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(54) **Pressurized steam generator**

(57) Comprises a tank (1) for water storage (15), a first pipe (3) that transports the water from the mentioned tank to a pump (2), a second pipe (4) that transports the referred water from the indicated pump (3) to a boiler (5) that heats up the water (16) inside it for pro-

ducing water steam (17), and at least a third pipe (6) that transports the mentioned water steam (17) from the boiler (5) to a steam apparatus (7), and in that the mentioned tank (1) extends on or in the surrounding area of the totality, or most, of the upper surface of the boiler (5).

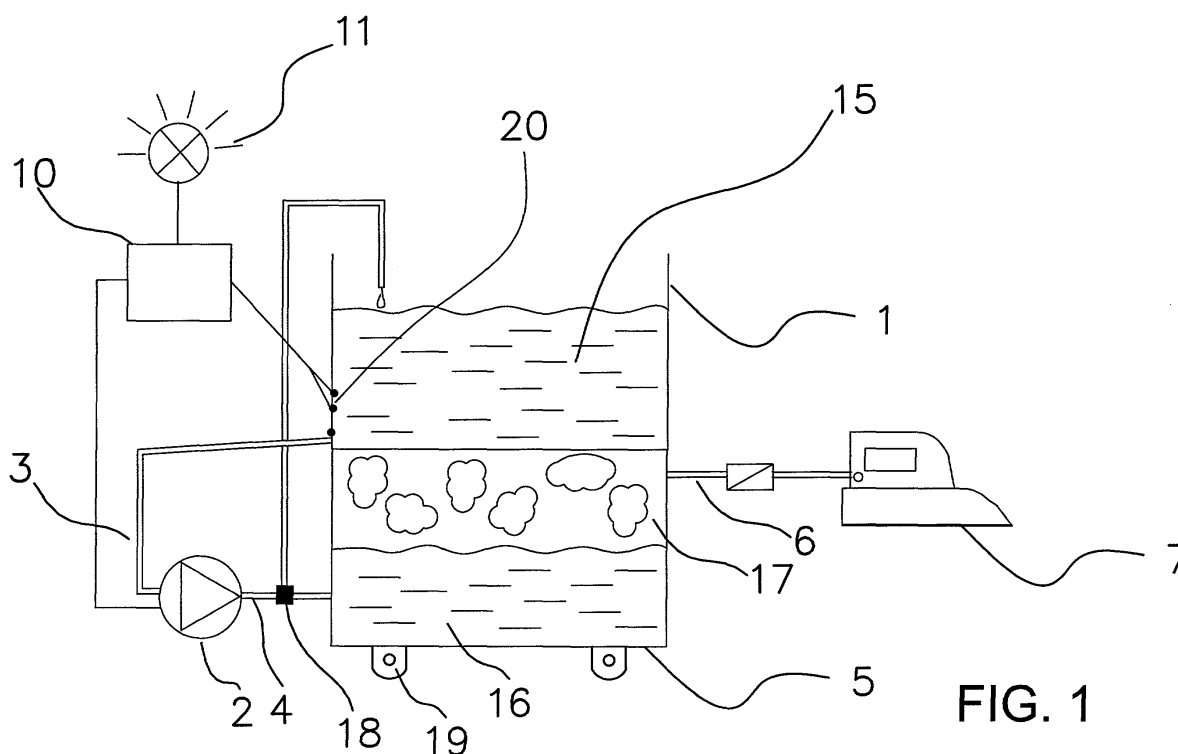


FIG. 1

Description

[0001] Pressurized steam generator, as for example an ironing centre, that comprises a tank for water storage to atmospheric pressure, a first pipe that transports water from the mentioned tank to a pump, a second pipe that transports the referred water from the mentioned pump to a boiler that heats up the water inside the boiler for the production of pressurized water steam, and at least a third pipe that transports the referred water steam from the boiler in order to be used as for example in a steam iron. And where the mentioned tank is located in the surrounding area of the boiler, (for example over the totality or most of the upper surface of boiler.

BACKGROUNDS OF THE INVENTION

[0002] It is known in the state of the art different patents that cover pressurized steam generators, specially for irons.

