Aug. 20, 1940. L. B. NEMMER ET AL 2,212,242

RADIATOR HEADER

Filed Jan. 14, 1938

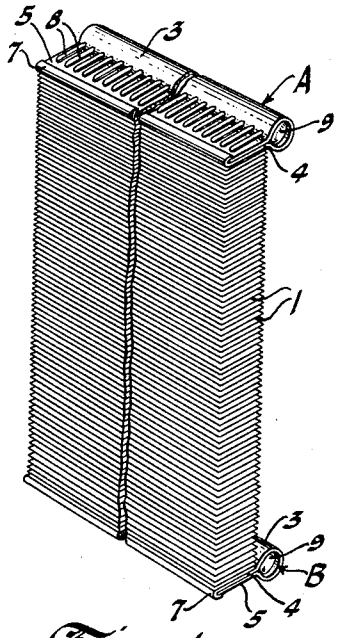


Fig. 1

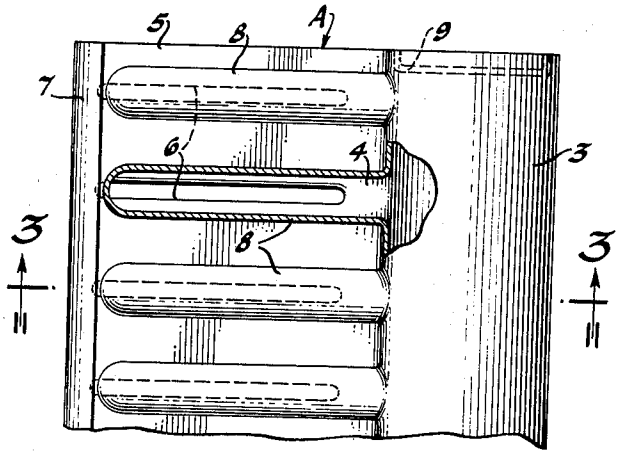
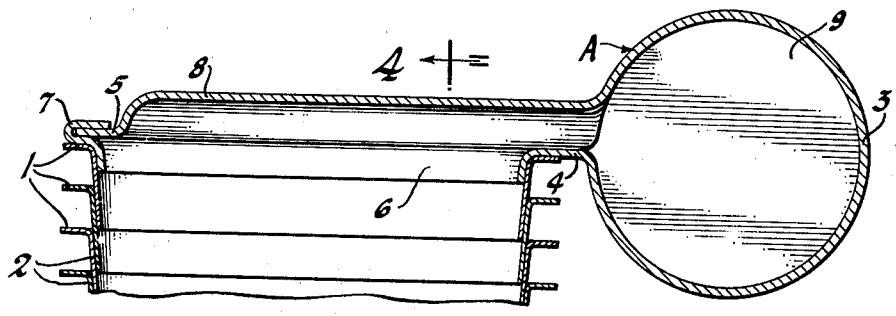


Fig. 2



4 Fig. 3

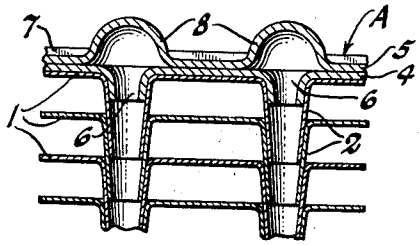


Fig. 4

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RADIATOR HEADER

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8 Claims. (Cl. 257—154)

This invention relates to heat exchangers and more particularly to an improved header construction. Ruggedness and simplicity of design are among the aims of the invention.

According to a preferred embodiment the header is formed in a single sheet of metal by an inexpensive stamping operation and turned upon itself, whereby there is afforded a pair of plate portions for face to face sealed engagement, one having a series of flanged openings or tubular formations for nested assembly with the passages or tubes of the heat transfer unit and the other having cooperating raised ribs to constitute branches or ducts communicating with an enlarged chamber at the fold or bight of the sheet joining adjacent edges of the plate portions. Working the sheet to shape and the formations produced impart strength thereto so that relatively low cost, light gage sheet material may be employed even for pressure system installations.

In the accompanying drawing Figure 1 is a perspective view of a core assembly having headers applied thereto in accordance with this invention; Figure 2 is an enlarged plan view of a fragment of the header partly in section; Figure 3 is a section taken on line 3—3 of Figure 2 and Figure 4 is a detailed section on line 4—4 of Figure 3.

Illustrated in the drawing is a nested tube plate type of heat transfer unit which comprises a series of plates 1—1 stacked on top of each other, each plate having a series of tubular formations 2 spaced apart across the width of the core assembly, and which tube formations as shown in Figures 3 and 4 are slightly tapered so that their lower ends fit into the upper ends of the tube formations in the succeeding plate, spacing the plates and constituting a series of spaced tubes. In the ordinary installation the tubes cooperate to form liquid or steam passages and the plate portions afford heat transfer fins over which moves a current of air. At the opposite ends of the core assembly are mounted headers or liquid distributor manifolds communicating with the several tubes for fluid flow from one end to the other of the core.

