Dec. 17, 1935. F. M. YOUNG 2,024,496

RADIATOR

Original Filed Oct. 23, 1933

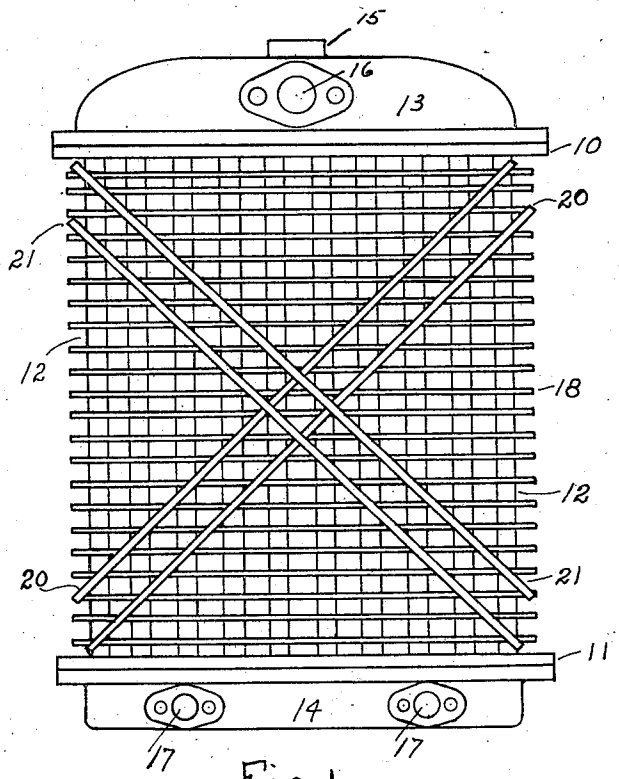


Fig. 1

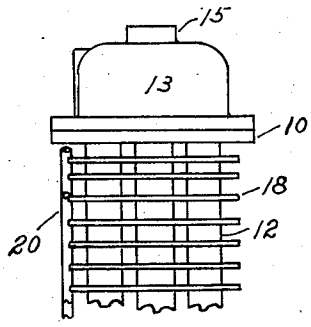


Fig. 2

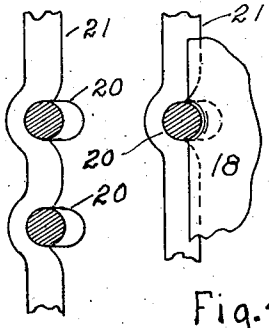


Fig. 3

Fig. 4

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RADIATOR

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Original application October 23, 1933, Serial No. 694,753. Divided and this application July 19, 1934, Serial No. 735,998

3 Claims. (Cl. 257—125)

This application is a divisional of application filed October 23, 1933, Serial No. 694,753 now Patent No. 1,998,112 issued April 16, 1935. It is therefore the intention that the present patent shall cover by suitable expression in the appended claims, features of patentable novelty other than claimed in the above stated copending application.

The invention relates to improvements in heat transfer devices, commonly called radiators and more particularly the type used for cooling large internal combustion engines, wherein the radiator is mounted on the engine supporting frame, or for use on rail cars, busses, trucks and the like. In either event the radiator is subjected to considerable vibration.

The usual vibration in radiators of this type is serious, in that the tubes are made of thin copper and therefore are fragile and sensitive to vibration, which sooner or later results in leaky joints where the tube ends are attached to the header plate or fractures develope in the tubes, near their connection to the header plate.

In large radiators there is considerable weight in the core and the core is of considerable length. The center portion of the core oscillates sidewise. This oscillation is frequently quite noticeable and serious. There is also serious vibration at the top of the radiator when the housing is not rigid enough to prevent it.

The tubes do not greatly resist this side motion because they are usually flattened and positioned with the long section in a transverse direction to the direction of vibration.

The object of my invention is to provide simple and inexpensive means whereby the core particularly midway the headers is held against a sidewise bending movement. I accomplish these objects by means of suitably positioned reenforcing wires in a manner which will hereinafter appear.

