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HEAT EXCHANGE DEVICE
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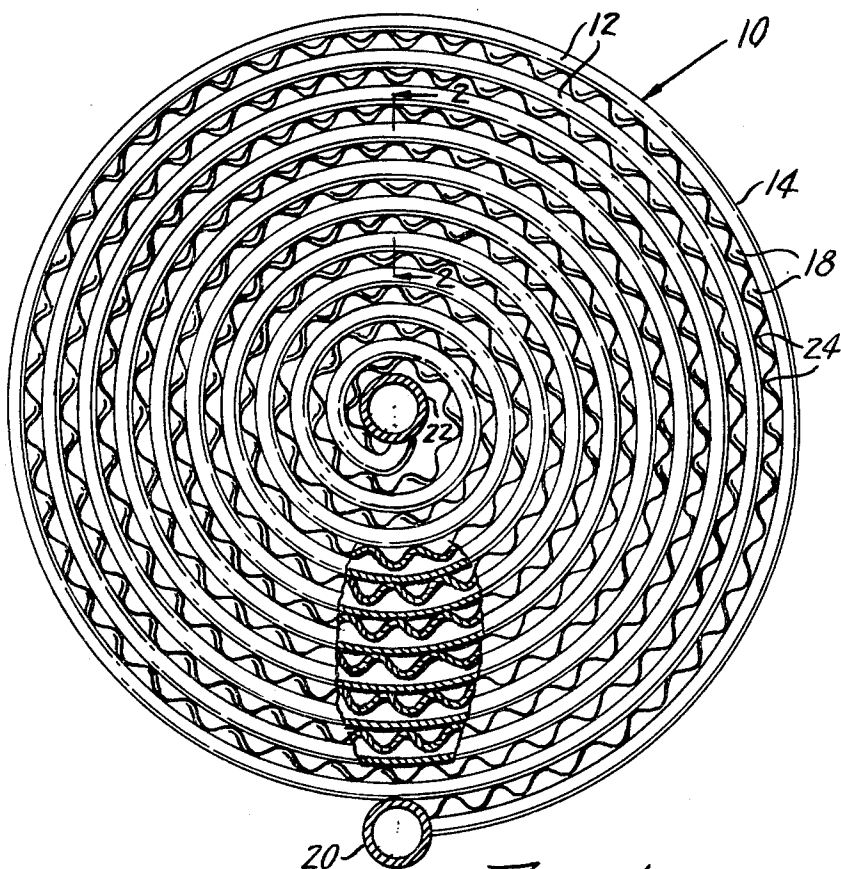


FIG. 1

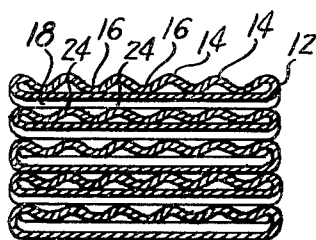


FIG. 2

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HEAT EXCHANGE DEVICE

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2 Claims. (Cl. 257-245)

This invention relates to a heat exchange device and a method of forming the same, and has for an object to provide an improved heat exchange device having tortuous passageways both longitudinally therethrough and transversely thereof so as to provide a maximum surface contact between the fluid flowing through the device and the fluid flowing transversely of the device, and thus provide a maximum of exchange of heat from one fluid to the other.

A further object of this invention is to provide an improved method of forming a heat exchange device wherein a long flat strip of material is provided with longitudinally extending corrugations across one half of its width and transversely extending corrugations across the other half of its width, then folding over the strip and joining the edges to form a flattened strip with the internal corrugations both transversely and longitudinally in spaced apart contact, thus providing tortuous passageways therebetween for the fluid flowing longitudinally through the tube.

As a further feature, the flattened corrugated tube is formed into a coil, with the longitudinal and transverse corrugations in external contact with each other, thus providing a plurality of tortuous transverse passageways for fluid flowing transversely through the coil, thus again providing a maximum of contact surface between the fluid and the surface of the coil and thus providing for a maximum and most efficient exchange of heat between the fluid flowing internally through the tube and the fluid flowing externally and transversely through the coil formed by the tube.

