

Feb. 10, 1953

A. L. HAYNES ET AL
RADIATOR CONSTRUCTION

2,628,079

Filed June 22, 1950

2 SHEETS—SHEET 1

FIG. 1

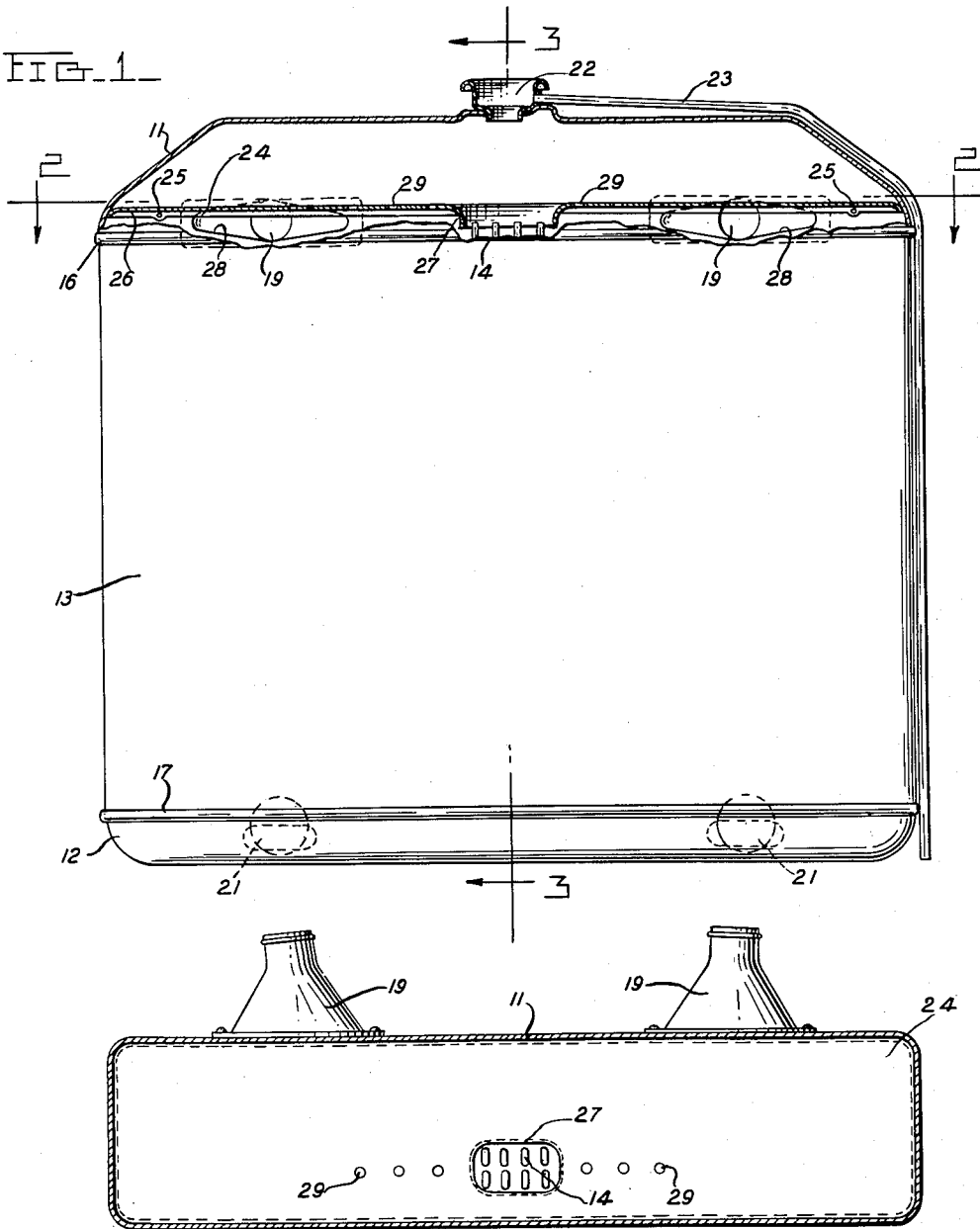


FIG. 2

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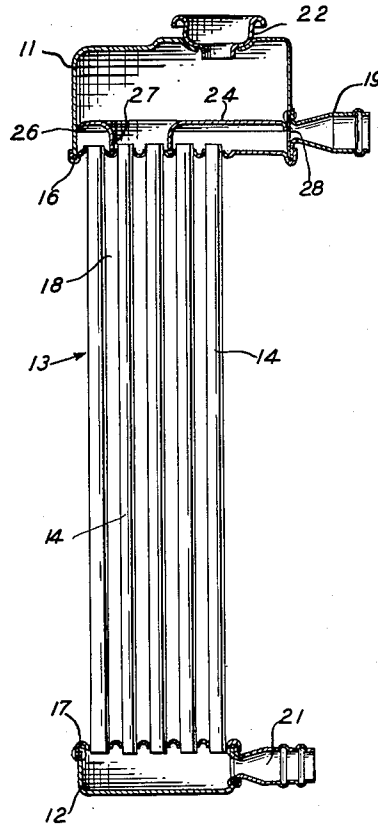


