Dec. 12, 1961 G. A. LYON, JR 3,012,758

RADIATOR STRUCTURE

Filed Jan. 23, 1957

Fig. 3

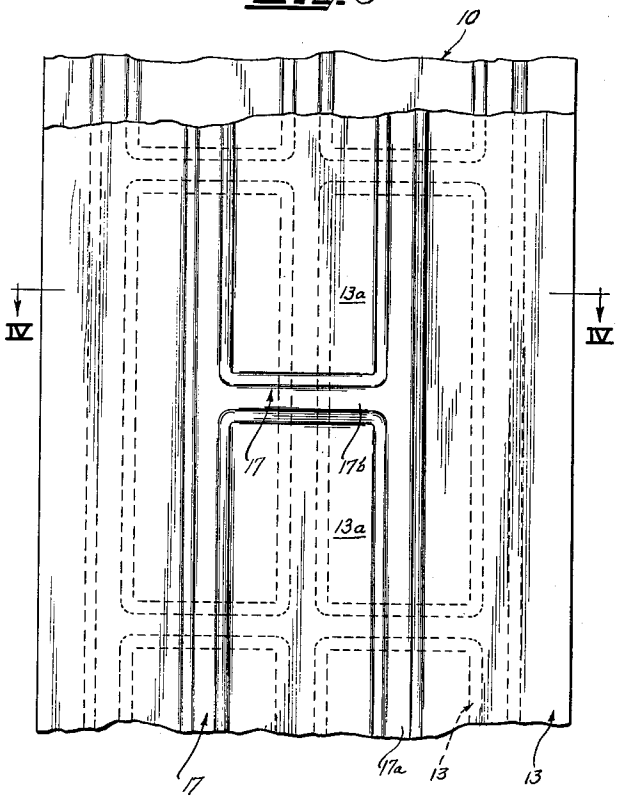


Fig. 1

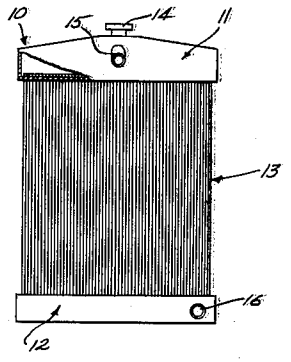


Fig. 2

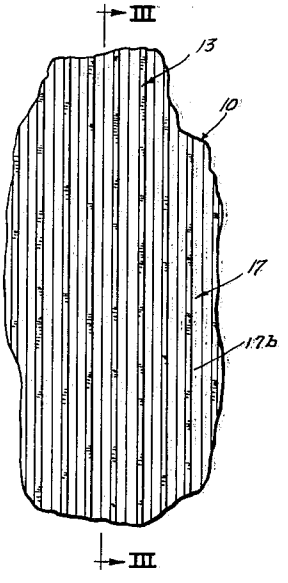


Fig. 4

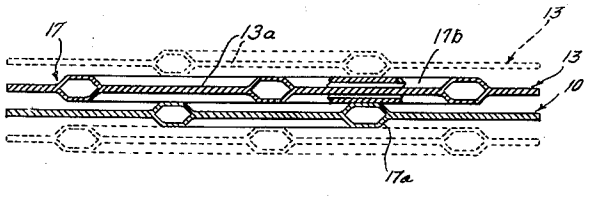
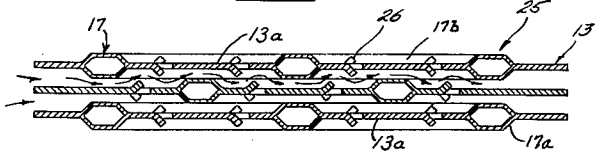


Fig. 5



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RADIATOR STRUCTURE

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This invention relates generally to a radiator fluid cooling structure and the like. More specifically, this invention relates to a radiator fluid cooling structure which lends itself to use with an automobile and other similar structures.

