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(54) **SYSTEM FOR DISPERSING CHEMICAL AGENTS IN OVENS**

(57) The system for dispersing chemical agents in ovens comprises a tube (4) for injecting water so that said water is dissolved with the chemical agent (1); a fan (10) for distributing the mixture of water and chemical agent (1) in a heat-generating area (11) and a cooking area (12) of the oven; and means for rinsing the mixture

of water and chemical agent (1); wherein said means for rinsing the mixture of water and chemical agent (1) comprise said tube (4) for injecting water and said fan (10).

It enables a dispersion system for ovens to be provided that is cheaper than the current dispersion systems.

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Description

[0001] The present invention relates to a system for dispersing chemical agents in ovens, in particular professional ovens for fine cuisine and hotels, using a chemical agent in a solid format without recirculation in the oven.

Background of the invention

[0002] Professional ovens are specialised machines for cooking and processing food with a very wide and very precise control over the conditions inside the cooking chamber. They enable the control of the temperature, the stability thereof, both at very low and high temperatures, the moisture, the steam convection, the homogeneity inside the oven, etc.

[0003] Most professional ovens have self-cleaning systems that enable the oven to wash itself at the end of the day.

[0004] Professional ovens are usually equipped with self-cleaning systems, based on the introduction of degreasing elements in the cooking cavity of the oven, which act on the present dirtiness, dissolving it and subsequently removing it through the drain.

[0005] Apart from cleaning, other cycles can be performed, such as polishing or decalcification depending on the chemical agent used.

[0006] There are two basic types of self-cleaning: without recirculation and with recirculation.

[0007] The self-cleaning system without recirculation is generally made up of one or more sprinklers of chemical agents in the upper portion of the cooking chamber. The chemical agent sprayed is usually liquid, and it is carried to the area of the sprinkler by means of a pump.

[0008] The sprinkler sprays the entire cooking chamber, usually in a rotating manner. During this process, a convection fan is turned off in order to prevent the flow of the chemical agent from being deviated by the air flow.

[0009] Once sprayed, the chemical agent is left to rest for a certain period of time under ideal temperature and moisture conditions in order for the desired effect to be produced.

[0010] After this time has passed, the rinsing will be performed by means of a solenoid valve which injects tap water into the sprinkler or other sprinklers/sprayers distributed in the cooking chamber.

[0011] It should be noted that in this type of cleaning, the leftover chemical agent is removed through a drain. Furthermore, the cleaning of the heat-generating area is poor, since the sprinkler is separated therefrom by a protective plate and, therefore, the chemical agent barely arrives at the heat-generating area.

[0012] A reduced version of this cleaning system must be made up of, at least, the following electromechanical elements:

- Pump for chemical agent

- Rinsing solenoid valve

[0013] Furthermore, it should include, at least, one rotating sprinkler, which adds cost to the system.

5 **[0014]** As for the self-cleaning system with recirculation, it is usually made up of one or several outlet points of the liquid recirculated in the upper portion of the cooking chamber.

[0015] Usually, solid chemical agent is used, in tablet or powder form, which is deposited in the cooking chamber for the dissolving thereof. However, liquid chemical agent can also be used. In that case, the liquid chemical agent is carried to the inside of the oven with an additional pump.

10 **[0016]** A solenoid valve is responsible for filling a collector, and once the chemical agent has been diluted with this water, a pump is responsible for carrying the mixture to the recirculation outlet, which is dispersed by mechanical elements, and distributed throughout all the area for cooking and for generating heat by means of the very convection fan of the oven.

[0017] This process of recirculating the mixture continues for a certain period of time under ideal temperature and moisture conditions for the desired effect to be produced. During the process of recirculating the mixture, a convection fan is generally operating in order to spread it throughout the cooking chamber and the heat-generating area.

25 **[0018]** After a time, the emptying of the collector is performed, and it is once again filled with tap water through a solenoid valve. Once this is done, the water is recirculated in order to rinse the oven. It is probable that the emptying and rinsing process must be repeated several times in order to ensure optimal rinsing.

