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⑤ **A conduit device.**

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**DE-A-1 501 573
DE-U-7 818 067
FR-A-2 169 742
US-A-3 856 079**

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March 1980, page 19M2**

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Description

The present invention relates to a device for conducting a fluid, for example liquid state freon or another liquid, comprising a conduit through which the fluid is conducted in order to be heated or cooled by means of a medium flowing around the conduit.

A device of this kind is disclosed in DE—A—1501573. This comprises a conduit around which a thread has been coiled with spaced windings.

Another prior art device is disclosed in Patent Abstracts of Japan, Volume 4, No. 29, 14.3.80, page 19 M 2. This comprises a group of heat transfer tubes around which wires are wound helically.

A further known device is disclosed in DE—U—7818067. This comprises three heat transfer tubes placed in an outer tube. The inner tubes are provided with ridges which extend as rings around the tube.

The object of the invention is to provide a device of the kind described above, in which the heat transmission between the fluid which is conducted through the conduit and the medium flowing around the conduit is better than in the devices previously known. At the same time flow losses should be kept low.

The invention as claimed complies with the object of the invention by providing each heat transfer conduit with a helically extending element such that the conduits are spaced radially a distance substantially equal to the diameter of the helically extending element, whereby a low loss flow is enabled between the conduits.

It is suitable that the conduits positioned together in parallel with each other are provided in an outer pipe, through which the flowing medium is conducted, and that said outer pipe and the conduits positioned therein extend helically.

By means of the device according to the invention there is provided a more effective heat transmission between the outer side of the conduit and the medium flowing around the conduit. The conduits can be positioned close to each other inside the outer pipe without causing the outer surfaces of the conduits to contact each other and thereby to obstruct the flowing of the medium outside the conduits.

Because of the fact that the flowing medium is brought to perform a circulating motion and the heat transmission to the conduits is thereby improved it is possible to reduce the dimensions of the device.

An embodiment of the invention is described in the following with reference to the accompanying drawing.

Fig. 1a is a side view of a device according to the invention.

Fig. 1b is a section on an enlarged scale showing a portion of the device according to Fig. 1a.

Fig. 1c is a section on an enlarged scale showing another portion of the device according to Fig. 1a.

Fig. 2 shows two conduits forming a part of the device according to the invention.

A freon liquid is fed in the direction of the arrow 13 through an expansion valve 7 and a distribution head 8 to pipes 5 and conduits 3 connected therewith. A helically extending element 4, preferably consisting of copper wire, extends around each of the conduits 3. The windings of the elements 4 are spaced from each other. The conduits 3 extend in common into a wider outer pipe 2 preferably consisting of polyethylene and extending as a helix 1. The lower end of the helix 1 is connected with a pipe section 15, by means of a hose clamp 14, the pipe section 15 having an outlet 10 for a medium, preferably water, which is supplied to the outer pipe 2 at the upper end thereof. Inside the pipe section 15 the pipes 5 extend through a sealed end portion 6 and into the conduits 3.

The upper end of the helix 1 is connected with a pipe section 9 by means of a hose clamp 14, the pipe section 9 having an inlet 12 for a hot medium, preferably water, and an outlet 10 for the heated freon liquid, the pipes 3 being fixed by means of a seal end portion 6.

The invention can be modified within the scope of the following claims.

Claims

1. A device for conducting a first fluid in heat transfer relationship with a second fluid, comprising a plurality of conduits (5) each containing the first fluid; an outer pipe (2) carrying the conduits (5) and containing the second fluid flowing around the conduits; and a thread shaped element (4) helically wrapped substantially around each of the conduits with the element windings around each conduit longitudinally spaced from each other to cause the second fluid flowing around the conduit to perform a circulating motion, said element having substantially an entire length and a surface thereof in continuous contact with the conduit, said element being at least partially spaced apart from the outer pipe along a common longitudinal plane extending radially through the conduit, enabling fluid to flow therebetween and said conduits being substantially parallel to the longitudinal axis of the outer pipe and spaced apart from each other radially toward the outer pipe by means of the helically extending elements, characterized in that the windings of each element (4) are offset axially relative to the corresponding windings provided on an adjacent conduit, said windings on one conduit thereby contacting an adjacent conduit to radially space adjacent conduits from each other in the outer pipe (2) a distance substantially equal to the diameter of an element interposed therebetween, said windings defining a continuous clearance between adjacent conduits extending substantially the entire axial length of said elements, enabling second fluid flow between adjacent conduits through the continuous clearance.

