B. C. LORING.

AUTOMOBILE RADIATOR.

APPLICATION FILED AUG. 18, 1913.

1,152,328. Patented Aug. 31, 1915.

Fig. 1.

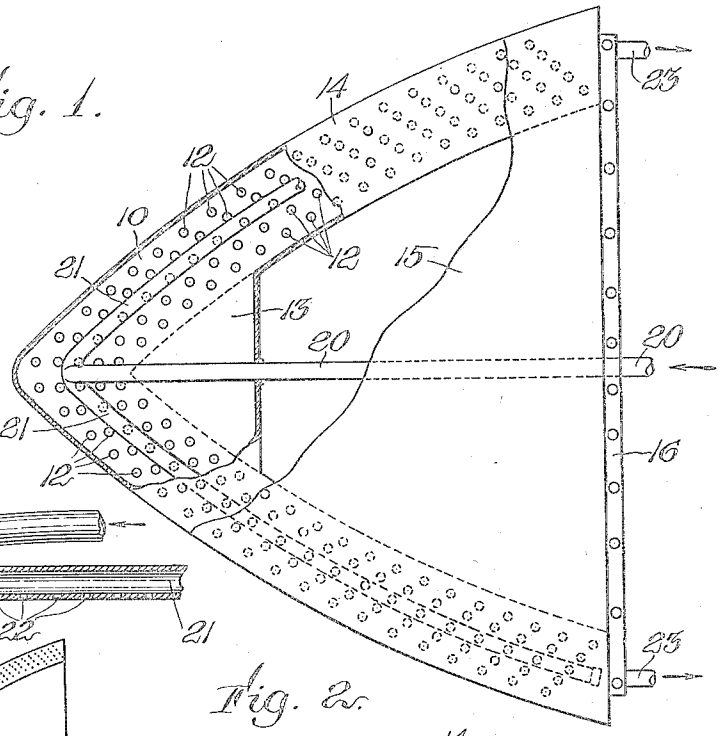


Fig. 3.

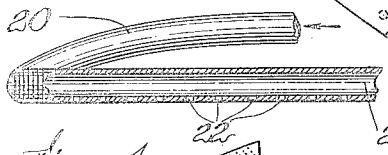


Fig. 4.

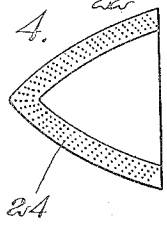
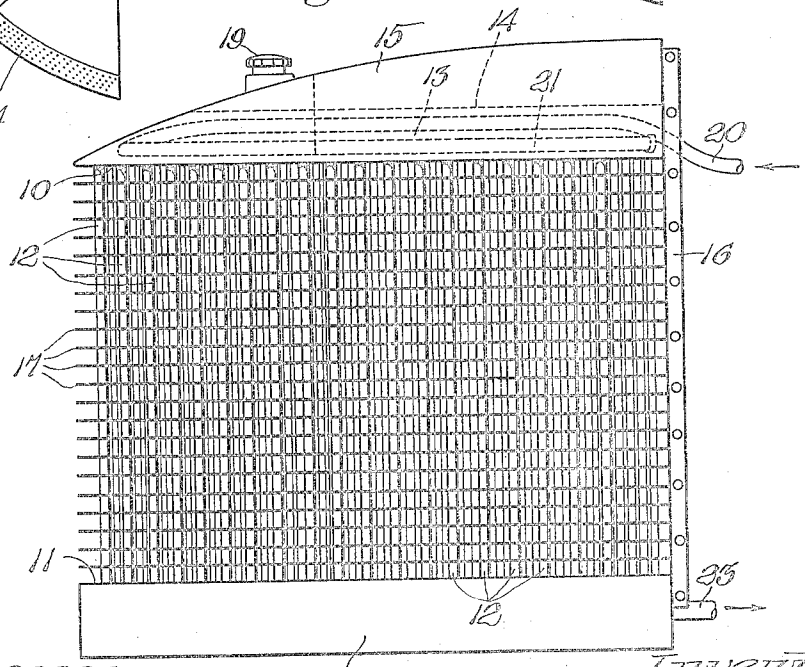


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

BENJAMIN C. LORING, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, OF THREE-FOURTHS TO RALPH G. LUMB, OF PAWTUCKET, RHODE ISLAND, AND ONE-FOURTH TO JOSEPH A. MOROSS AND MAUD S. MOROSS, OF DETROIT, MICHIGAN.

AUTOMOBILE-RADIATOR.

1,152,328. Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed August 18, 1913. Serial No. 785,279.

To all whom it may concern:

Be it known that I, BENJAMIN C. LORING, a citizen of the United States, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Automobile-Radiators, of which the following is a specification.

This invention relates to cooling devices employed in reducing the temperature of the water employed in keeping automobile motors or engines cool, and the object of the invention is to provide a device of this character which is economical in construction and provides for an improved circulation of air through the cooling device or radiator.

To these ends the invention consists in the improvements which I shall now proceed to describe and claim.

Of the accompanying drawings, in which I have not attempted to show any of the parts of the automobile, other than the radiator itself:—Figure 1 is a plan view of a radiator embodying my improvements, parts being broken away to better illustrate the interior construction. Fig. 2 is a side elevation of the radiator. Fig. 3 is a detail view, partly in section, to illustrate the water-distributing pipe. Fig. 4 is a plan view, on a reduced scale, illustrating a modification hereinafter described.

Similar reference characters indicate similar or the same parts in all of the views.

