

Oct. 10, 1939.

F. B. HEWEL

2,175,394

RADIATOR STRUCTURE

Filed July 18, 1936

2 Sheets-Sheet 1

Fig. 1.

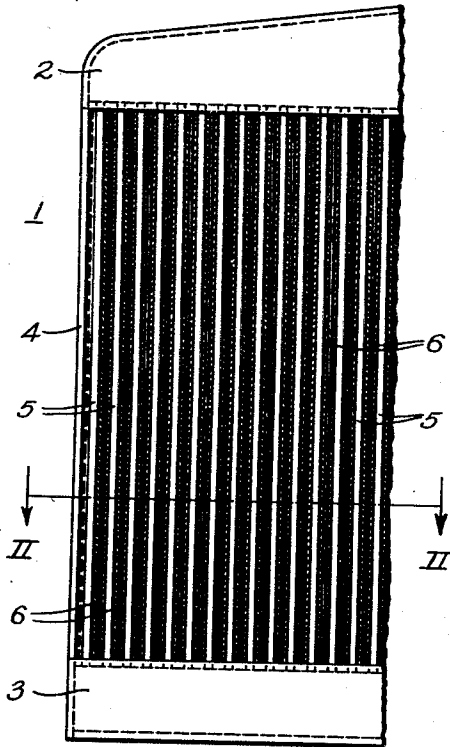
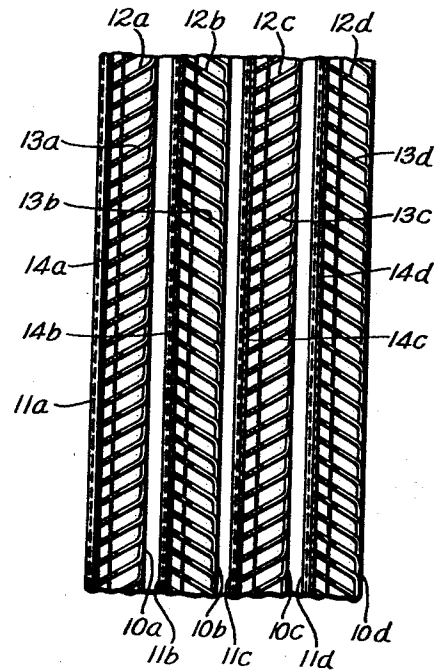
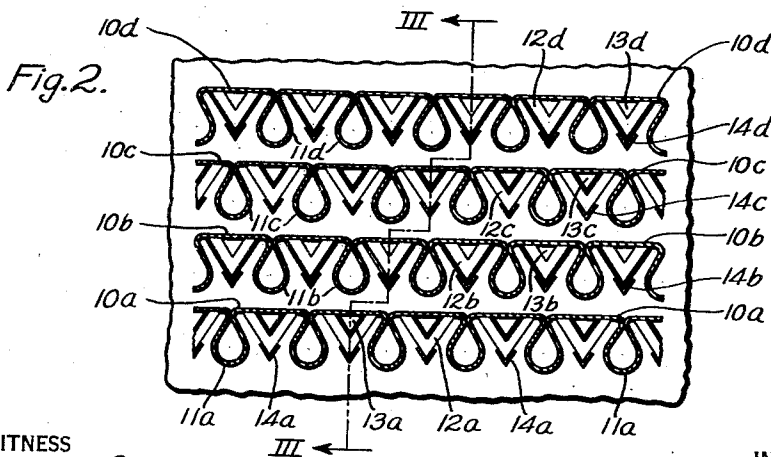


Fig. 3.