2. A device as claimed in claim 1, characterized in that the outer pipe (2) and the conduits (5) are arranged as a helix (1).

Patentansprüche

1. Vorrichtung zur Führung einer ersten Flüssigkeit in Wärmeaustausch-Beziehung zu einer zweiten Flüssigkeit, bestehend aus einer Anzahl von Leitungsrohren (5), deren jedes die erste Flüssigkeit enthält, einem die Rohrleitungen tragenden und die um die Rohrleitungen herumfließende zweite Flüssigkeit enthaltenden Außenrohr (2) und einem im wesentlichen um jede der Rohrleitungen schraubenförmig herumgewundenen fadenförmigen Element (4), dessen Windungen um jede Rohrleitung in Längsrichtung voneinander entfernt liegen, sodaß die um die Rohrleitung herumfließende zweite Flüssigkeit eine Umlaufbewegung vollführt, wobei dieses Element im wesentlichen über seine gesamte Länge und mit einer Seite ständig mit der Rohrleitung in Berührung steht, wobei dieses Element wenigstens teilweise vom Außenrohr längs einer gemeinsamen Längsebene entfernt ist, welche radial durch die Rohrleitung hindurchgeht, wodurch Flüssigkeit dazwischen fließen kann, und wobei die Rohrleitungen im wesentlichen parallel zur Längsachse des Außenrohres verlaufen und in radialer Richtung zum Außenrohr durch die schraubenförmig verlaufenden Elemente im Abstand voneinander gehalten werden, dadurch gekennzeichnet, daß die Windungen eines jeden Elementes (4) in axialer Richtung gegenüber den entsprechenden Windungen auf einer benachbarten Rohrleitung versetzt sind, wodurch die Windungen auf einer Rohrleitung an einer benachbarten Rohrleitung anliegen und dadurch benachbarte Rohrleitungen im Außenrohr um einen Abstand voneinander trennen, der im wesentlichen gleich dem Durchmesser eines zwischenliegenden Elementes ist, sodaß diese Windungen einen sich im wesentlichen über die gesamte Länge der Elemente erstreckenden durchgehenden Spielraum zwischen benachbarten Rohrleitungen begrenzen und die zweite Flüssigkeit zwischen benachbarten Rohrleitungen durch diesen durchgehenden Spielraum hindurchleitbar ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Außenrohr (2) und die Rohrleitungen (5) eine Spirale (1) bilden.

Revendications

1. Dispositif pour faire passer un premier fluide suivant un échange de chaleur avec un second fluide, comportant un ensemble de conduites (5) chacune contenant le premier fluide et une conduite extérieure (2) recevant les conduites (5) et contenant le second fluide qui s'écoule autour des conduites ainsi qu'un élément (4) en forme de filet, qui est enroulé hélicoïdalement pratiquement autour de chacune des conduites (5), les spires de l'élément autour de chaque conduite étant espacées longitudinalement l'une de l'autre pour que le second fluide s'écoule autour de la conduite suivant un mouvement de circulation, l'élément ayant essentiellement toute une longueur et la surface correspondante en contact continu avec la conduite, cet élément étant au moins partiellement espacé de la conduite extérieure suivant un plan longitudinal commun s'étendant radialement par la tuyauterie, permettant au fluide de passer dans l'intervalle et les tuyauteries étant essentiellement parallèles à l'axe longitudinal de la conduite extérieure en étant espacées l'une de l'autre radialement en direction de la conduite extérieure par l'intermédiaire des éléments disposés en hélice, caractérisé en ce que les spires de chaque élément (4) sont décalées axialement par rapport aux spires correspondantes prévues sur la conduite adjacente, les enroulements sur une tuyauterie touchant ainsi une tuyauterie adjacente pour écarter radialement les tuyauteries adjacentes, l'une par rapport à l'autre dans la conduite extérieure (2), d'une distance essentiellement égale au diamètre d'un élément placé entre ces tuyauteries, les enroulements définissant un jeu continu entre les conduites adjacentes et s'étendant essentiellement sur toute la longueur axiale des éléments, en autorisant le second fluide à passer entre les conduites adjacentes à travers l'intervalle continu.

