Jan. 30, 1923. 1,443,859

F. X. ALLEN ET AL.
ENGINE COOLING SYSTEM.
FILED MAR. 17, 1921.

FIG. 1.

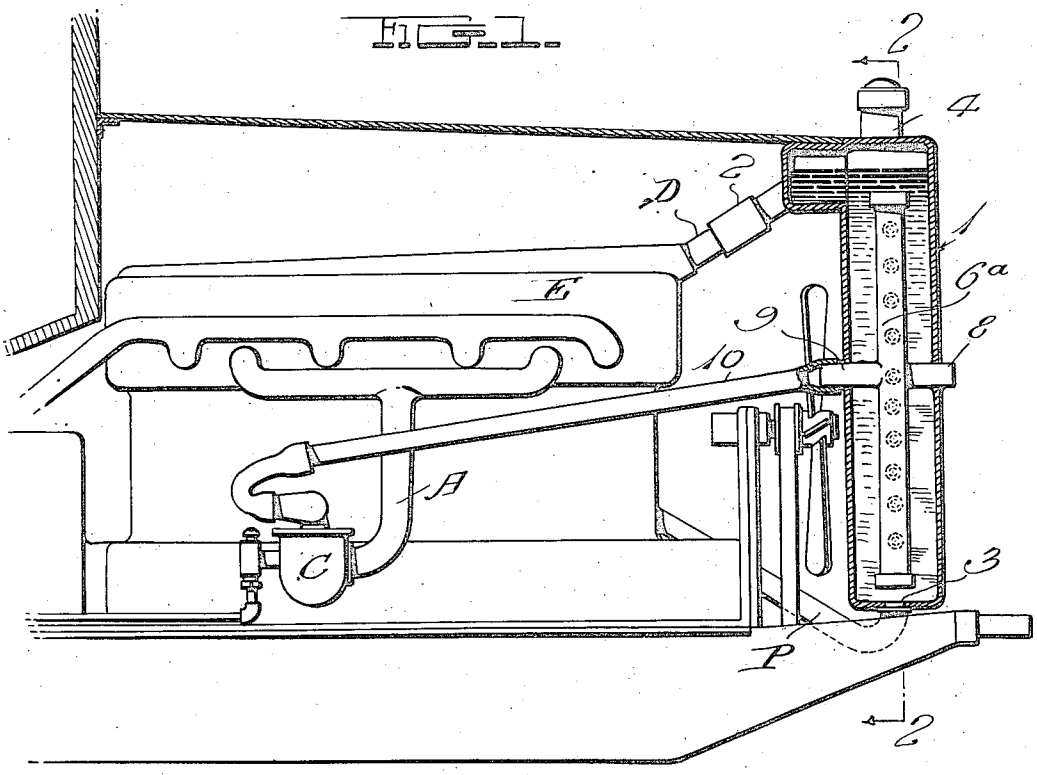


FIG. 2.

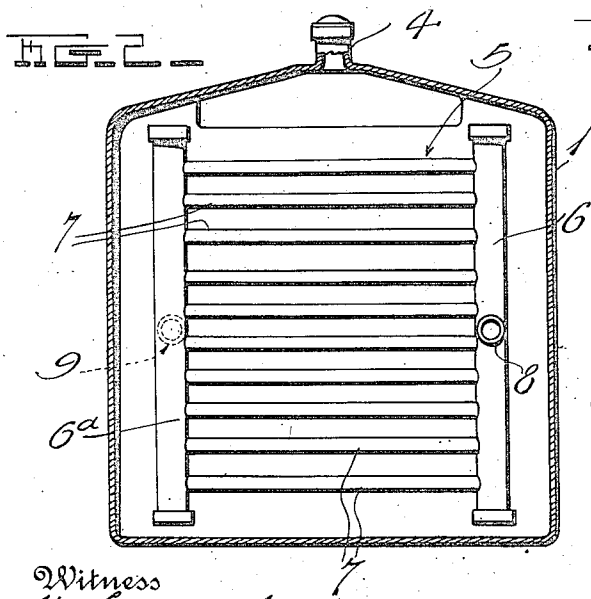
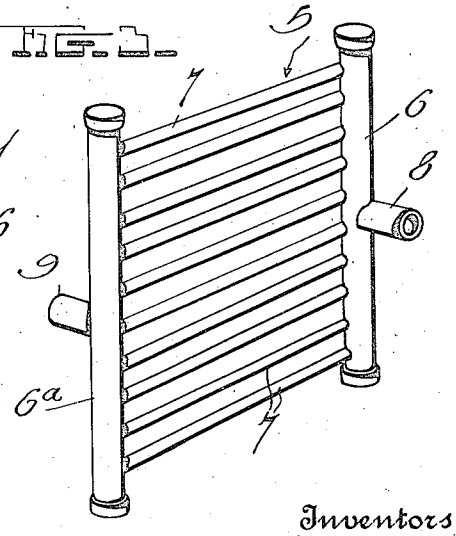