The preferred embodiment of my invention is illustrated in the accompanying drawing in which:

Figure 1 is a rear plan view of a radiator core, equipped with one form of my invention.

Figure 2 is a fractional transverse plan view of the radiator shown in Figure 1.

Figure 3 is an enlarged fractional view of the reenforcing wires, two being shown in section, illustrating how they are formed at their intersecting points.

Figure 4 is an enlarged fractional view illustrating how the wires fit into the edge of the fins.

As thus illustrated in the various figures, 10 designates the upper header plate of a radiator core, and 11 designates the lower header plate. A plurality of vertical tubes 12 are suitably positioned in parallel relation and the ends bonded into corresponding openings in the plates 10 and 11.

The upper header cap 13, is made fast to upper header plate 10 by means of a gasket and suitable bolts or otherwise attached, and the lower header cap 14 is similarly made fast to the lower tube plate 11. Header cap 13 is supplied with the usual filler cap nipple 15 and a coolant circulating connection opening 16. The lower cap 14 is provided with coolant outlet openings 17. Thus when the proper connections are made the coolant may pass into the cap 13, down through tubes 12, into cap 14 and out through opening 17.

In order to increase the radiating capacity of the device, closely spaced fins 18 are provided. These fins are provided with flanged openings, (not shown), through which the tubes extend and are bonded in the usual manner thereto.

Thus it will be seen that I have shown a conventional radiator, the tubes of which are preferably flattened.

If the core is supported from the lower header only, the top may oscillate sidewise to a considerable extent and cause loose joints or fractured tubes, and when the upper header is held sufficiently rigid by the housing to prevent side movement, the core itself at its center may be caused to vibrate sidewise and cause trouble at either end of the tubes. I provide novel means, therefore, to prevent all side movement or vibration in the following manner:

I provide anchor wires 20—20 and 21—21 which are positioned diagonally across the rear face of the core as indicated in Figure 1. These wires are preferably oppositely offset at their intersections as indicated in Figure 3. These offsets, or indentations, are equal to one-half the diameter of the wire, thus the wires will lie in the same plane. I show two pair of wires which extend from opposite corners of the core. In small units, a single wire, in each direction, may be all that is necessary, while in large units two or more wires are necessary. All of the wires may be in parallel relation and positioned diagonally in either direction.

I provide indentations in the edge of the fins, see Figure 4, thus to form channels into which the wires lie. These channels may be formed previous to this assembling operation or the indentations may be made by hammer blows on

the wires. In either event the edge of the fin will be folded and formed to thereby partly enclose the wire.

After the wires are in position in their channels they are made fast to the identations in the fins by suitable bonding. Thus there is a multiplicity of attachments made to the fins to thereby form a strong reenforcement for the core.

Attention is called to the fact that each individual fin is, as illustrated in Figure 1, attached to wires in four places and since each fin is bonded to each individual tube, the entire mass is made very strong without adding much to the weight and cost of the core.

Thus it will be seen that I have provided novel means for anchoring the core to thereby prevent harmful distortion and vibrations.

Having thus shown and described my invention what I claim is:

1. A radiator core, comprising a plurality of tubes in parallel relation, a multiplicity of closely spaced fins through which said tubes extend and are bonded thereto, one or more wires extending diagonally across said core and positioned in indentations in said fins and being bonded therein.

2. A radiator core comprising a plurality of tubes in parallel relation, a multiplicity of closely spaced fins through which said tubes extend and are bonded thereto, two groups of wires, the wires of each group positioned diagonally across the face of said core from opposite corners thereof, said wires having offsets at their intersections whereby the remainder of their length is in the same plane, grooves in said fins into which said wires are positioned and being bonded therein.

3. A radiator of the class, comprising a number of tubes in parallel relation, a multiplicity of closely spaced fins through which said tubes extend, forming a core, headers into which the ends of said tubes are suitably attached whereby a liquid or gas may pass from one header to the other through said tubes, a number of wires positioned diagonally, in indentations, across the edges of said fins and bonded therein, said wires having contact with said fin edges only to thereby yieldingly prevent excessive transverse vibration of said core at its center.

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