Dec. 2, 1952 A. E. BRICKMAN 2,620,170

HEAT TRANSFER UNIT

Filed Aug. 18, 1950 3 Sheets-Sheet 1

FIG. 1.

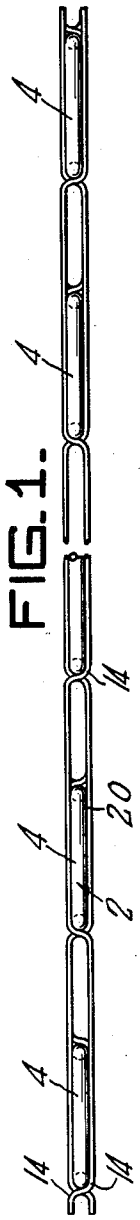
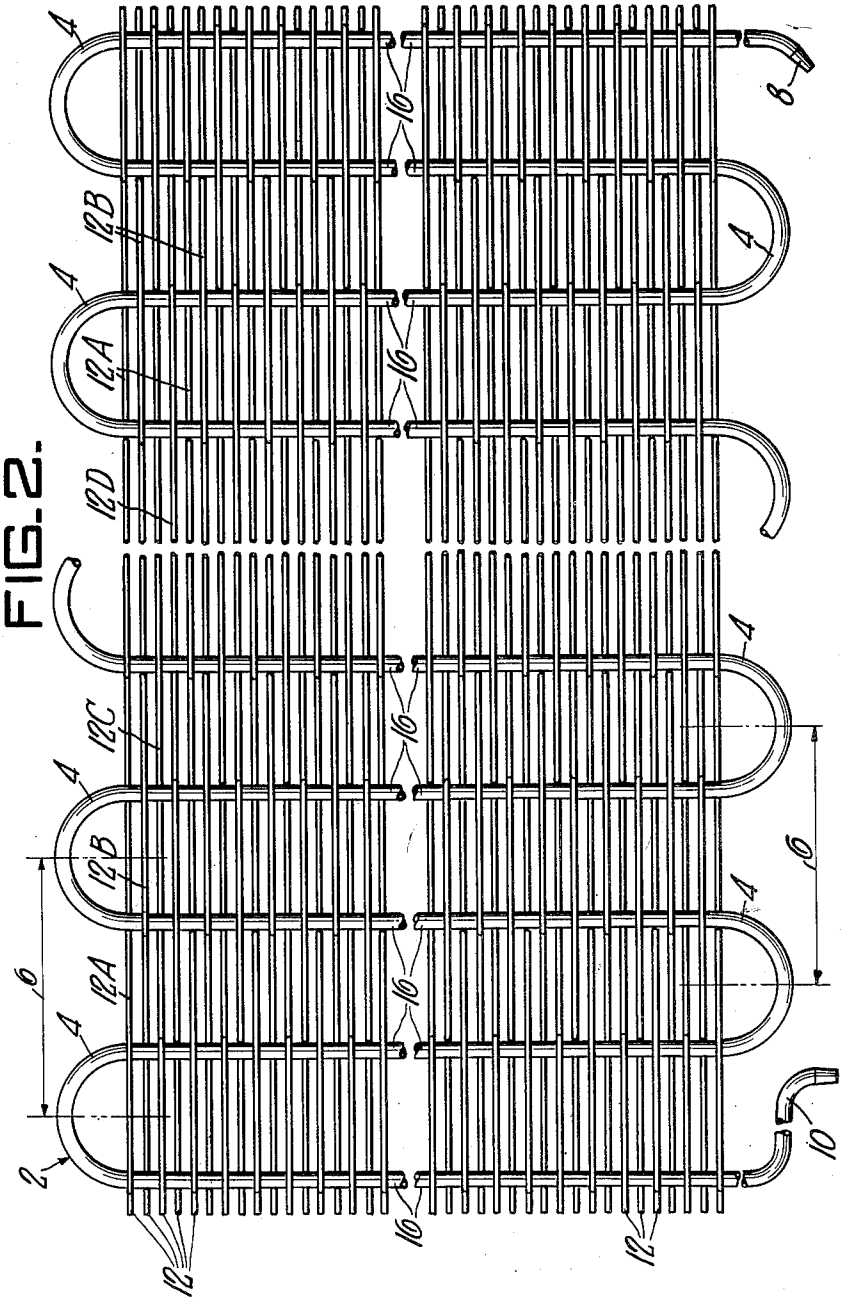


FIG. 2.