[0003] It is in the state of the art the EP 0772000, of 1996, in the name of the firm SEB, S.A., that refers to A steam generator with automatic supply having a level sensor arranged in a zone of a vessel located at a set threshold level. An indirect level sensor measuring the temperature (that works measuring the water temperature) is positioned in a boiler area, located in a level of the threshold level. Measures the temperature and comparing it with a reference temperature, in order to establish whether a liquid reaches the threshold level. Adjustment means acting in relation to the steam tapping operations so that the sensor temperature varies in relation to the level of liquid over a variation range, wherein the reference temperature remains within the variation range. It is an application of the ironing systems.

[0004] It is in the state of the art too, EP 0595292, filed in 1993, in the name of PLANETA HAUSGERATE GMBH & CO, ELEKTROTECHNIK KG. Combined steam generator, preferably for ironing appliances and cleaning apparatuses, for professional and non-professional use comprising a pressure chamber having a built-in or built-on heating element, a refilling device, an under-pressure safety mechanism, a discharge (drain) device, a control valve for the escaping steam flow, and an over-pressure safety mechanism. The heating element has a special resistance/temperature characteristic which lends to the steam generator self-cleaning properties which keep the pressure and the temperature of the generated steam largely independent of the final steam quantity, of the temperature of the water fed and of the supply voltage of the heating element. One or more mounting devices are provided on the steam generator.

[0005] It is known too EP 0877200, in the name of the firm IMETEC, S.p.A., filed in 1997, that refers to a household electrical steam generator, particularly for smoothing irons, where the water level within the boiler is stabilized by electronic and/or pneumatic action, electronic action being actuated by a temperature sensor

(not a direct water level) positioned on that portion of the body of a usual armoured resistance element which is subject to emergence following reduction in the water level, to activate a make-up micro-pump transferring into the boiler cold water drawn from a reservoir, pneumatic action being actuated by a floating valve enabling air to enter during boiler cooling, in order not to enable the boiler to draw water from the reservoir through the body of the halted micro-pump.

[0006] Lastly, it is necessary to refer to the EP 0855555, filed in 1997 too, in the name of Mr Mauro Biancalani. This invention refers to steam generators too, characterizes in that the boiler, which supplies the steam to a flexible pipe for the iron, is located on a moving member which oscillates about a horizontal hinging axis and is supported by a spring; with the reduction in the quantity of water inside the boiler, the moving member is raised by the spring (indirect level detection because the sensor is sensitive only to the mass of the mass of the set) and acts on a microswitch which operates an electric pump for supplying a limited quantity of water to the boiler via a flexible pipe.

BRIEF DESCRIPTION OF THE INVENTION

[0007] The present invention is a considerable advance in the sector of the steam generators since it increases the benefits of this type of household electrical apparatus, at the same time that reduces the electrical consumption of them, being for that reason in the long run more efficient, economic and lasting apparatus during the time.

[0008] Thus in this application, the inventors, after innumerable examinations and tests, have found that the positioning of the water tank over the boiler causes great utilities that will be analysed as follows.

[0009] On the one hand, the fact to locate the tank in the surrounding area of the boiler (upper part, being able to include in addition the sidewall ones), permits that the heat generated in the boiler is transmitted to the tank and from this one to the water that contains, in such a way that this pre-heated water of the tank when it is transferred to the boiler, minimizes the "thermal shock" inside of the boiler, and therefore it avoids a leak of steam pressure.

[0010] In addition, the inventors, in order to improve the benefits of the apparatus have developed a device to detect the lack of water inside of the tank.

[0011] With this device it is avoided that the pump and/or the boiler are not damaged when there is a lack of water, thing that could happen if as a consequence of a lack of water, an overheat of the boiler takes place.

[0012] The device consists of electrical terminals, although it could be any level sensor that uses the water conductivity as a way to know at any moment the existence of said liquid inside of the tank.

[0013] In this way if there is a lack of water, the circuit is opened because electrical conductivity between both

terminals does not exist. Said information is collected by the processor that immediately stops the apparatus in order to avoid to damage the boiler.

[0014] At the same time it is possible to foreseen that, when the apparatus stops, the processor sends signals that are converted in acoustic and/or visual means in order to claim the attention of the user of the apparatus.

[0015] To all the advantages previously mentioned, it can be added its simplicity, its solidness and the fact that by its special configuration, in the long run it must give a very few repairs to is user.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] With the purpose to facilitate the explanation four sheets of drawings are attached to the present description, in which a practical case of an embodiment has been reproduced, which is mentioned only for exemplificative, non limitative of the scope of the present invention:

- figure 1 shows a scheme of the pressurized steam generator object of the present invention,
- figure 2 is a view of the boiler and tank, both surfaces in contact,
- figure 3 is a view of the boiler and tank, located in the surrounding area one to each other, and
- figure 4 is a perspective view of the boiler.