2. Dispositif selon la revendication 1, caractérisé en ce que la conduite extérieure (2) et les tuyauteries (5) sont disposées en hélice (1).

Fig. 1a.

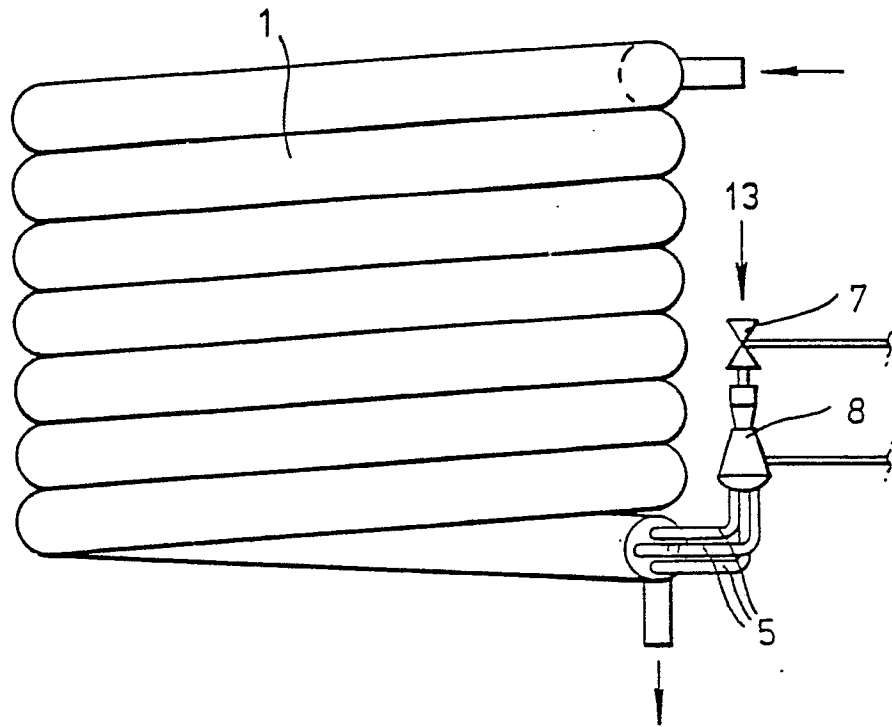


Fig. 1c.

