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REFRIGERATING APPARATUS

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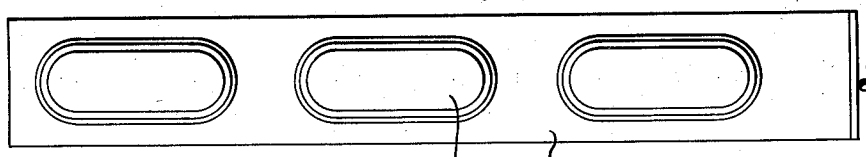


Fig. 1

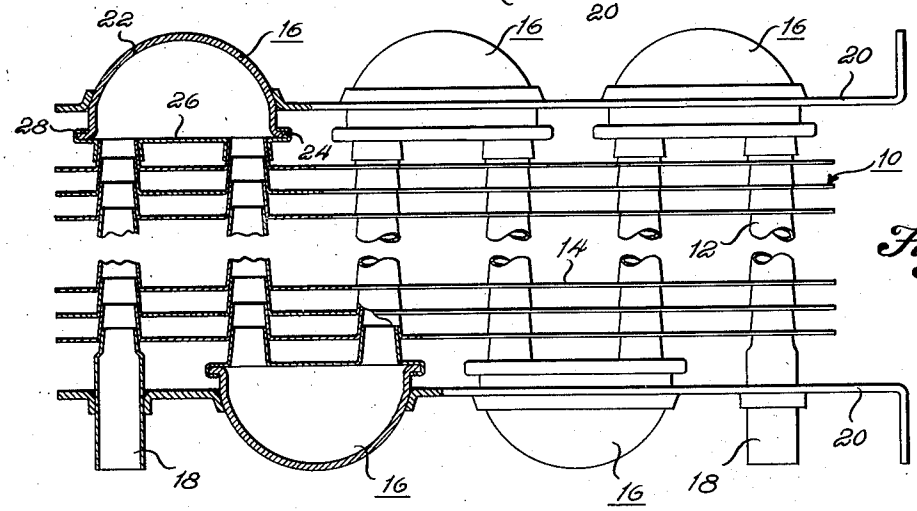


Fig. 2

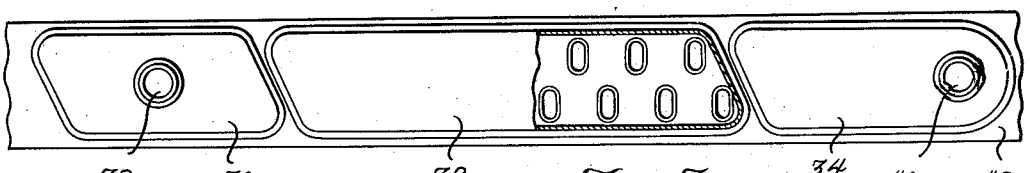


Fig. 3

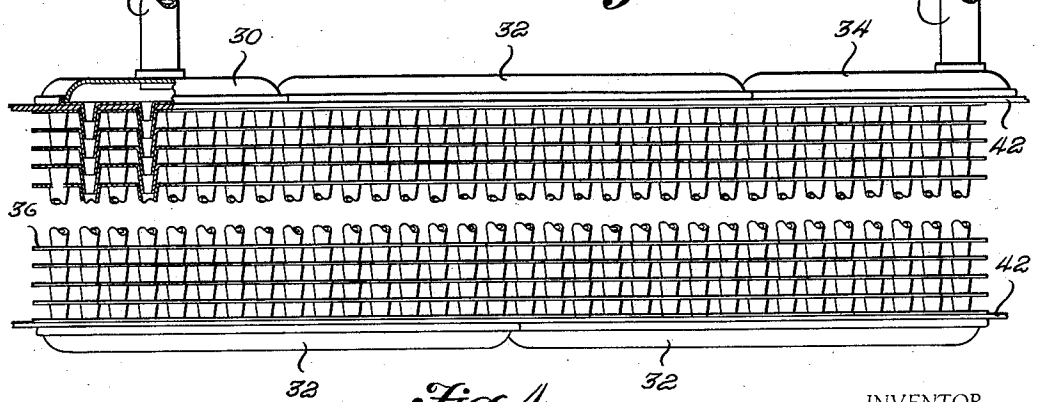


Fig. 4

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REFRIGERATING APPARATUS

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Application May 7, 1935, Serial No. 20,202

4 Claims. (Cl. 257—255)

This invention relates to refrigerating apparatus and more particularly to a heat exchange device adapted for use in refrigerating apparatus and for other uses.

