Aug. 31, 1926.

1,597,885

J. D. HARRIS

RADIATOR CORE

Filed Oct. 19, 1922.

Fig. 1.

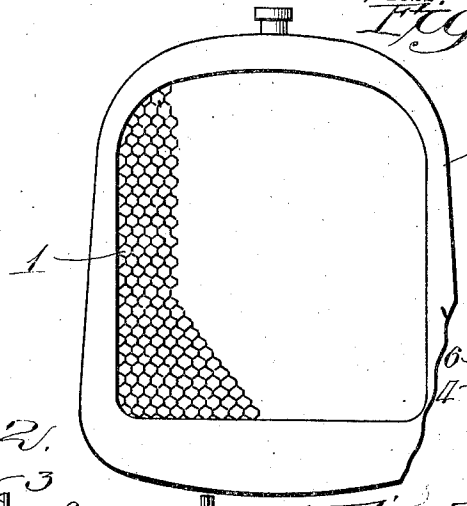


Fig. 4.

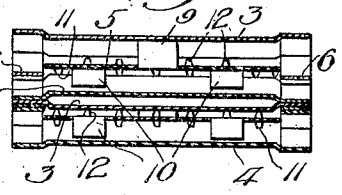


Fig. 2.

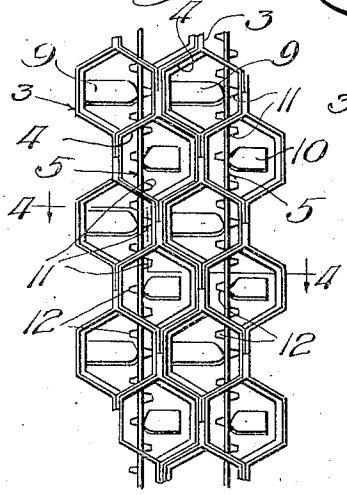


Fig. 3.

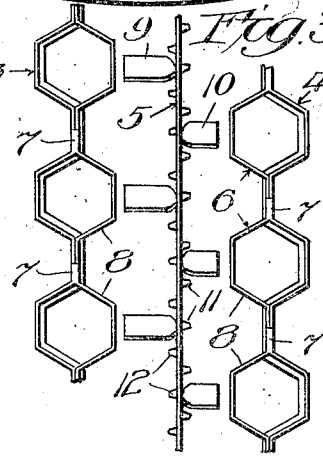


Fig. 5

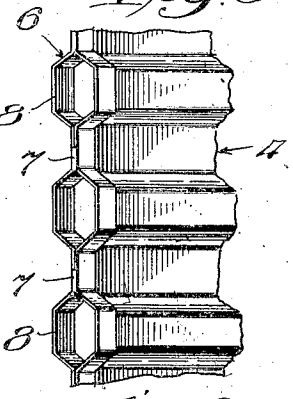


Fig. 9.



Fig. 6.

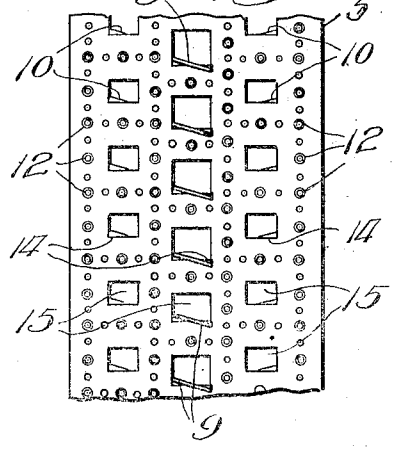


Fig. 7.

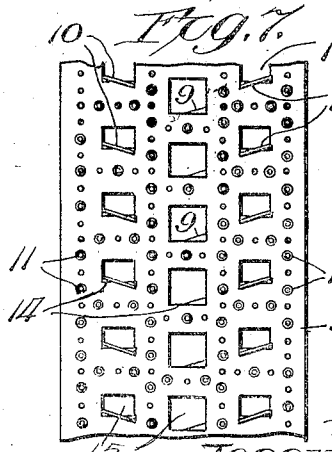


Fig. 8.

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UNITED STATES PATENT OFFICE.

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RADIATOR CORE.

Application filed October 19, 1922. Serial No. 595,475.

This invention relates to cores for automobile and like radiators.

One object of my invention is to increase the heat radiating capacity of the core by providing the units with flat partition plates having tongues or wings on opposite sides thereof and extending into the air passages of the structure.

