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(54) **COOKING OVEN WITH A CLEANING SYSTEM**

(57) The present invention is related to a cooking oven (1) for foodstuffs comprising: - a cooking chamber (2), wherein foodstuffs can be placed for being cooked, having a bottom wall (3) provided with one or more cooking chamber outlets (4, 10); - a cleaning system (70) comprising a washing/rinsing liquid introduction system (16) configured for taking washing/rinsing liquid within the cooking chamber (2), and for draining this washing/rinsing liquid from the cooking chamber (2) via the one or more cooking chamber outlets (4, 10); - a filter (410) arranged at least partially within the cooking chamber (2) for preventing solid bodies of prefixed dimensions from entering the one or more cooking chamber outlets (4, 10), while letting liquids flow from the cooking chamber (2) into the one or more cooking chamber outlets (4, 10), wherein the filter (410) comprises a seat (420) configured for supporting a washing/rinsing additive tab (430) spaced from the bottom wall (3) of said cooking chamber (2).

The invention is also related to a cleaning method for cleaning such a cooking oven (1), comprising the following steps: - positioning one or more washing/rinsing additive tabs (430) in the seat (420) of the filter (410) positioned within the cooking chamber (2); - loading washing/rinsing liquid within the cooking chamber until the washing/rinsing liquid covers the one or more washing/rinsing additive tabs (430); - melting the one or more washing/rinsing additive tabs (430) with the washing/rinsing liquid and forming a washing/rinsing solution in the bottom wall (3) of the cooking chamber (2).

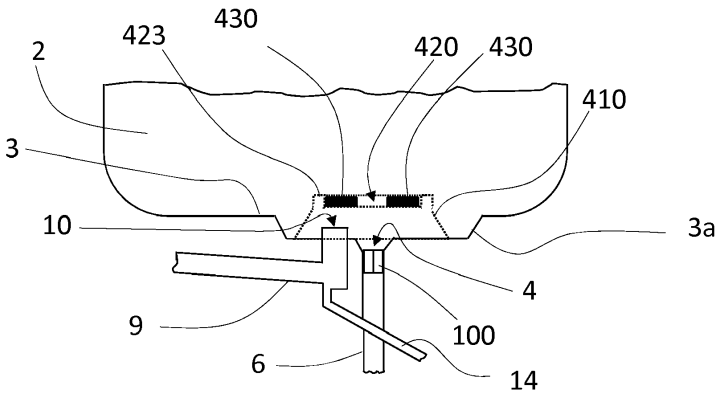

Fig. 12

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Description

[0001] The present invention relates to a cooking oven with a cleaning system, and in particular to a "professional" oven, i.e. and oven used mainly in professional activities, like restaurants, canteens, hotels, etc.

[0002] The invention also relates to a method for cleaning such an oven.

[0003] Typically, professional ovens for foodstuffs comprise a housing, typically made of steel, containing a cooking chamber wherein foodstuffs can be placed for being cooked.

[0004] The cooking chamber is frequently provided with removable trays or racks, where food and/or pots or backing trays containing foodstuff can be placed.

[0005] The cooking chamber is typically parallelepipedal, and it is provided with a bottom wall wherein the grease dripping from foodstuff during the cooking is collected, and periodically drained via a cooking chamber outlet fluidly connected, typically via a valve, to a grease container external to the oven.

[0006] The oven is also provided with a heating device, e.g. an electric heater, or a gas heater, configured for heating the internal of the cooking chamber.

[0007] Typically, professional ovens are also provided with a ventilation system for circulating air within the cooking chamber during the cooking process, so as to make uniform the temperature within the internal of the cooking chamber.

[0008] Professional ovens are also typically provided with a vapour outlet duct, configured for discharging vapour from the cooking chamber during the cooking process; discharging the vapour is essential for keeping the pressure, the humidity, and the temperature within the cooking chamber within prefixed ranges specific for the kind of food to be cooked.

[0009] It is underlined that in the present application the word "vapour" has to be understood indiscriminately as pure steam, or as a mixture of steam and air and/or gasses.

[0010] The vapour outlet duct is fluidly connected to the internal of the cooking chamber via the same cooking chamber outlet used for draining the grease.