In brief, this invention includes a flattened tube with longitudinal corrugations on one wall extending longitudinally thereof, and corrugations on the other wall extending transversely thereof, with the corrugations in internal contact with each other providing a tortuous passageway longitudinally within the tube.

As a further feature, the tube is wound into a spiral coil with the longitudinal corrugations in external contact with the transverse corrugations, thus serving to provide a self-spacing coil, at the same time providing a great number of tortuous transverse fluid passageways through the coil for the maximum transfer of heat between the fluid within the coil tube and the fluid externally of the coil tube passing between the convolutions of the coil in a transverse direction.

With the above and related objects in view, this invention consists in the details of construction and combination of parts, as will be more fully understood from the following description, when read in conjunction with the accompanying drawing, in which:

FIG. 1 is an elevational view of the heat exchange device of this invention, partly broken away, in sectional view.

FIG. 2 is a sectional view on line 2-2 of FIG. 1.

There is shown at 10 the heat exchange device of this invention. This heat exchange device consists principally of a flattened tube 12 having longitudinal convolutions extending along one wall and transverse convolutions extending across the other wall. The longitudinal convolutions, as shown at 14, are in spaced contact as shown at 16 with the transverse convolutions shown at 18. These spaced internal contact points 16 serve to provide a tortuous longitudinal passageway through the

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flattened tube 12 so that the fluid flowing longitudinally through the flattened tube 12 comes into maximum contact with the internal surface of the flattened tube 12 to more readily exchange heat through the material of the tube 12, the tube 12 being obviously made of a good heat conducting material such as the metals copper, aluminum, zinc, iron, or any other good heat conducting metal having the proper and suitable physical characteristics.

Although the heat exchange device can be used in the form of a flattened tube in a single plane, or at least in a single plane for certain lengths, in its preferred form, the heat exchange device is formed into a more compact form by rolling the flattened tube 12 into a spiral coil as shown in FIG. 1. Then, a fluid conducting pipe 20 is connected to the external convolution of the coil and another pipe 22 is connected at the internal end of the coiled tube as shown at 22, and obviously the pipes 20 and 22 can be connected to any suitable source of supply and discharge, or, in a closed circuit, may be obviously connected to each other with any suitable pumping mechanism arranged therebetween to keep the fluid continuously circulating therethrough as needed.

As thus rolled into a coil, the transverse corrugations 18 are in external contact as at 24 at spaced apart points with the longitudinally extending convolutions 14, and, as is quite obvious, these spaced apart external contact points 24 provide a tortuous transverse passageway through the coil of the heat exchange device, so that one fluid will flow longitudinally through the coil through the tortuous passageway therein, and a second fluid will flow transversely of the coil through the tortuous passageways provided between the convolutions of the coil, thus providing a maximum efficiency for the exchange or transfer of heat from one fluid to the other.

Although this invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. A heat exchange conduit comprising a flattened tube, said tube having spaced corrugations extending transversely thereof on one side and spaced corrugations extending longitudinally thereof, the internally extending portions of the longitudinal and the transverse corrugations substantially contacting each other, thereby providing tortuous longitudinal passages through said flattened tube to provide a maximum of contact by the fluid flowing through the tube with the tube surface, said flattened tube being wound longitudinally in a tight spiral coil in the direction of the longitudinal corrugations with adjacent convolutions intimately contacting each other, and fluid conducting means secured to the inner and outer ends of said coil, the externally extending portions of the transverse corrugations being in substantial contact with the externally extending portion of the longitudinal corrugations thereby providing both self-supporting means for the convolutions of the coil and also providing tortuous transverse passages for fluid flowing transversely and externally through said coil.

2. The method of forming a heat exchange device comprising providing a longitudinal strip of material, forming a series of spaced longitudinal corrugations in approximately one half the width of the strip, forming a series of spaced transverse corrugations in the remaining one half of the strip, folding the strip along the area between the two series of corrugations to bring both strip halves into intimate contact with each other, join-

ing the longitudinal edges of the strip together to form a flattened strip with the longitudinal corrugations internally contacting the transverse corrugations at spaced apart points, and then forming the flattened corrugated tube into a spiral coil with the longitudinal corrugations externally contacting the transverse corrugations in spaced apart point, thus providing tortuous passageways both internally and externally of the coiled tube.

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