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⑤④ **PLATE HEAT EXCHANGER WITH THREADED CONNECTION PORTS.**

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⑤⑥ References cited :  
**GB-A- 1 009 178**  
**GB-A- 1 041 805**  
**GB-A- 2 000 267**  
**SE-B- 127 970**  
**US-A- 1 222 806**  
**US-A- 1 330 910**  
**US-A- 1 364 814**  
**US-B- 2 699 324**

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## Description

The present invention relates to a plate heat exchanger comprising several heat exchange plates disposed between two end plates in a heat exchanger frame, at least one of the end plates having a threaded connection port. A previously known heat exchanger of this kind is disclosed for example in GB-A-1 009 178, where a connection pipe is screwed directly into each connection port from the outside surface of the relevant end plate.

End plates for heat exchangers of the above general kind are usually made of a material which is not resistant to corrosive media. Since use of a corrosion resistant material for the manufacture of end plates has been considered too expensive, development work has been concentrated on the provision of protective linings for the end plate connection ports where needed.

The current method of lining a connection port in a relatively small plate heat exchanger is to arrange a hollow cylinder with a flange in a non-threaded connection port such that the flange abuts against the inside surface of the end plate. The portion of the cylinder extending out of the outside surface of the end plate is then secured to the end plate either by being welded to the end plate along the circumference of the connection port or by being provided by rolling with a bulge located close to the outside surface of the end plate. The known linings are provided with a thread at the outer end portion of the hollow cylinder, which is intended to engage with a connection sleeve for connection with a threaded connection pipe. Such an arrangement is disclosed in US-A-2699324.

The just described linings have never been intended for use in a plate heat exchanger of the initially defined kind, which has an end plate with threaded connection ports allowing the connection pipes to be screwed directly into the end plate. The said known plate heat exchanger, obviously, is intended for use only in connection with non-corrosive heat exchanging media.

It is generally desirable to reduce the assortment of plate heat exchangers in a stock and, still, to have heat exchangers available for various applications. The object of the present invention is to provide a new design for plate heat exchangers which fulfills this desideratum in a way such that the end plates of the heat exchangers can be easily adaptable for use in connection with either corrosive or non-corrosive heat exchanging media.

This object is obtainable by means of a plate heat exchanger design of the initially defined kind, which is characterized mainly in that the connection port is provided with a lining, which comprises a hollow cylindrical part extending through the port and a flange abutting the inside surface of the end plate, facing the heat exchange plates, said cylindrical part having an external thread in engagement with the thread of the

connection port.

By the present invention it is possible to keep a stock of relatively cheap end plates, which can be used directly in plate heat exchangers intended for non-corrosive media or which easily can be provided with linings for use in plate heat exchangers intended for corrosive media. Further, by the present invention it will be both easier and cheaper than it was previously to provide an end plate with a new lining.

The invention will be described in more detail with reference to the accompanying drawing, which shows a section through a connection port in an end plate of a plate heat exchanger according to the invention.

In the drawing there is shown an end plate, which either forms a frame plate or a pressure plate of a plate heat exchanger. A threaded connection port 2 extends through the end plate 1. A lining 3 is arranged in said port 2 and comprises a flange 4, abutting against an inside surface 5 of the end plate 1 facing a pack of heat exchange plates (not shown), and a hollow cylindrical part 6 extending through the port 2. The cylindrical part 6 has an external thread allowing it to be screwed into the threaded connection port 2.

A portion of the cylindrical part 6 of the lining 3 extends out from the end plate 1 and is engaged by a connection sleeve 7, which is provided with an internal thread. The connection sleeve 7 has been screwed onto the cylindrical part 6 into abutment against an outside surface 8 of the end plate 1. The cylindrical part 6 extends about half-way into the connection sleeve 7.

Said connection sleeve 7 also is in engagement with a connection pipe 9, which has an external thread. The connection pipe 9 extends into the rest of the connection sleeve 7.

An important feature of this embodiment is that essentially the whole of the cylindrical lining part 6 and the connection port 2 are threaded. Thus it will be possible to provide the required locking of the lining 3 relative to the end plate 1 by means of the connection sleeve 7. The flange 4 may thus remain essentially unloaded and, thereby, be made of a thin sheet material. This would not be possible if there were no thread engagement between the lining and the end plate. A corresponding flange would then be subjected to excessive shearing forces.