FIG. 3.



Witness
H. Woodard

Inventors
F. X. ALLEN
S. WILBURN

By H. B. Williamson & Co
Attorneys

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UNITED STATES PATENT OFFICE.

FRANK X. ALLEN AND SYLVESTOR WILBURN, OF DEL RIO, TEXAS.

ENGINE-COOLING SYSTEM.

Application filed March 17, 1921. Serial No. 453,011.

To all whom it may concern:

Be it known that we, FRANK X. ALLEN and SYLVESTOR WILBURN, citizens of the United States, residing at Del Rio, in the county of Val Verde and State of Texas, have invented certain new and useful Improvements in Engine-Cooling Systems; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates broadly to improvements in engine cooling systems, being especially designed for use in connection with automobile engines and having more particular reference to what may well be termed a new type of radiator adapted to take the place of the types of radiators now in use.

Automobile radiators commonly used, embody inlets and outlets having connection with the water jacket of the engine together with a plurality of air-cooled conduits through which the water slowly passes in order to become cooled, this result being accomplished by cool atmospheric air which surrounds and strikes these conduits in the well known way. It is our intention, and the main object of this invention to do away with radiators of this type and substitute therefor, one embodying a closed tank having the usual filling neck and inlet and outlet means at its rear face for connection with the engine water jacket. The water is placed in this tank, which is shaped very much like radiators now in use, and an air-cooled structure is placed in the tank and surrounded by the water therein, this structure preferably embodying a plurality of communicating pipes having an air intake for atmospheric air and a discharge intended to communicate with, and supply partially heated air to the carburetor. Thus, instead of passing the water through air-cooled conduits as usual, the water surrounds the air-cooled conduits and is cooled in this way.

Another and important object of the invention is to substitute the type of cooling system above described for the types in use at this time, and to insure a proper circulation of air through the aforesaid air cooled structure by providing a conduit between the discharge of said structure and the carburetor, whereby the suction created in the latter will serve to draw air through the pipes of said structure, this arrangement bringing about another advantageous result since it feeds the partially warmed air, passing through said conduit, into the carburetor so as to mingle with the fuel mixture. Thus, the device serves the additional function of a fuel heater and it insures the production of an extremely desirable, effective, and highly explosive fuel.

A further object of the invention is to generally improve upon devices of this class by producing one of extreme simplicity and durability, which is of such construction that it may be easily installed on conventional types of automobiles without necessitating any alterations of the latter whatsoever, the number of parts employed being few and so arranged that the device may, if desired, be installed by unskilled hands.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is an elevational view of a conventional type of automobile engine, showing my improved cooling system associated therewith.

Figure 2 is an enlarged sectional view taken on the plane of the line 2—2 of Fig. 1 looking in the direction of the arrows.

Figure 3 is a detail perspective view of the water cooling device removed from the tank.

For the sake of convenience, we have disclosed a part of an automobile engine to enable the reader to understand exactly how our improved cooling system is associated therewith. The type of engine shown is old and well known and needs only to be referred to here generally. To this end, the letter E designates the engine which, as is usual includes a water cooling jacket. A designates the intake pipe of the intake manifold, while C designates a conventional type of carburetor. Water is circulated through the jacket and through the cooling

device by means of a return pipe P and a discharge neck D.

