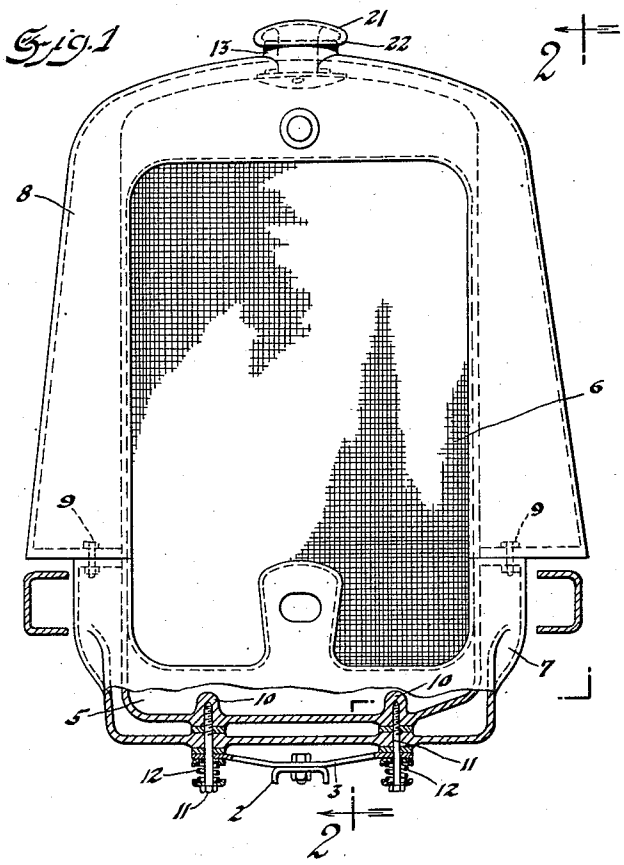
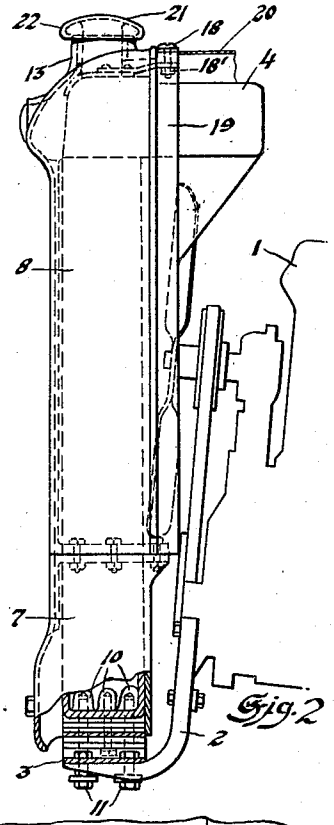
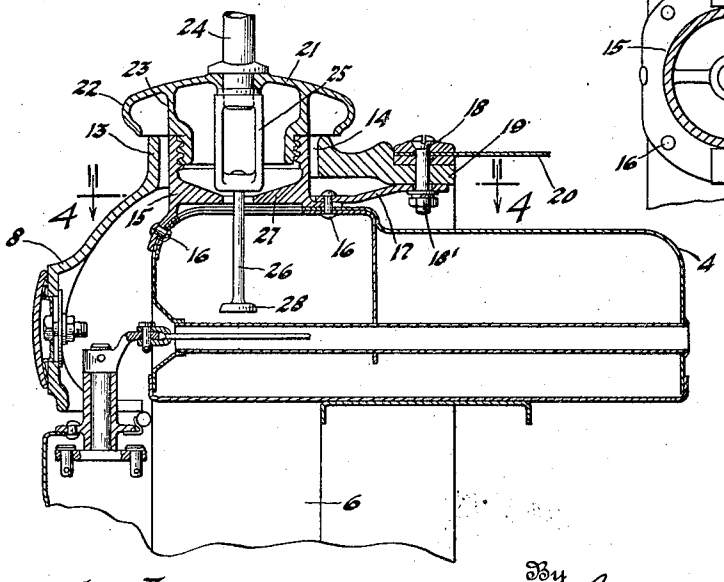
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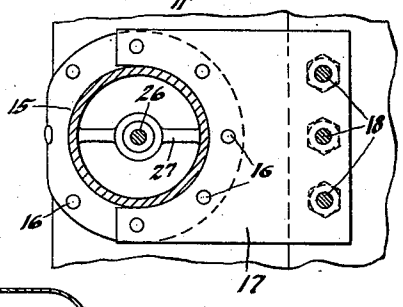
RADIATOR STRUCTURE

Filed Feb. 20, 1928









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UNITED STATES PATENT OFFICE

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RADIATOR STRUCTURE

Application filed February 20, 1928. Serial No. 255,695.

