United States Patent

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[54] **HEAT EXCHANGER**
2 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **165/166**
[51] **Int. Cl.** **F28f 3/00**
[50] **Field of Search** 122/134; 165/156, 163, 166, 170

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ABSTRACT: A heat exchanger, especially through flow heater for the preparation of hot water, which is composed of a plurality of discs arranged adjacent to each other. Each of said discs comprises two complementary plates which are connected to each other by cementing, welding or the like, and when so connected form with each other spiral-shaped flow passage means.

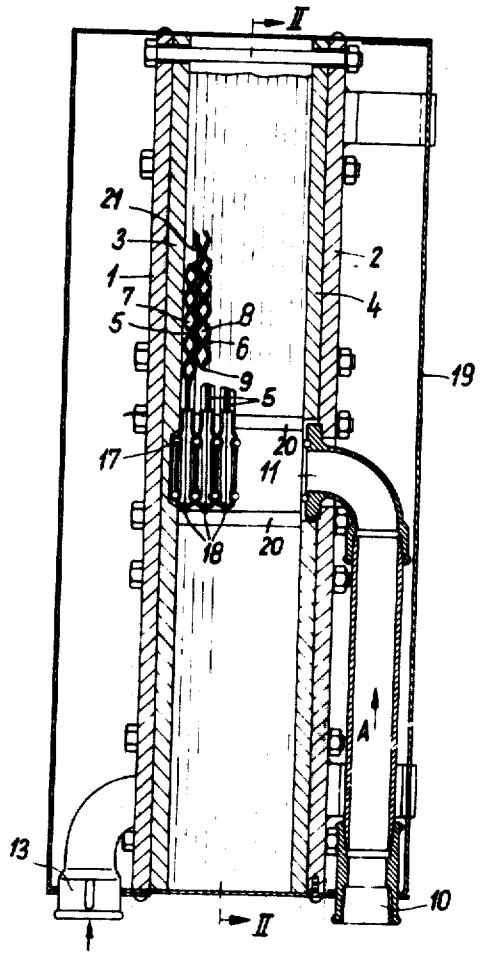

FIG. 1

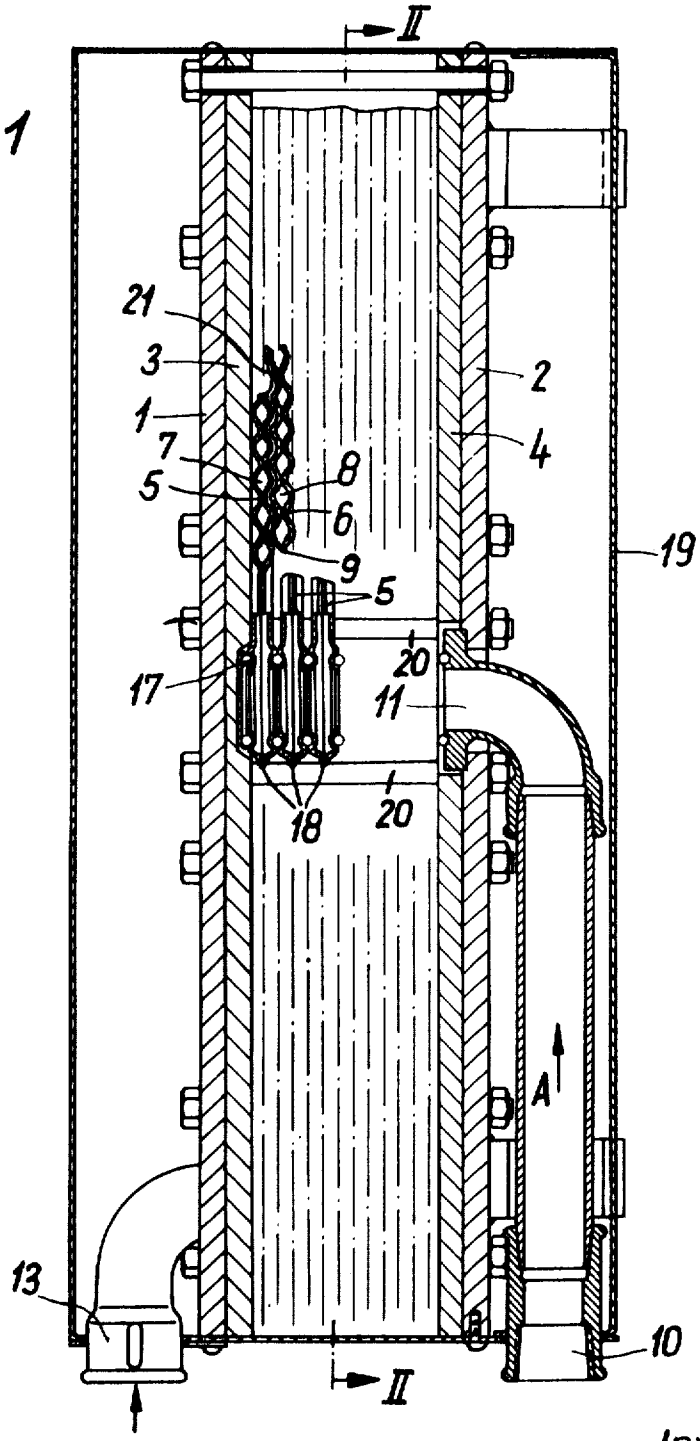

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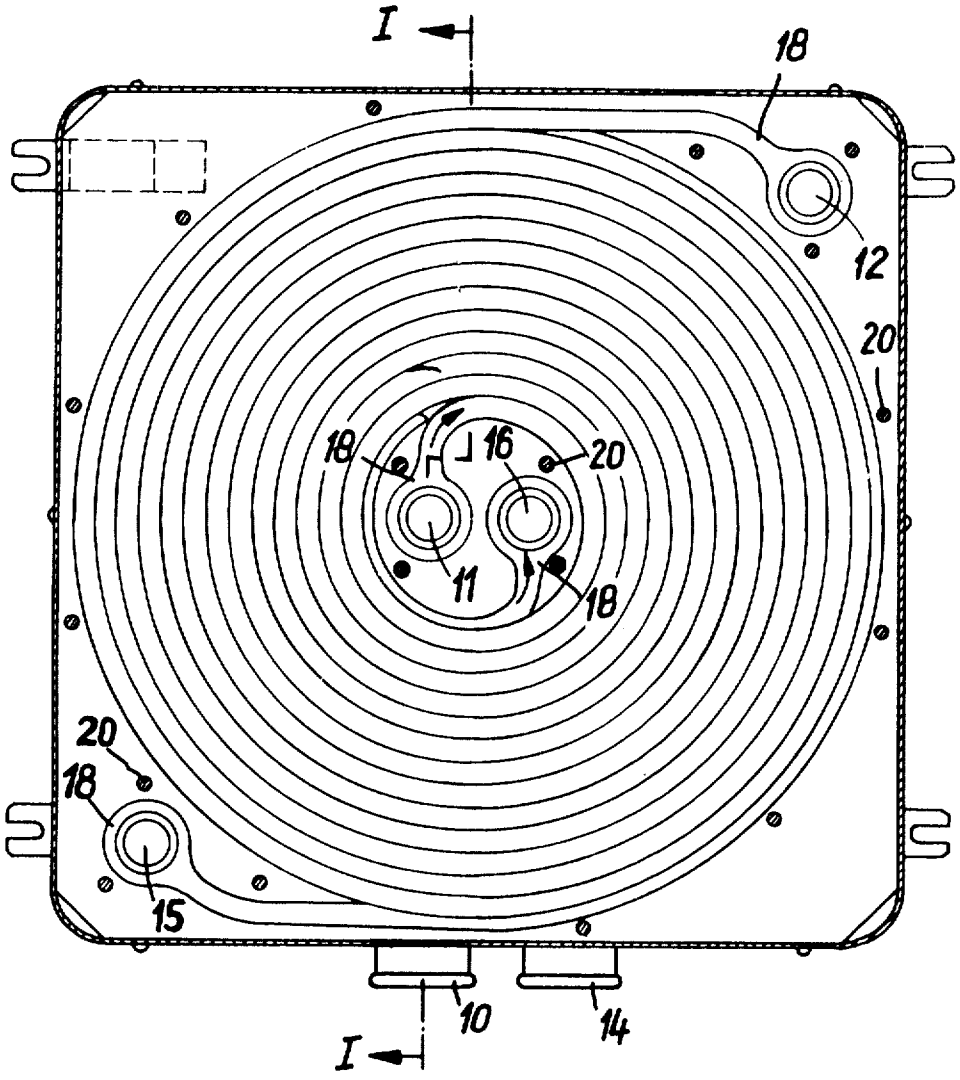
FIG. 2



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HEAT EXCHANGER

The present invention relates to a heat exchanger, especially a through flow heater for the preparation of hot water, in which the individual discs are each provided with a spiral-shaped flow passage, the arrangement being such that each second disc is passed through by the medium giving off heat whereas each of the remaining discs is passed through by the medium absorbing heat.

