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(54) Title: DUAL PURPOSE HEAT EXCHANGER

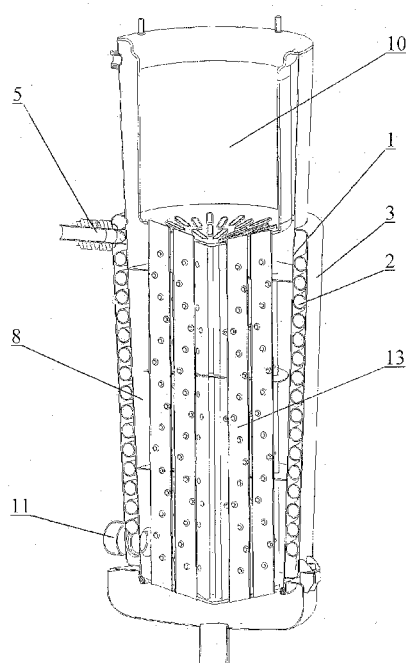


Fig. 2

(57) Abstract: A dual purpose heat exchanger comprises a central heating fluid circuit and hot utility water circuit. The exchanger contains fired or heated by flow of water or steam main heat exchanger and coil (2) enclosed by an external jacket (3) equipped with an inlet stub pipe (6) for fluid heating the utility water in the coil (2) as well as an inlet stub pipe (4) and outlet stub pipe (5) for utility water; however, the flow chamber of fluid heating the utility water in the coil (2) is connected with the flow chamber (8) of heated fluid in the main exchanger. Preferably, the coil (2) is wound on the jacket (1) of the main exchanger, and the flow chamber of fluid heating the utility water in the coil (2) is connected through at least one overflow hole (7) with the flow chamber (8) of heated fluid in the main exchanger.



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Dual purpose heat exchanger

The invention relates to a dual purpose heat exchanger used in central heating systems and hot utility water systems.

Document PL 165 412 B1 discloses a heat exchanger of counter-current flow, used in central heating and utility water systems. The exchanger comprises a cylindrical jacket terminating with bottoms, heating water stub pipes located in the exchanger axis, heated water stub pipes in the part of the cylindrical jacket and a replaceable coil unit wound around a core in a counter-current arrangement and fixedly connected with tube-sheets. The jacket comprises two identical symmetrical parts equipped with a bolted-flange connection in the middle of the exchanger length. The replaceable coil unit is seated between fastening elements, fixedly installed inside the jacket. An aligning and installation arbour is mounted to each tube-sheet of the coil unit, which represents an extension of the core and passes through a centric hole in the fastening element, terminating with a connection element. The exchangers can be functionally connected into sets.

Document PL 299295 A1 discloses a heat exchanger, especially for detached houses, comprising a hot utility water exchanger releasably connected with the central heating exchanger using flanges, between which a metal baffle is inserted with complete sealing, representing, at the same time, thermal insulation on both sides of the baffle; however, the heating coils of the central heating exchanger zero stage are connected in parallel with the coil distributor.

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Document PL 53318 Y1 discloses a heat exchanger used in central heating and hot utility water systems in group or individual high power thermal substations. The exchanger is equipped with a cylindrical jacket with heated water stub pipes and spiral coils for heating water located inside the jacket around the core in a counter-current arrangement, whose ends are fixedly installed to the tube-sheets. The front walls of the exchanger are demountable covers, and the heating water stub pipes are located perpendicularly to the exchanger axis between the covers and tube-sheet.

Document PL 184526 B1 discloses a direct water heater formed of a housing divided into two zones located one on top of the other or next to each other. Each zone comprises a water spraying nozzle located in the top section above the filling, consisting of heat exchanging elements and a tank located under the filling of heat exchanging elements and connected to a closed loop with a heat exchanging device. The first section further comprises a burner used to heat the water sprayed by the nozzle above the filling, and the other comprises an exhaust gas duct. Direct water heater with two chambers allows for the supply of hot water from two sources of different temperatures for different purposes.

The purpose of the invention is to minimize the dimensions of the device housing heat exchanger used in a central heating system and hot utility water system.

This is satisfied by developing a heat exchanger design that fulfils both functions simultaneously.