[0011] The vapour outlet duct is also typically provided with a quenching system for dehumidifying and cooling down the vapour before discharging it into the external environment; typically, the quenching system comprises a nozzle provided within the vapour outlet duct and positioned in such a way to spray a jet of fresh water against the vapour passing through the vapour outlet duct, so as to cool down the vapour and to condensate the humidity contained therein.

[0012] Condensate is drained from the vapour outlet duct via a condensate draining conduit fluidly connected to an oven outlet configured for draining liquid outside the cooking oven.

[0013] The cooking chamber and the various components of the oven where liquid and fluids are collected and flow (pipes, reservoirs, etc.), need to be periodically cleaned (e.g. washed, degreased, descaled) in order to ensure hygiene and preserve the correct functionalities of all the components.

[0014] A manual cleaning is burdensome and requires much time.

[0015] There are known cooking ovens provided with automatic or semi-automatic cleaning systems.

[0016] It is underlined that "semiautomatic" means comprising both automatic operations, i.e. operations performed automatically by the oven (e.g. controlled by the electronic board of the oven controlling also the cooking procedure), and manual operations, i.e. operations performed manually by a user, like for example loading additives, opening and closing valves, etc.

[0017] In some known automatic or semi-automatic cleaning systems a cleaning agent (i.e. water mixed with a washing agent, e.g. a degreaser or a descaling agent) is circulated through the cooking chamber (e.g. by a circulation pump and circulation ducts) and then drained, and then one or more rinsing phases are performed, in which clean water is circulated through the cooking chamber, and then drained.

[0018] In some known solutions, the cleaning agents are stored in tanks external to the oven and they are delivered into the cooking chamber by means of pumps. These known solutions are quite expensive and cumbersome.

[0019] Other known solutions use solid cleaning agents, typically in the form of compressed powder tablets, called also tabs, which are positioned on the bottom wall of the cooking chamber before starting the cleaning process, so as to be melted and chemically activated by the water loaded within the cooking chamber during the cleaning process, and to form with this water a cleaning solution.

[0020] These known solutions has however the drawback that the chemical products used as cleaning agents, when at high concentration, are potentially corrosive for the metal composing the cooking chamber.

[0021] When the compressed powder tabs are positioned on the bottom wall of the cooking chamber, if the cleaning process does not start immediately, the residual humidity in the bottom wall can locally activate the cleaning agent powder of the tabs; in this case, the local concentration of the cleaning agent can be very high, with the risk of corroding the cooking chamber bottom wall, which could compromise the functioning of the cooking oven.

[0022] The corrosion of the bottom wall requires, in the better case, a service intervention, and therefore at least temporarily interrupting the use of the oven.

[0023] In addition, replacing the bottom wall, when corroded, can be impossible, or, if possible, is anyway very expensive and time consuming.

[0024] In addition, since the tabs are positioned on the flat surface of the bottom wall of the cooking oven, their bottom wall is not touched, or only partially touched, by

the cleaning water, and therefore their complete melting is quite slow, which increases the time needed for completing a cleaning cycle.

[0025] The aim of the invention is therefore to provide a cooking oven provided with a cleaning system which ensure an optimal cleaning of the oven, without damaging or compromising the latter, in particular the bottom wall of the cooking chamber.

[0026] Within this aim, another object of the invention is to provide a cooking oven provided with a cleaning system which can perform a cleaning cycle/procedure relatively quickly.

[0027] Applicant has found that by positioning a washing/rinsing additive tab not on the bottom wall of the cooking chamber, but in a seat configured for supporting a washing/rinsing additive tab spaced from the bottom wall of the cooking chamber and provided in a filter at least partially arranged within the cooking chamber for preventing solid bodies of prefixed dimensions from entering one or more cooking chamber outlets, while letting liquids flow from the cooking chamber into one or more cooking chamber outlets, the washing/rinsing additive tab does not contact possible residual humidity present in the bottom wall of the cooking chamber, and therefore the risk of corroding such a bottom wall is avoided.

