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2,434,519

HEAT EXCHANGE CONDUIT WITH A SPIRAL FIN HAVING A CAPILLARY GROOVE

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Fig. 1.

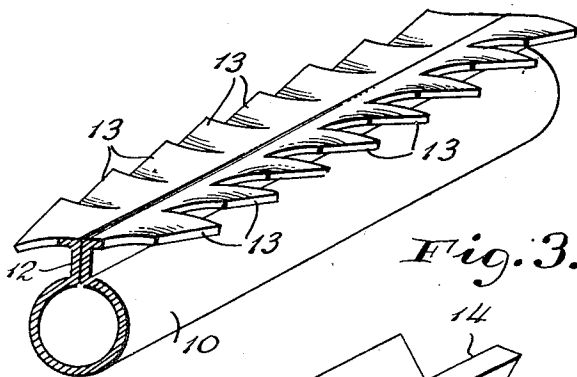


Fig. 2.

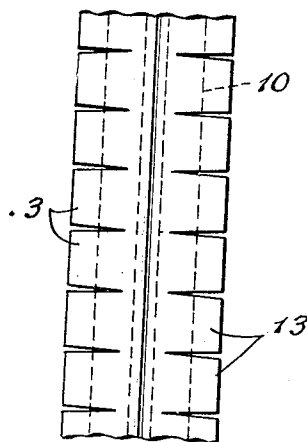


Fig. 3.

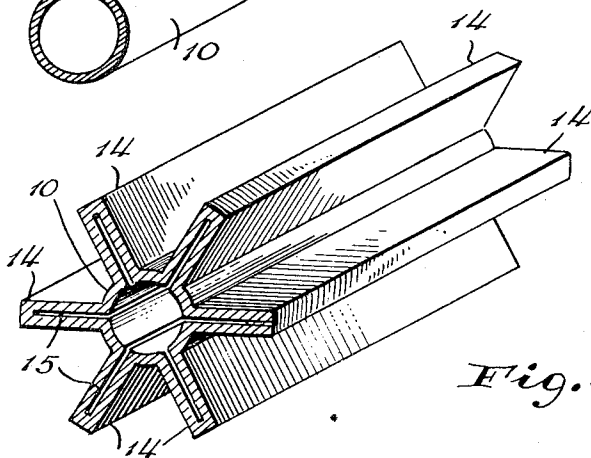


Fig. 4.

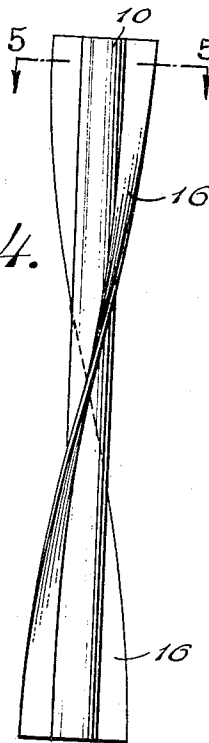


Fig. 6.

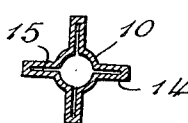


Fig. 7.

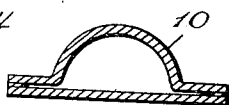
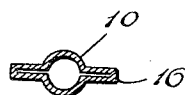


Fig. 5.



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HEAT EXCHANGE CONDUIT WITH A SPIRAL
FIN HAVING A CAPILLARY GROOVE

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1 Claim. (Cl. 257—262)

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This invention relates to a heat exchange device or heat absorption device and more particularly to a refrigerant tube used in connection with refrigerating equipment.

One of the principal objects of the invention is to increase the heat exchange surface or the evaporator surface to a maximum.

Another object is to utilize the capillary attraction principle in moistening the evaporator surfaces with the refrigerant.

Still a further object is to increase the turbulence of the refrigerant through the evaporator conduit without loss of energy and without appreciable friction increase.

Still a further object is to provide a heat exchange device or an evaporator conduit with added primary heat exchange or evaporator surfaces.

Other objects and advantages inherent in the invention will become apparent from the following description taken in conjunction with the attached drawing which illustrates, by way of example, various embodiments of the invention.

In the drawing:

Figure 1 is a perspective view of one embodiment of the invention;

Figure 2 is a fragmentary top plan view of the device shown in Figure 1 drawn to a somewhat enlarged scale;

Figure 3 is a perspective view of another embodiment;

Figure 4 is a front elevation of a modification;

Figure 5 is a section taken along the line 5—5 of Figure 4;

Figure 6 is a cross-section of another modification; and,

Figure 7 is a cross-sectional view of still another modification.

Throughout the drawing the same reference characters are used to designate the same or analogous parts.

Referring in greater detail to the drawing, the device comprises a closed tubular portion 10 formed of sheet metal or similar material.

In the modification shown in Figure 1, the ends of the sheet defining the tubular portion are bent and pinched together and welded to form a flange or fin 12. The ends are bent outwardly again in opposite directions to provide lateral extensions, as shown in Figure 1. These lateral extensions are preferably slit to form a series of blades 13 which are turned or twisted in the manner of air foil sections. This arrangement produces turbulence of the air passing over the blades and

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thus it is brought into more intimate contact with the evaporator surfaces.

In the embodiments shown in Figure 3, the wall of the tubular portion is extruded to form a plurality of fins 14. The walls of the fins are spaced to define an intermediate slot 15 which opens into the tube. Thus the fins 14 become part of the primary evaporator surface when the tube is flooded with the refrigerating medium.

However, if the width of the slots 15 is too large, little or no refrigerant will penetrate into the fin, except by forced flow. Such forced flow will cause a friction drop and require considerably more energy and will thus increase the load upon the operating machinery and decrease the efficiency of the device generally.

This objection has been overcome by the invention by making the width of the flow of such dimension that the refrigerant will penetrate into the slot through capillary attraction. It will be understood that a mere wetting or moistening of the interior surfaces of the slot will suffice to cause heat absorption.

In the modification illustrated in Figure 4, the turbulence of the refrigerant is increased by arranging the fins 16 in a spiral or helical fashion about the evaporator tube 10. The fin 16 is provided with a slot 17 in a manner similar to the embodiment shown in Figure 3. The spiral periphery has a relatively great pitch. In addition to the increased turbulence resulting from this construction, which feature is a very important factor in refrigerating equipment, the spiral will also have the effect of a sharply inclined plane of great mechanical advantage. By virtue of this construction, the refrigerant will be brought to the top of the slot and complete wetting of the inner surfaces of the tube as well as of the fins will be assured. This will prevent partial starvation of the tube as well as of the fins.

It will be understood that the invention is not limited to any particular number of fins. The evaporator tube, according to the invention, may have two fins, as shown in Figures 4 and 5, or as shown in the modification illustrated in Figure 7, or it may have four fins, as shown in Figure 6, or a greater number, as demonstrated in Figure 3.

It will also be understood that the foregoing description is given by way of example only and not by way of limitation. The invention may find expression in a great variety of other modifications within the scope of the following claim.

What is claimed is:

A heat exchange device comprising a tubular portion, a fin portion extending spirally about said

tubular portion, said fin portion having a longitudinal slot opening along said conduit, whereby said fin portion will become part of the primary evaporator surface, the width of said slot being of such dimension that capillary attraction will cause the refrigerant to penetrate into said slot.

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