PREFERRED EMBODIMENT OF THE PATENT APPLICATION

[0017] Thus in figure 1 it is shown a tank 1 with water 15 inside, a first pipe 3, a pump 2, a second pipe 4, a primer 18, means for heating 19 the water, a boiler 5 with water 16 and water steam 17 inside it, a third pipe 6, a steam iron 7, a connection point 8 in the surface of the boiler, acoustic or/and visual means 11, a processor 10 and a level sensor 20.

[0018] In figure 2 it is represented the tank 1, the boiler 5, being both surfaces in direct contact one to each other, both upper surface and one sidewall surface.

[0019] Figure 3 is a view of the tank 1 and boiler 5, being foreseen elevator elements that locate the tank 1 in the surrounding area of the boiler 5.

[0020] Figure 4 shows a boiler 5.

[0021] In a preferred embodiment, first of all the tank 1 extends on the totality or most of the upper surface of the boiler 5. Thus, initially the tank 1 is filled of water 15, over the level sensor 20, in where water 15, as a consequence of the nearness of the boiler 5 (figure 3) or for the fact to be in contact with the boiler (figure 2) is heated up, by the heat transfer of the referred boiler 5. The water fills up the first pipe 3 until the pump 2.

[0022] When it receives the order from the processor 10, the pump 2 pumps a predetermined amount of water through the second pipe 4, by the upper part of one of the sidewalls of the boiler 5.

[0023] Water 16 of the boiler is heated up, by means of the heating means 19, until produces water steam, leaving by the third pipe 6 until it arrives its purpose, for example, in a steam iron 7.

[0024] Predetermined amounts are mentioned, because what is wanted is to minimize the thermal shock. It is also obtained by means of the entrance of the water lower than water level of the boiler, minimizing in this way the cooling and the steam condensation that could take place if this water were introduced directly in the steam chamber of the boiler 5, and finally when entering predetermined amounts, amounts not very great, in order to avoid to make cooler the water 16 of the boiler.

[0025] The level sensor 20 is located in at least one of the inner walls of tank 1, below to the water level 15 inside of the tank, and in lower half of the tank. This sensor 20 is connected to a processor 10 that, when it is informed of the lack of water by the referred level sensor 20, the ironing centre is blocked, preventing the exit of more water steam 17 from the boiler 5.

[0026] The mentioned level sensor 20 consists of two electrical terminals that use water 15 like conductor, and that, as a consequence of the lack of this conductive liquid, sends a signal to the processor 10 informing that circuit is opened as a consequence of the lack of water in tank 1, the referred processor 10 interrupting the ironing centre, as it has been explained previously.

[0027] Thus, it is possible to foreseen that, in the case of lack of water 15 inside of the tank, the processor 10 sends a warning signal in order to activate visual and/or acoustic means, in order that the user realizes it.

[0028] As it can be seen, the present invention tries to minimize the thermal shock by means of three ways: first way is to put the tank 1 over the boiler 5, to produce a pre-heating of the water 15 of the tank 1; second way by means of the lower entrance of the water to the boiler 5; and, finally, third way, by means of the entrance or introduction of small amounts, depending on the capacity of the boiler, to avoid the cooling of the existing water inside of the indicated boiler.

[0029] Figure 2 shows a tank 1 that permits the heat transference by means of the contact with boiler 5, for example, because they, the boiler and tank, are manufactured in metallic materials.

[0030] In figure 3 it has been drawn the case when the boiler and tank cannot be in physical contact, for example because the tank is made of a plastic material, that is heated up by means of the heat transference through the air but not by the direct contact with the boiler, because said plastic would be damaged.

[0031] The present patent describes a new pressurized steam generator. The examples mentioned here are not limitatives of the present invention, for that reason it will be able to have different applications and/or be adapted, all of them within the scope of the following claims.

Claims

1. Pressurized steam generator, that comprises a tank (1) for water storage (15), a first pipe (3) that transports the water from the mentioned tank to a pump (2), a second pipe (4) that transports the referred water from the indicated pump (3) to a boiler (5) that heats up the water (16) inside it for producing water steam (17), and at least a third pipe (6) that transports the mentioned water steam (17) from the boiler (5) to a steam apparatus (7), **characterized in that** the mentioned tank (1) extends on or in the surrounding area of the totality, or most, of the upper surface of the boiler (5).