[0028] It is underlined that stating the filter prevents solid bodies of prefixed dimensions from entering one or more cooking chamber outlets means that the filter stops solid bodies having dimensions higher than a prefixed value, while it does to stop smaller solid bodies. It is underlined that the filter is arranged for preventing solid bodies of prefixed dimensions from entering one or more cooking chamber outlets, while letting liquids flow from the cooking chamber into such one or more cooking chamber outlets, which implies that the filter is positioned within the cooking chamber in such a way to intercept all, or most of the liquid flowing to the one or more cooking chamber outlets; providing the seat for the washing/rinsing additive tabs in the filter, guarantees that the tabs positioned therein are effectively contacted by the all the washing/rinsing liquid during the cleaning procedure, and therefore that such tabs are effectively melted by such liquid.

[0029] In particular, above aim and objects are solved by a cooking oven for foodstuffs comprising:

- a cooking chamber, wherein foodstuffs can be placed for being cooked, having a bottom wall provided with one or more cooking chamber outlets;
- a cleaning system comprising a washing/rinsing liquid introduction system configured for taking washing/rinsing liquid within the cooking chamber, and for draining the washing/rinsing liquid from the cooking chamber via one or more cooking chamber outlets,
- a filter arranged at least partially within the cooking chamber for preventing solid bodies of prefixed dimensions from entering the one or more cooking chamber outlets, while letting liquids flow from the cooking chamber into the one or more cooking chamber outlets, wherein the filter comprises a seat configured for supporting a washing/rinsing additive tab spaced from the bottom wall of the cooking chamber.

[0030] Advantageously, the seat is configured in such a way that a surface of a washing/rinsing additive tab positioned therein and contacting the seat is at least partially exposed to the internal of the cooking chamber.

[0031] In this way, the surface of a tab in contact with water during a cleaning process is increased, and therefore the melting of such a tab is faster than in the case of positioning the tab directly on the bottom wall of the cooking chamber.

[0032] In a preferred embodiment, the seat comprises a perforated supporting surface, configured for supporting a washing/rinsing additive tab spaced from the bottom wall of the cooking chamber, and comprising a plurality of openings allowing the passage of a liquid. These openings expose the surface of the washing/rinsing additive tab contacting the perforated supporting surface to the internal of the cooking chamber, and therefore to the liquid contained therein during the cleaning phase.

[0033] In a further preferred embodiment, the seat is configured for laterally retaining a washing/rinsing additive tab positioned therein. In this way, it is ensured that the tab rests in the seat during the cleaning process, and that it does not fall, for example, on the bottom wall of the cooking chamber, which could generate above mentioned problems related to corrosion.

[0034] In an advantageous embodiment, the seat comprises a lateral border configured for encircling a washing/rinsing additive tab positioned therein, so as to retain a washing/rinsing additive tab within the seat.

[0035] More preferably, the lateral border is perforated, so as to allow passage of liquids. In this way, if the tab contacts the lateral border, at least part of the surface of the tab contacting the lateral border is exposed to the internal of the cooking chamber, so that it can contact the washing/rinsing liquid contained therein during the cleaning phase.

[0036] In an advantageous embodiment, the lateral border protrudes upwards from the perforated supporting surface, encircling the perimeter of the latter.

[0037] Preferably the seat is configured for supporting a plurality of washing/rinsing tabs. Preferably, the filter is at least partially made of metal or of plastics.

[0038] More preferably, the filter is totally made of metal or of plastics.

[0039] In a preferred embodiment, the filter is at least partially made of mesh, for example a metallic mesh.

[0040] More preferably, at least the supporting surface is made of mesh.

[0041] Preferably, at least the lateral border is made of mesh.

[0042] Still more preferably, the filter is completely made of mesh.

[0043] Preferably, the seat is configured/positioned in

such a way that a washing/rinsing additive tab contained therein is at last partially, more preferably totally, contacted by a liquid flowing from the cooking chamber to the one or more cooking chamber outlets through the filter. In an advantageous embodiment, the filter comprises a perforated convex body positioned or positionable at least partially within the cooking chamber, over one or more cooking chamber outlets.

[0044] In preferred embodiment, the perforated convex body is truncated-cone-shaped or truncated-pyramid-shaped or parallelepiped-shaped or cubic-shaped or cylindrical-shaped, or reverse-basin-shaped.