An upper tube plate 10 and a lower tube plate 11, each preferably having a tapering formation such as is illustrated in Fig. 1, are connected by small tubes 12, which are arranged in elongated, substantially V-shaped rows and in shorter transverse rows. The tubes of each shorter row are in a plane which is oblique to the median line of the radiator, the obliquity of the shorter rows increasing from front to rear. An upper chamber or reservoir 13 is formed between the upper tube plate 10 and a roof 14, the whole being preferably protected as by a suitable hood 15. Said chamber is substantially V-shaped and has a salient or wedge-shaped front side and a reëntrant rear side, as indicated by Fig. 1. The radiator is provided with suitable means, such as flanges 16, by means of which it may be secured to the frame of an automobile.

A multiplicity of thin conducting plates 17, parallel with the plates 10 and 11, are perforated to permit of the passage of the tubes 12, said plates 17 being relatively spaced and held in position by any suitable means, such as solder, employed at intervals to connect the plates to the tubes.

The lower tube plate 11 forms the top of a lower water chamber or reservoir 18, so that water can flow from the upper chamber 13, through the tubes 12, into the lower chamber 18, said lower chamber being substantially V-shaped like the upper chamber 13.

At 19 I indicate a plug or cap of the usual filling aperture, to permit the initial filling of the radiator and the conduits connected therewith, and to admit fresh supplies of water as needed.

A pipe 20 leading from the usual water-jackets of the motor or engine extends through the rear side of the apex portion of the upper chamber 13 and is connected within the apex portion to a V-shaped conduit 21 conforming to the form of the upper chamber 13, said conduit 21 being composed of two pipes diverging from the delivering or forward end of the pipe 20 and having small holes 22, as shown by Fig. 3. The shape of the radiator as a whole is such that each chamber 13 and 18 may be said to have two ends, both of which are at the rear, while the apex is at the front of the machine when the radiator is in use. At each end of the chamber 18 there is a return pipe connection 23. In practice, a suitable circulating pump as usual will be employed, such pump serving to draw the water from the radiator through the pipes 23, through the usual water-jackets of the motor or engine, and then through the pipe 20 into the V-shaped conduit 21. Said conduit, or the perforated plate substituted therefor as hereinafter described, serves to distribute the hot water coming into the radiator so that it will pass into the cooling tubes 12 with substantial uniformity.

Instead of employing the V-shaped conduit 21, I may employ a thin plate, such as indicated at 24 in Fig. 4, said plate having small perforations uniformly distributed to

form a V-shaped perforated marginal portion. Said plate is secured in the upper chamber 13 between the roof 14 and the plate 10, and the water is delivered by the pipe 20 above said plate.

The outer surface of the radiator may be inclosed in any suitably constructed casing desired, such casing having apertures of sufficient size and of such number as to permit air to pass through to gain access to the cooling tubes 12 and to the thin plates 17, which, owing to their contact with the tubes 12, serve to conduct the heat more readily away from said tubes.

The tubes 12 constitute a V-shaped group the arms of which diverge from the center of the radiator at the front end thereof and partly inclose a cylinder chamber in which the engine cylinders are located.

It will be seen that the independent tubes forming the arms of said V-shaped group are relatively arranged to permit air currents to pass through said arms into said chamber either lengthwise or crosswise of the radiator, or in various intermediate directions, so that when the radiator is not in motion and the wind is in the direction at right angles to the median line of the radiator air currents will flow into the cylinder chamber in practically straight lines crosswise of the radiator. In case the wind is blowing toward the front of the radiator the air currents will of course pass through the group of tubes lengthwise of the radiator. It is obvious that if the wind is in any intermediate direction air currents will pass correspondingly through the group of tubes into the cylinder chamber. The above-described movement of air through the group of tubes also takes place to a considerable extent when the radiator is in motion.

I am the first, so far as I am aware, to provide an automobile radiator with a V-shaped group of tubes, the arms of the group partly inclosing a cylinder chamber and the tubes being arranged to permit air currents to pass through said arms into said chamber either lengthwise or crosswise of the radiator, or in various intermediate directions.

The arrangement of the tubes in shorter transverse rows which are oblique to the median line of the radiator, the obliquity increasing from front to rear, causes the tubes when the radiator is in motion to deflect the entering air into the cylinder chamber from the front and sides of the radiator, each shorter row of tubes acting as an open-work deflector.

I use the term "V-shaped" for convenience in pointing out the fact that the sides of the group of tubes diverge from the extreme forward portion of the radiator. It will, of course, be understood that the apex of the group of tubes may be more or less angular. In other words, said apex does not necessarily form an acute angle like the letter V.

The described arrangement of the tubes enables a relatively large number to be employed in a radiator of standard or average width from side to side, so that the total area of cooling surface presented by the group of tubes is much greater than would be the case if a single elongated row of flattened tubes were provided. The tubes employed by me are or may be of standard stock construction so that no special form of tubing is required.

I claim:—

1. An automobile radiator comprising upper and lower water chambers and a substantially V-shaped group of independent vertical cooling tubes, the arms of the group diverging from the center of the radiator at the front end thereof to partly inclose a cylinder chamber and being composed of independent tubes relatively arranged to permit air currents to pass through said arms into said chamber either lengthwise or crosswise of the radiator or in various intermediate directions.

2. An automobile radiator having upper and lower water chambers, and vertical cooling tubes connecting said chambers and forming a substantially V-shaped group partly inclosing a cylinder chamber and permitting the entrance of air thereto from the front and sides of the radiator, the tubes being arranged in transverse rows which are oblique to the median line of the radiator, the obliquity of said rows increasing from front to rear, so that the tubes deflect air inwardly into the cylinder chamber from the front and sides of the radiator.

In testimony whereof I have affixed my signature, in presence of two witnesses.

BENJAMIN C. LORING.

Witnesses:
A. W. HARRISON,
P. W. PEZZETTI.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."