30 **[0019]** In this type of self-cleaning it does correctly clean the heat-generating area, but the cost of the system is higher, since it needs a collector, pumps to recirculate and empty it, filling solenoid valve, etc.

35 **[0020]** A reduced version of this cleaning system must be made up, at least, of the following electromechanical elements:

- Recirculation pump
- Emptying pump
- 45 - Solenoid valve for filling the collector

[0021] Furthermore, a large collector must be included, which adds cost to the system.

50 **[0022]** Therefore, an objective of the present invention is to provide a dispersion system for ovens that is cheaper than the current dispersion systems.

Description of the invention

55 **[0023]** The dispersion system of the invention resolves the aforementioned drawbacks and has other advantages which are described below.

[0024] The system for dispersing chemical agents in

ovens according to the present invention comprises:

a tube for injecting water so that said water is dissolved with the chemical agent;
a fan for distributing the mixture of water and chemical agent in a heat-generating area and a cooking area of the oven; and
means for rinsing the mixture of water and chemical agent;
wherein said means for rinsing the mixture of water and chemical agent comprise said tube for injecting water and said fan.

[0025] Advantageously, said tube for injecting water is actuated by means of a solenoid valve for the dissolving of the water with the chemical agent and for the rinsing of the mixture of water and chemical agent. Meaning, a single solenoid valve is used for the dissolving and the rinsing.

[0026] According to a preferred embodiment, said fan is a convection fan, particularly, the convection fan of the very oven.

[0027] Preferably, said chemical agent is placed in at least one vessel, forming a collector wherein the water is accumulated in order to be mixed with the chemical agent.

[0028] Advantageously, said at least one vessel comprises upper holes for the inlet of water and an overflow hole connected to a duct, which leads the mixture of water and chemical agent from at least one vessel to the fan, dispersing the mixture in the heat-generating area and the cooking area of the oven. It also comprises a border which prevents the movement of the chemical agent.

[0029] Furthermore, the tube for injecting water preferably comprises a deflector for diverting the water in order to reach all the heat-generating and cooking area of the oven, and it also comprises an outlet hole located between the heat-generating area and the cooking area of the oven.

[0030] The cooking area of the oven comprises an opening located in the upper portion thereof which receives the air flow generated by said fan.

[0031] With respect to the systems for dispersing chemicals without recirculation, the advantages of the invention are:

- Lower cost, since neither the pump nor the sprinkler are necessary.
- Use of chemical agent in solid format: lower transportation and storage costs, as well as greater safety.

[0032] With respect to the systems for dispersing chemicals with recirculation, the advantages of the invention are:

- Lower cost, since neither the recirculation and emptying pumps or the collector are necessary.

- Greater degreasing power, since the dilution is highly concentrated.
- Less time needed to perform a cleaning process.

5 Brief description of the drawings

[0033] To better understand what has been set forth above, several drawings schematically depicting only by way of non-limiting example a practical embodiment are attached.

Figure 1 is a front view of an oven incorporating the dispersion system of the present invention;

Figure 2 is an elevation view of a cross section of the oven of Figure 1;

Figure 3 is a perspective view of a cross section of a portion of the oven of Figure 1;

Figure 4 is an elevation view of a cross section of a portion of the oven of figure 1.

20 Description of a preferred embodiment

[0034] The present invention describes a system for dispersing chemical agents in a solid format without recirculation in an oven. These chemical agents can have different purposes, such as the cleaning of the oven, decalcification, polishing, anti-rust treatments, etc.

[0035] The chemical agent 1, preferably in tablet form, is positioned inside the oven, in one or several vessels 2, such that the tablet 1 fits therein.

[0036] This vessel 2 has a border 3 which prevents the tablet 1 from coming out due to vibrations or turbulence in the air. This border 3, furthermore, acts to accumulate water in the bottom of the vessel 2.

