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O. PIETTE

1,503,846

HEAT EXCHANGE APPARATUS

Filed Feb. 26 . 1921

FIG. 1

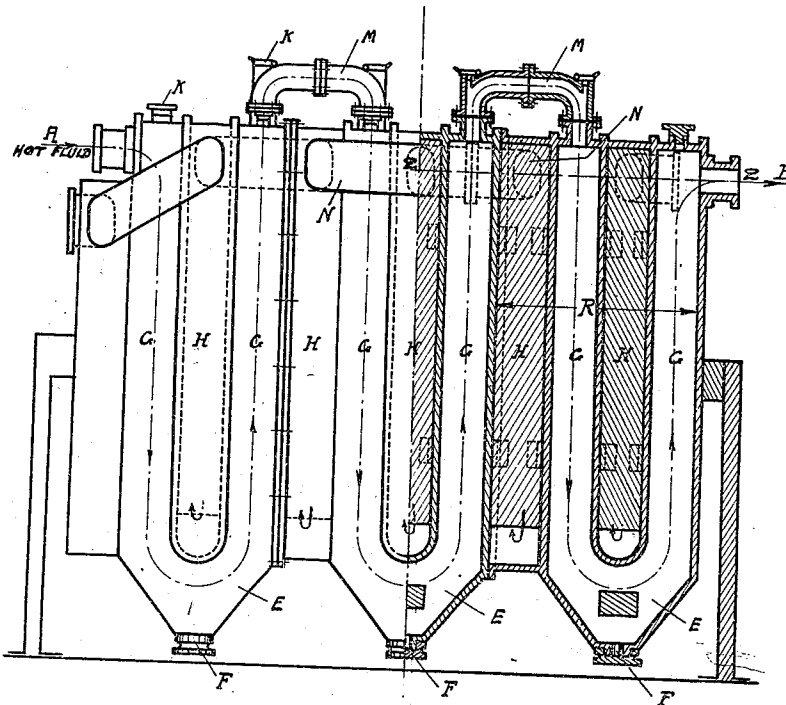
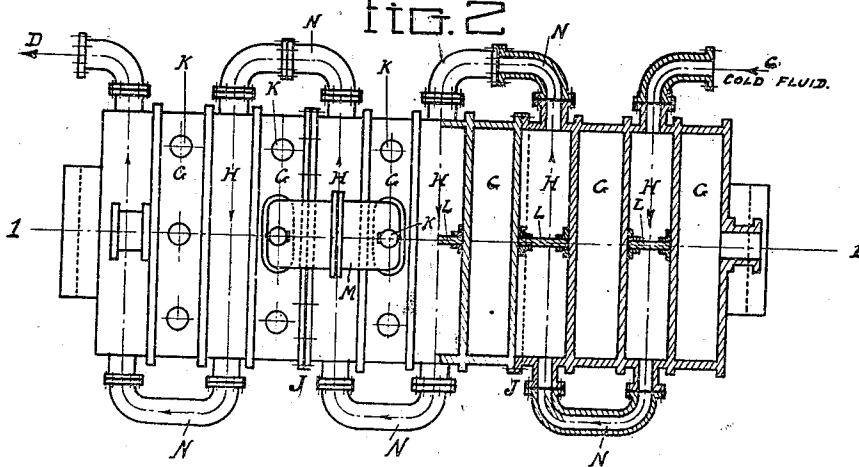


Fig. 2



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UNITED STATES PATENT OFFICE.

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HEAT-EXCHANGE APPARATUS.

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To all whom it may concern:

Be it known that I, OLIVIER PIETTE, engineer, a subject of the King of Belgium, and resident of Brussels, in the Kingdom of Belgium, have invented certain new and useful Improvements in Heat-Exchange Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to accompanying drawings, and to letters or figures of reference marked therein, which form a part of this specification.

The present invention relates to an apparatus for exchanging heat between two fluids, such as, for example, gas and air, consisting of juxtaposed chambers, the odd chambers of the series being traversed by one of the said fluids, and the even ones by the other of said fluids.

Heat-exchangers of the kind hitherto constructed have the disadvantage of being of complicated mounting and maintenance, and, in addition, of effecting the exchanges of heat under unfavourable conditions.

The object of the present invention is to obviate these disadvantages.

According to the present invention the heat exchanger consists of juxtaposed vertical chambers, the odd chambers of the series being externally interconnected to form the circuit for one of said fluids and the even chambers being externally interconnected to form the circuit for the other of said fluids and each two consecutive chambers being separated by a single thickness of sheet iron, the chambers traversed by the heated fluid being interconnected at their upper part, and the chambers traversed by the heating fluid being interconnected alternately at their upper part and at their lower part.

A certain number of the said chambers forms separated elements each of which is constructed completely independent of the others and made in the same manner.

In a form which is particularly advantageous for carrying the invention into effect, the chambers are placed vertically, a middle baffle being provided in each of the chambers traversed by the heated fluid in order to lead the incoming air directly at the bottom of the chamber, said air rising at the other side of the baffle, according to the lessening of its density.