This invention relates to motor vehicles, and more particularly to the construction of a radiator for the water cooling system of an internal combustion engine.

While not limited in its use, it may be said that the present invention is particularly adaptable for use on commercial automobiles, trucks, busses and other heavy duty vehicles, such as are usually subjected to extremely hard usage and even abuse. It contemplates the supporting of a rugged heat radiating unit and customary shell or casing, which in this instance is preferably of cast metal, in a manner that neither carries the weight of the other. The invention further involves the use of a flexible tie connection between the heat radiating unit and the shell, which while serving to firmly hold the parts in assembled relation, will be capable of bending to accommodate relative expansion of the heat radiating unit and shell. It will be apparent, therefore, that since the weight of the shell and heat radiating unit are each supported independently of the other, and their relative expansion is unconfined, there will be a consequent freedom from strain, whereby damage and breakage of parts is reduced, and the life or period of usefulness of the radiator structure materially increased.

A preferred but not necessarily the only embodiment of the invention is illustrated in the accompanying drawing, wherein Fig. 1 is a front view of the radiator with parts broken away; Fig. 2 is a side elevation partly in section, as indicated by the section lines 2—2 of Fig. 1; Fig. 3 is an enlarged detail sectional view of the central top portion of the radiator, and Fig. 4 is a fragmentary view, taken on line 4—4 of Fig. 3.

Referring more particularly to the drawing, the reference character 1 indicates the outline of the front portion of an internal combustion engine, to which is secured an L-shaped bracket 2 having a forwardly extending portion, projecting centrally beneath the radiator structure, and carrying a transversely extending spring leaf or plate 3. It is upon the spring plate 3 that the radiator structure is more or less flexibly supported, the flexibility of the plate serving to cushion road shocks and relieve the radiator structure of strains incident to frame weaving, engine vibration and the like.

That part of the radiator through which the water or other cooling fluid circulates and which for convenience, may be termed the heat radiating unit, comprises an upper tank or inlet header 4, and a lower tank or outlet header 5, with an intermediate core assembly 6, by means of which the cooling fluid dissipates its heat as it passes from the upper to the lower tank. Following general practice, a shell or casing is provided to lend a certain ornamental appearance to the structure.

The shell or casing in this instance, is of cast metal, preferably aluminum, aluminum alloy, or other light weight metal, and which for convenience and economy of manufacture and assembly, as well as to facilitate inspection and repair, is formed in two parts, a lower section 7, having a bottom cross portion and upwardly extending side arms, and an upper section 8, having a top cross portion and dependent side arms. The side arms of the respective sections 7 and 8, are secured to each other by attachment bolts 9 or the like. Integral bosses 10 are cast on the inside of the bottom wall of the lower tank 5, and these are drilled and tapped from the underside, for the reception of long bolts 11, which extend upwardly through aligned apertures in the ends of the spring plate 3, bottom wall of the casing portion 7 and into screw threaded engagement with the threads in the bosses 10. Coil springs 12 are interposed between the heads of the bolts and the underside of the spring plate, to yieldingly maintain the radiator structure on the spring supporting plate. It will thus be seen that the radiator structure is more or less flexibly mounted on the front of the engines and independent of the chassis frame, whereby the flexibility of the mounting cushions or absorbs engine vibrations, road shocks and the like, and at the same time the radiator structure is relieved of the racking strains incident to frame weaving.