FIG. 3

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2,628,079

RADIATOR CONSTRUCTION

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2 Claims. (Cl. 257—129)

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This invention relates generally to motor vehicle cooling systems and has particular reference to an improved radiator construction.

An object of the present invention is to provide a radiator in which the upper tank is divided into two chambers by means of a horizontally extending baffle plate, with the radiator inlet communicating with the tank beneath the baffle plate. By maintaining the liquid at any level above the baffle plate it is possible to materially reduce turbulence and aeration in the upper tank of the radiator and consequently attain greater efficiency in the cooling system. The baffle plate is preferably provided with a downwardly depending spout establishing communication between the chamber above the baffle plate and the radiator core to enable fill liquid to be readily and rapidly introduced into the radiator core. In addition, the baffle plate is provided with a number of small openings properly located, preferably near the spout, to permit air trapped beneath the baffle plate to escape into the chamber above the plate and also to permit a limited circulation of cooling liquid therethrough.

Other objects and advantages of the invention will be made more apparent as this description proceeds, particularly when considered in connection with the accompanying drawings, wherein:

Figure 1 is a front elevation, partly broken away and in section, of a radiator constructed in accordance with the present invention.

Figure 2 is a horizontal cross sectional view taken on the plane indicated by the line 2—2 of Figure 1.

Figure 3 is a vertical cross-sectional view taken on the plane indicated by the line 3—3 of Figure 1.

Referring now to the drawings, there is shown a radiator for a motor vehicle engine comprising an upper tank 11, a lower tank 12, and a core 13 of the cellular tubular type. The core 13 is constructed in accordance with conventional practice and for simplicity is shown in Figure 1 simply in outline. In Figure 3, however, the tubes 14 of the core are shown in elevation with their opposite extremities extending through pierced holes in the upper and lower tube sheets 16 and 17 respectively. Conventional horizontal fins are provided to assist in properly radiating the heat from the radiator, but for the sake of simplicity are not shown in the drawing and form no part of the invention.

Inasmuch as the radiator shown is for an engine of the V-type, a pair of inlets 19 communicate with the upper tank 11 to introduce liquid to the radiator from the engine, and a pair

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of outlets 21 are provided in communication with the lower tank 12 to permit liquids cooled by circulation through the core 13 to be returned to the engine in the usual manner. A filler neck 22 is mounted in the upper wall of the upper tank 11 and is adapted to be closed by a conventional filler cap (not shown), preferably of the pressure type. An overflow pipe 23 extends from an intermediate portion of the filler neck downwardly outside the radiator core to permit excess cooling liquid and air to be exhausted from the system.

It will be noted that the upper tank 11 is in the form of an inverted dished stamping closed at its lower extremity by means of the upper header 16, the joint therebetween being soldered and water tight. The upper tank 11 is divided into upper and lower chambers by means of a horizontally extending baffle plate 24 located at a predetermined intermediate position between the top wall of the tank and the upper header. The baffle plate is provided with a downturned peripheral flange 26 engaging the side walls of the upper tank 11 and secured thereto by rivets 25 and by soldering. The soldered joint between the peripheral flange 26 of the baffle and the adjacent walls of the upper tank is continuous and water tight and effectively prevents the transfer of liquid or air around the edges of the baffle.

The baffle 24 is provided with a downwardly extending spout 27 located centrally of the width of the radiator. As best seen in Figure 2, the spout 27 is so positioned as to encompass within its periphery the open upper ends of a predetermined number of tubes 14, here shown as eight tubes. While the lower edge of the spout 27 may, if desired, rest directly upon the adjacent surface of the upper tube sheet 16, in the construction shown in Figure 3 a slight clearance is allowed between the upper tube sheet 16 and the lower edge of the spout 27.

