C. H. TOWER.

WATER COOLING APPARATUS FOR AUTOMOBILE RADIATORS.

APPLICATION FILED FEB. 19, 1913.

1,116,169. Patented Nov. 3, 1914.

Fig. 1.

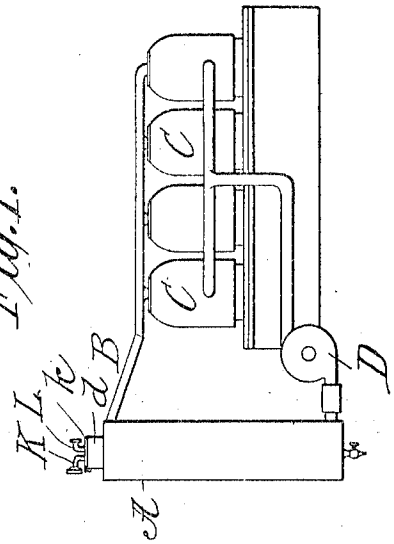


Fig. 3.

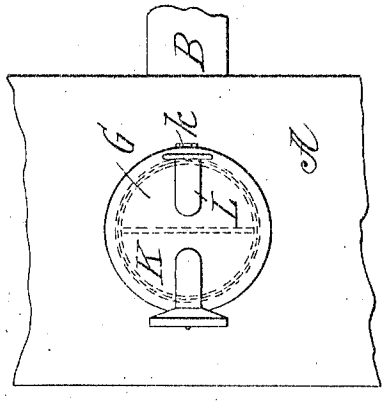


Fig. 2.

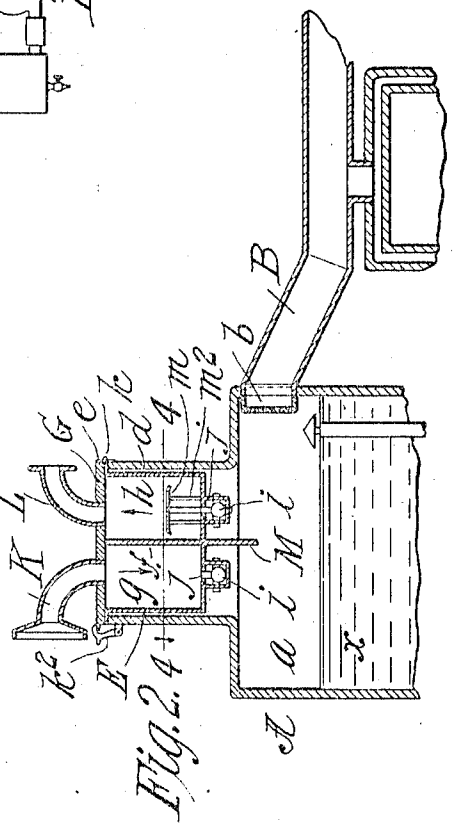
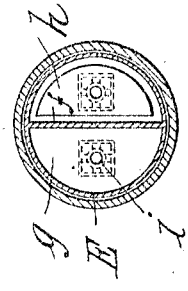


Fig. 4.



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WATER-COOLING APPARATUS FOR AUTOMOBILE-RADIATORS.

1,116,169. Specification of Letters Patent. Patented Nov. 3, 1914.

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To all whom it may concern:

Be it known that I, CHARLES H. TOWER, a citizen of the United States of America, and resident of Holyoke, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Water-Cooling Apparatus for Automobile-Radiators, of which the following is a full, clear, and exact description.

This invention pertains to appliances provided in conjunction with the radiator which is appurtenant to the circulatory water cooling apparatus for the engine cylinders of an automobile, the object thereof being to increase the efficiency or cooling capacity of the system.

Under the exercise of this invention, means are provided whereby the water circulating by reason of the action of the pump through the circulatory apparatus upon entering the chamber in the upper portion of the radiator above the water line therein, preferably in the form of a spray, is encountered by a current of air taken from the exterior of the radiator into the chamber in the upper portion of the radiator and which current of air thereafter has an exit to the atmosphere at the upper and rearward portion of the radiator.

The invention is described in conjunction with the accompanying drawings and is set forth in the claims.

In the drawings: Figure 1 is a diagrammatical elevation of a circulatory water engine-cooling apparatus and the radiator on which latter the present improvements are provided. Fig. 2 is a sectional view vertically and centrally through the upper portion of the radiator, with a portion of the circulatory cooling apparatus in conjunction therewith and showing the novel appliances comprised in the present invention. Fig. 3 is a plan view of part of Fig. 2. Fig. 4 is a horizontal, cross sectional view on line 4—4, Fig. 2.

In the drawings, A represents the upper portion of the radiator to the rear of which a conduit B comprised in the circulatory water-cooling apparatus for the cylinders C C of the engine leads. The circulation of water in and throughout the circulatory apparatus may be induced by a pump D or otherwise.