It is an object of the present invention to provide a heat exchange structure comprising a plurality of parallel tubes together with novel header means for connecting the ends of the adjacent tubes.

It is also an object to provide a header means for connecting adjacent tube ends of a heat exchange core which is economical and reliable in construction and which permits of a closer spacing of the parallel tubes than is permitted by the usual return bend formed from a portion of bent tubing.

It is a further object to provide a heat exchange structure comprising a plurality of groups of parallel tubes, the tubes of each group being connected for parallel flow thereto and the groups being connected for series flow through the groups.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is an end view of a heat exchange structure embodying the present invention;

Fig. 2 is a side view of the structure illustrated in Fig. 1;

Fig. 3 is an end view of a modified form of the invention; and

Fig. 4 is a side view of the structure illustrated in Fig. 3.

Referring now to Figs. 1 and 2, there is provided a heat exchange device comprising a heat exchange core 10 having parallel tubes 12 and transverse fins 14. The tubes 12 are formed by integral tapered tubular portions formed from the material of the fins 14 and telescoped together in a manner more particularly described in the patent to Karmazin 1,997,563 issued April 9, 1935. A plurality of header means 16 are provided for connecting the ends of the adjacent tubes to provide a fluid circuit through the heat exchange core 10. In the construction illustrated, the header means 16 connect with the ends of only two tubes and are arranged in a manner to provide a series flow circuit through the core 10. Suitable inlet and outlet connections 18 together with mounting frame plates 20 complete the heat exchange structure.

Each header means 16 is formed from a trough-like stamping 22 having an integral peripheral flange 24 thereon adjacent its open side. A cover plate 26 is provided having formed integrally therewith tapered tubular projections for engaging with the projections of the end fins of the core 10. The cover plate 26 is secured to the stamping 22 by clamping the edge 28 thereof over the flange 24 as illustrated in Fig. 2. When the various parts of the structure are assembled in the relation shown in Fig. 2, the entire heat exchange device is bonded together and sealed in a fluid tight manner by a suitable bonding operation, for example, by copper-hydrogen welding or by a solder dip.

In the form of the invention illustrated in Figs. 3 and 4, the header means 30, 32, and 34 are formed and arranged to provide a series-parallel flow through the heat exchange core 36. The core construction and the header constructions are similar to that previously described. The headers 30, 32, and 34, however, are made of the proper shape and size to embrace a plurality of parallel tubes of the core 36. The headers 30 and 34 are provided with inlet and outlet connections 38 and 40 respectively, so that the fluid circuit through the device is through the inlet connection 38, the header 30 and thence through the group of tubes into which the header 30 opens. From this group of tubes, the fluid then passes to the header 32, thence to the next group of tubes and so on until the fluid emerges from the right hand group of tubes to the header 34 and the outlet connection 40. In this form of heat exchange device, the structure is mounted by means of heavy frame plates 42 which are interposed between the outermost fins of the headers 30, 32, and 34 respectively.

While the form of embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A header for a heat exchange device which includes a plurality of parallel tubes comprising a trough-like stamping having a flange extending around the open side thereof, a closure plate extending across the open side of the stamping and in crimped engagement with said flange, said closure plate having a plurality of openings therein having tubular walls for telescopically engaging a plurality of said parallel tubes.

2. A header for a heat exchange device which includes a plurality of parallel tubes comprising

a trough-like stamping having a flange extending around the open side thereof, a closure plate extending across the open side of the stamping and in crimped engagement with said flange, said closure plate having a plurality of openings therein having tubular walls for telescopically engaging a plurality of said parallel tubes, said tubular walls extending outwardly of the header and being larger in cross section at the projecting end than at the end adjacent the plate.

3. A heat exchange structure comprising a plurality of parallel tubes connected in series flow relation by a plurality of headers, each of said headers comprising a trough-like stamping having a flange extending around the open side thereof, a closure plate extending across the open side of the stamping and in crimped engagement with said flange, said closure plate having a plurality of openings therein having tubular walls for telescopically engaging a plurality of said parallel tubes.

4. A heat exchange structure comprising a plurality of groups of parallel tubes, the tubes of each group being connected in parallel flow relation and the groups being connected in series flow relation by a plurality of headers, each of said headers comprising a trough-like stamping having a flange extending around the open side thereof, a closure plate extending across the open side of the stamping and in crimped engagement with said flange, said closure plate having a plurality of openings therein having tubular walls for telescopically engaging a plurality of said parallel tubes.

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