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AUTOMOBILE ENGINE COOLING APPARATUS

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Fig 1

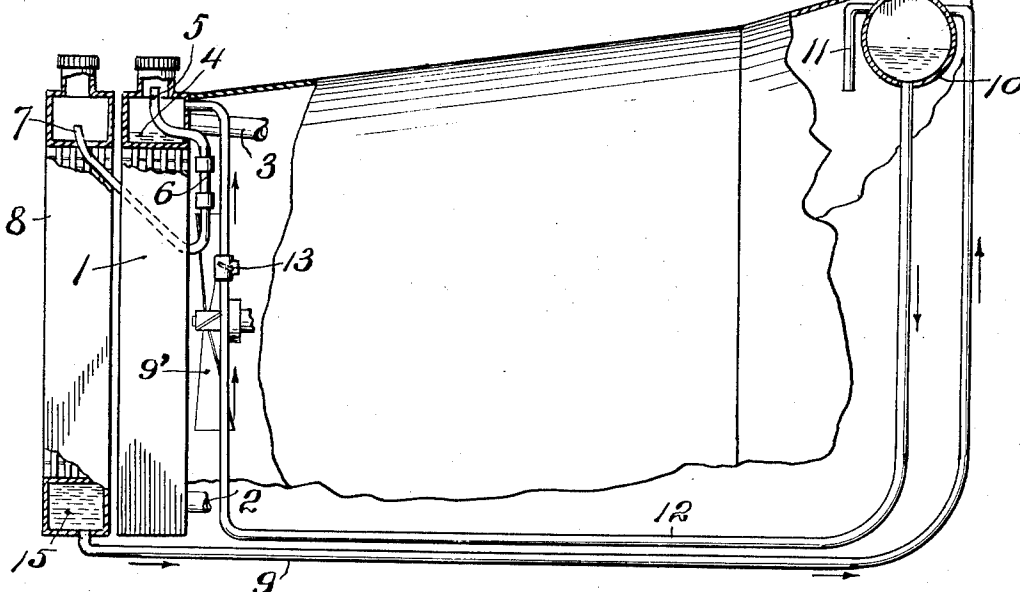
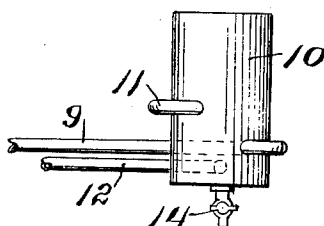


Fig 2



Witness:

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AUTOMOBILE ENGINE-COOLING APPARATUS.

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My invention relates to improvements in automobile engine cooling apparatus. It relates particularly to apparatus of the type employing a radiator in front of a fan, the radiator containing liquid, such as water, or water mixed with alcohol or glycerine or other non-freezing material.

One of the objects of my invention is to provide a cooling apparatus of the kind described, which will conserve the liquid used for cooling, which is simple, cheap, durable, not liable to get out of order, and which can be readily applied to cars now in use.

The novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawing, which illustrates the preferred embodiment of my invention,

Fig. 1 is a side view partly in vertical section and partly in elevation of my improvement shown applied to an automobile radiator of usual water cooling type, the fan, and portions of the hood and cowl being shown.

Fig. 2 is a top view of the tank for receiving the liquid condensed from the vapors, and portions of the pipes connected thereto.

Similar reference characters designate similar parts in the different views.

1 designates a radiator of usual construction having the usual inlet and outlet pipes 2 and 3 which connect it with the engine, not shown. The radiator 1 is adapted to contain liquid 4, which may be water or water mixed with alcohol or other non-freeze material. In the radiator 1 is a vent pipe, 5, which usually communicates with the atmosphere, but which in my improved construction, is connected by a coupling 6 with a pipe 7 which extends into the upper portion of another radiator 8, which is disposed in front of the radiator 1 in the path of the current of air produced by the usual fan 9' located at the rear of the radiator 1.

The bottom of the radiator 8, which is a condensing radiator, has connected to it a pipe 9, the other end of which is connected with a liquid receiving receptacle comprising a tank 10, which near its upper side has a liquid inlet opening in which the pipe 9 is fitted. The receptacle 10 has in its upper side an opening in which is fitted a pipe 11 which communicates with the atmosphere and serves as an air vent. The bottom of

the tank or receptacle 10 has a liquid outlet opening in which is fitted one end of a conductor 12, the other end of which is connected to the radiator 1 at a point lower than the bottom of the tank 10. In the conductor 12 is a check valve 13 which opens toward the radiator 1, thereby permitting liquid to flow from the receptacle 10 through the conductor 12 into the radiator 1, when the pressure in the radiator falls below the pressure of the column of water in the conductor 12. When the pressure in the radiator 1 is greater than the pressure in the conductor 12, the check valve 13, prevents flow from the radiator 1 through the conductor 12.

The liquid receptacle 10 may have a drain cock 14, Fig. 2, through which the liquid in the receptacle may be withdrawn, should the conductor 12 become clogged.

