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(71) Applicant: **AIC Spółka Akcyjna**
81-577 Gdynia (PL)

(72) Inventor: **Koscinski, Przemysław**
80-399 Gdansk (PL)

(74) Representative: **Pomianek, Grazyna**
Kancelaria Patentowo-Prawna
Grazyna Pomianek
ul. Subisława 23 C lok. 7
80-354 Gdansk (PL)

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(54) **BI-FUNCTIONAL BOILER**

(57) A bi-functional boiler having an outer jacket with two heat exchangers inside thereof, one serving the heating of boiler water, the other the heating of domestic water with the heated boiler water, characterised in that in between the said exchangers (2, 3) there is a partition (4) separating the boiler water heating space (A) from the domestic water heating space (B), where the spaces (A, B) are interconnected via an overflow slot (5) and each of the said spaces (A, B) is connected via a conduit (7, 8) with the circulation pump (6) so that the domestic water heating space (B) is connected with the inlet of the circulation pump (6), and the boiler water heating space (A) is connected with the outlet of the circulation pump (6).

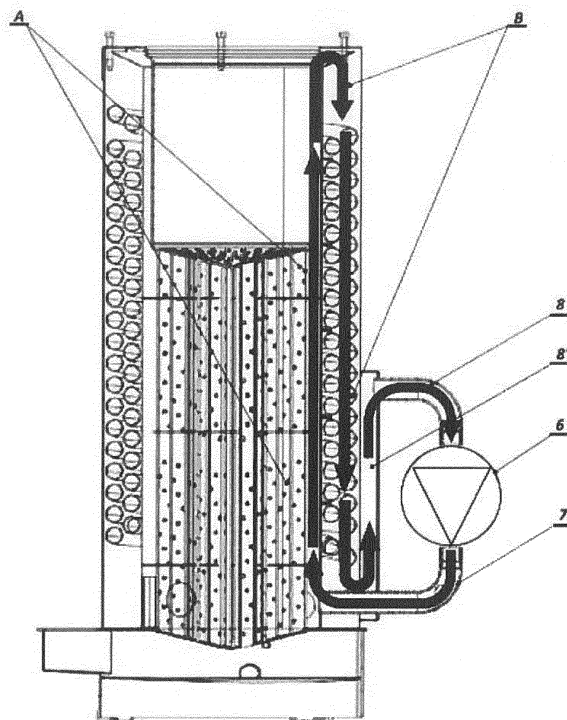


Fig. 4

Description

[0001] The invention concerns a bi-functional boiler designed for central heating and domestic hot water installations.

[0002] Known from document WO 01/98716 A1 is a bi-functional heat exchanger where the water for the central heating system is heated in the main chamber and the domestic water is heated in a coil placed in an additional chamber connected with the main chamber via a slotted canal from where it is discharged to a tank connected to the heating circuit.

[0003] Known from document PL 223 959 B1 is a bi-functional heat exchanger combining a boiler fluid circuit and a domestic water circuit in a coil wound on an inner jacket of the main exchanger and enclosed in an outer jacket, where the chamber where the fluid heating the domestic water in the coil flows is connected via an overflow outlet with the chamber where the heated fluid flows in the main exchanger.

[0004] The invention solves the problem of inner circulation of the boiler water in the bi-functional heat exchanger by having a boiler water circuit and a domestic water circuit, both constituting a single device.

[0005] The purpose of the invention is to minimise the dimensions of the device supplying boiler water to the central heating installation and as well as domestic hot water. The purpose of the invention is also to simplify the structure of the bi-functional heat exchanger whilst retaining its high thermal efficiency.

[0006] A bi-functional boiler having an outer jacket with two heat exchangers inside thereof, one of which serves the heating of boiler water, the other the heating of domestic water with the heated boiler water, according to the invention, is characterised in that there is a partition in between the said exchangers which separates the boiler water heating space from the domestic water heating space, where both spaces are interconnected via an overflow slot and each of the said spaces is connected via a conduit with a circulation pump so that the domestic water heating space is connected to the inlet of the circulation pump and the boiler water heating space is connected to the outlet of the circulation pump.

[0007] Preferably, the conduit connecting the domestic water heating space with the circulation pump is fitted in an opening in the outer jacket, and the conduit connecting the boiler water heating space with the circulation pump is drawn through the said opening in the outer jacket and fitted in an opening in the partition.

[0008] Preferably, the conduit connecting the domestic water heating space with the circulation pump incorporates a section fitted on the outer jacket.

[0009] The flow of the boiler water in the configuration according to the invention enables reduction of the dimensions of the whole device, simplification of its structure, and guarantees counterflow in both circuits, i.e. the boiler water heating circuit and the domestic water heating circuit.