[0037] In the upper portion of the vessel 2 a tube 4 for injecting water is arranged, connected to a solenoid valve 5, which will be activated in a pulsed manner when the tablet 1 needs to be dissolved. For the dissolving of the chemical agent, the activation of the solenoid valve 5 is performed periodically during a time W_L every T seconds.

[0038] The bottom of this vessel 2 is closed, such that it acts as a collector 6. When the solenoid valve is activated, the water comes out of the tube 4 and a portion thereof falls onto the tablet 1 through upper holes 7 of the vessel 2.

[0039] The water dilutes the tablet 1 in a controlled manner, the dilution staying in the collector 6 of the bottom of the vessel 2.

[0040] As the tablet 1 becomes increasingly diluted, the excess liquid with the mixture of water and chemical agent that is in the collector 6 overflows from a hole 8 which is carried through a duct 9 to a convection fan 10.

[0041] The convection fan 10, when it rotates in both directions of rotation, disperses the mixture of water and chemical agent throughout all the heat-generating area 11 and the cooking area 12 of the oven.

[0042] Once dissolved and distributed, the chemical agent is left to rest for a certain period of time under ideal

temperature and moisture conditions in order for the desired effect to be produced on the heat-generating area 11 and the cooking area 12 of the oven.

[0043] After this time has passed, the rinsing is performed by activating the solenoid valve 5, which injects tap water to the upper area of the oven through the tube 4. The outlet hole 13 of this tube 4 is in the border between the heat-generating area 11 and the cooking area 12.

[0044] In order to perform the rinsing, the activation of the solenoid valve is performed periodically during a time W_A every T seconds, being $W_A \geq W_L$ and $W_A \leq T$. When this solenoid valve is activated, the jet of water is directed at a deflector 14 strategically placed so the water can reach all the heat-generating 11 and cooking 12 area of the oven.

[0045] The air generated by the convection fan 10 is directed to the upper portion of the cooking area 12 through an opening 15 close to the outlet hole 13 for water and the deflector 14. This air flow helps the water to be distributed throughout all the heat-generating 11 and cooking 12 area of the oven, performing the rinsing in an effective manner.

[0046] Despite the fact that reference has been made to a specific embodiment of the invention, it is evident for the person skilled in the art that numerous variations and changes may be made to the dispersion system described, and that all the aforementioned details may be substituted by other technically equivalent ones, without detracting from the scope of protection defined by the attached claims.

Claims

1. A system for dispersing chemical agents in ovens, comprising:

a tube (4) for injecting water so that said water is dissolved with the chemical agent (1);
a fan (10) for distributing the mixture of water and chemical agent (1) in a heat-generating area (11) and a cooking area (12) of the oven; and
means for rinsing the mixture of water and chemical agent (1);

characterised in that said means for rinsing the mixture of water and chemical agent (1) comprise said tube (4) for injecting water and said fan (10).

2. The system for dispersing chemical agents in ovens according to claim 1, wherein said tube (4) for injecting water is actuated by means of a solenoid valve (5) for the dissolving of the water with the chemical agent (1) and for the rinsing of the mixture of water and chemical agent (1).
3. The system for dispersing chemical agents in ovens according to claim 1, wherein said fan (10) is a con-

vection fan.

4. The system for dispersing chemical agents in ovens according to claim 1, wherein said chemical agent (1) is placed in at least one vessel (2), forming a collector (6).
5. The system for dispersing chemical agents in ovens according to claim 4, wherein said at least one vessel (2) comprises upper holes (7) for the inlet of water.
6. The system for dispersing chemical agents in ovens according to claim 4, wherein said at least one vessel (2) comprises an overflow hole (8) connected to a duct (9), leads the mixture of water and chemical agent (1) from the at least one vessel (2) to the fan (10), dispersing the mixture in the heat-generating area (11) and the cooking area (12) of the oven.
7. The system for dispersing chemical agents in ovens according to claim 1, wherein the tube (4) for injecting water comprises a deflector (14) for diverting the water in order to reach all the heat-generating (11) and cooking (12) area of the oven.
8. The system for dispersing chemical agents in ovens according to claim 1, wherein the tube (4) for injecting water comprises an outlet hole (13) located between the heat-generating area (11) and the cooking area (12) of the oven.
9. The system for dispersing chemical agents in ovens according to claim 1, wherein the cooking area (12) of the oven comprises an opening (15) located in the upper portion thereof which receives the air flow generated by said fan (10).
10. The system for dispersing chemical agents in ovens according to claim 4, wherein said at least one vessel (2) comprises a border (3).