In the operation of my invention, when vapor forms in the radiator 1, it will, instead of going to the atmosphere, as usually occurs, pass through the vent pipe 5, coupling 6 and pipe 7 into the radiator 8, in which it will be condensed, the resulting liquid mixing with a quantity of liquid 15, which is initially placed in the radiator 8 to form a liquid seal over the pipe 9, to prevent vapor passing from the radiator 8 into the receptacle 10. The quantity of water, or water mixed with an anti-freeze, such as alcohol, may be about two or three quarts.

The receptacle 10 may be placed in any convenient place on the car, as under the cowl 16, as shown.

If the engine gets hot enough to form a considerable pressure in the radiator 1, this pressure will be communicated to radiator 8, and will force some of the liquid 15 through the pipe 9 into the receptacle 10, which will catch and hold the liquid so caught until the pressure in radiator 1 lowers sufficiently, upon which the liquid will flow by gravity through the conductor 12, past the check valve 13 into the radiator 1.

Thus, with the use of my improvement, the loss of alcohol or of water from the radiators and cooling system of the machine, due to evaporation to the atmosphere, will be very small. As the liquid which enters the radiator 8 from the radiator 1 is distilled, there will be no dirt or scale carried into the radiator 8, so that the radiator 1 is kept supplied with distilled liquid from

the receptacle 10, and there will be little need of ever cleaning or flushing the improved part of the apparatus.

I do not limit my invention to the structure shown and described, as many modifications, within the scope of the appended claims, may be made without departing from the spirit of my invention.

What I claim is—

10 1. In an automobile engine cooling apparatus, the combination with a liquid containing radiator having a vapor vent, of a receptacle for liquid, and vapor condensing means connecting said vent and said
15 receptacle and having means by which vapor or steam in said condensing means is held from passing into said receptacle but which permits liquid to so pass.

20 2. In an automobile engine cooling apparatus, the combination with a liquid containing radiator having a vapor vent, of a receptacle for liquid, and condensing means connecting said receptacle with said vent by which vapor from said vent is liquefied and the liquid forced by pressure
25 in said radiator into said receptacle and by which steam or vapor is held from passing from said condensing means into said receptacle.

30 3. In an automobile engine cooling apparatus, the combination with a liquid containing radiator having a vapor vent, of a receptacle for liquid, condensing means connecting said vent and said receptacle by which vapor from said vent is liquefied and the liquid forced by pressure in said radiator
35 into said receptacle, and by which steam or vapor is held from passing from said condensing means into said receptacle and said radiator by which, when the pressure in the radiator falls below a predetermined amount,
40 liquid in said receptacle will be discharged therefrom into said radiator.

45 4. In an automobile engine cooling apparatus, the combination with a liquid containing radiator having a vapor vent, of a receptacle for liquid, condensing means connecting said vent and said receptacle by which vapor from said vent is liquefied and the liquid discharged into said receptacle,
50 and by which steam or vapor is held from passing from said condensing means into said receptacle and a liquid conductor connecting said receptacle and said radiator, said receptacle and said conductor being disposed so that liquid will pass by gravity
55 through said conductor from said receptacle into said radiator.

60 5. In an automobile engine cooling apparatus, the combination with a liquid containing radiator having a vapor vent, of a receptacle for liquid, condensing means connecting said vent and said receptacle by which vapor from said vent is liquefied

and the liquid discharged into said receptacle and by which steam or vapor is held from passing from said condensing means into said receptacle, and a liquid conductor
65 connecting said receptacle and said radiator and including a check valve which opens toward said radiator, said receptacle and said conductor being disposed so that liquid will pass by gravity through said conductor from said receptacle into said radiator.

70 6. In an automobile engine cooling apparatus, the combination with a liquid containing radiator having a vapor vent, of a receptacle for liquid having a liquid outlet and having a vent to the atmosphere and a liquid inlet higher than said liquid outlet,
75 a liquid conductor communicating with said liquid outlet and with said radiator and including a check valve which opens toward said radiator, vapor condensing means into which said vapor vent discharges, and a liquid conductor communicating with said condensing means and with said liquid inlet.

80 7. In an automobile engine cooling apparatus, the combination with a liquid containing radiator, having a vapor vent, and the radiator cooling fan of an automobile, of a condensing radiator into which said vent discharges disposed in the path of the current of air produced by said fan and having
85 an outlet for liquid, a receptacle for liquid having a liquid inlet and a liquid outlet lower than said liquid inlet, a liquid conductor communicating with the liquid outlet of said condensing radiator and with said liquid inlet of said receptacle, and a conductor communicating with the liquid outlet of said receptacle and discharging into the first named radiator and including
90 a check valve which opens toward the first named radiator.

95 8. In an automobile engine cooling apparatus, the combination with the cooling fan of an automobile and the liquid containing radiator in front of said fan and having a vapor vent, of a condensing radiator into which said vent discharges disposed in front of the first named radiator in the path of the current of air produced by said fan and having a liquid outlet, a receptacle for liquid disposed at an elevation
100 higher than the level to which liquid can rise in the first named radiator, and having a vent communicating with the atmosphere and a liquid inlet, and having a liquid outlet lower than said inlet and the last named vent, and a conductor communicating with said liquid outlet of said receptacle and discharging into the first named radiator and including a check valve which opens toward
105 said first named radiator.

In testimony whereof I have signed my name to this specification.

PHILIP L. HOWE.