

Dec. 1, 1931.

M. CHAVARA ET AL

1,833,985

RADIATOR

Filed March 22, 1928

3 Sheets-Sheet 1

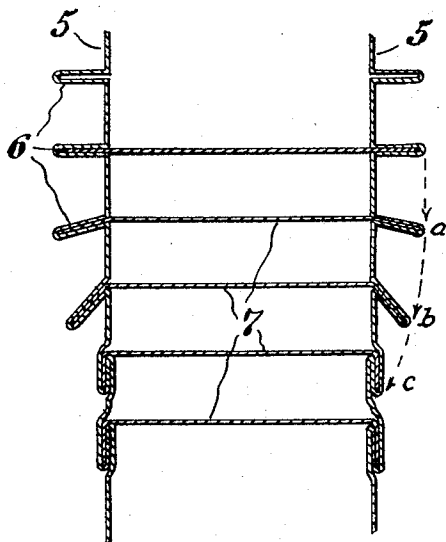


Fig. 1.

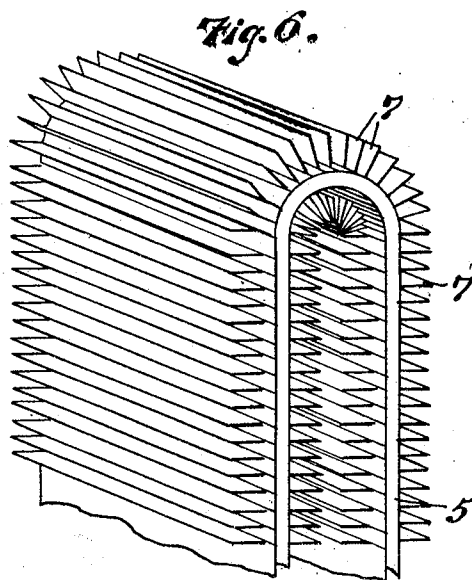


Fig. 6.

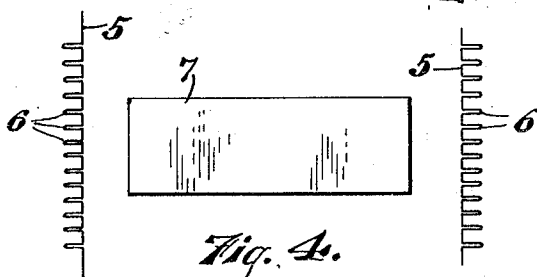


Fig. 4.

Fig. 2.

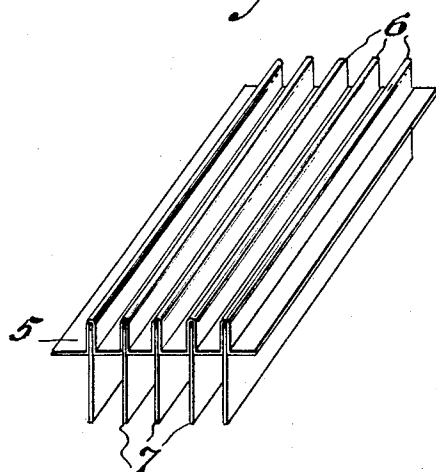
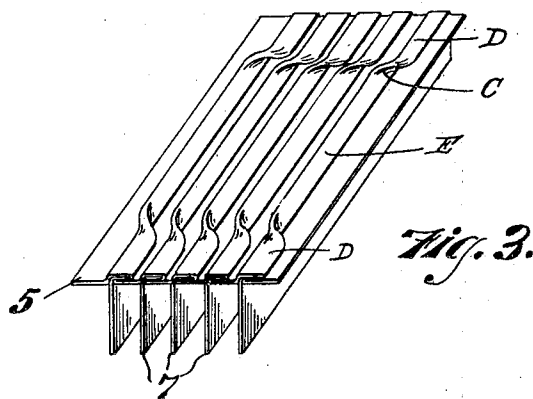


Fig. 3.

