

E. S. ERICKSON.
CELLULAR RADIATOR.

APPLICATION FILED DEC. 20, 1915.

Patented July 17, 1917.

2 SHEETS—SHEET 1.

1,233,765.

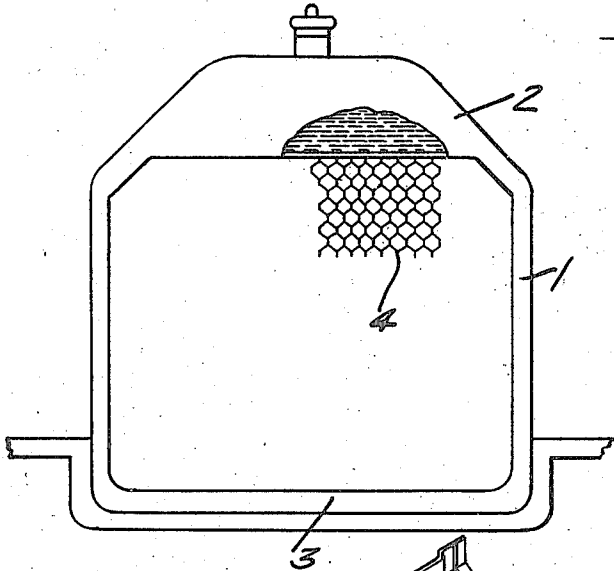


Fig. 1.

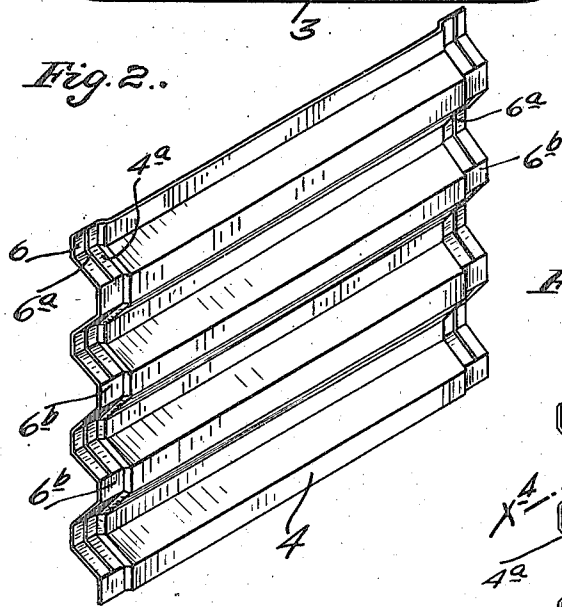


Fig. 2.

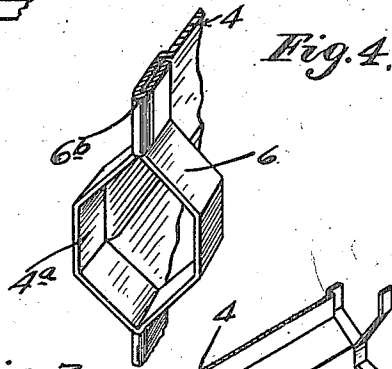


Fig. 4.

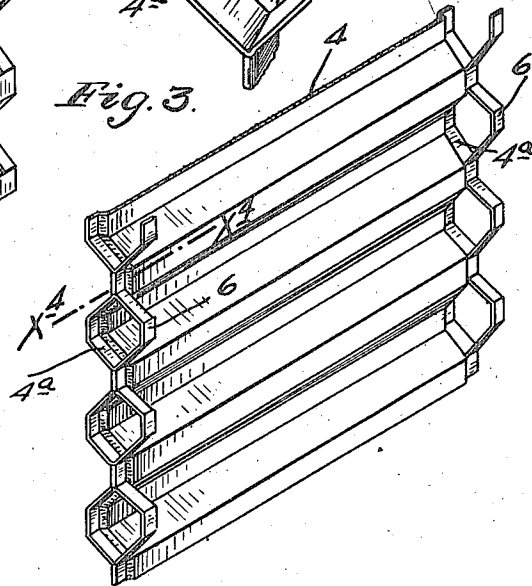


Fig. 3.