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2. Pressurized steam generator in accordance with claim 1 **characterized in that**, in addition, the referred tank (1) extends on or in the surrounding area, at least partially, of at least one of the sidewalls of the boiler (5).

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3. Pressurized steam generator in accordance with claim 1 or 2 **characterized in that** it includes a device for the detection of the lack of water inside of the tank (1).

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4. Pressurized steam generator in accordance with claim 3 **characterized in that** the referred device for the detection of the lack of water inside of the tank consists on a level sensor (20), located in at least one of the inner walls of the tank (1), below the level of the water (15) inside the tank, and in lower half of the tank, being connected said sensor (20) to a processor (10) that, when it is informed by the lever sensor (20) about the lack of water, blocks or stops the ironing centre, preventing the exit of more water steam (17) from the boiler (5).

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5. Pressurized steam generator in accordance with claim 4 **characterized in that** the level sensor (20) consists of two electrical terminals that use the water (15) like a conductor, and that when there is a lack of this conductive liquid sends a signal to the processor (10) that the circuit is opened as a consequence of the lack of water in the tank (1).

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6. Pressurized steam generator in accordance with claim 4 **characterized in that** when there is a lack of water (15) inside the tank, the processor (10) sends a signal in order visual and/or acoustic means are activated.

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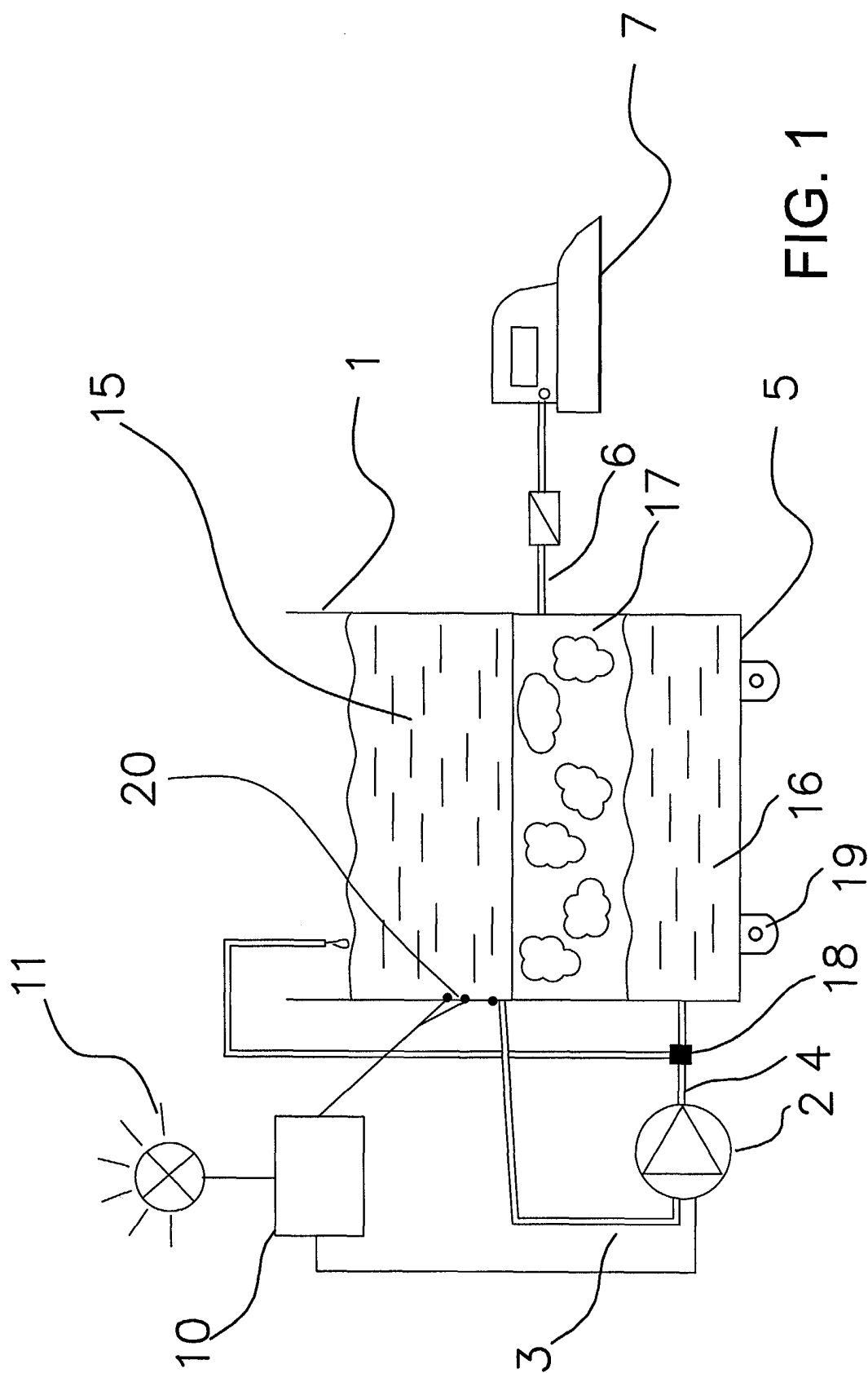