According to this invention, there is provided a radiator structure which includes a series of laterally adjacent plates. Each of the plates has a series of raised portions defining tubular fluid passageways. When the plates are placed in abutting relation with one another the raised portions serve to space the plates slightly so that a coolant such as air may be passed between the plates to facilitate cooling of the same. To augment the cooling action of the coolant as it passes between the plates, the plates may be provided with fins extending between the plates to force the coolant to flow in a tortuous path to facilitate wiping and cooling of the plates.

Accordingly, an object of this invention is to provide a new and improved fluid cooling structure.

Still another object of this invention is to provide a radiator fluid cooling structure with fins to aid in the cooling of the structure by causing the coolant which passes through the radiator structure to flow in an irregular path.

Still another object of this invention is to provide a new and improved reinforced radiator construction.

Still another object of this invention is to provide a radiator structure which is comprised of a plurality of abutting plates each of which has raised portions defining tubular fluid passageways through which hot fluid entering the radiator inlet may be cooled in its flow to the radiator outlet.

Another and still further object of this invention is to provide a radiator cooling fluid structure which lends itself to economical manufacture on a large production basis and which is extremely efficient in operation and of a sturdy construction.

According to the general features of this invention there is provided in a radiator fluid cooling structure having a hot fluid inlet and a cooled fluid outlet, the improvement of the structure having a series of laterally adjacent abutting plates. The plate has a main plate portion with the portion having a series of criss-cross raised portions defining tubular fluid passageways through which hot fluid entering from the inlet may be cooled in its flow to the outlet. The raised portions on the adjacent plates abut against one another to provide spaces between the plate portions to permit the coolant to flow therebetween. The main plate portions have fins extending into the spaces therebetween to force the air coolant to flow in an irregular path to facilitate wiping and cooling of the plates. The fins comprise struck out extensions projecting from opposite sides of the main plate portion and are spaced from the immediately adjacent abutting plates.

Other objects and features of this invention will more fully become apparent in view of the following detailed description taken in conjunction with the accompanying drawing illustrating therein several embodiments and in which:

FIGURE 1 is a side elevation of my radiator structure;

FIGURE 2 is an enlarged fragmentary side elevation of a portion of the radiator structure of FIGURE 1;

FIGURE 3 is an enlarged cross sectional view taken substantially on the line III—III of FIGURE 2 looking in the direction indicated by the arrows;

FIGURE 4 is a cross sectional view taken substantially on the line IV—IV of FIGURE 3 looking in the direction indicated by the arrows and showing in full and dotted lines the relationship of the abutting plates; and

FIGURE 5 is a cross sectional view similar to FIGURE 4 only illustrating a modification of my invention.

As shown on the drawings:

The reference numeral 10 indicates generally my radiator structure. The radiator structure may be used in connection with an automobile vehicle or any other similar device which requires a fluid cooling system.

The radiator structure includes a conventional header 11 at the top of the radiator structure 10 and a conventional collector 12 at the bottom of the radiator structure with cooling plates 13 therebetween. The reference numeral 14 indicates where liquids may be injected into the radiator structure to fill the same. The header 11 has a hot fluid inlet 15 through which is received fluid to be cooled. The collector 12 has an outlet 16 through which cooled fluid may be discharged. According to this invention, the plates 13 are particularly arranged to provide a new and improved system for cooling fluid with the plates lending themselves to economical production on a large scale manufacturing operation.

Each of the plates may be made from any suitable material such as aluminum and the like and preferably a type of material which may be economically obtained, which may be easily worked and which rapidly gives off heat.

Each of the plates has a series of relatively flat main plate portions 13*a* separated from one another by raised criss crossed portions 17. Included among the raised portions 17 are spaced vertical raised portions 17*a* and spaced horizontal raised portions 17*b* with the latter portions connecting adjacent vertical raised portions. Each of the raised portions 17 is tubular to enable fluid to flow generally in a vertically downward direction from the hot fluid inlet 15 to the discharge outlet 16. The plates 13 may be made from any suitable operation such as by means of stamping and other related methods of forming tubular plates.