[0010] The invention is presented on an exemplary embodiment on a drawing where

Fig. 1 shows the boiler in a perspective view;

Fig. 2- the boiler in longitudinal section;

Fig. 3- a section of detail C as on fig. 2;

Fig. 4 - the boiler in longitudinal section with the schematically illustrated circuit in the domestic water heating mode.

[0011] A bi-functional boiler has an outer jacket 1 with two heat exchangers 2, 3 inside thereof, arranged axially with respect to each other so that the exchanger designated for heating the domestic water 3 encloses the exchanger for heating the boiler water 2. In this exemplary embodiment, the exchanger for heating the boiler water takes the form of a flame-heated tube heat exchanger, whereas the exchanger for heating the domestic water takes the form of a coil.

[0012] Between exchangers 2 and 3 there is a partition 4 which separates the boiler water heating space A from the domestic water heating space B, where both spaces are interconnected above the partition 4 via an overflow slot 5, and opposite the slot 5 they are connected via conduits 7, 8, with the outer circulation pump 6 so that the domestic water heating space B is connected via conduit 8 with the inlet of the circulation pump 6, and the boiler water heating space A is connected via conduit 7 with the outlet of the circulation pump 6. The conduit 8 connecting the domestic water heating space B with the circulation pump 6 is fitted in an opening 8a in the outer jacket 1 and incorporates section 8' fitted on the outer jacket 1, and conduit 7 connecting the boiler water heating space A with the circulation pump 6 is drawn through the said opening 8a in the inner jacket 1 and fitted in opening 7a in the partition 4.

[0013] In the domestic water heating mode, the outer boiler water circuit can be closed. In the configuration, the hot boiler water circulates only between spaces A and B of both exchangers.

[0014] The flow of boiler water across the domestic water heating space B is forced by turning on the circulation pump 6, as presented on fig. 4. The boiler water in the domestic water heating space B, i.e. between the partition 4 and the outer jacket 1, is cooled by the cold domestic water flowing through the exchanger 3. Upon turning on the circulation pump 6, the cooled boiler water in space B is sucked by the circulation pump 6 therefrom, and sent along conduit 8 fitted in opening 8a in the outer jacket 1 and its section 8' fitted on the outer jacket 1, to the circulation pump 6 where it is pumped along conduit 7, and through opening 7a in the partition 4 it flows into the boiler water heating space A, and hot boiler water flows through the overflow slot 5 above the partition 4 to the domestic water heating space B and when washing the exchanger 3 dissipates heat to the domestic water.

Claims

1. A bi-functional boiler having an outer jacket with two heat exchangers insider thereof, one serving the heating of boiler water, the other the heating of domestic water with the heated boiler water, **characterised in that** in between the said exchangers (2, 3) there is a partition (4) which separates the boiler water heating space (A) from the domestic water heating space (B), where both spaces (A, B) are interconnected via an overflow slot (5) and each of the said spaces (A, B) is connected via a conduit (7, 8) with a circulation pump (6) so that the domestic water heating space (B) is connected with the inlet of the circulation pump (6), and the boiler water heating space (A) is connected with the outlet of the circulation pump (6).

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2. The boiler according to Claim 1, **characterised in that** the conduit (8) connecting the domestic water heating space (B) with the circulation pump (6) is fitted in an opening (8a) in the outer jacket (1), and that the conduit (7) connecting the boiler water heating space (A) with the circulation pump (6) is drawn through the said opening (8a) in the outer jacket (1) and fitted in an opening (7a) in the partition (4).

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3. The boiler according to Claim 2, **characterised in that** the conduit (8) connecting the domestic water heating space (B) with the circulation pump (6) incorporates a section (8') fitted on the outer jacket (1).