It will be noted that while the outer ends of the inlets 19 are cylindrical to facilitate connection of hose thereto, their inner extremities are flared in a horizontal direction and flattened in a vertical direction to provide a horizontally elongated opening 28 having substantially the same cross sectional area as the outer cylindrical ends of the inlets. The elongated openings 28 at the inner ends of the inlets 19 communicate with the upper tank of the radiator beneath the baffle plate 24 so that all incoming liquid from the engine enters the radiator beneath the baffle. As long as the level of the liquid in the radiator is above the baffle plate 24 it will be seen that the incoming liquid from the engine is introduced into the

core of the radiator without coming into contact with any air which may be located in the upper portion of the upper tank 11. Consequently turbulence and aeration is held to a minimum and an efficient flow of cooling liquid through the system is obtained.

When the radiator is being filled with cooling liquid through the filler neck 22 the liquid passes readily through the spout 27 provided in the baffle plate and thence into the core and lower tank of the radiator as well as into the other portions of the engine cooling system such as the water jacket, etc. During filling, the majority of the liquid enters the core directly through the tubes 14 whose open upper ends are encompassed by the periphery of the spout 27. Intercommunication between the open lower ends of the tubes and the lower tank of the radiator permits the entire radiator core to be filled. A certain amount of the filled liquid may of course enter the upper tank through the clearance space provided between the lower end of the spout 27 and the upper tube sheet 16.

As best seen in Figure 2, a number of small holes 29 are formed in the baffle plate 24. The holes 29 form air vents permitting air trapped beneath the baffle plate to pass upwardly there-through into the upper chamber of the upper tank. It has been found that by locating these holes relatively close to the spout 27 effective venting is provided. The holes 29 are relatively small and few in number and do not materially interfere with the normal circulation of cooling liquid directly from the inlets 19 through the core 13 to the outlets 21.

With the radiator construction shown, turbulence in the upper tank is effectively minimized even though the liquid level in the upper tank drops considerably. As long as the liquid level is above the baffle plate 24, effective circulation of the cooling liquid without turbulence is possible. Cooling liquid should be added to the system, however, whenever the level drops to or beneath the baffle plate 24. In some instances, when the level is dangerously low, as for example just above the baffle plate, there may be a tendency to draw air into the radiator core through the spout 27. Under these conditions, the small holes 29 in the baffle function to alleviate this condition. Being located closely adjacent the spout 27, liquid may flow upwardly through the holes to replenish liquid momentarily drawn down into the spout 27 thus preventing air from entering the system.

Attention is invited to the fact that, as best seen in Figure 3, the spout 27 of the baffle plate 24 is offset from the filler neck 22 in a forward direction. An advantage of this arrangement is that the baffle plate itself will be seen through the filler neck when the filler cap is removed and the amount of liquid above the baffle plate can be more accurately judged. If the spout in the baffle plate were not offset from the filler neck it would be possible for the liquid level in the radiator to be somewhat beneath the baffle and yet show in the spout 27 when viewed through the filler neck, thus making it difficult to ascertain the liquid level and to judge whether the liquid level was dangerously low or not.

It will be understood that the invention is not

to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. In a radiator construction, a tubular core having upper and lower tube sheets and a plurality of tubes extending vertically therebetween and projecting through the upper tube sheet with their upper ends terminating a short distance above said tube sheet, an upper tank located above said upper tube sheet, a generally horizontal baffle plate extending across said upper tank with its peripheral edges engaging the walls of said tank to form a fluid tight seal therebetween, said baffle plate being located between said upper tube sheet and the upper wall of said tank with the distance from said upper tube sheet to said baffle plate being substantially smaller than the distance from said baffle plate to the upper wall of said tank to divide said tank into a small lower chamber and a larger upper chamber, a pair of inlets for introducing fluid to be cooled into said radiator communicating directly with said smaller lower chamber, a filler neck in the upper wall of said tank communicating directly with said upper chamber for introducing fill fluid therein, said baffle plate having an enlarged opening therein, and a spout extending downwardly from said baffle plate in alignment with said opening to provide for the passage of fill fluid from said upper chamber to said radiator core, said spout terminating close to said upper tube sheet to deter fluid which enters the lower chamber through said inlet from surging through said opening into said upper chamber.

2. The structure defined by claim 1 which is further characterized in that said spout and said filler neck are offset laterally from each other to such an extent that their vertical projections do not intersect, and the lower end of said spout terminates below the level of the upper ends of the tubes of said radiator core and encompasses within its periphery the upper ends of a number of said tubes but with the majority of said tubes being located outside the periphery thereof, the inlet for said baffle plate being provided with a plurality of small holes spaced from said spout to provide direct communication between opposite sides of said baffle plate to permit air trapped in said lower chamber to escape into said upper chamber.

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