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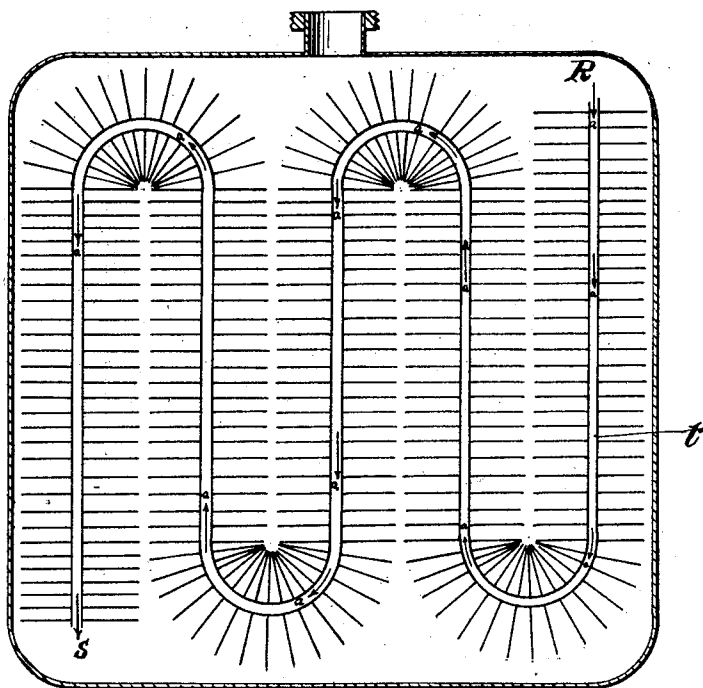


Fig. 5.

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Fig. 7.



Fig. 8.

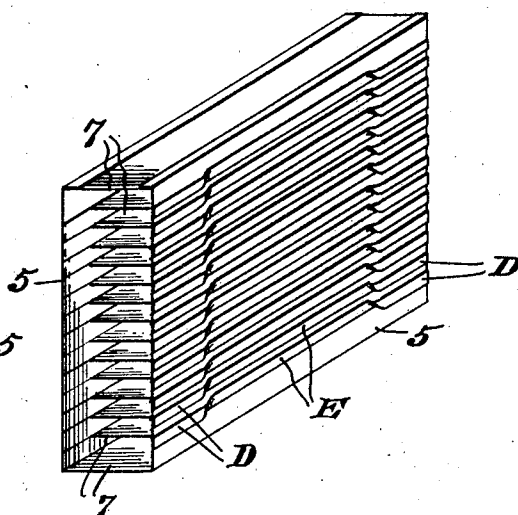
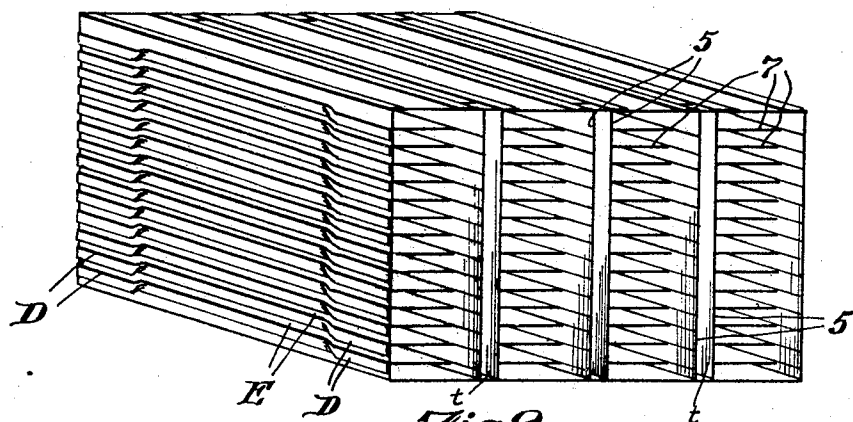


Fig. 9.

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RADIATOR

Application filed March 22, 1928. Serial No. 263,834.

This invention relates to improvements in the construction of radiators of the type ordinarily employed in conjunction with the cooling systems of internal combustion engines.

The invention has for its object to provide an arrangement of this character in which the tubular parts for conducting the water or other cooling medium are connected with the cooling fins in such manner that these parts are permanently held in position without the use of solder.

A further object of the invention is the provision of a radiator construction in which the parts which are preferably formed of sheet metal and constitute the walls of the passage for the cooling medium are formed with corrugations in which the edges of the cooling fins are located, such portions of the corrugations being subsequently bent first in one direction and then in another to provide an interlock between the fin parts and the wall parts.

In the accompanying drawings wherein an approved embodiment of the invention is illustrated:

Fig. 1 is a detail section through a portion of a radiator constructed in accordance with the invention and showing the various steps followed in joining the wall members with the fin members.

Fig. 2 is a perspective view showing one wall member with a plurality of fins inserted in the corrugations thereof, prior to the folding or bending of the corrugations.

Fig. 3 is a view similar to Fig. 2 showing the corrugations following the folding or bending thereof.

Fig. 4 is a diagrammatic view of two opposed wall members, shown in edge elevation, and one of the fins, shown in plan view, the several parts being shown prior to assembly.

