

Aug. 14, 1928.

1,680,673

J. M. FEDDERS.

CORE FOR RADIATORS.

Filed Nov. 7, 1925

Fig. 1.

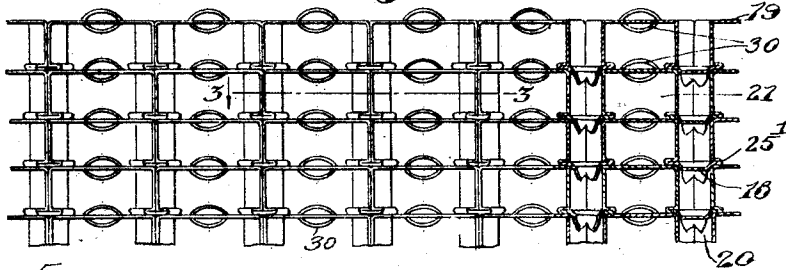


Fig. 2.

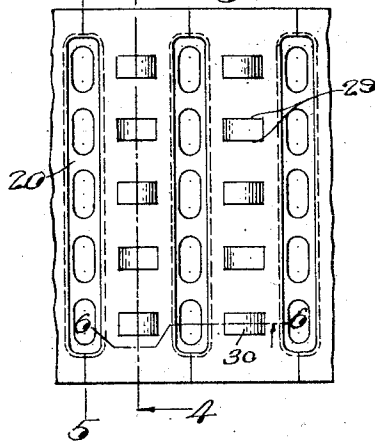


Fig. 3.

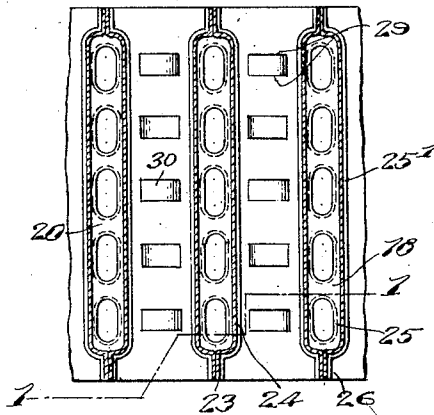


Fig. 4.

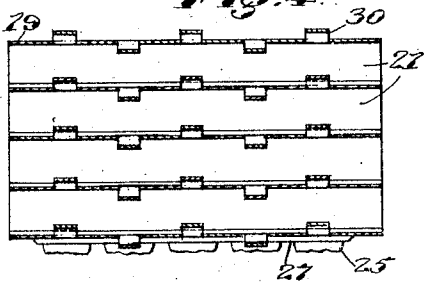


Fig. 5.

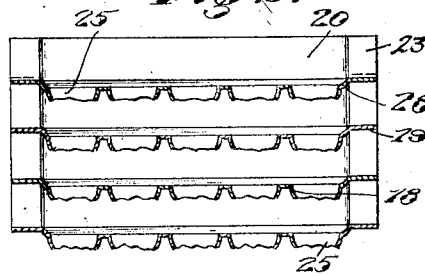


Fig. 6.

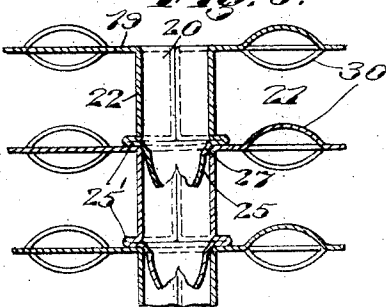
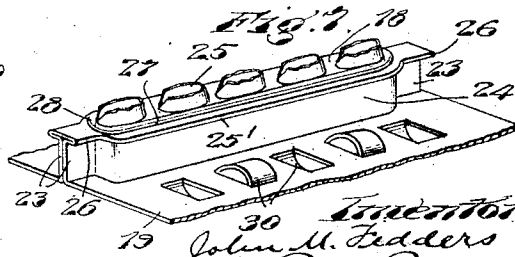


Fig. 7.



Inventor:
John M. Fedders
By Popp & Powers
Attys.

UNITED STATES PATENT OFFICE.

JOHN M. FEDDERS, OF BUFFALO, NEW YORK, ASSIGNOR TO FEDDERS MANUFACTURING COMPANY, INC., OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

CORE FOR RADIATORS.

Application filed November 7, 1925. Serial No. 67,529.