FIG. 1

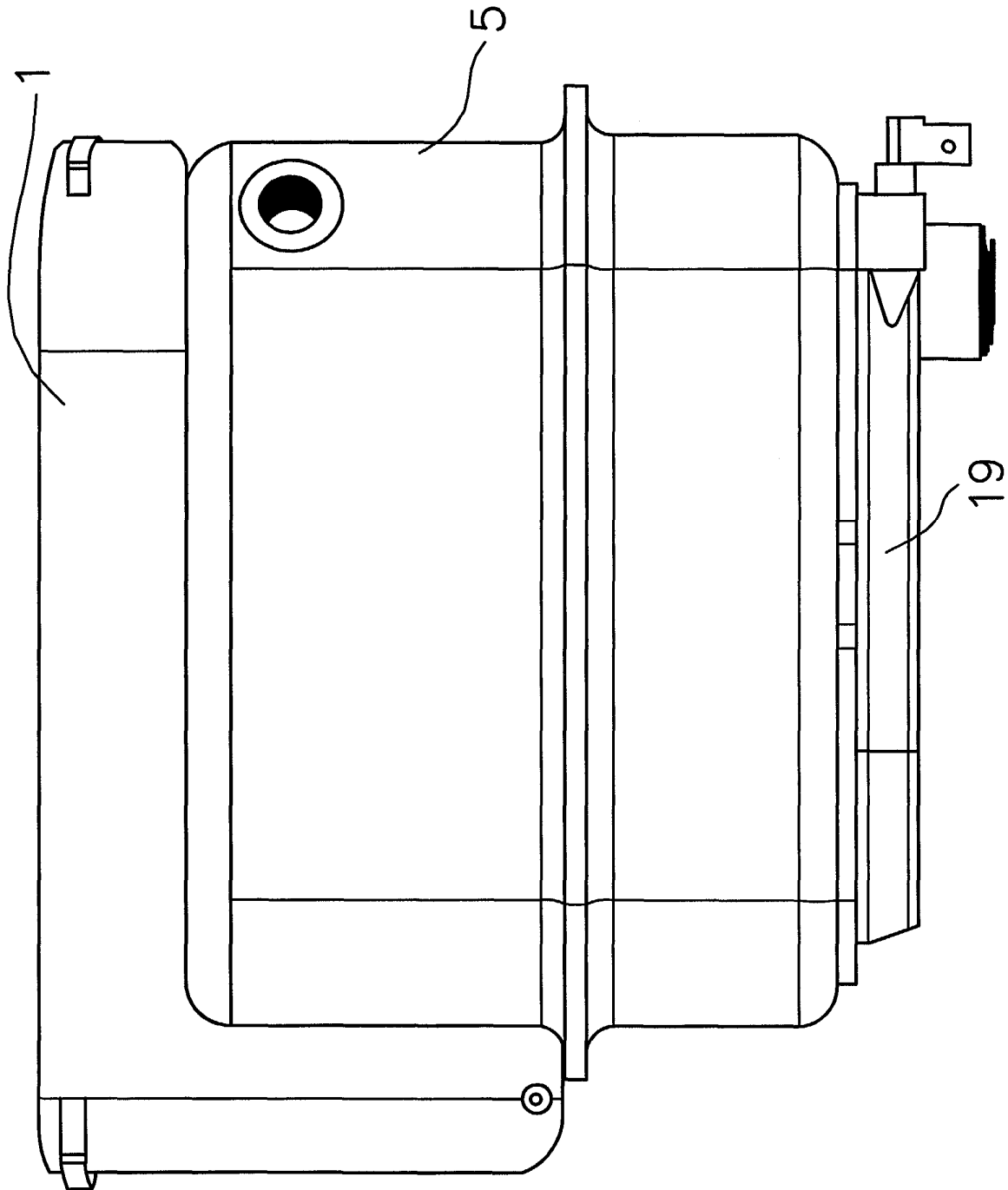


FIG. 2

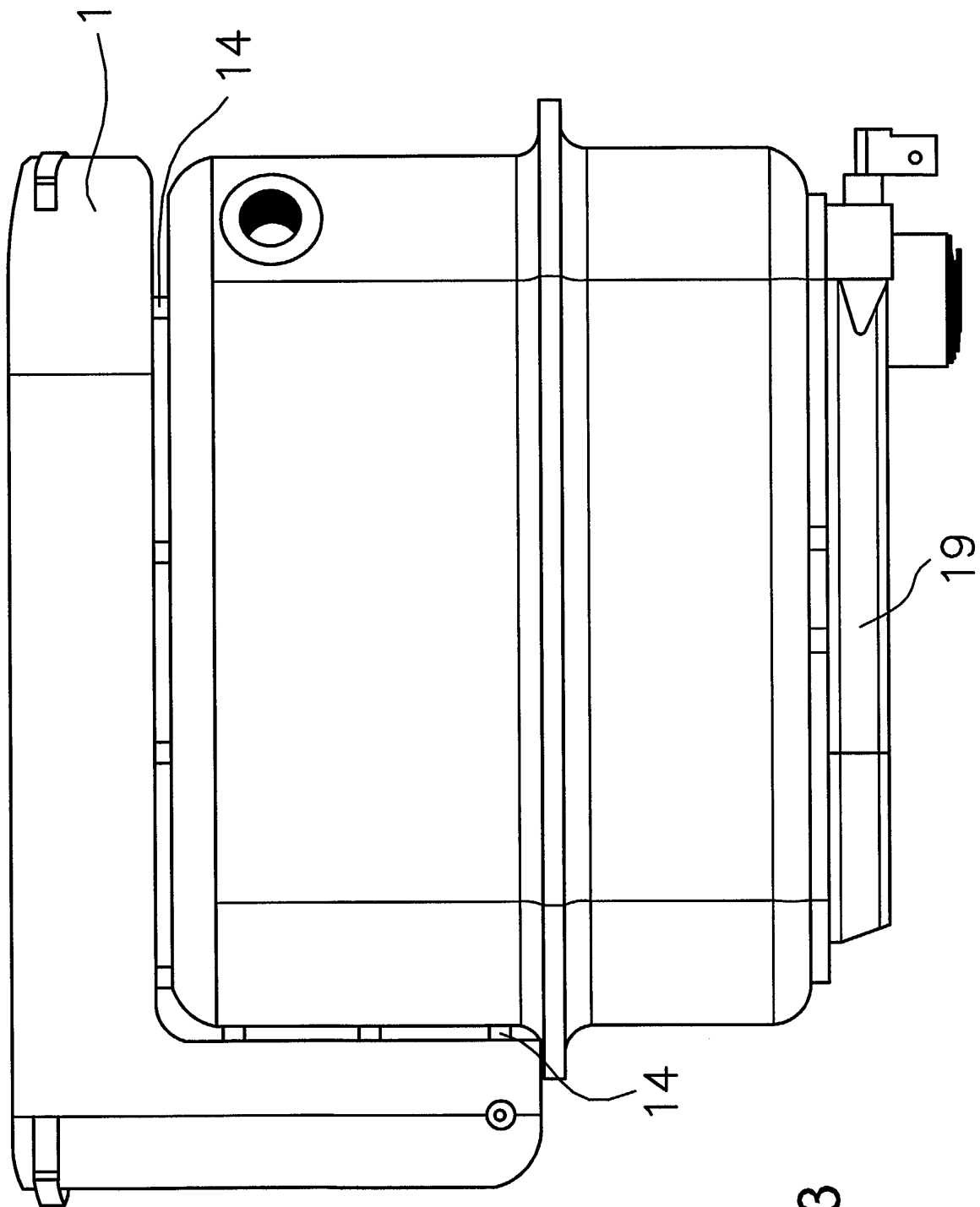


FIG. 3

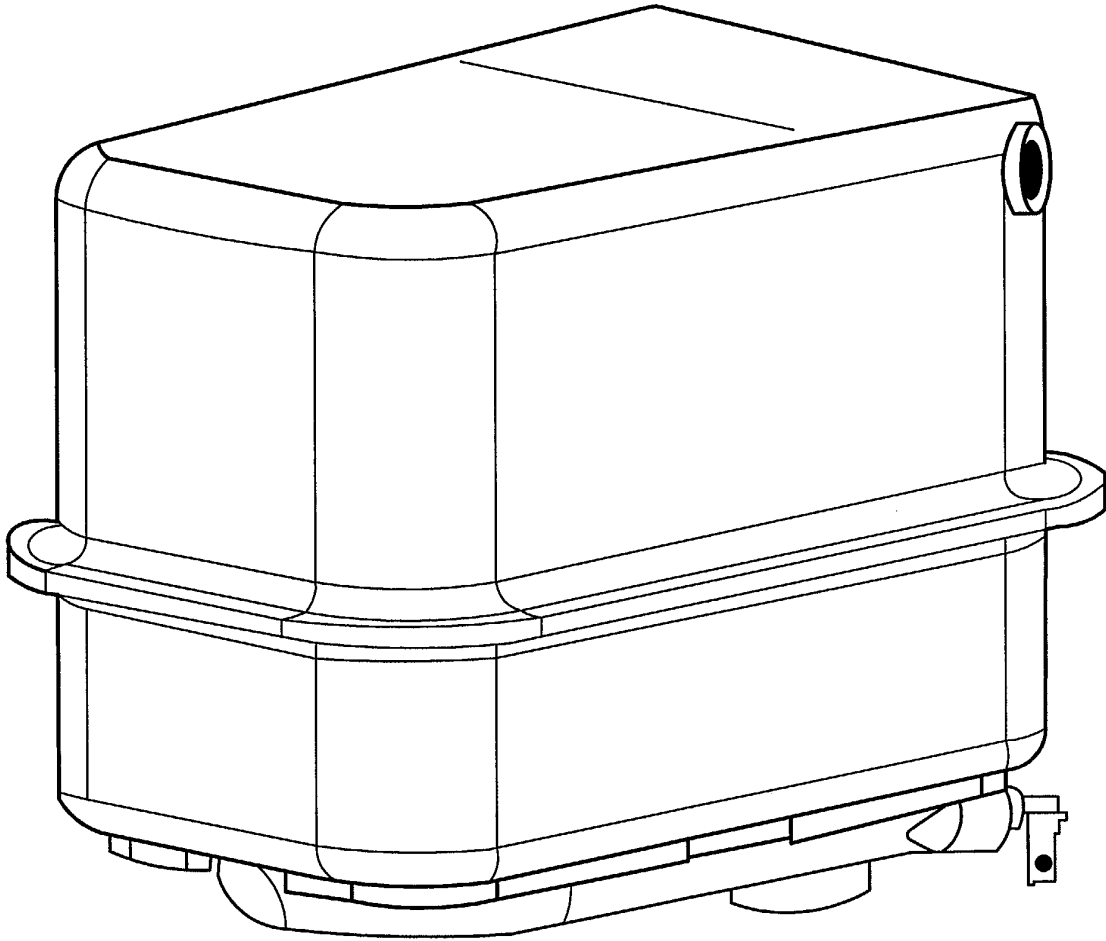


FIG. 4



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 03 38 0311

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X	US 4 937 430 A (BELLONI CESARE) 26 June 1990 (1990-06-26) * abstract; figures 2,4 * * column 1, line 54 - column 2, line 54 * * column 3, line 4 - column 4, line 51 * ---	1,2	F22B1/28 D06F75/12
X	EP 0 795 720 A (FEMIX DI GIANNELLI STEFANO) 17 September 1997 (1997-09-17) * abstract; figures 1-3 * * column 2, line 20 - column 3, line 59 * ---	1,2	
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X	US 3 977 198 A (BERRY CLYDE F) 31 August 1976 (1976-08-31) * abstract; figure * * column 1, line 66 - column 2, line 45 * ---	1,2	
X	US 4 399 657 A (BERRY CLYDE F) 23 August 1983 (1983-08-23) * abstract; figure 1 * ---	1,2	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	US 2 478 569 A (PETER COOPER HARRY) 9 August 1949 (1949-08-09) * figure 1 * -----	1,2	F22B D06F
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 7 June 2004	Examiner Zerf, G
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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EPO FORM 1503 03/82 (P04C01)

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

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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