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(54) A electric device for hot water production

(57) The invention relates to an electric device for hot water production, comprising a plurality of juxtaposed vertical tubes (11), a lower manifold (12) and an upper manifold (13) to which all the vertical tubes are connected, and at least one electric heating resistor (23). Each tube (11) is connected to the manifolds by screwing means, the lower manifold has an inlet passage for the water to be heated, the upper manifold has an outlet passage for hot water toward usage appliances, and the electric resistor can be either placed outside a wall of the lower manifold without contacting water, or it is immersed in the water contained in said manifold.

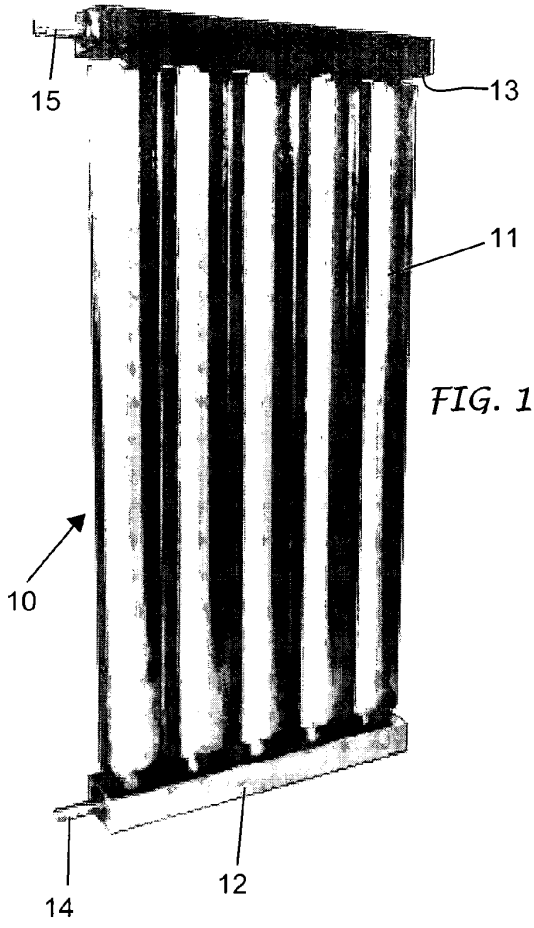

FIG. 1

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Description

[0001] The present invention relates to an electric device for heating water, i.e. a boiler, of flat type, which can find application, in particular but not only, in producing hot water for domestic use.

[0002] Various boiler embodiments are already known, for the so-called flat type too, such as those described, for example, in documents DE 40 12 203; US 4 551 612; GB 731 769; FR 2 900 719; WO 9745250.

[0003] These devices, however, appear to be relatively complex, labour-consuming and costly to manufacture, and most of them make use of electric immersed resistors, that is to say placed directly in contact with the water to be heated, the resulting problems being well known to those skilled in the art.

[0004] Instead, the object of the present invention is to propose and provide an electric device for heating water which is easier to manufacture and in which the resistors can be advantageously disposed not in contact with the water to be heated but out of water, and the components in which water flows are substantially joined without welding.

[0005] According to the invention, the object is achieved by a device for producing hot water including a system for storing and heating water comprising a plurality of juxtaposed vertical tubes, a lower manifold and an upper manifold to which all the vertical tubes are connected, and at least one electric heating resistor, wherein the lower manifold has an inlet passage for the water to be heated, the upper manifold has an outlet passage for hot water toward the usage appliances, and the electric resistor is placed outside, and in contact with, a wall of the lower manifold, or it is immersed therein.

[0006] Particularly, the vertical tubes and the manifolds are then buried within a jacket of a thermo-insulating material such as polystyrene, which is in turn enclosed by a finish coating, for example of polycarbonate.

[0007] However, further details of the invention will be more apparent from the following description made with reference to the attached exemplary and non-limiting drawings, in which:

Fig. 1 shows a perspective view of the device without insulation;

Fig. 2 shows a front view of the device in Fig. 1 with a sectioned part;

Fig. 3 shows a side view taken from one side of the device in Fig. 2;

Fig. 4 shows another side view taken from the opposite side of the device in Fig. 2;

Fig. 5 shows a top view of the device;

Fig. 6 shows an enlarged, sectioned detail of the connection of a vertical tube to the lower manifold;

Fig. 7 shows an enlarged, sectioned detail of the connection of a vertical tube to the upper manifold;

Fig. 8 shows the arrangement of the electric resistor beneath the lower manifold; and

Fig. 9 shows a section of the device when it is insulated and finished by an external coating.