WITNESS

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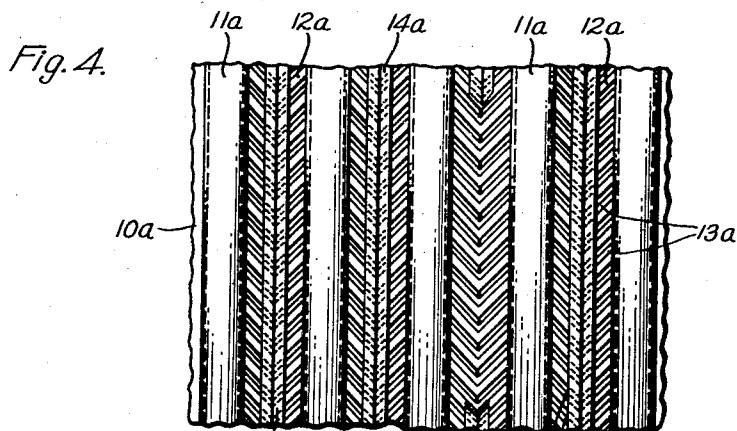
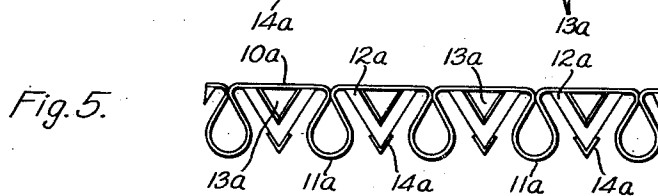
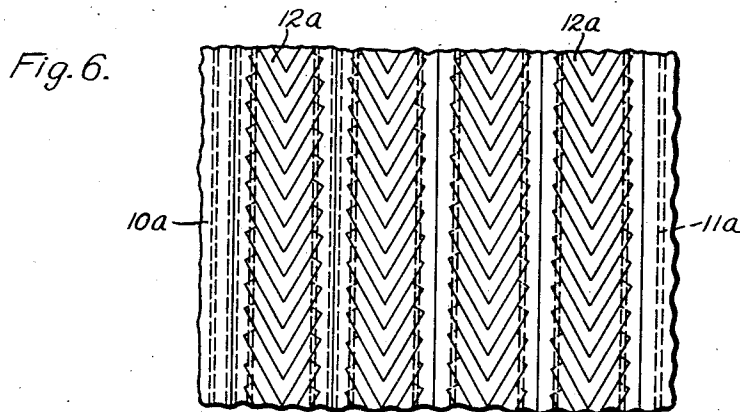
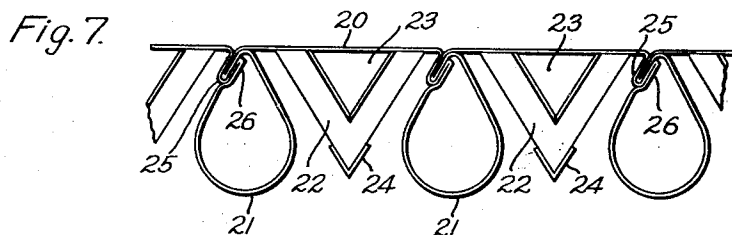
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RADIATOR STRUCTURE

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2 Sheets-Sheet 2



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RADIATOR STRUCTURE

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Application July 18, 1936, Serial No. 91,339

4 Claims. (Cl. 257-129)

My invention relates to ventilating and cooling structures and particularly to radiator structures for automobiles and the like.

One object of my invention is to provide a simple and inexpensive but particularly effective radiator structure.

Another object of my invention is to provide a structure of this character in which a number of upwardly-extending hollow portions are spaced in pairs by ventilating portions having protruding parts inclined at an angle to the horizontal, all of the portions being preferably integral or made from a single piece of sheet metal.

A further object of my invention is to provide a radiator structure having a number of tubular portions and an intermediate portion having struck-up parts for directing a stream of fluid between the past said tubular portions.

Another object of my invention is to provide a structure of the character just set forth, including a number of members relatively staggered in position in order to dispose a tubular portion in substantial alinement with a ventilating portion, thereby providing a particularly effective radiator structure for automobiles and the like.

Another object of my invention is to provide a radiator structure having a number of substantially tear-drop-shaped water-conveying portions and an intermediate ventilating portion having struck-up parts, whereby an especially efficient cooling and ventilating structure is provided.

Other objects of my invention will become evident from the following detailed description, taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a partial view in front elevation of an automobile radiator constructed in accordance with my present invention;

Fig. 2 is a partial view in horizontal section taken along the line II—II of Fig. 1;

Fig. 3 is a vertical section taken along the broken line III—III of Fig. 2;

Fig. 4 is an enlarged plan view, with parts broken away, of a portion of the radiator structure shown in Fig. 1;

Fig. 5 is an enlarged view corresponding to a part of the structure shown in Fig. 2;

Fig. 6 is a view showing my radiator structure after undergoing an intermediate manufacturing process; and

Fig. 7 is a top plan view of a modified form of the structure shown in Fig. 2.

Referring to the drawings, the structure here shown comprises an automobile radiator 1, for example, having the usual upper and lower

chambers or manifolds 2 and 3, which may be of any desired or suitable form and which are joined by the familiar or any suitable framework 4, a plurality of ventilating and cooling members constructed in accordance with my present invention comprising hollow or tubular water-conveying portions 5 and apertured ventilating portions 6 included in the area between the upper and lower water chambers 2 and 3 and the frame 4, as is customary.

The cooling and ventilating structure shown in Fig. 1 is shown in horizontal cross section in Fig. 2 as comprising four members, although any number from one up may be employed, depending upon the desired cooling and ventilating capacity of the completed radiator. The front member of the row of ventilating and cooling members is shown near the bottom of Fig. 2 and at the left of Fig. 3 and comprises a base member 10a from which is formed a plurality of spaced hollow or tubular water-conveying portions 11a, preferably tear-drop- or pear-shaped, with an apertured ventilating portion between each pair of tubular portions comprising a plurality of hollow triangular struck-up parts 12a, the apices of which may be connected together by means of a suitable thin angle member 14a or by a wire soldered thereto or, if desired, such connecting member may be omitted. In Fig. 2, the illustrated top struck-up part 12a is shown as provided with a triangular opening 13a, whereas the other struck-up parts are of similar hollow triangular shape, as will be noted from Fig. 6, which shows the struck-up parts 12a when the stamping machine has cut them out of the sheet of metal but before they have been bent into the final plane and the apex-connecting member, such as 14a, applied.