Heat exchangers have become known which are composed of individual discs which consist of spirally wound pipes passed through by the medium giving off heat and by the medium absorbing heat. It has also been suggested between the individual discs to provide a layer of water soluble material of good heat conductivity as it is known and obtainable in the form of heat conductive cement. If with such a heat exchanger a leak occurs on the heating or consumer water side, the heat conductive cement is dissolved and by means of the water pressure is driven out of the gap between two adjacent discs. In this way the spot where the leak occurred can be ascertained and can easily be remedied by replacing the defective disc.

With heretofore known heat exchangers of this type, depending on the desired heat output, any desired number of discs may be arranged one on top of the other. Such an arrangement has the advantage of a simple and relatively inexpensive manufacture.

It is an object of the present invention to further to improve these known heat exchangers.

This object and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 is a longitudinal section through a heat exchanger according to the invention taken along the line I—I of FIG. 2.

FIG. 2 is a vertical section through FIG. 1 taken along the line II—II thereof.

The heat exchanger according to the present invention is characterized primarily in that the individual discs to be passed through by a heating medium and a medium to be heated consist of two plates which previously have been so deformed that when these plates are placed one upon the other and connected to each other, a spiral-shaped flow passage is obtained. The individual discs are expediently so placed upon each other that the flow passage passed through by the heating medium and pertaining to one plate will be located in the corresponding grooves of the plate to be passed through by the medium to be heated. In this way a maximum of heat transfer surface is obtained. Preferably, between each two associated plates there is, in a manner known per se, provided a layer of heat conductive cement. As material for the plates from which the individual discs of the heat exchanger may be made, iron and noniron sheet metal plates may be used. In particular instances, the individual discs of the heat exchanger according to the invention may also be made of synthetic material in the form of plates.

Referring now to the drawings in detail, the heat exchanger

according to the invention and shown therein is built up of sidewalls 1, 2 which consist of plates having their inner side lined with a layer of asbestos 3, 4 or another heat insulating material. Between the two sidewalls there are arranged pairs of discs 5, 6 with spiral-shaped, passages, said discs being built up of two plates which are deformed in such a way that when being placed one upon the other they will form the spiral-shaped passages 7, 8. Each two associated plates are connected to each other at their joints 9 by soldering, welding or cementing. One disc each is passed through by heating water, whereas the adjacent disc is passed through by consumer water. This is effected in such a way that the heating water passes through the connection 10 in the direction of the arrow A to the opening 11 which forms the start of the flow passage 7 passed through by the heating water. From here the heating water passes through the opening 12 and leaves the consumer water preparing device through an outlet not shown. Inversely, the consumer water enters through the inlet 13 and passes through an opening 15 through the spiral-shaped flow passage 8 to the opening 16 and from there through the passage 14 to the consumer water line.

Introduced between the disc means 5 and 6, consisting each of two plates, is a layer 21 of water-soluble material with high thermal conductivity known as "heat-conducting cement." Heat transfer cements of this type are known and available in Germany for example under the trade name "Thermon."

Also with the consumer water preparing device according to the invention, depending on the desired heat output, any desired number of discs with spiral-shaped passages may be arranged one on top of the other. In this instance, seals 17 are interposed between the individual connecting sections 18 of the discs provided with spiral-shaped passages, and the packet composed of the individual discs is by means of tie rods 20 firmly anchored between the sidewalls 1, 2. The consumer water preparing device is surrounded by a protective housing 19.

It is of course, to be understood that the present invention is, by no means, limited to the particular showing in the drawings but also comprises any modifications within the scope of the appended claims.

What I claim is:

1. A heat exchanger, especially through-flow heater, for the preparation of hot water, which includes: a plurality of disc means, each of said disc means comprising two plates provided with spiral-shaped depressions and elevations and so engaging each other as to define with each other spiral-shaped flow passage means, each two adjacent disc means having their flow passage means respectively arranged for connection with a heat discharging and a heat receiving fluid medium, and the disc means are so placed one upon another that the plate elevations of the flow passage are located in the corresponding depressions of the plate pertaining to the next disc means.

2. A heat exchanger according to claim 1, which includes heat conductive water soluble means interposed between each two adjacent disc means.