Oct. 7, 1930. C. OPPE 1,777,675

RADIATOR

Filed Sept. 22, 1922 2 Sheets-Sheet 1

Fig. 1.

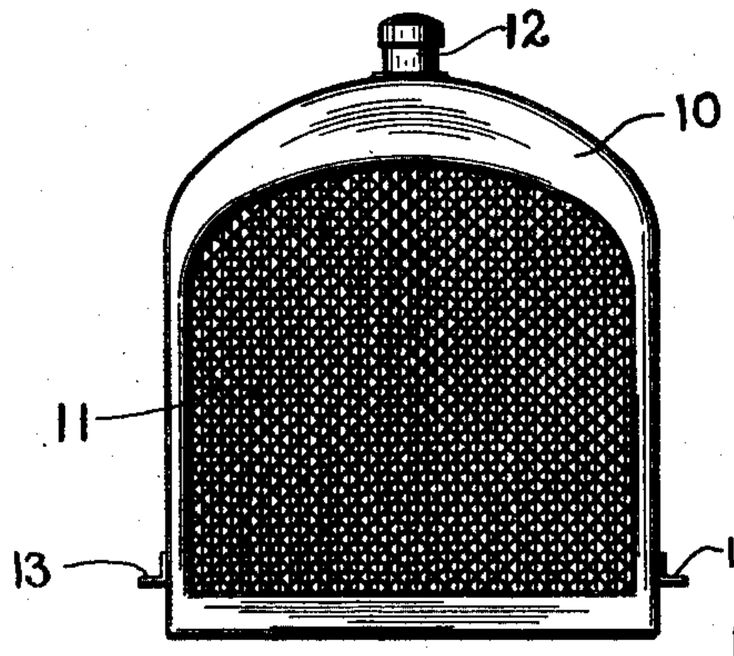


Fig. 2.

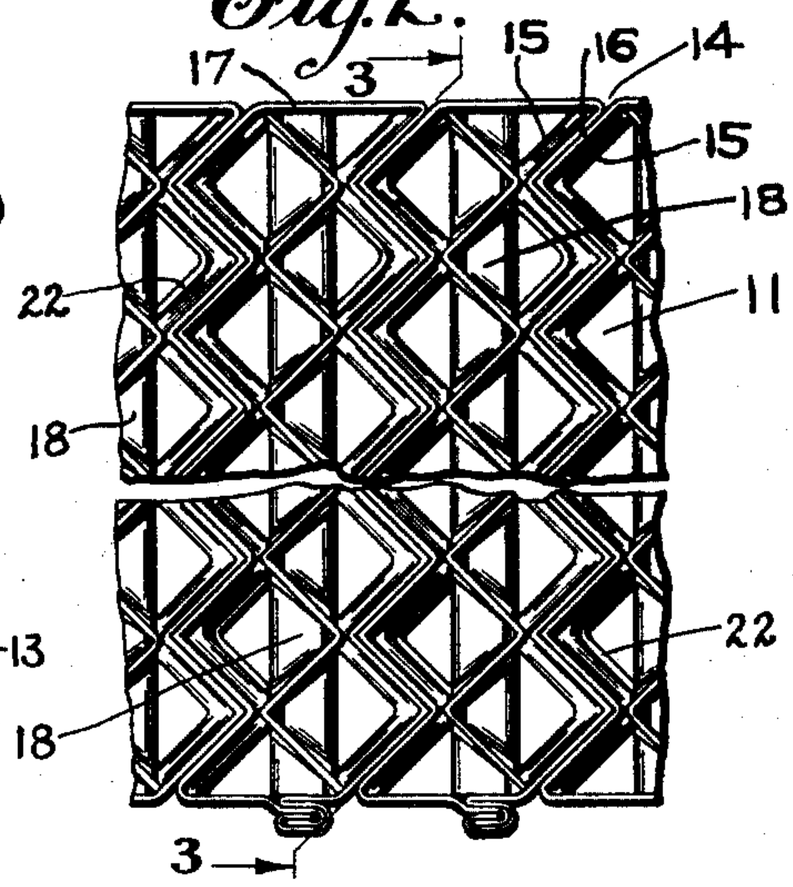


Fig. 3.

