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(54) **Improved fireplace/boiler for domestic use**

(57) The present invention relates to an improved fireplace/boiler for domestic use of the type foreseeing a radiant hood, consisting of an inner hearth (2), of a radiant hood and of a chimney (4) for discharging the smokes. Said fireplace is characterised in that it foresees a coil (5) that is wound around said hood, outside of it, and through which a water flow runs warming up by removing heat from the combustion smokes.

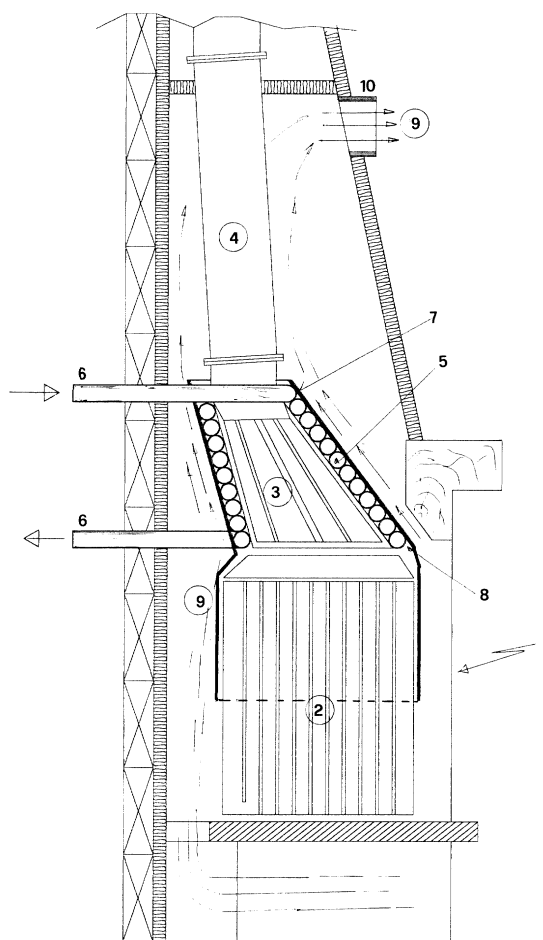


Fig 1

Description

[0001] The finding relates to the provision of an improved fireplace/boiler for domestic use.

[0002] So called fireplace/boilers are well known, which are installed in domestic sites and, besides heating the surrounding environment through radiancy and ventilation, also heats water up which, through a system of tubes, feeds radiators located in different rooms of the flat.

[0003] Essentially the fireplace/boilers of standard production foresee the presence of a water flow around the inner hearth that, heated by the combustion, is made circulate in the building heating plant.

[0004] Object of the present finding is that of providing a fireplace/boiler having a much higher energy efficiency than known akin products.

[0005] A further object of the finding is that of providing a fireplace/boiler in which the pollution due to the combustion discharge fumes is reduced.

[0006] A further object is that of providing a combustion heating recovery device which is applicable onto fireplaces provided with a radiant hood inner hearth which are already available on the market or of standard production.

[0007] Such objects are achieved by using as a base a radiant hood inner hearth i.e. equipped with a hood, normally made of cast iron, which reaches high temperatures when licked by the combustion smokes.

[0008] Nowadays, the heat emitted by the radiant hood is to heat up an air flow which licks the outer surface of the hood itself and is blown in the different rooms of a flat through suitable canalizations.

[0009] Experimental tests as well as appropriate building and design choices have shown how the radiant hood can be best employed also in heating up water flowing in a coil surrounding said hood, thus overcoming a technical prejudice common to many heating plants designers and installers, according to whom the heat exchange between the hood and a water coil is not very efficient.

[0010] The finding foresees the water coil to be wound in direct contact with the radiant hood outer surface and possibly even partially with the inner hearth body as well, thus being capable of absorbing the largest possible amount of heat, which is immediately removed by suitably adjusting the water flow speed.

[0011] It is further foreseen that the water coil be contained within a jacket made of metal sheet which has hence a double purpose: first of creating a containment chamber, in such a way that the heat does not dissipate outwards, and second that of allowing, at the same time, the fireplace secondary air to remove even the possible heat dissipated by the coil and the inner hearth and which is transmitted outwards by conduction through the sheet wall.