Another object of my invention is to roughen the surfaces of the flat partition plates by providing them with pin-pricked undulations distributed over the plates on opposite sides thereof, in order to further increase the heat radiating capacity of the core.

A further object of my invention is to turn or twist the tongues or wings on an angle to the partition plates so that air at high velocity entering the core will be diverted or its course changed to direct colder air against the heated metal.

The invention consists further in the matters hereinafter described and more particularly set forth in the appended claims.

In the accompanying drawings—

Fig. 1 is a front view of an assembled core and shell, the former being constructed in accordance with my invention;

Fig. 2 is an enlarged front elevational view of a portion of two units of said core;

Fig. 3 is a like view of a portion of one unit, with the three parts thereof separated for the purpose of illustration;

Fig. 4 is a transverse horizontal sectional view taken on the indirect line 4—4 of Fig. 2;

Fig. 5 is a fragmentary perspective view of a portion of one of the outer plates of a unit;

Figs. 6 and 7 are front and rear views, respectively, of the partition plate;

Fig. 8 is an enlarged vertical sectional view of a detail of construction to be hereinafter described; and

Fig. 9 is an edge view of a complete unit.

In Fig. 1 of the drawings, I have shown an automobile radiator having a core 1 constructed in accordance with my invention and contained within an outer casing or shell 2, as usual in radiator construction. The core 1 is built up of a plurality of units, which in the form of radiator shown in the drawings are vertically arranged side by side to form the vertical water passages and horizontal air passages of the core.

Each unit comprises a pair of outer plates 3, 4 and an interposed partition plate or web 5 all made of relatively thin sheet metal, such as brass. The outer plates 3, 4 are corrugated transversely throughout their lengths and have their side margins offset outward to form with the outer plates of the adjacent units water passages, as understood in radiator practice.

Said outer plates 3, 4 are further provided along their side edges with integral strips 6, 6 arranged on the inside of the plates and having folded connection therewith at spaced points 7, 7 in the length of said strips, as in the Patent No. 1,233,765, granted July 17, 1917 to C. S. Erickson for cellular radiators. The strips 6, 6 are also corrugated or bent like the outer plates, with the folded portions 7, 7 in flat contact with the associated portions of said plates and the other portions 8, 8 projecting inward. In the particular construction shown, the corrugations are semi-hexagonal in form, with the portions 8, 8 of the strips 6, 6 completing the hexagons of the associated plates, as shown. At the folded sections 7, 7 the plates 3, 4 present a double thickness of sheet metal while opposite the sections 8, 8 there is only a single thickness.

The outer plates 3, 4 so formed are assembled one against the other with the projections 8, 8 of one plate fitting in the spaces between the projections of the other plate to form the hexagonal air cells at the front and rear of the unit, as shown in Figs. 2 and 4. The strips 6, 6 also space the outer plates 3, 4 apart to provide a space for the partition plate or web 5. This extends vertically of the unit and has a width to extend between the strips 6, 6 at the front and rear. Being in contact with these strips the plate 5 is held from edgewise displacement.

As shown in the drawings, the body of the partition plate or web 5 is substantially flat throughout, and is provided on opposite sides with outwardly projecting wings or tongues 9, 10 arranged in rows lengthwise of said plate. The wings 9 on one side of the plate 5 are in a single row while those 10 on the opposite side of said plate are in a double row, as shown in Figs. 6 and 7,

respectively. When in place between the outer plates 3, 4, the wings or tongues 9, 10 extend into the depressions in said outer plates. The tongues or wings 9 of the single row are longer or project outward a greater distance from the plate 5 than the wings 10 of the double row. This causes the body of the plate 5 to be closer to the outer plate 4 than to the plate 3, as shown.

In the particular structure shown in the drawings, the longer tongues or wings 9 contact at their outer edges with the associated outer plate 3, while the shorter tongues 10 terminate short of the outer plate 4 toward which they extend. The body of the plate 5 is held out of contact with the outer plate 4, however, by outwardly projecting pin pricks 11, 11 on that side of the plate 5 facing said outer plate 4. These projections 11, 11 are distributed over the plate 5 and engage the vertical flat portions of said plate 4 in line with the folded parts 7, 7 of the strips 6, 6.

On the opposite side, the plate 5 is provided with pin pricks 12, 12. These are also distributed over that surface of the plate. These pricks or projections 11, 12 are formed by punching through from that side of the plate 5 opposite to the one from which they extend. These projections are somewhat conical in shape and the apertures at their apexes have ragged edges 13, as shown in Fig. 8. The tongues or wings 9, 10 are formed by being punched out of the body of the plate 5 and bent outward, as shown. The bases 14 of these tongues are preferably arranged substantially parallel and transverse to the length of the plate.