This invention relates to a core for radiators such as are commonly used for cooling the water of gas engines and similar installations. The purpose of this invention is to provide a core for such radiators which can be made more rapidly and easily and in which tight joints can be produced between adjacent sections so as to avoid leakage of water into the air passages.

In the accompanying drawings:—

Figure 1 is a fragmentary elevation of a radiator core embodying my invention, partly in section the sectional part being taken on line 1—1 Fig. 3.

Figure 2 is a top plan view thereof.

Figure 3 is a horizontal section of the same taken on line 3—3 Fig. 1.

Figures 4 and 5 are vertical longitudinal sections taken on the correspondingly numbered lines in Fig. 2.

Figure 6 is a fragmentary vertical cross-section, on an enlarged scale, of several adjacent units of a radiator core made in accordance with my invention the section being taken on line 6—6 Fig. 2.

Figure 7 is a fragmentary perspective view of a unit forming part of the radiator core.

Similar characters of reference indicate corresponding parts in the several figures of the drawings:

In its completed form the radiator core forming the subject of this invention provides a plurality of parallel water conduits 20 which in the present case are arranged vertically, and a plurality of air passages 21 intercalated with the water conduits and extending horizontally from the front to the rear side of the radiator core.

These water conduits and air passages are formed by means of a plurality of sheet metal units which are constructed and assembled in accordance with my invention. In the present case these units are superposed so as to form a vertical tier, stack or pile and the several units are connected with each other by soldering so that the core as a whole forms one solid mass which is strong and durable and not liable to be loosened or distorted under unusually heavy strains which may be imposed on the same.

Each of these units is preferably constructed from a single sheet of metal which is bent to form a plurality of pleats, the longitudinal walls or plies 22 of which are

upright and project downwardly and the corresponding pairs of lower longitudinal or outer edges of each pleat being connected with each other by outer webs 18, and a plurality of horizontal inner webs 19 each of which connects the upper or inner longitudinal edge of one wall of a pleat with the corresponding inner or upper edge of the wall of an adjacent pleat of the unit.

At the opposite ends of each pleat the metal of its walls is offset toward each other, as shown at 23, and securely united by soldering so as to form a leak tight joint therebetween. The intermediate parts 24 of the walls of each pleat are spaced apart and at its lower or outer end the same is provided with a longitudinal row of downwardly projecting nipples 25 so that in effect each pleat forms a water tube section.

Arranged lengthwise on the outer sides of the lower parts of the longitudinal walls of each pleat are two laterally projecting ribs or beads each of which has a comparatively long central part 25' which is formed on the intermediate part 24 of the pleat wall and two comparatively short parts 26 formed on the off-set end parts 23 of the respective pleat wall. The ribs of each pleat form a flat downwardly facing shoulder lengthwise on opposite longitudinal sides of the pleat and also transversely across opposite ends of the same which shoulder bears against that part of the upper side of the inner webs 19 around one of the tubular sections of the next lower unit, as shown in Figs. 1, 5 and 6.

The outer web 18 connecting the outer ends of the longitudinal walls of each pleat bulges outwardly or downwardly so as to form longitudinal side shoulders 27 on opposite longitudinal sides of each pleat which engage with the inner sides of the longitudinal walls of the adjacent pleat in the next lower unit as shown in Figs. 1 and 8, and also to form transverse shoulders 28 at opposite ends of each pleat which engages with the inner side of the end portions of an adjacent pleat in the next lower unit, and shown in Fig. 5. By this means an interlock is produced between adjacent units whereby the same are securely held against longitudinal and transverse displacement relatively to each other and they are positively held in this assembled position preparatory to permanently connecting the several units with each other by soldering. After the required

number of units are thus assembled in the form of a core one side of the same is first dipped into a solder bath which causes the off-set ends 23 of the tube sections on one side of the core to be united and those parts of the narrow ribs 26 and wide ribs 25' to be riveted with the inner ends of adjacent tube sections on the corresponding side of the core, and the core is reversed and the end ribs 26 and intermediate rib portions 25' on the opposite side of the core and similarly soldered together so that the several units form one common or solid mass.

The inwardly offset end portions 23 of the several tube sections in each row rest against each other at their inner and outer edges and are connected by soldering so that they form lines at opposite ends of the water tube sections. When a plurality of units are thus assembled the nipples at the outer ends of the water tube sections of one unit project into the inner ends of the water tube sections of an adjacent unit so that the several water tube sections in one row communicate with each other and produce a continuous water tube which constitutes one of the water conduits of the radiator.

