July 16, 1935. L. SHAPIRO 2,008,566

RADIATOR CORE

Filed April 14, 1931

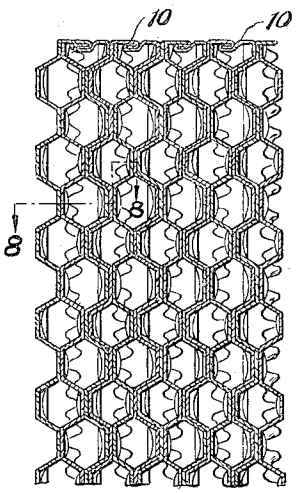


FIG. 1

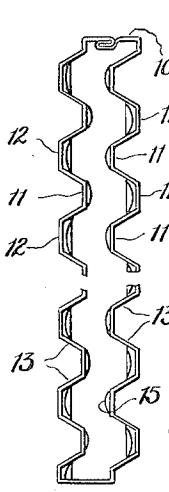


FIG. 4

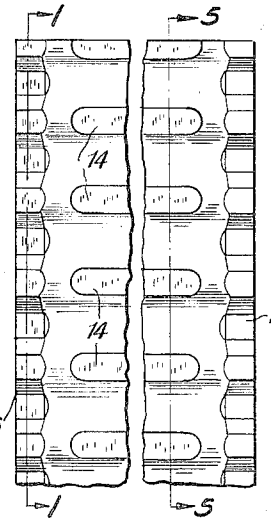


FIG. 3

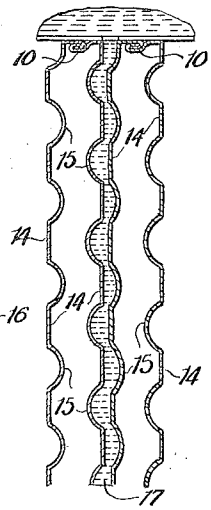


FIG. 5

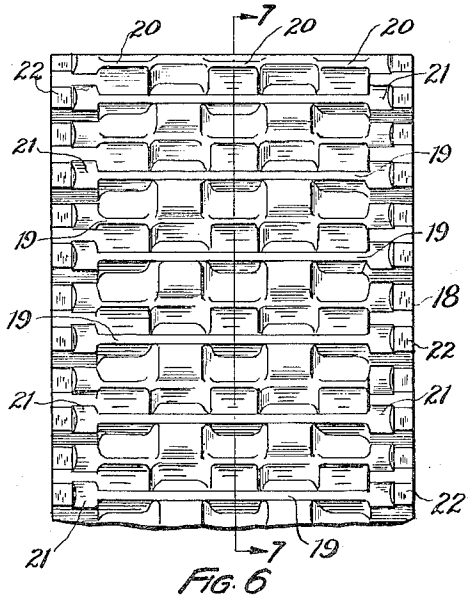


FIG. 6

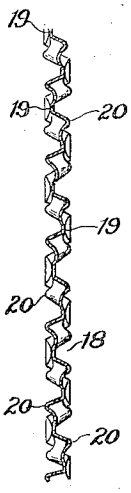


FIG. 7

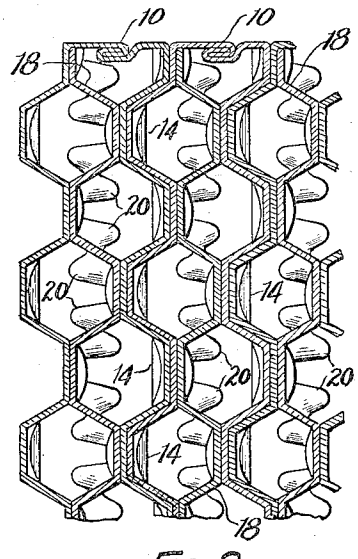


FIG. 2

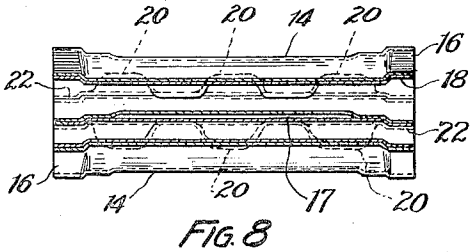


FIG. 8

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RADIATOR CORE

Louis Shapiro, Cleveland, Ohio

Application April 14, 1931, Serial No. 530,005

2 Claims. (Cl. 257—130)

Thus invention relates to improvements in radiator cores, intended primarily for the cooling systems of vehicle engines. The invention has to do with the cellular type of radiator, made up of ribbon metal which is formed into water channel frames that are juxtaposed in order to provide the water channels, there being a spacing strip set into each frame for the purpose of providing additional radiating surface as well as for strengthening the frames.

One of the objects of the invention is the provision of simple means for insuring the accurate positioning of the spacing strips when the core is assembled, and the maintenance of the parts in such position, particularly prior to the soldering operation.

Another object is the provision of means for causing solder to run into the body of each frame along the joints between the frame and the spacing strip, when the core is dipped in the usual manner, thereby increasing the strength and rigidity of the resulting structure, and greatly improving the cooling effect.

Other objects and features of novelty will appear from the following description of the preferred embodiment of the invention which, for the purposes of the present application, has been illustrated in the accompanying drawing, in which

Figure 1 is a view, principally in front elevation, showing a fragment of a radiator core embodying the invention, a portion of the figure being in vertical section taken substantially on the line 1—1 of Fig. 3.

Fig. 2 is a similar sectional view on a larger scale, the section being taken substantially on the line 1—1 of Fig. 3.

Fig. 3 is a side elevational view of a portion of one of the water channel frames.

Fig. 4 is a front elevational view of the same.

Fig. 5 is a vertical sectional view showing a water channel between two frames, the view corresponding substantially with the section line 5—5 of Fig. 3.

