R. KLEINE.

RADIATOR CORE.

APPLICATION FILED SEPT. 24, 1918.

1,352,068. Patented Sept. 7, 1920.

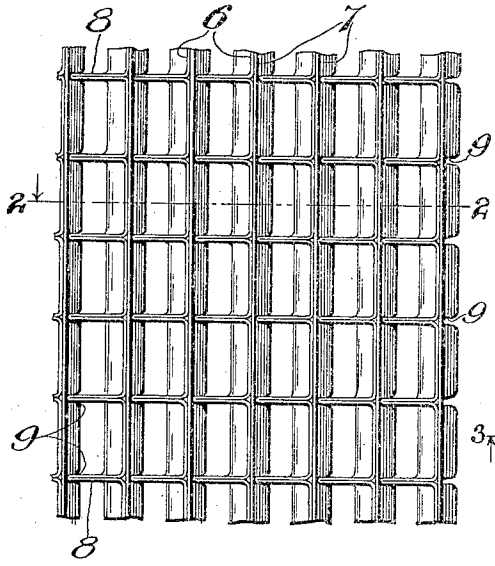


Fig. 1.

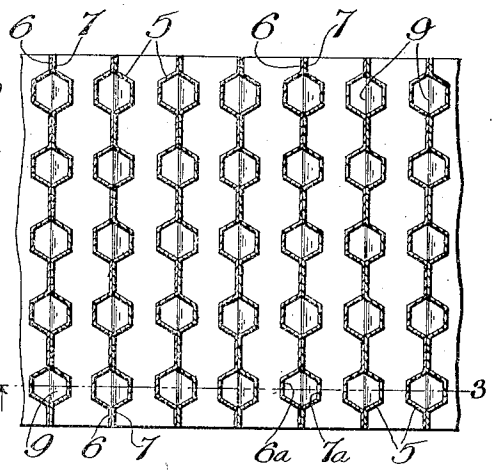


Fig. 2.

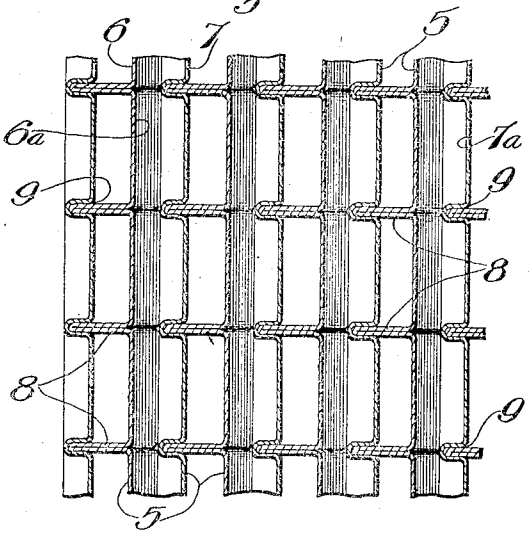


Fig. 3.

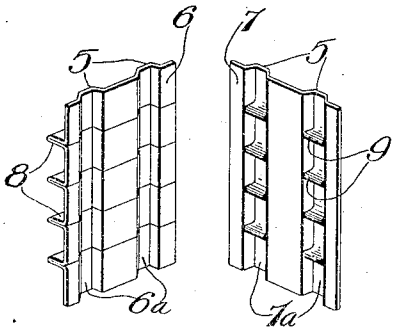


Fig. 4.

Robert Kleine

Inventor

By Miles B. Stevens & Co.

Attorneys.

UNITED STATES PATENT OFFICE.

ROBERT KLEINE, OF CHICAGO, ILLINOIS.

RADIATOR-CORE.

1,352,068. Specification of Letters Patent. Patented Sept. 7, 1920.

Application filed September 24, 1918. Serial No. 255,505.

To all whom it may concern:

Be it known that I, ROBERT KLEINE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Radiator-Cores, of which the following is a specification.

This invention relates to radiators employed for cooling the water from the jackets of internal combustion engines, the invention being applicable to automobiles, motor trucks, aeroplanes, etc.

The radiator is of the honeycomb type, having vertical tubes through which the water circulates, and the invention relates more particularly to the manner in which these tubes are constructed and provided with projecting fins for assisting the radiation of heat.

