May 12, 1959 L. A. WRIGHT 2,886,296

REFRIGERATING APPARATUS

Filed Feb. 14, 1957

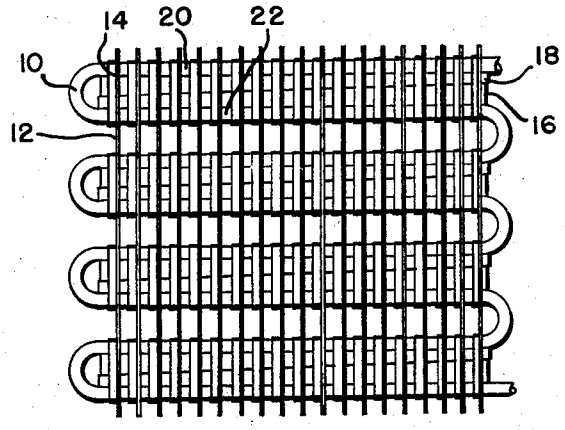


Fig. 1

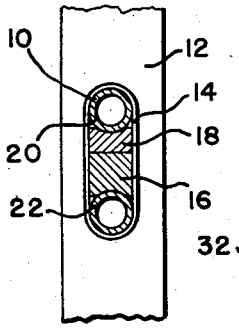


Fig. 2

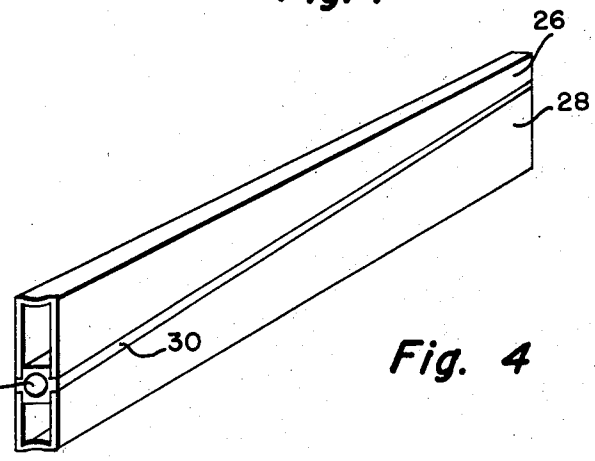


Fig. 4

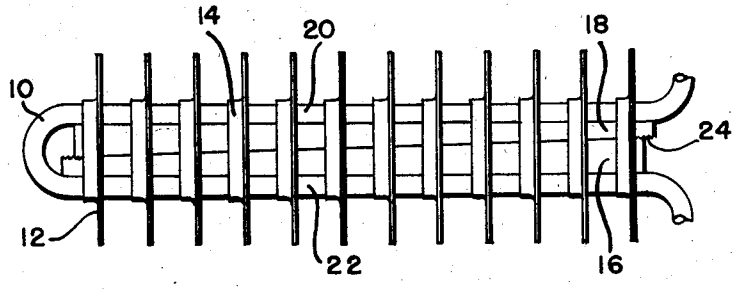


Fig. 3

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United States Patent Office 2,886,296 Patented May 12, 1959

2,886,296

REFRIGERATING APPARATUS

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Application February 14, 1957, Serial No. 640,200

5 Claims. (Cl. 257—262.11)

This invention relates to refrigerating apparatus and more particularly to an evaporator or the like.

One of the big problems in designing a fin and tube type heat exchanger such as a refrigerant evaporator is that of providing a good heat transfer connection between the tube and the fins. Various arrangements have been used from time to time for expanding the fluid conduit or tube so as to enlarge the same and thereby press the walls of the tube against the fin slots but such arrangements have unduly increased the cost of manufacture. It is an object of this invention to provide a heat exchanger construction wherein the tubing is formed into serpentine shape and the loops thus formed are inserted into slots in a series of fins and wedges are thereafter inserted between the adjacent tubes of each loop so as to force the tubing into firm mechanical contact with the walls of the fin slots.

It is another object of this invention to provide an evaporator construction wherein novel means are provided for wedging the fluid conduits of an evaporator into firm engagement with the walls of the fin slots.

Another object of this invention is to provide an inexpensive wedge for wedging the tubes into contact with the fin slots and for conducting heat from the fins to the tubes or vice versa.

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

In the drawings:

Figure 1 is a side elevational view showing a preferred embodiment of the invention;

Figure 2 is a fragmentary sectional view showing the arrangement of the tubing and wedge members within a fin slot;

Figure 3 is a fragmentary side elevational view showing the arrangement of the parts on an enlarged scale; and

Figure 4 is a perspective view of a modified wedge construction.