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Fig. 5

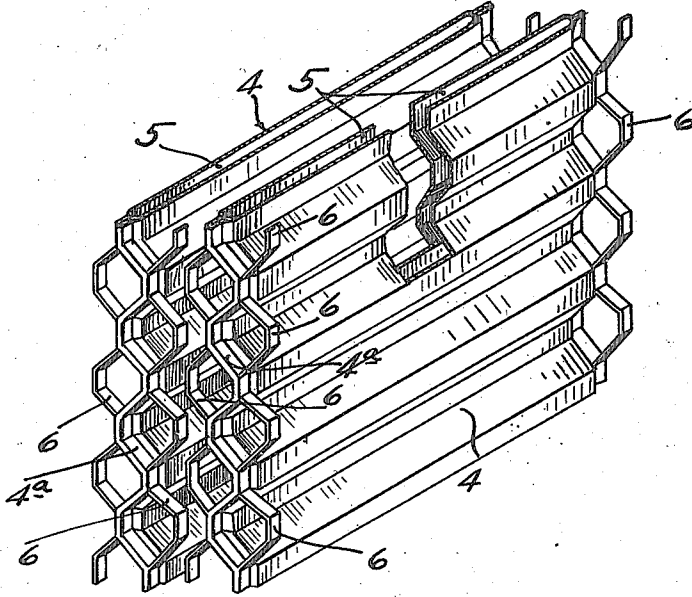


Fig. 6

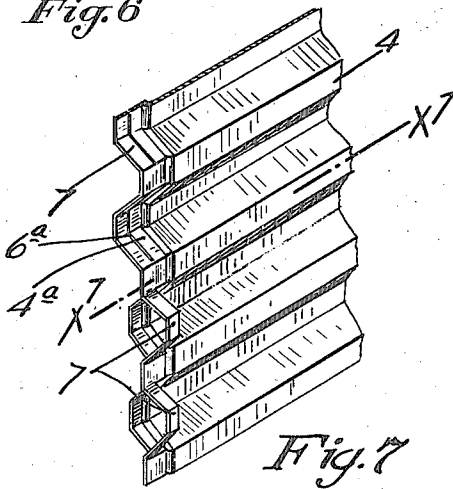


Fig. 8

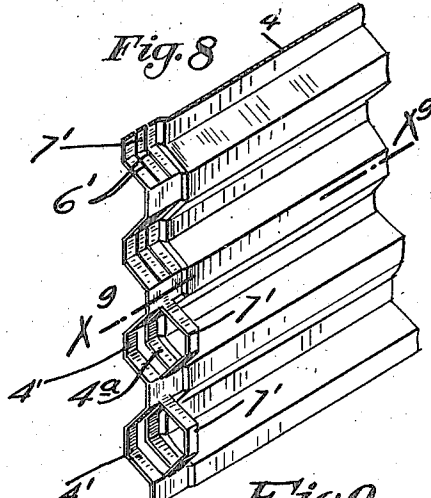
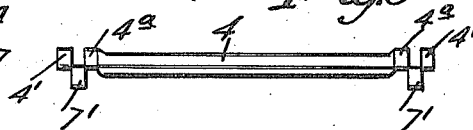


Fig. 7



Fig. 9



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UNITED STATES PATENT OFFICE.

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CELLULAR RADIATOR.

1,233,765.

Specification of Letters Patent. Patented July 17, 1917.

Application filed December 20, 1915. Serial No. 67,780.

To all whom it may concern:

Be it known that I, EDWARD S. ERICKSON, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Cellular Radiators; 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.

My invention relates to so-called cellular types of radiators, such as are extensively used in connection with automobiles employing explosive engines as their motive power. The chief objects of the invention are high efficiency, simplicity of construction and small cost, all with the use of a minimum amount of sheet metal; and to such ends, generally stated, the invention consists of the novel construction and combination of parts hereinafter described and defined in the claims.

The improved radiator is illustrated in the accompanying drawings wherein like characters indicate like parts throughout the several views. Referring to the drawings:

Figure 1 is a diagrammatic view in front elevation showing a radiator designed in accordance with my invention;

Fig. 2 is a perspective view showing a portion of one of the tube-forming plates of the radiator core, illustrating the same as it appears when first stamped and before its formation is completed;

Fig. 3 is a view corresponding to Fig. 2, but showing the alining webs turned over into final position;

Fig. 4 is a fragmentary perspective on an enlarged scale, the upper section being on the line $x^4 x^4$ of Fig. 3;

Fig. 5 is a perspective view with some parts broken away and some parts sectioned showing two tube-forming units of the cellular radiator, the said units being slightly separated;

Fig. 6 is a view corresponding to Fig. 2 but illustrating a modified construction;

Fig. 7 is a section taken on the line $x^7 x^7$ of Fig. 6;

Fig. 8 is a view corresponding to Fig. 6, but illustrating a slight modification thereof; and

Fig. 9 is a section taken on the line $x^9 x^9$ of Fig. 8.

In Fig. 1, the radiator frame is indicated by the numeral 1, the upper water chamber of the radiator by the numeral 2 and the lower water chamber of the radiator by the numeral 3, which parts may be of well known or any suitable construction.

The cellular core of the radiator is made up of a multiplicity of thin sheet metal (preferably of brass) tube forming plates that are bent into zigzag form and adapted to be put together in pairs to form zigzag water tubes, each of which tubes constitutes one unit and they are arranged to be put together to form the cellular core consisting of the above noted vertically extended zigzag water tubes and intervening zigzag air cells or passages opening at front and rear ends. The zigzag tube-forming plates are indicated by the numeral 4. In vertical cross section, the plates 4 follow zigzag lines forming adjacent surfaces at angles of 120 degrees, thus forming the alternated surfaces of zigzag cells or passages. The said tube-forming plates 4, at their front and rear edges are offset at 4^a , so that they are brought closely together, and these joints are connected by solder, so that the water tubes 5 formed by the cooperating plates are closed at front and rear of the radiator.