FIG. 1

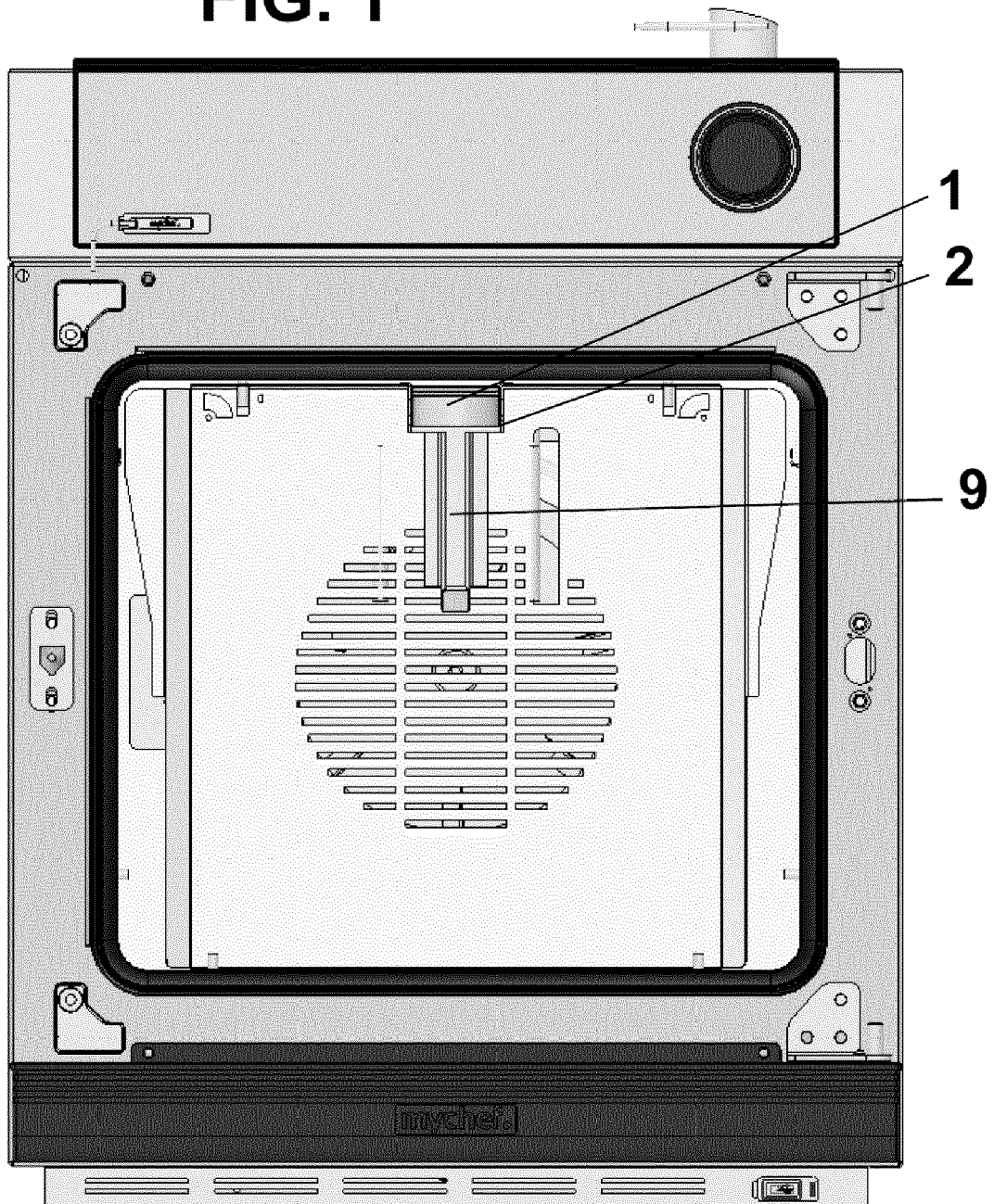