[0012] With the constructive solution according to the finding, which allows the removal of a large amount of

heat, always keeping though the radiant hood at high temperatures, i.e. above 400°, the combustion fumes are completely burnt and are thus discharged without any of those unburnt residues which are one of the causes for the atmosphere pollution.

[0013] The features of the finding will be better clear through the description of one of the possible embodiments thereof, provided only as an illustrative and not limiting example based upon the attached drawing, in which:

- fig. 1 (table I) represents a elevational sectional view of a fireplace/boiler equipped with a device according to the finding, according to a first embodiment thereof;
- fig.2 (table II) represents an elevational sectional view of a fireplace/boiler equipped with a device according to the finding, according to a second embodiment thereof.

[0014] As it can be seen in the drawings, the fireplace 1, of standard production, consisting of an inner hearth 2, of the radiant hood 3 and of the fumes discharge chimney 4, is characterised in that it foresees a coil 5 wound externally onto and brought into contact only with said hood (see fig.1), or even with a portion of the inner hearth 2 body through which a water flow runs, which warms up removing heat from the combustion fumes.

[0015] The coil 5, preferably made of copper tubes is equipped with joints 6 for the connection to the building heating plant.

[0016] The coil and a portion of the inner hearth, which is free or partially surrounded by said coil, are externally coated by a jacket 7 made of metal sheet, forming a containment chamber 8.

[0017] In this way, as it can be seen in the drawings, the secondary air flow present in fireplaces of standard production, which warms up by licking the inner hearth 2 outer walls and exits through the slot 9, expanding in the ambient outside, comes into contact with the metal sheet jacket 7 wall, removing and thus recovering even the smallest amount of heat emitted by the coil, thus achieving the maximum plant energy efficiency.

[0018] Embodiments other than the one illustrated are obviously possible, without exiting for this reason from the patent claims defined in the following.

Claims

1. IMPROVED FIREPLACE/BOILER FOR DOMESTIC USE, of the type with radiant hood, comprised of an inner hearth (2), a radiant hood (3) and a fume discharge chimney (4), said fireplace being characterised in that it foresees a coil (5), wound externally onto said hood and through which a water flow runs, which

warms up by removing heat from the combustion fumes

2. IMPROVED FIREPLACE/BOILER FOR DOMESTIC USE, according to claim 1, characterised in that the coil (5) partially surrounds the hearth (2) body as well. 5
3. IMPROVED FIREPLACE/BOILER FOR DOMESTIC USE, according to claims 1 and/or 2, characterised in that the coil (5), preferably consisting of copper tubes and equipped with joints (6) for the connection with the building heating plant, is externally coated by a metal sheet jacket (7) forming a containment chamber (8) for said coil. 10 15
4. IMPROVED FIREPLACE/BOILER FOR DOMESTIC USE, according to claims 1 and/or 2 or 3, characterised in that the inner hearth (2) is partially coated on its outer part, preferably on three sides only by the metal sheet jacket (7). 20
5. IMPROVED FIREPLACE/BOILER FOR DOMESTIC USE, according to one or more of the previous claims, characterised in that the secondary air flow (9), which warms up by licking the inner hearth (2) outer walls and exits from the slot (10), then expanding in the ambient outside, comes into contact with the metal sheet jacket (7) wall, removing and thus recovering the heat emitted by the coil and the inner hearth, thus achieving the maximum plant energy efficiency. 25 30
6. IMPROVED FIREPLACE/BOILER FOR DOMESTIC USE, according to claims 1-4, characterised in that the water coil is wound in direct contact with the radiant hood outer surface thus being capable of absorbing the largest possible amount of heat, said heat being immediately removed by suitably adjusting the water flow speed. 35 40
7. IMPROVED FIREPLACE/BOILER FOR DOMESTIC USE, according to one or more of the previous claims, characterised in that it can remove a considerable amount of heat, always keeping though the radiant hood at high temperatures, above 400°, so that the combustion fumes are completely burnt thus being discharged without any unburnt residue. 45 50

