H. C. HARRISON.

RADIATOR UNIT.

APPLICATION FILED JUNE 11, 1917. RENEWED FEB. 4, 1920.

1,336,136. Patented Apr. 6, 1920.

Fig. 1.

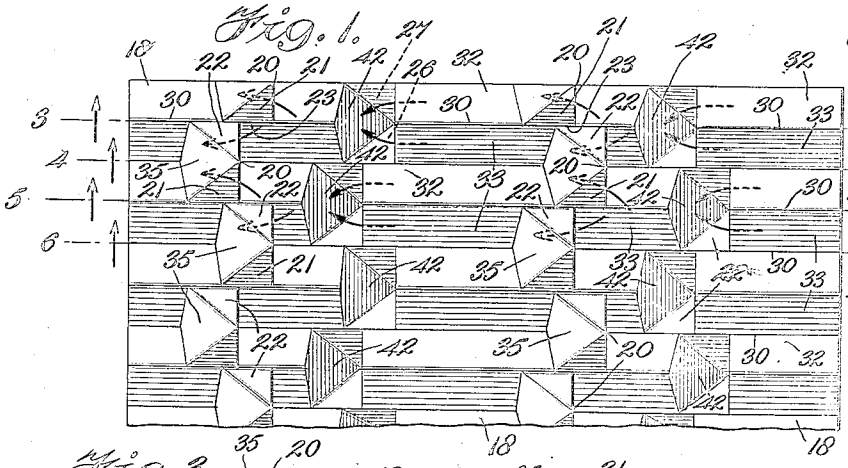


Fig. 2.

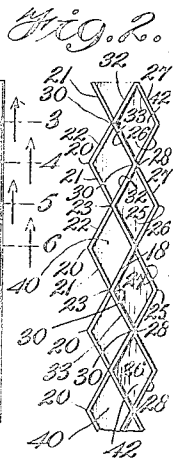


Fig. 3.

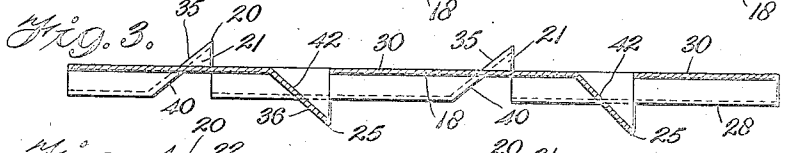


Fig. 4.

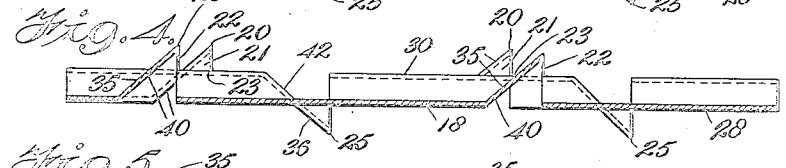


Fig. 5.

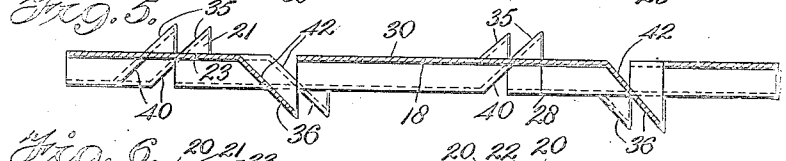


Fig. 6.

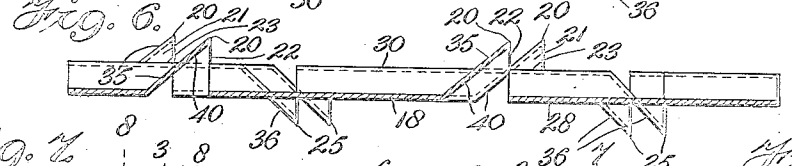


Fig. 7.