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Dec. 2, 1952 A. E. BRICKMAN 2,620,170

HEAT TRANSFER UNIT

Filed Aug. 18, 1950 3 Sheets-Sheet 2

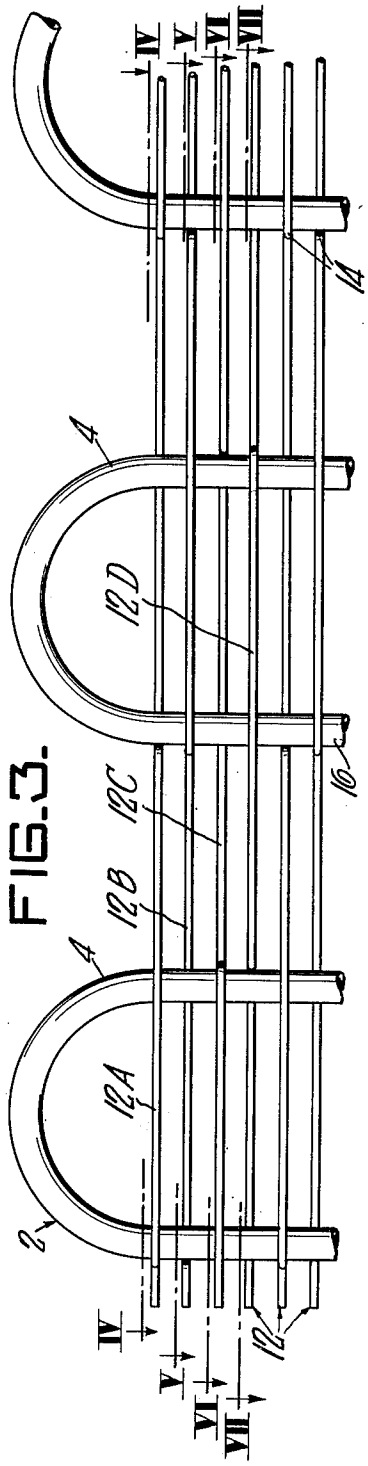

FIG. 3.

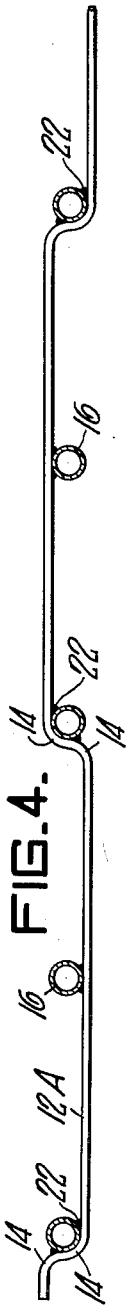

FIG. 4.

FIG. 5.

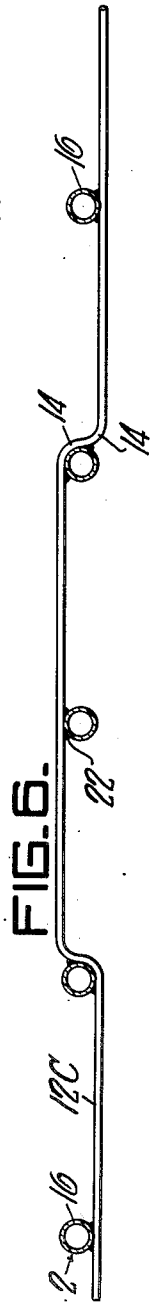

FIG. 6.

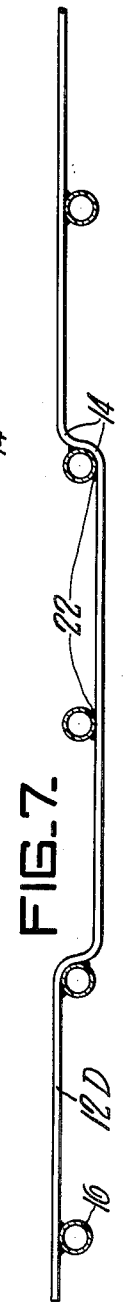

FIG. 7.