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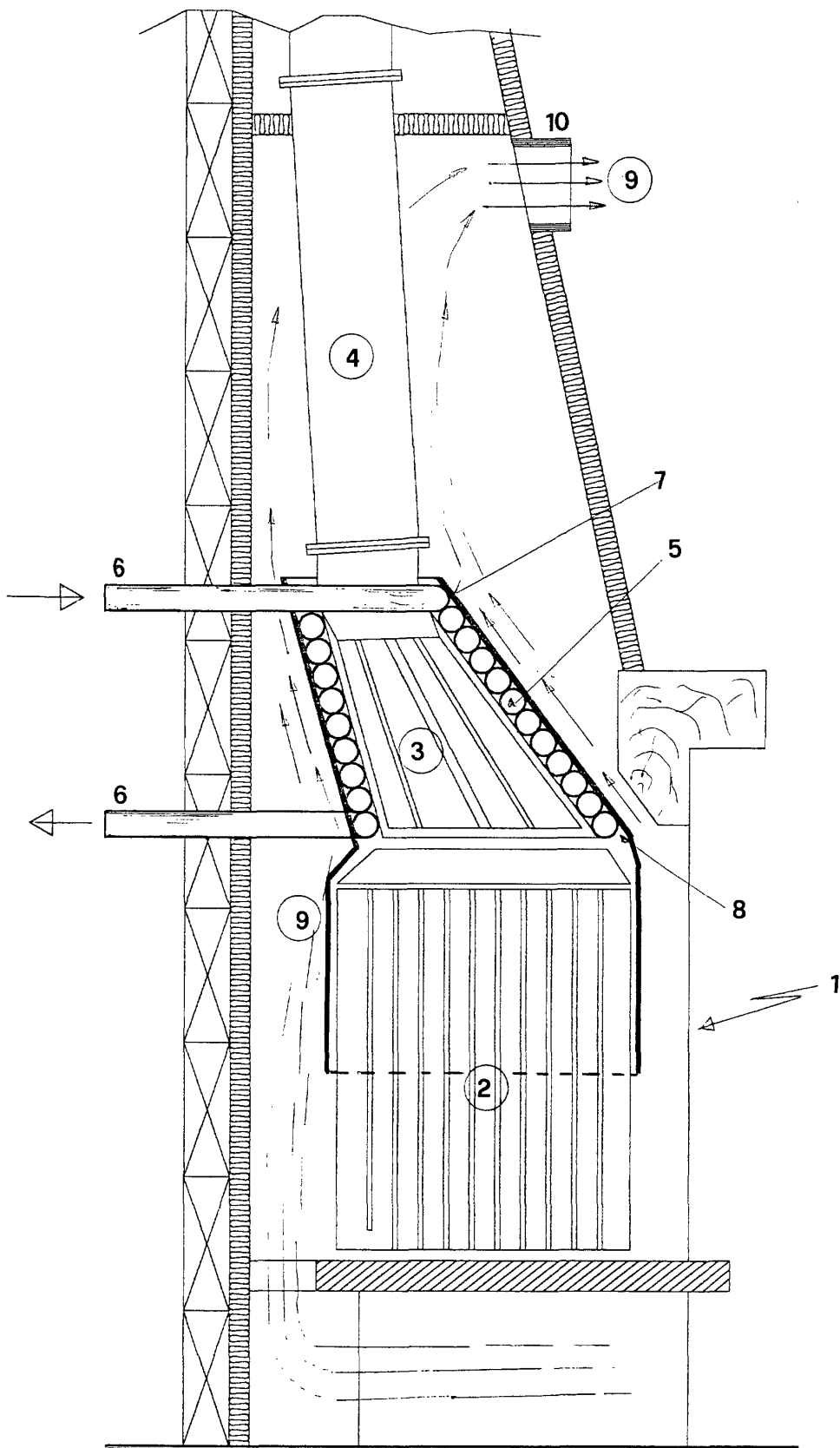


