

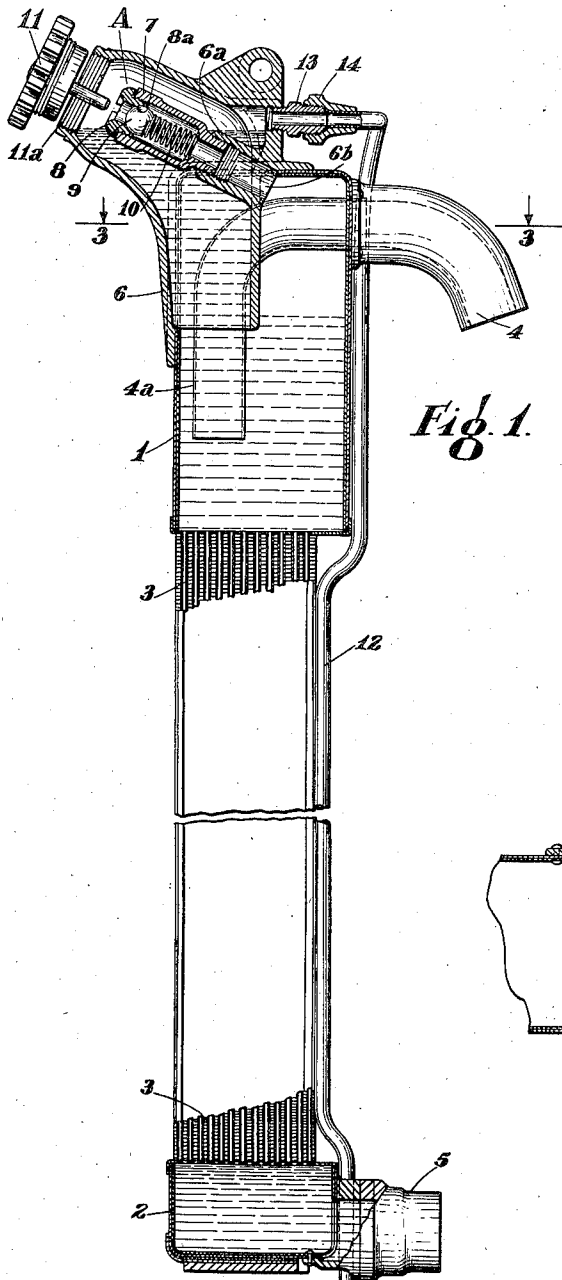
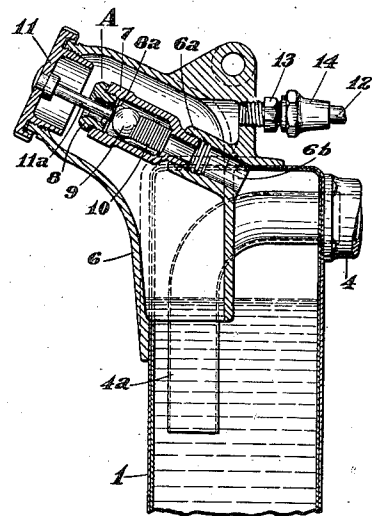
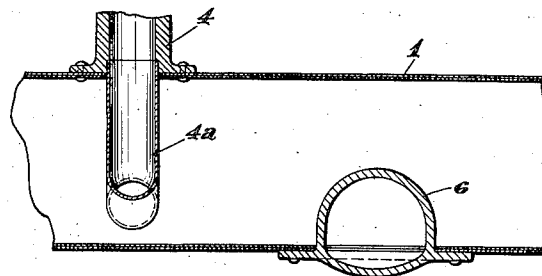
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RADIATOR

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RADIATOR

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2 Claims. (Cl. 257—125)

This invention relates to radiators of the type which are employed in the engine cooling systems of conventional motor vehicles.

It is the object of this invention to provide a radiator which is so constructed that when the cooling system is filled with liquid a space will automatically be left within the top of the radiator below the overflow to receive the cooling fluid displaced from the remaining portion of the cooling system by thermal expansion of the cooling liquid.

The use of an expansion space as set forth prevents the loss of cooling fluid through the overflow, and is particularly desirable when costly anti-freeze solutions are being used in the cooling system.

Referring to the drawing which illustrates a preferred embodiment of my invention:

Figure 1 is a longitudinal section of a radiator for use in the engine cooling system of a motor vehicle, the view showing the relation of parts with the radiator cap removed, and the disposition of the liquid in the radiator resulting after filling before closure of the filling tube by the radiator cap.

Figure 2 is a fragmentary section of the radiator taken on the same plane as Figure 1, the view showing the relation of parts with the radiator cap secured in place in the filling tube, and the disposition of the liquid in the radiator after filling following the closure of the filling tube by the radiator cap, and

Figure 3 is a fragmentary sectional view of the radiator taken on line 3—3 of Figure 1.