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Dec. 2, 1952 A. E. BRICKMAN 2,620,170

HEAT TRANSFER UNIT

Filed Aug. 18, 1950 3 Sheets-Sheet 3

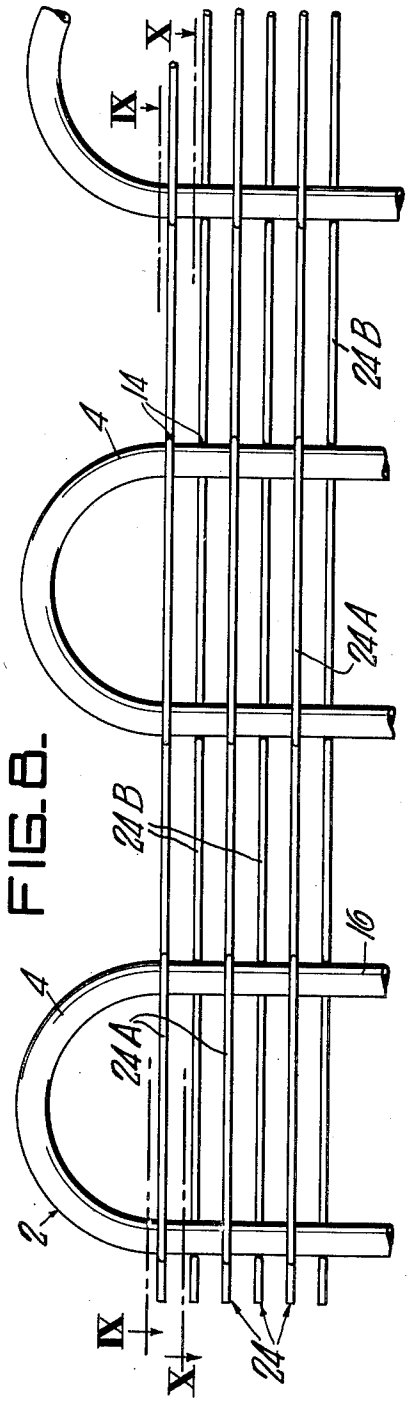

FIG. 8.

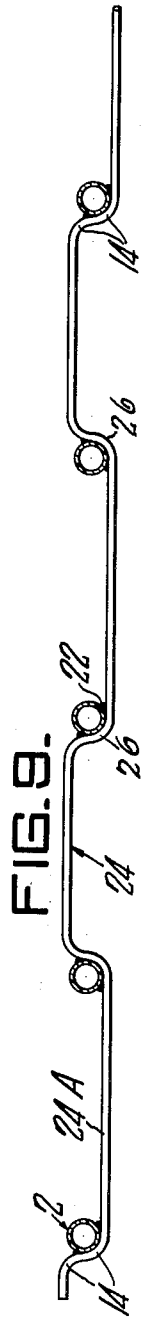

FIG. 9.

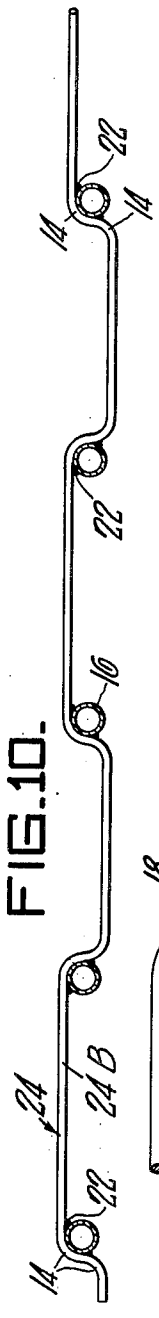

FIG. 10.

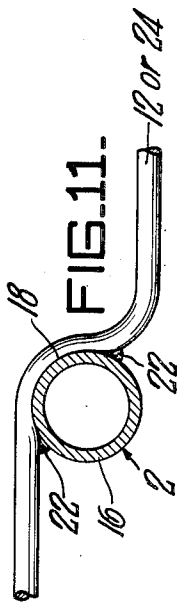

FIG. 11.

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Patented Dec. 2, 1952

2,620,170

UNITED STATES PATENT OFFICE

2,620,170

HEAT TRANSFER UNIT

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Application August 18, 1950, Serial No. 180,178

4 Claims. (Cl. 257—262.12)

1

This invention relates to a heat transfer unit and more particularly to a condenser for use in a refrigerator. However, the unit need not be limited to a condenser, but may be used as a radiator or for other heat transfer purposes. Condensers are of course well known and are in successful use. However, such condensers are not entirely satisfactory, either from the standpoint of cost or heat transfer efficiency. Another drawback of the present condensers is that dust accumulates thereon in excessive amounts, thus decreasing the efficiency of the unit.