The upper connecting conduits of the chambers for the heating fluid may be provided with openings for cleaning, whilst the lower connecting conduits are provided with orifices for evacuation of dust and other impurities.

The invention also provides for a mode of constructing the heat exchanger which is especially advantageous, in which the sheet-iron constituting the partitions of the chambers has its joints arranged outside the apparatus.

By way of example, a form of carrying the invention into effect is illustrated by the accompanying drawings, in which:—

Fig. 1 is a view of the apparatus partly in elevation and partly in longitudinal vertical section, the section being taken along the line 1—1 of Fig. 2.

Fig. 2 is a view of the apparatus partly in plan and partly in horizontal section, the section being taken along the line 2—2 of Fig. 1.

The apparatus consists of juxtaposed elements of rectangular section, which can be easily separated from each other and which have a width indicated by R in Fig. 1, each of said elements comprising four juxtaposed vertical rectangular chambers, two odd interconnected chambers and two even interconnected chambers, and said elements being connected to each other by external joints J.

As has been described above, the odd chambers G interconnected at their base by means of hoppers E and at the upper part by means of pipes M bent twice form the heating circuit and the even chambers H also interconnected by means of pipes N bent twice form the heated circuit.

In this manner two separate circuits are formed, the gases which leave the gas producers passing through one of the circuits, for instance, through the circuit G, and the air which goes to hearths of the gas-producers passing through the other circuit H. The heat is exchanged through plane partitions which separate the gas chambers G from the air chambers H.

The admission of the gas is shown in Fig. 1 at A and its outlet at B. The admission of the air is shown in Fig. 2 at C and its outlet at D.

The air enters laterally at the upper part of the chamber H and is compelled to pass under a middle baffle L through the bottom

of the chamber in order to rise again on the other side and leave the chamber through a pipe provided at the side of the said chamber at its upper part.

5 As shown in the drawing, the axis of the circuit of the gas is in a vertical plane; this arrangement allows the mixture of dust and tarry bodies to fall along the plane walls and to be collected by the hoppers E and
10 evacuated through the holes F.

Openings K provided at the upper part of the gas compartment allow the apparatus being cleaned during its working in case that tarry bodies and dust stick to the walls.
15 The whole apparatus may be heat insulated.

What I claim is:—

1. An apparatus for heat exchange between two fluids comprising juxtaposed vertical rectangular chambers, a number of
20 which form separated elements, each of which is constructed completely independently of the others and made in the same manner, said chambers being interconnected
25 in pairs, and each of two consecutive chambers being separated by a single thickness of plane sheet iron, the chambers traversed by the heated fluid being interconnected at their upper parts, the chambers traversed
30 by the heating fluid being connected alternately at their upper parts and at their lower parts.

2. An apparatus for heat exchange between two fluids comprising juxtaposed
35 vertical rectangular chambers, a number of which form separated elements each of which is constructed completely independently of the others and made in the same manner, said chambers being interconnected
40 in pairs, and each of two consecutive chambers being separated by a single thickness of plane sheet iron, the chambers traversed by the heated fluid being interconnected at their upper parts, the chambers traversed
45 by the heating fluid being connected alternately at their upper, and at their lower parts, a middle baffle being provided in each of the chambers traversed by the heated fluid in order to lead the incoming heated
50 fluid directly to the bottom of its chamber,

said heated fluid rising on the other side of the baffle accordingly as its density decreases.

3. An apparatus for heat exchange between two fluids comprising juxtaposed vertical rectangular chambers, a number of
55 which form separated elements each of which is constructed completely independently of the others and made in the same manner, said chambers being interconnected
60 in pairs and each of two consecutive chambers being separated by a single thickness of plane sheet iron, the chambers traversed by the heated fluid being interconnected at their upper parts, alternate upper and lower
65 connecting conduits for the chambers traversed by the heating fluid, the upper connecting conduits of the chambers for the heating fluid being provided with openings for cleaning whilst the lower connecting
70 conduits of each of the same chambers are provided with orifices for evacuating dust and other impurities.

4. An apparatus for heat exchange between two fluids comprising juxtaposed
75 vertical rectangular chambers, a certain number of which form separated elements, each of which is constructed completely independently of the others and made in the same manner, said chambers being inter-
80 connected in pairs and each of two consecutive chambers being separated by a single thickness of plane sheet iron, the joints of which are placed on the outside, the chambers traversed by the heated fluid being in-
85 terconnected at their upper part, alternate upper and lower connecting conduits for the chambers traversed by the heating fluid, the upper connecting conduits of the chambers for the heating fluid being provided
90 with openings for cleaning whilst the lower connecting conduits of each of the same chambers are provided with orifices for evacuating dust and other impurities.

In testimony whereof I affix my signature 95 in presence of two witnesses.

OLIVIER PIETTE.

Witnesses:

G. NOEL,
LEONARD LEVA.