As before intimated, we entirely eliminate the radiator now in use and substitute for it, a closed tank 1 which is shaped to permit it to be used on the type of car from which the old radiator is removed. This tank is equipped on its rear side with an intake 2 communicating with the discharge neck of the engine, and at its bottom with an outlet 3 with which the return pipe P is connected, being also provided at its top with the usual filling neck 4. In accordance with our ideas, this tank is to be filled with a quantity of water. Placed inside of the tank is a water cooling device designated generally by the numeral 5. By preference, this device is made up of a pair of vertically disposed spaced pipes 6 and 6^a connected together by a plurality of closely spaced horizontal pipes 7.

At this point, I wish to make it known that the words "vertically" and "horizontal" are used merely for the sake of clearness of description and it is to be understood that the pipes may be reversed to extend in an opposite direction to that shown. The pipe 6 is provided intermediate its ends with a forwardly extending air intake neck or pipe 8 while the remaining pipe 6^a is provided at a similar point with a rearwardly extending air discharge neck 9. When the device is in position in the tank, the neck 8 extends through an opening in the front side of the tank near one vertical end of the latter while the remaining neck 9 extends through an opening in the rear side of the tank, these necks being soldered or otherwise secured in the openings to prevent leakage of water through them. In both cases, the intake and discharge necks project beyond the walls of the tank in the manner shown. As before stated, a conduit 10 in the form of a pipe or tube is connected with the projecting end of the air discharge neck 9 and leads to the carbureter. With this construction and arrangement, it will be seen that when the engine is in operation, the suction created in the carbureter will serve to suck air through the intake neck 8, circulate it through the pipes 6, 6^a and 7, and thus cool the surrounding water in the tank 1. The air passing through these pipes is bound to become slightly heated since the water in the tank is ordinarily quite warm. By leading the conduit 10 to the carbureter C, this warm air can be advantageously introduced into the carbureter so as to mix with the fuel in the latter. Hence, it will be seen that our device not only acts to effectively cool the water in the tank, but it has the additional function of serving as a heater for the fuel and accounts for a great saving of gas. At this point, we wish to state that, if desired, a pump may be used in connection with our device to assist in creating an effective and rapid circulation of cool air through the pipes of the water cooling structure. Furthermore, while it is not shown, we wish it to be understood that the tank 1 will be constructed in such a way that it will be possible to remove the device therefrom in order to repair or entirely replace it.

In all probability, a careful consideration of the foregoing description taken in connection with the drawings, will enable persons skilled in this art to obtain a clear understanding of the same. However, to insure that this end will be accomplished, we will at this point, briefly review the operation of the device. As before indicated, the old or existing radiator should be removed and my improved tank-radiator be substituted for it so that it will assume the position shown in Fig. 1. When our improved cooling system is in place as indicated in this figure, it will be seen that as the engine is in operation, the suction created in the pipes of the water cooling device 5 will cause air to be drawn into the intake neck 8, circulate through the various pipes of the structure 5, and thus effectively cool the surrounding water in the tank 1. Since the water in the tank is generally quite warm the air passing through the various pipes of the water cooling device will become partially heated and drawn through the conduit 10 and introduced into the carbureter to which this conduit is connected. This warm air mixing with the air and gas in the carbureter will provide a very desirable and highly efficient mixture. In view of the foregoing, further detailed description is thought unnecessary.

Since probably the best results may be obtained with the construction and arrangement herein shown and described, this construction and arrangement is taken as a preferred embodiment of the invention. However, we wish to be understood that various minor changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claim.

We claim:

A water cooling and air warming device comprising a water tank positioned in front of an internal combustion engine and having its upper portion provided for connection with the water discharge of the water jacket of the engine and its lower end having connection with the feed pipe of the water jacket of the engine, and means for conducting air through the tank comprising a hollow frame in said tank, said frame having hollow side bars closed at their upper and lower ends, hollow cross rods connecting said side bars and communicat-

ing with the same, one of said side bars having a neck extending through the front of said tank and constituting an air inlet and the other side bar having a neck extending through the rear wall of said tank and constituting an air outlet, and a pipe for conducting air from the last mentioned neck to the air inlet of the carbureter of the engine.

In testimony whereof we have hereunto set our hand.

FRANK X. ALLEN.
SYLVESTOR WILBURN.