It is therefore an object of my invention to provide a heat transfer unit having good heat transfer characteristics and a relatively low cost.

This and other objects will be more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is an end view of the condenser;

Figure 2 is a plan view thereof;

Figure 3 is an enlarged segmental plan view;

Figures 4, 5, 6 and 7 are views taken on the lines IV—IV, V—V, VI—VI and VII—VII, respectively, of Figure 3;

Figure 8 is a view, similar to Figure 3 showing a second embodiment of my invention;

Figures 9 and 10 are views taken on the lines IX—IX and X—X of Figure 8; and

Figure 11 is an enlarged view of a detail.

Referring more particularly to Figures 1 to 7, which disclose a preferred embodiment of my invention, the reference numeral 2 indicates a tube having a plurality of return bends 4 therein. As shown, the distance 6 from center to center of the return bends is uniform. The tube 2 is provided with an inlet 8 and outlet 10 for the fluid being cooled. A plurality of bent wires 12 extend transversely of the return bends 4 and are arranged in spaced apart relationship as shown. As best shown in Figures 4 to 7, each of the wires is provided with a plurality of bends 14 therein so that part of each wire is on each side of the tube. The distance between the bends is substantially equal to the distance 6 between the return bends. The bends in the wires are staggered with respect to each other and are arranged in groups of four. As shown in Figure 3 the wire 12A passes up and around leg 16, wire 12B passes down and around leg 16, wire 12C passes beneath leg 16, and wire 12D passes above leg 16. When round wire is used the part of wire 12 which passes around the tube 2 is flattened at 18 as shown in Figure 11 in order to give better heat conduction between the tube and the wire. This is not necessary when square or flat

2

wire is used. The straight parts of the wire are preferably given a slight inward bend so that they are stressed inwardly toward the opposite side of the completed unit. It will be seen that the above construction provides an opening 20 through the groups of wires for receiving the return bends 4. The wires 12 are connected to the tube 2 by means of brazing 22 or by welding at the intersections. This is preferably done by dipping the assembled unit in a molten zinc bath.

Figures 8 to 10 show a second embodiment of my invention. The arrangement of the tube 2 in this embodiment is the same as in the first embodiment, but bent wires 24 are used for connecting the return bends 4. The wires 24 are formed in a different manner than wires 12. The distance between the bends 26 in the wires is made equal to the width of the return bends of the tube. Alternate wires 24A and 24B have the same construction, but when assembled each leg of the tube 2 will be above the wire in one instance and below the wire in the other instance. The shape of the bends and the manner of attaching the wires to the tube are otherwise the same as in the first embodiment. While the second embodiment of my invention provides more contact area between the tube and the wires, the first embodiment is preferred since it facilitates assembly of the unit.

While two embodiments of my invention have been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. A heat transfer unit comprising a tube having a plurality of return bends therein, all in the same plane, a plurality of spaced apart bent wires extending transversely of said return bends in parallel planes, each of said wires having a plurality of bends therein so that part of the wire is on each side of said tube, the bends in adjacent wires being staggered with respect to each other so that each wire passes around a substantial arc of the tube in some of said return bends, the tubes in each of the return bends having some wires passing therearound and the portions of said wires between the bends being substantially straight and parallel to each other, whereby a plurality of spaced apart unobstructed openings are provided through said wires, each opening having a length equal to the outside distance between the tubes in each return bend and a width equal to the diameter of said tubes, and means for fastening said wires to said tube.

2. A heat transfer unit according to claim 1 in which the parts of said wires extending around the tube are flattened.

3. A heat transfer unit comprising a tube having a plurality of return bends therein, all in the same plane, a plurality of spaced apart bent wires extending transversely of said return bends in parallel planes, each of said wires having a plurality of bends therein so that part of the wire is on each side of said tube, the distance between the bends in said wires being substantially equal to the center to center distance between said return bends, the wires being arranged so that successive wires pass down around, up around, beneath and over the tube in each leg of each return bend and the portions of said wires between the bends being substantially straight and parallel to each other, whereby a plurality of spaced apart unobstructed openings are provided through said wires, each opening having a length equal to the outside distance between the tubes in each return bend and a width equal to the diameter of said tubes, and means for fastening said wires to said tube.

4. A heat transfer unit according to claim 3 in which the parts of said wires extending around the tube are flattened.

ALAN E. BRICKMAN.

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