It will be noted that each of the members shown in Fig. 2, respectively carrying notations such as 10a, 10b, 10c, and 10d for the base portions, 11a, 11b, 11c, and 11d for the tubular portions, etc., is shown as formed from a single piece of sheet metal. While this is the preferred form, my invention is not necessarily limited thereto.

It will be further noted that efficient use is made of the material in that the tubular portions are pear- or tear-drop-shaped, so that the air flowing through the radiator structure will cover the complete tube with no dead spots or low pressure spots in the air stream. In addition, the struck-up parts 12a, 12b, etc., provide relatively large apertures in the base portions 10a, 10b, etc., to permit air to readily flow through these ventilating portions, and are triangular in shape, their

sides extending substantially parallel to the respective confronting sides of the tubular portions.

It will be further noted that the members shown in Fig. 2 are relatively staggered, so that the tubular portion 11b of the second member is substantially in alinement with the struck-up ventilating portion 12a of the first member, etc.

Furthermore, in order to improve the ventilating and cooling effect, the struck-up parts 12a of the first member are bent downwardly, of the second member upwardly, of the third member downwardly, and of the fourth member upwardly, as clearly shown in Fig. 3, whereby a tortuous but relatively unobstructed path for ventilating air is provided.

While these struck-up parts 12a, 12b, etc., thus preferably extend at an acute angle to a plane substantially perpendicular to the axes of the tubular portions, this is not essential, as, if desired, they may extend substantially parallel thereto.

As a result of the illustrated arrangement of parts in my radiator, a relatively efficient structure is provided, from the standpoint of cooling of the liquid, by reason of the tear-drop-shaped tubular portions and the staggered arrangement of parts mentioned above, from the standpoint of ventilation for the reason mentioned in the next to the last paragraph, and from the standpoint of efficient use of the metal by reason of parallelism of adjacent parts and yet relative ruggedness of the individual members. It will be appreciated that the assembly of a radiator of any desired capacity is a relatively simple and inexpensive process, inasmuch as the same parts are employed, the relative positions thereof merely being relatively staggered as mentioned above. Each member is made from sheet metal which may be readily produced by suitable machinery or by hand, and replacement of a damaged section or members is a relatively simple and inexpensive matter also.

Referring now to the modified form of my invention shown in Fig. 7, the illustrated structure comprises a base portion 20, and a plurality of tear-drop-shaped tubular portions 21 spaced by intervening struck-up parts 22 having the top opening 23 and the connecting ridge 24, if desired, thus corresponding to the general arrangement of the structure shown in the other figures. However, in order to stiffen the junction of the tear-drop-shaped portions 21 with the base portion 20, the parts are formed as follows: A doubled-back portion 25 extends at an oblique angle to the base portion 20 and is then reversed on itself to form the loop of the tubular portion 21. Another doubled-back portion 26 tightly engages the inner side of the oblique doubled-back portion 25 and is bent around the same and then into the plane of the base portion 20. In this way again a single piece of sheet metal is employed for the purpose of providing both the water-conveying tubular portions and the ventilating struck-up

portions, the radiating and water-containing sections, however, being substantially as efficient as in the case of the structure shown in the other figures, although, as noted above, the juncture of the tear-drop-shaped portions with the base portion is somewhat stiffer.

It will be seen that I have thus provided a relatively simple and inexpensive radiator structure which may be readily expanded to provide any desired capacity, the parts being so arranged that particularly effective cooling and ventilating is insured.

I do not wish to be restricted to the exact structural details or arrangement of parts herein set forth, as various other modifications thereof may be effected without departing from the spirit and scope of my invention. I desire, therefore, that only such limitations shall be imposed thereon as are indicated in the appended claims.

I claim as my invention:

1. A radiator structure having a row of members, each member comprising a base portion, a plurality of tubular portions disposed thereon and an intermediate portion having parts struck-up from said base portion, said members being relatively staggered to dispose a tubular portion in substantial alinement with an intermediate portion.

2. A radiator structure having a row of members, each member comprising a base portion, a plurality of substantially tear-drop-shaped tubular portions disposed thereon and an intermediate portion having struck-up parts with their edges extending in planes substantially parallel to the planes of the confronting tear-drop-shaped portions, said members being relatively staggered to dispose a tear-drop-shaped portion in substantial alinement with an intermediate portion.

3. A radiator structure comprising a base portion having a plurality of substantially parallel and tear-drop-shaped tubular portions disposed thereon and intermediate portions extending substantially parallel to the axes of said tubular portions and having substantially triangular apertured struck-up parts with their projecting edges extending in planes substantially parallel to the planes of the sides of the confronting tear-drop-shaped portions, the apertures in the struck-up parts of any intermediate portion being alined vertically for directing a stream of fluid therethrough.

4. A radiator structure having a row of members, each member comprising a base portion, a plurality of tubular portions disposed thereon and an intermediate portion having parts struck-up from said base portion, said members being relatively staggered to dispose a tubular portion in substantial alinement with an intermediate portion, said struck-up parts being provided with apertures, said apertures being alined vertically for directing a stream of fluid therethrough.

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