The dual purpose heat exchanger comprising a central heating fluid and hot utility water circuit, according to the invention, characterised in that it contains fired or heated by a flow of water or steam main

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heat exchanger and coil enclosed by an external jacket equipped with an inlet stub pipe for fluid heating the utility water in the coil as well as an inlet and outlet stub pipe for utility water; however, the flow chamber of fluid heating the utility water in the coil is connected with the flow chamber of heated fluid in the main exchanger.

Preferably, the coil is wound on the jacket of the main heat exchanger; however, the external jacket enclosing the coil is tightly connected with the main exchanger jacket, forming a flow chamber of fluid heating the utility water in the coil, whose chamber is connected using at least one overflow hole with the flow chamber of heated fluid in the main exchanger.

Preferably, the inlet and outlet stub pipe of the utility water is connected with the external jacket using a welded, stainless sleeve with a thread, ring and nut.

Preferably, the main heat exchanger jacket is of a conical shape with the diameter increasing towards top.

Preferably, the main heat exchanger jacket is of a cylindrical shape.

To maintain the distance of individual turns, uniform indents are made in the external jacket that set the location of coil turns, or a tape is passed through the coil turns in an alternating arrangement, which set their location, or the coil turns are placed on a separating comb.

As a result of eliminating a separate heat exchanger for heating utility water, one gains power and material savings resulting from eliminating the additional connections between exchangers.

The invention is presented in exemplary embodiments in figures, where fig. 1 – view of exchanger in conical shape, fig. 2 – view of exchange as given in fig. 1 in axial section, figs. 3, 4 – axial section of conical exchanger, figs. 5, 6 – axial section of cylindrical exchanger.

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The dual purpose heat exchanger, according to first embodiment of the invention, shown in figs. 1, 2, 3, comprises a known fired main heat exchanger and a copper coil 2 wound on the exchanger jacket 1. The main exchanger jacket is of a conical shape with the diameter increasing towards the top, inside which there is a set of vertical tube elements 13 fixed at their ends on both sides to the tube-sheets. The combustion chamber 10 is located over the top tube-sheet. The coil 2 is wound around the main heat exchanger jacket 1, and the coil is enclosed by an external jacket 3 equipped with an inlet stub pipe 6 of fluid heating the utility water in coil 2 and an inlet stub pipe 4 and an outlet stub pipe 5 of utility water. The inlet stub pipe 4 and outlet stub pipe 5 of utility water are connected with the jacket 3 using a welded, stainless sleeve with a thread, ring and nut. The jacket 3 is tightly connected with the main exchanger jacket 1, and the space between the jackets 1, 3, composing a flow chamber of fluid heating the utility water in coil 2, is connected through the overflow hole 7 with the flow chamber 8 of heated fluid in the main exchanger. The inlet stub pipe 11 of fluid passes through the external jacket 3 to the main heat exchanger; the outlet stub pipe 12 of hot fluid is located within the top section of the main heat exchanger jacket 1. The external jacket 3 has uniform dents 9 in three vertical rows that set the coil 2 turns.

Hot exhaust in the combustion chamber 10 flows down via tube elements 9 and give up the heat of fluid circulating in a counter-current arrangement in relation to the direction of exhaust flow inside the jacket 1. Hot fluid from the main exchanger, collected by the outlet stub pipe 12, is cyclically introduced through the inlet stub pipe 6 to the chamber between jackets 1 and 3, where by when flowing down, it heats the utility

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water in the coil 2 and then, through the overflow hole 7 in the jacket 1 of the main heat exchanger, returns to the flow chamber 8 of heated fluid in the main exchanger. Utility water is supplied to the coil 2 using an inlet stub pipe 4, which is heated by flowing in a counter-current arrangement in relation to the heating fluid and is collected by the outlet stub pipe 5.

According to the second embodiment of the invention, the dual purpose heat exchanger, described in the first embodiment, has a cavity for coil 2 (fig. 4) formed in the main heat exchanger jacket 1.

According to the third embodiment of the invention, the dual purpose heat exchanger, described in the first embodiment, has the main heat exchanger jacket 1 in a cylindrical shape (fig. 5).

According to the fourth embodiment of the invention, the dual purpose heat exchanger, described in the third embodiment, has a cavity for coil 2 (fig. 6) formed in the main heat exchanger jacket 1.

