitted, if desired.

One of the advantages of my invention is the capacity of converting the heater into a ventilator for use in warm weather. To so utilize the apparatus, the valve e is turned to close the branch exhaust pipe and the valve o' is moved to admit a larger volume of air, which escapes through the registers in a continuous current of considerable volume.

While I have shown two air chambers arranged one behind the other on the same pipe, it will be understood that the invention is not limited to any particular number of air chambers, it being advisable, although not necessary, to provide as many air chambers as there are to be registers.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In a heater for automobiles, the combination with an engine gas exhaust pipe, of a chamber extending around the gas pipe and adapted to contain water which will abstract heat from the exhaust gas, and an air chamber surrounding the water chamber and provided with an inlet and an outlet for air which, in its passage therethrough, will abstract heat from the water in the first chamber and thereby warm the interior of the car.

2. In a heater for automobiles, the combination with a branched engine gas exhaust pipe, of a valve at the junction of the branches whereby flow of the exhaust gas may be directed through either pipe, an air chamber extending around one of the branch exhaust pipes, a water chamber interposed between the air chamber and such branch exhaust pipe, an inlet to the air chamber communicating with the atmosphere, and a register communicating with the air chamber.

3. In a heater for automobiles, the combination with an engine gas exhaust pipe, of two independent air chambers arranged along the pipe one in advance of the other, a common casing affording an inlet to both chambers, said casing having an inclined front, a partition rising from said inclined front and diverting the air to the respective chambers, a movable closure for said inclined front to regulate the volume of air admitted to the air chamber, and registers communicating respectively with the front of the front air chamber and the rear of the rear air chamber.

4. In a heater for automobiles, the combination with an engine gas exhaust pipe, of two independent air chambers arranged along the pipe one in advance of the other, there being an air inlet at the rear of the front chamber and at the front of the rear chamber, means positioned at said inlet to distribute the air proportionately to the front and rear chambers, and two registers communicating respectively with the front of the front air chamber and the rear of the rear air chamber.

5. In a heater for automobiles, the combination with an engine gas exhaust pipe, of an air chamber extending around the exhaust pipe, a water chamber interposed between the air chamber and the exhaust pipe, and tubes extending through the walls of the gas exhaust pipe and transversely through the interior of said pipe and communicating with said water chamber.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 29th day of February, 1916.

NATHAN LOUIS SHATEN.