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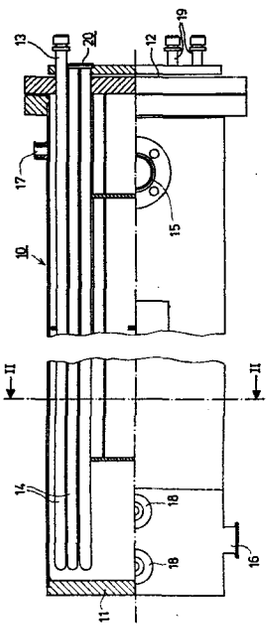
(54) Condenser structure.

(57) The invention concerns a condenser structure. The condenser structure (10) comprises a body (11), an end structure (12), U-shaped heat exchange tubes (14) disposed within the body (11), at least one inlet connector (15) for vapour to be condensed, at least one feed-in connector (13) for cooling fluid and at least one cooling fluid outlet connector (19). The joining with each other of the U-shaped heat exchange tubes (14) within the body (11) of the condenser structure for making the flow path continuous is such that the juncture (20) is located outside the end structure (12) of the condenser structure (10). In the upper part of the body (11) of the condenser structure (10) there is disposed a connector (17) for gas venting, whereby the upper part of the body (11) of the condenser structure (10) stays coldest at all times.



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"CONDENSER STRUCTURE"

The present invention relates to a condenser structure comprising a body, an end structure, U-shaped heat exchange tubes disposed within the body, at least one cooling fluid inlet connector, at least one condensate outlet connector and at least one cooling fluid outlet connector.

Condenser structures of the kind defined above are used in numerous different applications, e.g. in distilling apparatus. The condenser structure prsently used has a distributor chamber from which there extends into the body part of the condenser a plurality of straight or U-shaped heat exchange tubes. The drawback of these prior art condenser structures is however that the flow velocity is very low and the condenser design requires very great amounts of cooling liquid for good heat exchange to be achieved.

Another structure used in the art is as follows. The heat exchange surface is formed of tube coils, whereby the flow velocity can be made as high as is required, because there are few flow paths compared with the U-tube construction. The drawback of these structures is that the coils have to be welded, with the welds located within the body part of the condenser.

This gives rise to detrimental distensions and stresses which detract from the reliability of the condenser structure.

The object of the invention is to achieve an improvement in condenser structures as known at present. The more detailed object of the invention is to provide a condenser structure in which the faults described above have been overcome.

The aims of the invention are attained with a condenser structure which is mainly characterized in that the co-joining of the U-shaped heat exchange tubes for the purpose of dividing the flow path is arranged so that the juncture is located outside the end structure of the condenser structure.

The rest of the characteristic features of the condenser structure of the invention are stated in the appended claims 2 to 5.

With the condenser structure of the invention numerous significant advantages are gained. It has been understood in the condenser structure of the invention to make the flow path continuous, in other words to connect to a U-shaped heat exchange tube another U-shaped heat exchange tube, outside the body of the condenser structure. In this manner no harmful phenomena are caused in the structure by the welds. At the same time the design of the invention renders a high flow velocity possible, and this feature is achieved

with a small quantity of coolant. Furthermore, in the condenser structure of the invention several different cooling liquids may be introduced. The upper part of the condenser structure is always cold enough. Gas venting is advantageously arranged to take place from the upper part of the condenser structure. Naturally, in certain embodiments another point or region within the condenser structure may be made the coldest point of all. In the condenser structure of the invention, the U-shaped condenser tube system is self-draining in that the flow is in a downward direction.

The invention is hereinafter described in detail by reference to an advantageous embodiment of the invention, which is illustrated in the accompanying drawings, but to which the invention is not exclusively confined. In these drawings:-

Fig. 1 shows this embodiment in partly sectioned elevation view.

Fig. 2 is a section along line II-II in Fig. 1.

Fig. 3 shows the condenser structure of Fig. 1, seen from one end.

In the embodiment depicted in Figs. 1 to 3, the condenser structure 10 comprises a body 11 and an end structure 12. The cooling fluid flows into the condenser structure 10 through a connector 13. Within the body 11 there is disposed a plurality of U-shaped heat exchange tubes 14. Pure vapour is fed in through an inlet 15 whilst distillate is withdrawn through

an outlet 16. In the upper part of the body 11 there is disposed a gas venting connector 17. Also provided are entry pipes 18 for liquid distillates and cooling fluid outlet pipes 19.