When a plurality of units are thus assembled the same also form a plurality of air passages 21, each of these passages being formed between the opposing walls of two water tube sections on one unit and between the inner web connecting these walls and the corresponding web of the adjacent unit.

When associated with other parts which make up a complete radiator the heated water to be cooled is introduced into one end of the water tubes and discharged from the opposite ends thereof for which purpose the ends of these water tubes open into water supply and delivery manifolds, boxes or headers which are not shown in the drawings and which may be connected with the opposite ends of the water tubes in any suitable and well known manner.

In order to increase the radiating efficiency of this radiator baffle means are provided whereby the passage of the air through the air conduits is intercepted and a greater amount of heat is absorbed by the air than would otherwise occur. The preferred means for this purpose consist in providing each of the webs, excepting those at the extremities of the water tubes, with a plurality of transverse openings or slits 29 which are arranged in a longitudinal row, and bending the metal between each pair of adjacent slits laterally to form a loop shaped baffle 30 which projects into the path of the stream of air passing through the respective air conduit. These loops are bent alternately upwardly and downwardly to form baffles or wings in each air passage and thus obstruct the passage of the air and compel the same to take a tortuous course and ab-

sorb an increased amount of heat from the water from the time the air enters the front side of the radiator until it leaves at the rear side of the same.

In the foregoing radiator core the laterally projecting ribs on the tube sections form flat shoulders on the underside thereof which engage with the flat surfaces on the inner webs around the inner ends of the tube sections, which co-operating surfaces are of extended area and therefore permit of reliably soldering together adjacent units at the surfaces and thus form a leak tight joint therebetween without any manufacturing difficulties.

I claim as my invention:

1. A radiator core having a plurality of water tubes and a plurality of air passages intercalated with said water tubes, said core comprising a plurality of units arranged adjacent to each other and each unit being constructed of a sheet of metal which is bent to form a plurality of pleats and a plurality of webs, the walls of each pleat being spaced apart but connected with each other at one pair of corresponding longitudinal outer edges while their transverse edges at the ends thereof abut against one another to form a tube section, and each of said webs connecting the opposite longitudinal inner edge of one wall of a tube section with the corresponding longitudinal inner edge of the wall of an adjacent tube section, the outer ends of the tube section of one unit being provided with laterally projecting ribs which engage the webs around the inner ends of the tube sections of an adjacent unit and also provided with outwardly bulging parts fitting into the ends of adjacent tube sections, the tube sections of the several units communicating to form said water tubes and the webs of adjacent units being spaced apart to form said air passages.

2. A radiator core having a plurality of water tubes and a plurality of air passages intercalated with said water tubes, said core comprising a plurality of units arranged adjacent to each other and each unit being constructed of a sheet of metal which is bent to form a plurality of pleats and a plurality of webs, the walls of each pleat being spaced apart but connected with each other at one pair of corresponding longitudinal outer edges while their transverse edges at the ends thereof abut against one another to form a tube section, and each of said webs connecting the opposite longitudinal inner edge of one wall of a tube section with the corresponding longitudinal inner edge of the wall of an adjacent tube section, the outer ends of the tube sections of one unit engaging the inner ends of the tube sections of an adjacent unit and communicating therewith to form said water tubes, and the webs of adjacent units being spaced apart to form

said air passages therebetween, some of said webs being provided with slits and the metal between said slits being deflected laterally therefrom to form loops.

5 3. A radiator core having a plurality of water tubes and a plurality of air passages intercalated with said water tubes, said core comprising a plurality of units arranged adjacent to each other and each unit being constructed of a sheet of metal which is bent
10 to form a plurality of pleats and a plurality of webs, the walls of each pleat being spaced apart but connected with each other at one pair of corresponding longitudinal
15 outer edges while their transverse edges at the ends thereof abut against one another to form a tube section, and each of said webs

connecting the opposite longitudinal inner edge of one wall of a tube section with the corresponding longitudinal inner edge of 20 the wall of an adjacent tube section, the outer ends of the tube sections of one unit engaging the inner ends of the tube sections of an adjacent unit and communicating therewith to form said water tubes, and 25 the webs of adjacent units being spaced apart to form said air passages therebetween some of said webs being provided with pairs of slits and the metal between each pair of slits being deflected laterally therefrom in 30 opposite directions to form loop-shaped baffles.

JOHN M. FEDDERS.