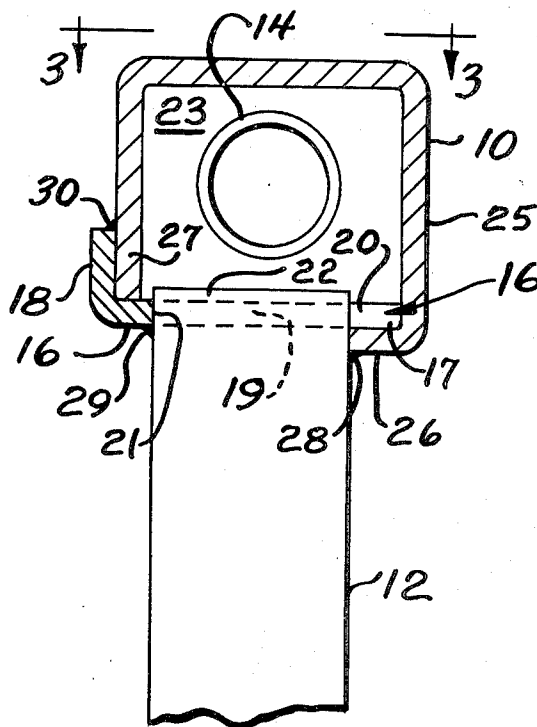


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|-----------|---------|--------------------|------------|
| 1,813,079 | 7/1931 | Oppe | 165/149 X |
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The disclosure also includes a heat exchanger as prepared by this method.

6 Claims, 3 Drawing Figures



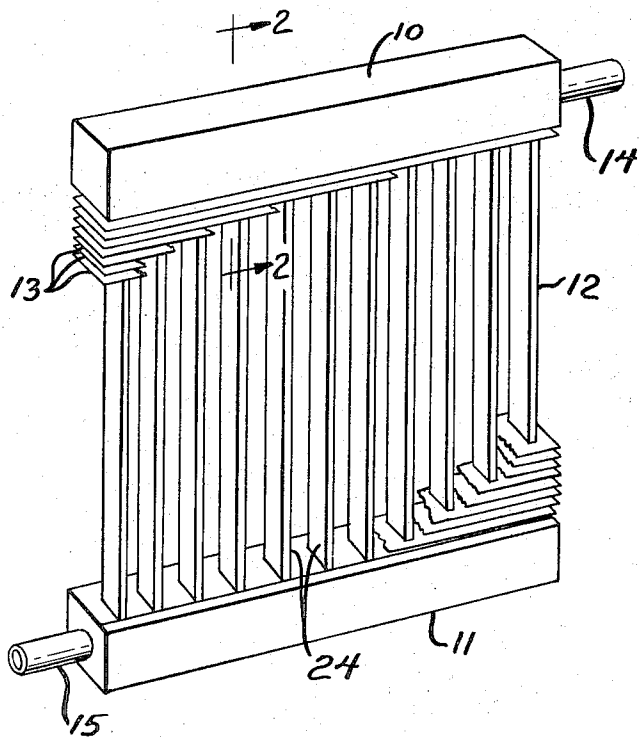


Fig. 1

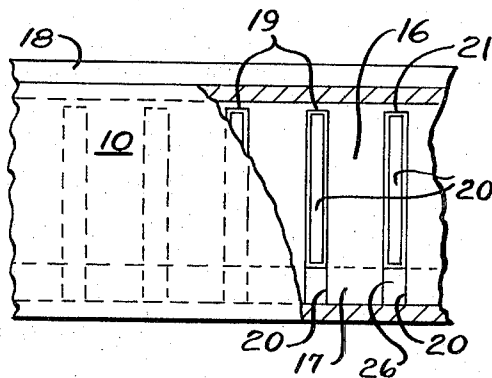


Fig. 3

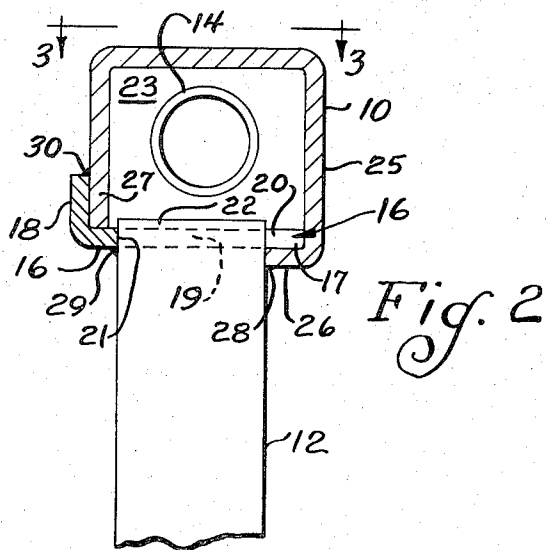


Fig. 2

METHOD OF MAKING A HEAT EXCHANGER AND A HEAT EXCHANGER

SUMMARY OF THE INVENTION

One of the features of this invention is to provide an improved method of making a heat exchanger having a header plate and tank with spaced tubes attached to the header plate and communicating with the interior of the tank in which edge portions of the tank part aid in locating and retaining the tubes in tube receiving slots in the header plate.

Another feature of the invention is to provide a heat exchanger constructed according to the above method and having the characteristics set out above.

The invention will be described as illustrated by the heat exchanger embodiment shown in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a heat exchanger prepared according to a method of this invention.