In accordance with the fundamental feature of the invention, the connecting of the heat exchange tubes 14, i.e., their joining with each other, has been solved in such a way that the flow path juncture 20 is located outside the end structure 12 of the condenser structure 10. There will then be no harmful welds at all within the body 11 of the condenser structure 10. The condenser structure of the invention makes a high flow velocity possible, but the design operates in spite of this faultlessly on an exceedingly small cooling liquid quantity. In some embodiments, several different cooling fluids may be introduced to the condenser structure 10. The upper part of the body 11 of the condenser structure 10 stays cold all the time because gas venting takes place from the upper part by the connector 17. Naturally, it is possible in certain embodiments to assign another region within the condenser structure 10 to be the coldest of all.

In the foregoing, the invention has only been described on the basis of one particular embodiment conforming to the invention, and it should be obvious to a person skilled in the art that the condenser structure of the invention can be applied in numerous other

embodiments in practice. Attached are the claims, numerous modifications being possible within the scope of the inventive idea thereby defined.

CLAIMS

1. A condenser structure (10) comprising a body (11), an end structure (12), U-shaped heat exchange tubes (14) disposed within the body (11), at least one inlet connector (15) for vapour to be condensed, at least one feed-in connector (13) for cooling fluid, and at least one cooling fluid outlet connector (19), characterized in that the joining with each other of the U-shaped heat exchange tubes (14) residing within the body (11) of the condenser structure (10) for making the flow path continuous has been formed so that the juncture (20) is located outside the end structure (12) of the condenser structure (10).

2. A condenser structure according to Claim 1, characterized in that in the upper part of the body (11) of the condenser structure (10) there is a connector (17) for gas venting, whereby the upper part of the body (11) of the condenser structure (10) stays coldest at all times.

3. A condenser structure according to Claim 1, characterized in that in a selected region between the upper and lower parts of the body (11) of the condenser structure (10) there is a connector (17) for gas

venting, whereby said selected region of the body (11) of the condenser structure (10) stays coldest at all times.

4. A condenser structure according to Claim 1, 2 or 3, characterized in that there is a plurality of cooling fluid feed-in connectors (13) for conducting different cooling fluids into the body (11).

5. A condenser structure according to any of Claims 1 to 4, characterized in that the body (11) has at least one inlet connector (18) for liquid distillates.