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Claims

1. A dual purpose heat exchanger comprising a central heating fluid and hot utility water circuit, characterised in that it contains fired or heated by flow of water or steam main heat exchanger and coil (2) enclosed by an external jacket (3) equipped with an inlet stub pipe (6) for fluid heating the utility water in the coil (2) as well as an inlet stub pipe (4) and outlet stub pipe (5) for utility water; however, the flow chamber of fluid heating the utility water in the coil (2) is connected with the flow chamber (8) of heated fluid in the main exchanger.
2. The exchanger according to claim 1, characterised in that the coil (2) is wound on the jacket (1) of the main heat exchanger; however, the external jacket (3) enclosing the coil (2) is tightly connected with the main exchanger jacket (1), forming a flow chamber of fluid heating the utility water in the coil (2), whose chamber is connected using at least one overflow hole (7) with the flow chamber (8) of heated fluid in the main exchanger.
3. The exchanger according to claim 1 or 2, characterised in that the inlet stub pipe (4) and outlet stub pipe (5) of utility water is connected with the external jacket (3) using welded, stainless sleeve with a thread, ring and nut.
4. The exchanger according to claim 2, characterised in that the main heat exchanger jacket (1) is of a conical shape with the diameter increasing towards the top.
5. The exchanger according to claim 2, characterised in that the main heat exchanger jacket (1) is of a cylindrical shape.

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6. The exchanger according to claim 2 through 5, characterised in that uniform indents (9) are made in the external jacket (3), which set the position of the coil (2) turns.

7. The exchanger according to claim 2 through 5, characterised in that a tape is passed through coil (2) turns in alternating arrangement, which sets their location.