[0008] The device for heating water herein proposed and generally denoted by 10, consists in a plurality of juxtaposed vertical tubes 11 extending between two common parts formed by a lower manifold 12 and an upper manifold 13, respectively - Figs. 1, 2.

[0009] Preferably, the vertical tubes 11 and the lower and upper manifolds 12, 13 are made of stainless steel, said manifolds 12, 13 being preferably box - shaped.

[0010] The lower manifold 12 has an inlet passage 14 for the water to be heated; on the other hand, the upper manifold 13 has an outlet passage 15 for the hot water.

[0011] The vertical tubes 11 are each provided with end flanges 11 a, 11 b closing their respective opposite ends, and are hydraulically communicating with both the lower manifold 12 and the upper manifold 13 to which they are connected, preferably by screwing them.

[0012] In particular, each tube 11 is then connected to the lower manifold 12, either mechanically or hydraulically, for example by means of a connecting sleeve 16 defining a duct for the passage of water and having a double thread that is screwed both to the adjacent end flange 11 a of the tube itself and a wall of said lower manifold with interposed gaskets 17 of the "o-ring" type - Fig. 6.

[0013] Each tube 11 is connected to the upper manifold 13 by a fitting 18 and a sleeve 19 - Fig. 7. These are screwed one to the other with an interposed gasket 20. In addition, the fitting 18 is screwed to the end flange 12b of said tube 11 with an interposed gasket 21, and the sleeve 19 is screwed to a wall of said upper manifold with another interposed gasket 22. These gaskets can also be of the "o-ring" type.

[0014] Water is heated by means of at least one electric resistor 23 that is placed outside the device, for example by nickel braze welding, thereby without directly contacting water.

[0015] Preferably, the at least one resistor 23 is positioned flush with the lower manifold 12 and against the underlying surface of the latter - Fig. 8 - and it can be connected to an electric power supply. However, without affecting the assembly of the heating device, it is not to be excluded that the electric resistor may be arranged immersed in the water contained in the lower manifold.

[0016] Once the components of the device have been assembled, the whole is encased in a jacket 24 of a thermo-insulating material such as polystyrene, and it is enclosed in an external finish coating 25, preferably of polycarbonate.

[0017] The assembly will be completed, moreover in a traditional manner, with water inlet and outlet control valves, temperature probes, and safety systems for the electric heater.

[0018] Generally, the water entering from the inlet passage is then accumulated in the lower manifold and transferred to the upper manifold through the vertical tubes.

The water is gradually heated by the electric resistor and, when required, it is delivered to the usage appliances through the outlet passage of the upper manifold.

[0019] The resistor ensures heating without directly contacting water, and the insulating jacket prevents heat losses to the outside and retains the heat content of the water within the boiler.

Claims

1. Electric device for hot water production, having a system for storing and heating water including a plurality of juxtaposed vertical tubes (11), a lower manifold (12) and an upper manifold (13) to which all vertical tubes are connected, and at least one electric heating resistor (23), wherein each tube is connected to said manifolds by screwing means, the lower manifold has an inlet passage for the water to be heated, the upper manifold has an outlet passage for hot water toward usage appliances, and the electric resistor is either placed outside a wall of the lower manifold without contacting water, or it is immersed in the water contained in said manifold.

2. Device according to claim 1, wherein the vertical tubes (11) and the manifolds are made of stainless steel, and wherein each tube is provided with end closure flanges (11a, 11b) and each manifold is box - shaped.

3. Device according to claim 1 or 2, wherein each vertical tube (11) is mechanically and hydraulically connected to the lower manifold (12) by a connecting sleeve (16) having a duct for water passage, and having a double thread which is screwed both to an adjacent end flange (11a) of the tube itself and a wall of said lower manifold with an interposed gasket.