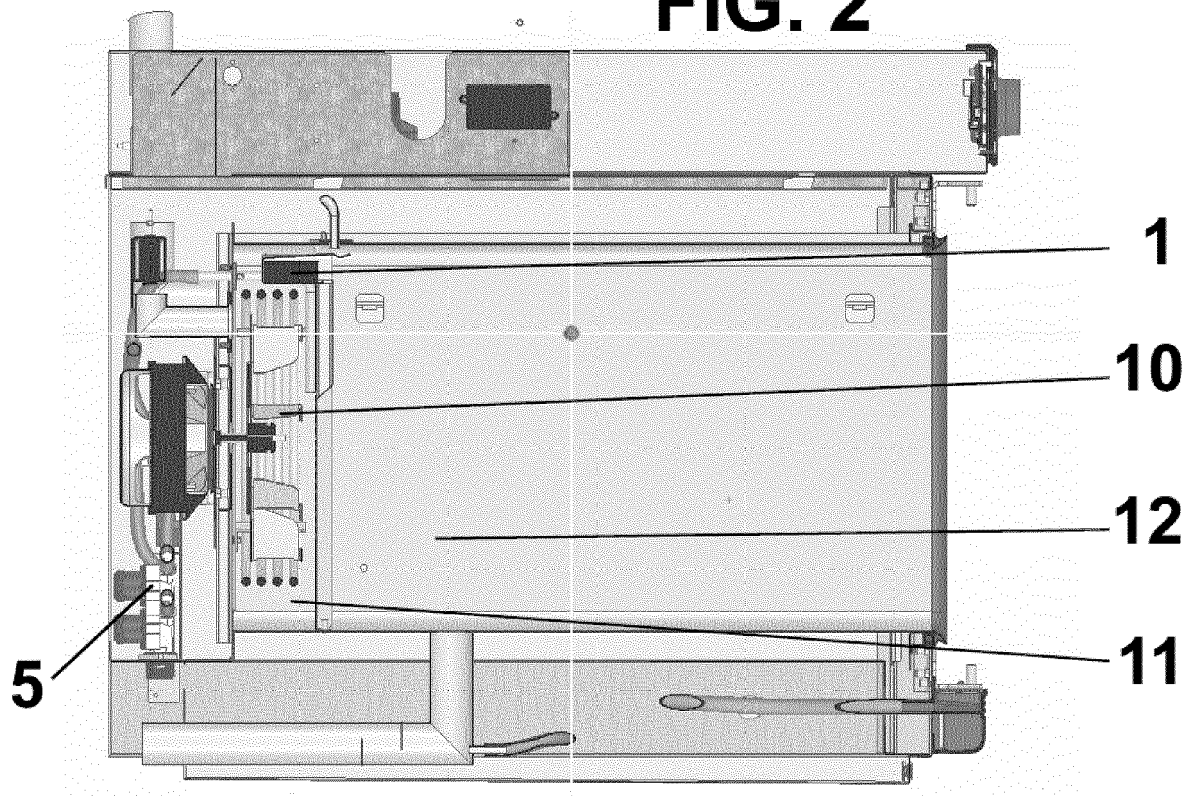
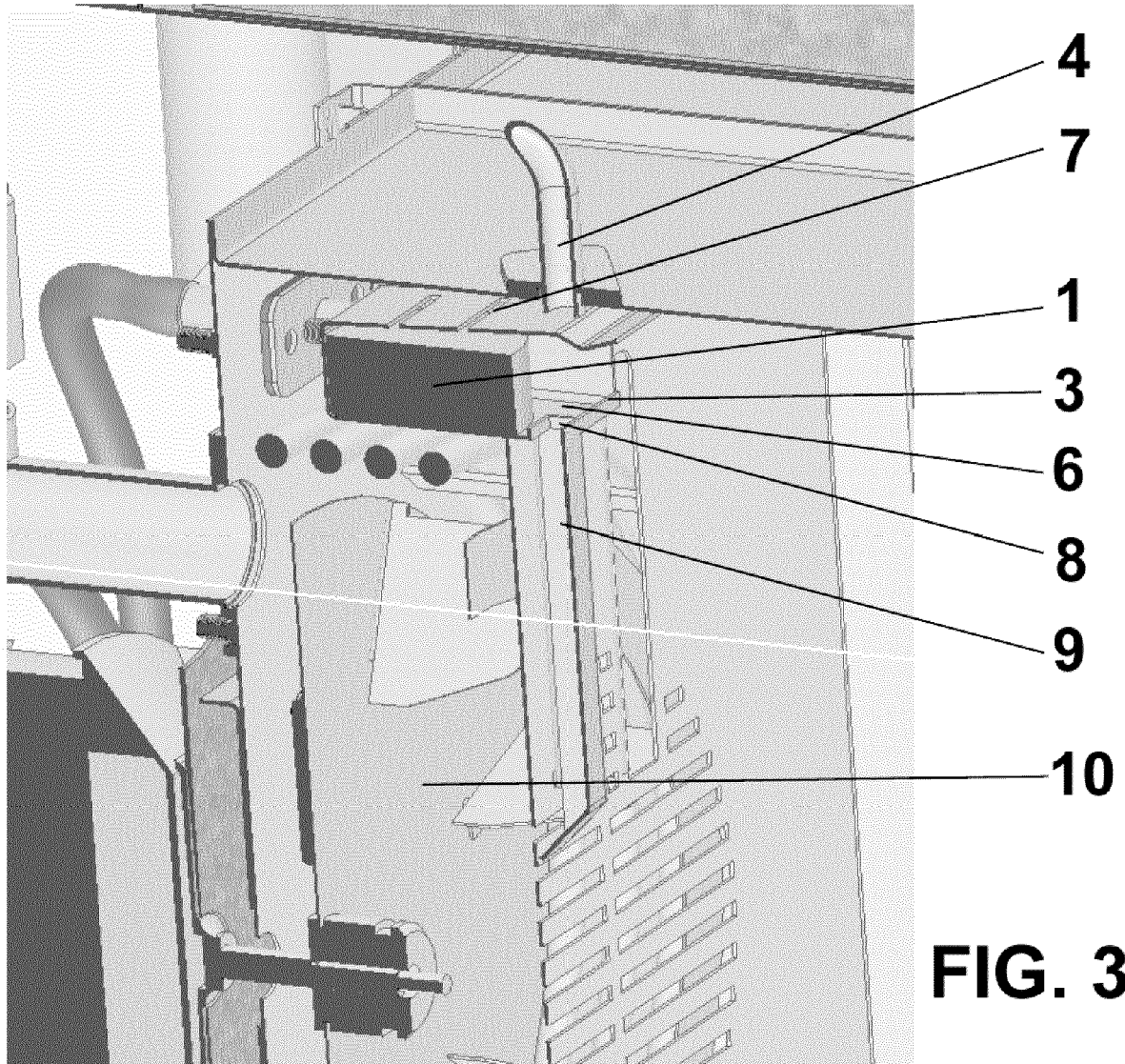