8. The exchanger according to claim 2 through 5, characterised in that coil (2) turns are placed on a separating comb.

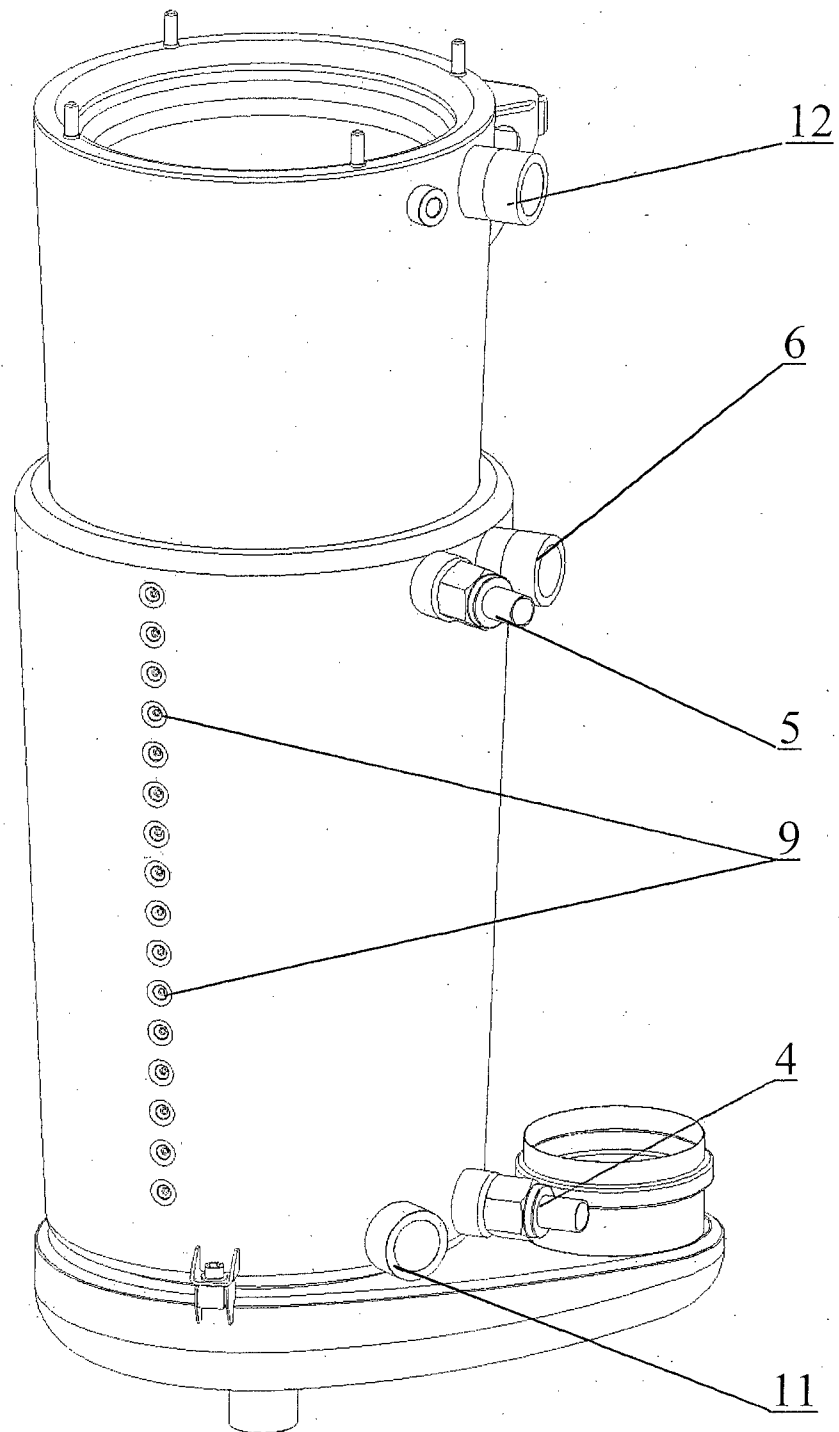


Fig. 1