4. Device according to claim 1 or 2 and 3, wherein each vertical tube (11) is connected to the upper manifold (13) through a fitting (18) and a sleeve (19) which are screwed one to the other with an interposed gasket (20), and wherein said fitting (18) is screwed to an end flange (12b) of said tube with an interposed gasket (21), and the sleeve (19) is screwed to a wall of said upper manifold with another interposed gasket (22).

5. Device according to the preceding claims, wherein the vertical tubes and the upper and lower manifolds, which are connected one to each other, are buried within a jacket (23) of a thermo - insulating material enclosed in a finish coating (24).

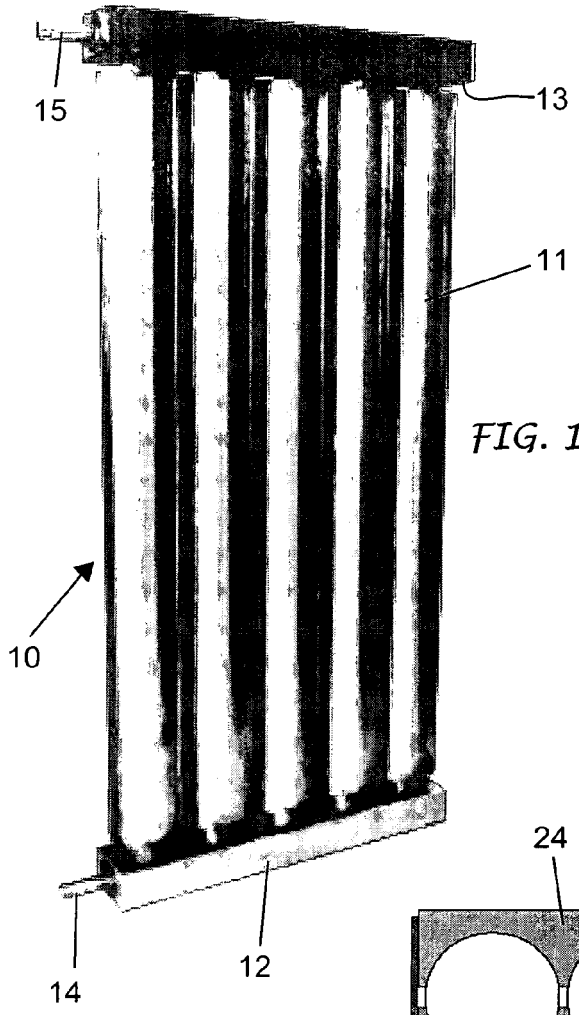

FIG. 1

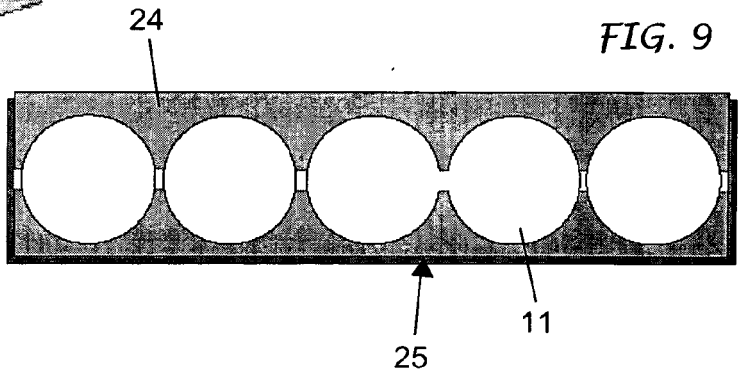

FIG. 9

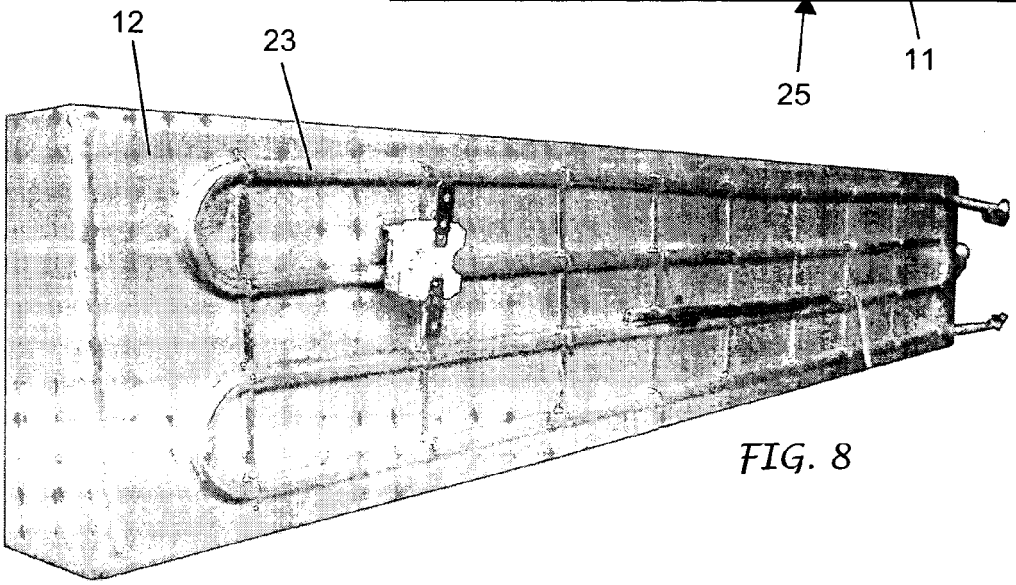

FIG. 8

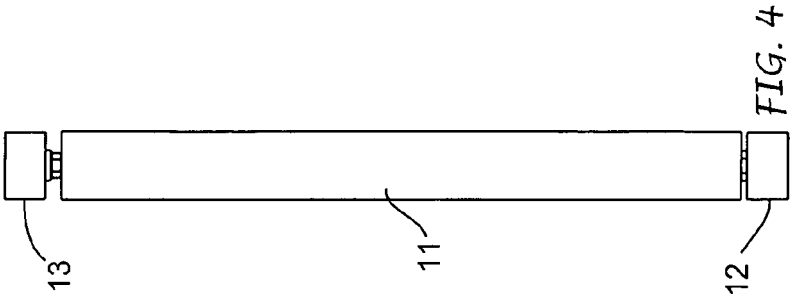