[0045] Preferably, the one or more cooking chamber outlets comprise a first cooking chamber outlet positioned in such a way to receive grease collected in the bottom wall and fluidly connected to a grease conduit configured for draining grease from the cooking chamber.

[0046] In a further advantageous embodiment, the one or more cooking chamber outlets comprise a second cooking chamber outlet distinct from the first cooking chamber outlet and fluidly connected to a vapour outlet duct configured for discharging vapour from the cooking chamber.

[0047] Advantageously, the filter is arranged for protecting all the one or more cooking chamber outlets.

[0048] In a different advantageous embodiment, the filter is arranged for protecting only one of the one or more cooking chamber outlets.

[0049] In a different advantageous embodiment, the filter is arranged for protecting only some of the one or more cooking chamber outlets.

[0050] In an advantageous embodiment, the filter leans on the bottom wall of the cooking chamber via spacing elements defining, between the filter and the bottom wall, one or more gaps letting liquids flow from the cooking chamber into the one or more cooking chamber outlets, while preventing solid bodies of prefixed dimensions from entering the one or more cooking chamber outlets.

[0051] Preferably the spacing elements are configured in such a way that the gaps defined between the latter and the bottom wall of the cooking chamber can be entered by solid bodies having the same or higher dimensions of the solid bodies stopped by the filter.

[0052] These gaps allow that all the liquid present in the bottom wall of the cooking chamber could be effectively and rapidly drained to the one or more cooking chamber outlets.

[0053] In a preferred embodiment, the one or more of said spacing elements are a part of the filter. More preferably, the one or more of said spacing elements are a single piece-construction with the filter.

[0054] Still more preferably, the one or more spacing elements that are part of the filter protrude from a peripheral bottom flange of the filter.

[0055] Advantageously, the one or more spacing elements being part of the filter abut against the bottom wall of the cooking chamber.

[0056] In a further advantageous embodiment, one or more of the spacing elements are a part of the bottom wall of the cooking chamber.

[0057] Preferably, the one or more spacing elements being part of the bottom wall of the cooking chamber abut against the filter.

[0058] In a further advantageous embodiment, one or more of the spacing elements are separate spacers interposed between the filter and the bottom wall.

[0059] In a further advantageous embodiment, one or more of the spacing elements are part of the filter, and/or one or more of the spacing elements are part of the bottom wall of the cooking chamber, and/or one or more of the spacing elements are separate spacers interposed between the filter and the bottom wall.

[0060] Preferably, the cooking oven according to the invention comprises:

- a heating device configured for heating the internal of the cooking chamber.

[0061] Preferably, in the cooking oven according to the invention, the first cooking chamber outlet, i.e. the one connected to the grease conduit, and the second cooking chamber outlet, i.e. the one connected to the vapour outlet duct, are reciprocally positioned and/or arranged, in such a way that the grease collected in the bottom wall of the cooking chamber enters firstly/more easily the first cooking chamber outlet than the second cooking chamber outlet, so that the possibilities that the grease enters the second cooking chamber outlet are highly reduced. For example, in an advantageous embodiment, the inlet border of the second cooking chamber outlet can be placed at a raised position with respect to the inlet border of the first cooking chamber outlet; this preferred positioning of the inlet border of the second cooking chamber outlet guarantees that if the grease collects in the bottom wall of the cooking chamber, it enters firstly the first cooking chamber, and it is therefore drained to the grease conduit before reaching the level of the inlet border of the second cooking chamber outlet. In a further advantageous example, the bottom wall of the cooking chamber can be at least partially funnel-shaped, at least at or in proximity to the inlet border of the first cooking chamber outlet, so as to favour the drain of the grease collected in such a region to the first cooking chamber outlet.

[0062] Anyway other possible solutions can be used for forcing the grease collected in the bottom wall of the cooking chamber to enter firstly/more easily the first cooking chamber outlet than the second cooking chamber outlet; for example obstacles (e.g. protrusions) can be provided in the bottom wall of the cooking chamber, positioned in such a way to hinder the flow of the grease towards the second cooking chamber outlet and/or to and or to divert the flow towards the first cooking chamber outlet.

[0063] In a preferred embodiment, the bottom wall of the cooking chamber has a region, preferably centrally positioned, which is basin-shaped.