The tongues or wings 9, 10 and the projections 11, 12 stand in the air passages provided by the unit. The projections 11, 12 stand in the air passages provided by the unit. The projections 11, 12 make the surface of the plate 5 rough and increase the radiating capacity of the plate 5 by raising up numerous minute points from which the heat is more rapidly radiated than from an equivalent flat surface. Said projections 11, 12 also have the tendency to increase the turbulence of the air in its passage through the core. The wings or tongues 9, 10 are turned at an inclination of approximately 15 degree angle to the passage of air between the outer plates so that the air at high velocity entering the core is diverted or the course changed, further increasing the turbulence and turning cooler air against the heated metal.

The holes 15, 15 made in the plate 5 by punching out the tongues or wings 9, 10 allow the air to flow through the plate at many places over its surface, thus again increasing the radiating capacity of the device.

While the outer plates 3, 4 of a unit could be made separate and joined together after assemblement, yet it is better practice from a production standpoint to form these plates from a single strip of stock. This, after being corrugated, is folded to provide the outer plates 3, 4 with a folded edge 16 at one end of the unit and overlapped edges 17, 17 at the opposite end with the partition plate between, as shown in Fig. 9. The units so made are placed together to build up a complete core and the whole secured to the tanks and placed in the shell 2 in accordance with radiator practice.

In the drawings, I have shown the plate 5 held out of actual contact with the outer plate 4 by the projections 11. It might be desirable in some instances to have the two plates 4 and 5 in actual contact to have as great an area as possible in order to permit rapid conduction of heat from the plate 4 forming part of the water conduit to the partition plate 5. To obtain this, the plate 5 at the point of contact would not be provided with projections 11, as obvious.

While I have shown and described herein in detail a structure embodying the features of my invention, the details of construction and arrangement of parts may be variously changed and modified without departing from the spirit and scope of my invention.

I claim as my invention:

1. A radiator unit, comprising a pair of opposed corrugated outer sheet metal plates spaced apart to provide an air passage between them, and a flat sheet metal partition plate between said outer plates and having tongues and pin pricks punched out from the metal of the plate with the tongues on opposite sides of the plate and extending into the corrugations of the outer plates, said tongues being flat and twisted bodily to extend across their connections with said partition plate and be at an inclination to the passage of air between said outer plates, the tongues on one side of the partition plate having their outer ends in contact with the adjacent outer plate and the pin pricks on the opposite sides of the partition plate contacting with the other outer plate for spacing the body portion of the partition plate from both outer plates.

2. A radiator unit, comprising a pair of opposed outer plates spaced apart to provide an air passage between them, and a flat partition plate between said outer plates, said partition plate having tongues on opposite sides thereof and arranged at an inclination to the passage of air between said outer plates, said tongues being punched from the partition plate and projecting toward said outer plates with the tongues on one side of said partition plate longer than those on the other for spacing the partition plate closer to one outer plate than the other.

3. A radiator unit, comprising a pair of

opposed outer plates spaced apart to provide an air passage between them, and a flat partition plate between said outer plates, said partition plate having tongues and pin pricks on opposite sides thereof and punched from said plates, said tongues being arranged at an inclination to the passage of air between said outer plates and projecting toward the same, said tongues being longer on one side of said partition plate than the other for spacing said partition plate closer to one outer plate than the other, the pin pricks on the side of the shorter tongues engaging the outer plate opposite the same.

4. A radiator unit, comprising a pair of opposed corrugated outer plates, corrugated strips carried by said outer plates at the longitudinal edges thereof for spacing said outer plates apart, and a flat partition plate between said outer plates and inside of said strips, said partition plate having tongues on opposite sides thereof and extending into the depressions in said outer plates for spacing the partition plate therefrom.

5. A radiator unit, comprising a pair of opposed corrugated outer plates, corrugated strips carried by said outer plates at the longitudinal edges thereof for spacing said outer plates apart, and a flat partition plate between said outer plates and inside of said strips, said partition plate having tongues and pin pricks on opposite sides thereof, said tongues extending into the depressions in said outer plates and being longer on one side than the other for spacing said partition plate closer to one outer plate than the other.

In testimony that I claim the foregoing as my invention, I affix my signature this third day of October, A. D. 1922.

JOSEPH D. HARRIS.