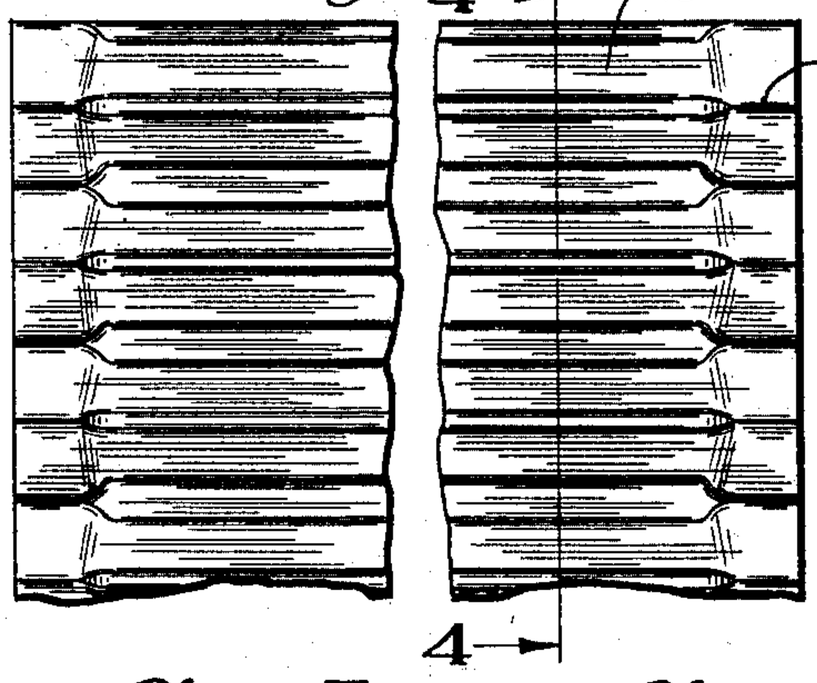


Fig. 4.

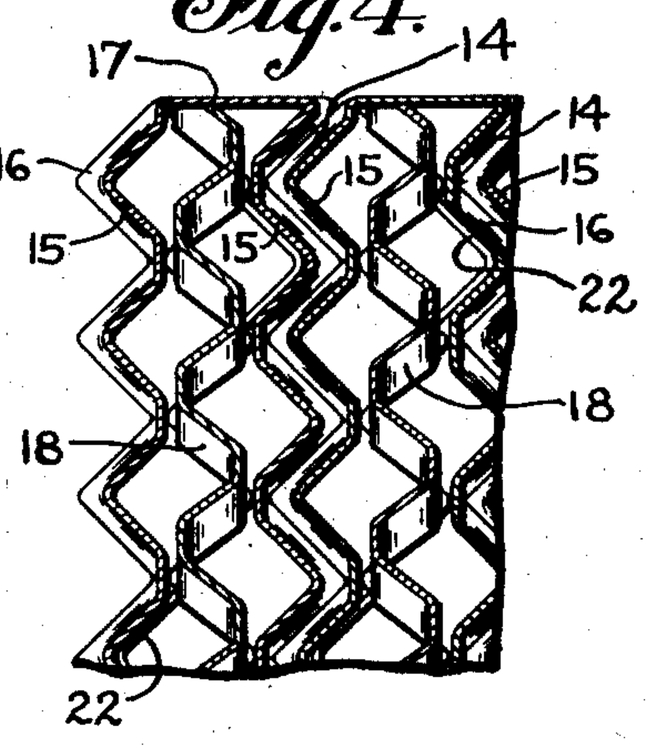


Fig. 5.