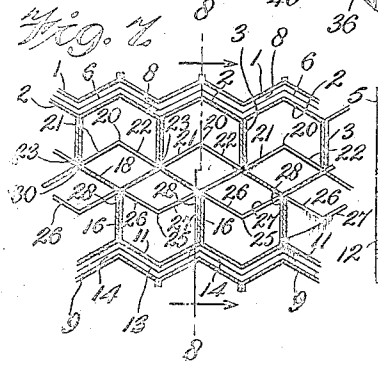
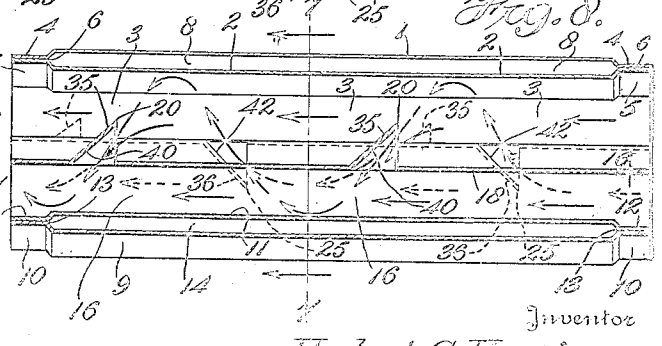


Fig. 8.



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Attorney

UNITED STATES PATENT OFFICE.

HERBERT CHAMPION HARRISON, OF LOCKPORT, NEW YORK, ASSIGNOR TO HARRISON RADIATOR CORPORATION, OF LOCKPORT, NEW YORK, A CORPORATION OF NEW YORK.

RADIATOR UNIT.

1,336,136. Specification of Letters Patent. Patented Apr. 6, 1920.

Application filed June 11, 1917, Serial No. 174,043. Renewed February 4, 1920. Serial No. 356,123.

To all whom it may concern:

Be it known that I, HERBERT CHAMPION HARRISON, a subject of the King of Great Britain, residing at Lockport, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Radiator Units; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to automobile radiator units and especially to the division plates separating each pair of outer walls or plates forming said unit in an automobile radiator, and has for its object to render said radiator units more efficient in extracting heat from the water traversing the water passages with which said units are associated than has been the case heretofore.

It is well known that when air is forced through a passage with a view to extracting heat from the walls of said passage, the more intimate each particle of air is made to contact with said walls, the more efficiently will the heat be extracted. Therefore, according to this invention the air passing through the cells of the radiator is thoroughly broken up and efficiently thrown against and made to contact with the hot outer walls of said cells, all as will appear below.

With these and other objects in view the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—

Figure 1 is a plan view of a partition plate for radiator units made in accordance with this invention;

Fig. 2 is an edge view of the parts shown in Fig. 1;

Figs. 3, 4, 5 and 6 are sectional views taken respectively on the lines 3—3, 4—4, 5—5 and 6—6 of Fig. 1, looking in the direction of the arrows;

Fig. 7 is a sectional view, taken on the line 7—7 of Fig. 8, showing a radiator unit provided with the division plate illustrated in Fig. 2 and a pair of water passages; and

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7, looking in the direction of the arrows.

For convenience of description, reference is first made to Fig. 8, in which 1 represents the outer plate or wall of a radiator unit, 2 represents a similar outer plate or wall of an adjacent unit provided with the flat cell walls or plaits 3. The unit plate 1 at its edges is provided with the offsets 4, and the unit plate 2 is provided at its edges with the offsets 5, which meet in the planes 6 to form the water passages 8, (see Fig. 7.) In like manner the unit plate 9 is provided with the offsets 10, and the unit plate 11 is provided with the offsets 12 which meet in the planes 13 to form the water passage 14. The plate 11 is also provided with the flat cell walls or plaits 16, extending in a direction opposite to that of the flat walls or plaits 3, and preferably staggered or alternating with said walls 3 as shown. Between the oppositely extending plaits 3 and 16 is located the division plate 18 preferably corrugated as shown, and provided on one side with guiding and centering projections 20. Each projection 20 is provided with an inclined guiding surface 21 extending in one direction, and with an inclined guiding surface 22 extending in an opposite direction, and the said surfaces 21 and 22 of adjacent projections meet in the centering grooves or depressions 23 as shown.

