

C. W. COLE,
RADIATOR CONSTRUCTION.
APPLICATION FILED JULY 16, 1920.

1,407,929.

Patented Feb. 28, 1922.

Fig. 1

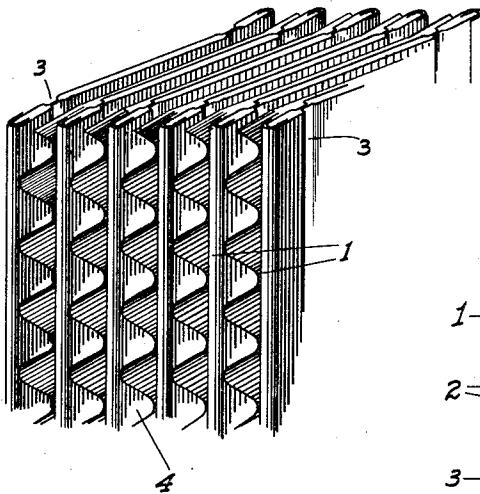


Fig. 2

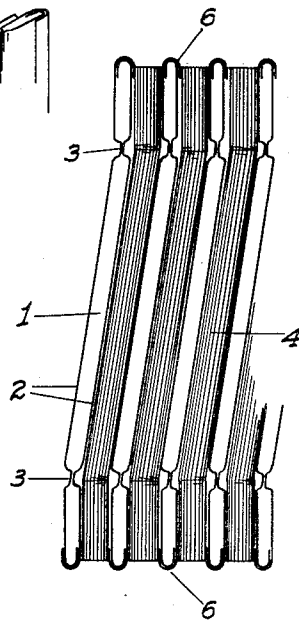


Fig. 4

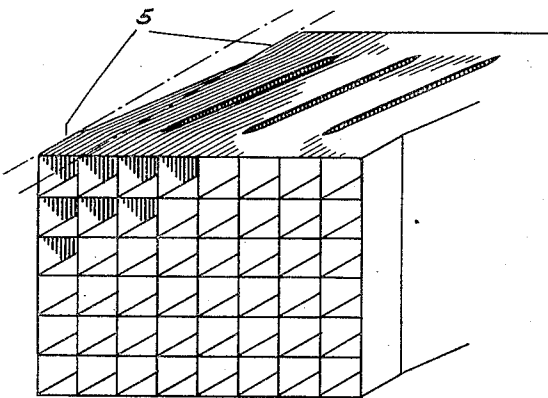
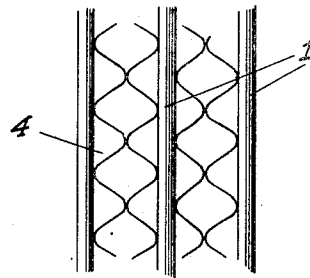


Fig. 3



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1,407,929.

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To all whom it may concern:

Be it known that I, CLARY W. COLE, a citizen of the United States, residing at Modesto, in the county of Stanislaus, State of California, have invented certain new and useful Improvements in Radiator Constructions; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in radiators such as are almost universally in use for cooling the water of internal combustion engines when applied to land and air vehicles of all kinds.

The principal object of the invention is to construct a radiator in such a manner that while it will have a maximum of water-conveying area, it will also be subject to the greatest possible cooling effect of the air passing through the radiator.

A second object is to so form the cells that while having sufficient strength and rigidity for their purpose, they will be substantially flexible and well enabled to take a crushing shock, whether endways or laterally, without vitally damaging the cells or causing them to leak.

I have also joined the ends or edges of the cell-pieces to each other in such a manner that they will have a maximum of overlapping or connected surface, making a rigid joint and one which will not be liable to become loosened and start a leak with either normal or excessive vibration.

It is also admirably adapted to take care of the expansion and contraction due to freezing of the water in the winter, without damage to the cells or stopping up either the water or the air passages, or causing leakage of the former.

A further object is to construct the radiator as a whole, so that while when the radiator is assembled, the radiating fins cannot be removed, they are independent from the water cells or cores, and may be detached therefrom when the radiator is taken down, thus exposing the entire surface of the water cells and making the repairing of the radiator an easy task.