FIG. 4

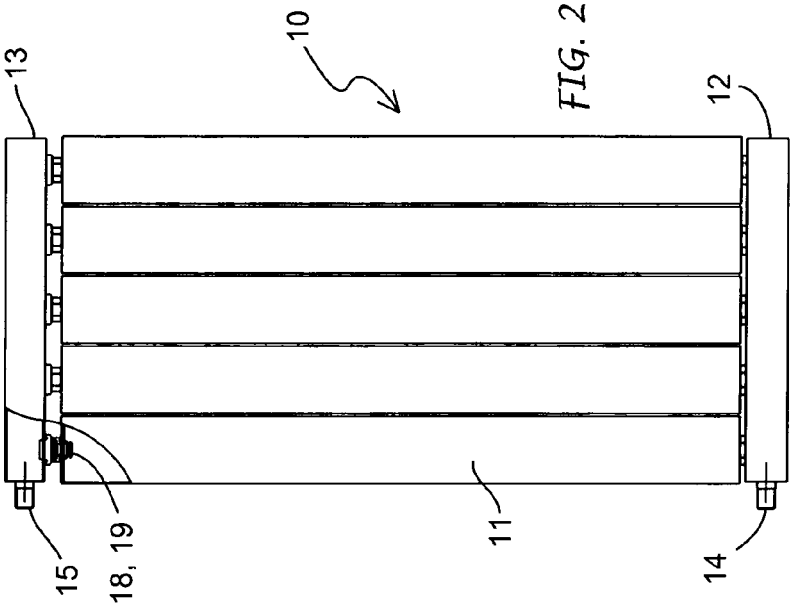

FIG. 2

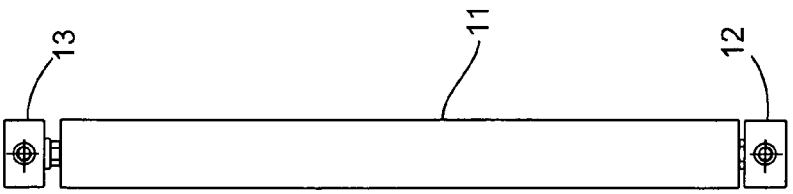

FIG. 3

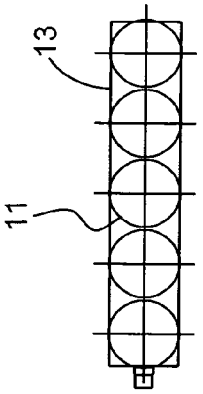

FIG. 5

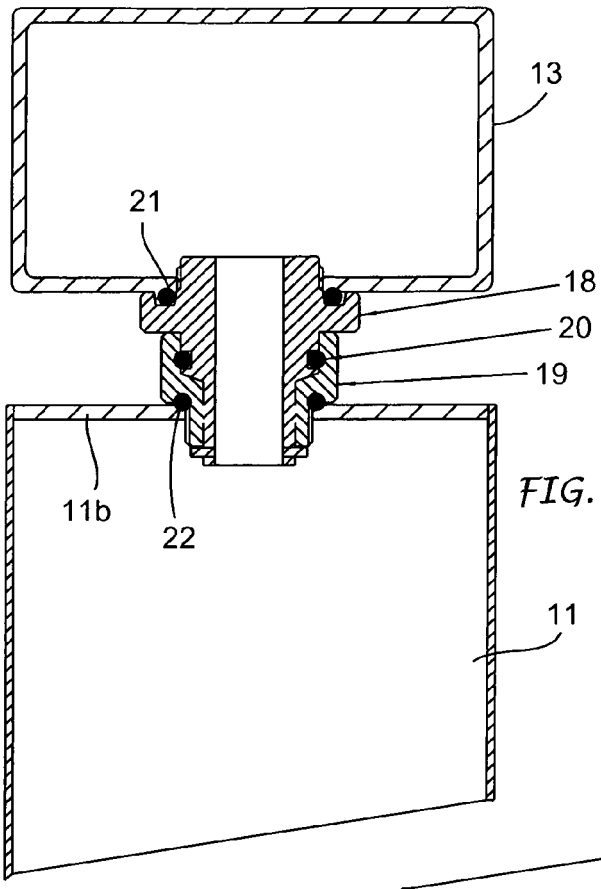

FIG. 7

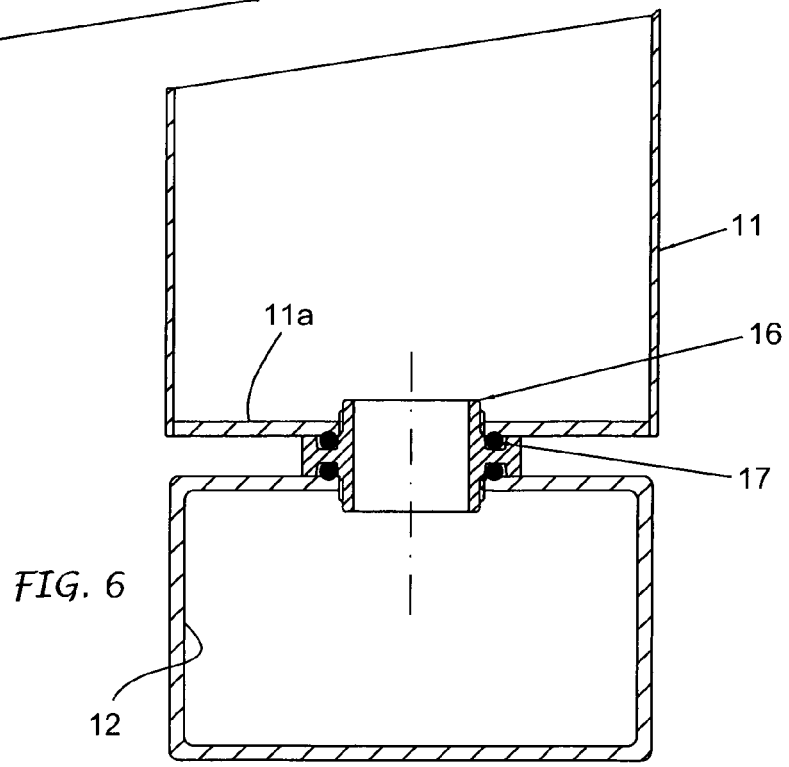

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 4012203 **[0002]**
- US 4551612 A **[0002]**
- GB 731769 A **[0002]**
- FR 2900719 **[0002]**
- WO 9745250 A **[0002]**