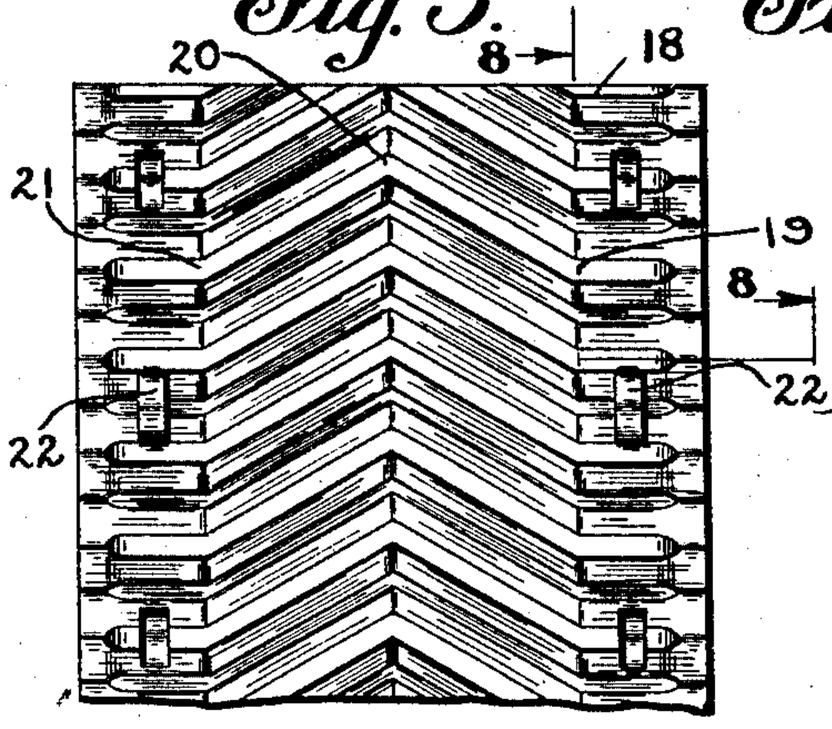


Fig. 6.

Fig. 7.

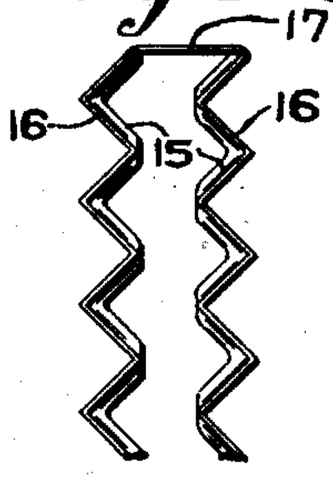
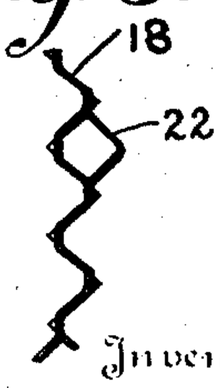


Fig. 8.



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Oct. 7, 1930. C. OPPE 1,777,675

RADIATOR

Filed Sept. 22, 1922 2 Sheets-Sheet 2

Fig. 9.