Fig. 6 is a side elevational view of a portion of a spacing strip.

Fig. 7 is a longitudinal section of the same taken substantially on the line 7—7 of Fig. 6, and

Fig. 8 is a transverse sectional view taken substantially on the line 8—8 of Fig. 1.

The invention is herein shown for illustrative purposes as applied to a cellular type radiator core having hexagonal cells, although it is to be understood that other forms of cells may be employed with equal facility and the invention is not limited to the form of the cells illustrated.

The core is made up of a series of corrugated water channel frames 10, illustrated in detail in Fig. 4, these frames being formed of ribbon metal rolled to the desired configuration and closed at their ends. Each side of the frame is formed with a series of inner crests or wall portions 11 and a series of outer crests or wall portions 12 joined by connecting portions 13. The outer corrugations or crests of the main central portion of each side of the frame may be flatted if desired, while the inner corrugations or crests 15 remain rounded, as shown particularly in Figs. 4 and 5. Both walls of the frames 10 have edge bands 16, the vertical portions of which are offset outwardly, in such a manner that when two frames are juxtaposed the edge bands thereof contact with each other, and space the main portions of the frames apart far enough to form water channels 17 through which the water to be cooled may descend from the upper header of the radiator to the lower header thereof.

The spacing strip 18 is shown by itself in Figs. 6 and 7 and is of a width nearly equal to the width of the water channel frame. The spacing strip is formed of a single sheet of metal having narrow ribs 19 extending alternately in opposite directions from the median plane of the strip. Adjacent ribs 19 are therefore offset laterally from each other, and are joined by connecting portions of the strip. Between successive ribs 19 the metal is pressed laterally to form three bosses 20 extending outwardly in one direction and two bosses 20 extending outwardly in the opposite direction, the sets of three bosses on one side of the strip alternating in a longitudinal direction with the sets of two bosses on the same side of the strip. It is not desired to be limited to any particular number of bosses in transverse alignment, as the number may be varied within the scope of the present invention. However it is preferred that the bosses which extend into each cell in two rows shall be alternately arranged thereby causing the column of air traversing the cell to take a tortuous course. These bosses 20, it will be noted by inspection of Fig. 2, are exposed to the air upon both sides. Furthermore they leave the central horizontal plane of the cell unobstructed thereby facilitating repairs to the water channel whenever a break occurs.

Just beyond the ends of the ribs 19 there are formed small rounded sockets or lands 21, the concave surface of which faces outwardly. The ribs 19 and lands 21 constitute important features

of the present invention. Beyond the lands 21 are the edge bands 22 of the strip, the vertical portions of which lie in planes substantially even with the higher or edge lines of the lands 21.

When the strip 18 is slid into place within the water channel frame, the side walls of the frame are forced apart slightly by the edge band of the strip until the strip is advanced as far as it should go, whereupon the forward end of the edge band of the strip extends past the inner corrugations or crests 15 of the main central portion of the frame and snaps into position within the edge bands of the frame. The inner corrugations or crests 15 of the frame then engage the ribs 19 forming a line contact, and the ends of these corrugations 15 rest within the rounded lands 21, which serve to position the spacer strip with a considerable degree of accuracy. The edge bands of the spacer strip being half hexagonal, and the edge bands of the frame members being half hexagonal, the cells at their ends are fully hexagonal but, as shown in Fig. 2, the inner portions of each cell have bosses 20 extending thereinto from the spacer strip, and the air passing through the cell is deflected into a more or less tortuous path in order that the heat absorption during the travel of the air through the core may be as great as possible.

In the manufacture of the radiator core, after the spacer strips are positioned in the water channel frames and the various frames assembled together, as indicated in Figs. 1 and 2, the frames are all bound together in a suitable clamping apparatus, and one face of the assembly dipped in molten solder for a short distance only, and then withdrawn, after which the core is turned over, and its opposite face similarly immersed. At each of these dipping operations molten solder is drawn upwardly along the ribs 19 by capillary attraction, so that soldering of the spacer strip to the frame walls occurs substantially along the entire length of the various ribs 19. It will be noted that the ribs 19 are very narrow as compared with the width of corrugations 15, the ribs 19 being of less than one-third the width of the corrugations 15, in fact, so that the lines of solder are quite slender. When the solder hardens a strong and rigid structure results, and a perfect contact is established between the frame sides and the spacing strip, resulting in excellent heat transference, and this, it will be noted, is accomplished without the use of a large quantity of solder, such as would have to be employed if the entire core were dipped into the solder.

In the foregoing description I have necessarily gone somewhat into detail in order to explain fully the particular embodiment of the invention herein illustrated, but I desire it to be understood that such detail disclosure is not to be construed as amounting to a limitation except as it may be included in the appended claims.

Having thus described my invention, I claim:

1. In a radiator core, a water channel frame having corrugations in the two sides thereof, and a spacing strip adapted to be inserted between the sides of said frame, said spacing strip being provided with corrugations facing the corrugations in the said frame and adapted to form with the frame a series of polygonal air cells on either side of the spacing strip, said strip being formed with two transverse rows of bosses extending into each cell, the metal of the bosses being continuous with that of the strip, the rows being spaced apart to leave the cell free of obstruction in its horizontal central plane.

2. In a radiator core, a water channel frame having corrugations in the two sides thereof, and a spacing strip adapted to be inserted between the sides of said frame, said spacing strip being provided with corrugations facing the corrugations in the said frame and adapted to form with the frame a series of polygonal air cells on either side of the spacing strip, said strip being formed with two transverse rows of bosses extending into each cell, the metal of the bosses being continuous with that of the strip, the rows being spaced apart and the bosses of one row lying opposite the spaces between the bosses of the other row.

LOUIS SHAPIRO.