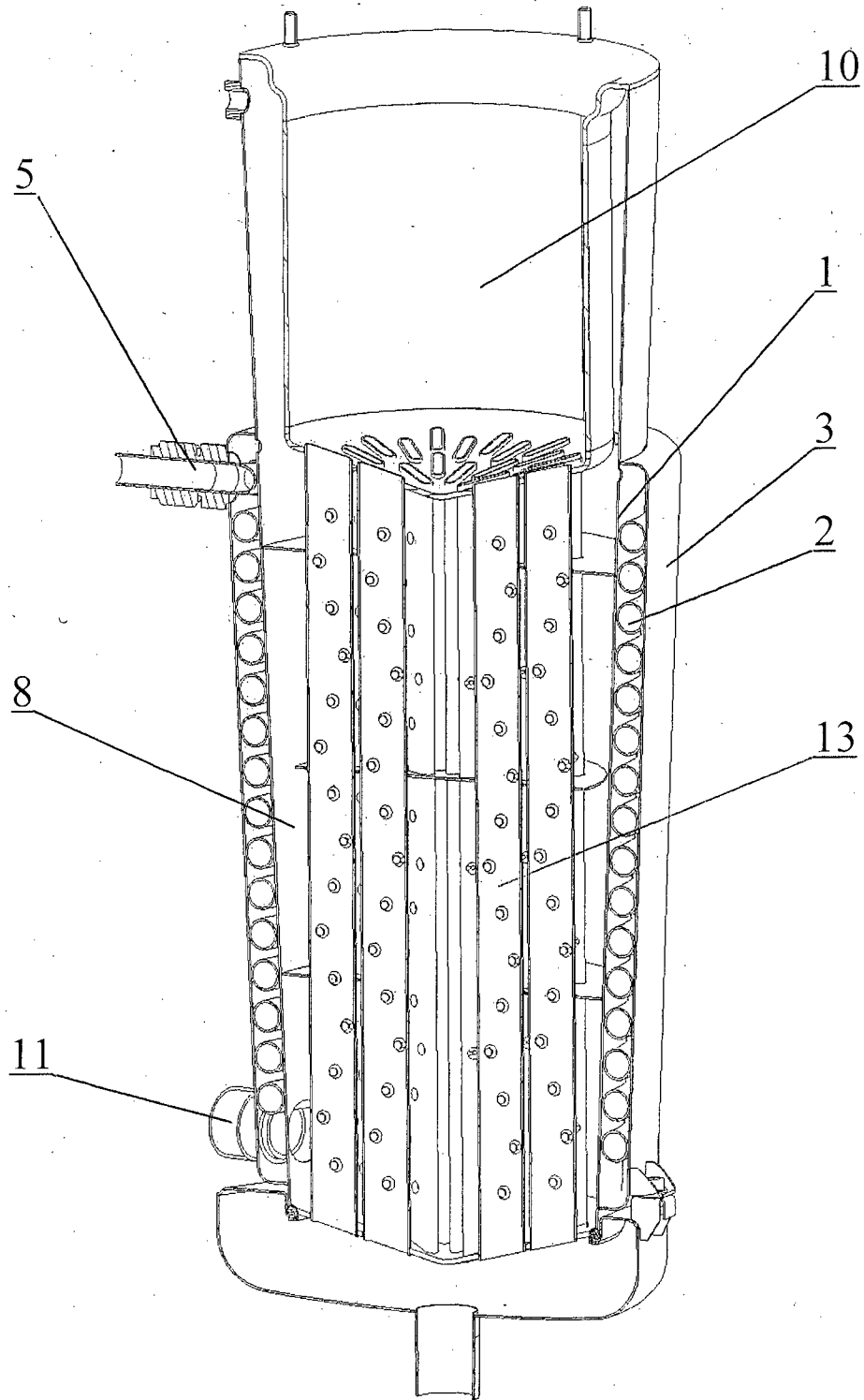


Fig. 2

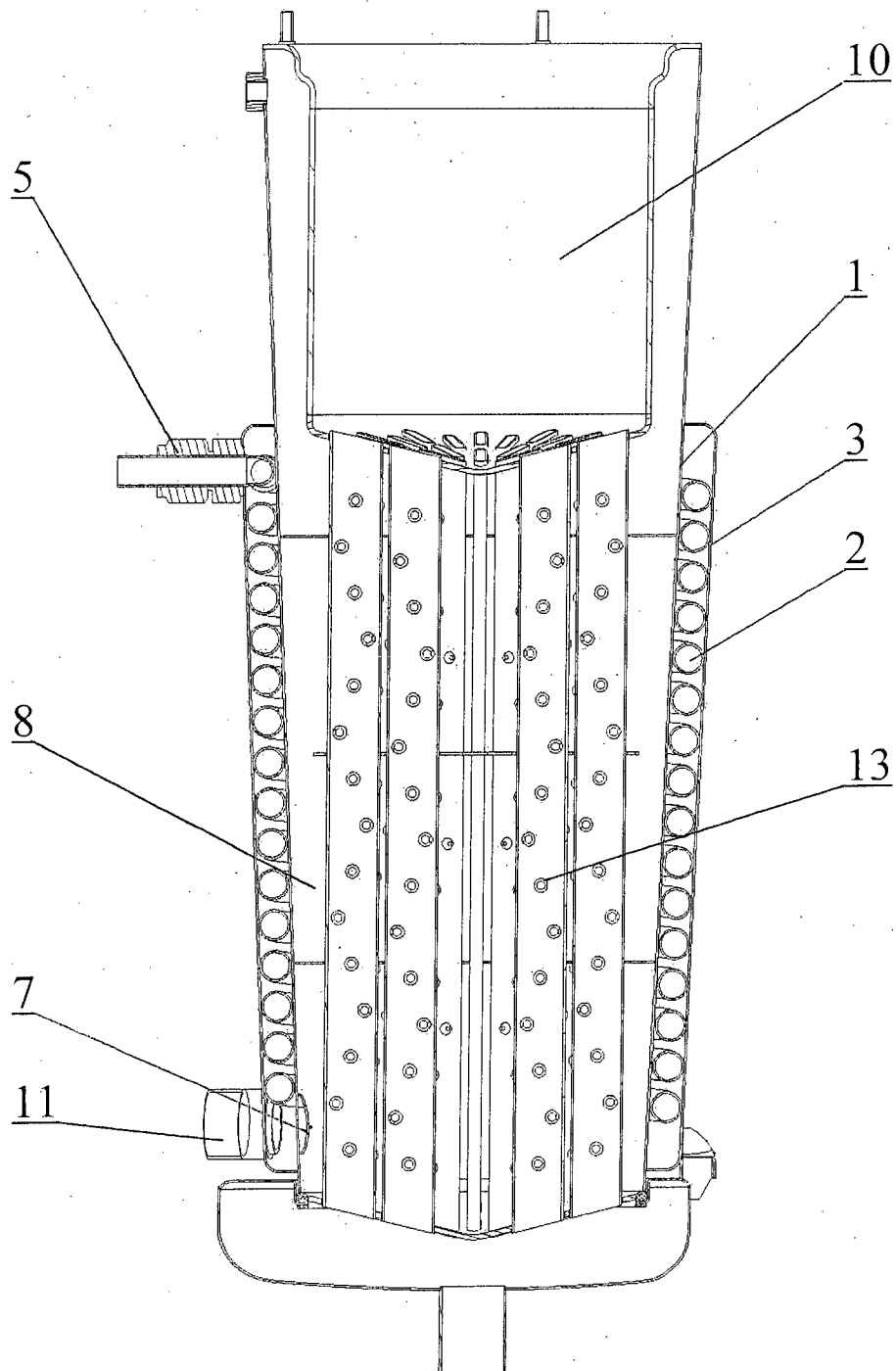


