Sept. 5, 1944. A. B. ARNOLD 2,357,626

AIR VENT AND OVERFLOW FOR RADIATORS

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Fig. 1

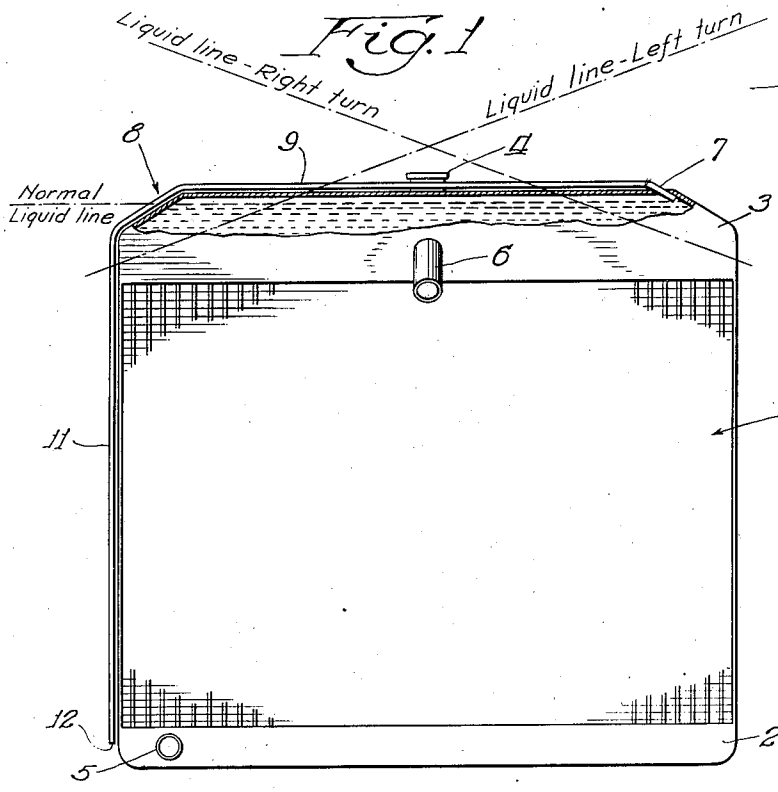
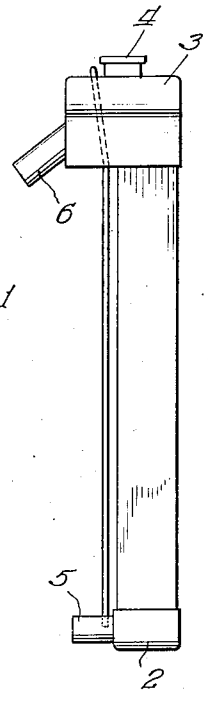


Fig. 2



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AIR VENT AND OVERFLOW FOR RADIATORS

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2 Claims. (Cl. 220—85)

The invention relates generally to vehicle radiators, and the like, and more particularly to an air vent and overflow means for the same. Automotive radiators are normally equipped with an overflow tube which is connected to the top tank of the radiator to provide a vent to the atmosphere. This vent prevents the building up of pressure in the radiator as a result of expansion of the liquid therein, as the temperature increases when the motor is operated, and permits the return of air when the volume of the cooling liquid is reduced as the temperature decreases. This vent also provides an outlet for excess liquid in the radiator, when the latter is filled too full to allow for normal liquid expansion which occurs during the warming up of the system.

In the past this tube has ordinarily been connected to the radiator at the filler neck thereof, the position of the filler neck being at any convenient point on the top of the tank considering the design of the radiator shell, hood of the vehicle, etc. In cases where the filler neck is located to one side or the other of the radiator center line, the practice has been to take the overflow tube down the nearest side of the radiator, thereby using the least amount of material in the overflow tube. The general practice is to mount the radiator transversely across the vehicle, and when the vehicle is rounding a curve, particularly at high speed, the liquid in the radiator tends to be thrown to the outer end of the tank due to the centrifugal force as the vehicle rounds the curve. In such a case, the centrifugal force is sufficient to raise the liquid line above the top of the ordinary overflow tube in which case considerable liquid may be lost through the overflow tube. This condition is aggravated by the present day trends in design which utilize lower and wider radiators than those previously used.

The present invention, therefore, has among its objects the production of a radiator construction and overflow tube in which this objection just described is eliminated.

Another object of the invention is the production of a means for achieving the desired results, which means is very simple in construction and relatively inexpensive to manufacture.

Another object of the invention is the production of such a device in which the action of the overflow tube is not affected by the location of the filler opening.

Many other objects and advantages of the invention herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described and more particularly pointed out in the claims.