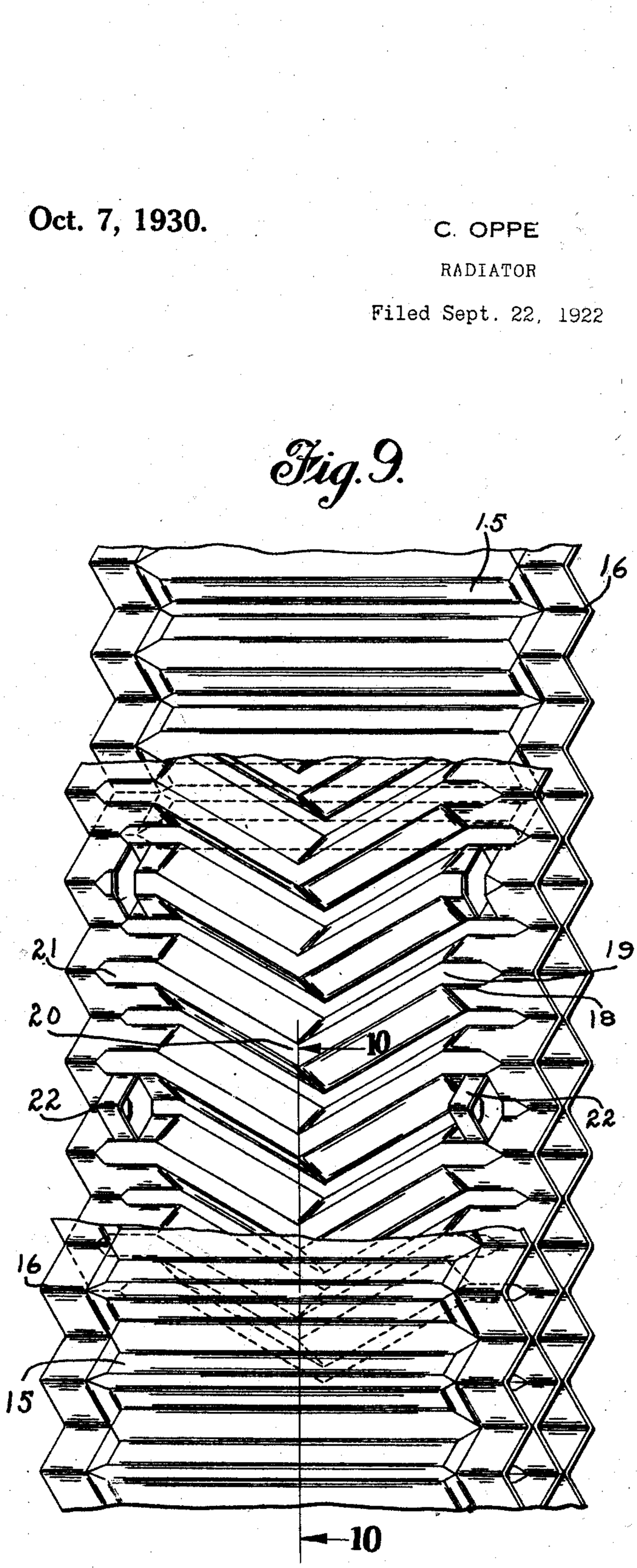
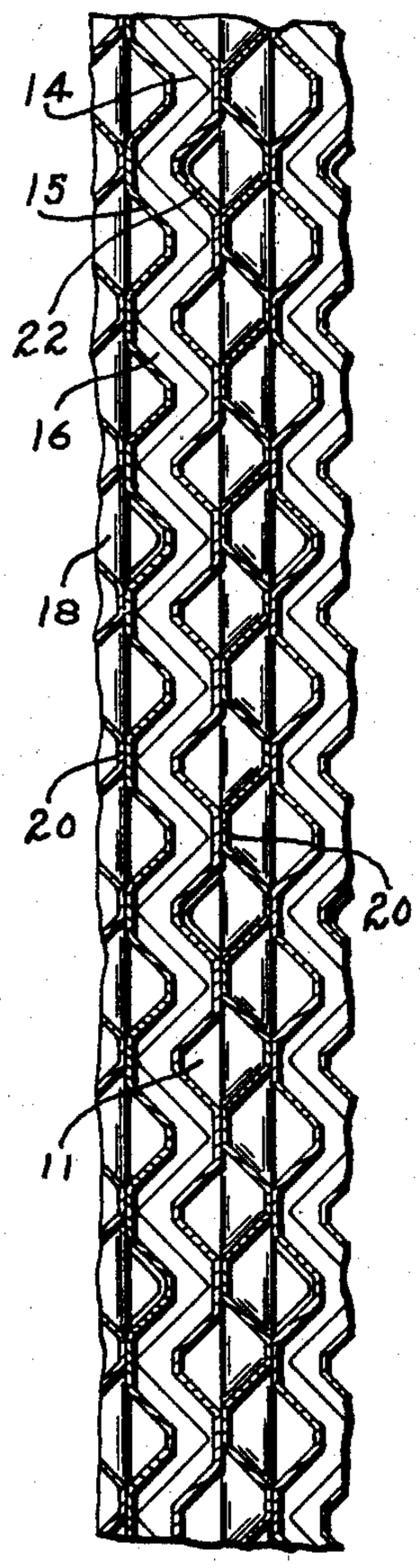


Fig. 10.