Fig 1

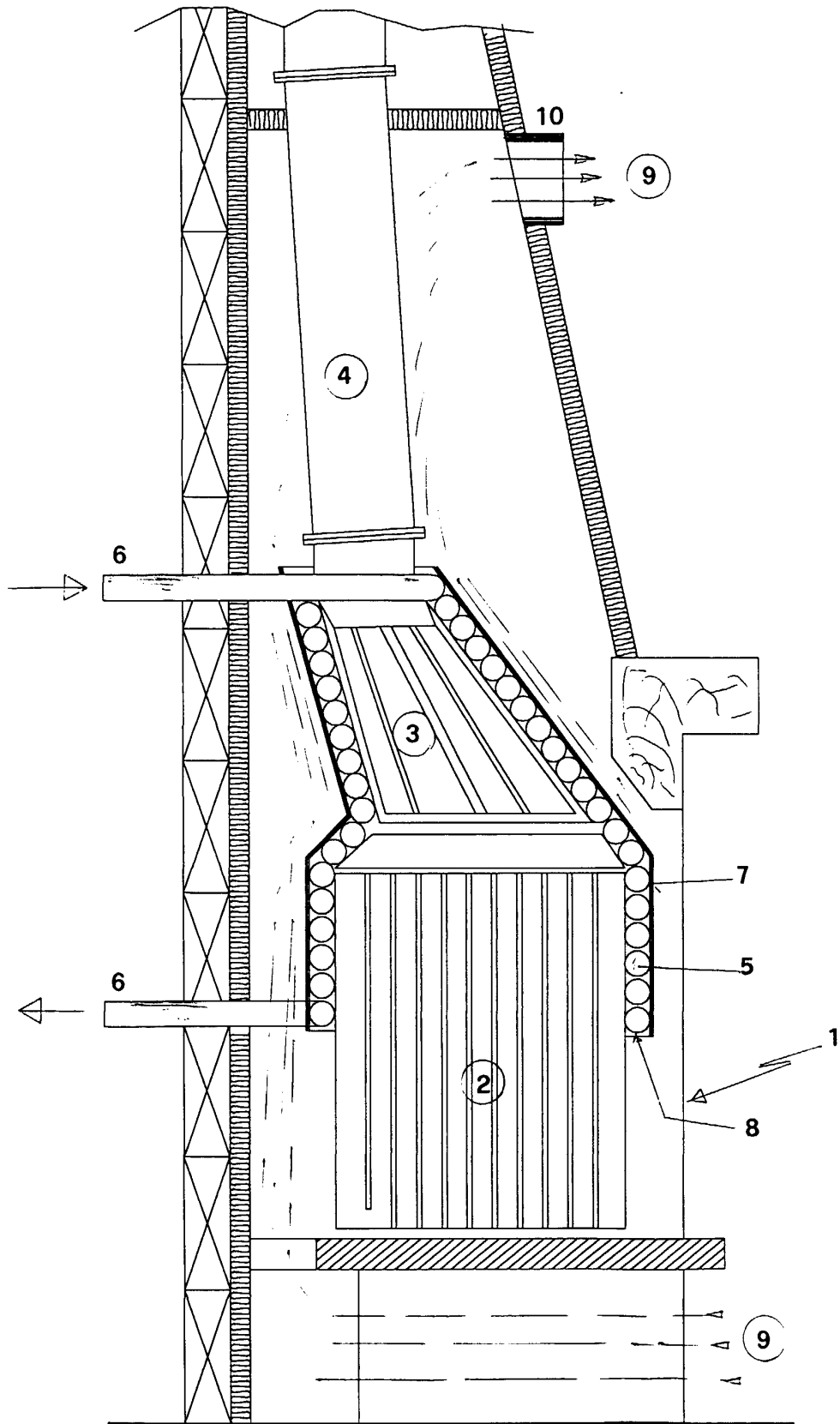


Fig.2



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 5940

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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Place of search		Date of completion of the search	Examiner
THE HAGUE		13 March 2001	Vanheusden, J
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 00 12 5940

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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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82