In the drawing, wherein like reference characters indicate like or corresponding parts:

Fig. 1 is an elevational view of the rear side of a radiator embodying the present invention, a portion of the upper tank being broken away to show the details of construction;

Fig. 2 is a side elevational view of the same.

Referring to the drawing 1 designates generally a radiator core of the usual construction having a bottom tank 2, and an upper tank 3 for receiving the cooling liquid. The tank 3 is provided with a filler opening 4, illustrated in the present instance, as positioned in the center of the tank 3. The filler opening 4, however, may be positioned at any suitable point of the tank for convenience with respect to the design of the particular vehicle on which it is to be used. The tanks 2 and 3 are provided with the usual outlets and inlets 5 and 6 respectively, for connecting the core into the cooling system of the motor. Communicating with the upper tank 3 adjacent one end thereof, is the end 7 of an overflow tube, designated generally by the numeral 8. The tube 8 extends from one side of the tank horizontally across the top of the tank, as shown at 9, and down the opposite side of the core, as shown at 11, the open end 12 of the tube communicating with the atmosphere.

In contrast to this is the usual radiator construction wherein the filler opening is positioned at the central portion of the tank, the overflow tube terminating in the neck of the filler opening, through which it extends laterally over to one side of the tank and then downwardly along the side thereof. If the filler opening is positioned at the center of the tank, the overflow tube is often brought directly downward along one face of the core to use the least possible amount of tubing, and similarly where the filler opening is positioned to one side of the center of the core the tube is usually brought over to the nearest side of the core and run downwardly along the same. When the vehicle rounds a curve, particularly at high speed, the liquid line, instead of remaining horizontal, will be tilted at an angle due to the resultant of the force of gravity and centrifugal force caused by the motion of the vehicle as it rounds the curve. Thus, assuming the vehicle is making a right-hand

turn the liquid line will approximate that indicated for a right turn in Fig. 1 of the drawing. Similarly, when making a left-hand turn the liquid line will approximate that indicated for a left turn in the drawing. It will be apparent that the liquid lines in either case, would be above the end of the overflow tube if the end of the latter were positioned in the filler opening. Liquid would, therefore, flow into the tube and out into the atmosphere resulting in a loss of liquid. This will continue until the liquid in the tank has diminished to a point where the liquid line when rounding a curve is below the overflow tube.

It will be apparent that in the old construction, the liquid loss will be substantially the same, whether right-hand or left-hand turns are made. In a great number of the present day automobiles the filler opening is positioned adjacent one end of the tank, the end of the overflow tube being positioned in the neck of the filler opening. Obviously, when positioned at one end of the tank the potential liquid loss will be increased, as for example, if the filler opening is positioned adjacent the left-hand end of the tank the end of the overflow tube will be positioned farther below the liquid line when the vehicle is making a right-hand turn, resulting in a greater loss of liquid than in the construction where the filler opening is in the center of the header.

Referring to Fig. 1, it will be noted that with the present invention such losses of liquid are eliminated. When the vehicle makes a right-hand turn so that the liquid line will approach that indicated for a right turn in the drawing, the end 7 of the overflow tube will be positioned above the liquid line, so that there is no possibility of a flow through the tube. When making a left-hand turn so that the liquid line approaches that indicated for a left-hand turn in the drawing, liquid will enter the overflow tube passing into the tube only to a point corresponding to the liquid line, and obviously, as the horizontal portion 9 of the tube adjacent the left side of the core extends above the liquid line there will be no flow to the atmosphere. As the centrifugal force diminishes when the vehicle comes out of the curve, the angle of the liquid line will gradually approach the horizontal and will necessarily fall below the end 7 of the overflow tube before any forces tending to throw the liquid towards the left-hand end of the tube can be developed. Thus, liquid loss due to the centrifugal forces exerted on the liquid is eliminated. It will be seen that the position of the filler opening 4 is immaterial with respect to the action of the overflow tube 8.

It will be apparent from the above description that I have provided means for eliminating the disadvantages of the present day construction which means is simple, inexpensive, and very efficient. Likewise, the invention may be readily adapted for use on substantially any type of radiator.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement, and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. In a device of the kind described the combination of a heat exchange core, a tank positioned on the top of said core, a combined vent and overflow tube communicating with said tank adjacent one end of the tank at the top thereof, said tube extending horizontally along the top of said tank to the opposite end thereof and thence downwardly at the side of said core, the free end of said tube communicating with the atmosphere.

2. In a device of the kind described the combination of a heat exchange core, a tank positioned on the top of said core, a combined vent and overflow tube communicating with said tank adjacent one end thereof at the top thereof with its inlet directed laterally toward the adjacent end of the tank, said tube extending horizontally along the top of said tank to the opposite end thereof and then downwardly at the side of the core, the free end of said tube communicating with the atmosphere.

ARTHUR B. ARNOLD.