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UNITED STATES PATENT OFFICE

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RADIATOR

Application filed September 22, 1922. Serial No. 589,879.

This invention relates to radiators, and more particularly to that class of radiators designed for cooling the water of explosion engines or the like, and has for its object the provision of means whereby this can be accomplished economically and efficiently and in a manner which will increase the strength of the radiator and also permit the same to be manufactured expeditiously and with comparative economy.

Another object of the invention is the provision of a cooling radiator of this character, which shall be provided with air and water passages, the areas of which will be of such proportions that the most efficient cooling will take place while at the same time the structure will be of rigid and firm construction.

Another object of my invention is to provide a radiator of this character in which the cooling fluid, usually air, may be deflected upon its passage through the radiator in such a manner that all parts thereof may absorb heat from the water passing through the radiator.

More specifically the invention comprises a radiator having spaced water passages, the opposing walls of two adjacent passages being spaced apart by a strip of metal provided with corrugations of such shape that the air in passing through the radiator will be deflected for the purpose described.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a somewhat diagrammatic front elevational view of a radiator embodying my improvements;

Fig. 2 is an enlarged fragmentary front elevational view of the core of the radiator shown in Fig. 1;

Fig. 3 is a sectional view along one of the water passages along line 3—3 of Fig. 2;

Fig. 4 is a sectional view along line 4—4 of Fig. 3;

Fig. 5 is a side elevational view of a spacing or fin strip;

Fig. 6 is an edge view of the same;

Fig. 7 is a front elevational view of one of the units of which the radiator is constructed;

Fig. 8 is a sectional view of the fin strip on line 8—8 of Fig. 5.

Fig 9 is a perspective fragmentary view of a radiator unit, showing a spacing or fin strip interposed between the side walls thereof, portions being broken away for the sake of clearness, and,

Fig. 10 is a vertical section of the part shown in Fig. 9, generally on line 10—10 thereof.

In Fig. 1 I have shown a radiator consisting of a case 10, in which is mounted a radiator core 11, the case being provided with a filler neck 12 and side brackets 13 by which it may be secured to the suitable part of an engine or vehicle frame. The core of the radiator is, composed of generally upright zig-zag water passages between which are arranged generally horizontally disposed air cells or passages.

The water passages 14 are provided between two adjacent zig-zag plates or strips 15 having offset or flanged edges 16, which, when placed together, serve to space apart the walls 15 to provide a water passage of suitable width. While the walls 15 may be constructed and assembled in any desired way, I have found it expedient to build up the radiator of units, such as shown in Fig. 7. This unit comprises two walls 15, which in the finished product are walls of adjacent water passages, the walls being formed of a single sheet of material, the intermediate part of which extends laterally across the top of the unit as at 17. The ends of the strip of material may be suitably joined by soldering or the like. The walls 15 of these

units are as shown in Figs. 2, 4 and 7 corrugated or arranged in zig-zag formation, so that when two of such units are placed in contiguity, a zig-zag water channel will be formed between them, the offset edges 16 spacing the walls apart.

Prior to the assembly of these units to form a radiator, each unit is completed by the insertion between the walls thereof of a fin strip or spacing strip of such a character that two rows of horizontal air passages or air cells are provided between two adjacent water passages. The proportion of the amount of air to the amount of water passing through the radiator will in this instance be approximately 4 to 1 and this has been found to give desirable results. It will be understood, however, that changes in this respect may be made, if desired, by increasing the width of the water passage or decreasing the width of the air passages.