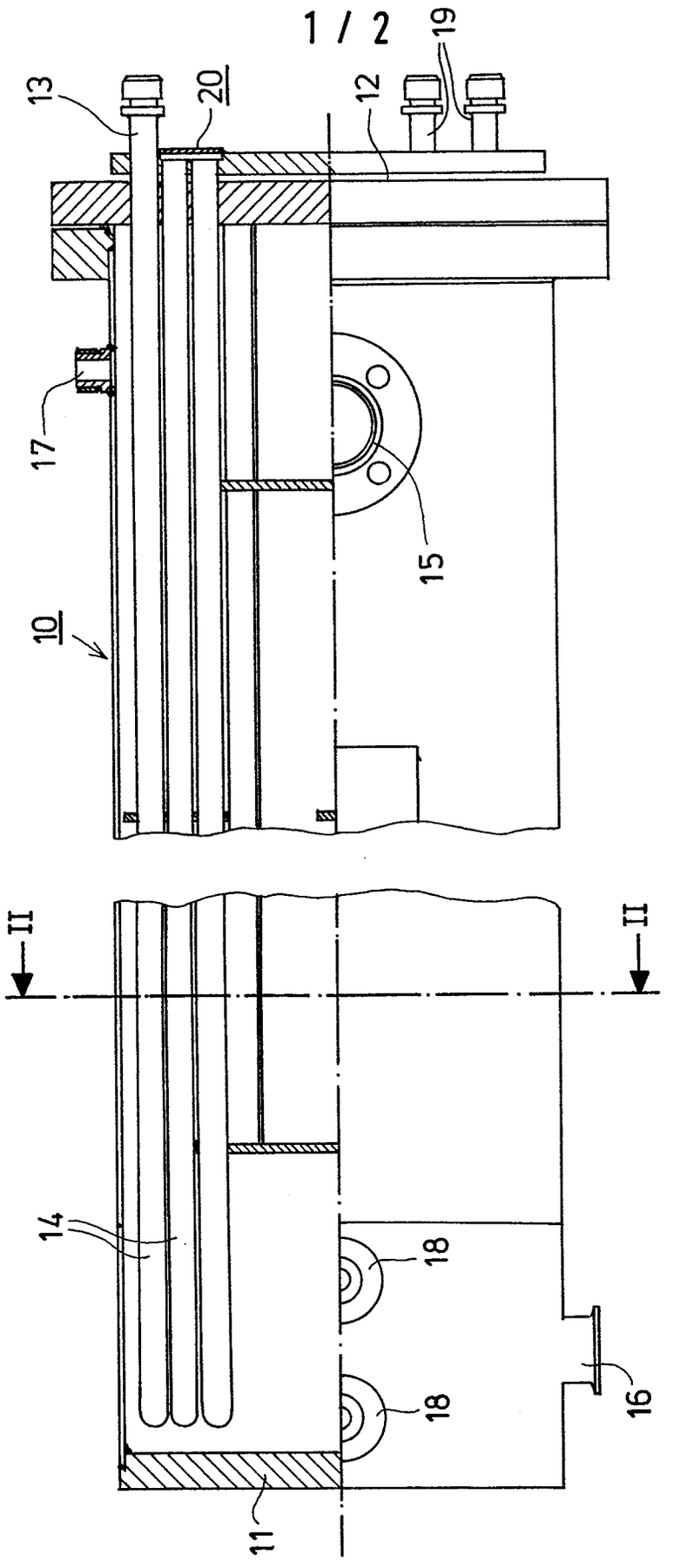

FIG.1

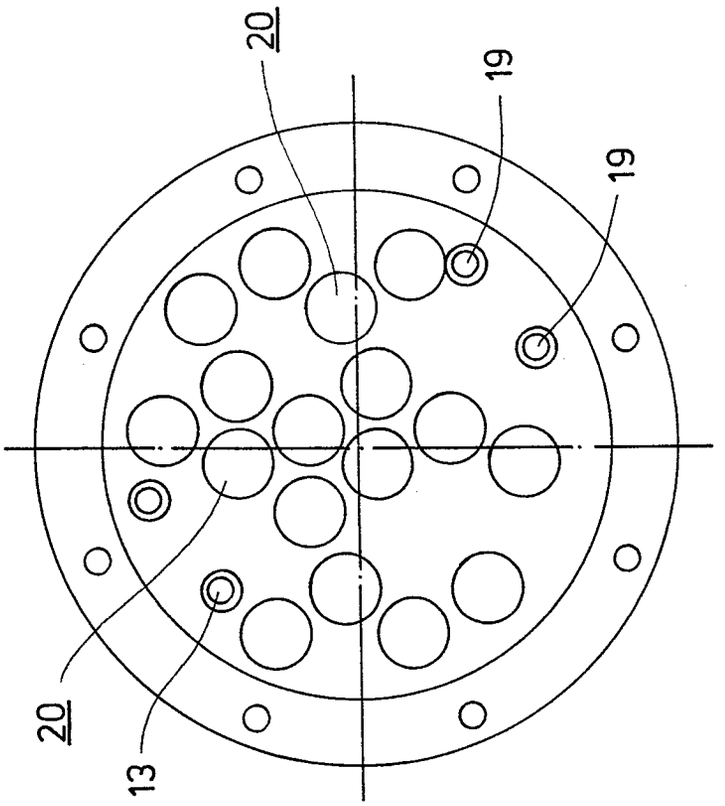

FIG. 3

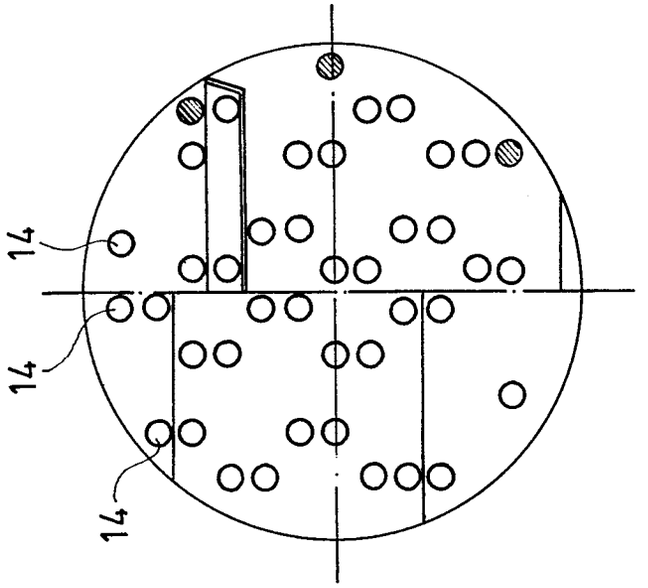

FIG. 2