Fig. 3

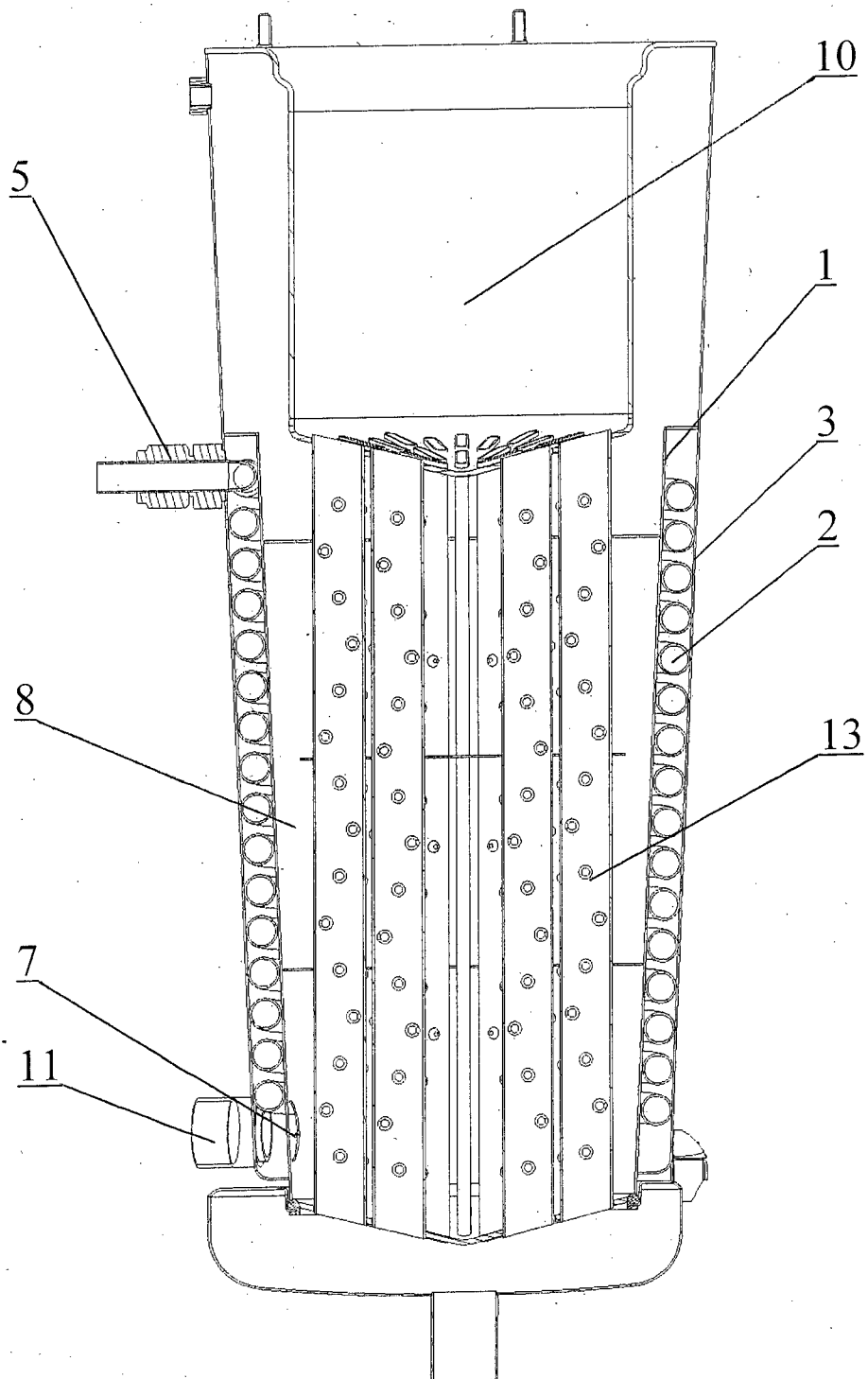


Fig. 4