These spacing or fin strips 18, as shown in Figs. 5, 6, 8 and 9, are corrugated to correspond to some extent with the corrugations of the walls 15 of the radiator units. By reference to Figs. 5 and 9, however, it will be seen that these corrugations are not precisely horizontally disposed, as in the case of those of the walls 15, but are substantially V-shaped or of what I term herringbone formation in elevation, as shown in Figs. 5 and 9. In the particular form shown, the end portions of the corrugations are substantially horizontally disposed, but this is not essential in all cases.

In Figs. 5 and 9, the corrugations, which may be V-shaped in cross-section as well as lengthwise, are shown as having portions that are generally horizontally disposed from the edge of the strip to a point designated by the numeral 19 where they are turned upwardly or downwardly to a point 20 at about the center of the spacing strip. The corrugation here again turns downwardly or upwardly and extends in this direction until it reaches a point 21, a short distance from the other edge of the strip, from which point the corrugation extends again in a horizontal direction. The corrugations being horizontally disposed adjacent the edges of the spacing strip, the air cells formed in the completed radiator will, as shown in Fig. 2, be substantially square or in the shape of a rhombus, while the intermediate part of the corrugation being V-shaped longitudinally thereof will deflect the streams of air passing through the radiator causing this air to be broken up so that all particles thereof will come in contact with and absorb heat from the radiator structure.

The spacing strip is provided with projections or wings 22 struck out on opposite sides thereof, which projections are arranged opposite a trough of a corrugation and are designed to fit into the corrugations of the walls 15 and hold the parts in their proper relations.

When a strip of metal has been formed in the shape shown in Fig. 7 and one of the spacing or fin strips has been prepared, as shown in Figs. 5 and 6, the latter is inserted between the walls 15 of the structure shown in Fig. 7 and the completed unit has been formed, such units are then placed side by side with the offset or flanged edges in abutting relation, the edges being soldered to provide water tight joints. The offset edges of the opposing walls of two adjacent units will space these walls apart sufficiently to provide a narrow generally vertically disposed water channel and the spacing plate between the two walls of one of the units will in conjunction with the troughs and crests of the walls provided by the zig-zag formation thereof form two rows of generally horizontally disposed air passages. A sufficient number of these units are placed side by side and soldered together in this manner to form a radiator structure of the desired size provided with these air and water passages and such a structure has been found to comprise a highly efficient cooling core.

While I have shown and described a preferred embodiment of my invention, it will be apparent that my invention is not limited to the exact details shown, but is capable of many modifications and variations which lie within the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. A radiator unit comprising a pair of opposed plates of thin material, each plate being adapted for use as an enclosing wall for adjacent water passages, and a dividing plate positioned between the opposed plates of each unit, said dividing plate being provided with corrugations extending transversely thereof, said corrugations being V-shaped intermediate the edges of the plate and spacing wings on said dividing plate contacting with said outer plates.

2. A radiator unit comprising a pair of opposed plates of zig-zag formation, and a dividing plate positioned between said plates, said dividing plate being provided with corrugations extending transversely thereof, said corrugations being V-shaped intermediate the edges of the plate, said plate having aligned projections adapted to fit within the zig-zag formation of the outer plates.

3. In a radiator for a motor driven vehicle or the like, a plurality of radiator units, each comprising a pair of opposed plates having corrugations extending transversely thereof in substantially a straight line from edge to edge, and another plate interposed between said first mentioned plates, said last named plate having corrugations extending transversely from edge to edge thereof, disposed from one edge of said plate out of

the horizontal in a straight line to an intermediate portion of said plate and then back to the horizontal in a straight line from the intermediate portion to the other edge of said plate, said interposed plate having wings struck out alternately from one side and then the other, said wings being adapted to enter the corrugations of said first named plates to position all of said plates relatively to each other.

In witness whereof, I have hereunto set my hand this 19th day of September, 1922.

CHARLES OPPE.