In the present instance the upper and lower headers A and B are formed in much the same manner and a detailed description of one will be sufficient. In the case of the upper header A, this is made from a single sheet of metal having proper formations therein and being folded upon itself with an enlarged circular formation 3 at the fold which is offset laterally of the core assembly and constitutes a chamber or tank. Extending from the enlarged chamber 3 are the plate portions 4 and 5 of the sheet, superposed one on top of the other with their abutting surfaces sealed and joined together.

The formations in the lowermost plate portion 4 consist of a number of spaced elongated slots defined by dependent tapered flanges 6 which are aligned with and extend into the tubular formations 2 of the topmost plate 1 of the core assembly. Otherwise the plate 4 rests on the upper surface of the topmost plate 1 and to fasten the parts and seal the several joints against leakage these adjoining plates are soldered or otherwise joined. The soldering may be effected by pretinning the surfaces and subsequently subjecting the parts to sweating or brazing heat. Optionally, a fusible material can be introduced between the surfaces by capillary flow. Similarly the adjacent faces of the header plates 4 and 5 may be brazed together, affording internal bonds which not only seal the parts but unite them for the mutual reinforcement. As a safeguard against separation, the edges of the two plates may have one turned over the other to form a lock seam as shown at 7. Aligned with the several tube formations 6 in the lower plate are a number of raised ribs or embossments 8 in the upper plate 5 forming branches or ducts which communicate the several tubes with the header or tank 3 in fingerlike arrangement.

To close the opposite ends of the chamber formed by the looped bight 3 end walls 9 are provided in the form of cupped stampings which can be inserted into the ends and secured by solder or other means. In addition the tank wall 3 may be provided with a suitable connection or fitting, not shown, for coupling it to a circulating system. Optionally, only one end need be closed with provision at the open end for coupling the tank in the circulating system.

As before indicated the lower header B is formed in a similar fashion, the main difference being that whereas the tubular extension 6 of the upper header is formed to fit inside the tube formation 2 of the uppermost core plate in the case of the lower header the corresponding tube formation is of slightly larger width and receives the tubular portion 2 of the lowermost plate of the core assembly. In each instance a nested relation of the tubular portions is afforded.

While the above description has been of a specific character and has referred only to the preferred embodiment, it will be understood that the novel features may be incorporated in various

forms and modified without departing from the invention set forth in the following claims:

We claim:

1. In a heat exchanger, a manifold distributor for a nested tube core, comprising a pair of superimposed plates, one thereof having a series of spaced tube formations for nested engagement with the tubes of an endmost core plate, and the other thereof having a series of spaced individual embossments aligned with said tube formations and constituting branch passages, means bonding together in face to face relation the plate portions in the regions between the embossments of one plate with those in the regions between the tube formations in the other plate and a header associated with said plates and communicating with the several branch passages.

2. In a heat exchanger having a series of core tubes, a header comprising a pair of plates secured in face to face engagement, one having a series of openings for cooperation with said tubes and the other having a series of branch formations cooperating with said openings, and a chamber common to the branch formations.

3. In a heat exchanger, a pressed sheet metal header assembly including plate portions secured in face to face engagement having oppositely pressed portions along the side to constitute a tank, one of said plate portions having a series of spaced embossments projecting laterally from said tank to constitute branches thereof and the other plate portion having dependent tube formations aligned with said embossments for nested engagement with heat exchanger core tubes.

4. A pressed metal header for the spaced tubes of a radiator core assembly, comprising a pair of plate portions secured face to face and formed from a single sheet with an enlarged loop joining adjacent ends of the plates to afford a chamber, one of said plates having a series of dependent annular skirt formations for nested assembly with said tubes and the other plate having raised ribs aligned with said annular skirt formations and affording branch passages communicating with said chamber.

5. A pressed metal header for the spaced tubes of a radiator core assembly, comprising a pair of plates secured face to face at the end of the tube assembly, one of the plates having openings aligned with the tubes and the other plate having cooperating raised ribs affording spaced ducts, said plates being formed from a single sheet folded upon itself with an enlarged loop joining said plates and affording a header common to said ducts.

6. A pressed metal header for the spaced tubes of a radiator core assembly, comprising a pair of plate portions secured face to face at the end of the tube assembly, one of the plates having skirted openings aligned with the tubes and the other plate having cooperating raised ribs affording spaced ducts, said plates along adjacent edges having cooperating enlarged formations to afford a header communicating with said ducts.

7. In a heat exchanger having an assembly of spaced passages, a plate to be positioned over the end of the assembly and having tube formations for nested relation with said passages, a complementary plate secured in face to face relation with the first mentioned plate and having a series of spaced duct formations therein overlying said tube formations, and a header communicating with said ducts.

8. A radiator header formed of a single metal sheet stamped to shape and bent upon itself, comprising a large loop at the bend constituting a distributor tank, and a pair of plates secured in face to face engagement and projecting laterally from the header, one of said plates having a series of spaced dependent radiator tube engaging skirts defining openings therethrough and the other plate having spaced embossments aligned with said openings and cooperating with the first mentioned plate to afford branch ducts in communication with said distributor tank and means bonding together the portions of the two plates occupying the regions between the aligned embossments and skirted openings in face to face relation.

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