In the same way the other side of said division plate 18 is provided with guiding and centering projections 25, each having oppositely extending inclined guiding surfaces 26 and 27. Said surfaces 26 and 27 of adjacent projections 25 likewise meet to form the centering grooves or depresions 28 as illustrated. It will be clear from the drawings that each of the centering grooves 23 and 28 are located on a bend or ridge such as 30 forming a corrugation in the plate 18.

It will be further observed that the oppositely inclined sides 32 and 33 of the corrugated plate 18 extend throughout the width of said plate 18 while the oppositely extending projections 20 and 25 are located in rows, and only extend over a portion of the width of said plate 18. It will also be observed that each projection 20 or 25 is not only provided with the inclined guiding surfaces such as 21 and 22, or such as 26 and 27, but each projection is provided with a

third air deflecting surface 35 or 36. In other words, each projection 20 or 25 as will be clear from the drawings is formed by perforating and forcing up the metal from the bottom of a corrugated angle such as 30, and it constitutes a sort of hood to catch any air that may traverse said angle or depression 30. It thus forces said air to pass from one side to the other of the plate 18. Stated in other language, if we suppose in Fig. 6 that a plait 3 is located on a corrugated angle 30, and occupies the centering depressions 23, the position of the parts will be that illustrated in the upper half of Fig. 7. If we now imagine in Fig. 6 that an oppositely projecting plait 16 contacts with the opposite and adjacent corrugation 30 on the other side of the plate 18, and in such a manner as to occupy the centering depressions 28 formed by the guiding surfaces 26 and 27 of adjacent projections 25, then the parts will occupy the position shown in the lower half of Fig. 7.

To make the construction more clear it is said:—An end view of the division plate 18 such as appears in Fig. 2, does not show the air deflecting surfaces 35 of said projections 20, but shows instead the opposite deflecting surfaces 40 of said projections 20. In the same way the outer surfaces 36 of the projections 25 do not appear in said Fig. 2, but their other sides 42 do appear therein. These said deflecting surfaces 40 and 42 have been omitted from Fig. 7 for the sake of clearness but they appear in Figs. 3, 4, 5 and 6.

From the foregoing it will now be clear that an automobile radiator is made up of a plurality of units each consisting of a pair of outer unit plates such as 2 and 11, the said unit plates being separated by a corrugated division plate such as 18, (see Fig. 7), that water passages such as 8 and 14 are located on the outside of each unit, and that the said separating or division plate 18 is provided with oppositely extending projections such as 20 and 25, each having guiding surfaces such as 21 and 22, and 26 and 27 respectively, which surfaces are adapted to guide the plaits such as 3 and 16 into the centering depressions such as 23 and 28, when the parts are assembled. It will further be clear that these said projections 20 and 25 do not extend from edge to edge of the division plate 18 as do the corrugated or angular portions such as 30, but that the said projections, on the contrary, extend in rows from end to end of the division plate 18 and only occupy a comparatively small portion of its width. It will still further be observed that each projection, such for example as 20, is provided with a deflecting surface such as 35 which serves to deflect any air which may flow along a corrugation such as 30 and that the opposite side of the projection 20 is provided with a similar deflecting surface such as 40, which will deflect any air which may flow along the opposite side of the plate 18 or along a companion corrugation 30 of said plate 18. Stated in other language, no matter which way the air may traverse the width of the plate 18, it will be deflected toward a unit plate 2 or toward a unit plate 11, by a surface such as 35 or 40 as the case may be. In the same way, it will be observed that air traversing in either direction the width of the unit plate 18 will be likewise deflected toward the outer unit plates 2 and 11 by the surfaces such as 36 and 42, that are associated with the projections 25.