When the plates are placed in laterally adjacent abutting relation, the raised portions abut with the raised portions on the adjoining plates. When the plates are staggered with respect to one another, that is, the raised portions 17 are staggered with respect to one another, even though the plates are in abutting relation, air coolant may flow in an irregular path through the radiator structure from the front edge to the rear edge thereof.

If it is desired, fluid as it is discharged from the inlet 15 may fall upon a plate having a series of openings which are in registry with the upper ends of the channels defined by the raised portions so that fluid may be distributed between the plates and into the passageways with a minimum amount of effort.

The plates 13 may be connected with the header 11 and the collector 12 in any suitable conventional manner such as shown in the Smith Patent 2,462,136. As here illustrated, a bottom wall of the header 11 has slots for snugly receiving top ends of the plates (FIGURE 1) so fluid may flow directly from the header into the fluid passageways on the plates and then into the collector 12.

Shown in FIGURE 5 is a modified radiator structure indicated generally by the reference numeral 25. Where identical elements again appear as in the first form of my invention, the same numerals have been again applied.

In this instance, it will be noted the main plate por-

tion 13*a* of the plates 13 are provided with a series of fins 26 which are struck out at a divergent angle therefrom on opposite sides thereof. The fins are adapted to cause air flowing from the front edge of the radiator structure through to the rear edge, as indicated by the arrows, to move in a tortuous path over the staggered portions 17 to facilitate cooling thereof.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In a heat exchanger structure having a heated fluid inlet and a cooled fluid outlet, the improvement of said structure having a series of laterally adjacent abutting plates which plates are disposed in planes which are all parallel with respect to one another, each of said plates having a main plate portion with said main plate portion having a series of transverse and longitudinal raised portions defining tubular criss-crossing interconnected fluid channels through which hot fluid entering from the inlet may be cooled in its flow to the outlet, the transverse and the longitudinal raised portions on the plates being engaged with one another to provide a rigidified cooling structure, the transverse raised portions on the plates being longitudinally offset with respect to the transverse raised portions on adjacent plates and the longitudinal raised portions on the plates being transversely offset with respect to the longitudinal raised portions on adjacent plates providing passageways between the main plate portions and the raised portions to permit coolant to flow therebetween to more effectively cool the raised portions as well as the main plate portions.

2. In a heat exchanger structure having a heated fluid inlet and a cooled fluid outlet, the improvement of said structure having a series of laterally adjacent abutting plates which plates are disposed in planes which are all parallel with respect to one another, each of said plates having a main plate portion with said main plate portion having a series of transverse and longitudinal raised portions defining tubular criss-crossing interconnected fluid channels through which hot fluid entering from the inlet may be cooled in its flow to the outlet, the transverse and the longitudinal raised portions on the plates being engaged with one another to provide a rigidified cooling structure, the transverse raised portion on the plates being longitudinally offset with respect to the transverse raised portions on adjacent plates and the longitudinal raised portions on the plates being transversely offset with respect to the longitudinal raised portions on adjacent plates providing passageways between the main plate portions and the raised portions to permit coolant to flow therebetween to more effectively cool the raised portions as well as the main plate portions, the main plate portions having cut-out areas from which extend angular extensions having inner ends joined with the main plate portions and outer ends free of the main plate portions for breaking up the paths of coolant flow between the plates to improve the cooling effect of the coolant.

References Cited in the file of this patent

UNITED STATES PATENTS

1,413,163	Hromadko	Apr. 18, 1922
1,823,788	Dewoitine	Sept. 15, 1931
2,537,797	Simpelaar	Jan. 9, 1951
2,548,036	Milborn	Apr. 10, 1951
2,690,002	Grenell	Sept. 28, 1954
2,759,247	Grenell et al.	Aug. 21, 1956
2,856,162	Adams	Oct. 14, 1958
2,877,000	Person	Mar. 10, 1959