Proper assembling of the tubes to thus form the cells requires accurate alinement or positioning of the tubes with the flat outer surfaces of the tube-forming plates, at least at front and rear of the core, in proper contact. To accomplish this alinement or proper accurate assembling of the units, various devices, such as independent or additional alining plates have been interposed between the units and provided with the proper lateral projections for engagement with the cell-forming walls of the plates.

In my improved radiator, only the tube-forming plates are used, and the alining devices are formed by partially severing, from the said tube-forming plates, alining webs and giving the same the proper lateral projection for engagement with channels of the cell-forming walls of tube forming plates of adjacent units. This result may be accomplished in different ways, several of which are illustrated in the drawings.

In the preferred arrangement illustrated in Figs. 2 to 5, inclusive, the offset end portions 4^a of the plates 4 are made a little longer than would be otherwise required and

the outer portions 6, on the three sides of each air cell-forming channel, are slit at 6^a (see Fig. 2), leaving the web-forming portions 5 connected to the respective plates 4 only at the flat surfaces 6^b that are to engage with the corresponding flat surfaces of an adjacent unit or tube. The said web-forming portions 6 are then properly offset by bending the same 180 degrees (under which movement the unslit portions at 6^b will bend) until they occupy the position shown in Fig. 3, in which positions they will engage each with the three walls of the air cell-forming surface of the tube-forming plate of an adjacent unit.

Fig. 5, as already indicated, shows two tubes or units constructed as just described, brought nearly into an assembled position, so that they require only to be pressed together to complete the proper assembling and alignment thereof. The said units or tubes, when assembled, will, of course, be permanently united by solder, preferably applied at the front and rear edges of the tubes or units.

The construction illustrated in Fig. 6, up to the point illustrated in Fig. 2 is identical with the first described construction, but in this instance, the offsetting of the alining webs 7 correspond to the web 6, is accomplished by pressing the same laterally, as indicated in the lower portion of Figs. 6 and 7, instead of turning the said webs by the swinging movement described in the first instance.

Figs. 8 and 9 illustrate a construction like that illustrated in Figs. 6 and 7, except that the offset edge portions 4^a, in lieu of the slits 6^a, have parallel pairs of slits 6' which partly sever alining webs 7' corresponding to the alining flanges 7, except that they are located slightly inward from the edges of the plates 4.

As is evident, by virtue of the construction above described, highly efficient alining webs or devices are provided without adding appreciably to the cost of manufacture of the tube-forming plates themselves and without requiring any intermediate spacing plates or elements additional to or distinct from the said tube-forming plates. By the use of the said spacing webs pressed from and integral with the tube-forming plates, the process of soldering is also simplified, so that not only the amount of sheet metal or material, but also labor is reduced to a minimum, and at the same time, a superior cellular radiator core is produced.

What I claim is:

1. A cellular radiator made up of alternately bent zigzag plates united in parallel to form laterally spaced zigzag water tubes,

the said zigzag water tubes being assembled to form intervening air cells, and the said tube-forming plates having, at their edges, laterally projecting integral alining portions that engage and fit the cell-forming channels of adjacent tubes.

2. A cellular radiator made up of alternately bent zigzag plates united in parallel to form laterally spaced zigzag water tubes, the said zigzag water tubes being assembled to form intervening air cells, the said tube-forming plates being united at the edges of the tubes and having, at their edges, laterally pressed alining webs that engage and fit the cell-forming channels of adjacent tubes.

3. A cellular radiator made up of alternately bent zigzag plates united in parallel to form laterally spaced zigzag water tubes, the said zigzag water tubes being assembled to form intervening air cells, the said tube-forming plates having their front and rear edges pressed together and united with fluid tight joints and formed with partially severed laterally pressed alining webs engageable with the cell-forming channels of adjacent tubes.

4. A cellular radiator made up of alternately bent zigzag plates united in parallel to form laterally spaced zigzag water tubes, the said zigzag water tubes being assembled to form intervening air cells, the said tube-forming plates, adjacent their edges, having alining webs severed therefrom at their sides but integral therewith at their ends, and laterally pressed to a form reverse to the surface from which they were cut, and adapted to engage the cell-forming channels of adjacent tubes.

5. A cellular radiator made up of alternately bent zigzag plates united in parallel to form zigzag water tubes and intervening air cells, said plates having longitudinally spaced slits near their edges, and the slit edge portions being reversely bulged and forming alining portions that engage the cell forming channels of adjacent plates.

6. A cellular radiator made up of alternately bent zigzag plates united in parallel to form zigzag water tubes and intervening air cells, said plates at their edges being slit and over-turned to form integral reversely bulged alining portions that engage with the cell-forming channels of adjacent plates.

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

EDWARD S. ERICKSON.

Witnesses:

F. J. KOSTAT,
H. A. MALSTRUM.