The radiator illustrated in the drawing comprises an upper tank 1 and a lower tank 2 connected by cooling tubes 3. It is provided with an inlet pipe 4 associated with the upper tank 1, including a downwardly extending portion 4a within the tank 1, through which it receives liquid from the engine, and with an outlet pipe 5 associated with the lower tank 2 through which liquid leaves the radiator for delivery to the engine.

Mounted upon the upper tank 1 and extending into such tank, there is a hollow casting 6 which serves as a filling tube for the radiator. The rear wall of the casting 6 is constructed with a boss 8a located at the top of the tank 1 and formed with a bore 8b. Screwed into the upper end of the bore 8b in the boss 8a, there is a mechanism A comprising a tubular housing member 7, an annular member 8 screwed into the outer end of the housing member, a ball valve 9 mounted in the upper end of the housing member and designed to engage a seat 8a on the member 8,

and a spring 10 mounted in the housing member below the valve 9 and pressing such part in the direction of its seat 8a on the member 8.

The casting 6 is formed with a threaded portion at its outer end designed to receive a threaded radiator cap 11. The radiator cap 11 is constructed with a rigidly affixed rod 11a which when the cap is secured in place engages and unseats the ball valve 9 opening the passage through the boss 8a and the mechanism A.

An overflow conduit for the radiator is provided in the form of a pipe 12 located at the rear of the radiator and communicating with the interior of the casting 6 above the tank 1 through a connection consisting of a threaded coupling 13 and a nipple 14.

In accordance with the manner in which the radiator is constructed the upper part of the tank 1 serves as an expansion chamber to receive the cooling liquid displaced from the remaining portions of the cooling system by thermal expansion of the cooling liquid. The manner in which the upper portion of the tank 1 is conserved as an expansion chamber will hereafter be explained.

Assuming that the radiator has been installed in an engine cooling system and is desired to fill the system, filling is accomplished by introducing cooling liquid into the system by way of the casting 6 until the liquid rises in the casting to a position where it can be seen. During the filling operation, the fluid rises in the radiator in a normal manner until the level of the fluid reaches the lower end of the casting 6 in the tank 1. At such stage, the liquid in sealing the lower end of the casting closes the only means of escape of air from the tank 1, the passage through the mechanism A having been closed by the valve 9 on removal of the cap 11 preparatory to filling of the radiator. The further introduction of fluid into the casting 6 after the level in the tank 1 has reached the lower end of the casting causes but a slight rise in level in such tank, and the upper portion of such tank is as a result left unfilled even when sufficient fluid has been introduced into the system to bring the level of the liquid in the casting to the top of such part. When the cap 11 is secured in place in the casting 6 following the filling of the system, the rod 11a engages and unseats the ball valve 9 allowing air to escape from the upper part of the tank 1 and liquid from the casting 6 to flow into the tank 1 until the liquid in such parts reaches the same level.

The water flowing into the tank 1 from the casting 6 following unseating of the valve 9

raises the level of the water in the tank 1 but a small amount since the area of the passage in the casting 6 is relatively small as compared to the area of the tank 1. As a result, a substantial part of the upper portion of the tank 1 is left unfilled. This unfilled portion of the tank 1 remaining after insertion of the radiator cap 11 constitutes the expansion chamber previously referred to, and when the liquid is heated by the engine receives the liquid displaced from the other part of the system returning same upon cooling of the liquid.

Should an attempt be made to fill or replenish the system when full, the liquid will immediately rise in the casting 6 in consequence of the communication through the mechanism A having been closed by the valve 9 on removal of the cap 11. As a result, the person attempting to fill the radiator will be immediately notified that the system is full; and the only result of the attempt will be to introduce into the system the small amount of liquid poured into the casting 6 with a slight rise of the liquid in the tank 1 when the valve 9 is unseated by the rod 11a on reinsertion of the cap 11. Although continued attempts to refill or replenish the system could result in the upper portion of the tank 1 being filled with liquid thereby eliminating the expansion space, such elimination of the expansion space does not happen in practice when proper care is exercised to avoid too frequent refilling.

Having described my invention, what I claim is:

1. In a radiator, an upper tank and a lower tank connected by cooling conduits, a filling tube leading into said upper tank and extending downward within said upper tank below its entrance into said upper tank, a conduit associated with said filling tube communicating at one end with the interior of said filling tube and at its other end with the interior of said upper tank above the lower end of said filling tube, a valve for closing the passage through said conduit, a cap for closing the outer end of said filling tube, means carried by said cap designed to open said valve when said cap is placed in a position to close the outer end of said filling tube, and an overflow pipe communicating with the interior of said filling tube.

2. The combination in a radiator, of an upper tank, a filling tube leading into said upper tank and extending downward within said upper tank below its entrance into said upper tank, a conduit associated with said filling tube communicating at one end with the interior of said filling tube and at its other end with the interior of said upper tank above the lower end of said filling tube, a cap for closing the outer end of said filling tube, means operable to close the passage through said conduit when said cap is removed, means for opening the passage through said conduit when said cap is placed in a position to close the outer end of said filling tube, and an overflow pipe communicating with the interior of said filling tube.

WERNER F. BOLDT.