## Claims

1. Plate heat exchanger comprising several heat exchange plates disposed between two end plates in a heat exchanger frame, at least one (1) of the end plates having a threaded connection port (2), characterized in that the connection port (2) is provided with a lining (3), which comprises a hollow cylindrical part (6) extending through the

port (2) and a flange (4) abutting the inside surface (5) of the end plate (1) facing said heat exchange plates, said cylindrical part (6) having an external thread in engagement with the thread of the connection port (2).

2. Plate heat exchanger according to claim 1, characterized in that the cylindrical part (6) of the lining (3) extends from the end plate (1) and is in engagement through its external thread with a connection sleeve (7) provided with an internal thread.

3. Plate heat exchanger according to claim 2, characterized in that the connection sleeve (7) abuts against the outside surface (8) or the end plate (1).

4. Plate heat exchanger according to claim 3, characterized in that the connection sleeve (7) is in engagement with a connection pipe (9) having an external thread.

5. Plate heat exchanger according to any of the claims 1-4, characterized in that the external thread of the cylindrical part (6) extends over essentially its whole length.

#### Patentansprüche

1. Plattenwärmetauscher mit mehreren Wärmeaustauscherplatten, die zwischen zwei Endplatten in einem Wärmetauscherrahmen angeordnet sind, wobei wenigstens eine (1) der Endplatten eine mit einem Gewinde versehene Verbindungsöffnung (2) besitzt, dadurch gekennzeichnet, daß die Verbindungsöffnung (2) mit einer Auskleidung (3) versehen ist, die einen hohlen zylindrischen Teil (6) aufweist, der sich durch die Verbindungsöffnung (2) und einen Flansch (4) erstreckt, der an der inneren Oberfläche (5) der Endplatte (1) anliegt, die den Wärmeaustauscherplatten zugewandt ist, wobei der zylindrische Teil (6) ein Außengewinde im Eingriff mit dem Gewinde der Verbindungsöffnung (2) aufweist.

2. Plattenwärmetauscher nach Anspruch 1, dadurch gekennzeichnet, daß der zylindrische Teil (6) der Auskleidung (3) sich von der Endplatte (1) aus erstreckt und über sein Außengewinde im Eingriff steht mit einer Verbindungshülse (7), die mit einem Innengewinde versehen ist.

3. Plattenwärmetauscher nach Anspruch 2, da-

durch gekennzeichnet, daß die Verbindungshülse (7) an der Außenfläche (8) der Endplatte (1) anliegt.

5 4. Plattenwärmetauscher nach Anspruch 3, dadurch gekennzeichnet, daß die Verbindungshülse (7) im Eingriff steht mit einem Verbindungsrohr (9), das ein Außengewinde aufweist.

10 5. Plattenwärmetauscher nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß das Außengewinde des zylindrischen Teils (6) sich über im wesentlichen seine ganze Länge erstreckt.

#### 15 Revendications

1. Echangeur de chaleur à plaques comprenant plusieurs plaques d'échange de chaleur disposées entre deux plaques d'extrémité dans un châssis d'échangeur de chaleur, l'une au moins (1) des plaques d'extrémité ayant un trou de liaison taraudé (2), caractérisé en ce que le trou de connexion (2) est muni d'une chemise (3) qui a une partie cylindrique creuse (6) traversant le trou (2) et une collerette (4) en appui contre la face interne (5) de la plaque d'extrémité (1) qui fait face auxdites plaques d'échange de chaleur, ladite partie cylindrique (6) ayant un filetage externe en prise avec le taraudage du trou de connexion (2).

20 2. Echangeur de chaleur à plaques selon la revendication 1, caractérisé en ce que la partie cylindrique (6) de la chemise (3) s'étend à partir de la plaque d'extrémité (1) et est en prise, par son filetage externe, avec une douille de liaison (7) munie d'un taraudage interne.

30 3. Echangeur de chaleur à plaques selon la revendication 2, caractérisé en ce que la douille de liaison (7) est en butée contre la face externe (8) de la plaque d'extrémité (1).

40 4. Echangeur de chaleur à plaques selon la revendication 3, caractérisé en ce que la douille de liaison (7) est en liaison avec une conduite de connexion (9) ayant un filetage externe.

50 5. Echangeur de chaleur à plaques selon l'une quelconque des revendications 1 à 4, caractérisé en ce que le filetage externe de la partie cylindrique (6) s'étend pratiquement sur toute sa longueur.

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