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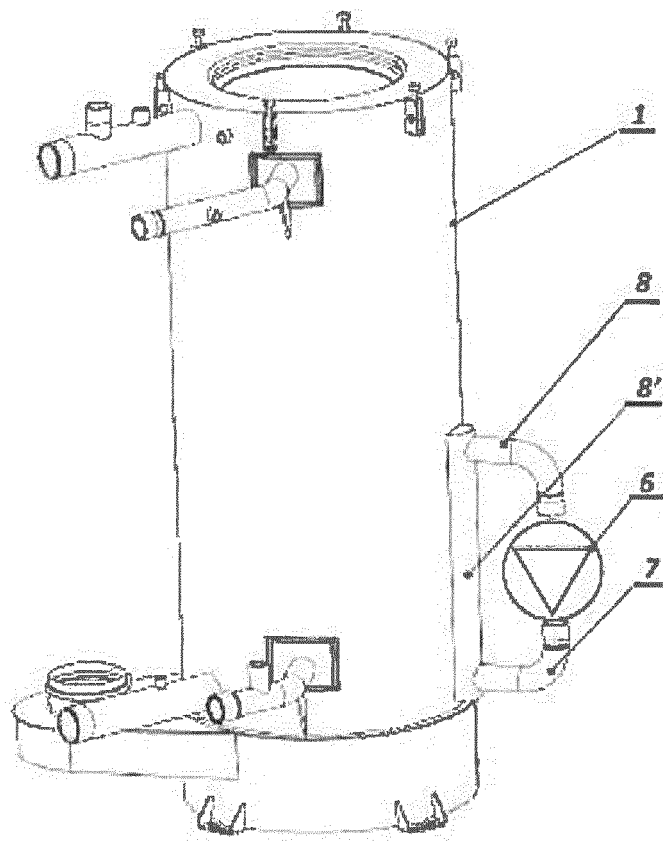
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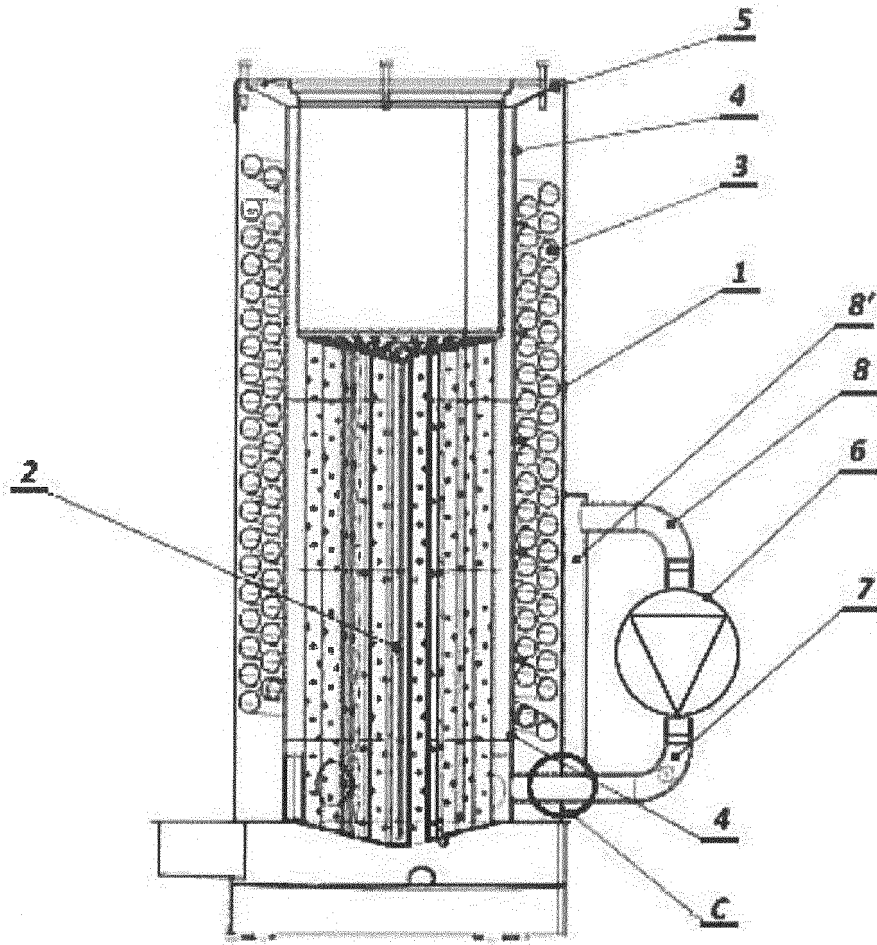


Fig. 2

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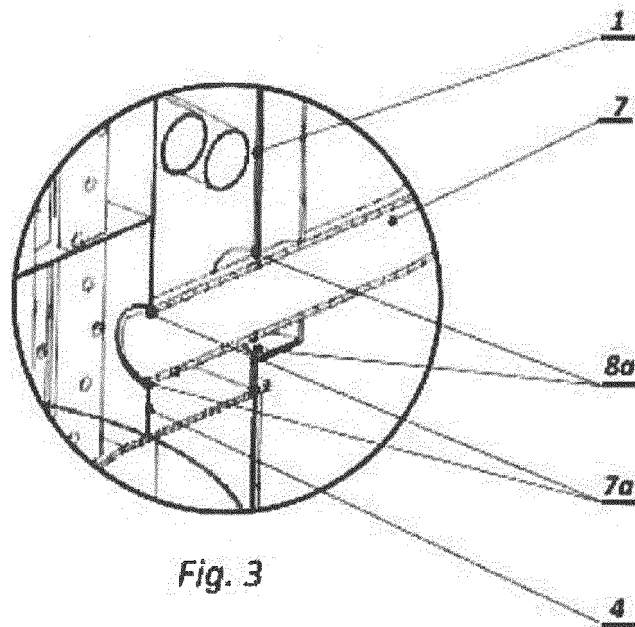