As a matter of fact, supposing the air to be traversing the cells of the radiator from right to left, as seen in Fig. 8, and as is indicated by the arrows in said figure, it is evident that the deflecting surfaces 42 associated with the projections 25 will deflect the air toward the unit plate 2, while the surfaces 40 associated with the projections 20 will deflect said air toward the unit plate 11, and further, since said surfaces 40 and 42 alternate with respect to each other, the said air will be balloted to a greater or less extent backward and forward between the said unit plates 2 and 11, and thus it will be broken up and brought into a most intimate contact with said outer unit plates 2 and 11, and therefore most efficiently extract heat from the water passages 8 and 14. In the drawings there is illustrated two pairs of rows of projections 20, and two rows of projections 25, but it is evident that these projections may be increased or decreased according to the desire of the manufacturer. The projections in each row are further staggered with relation to each other, but it is evident they may be placed in any other suitable relation.

It is an important feature of this invention that although the air is thus broken up and balloted backward and forward between the outer unit plates 2 and 11, yet the projections 20 and 25 are so located that they still provide the guiding surfaces such as 21 and 22 and such as 26 and 27. These said surfaces serve to automatically center the plaits such as 3 and 16 during the assemblage of the parts, as will be clear from my Patent #1,169,481, dated Jan. 25, 1916, and entitled Process of making automobile radiator sections.

By employing the construction above disclosed I am not only enabled to retain the advantageous features described in my said patent, but I am also enabled to thoroughly break up the air passing through the radiator cells and to therefore extract more heat from the water passages 8 and 14 than would otherwise be possible.

It is obvious that the division plate 18 may be provided with perforations, guiding and centering projections as well as air deflecting surfaces disposed in other relations to each other than those disclosed without departing from the spirit of the invention and therefore I do not wish to be limited to the above disclosure except as may be required by the claims.

What I claim is:—

1. A corrugated division plate for radiators provided with perforations and projections having inclined guiding and centering surfaces, and said projections also provided with air deflecting surfaces associated with said perforations, substantially as described.

2. A corrugated division plate for radiators provided with perforations and oppositely extending projections having oppositely inclined guiding and centering surfaces and also having oppositely inclined air deflecting surfaces, substantially as described.

3. In a radiator unit, the combination of a pair of outer unit plates having plaits; and a division plate having oppositely inclined guiding surfaces adapted to aid in centering said plaits when assembling the parts, said division plate also provided with perforations and having inclined air deflecting surfaces associated with said perforations, substantially as described.

4. In a radiator unit, the combination of a pair of outer unit plates provided with oppositely extending members constituting cell walls; and a division plate of a single thickness of metal separating said members provided with perforations and having oppositely inclined deflecting surfaces at said perforations adapted to cause air passing through the radiator to intimately contact with said outer plates, substantially as described.

5. In a radiator unit, the combination of a pair of outer unit plates provided with oppositely extending members constituting cell walls; and a division plate of a single thickness of metal separating said members provided with perforations and guiding surfaces adapted to center said members when assembling the parts, said division plate also having oppositely inclined deflecting surfaces at said perforations adapted to cause air passing through the radiator to intimately contact with said outer plates; substantially as described.

6. A division plate for radiators having corrugations provided with transverse perforations forming a double row of projections on each side of said plate, said projections being staggered with relation to each other in each row, and some of said projections being provided with air deflecting surfaces associated with said perforations, substantially as described.

7. A division plate for radiator units consisting of a sheet metal body portion having integral inclined guiding and centering projections extending from each side thereof, and said projections provided with inclined air deflecting surfaces, substantially as described.

8. A radiator unit comprising a pair of sheet metal outer plates each having on the inner side thereof a set of projections constituting cell walls; and a division means having projections on each side thereof, adapted to separate the projections on said plates, one of said sets of projections having associated therewith inclined guiding surfaces, as well as inclined air deflecting surfaces, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HERBERT CHAMPION HARRISON.

Witnesses:
KLARE F. COVERT,
MARGARET J. GARNER.