FIG. 2 is a fragmentary enlarged sectional view taken substantially along line 2—2 of FIG. 1.

FIG. 3 is a fragmentary plan view with portions broken away for clarity of illustration of the top of the upper tank as viewed from line 3—3 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The heat exchanger shown in the accompanying drawings in one embodiment illustrates the novel method of making such a heat exchanger having a tank and spaced tubes. Thus the structure obtained by practicing the method of this invention comprises a heat exchanger having an upper tank 10, a lower tank 11, a plurality of substantially parallel spaced tubes 12 which in this embodiment are of essentially rectangular cross section but which may be of any shape desired, the customary spaced heat conducting metal fins 13 interconnecting the tubes and heat exchanger fluid pipes 14 and 15 for providing fluid flow to and through the tank 10, tubes 12 and tank 11 in the customary manner.

In the method of making such heat exchangers according to this invention there is provided a header plate 16 having a pair of opposite side edge portions 17 and 18 with spaced slots 19 extending inwardly from one edge portion 17 and toward the other edge portion 18. Each slot therefore has an open end 20 as can be seen at the lower right corner of FIG. 3 at the one plate edge 17 and a closed end 21 at the other edge 18.

In the method of this invention a tube end 22 is positioned to be received snugly in each slot 19 and thus is in communication with the interior 23 of the upper tank 10. The lower ends 24 are similarly located in similar slots in the lower tank 11. As they are essentially the same as those for the upper tank 10 the detailed showing of FIG. 2 in relation to the upper tank 10 also applies to the lower tank 11.

Then in the method of this invention a metal tank part 25 is positioned so that the opposite edge portions cooperate with the heated plate and the tubes in the following manner. Of the two opposite edge portions 26 and 27 the one edge portion 26 covers and closes the formerly open ends 20 of the slots while the other tank portion 27 contacts the corresponding other header plate edge portion 18. Then, to complete the method the contacting areas of the header plate 16 and

metal part 25 joined together as indicated somewhat exaggeratedly at 28, 29 and 30 in FIG. 2. Any well known joining method may be used such as the brazing that is quite customary in this art.

In the preferred method as illustrated in the embodiment of the drawings the header plate edge portion 18 comprises a flange as shown in FIG. 2 which overlaps the corresponding area on the corresponding tank edge portion 27 and the tank part 26 comprises a similar flange that overlies the corresponding edge of the header plate 16. This providing of the flange edge portions not only is preferred for ease and rapidity in practicing the invention but also results in a stronger structure.

As can be seen, the method and the resulting heat exchanger of this invention not only provides a simple and ready way of making tank and interconnecting tube heat exchangers but the parts also function as an assembly fixture. Thus by providing the open ended slots in the header plate the tubes and the fins attached thereof are self-locating and the method provides automatic jiggling for the assembly. Likewise, the length of each slot 19 is variable to accommodate tubes 12 of various widths as it is only necessary to vary the width of the overlap tank flange 26 accommodate the width of any given tube or tubes. In addition, the self-locating and jiggling parts are not foreign to the heat exchanger but become an actual part of the heat exchanger after the final joining of the parts together. Although the tubes in the illustrated embodiment are generally rectangular, the invention does not depend upon the shape of the tubes as they may be either oval, square or any other desired configuration.

Having described our invention as related to the embodiment shown in the accompanying drawings, it is our intention that the invention be not limited by any of the details of description, unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the appended claims.

We claim:

1. A heat exchanger, comprising: a header plate having a pair of opposite side portions with spaced slots extending inwardly from one plate edge portion to short of the other plate edge portion, each slot having an open end at said one plate edge portion; a plurality of fluid flow tubes each having a tube end received snugly in a said slot; a tank part sheet having opposite edge portions on said header plate to enclose said tube end with one tank edge portion covering and closing said slot open ends and the other tank edge portion contacting said other plate edge portion, the intermediate portion of said tank part sheet between said edge portions being spaced from said tube ends to define a fluid tank means with said header plate; and joining means joining together said tube ends, said tank edge portions and said header plate.

2. The heat exchanger of claim 1 wherein said other plate edge portion is shaped to provide a flange which is positioned to overlap said opposite tank edge portion and said one tank edge portion is shaped to provide a flange which is positioned over said slots at their open ends to abut against said tubes.

3. The method of making a heat exchanger having a tank and spaced tubes, comprising: providing a header plate having a pair of opposite side edge portions with spaced slots extending inwardly from one plate edge portion to short of the other plate edge portion, each

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slot having an open end at said one plate edge portion; providing a plurality of fluid flow tubes each having a tube end; positioning a tube end snugly in each said slot; positioning a metal tank part sheet having opposite edge portions on said header plate to enclose said tube end with one tank edge portion covering and closing said slot open ends and the other tank edge portion contacting said other plate edge portion, the intermediate portion of said tank part sheet between said edge portions being spaced from said tube ends to define a fluid tank means with said header plate; and joining together said tube ends, said tank edge portions and said header plate.

4. The method of claim 3 wherein said other plate

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edge portion is shaped to provide a flange which is positioned to overlap said opposite tank edge portion.

5. The method of claim 3 wherein said one tank edge portion is shaped to provide a flange which is positioned over said slots at their open ends to abut against said tubes.

6. The method of claim 3 wherein said other plate edge portion is shaped to provide a flange which is positioned to overlap said opposite tank edge portion and said one tank edge portion is shaped to provide a flange which is positioned over said slots at their open ends to abut against said tubes,

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