The invention has for its object to provide a radiator core of simple and inexpensive construction, and also one which is highly efficient, and with this object in view the invention consists in a combination and arrangement of parts to be hereinafter described in detail and claimed.

In order that the invention may be better understood, reference is had to the accompanying drawing forming a part of this specification, and in said drawing,

Figure 1 is an elevation of a fragment of a radiator core constructed in accordance with the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged section on the line 3—3 of Fig. 2; and

Fig. 4 is a perspective view showing the interior of two matching sections of the core, taken apart.

As pointed out hereinbefore, the radiator is of that type having vertical water tubes. These tubes are shown at 5 in the drawing. A sufficient number of these tubes are illustrated to suffice for an understanding of the invention. The top and bottom headers between which the tubes extend, and the other parts of the radiator have not been illustrated as they form no part of the present invention. The tubes are of hexagonal or other angular cross-section to give them a number of corners for a better dissipation of heat.

Each radiator tube 5 is formed by two contiguous sheet metal plates 6 and 7, respectively, having at regular intervals vertical grooves 6^a and 7^a, respectively, which are stamped or otherwise formed. The grooves of one plate face and match the grooves of the opposite plate, as should be evident when the sections of Fig. 4 are combined, and these matching grooves define the tubes 5. The two plates are soldered or otherwise firmly connected so that there is no leakage across from one tube to the other.

The tubes 5 are also provided with heat-radiating fins 8. These fins are integral with the plates 6 and they are formed by doubling or folding said plates horizontally outward at intervals to form a vertical row of fins, the folds forming each fin being pressed into close contact. In order that the outer edge of the fins 8 may abut the contiguous face of the adjoining plates 7 throughout, the walls of the grooves 7^a of the latter are sunk or indented, as shown at 9, opposite each fin, so as to receive the latter and enable a firm joint to be formed between the plates when the core is dipped into the solder bath.

A radiator core constructed as hereinbefore described can be easily and cheaply produced as each row of tubes is composed of only two plates stamped to form the tubes and the fins, the latter being integral with one of the plates. While the indentations 9 partially constrict the tubes 5 at intervals, which fact might be considered detrimental to the circulation of the cooling fluid, it should at the same time be apparent that the indentations will reduce the rate at which the fluid courses through the tubes, thereby allowing the fluid to remain in the radiator for a longer period and to be relieved of more heat by the transverse air-currents. This should enable the fluid to return to the engine at a lesser temperature than in a case where the tubes 5 are uninterrupted. It should also be evident that the indentations will not cause the secretion of sediment or impurities in the tubes, as the grooves 7^a will still be sufficiently open to permit the fluid current to fill them and wash out all sediment or impurities in its motion.

I claim:—

1. In a radiator of the kind described, cooperating plates for forming a radiator core unit, one of said plates being folded transversely at intervals to form laterally projecting leaves or walls and having longitudinally extending shallow grooves pressed

into its face opposite to said walls, the other plate being flat and provided with outwardly extending depressed portions spaced longitudinally thereof similar to the spacing of said leaves and adapted to space the leaves of an adjacent plate, the hollow sides of said depressions being arranged opposite to said grooves and the said plates being adapted to be joined at their edges by soldering or otherwise, substantially as described.

2. In a radiator of the kind described, a unit section comprising two coöperating plates having flat opposed surfaces adapted to be joined at their edges by solder, one of said plates having heat radiating walls projecting laterally therefrom at regularly spaced intervals and having vertically extending water grooves pressed into the surface thereof which is opposed by the other plate, said grooves forming water passages, the opposed plate having a series of depressions opposite to each groove and adapted to widen the water passage at intervals, the projecting walls of said depressions serving to space the laterally projecting walls of an adjacent unit, substantially as described.

3. A radiator of the kind described built up of a plurality of pairs of vertically arranged strips of sheet-metal forming units, one member of each pair being folded from edge to edge to provide laterally projecting walls on one side of the unit spaced longitudinally of the strip and said strip provided with a plurality of shallow longitudinal grooves on its flat side, providing water passages, the other strip of each pair having a series of depressions arranged opposite to said grooves and spaced similarly to said laterally projecting walls and serving to enlarge the water carrying capacity of said passages at intervals, and to form regularly spaced partial baffles in said water passages, substantially as described.

In testimony whereof I affix my signature.

ROBERT KLEINE.