Fig. 3

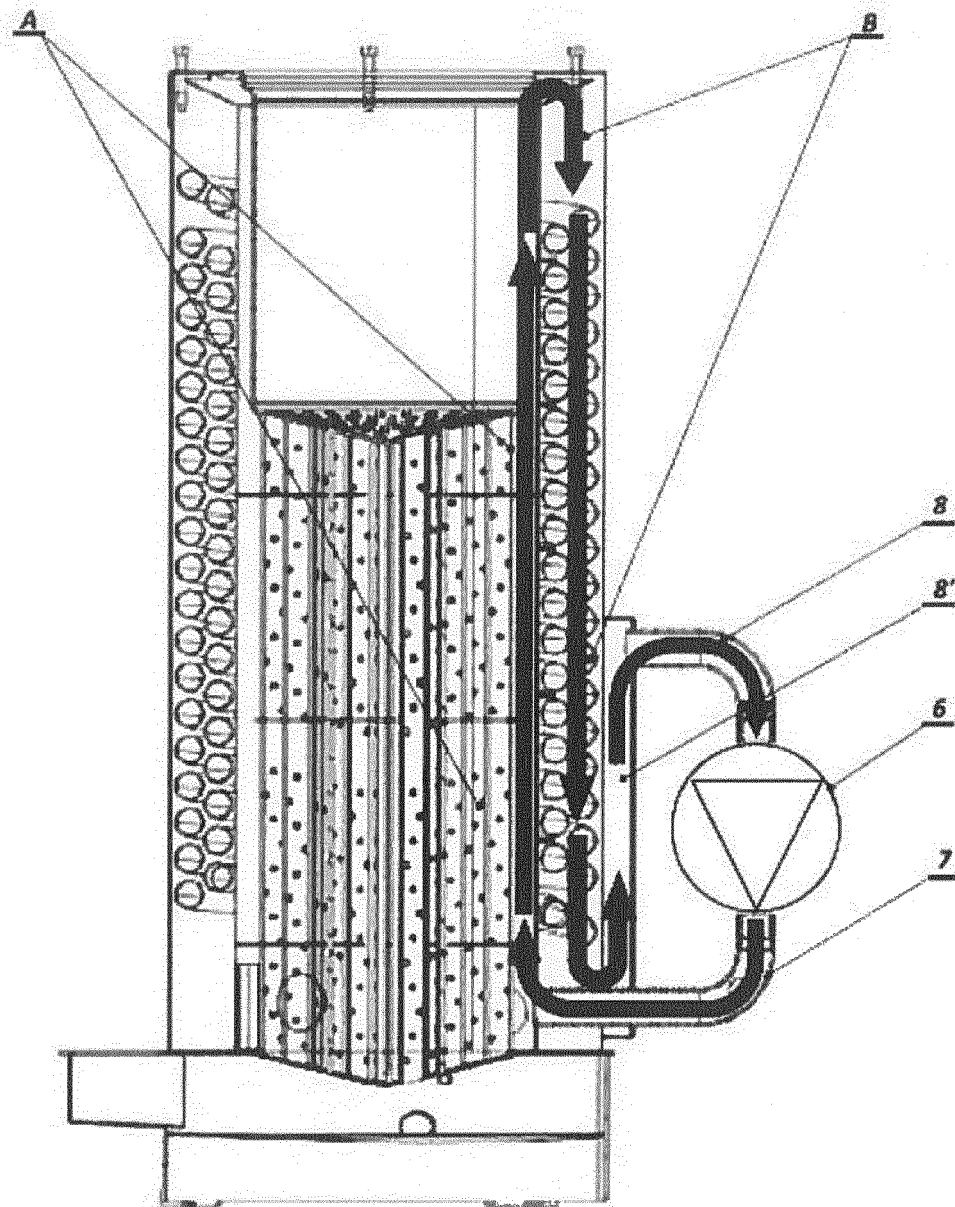


Fig. 4



EUROPEAN SEARCH REPORT

Application Number

EP 21 46 0031

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EPO FORM 1503 03.82 (P04C01)

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			TECHNICAL FIELDS SEARCHED (IPC)
			F24H F24D F28D
1 The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 December 2021	Examiner von Mittelstaedt, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 21 46 0031

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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- PL 223959 B1 [0003]