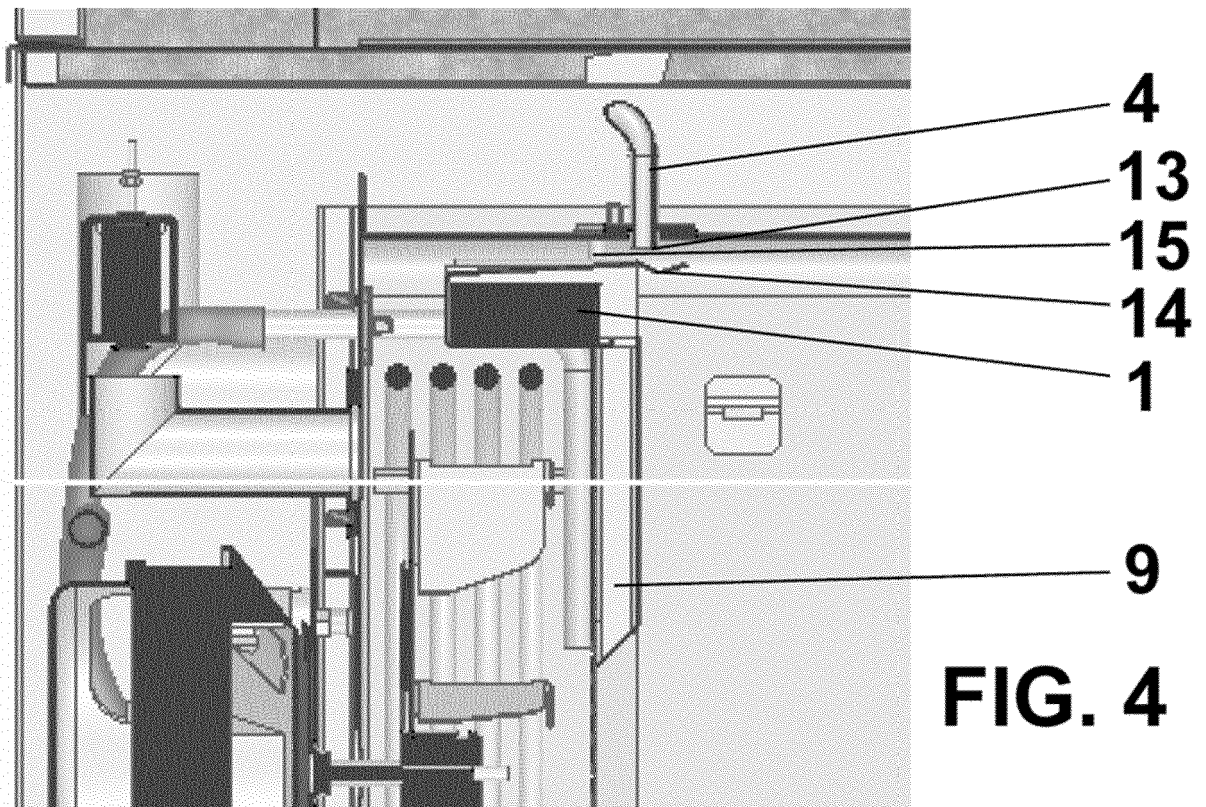