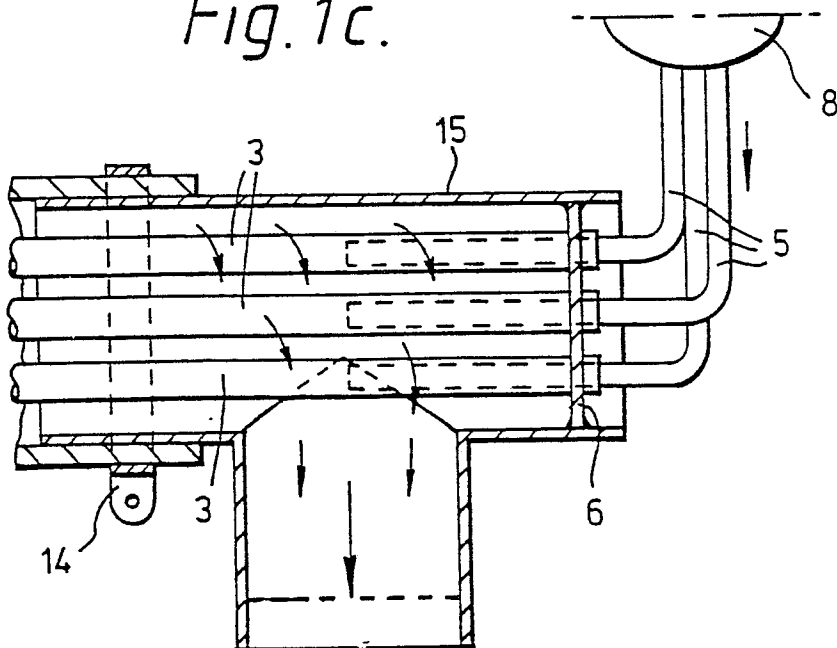


Fig. 1b.

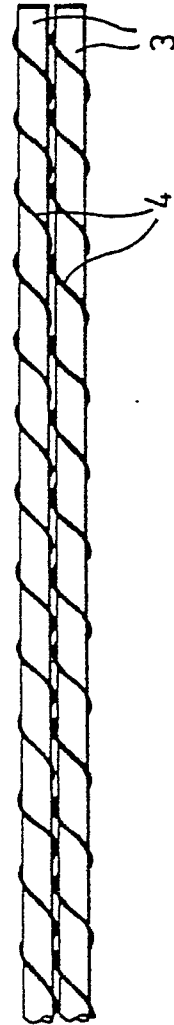
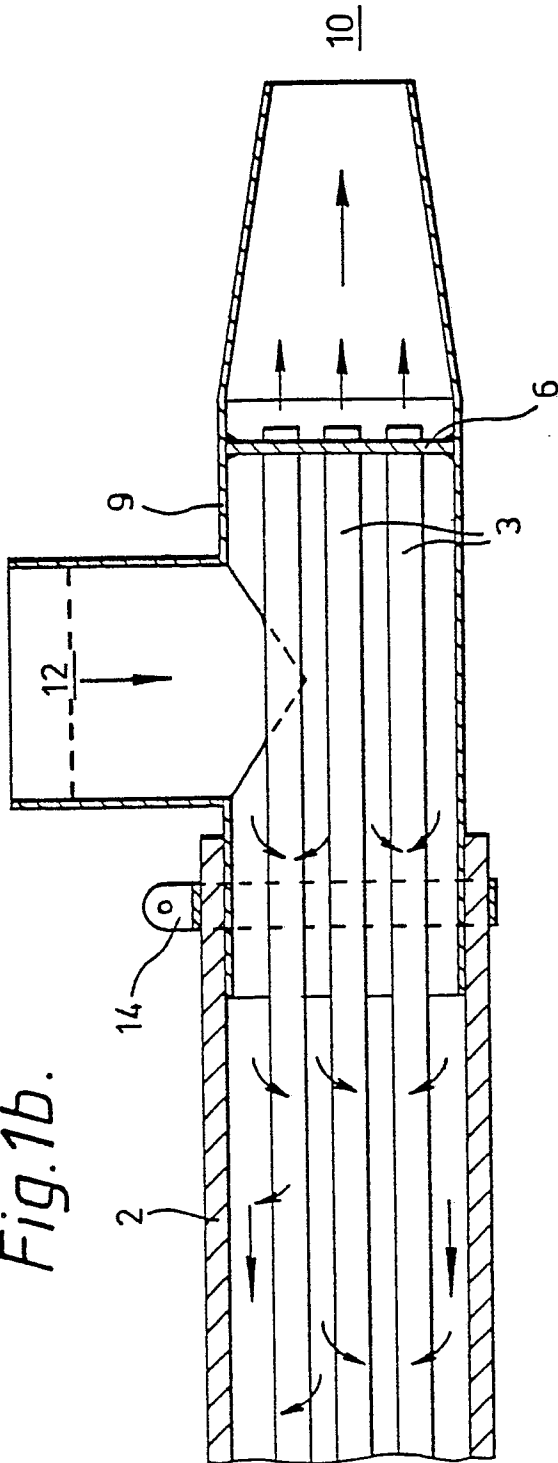


Fig. 2.