The central top wall of the casing section

8 is provided with an upstanding circular flange 13, defining the opening 14, which is of larger diameter than the filler spout 15, projecting through the opening and connected by rivets 16 to the top wall of the tank 4. In order to tie the radiating unit and casing together against fore and aft and sidewise movement, there is employed a flat spring plate 17, having a semi-circular opening in one edge, fitting about the filler spout 15 and secured to the top tank by the rivets 16. Bolts 18 having nuts 18′ threaded thereon, secure the opposite end of the flexible plate 17 to the hood ledge 19 of the radiator shell or casing, these bolts also serving to fasten a stationary plate 20, extending rearwardly to the cowl or dashboard to brace the radiator structure, and which also forms a part of the engine hood or bonnet, and to which the other parts in the engine hood are hingedly secured. The closure cap 21 has a downturned peripheral flange 22 extending beyond the circular flange 13 of the casing or shell, and also has a dependent annular wall 23, for screw-threaded engagement with the interior of the filler spout 15. If desired, the cap may be provided with a temperature indicator 24, extending through an opening in the cap and having threaded thereon a part 25 carrying a dependent stem 26, projecting through an opening in a cross web 27 integral with the filler spout, and having an enlarged head 28 at its lower end to prevent complete removal and accidental loss of the closure cap.

Since the opening in the casing is of larger diameter than that of the filler spout, and because of the fact that the dependent flange 22 extends beyond the flange 13, ample clearance is provided between these parts for the unobstructed relative vertical movement of the heat radiating unit and casing upon relative expansion or contraction, at which time also the tie plate 17 will flex or bend to accommodate and permit such unrestrained movement. It will thus be seen that the weight of the heat radiating unit and shell are each supported independently of the other, there being a definite fixed relation only at their lower ends, and that the upper ends are so connected as to prevent undesirable relative fore and aft and sidewise movement, while freely permitting a slight relative vertical movement, whereby expansion of both the shell and heat radiating unit is unconfined and the relative expansion between these parts will not impose strains on the other.

I claim:

1. Means to rigidly maintain a radiator in definite centered relation within its shell and permit relative vertical movement between the radiator and shell, including in combination with a radiator shell and a radiator therein having a filler spout projecting through an opening in the shell of greater diameter than the spout to permit movement therein of the spout, of a flat spring plate flexible only at right angles to its plane and having in one end thereof a substantially semi-circular recessed portion closely fitting the wall of the spout, means to connect the recessed end of the plate to said radiator and a rigid connection between the opposite end of the plate and said shell.

2. Means to rigidly maintain a radiator in definite centered relation within its shell and permit relative vertical movement between the radiator and shell, including in combination with a radiator shell and a radiator therein having a filler spout projecting through an opening in the shell of greater diameter than the spout to permit movement therein of the spout, of a flat spring plate flexible only at right angles to its plane and having a recessed end that conforms substantially to the contour of the filler spout wall, means to rigidly connect said recessed end to the radiator in close fitting relation with the filler spout and a rigid connection between the other end of the plate and the shell.

3. Means to rigidly maintain a radiator in definite centered relation within its shell and permit relative vertical movement between the radiator and shell, including in combination with a radiator and a shell, connected together adjacent their lower ends, of a flat spring plate which is flexible only in a direction at right angles to its plane, means to rigidly connect said plate at opposite ends to the upper portions of the radiator and the shell, with the plate extending in a substantially horizontal plane.

4. In a radiator construction, a support, a radiator shell, a radiator unit enclosed within the shell and having a dependent rigid projection adjacent the bottom thereof that extends loosely through a lower part of the shell and said support, a spring bearing on said projection to resiliently hold down the radiator unit and shell on said support, and a horizontally disposed spring plate which is flexible only in a direction at right angles to its horizontal plane, rigidly connected at opposite ends to upper portions of the radiator unit and shell, whereby the shell and unit are firmly held against lateral movement and are movable freely relative to each other in a vertical direction.

5. In combination with a radiator shell having a flanged opening therein and a radiator unit encased within the shell and carrying a filler spout that projects loosely through said flanged opening, of a spring blade that is flexible only in a direction at right angles to its plane, having its opposite ends rigidly connected with the shell and radiator and lying in a plane at right angles to the spout, to rigidly hold the radiator and shell against relative lateral movement while permitting, through the bending thereof, of relative

movement of the radiator and shell in a direction at right angles to its plane.

6. The structure of claim 16 wherein the filler spout has a closure cap that overhangs the top of the flange of the shell opening and the overhanging portion thereof is provided with a space into which the flange may project.

In testimony whereof I affix my signature.

C. J. BOCK.