At or about the place of communication of the conduit B into the chamber *a* in the upper part of the radiator above the normal level of the water *x* therein, such conduit is provided with means to cause a separation of the body of the incoming water so that it assumes the form of a spray, such means as represented in Fig. 2 consisting of a nozzle end *b* of the conduit forwardly closed by a foraminous wall, although other, and equivalent, means to serve the same purpose may be provided in substitution of the form of spraying nozzle shown. The radiator has at its top an upstanding tubular neck *d* in which a cup shaped casing E is removably supported by the outwardly projecting annular flange *e* at its upper edge. The said cup-shaped casing is provided with a transverse partition *f* which divides it into forwardly and rearwardly located conducting chambers *g* and *h* at the bottoms of both of which check valves *i i* are provided, the same being retained in openwork cages or keepers therefor,—said check valves being so applied relatively to the openings *j* at the bottom of the conducting chambers *j* and *h* that while normally open they may under water pressure be raised to close the passages and prevent a discharge of the water from the radiator upwardly through the air conduits which lead into the tops of the said partitioned chambers.

G represents a closing cap connected by hinge *k* to the upper part of the tubular neck *d* for covering the top of the cup-shaped casing,—an oppositely located catch k^2 confining the cap in its closed position. The conduit for the entrance of air into the forward conduit chamber *g* is constituted by the forwardly directed and forwardly opened funnel mouthed pipe K carried by the cap and having the passage therein extending through the latter; and the rearwardly directed pipe L constitutes the conduit also carried by said pipe for leading air outwardly and rearwardly from the conduit chamber *h*. M represents a baffle plate depending from the middle portion of the cup-shaped portion downwardly into the air space in the upper portion of the radiator. A current of air induced in a greater degree when the automobile is traveling entering through the forwardly directed funnel-mouth of the pipe K thence passes downwardly into and through chamber *g* and through the port *j* therein into the air space above the normal water level in the upper portion of the radiator, and by the baffle plate M, its course is more

or less downwardly deflected so that such air instead of quickly passing through chamber *h* and egress pipe L, before having the course for exit last mentioned is compelled to be brought into conjunction with the incoming spray of water which enters the air space *a* by way of the conduit B. This insures a considerable increase in cooling efficiency of the circulatory system.

In case, from overheating, the water in the radiator becomes expanded and rises above the desired normal in the upper portion of the radiator, the hot water will be prevented from escape through either of the pipes K and L by the check valves *i i*. Above the check valve passage or port *j* at the bottom of the rear conducting chamber *h*, I provide a guard plate or baffle *m* supported on the uprights m^2, as a measure to intercept and prevent the outdrawing of water from the radiator as might occur under extreme conditions when by the rapid moving of the automobile an air current having the course hereinabove described may become induced beyond the usual degree. The partitioned cup-shaped casing, which carries the baffle plate may on the overturning to open position of the cap G, be removed from the tubular neck *d* most readily at times when it is necessary or desirable to fill or replenish the supply of water into the radiator.

I claim:—

1. In an apparatus of the character described, a radiator and a circulatory water engine-cooling apparatus, a conduit of which enters the chamber in the upper portion of the radiator, said radiator having at the upper portion thereof a forwardly directed and forwardly open funnel mouthed conduit for air entrance into such air chamber and a separate conduit for the exit of air from said chamber, both said conduits having check valves therein.

2. In an apparatus of the character described, a radiator and a circulatory water engine-cooling apparatus, a conduit of which enters the chamber in the upper portion of the radiator, and means for causing the water to enter such chamber in sprayed form, said radiator having at the upper portion thereof a forwardly directed and forwardly open funnel mouthed conduit for air entrance into such air chamber and a separate conduit for the exit of air from said chamber, both said conduits having check valves therein.

3. A radiator and a circulatory water engine-cooling apparatus, a conduit of which enters the chamber in the upper portion of the radiator and means for causing the spraying of the incoming water, and said radiator having an upstanding tubular neck, a cup-shaped casing supported in said tubular neck, provided with a transverse partition dividing it into forwardly and rearwardly located air conducting chambers, check valves at the bottoms of said chambers, a closure for the top of said cup-shaped casing, a forwardly directed and forwardly opened funnel mouthed conduit for air entrance through said closure into the forward one of said chambers and a separate conduit rearwardly directed having an opening leading from the rearward of said chambers and a baffle plate depending from the middle portion of the cup-shaped casing.

4. A radiator and a circulatory water engine-cooling apparatus, a conduit of which enters the chamber in the upper portion of the radiator and means for causing the spraying of the incoming water, and said radiator having an upstanding tubular neck, a cup-shaped casing provided in said tubular neck, and provided with a transverse partition dividing it into forwardly and rearwardly located air conducting chambers, check valves at the bottoms of said chambers, a closing cap hinge-connected to the upper part of said tubular neck, for covering the top of said cup-shaped casing, and a catch for holding it in its closed position, a forwardly directed and forwardly opened funnel mouthed conduit carried by said cap for air entrance through the latter and into the forward one of said chambers, and a separate conduit rearwardly directed and opening carried by said cap and leading from connection with the rearward of said chambers, and a baffle plate depending from the middle portion of the cup-shaped casing downwardly into the chamber in the upper portion of the radiator.

Signed by me at Springfield, Mass., in presence of two subscribing witnesses.

CHARLES H. TOWER.

Witnesses:
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G. R. DRISCOLL.