Referring now to the drawings wherein a preferred embodiment of the invention has been shown, reference numeral **10** generally designates a fluid conduit which has been bent into serpentine shape and reference numeral **12** designates the fins which are attached to the serpentine tubing. Each of the fins is provided with slots through which loops of the tubing **10** project. In order to increase the area of contact getween each fin and the tubing a flange **14** is provided at each of the fin slots as best shown in Figure 2. The flange **14** is made as an integral part of the fin **12**. The fin slots are of such a shape and size that the loops of the serpentine coil **10** may be readily passed through the slots in the fins.

After the fins and loops have been assembled, a pair of adjustable wedge elements **16** and **18** are inserted between adjacent tubing portions **20** and **22** of the loops so as to wedge the portions **20** and **22** into firm contact with the flange portions **14** of the fins **12**. It will be noted

that the wedge elements **16** and **18** are identical to one another and that each is tapered in such a manner that it is easy to insert a pair of wedge elements between the adjacent tubing portions **20** and **22**. Once the wedges have been inserted loosely between the tube portions **20** and **22** it is possible to further shift the elements **16** and **18** relative to one another so as to obtain the desired wedging action.

By virtue of the above described construction and arrangement, the wedge elements not only serve to improve the contact between the fins and the tubing, but also serve as additional means for transferring heat from the tubing to the fin elements in that the wedge elements **16** and **18** contact both the tubing and the side walls of the flange portion **14** formed on the fins and thus form a metallic heat transfer path between the tubes and the fins.

As best shown in Figure 3, each of the wedge portions is provided with a serrated end part **24** which comes into frictional engagement with a portion of the adjacent wedge only after the wedges approach their final wedging position. These serrated portions serve to hold the wedges in place relative to one another in their final assembled relationship.

Whereas the wedges shown in Figures 1, 2 and 3 are made in the form of solid bars, it is possible and is in fact preferable to form the wedges from extruded sheet metal parts as shown in Figure 4. Thus a pair of channel shaped wedge elements **26** and **28** which are identical to one another are used in combination with an extruded member **30** which is placed between the meeting flanges of the sheet metal wedge members **26** and **28**. It will be noted that this extruded member **30** is provided with a hollow core **32** so as to keep the weight of the parts at a minimum. The preferred material for the tubes, the fins and the wedge elements is aluminum but other materials could be used if desired.

In each of the wedge constructions shown the adjacent tapered wedge elements are offset relative to one another a sufficient amount when they are first inserted within the fin slots so as to facilitate insertion. The construction shown has the advantage that it is possible to compensate for slight differences in fin slot sizes and also to compensate for variations in the diameter of the tubing.

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

What is claimed is as follows:

1. In a heat exchanger, a fluid conduit having a loop portion, a plurality of aligned fin means each having a slot for receiving said loop portion, and wedge means between adjacent sections of said loop portion for wedging said sections into firm mechanical contact with the walls of said fin slots, said fin means having flange portions formed integrally therewith adjacent said slots and arranged to contact said fluid conduit and said wedge means.

2. In a heat exchanger, a fluid conduit having a loop portion, a plurality of aligned fin means each having a slot for receiving said loop portion, and a pair of tapered wedge elements disposed within the said loop portion and being so arranged whereby relative longitudinal displacement of said tapered wedge elements forces the sides of said loop portion into firm contact with the walls of said slot.

3. In a heat exchanger, a fluid conduit having a loop portion, fins having slots for receiving said loop portion, and wedge means between the adjacent sides of said loop portion for wedging said fluid conduit into firm mechanical contact with the walls of said fin slots, said

wedge means comprising a pair of tapered sheet metal channel elements disposed within said slots between the adjacent sides of said loop portion.

4. In a heat exchanger, a fluid conduit having a loop portion, fins having slots for receiving said loop portion, and a pair of U-shaped wedge elements and an intermediate guide element between said U-shaped elements all disposed in said slots between adjacent sides of said loop portion, at least one of said elements being wedge shaped so as to wedge the sides of said loop portion against the ends of said fin slots.

5. In a heat exchanger, fluid conduit means including spaced tubes, fin means having a slot therein for receiving a pair of said tubes and tapered wedge means between said tubes for wedging said tubes into firm mechanical contact with the walls of said fin slot.

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