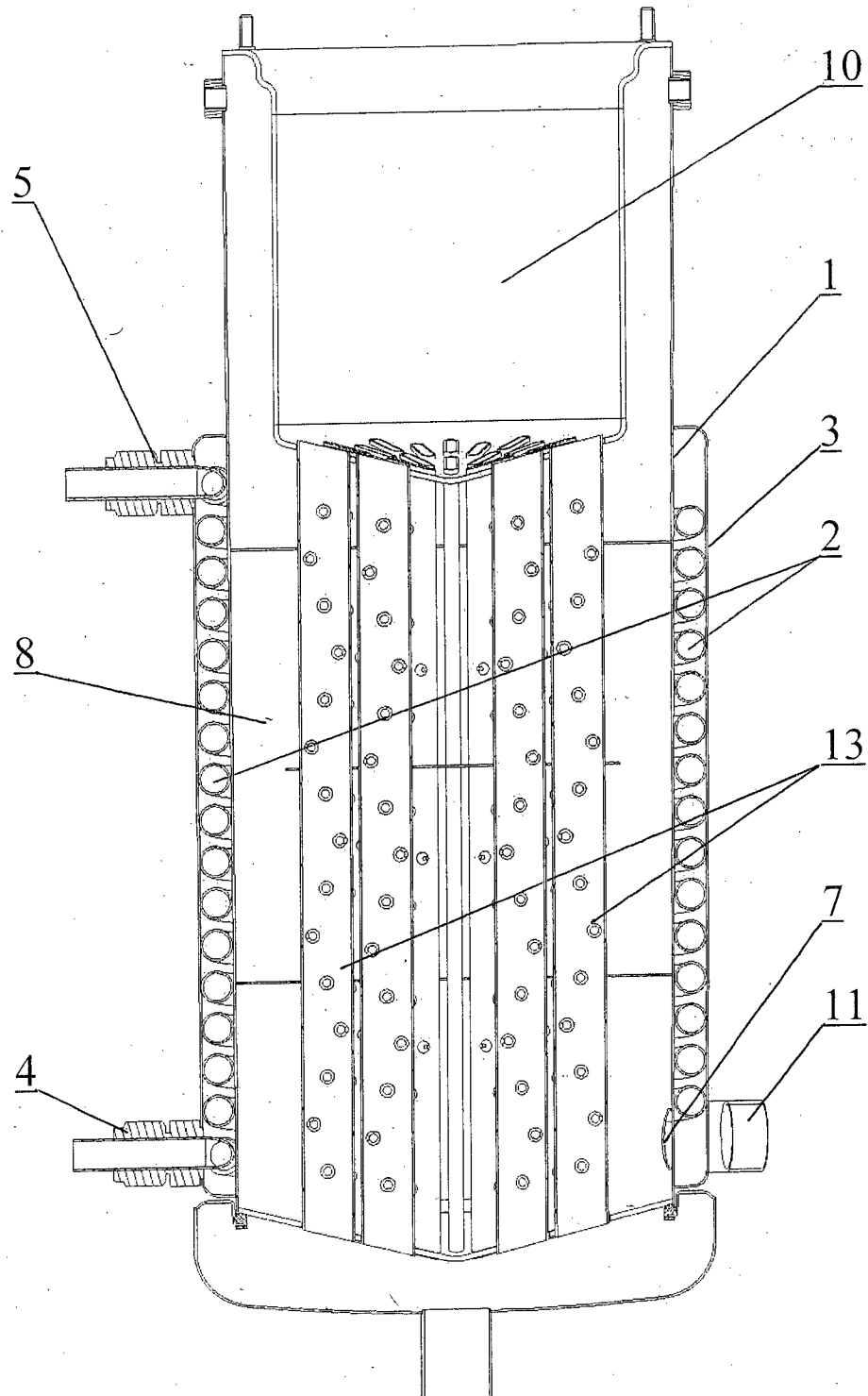


Fig. 5

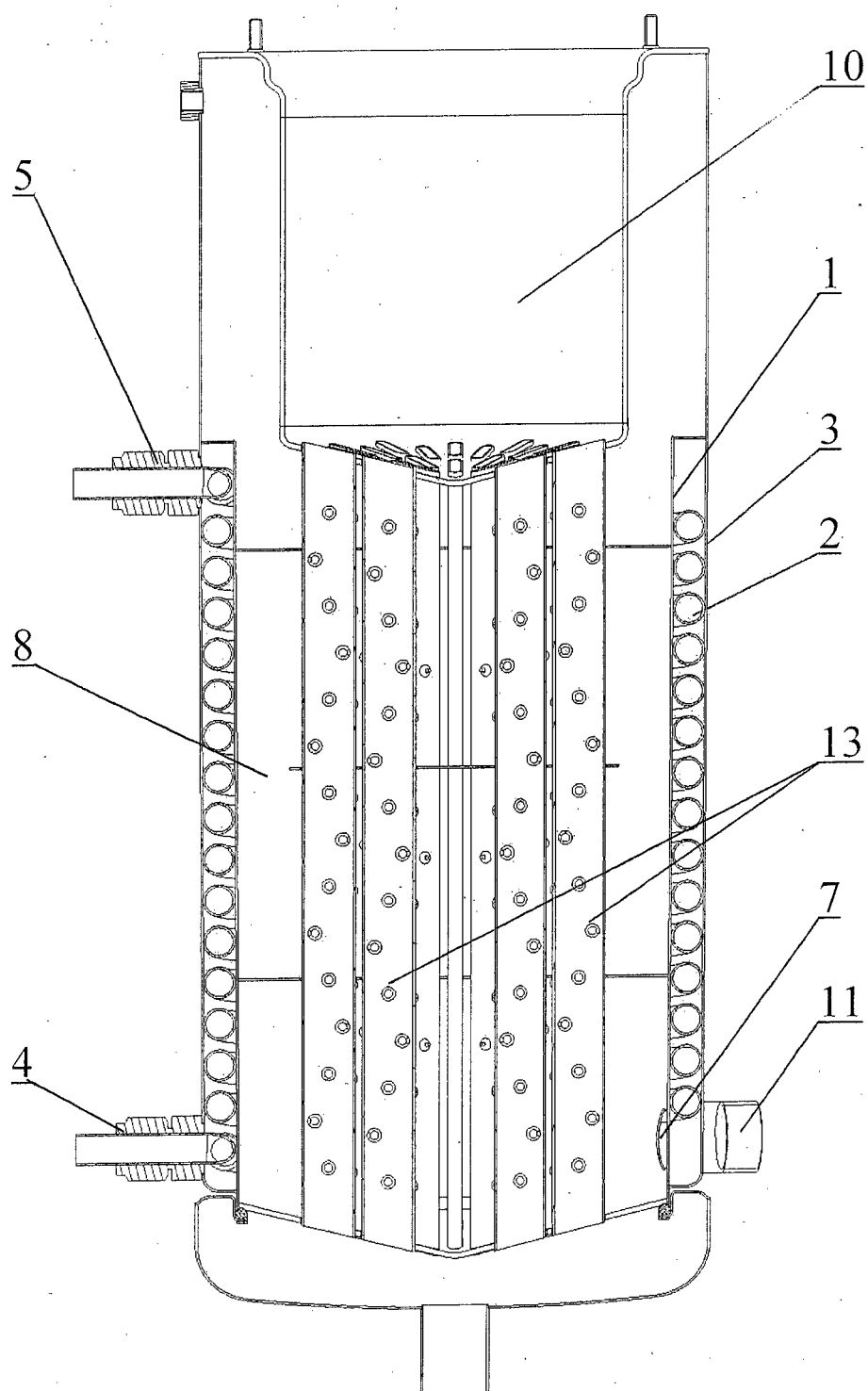


Fig. 6