A further object of the invention is to produce a simple and inexpensive device, and

yet one which will be exceeding effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Fig. 1 is a fragmentary perspective view of the preferred form of my radiator construction.

Fig. 2 is a top plan view thereof.

Fig. 3 is a fragmentary end elevation of the cell structure with a double row of radiating fins therebetween.

Fig. 4 is a fragmentary perspective of a radiator of the honeycomb type, showing my principle of construction applied thereto.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes in general the water cells, each of which comprises a pair of vertical plates 2, preferably of thin sheet copper or the like, which are held in transverse spaced relation and also strengthened by means of integral ribs or corrugations 3, projecting inwardly from each plate in alinement with each other. It will be understood that the cells are continuous from top to bottom of the radiator, forming a vertical water passage, while their depth is from front to back of the radiator, and their thickness about an eighth of an inch or thereabouts, each cell being spaced apart a distance from adjacent cells sufficient to receive horizontally corrugated radiating fins 4 therebetween. This fin structure may be of one piece, with a single line of corrugations, as shown in Fig. 1, or a double row may be used, as shown in Fig. 3.

The ribs 3 are positioned about one fifth of the depth of each cell from each edge, there being preferably two alined pairs of such ribs for each cell, and each end of the cell to the adjacent ribs is in an offset but parallel plane to the other end, the bend being at the ribs and the portion of the depth of the cell between the ribs being straight. To obtain the best results, the amount of offset is about equal to the width of the spacing between adjacent cells, or in other words, the adjacent sides of the opposite ends of adjacent cells are in aline-

ment with each other. In this manner, the straight air currents passing through the fins strike against the angled surfaces of the cells, and are deflected from side to side, instead of passing straight through, thereby causing the air to be broken up and exposing the calls to different strata of the volumes of air. In the straight air passage type of radiator, as usually constructed, the layers of air adjacent the cell walls become heated, and these same strata on account of their unbroken flow, remain in contact with the cell walls throughout their depth, so that much of the cooling effect which might be obtained therefrom is lost. This same air-deflecting principle may be applied to the ordinary honeycomb radiator as shown at 5 in Fig. 4, and in other similar types, by merely offsetting one end of the cell from the other.

With my improved structure, as shown in Figs. 1 and 2, a very flexible construction is had, since if a blow was received on the front end, by reason of a collision or otherwise, the amount of offset would merely tend to increase, instead of the cell structure being crushed and broken.

The fins 4 of course are also offset, and are placed in position before the radiator is assembled. When this is done it will be evident that even without fastening the fins to the cells in any way, they cannot be removed by horizontal movement. At the same time however, they are preferably dipped in solder with the cells when assembling the radiator, so that they cannot close together or fold up with repeated shocks and vibration.

The ends of the cells are bent in a curve as shown at 5, one cell-plate overlapping the other for a distance equal to the extent of the curved portion of the other plate, so that a two-ply end is had. The ends are then dipped in solder, so that the latter may penetrate between the overlapped surfaces and bind the two plates together throughout the lapped area and a very strong and rigid joint

is thus had, while at the same time a smooth and unbroken appearance is presented from the front or back of the radiator.

It will be seen that with my improved construction the air strikes the motor in a straight fore and aft direction after passing through the air passages, since the latter terminate in a longitudinal plane.

Also it will be evident that the same principle of operation and the advantages thereof hold good whether the cores are angled horizontally or vertically.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the object of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:—

1. A radiator comprising spaced and vertical water cells, each cell comprising a pair of spaced plates secured together to enclose a water area, and extending from top to bottom of the radiator and from front to rear thereof, inwardly projecting vertical corrugations on the plates abutting against each other to space the plates, and the cells being bent from top to bottom at such corrugations and in opposite directions so that the opposite ends of the cells will be parallel to each other but in an offset plane.

2. A radiator comprising spaced and vertical water cells, the cells being bent from top to bottom so that the forward and rear ends lie parallel to each other for a certain distance but in an offset plane, and horizontally corrugated fin-plates between the cells and abutting thereagainst, the fins being bent to conform to the bend of the cells.

In testimony whereof I affix my signature.
CLARY WM. COLE.