FIG. 2









EUROPEAN SEARCH REPORT

Application Number
EP 19 38 2028

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2008/223357 A1 (BARTELUCK JANUS [US] ET AL) 18 September 2008 (2008-09-18)	1-6,8-10	INV. F24C14/00
Y	* figures 1-5 * * paragraphs [0003], [0004], [0008], [0023], [0026], [0027], [0028], [0029], [0030], [0034], [0040] *	7	
X	EP 0 801 271 A1 (WIESHEU WIWA GMBH [DE]) 15 October 1997 (1997-10-15) * column 1, line 3 - column 1, line 6 * * column 1, line 24 - column 1, line 29 * * column 1, line 40 - column 1, line 44 * * column 1, line 48 - column 2, line 2 * * column 4, line 32 - column 4, line 42 * * column 4, line 54 - column 5, line 23 * * column 5, line 32 - column 5, line 44 * * column 6, line 39 - column 6, line 45 * * column 7, line 19 - column 7, line 30 * * column 7, line 35 - column 7, line 39 *	1-4,7-10	
Y	EP 1 147 731 A1 (ELOMA GMBH GROSSKUECHENTECHNIK [DE]) 24 October 2001 (2001-10-24) * paragraph [0023]; figure 1 *	7	TECHNICAL FIELDS SEARCHED (IPC) F24C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 June 2019	Examiner Jalal, Rashwan
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	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 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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24-06-2019

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