Fig. 5 is a sectional view through one type of radiator showing one embodiment of the invention applied thereto in which a single passage for the liquid cooling medium is provided.

Fig. 6 is an enlarged perspective view of a portion of a radiator constructed in ac-

cordance with the arrangement shown in Fig. 5.

Fig. 7 is a diagrammatic edge elevation of a complete radiator section constructed in accordance with the arrangement illustrated in Fig. 1.

Fig. 8 is a diagrammatic perspective view of the arrangement shown in Fig. 7.

Fig. 9 is a diagrammatic perspective of a plurality of sections shown in Fig. 8 arranged side by side to provide the passages for the liquid cooling medium therebetween.

Referring to the drawings in detail the numerals 5 indicate sheets of metal which, in the finished radiator, constitute the walls of the passage for conducting the water or other liquid cooling medium. The wall members 5 are provided with a plurality of spaced parallel folds or corrugations 6, the corrugations of each plate being arranged equidistant so that when two plates are arranged side by side, as shown in Fig. 1, with the corrugations projecting outwardly, channels are provided by the corrugations in which the fins 7 are seated. The preliminary insertion of the fins is shown at the extreme top of Fig. 1 and in the partially assembled radiator section in Fig. 2.

Following the insertion of the fins in the corrugations, the end portions D of the latter are folded inwardly through the positions A, B and C, Fig. 1, in one direction into facial abutment with the wall plate 5 and the medial portions E of the corrugations are folded in the opposite direction into facial abutment with the wall plate as clearly shown in Fig. 3. The opposite bending of the corrugations 5 with the fins 7 inserted therein provides a fluid-tight joint between these portions and due to the lateral bend at the edges of the fins produced when folding the corrugations 6 into facial abutment with the wall plate, the fins are effectively held against withdrawal. Unintentional displacement of the fins is further prevented due to the twisting of the material of the fin produced at the points C where the direction of the bending of the corrugations 6 is reversed.

The walls and fins constructed and assem-

bled in accordance with the invention may be employed in connection with radiators either of the type shown in Fig. 5 or the honeycomb type shown in Fig. 9. In the construction of the radiator shown in Fig. 5, two wall members 5 with the fins 7 secured in position thereon as shown in Fig. 3 are arranged side by side in spaced relation so as to provide a water space t therebetween and the wall members may be bent into the form shown in Fig. 5 so as to provide a circuitous passage for the water and thereby better utilize the space available for the radiation of heat. The water may enter at the point R and following the passage t passes out at the point S.

A radiator constructed in accordance with this embodiment of the invention provides a circuitous passage for the liquid cooling medium and the fins 7 radiating from the walls of the liquid passage produce a highly efficient radiation of the heat.

In the embodiment of the invention shown in Figs. 7-9 the radiator is assembled in sections of the type shown in Fig. 7. Each section is composed of two opposed wall plates 5 joined by the fins 7, as shown in detail in Fig. 1, and thereafter the radiator sections are arranged side by side in spaced relation to provide the passages t therebetween for the cooling medium. It will be understood that the spaces between the wall members 5 in which the fins 7 are located are for the passage of air.

A radiator constructed in accordance with the invention provides a highly efficient arrangement preventing leakage of the cooling fluid at the joints between the radiator walls and the fins without the use of solder and like sealing materials.

Having now fully described and ascertained the nature of our invention what we claim is:

1. In a radiator structure, a wall of sheet material having folds therein presenting a series of corrugations, fin members inserted in said corrugations, the corrugations being bent back upon the body of the wall to lock the fins in position and provide a fluid-tight joint between the wall and fins.

2. In a radiator structure, a wall of sheet material having folds therein presenting a series of corrugations, fin members inserted in said corrugations, each corrugation being bent laterally first in one direction and then in the other upon the body of the wall to lock the fin associated therewith in position and to provide a fluid-tight joint between said fin and the wall.

3. In a radiator structure, opposed walls forming portions of passages for cooling medium and fins connecting said walls and forming spaces therebetween for the passage of air, said walls having folds therein presenting corrugations receiving said fins and

the corrugations being folded laterally back upon the wall.

4. In a radiator structure, opposed walls forming portions of passages for cooling medium and fins connecting said walls and forming spaces therebetween for the passage of air, said walls having folds therein presenting corrugations receiving said fins, the corrugations being folded laterally first in one direction and then in the other with the fins inserted therein to prevent displacement of the latter.

In testimony whereof we have signed our names to this specification.

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