[0064] More preferably, the first cooking chamber outlet is positioned centrally with respect to this basin-shaped region.

[0065] Preferably, if the trays or racks are provided, the first cooking chamber outlet is positioned centrally with respect to overlying trays or racks, so as to effectively receiving grease dripping from the foodstuff positioned on these trays or racks.

[0066] In a preferred embodiment, the cooking oven comprises a shield element arranged for preventing grease, in particular grease falling from the overlying foodstuff being cooked, from entering the second cooking chamber outlet.

[0067] More preferably, the shield element is positioned over the second cooking chamber outlet, spaced apart from the inlet border of the latter.

[0068] Even more preferably, the shield element protrudes from a lateral wall of the cooking chamber.

[0069] Preferably, the shield element can be fixed to the lateral wall of the cooking chamber for example by welding and or screwing, and or bolts, etc.

[0070] In an advantageous embodiment, the shield element can have a convex shape, preferably a reversed V-shaped cross section, so as to deflect away from the underlying second cooking chamber outlet the grease droplets falling from the foodstuff being cooked. Advantageously, the vapour outlet duct comprises a vapour outlet valve, for selectively opening/closing the vapour outlet duct, so as to regulate the discharge of the vapour in the external environment.

[0071] Advantageously, the cooking oven comprises an oven outlet, configured for draining liquid outside the cooking oven.

[0072] Preferably, the oven outlet is provided with an air trap.

[0073] In an advantageous embodiment, the grease conduit is selectively connected or connectable to a grease container.

[0074] Preferably, the grease conduit is selectively connected or connectable to the grease container via a first valve.

[0075] Preferably, the grease conduit is configured for draining grease exiting the first cooking chamber outlet by gravity.

[0076] It is underlined, that in the present application *"by gravity"* means due only to the gravity force, so without the need of a dedicated fluid moving device, like for example a pump.

[0077] For example, stating that *"the grease conduit is configured for draining grease exiting the first cooking chamber outlet by gravity"* means that grease exiting the cooking chamber outlet is taken from the inlet to the outlet of the grease conduit due only to the effect of the gravity force, for example since the inlet is positioned higher than the outlet.

[0078] In a preferred embodiment, the grease conduit is oriented vertically, or substantially vertically, when the cooking oven is in its operative position.

[0079] It is underlined that in the present application *"operative position"*, is defined as a position in which the oven is installed to be operated, and it lies in a horizontal, or substantial horizontal, plane such as the floor of a room, or the internal bottom wall of a piece of furniture in which the oven is built-in.

[0080] In an advantageous embodiment, the cooking oven comprises a vortex preventing device positioned at the first cooking chamber outlet and/or in the grease conduit, and configured for hindering the formation of vortexes in a stream of liquid exiting the cooking chamber via the first cooking chamber outlet.

[0081] The vortex preventing device hinders the formation of vortexes in the liquid flow exiting the cooking chamber through the first cooking chamber outlet.

[0082] Preferably, a vortex preventing device can be provided also at the second cooking chamber outlet.

[0083] Advantageously, the vortex preventing device is an insert having preferably a cross-shaped, or star-shaped cross section, in which a plurality of wings are advantageously defined. Advantageously, these wings partialize the opening of the first cooking chamber outlet, hindering the formation of vortexes in the liquid flow exiting the cooking chamber through the first cooking chamber outlet.

[0084] Advantageously, the vortex preventing device is form-fitted within the first cooking chamber outlet.

[0085] In a preferred embodiment, the first cooking chamber outlet is fluidly connected, in addition to the grease conduit, to the oven outlet.

[0086] In a further preferred embodiment, the first cooking chamber outlet is fluidly connected, in addition to the grease conduit, to the circulation system.

[0087] In a further preferred embodiment, the second cooking chamber outlet is fluidly connected, in addition to the vapour outlet duct, to the oven outlet.

[0088] In a further preferred embodiment, the second cooking chamber outlet is fluidly connected, in addition to the vapour outlet duct, to the grease conduit.

[0089] In a further preferred embodiment, the second cooking chamber outlet is fluidly connected to the grease conduit via a connection duct whose end portion protrudes within the grease conduit, substantially perpendicularly to the internal surface of the latter.

[0090] This advantageous positioning of the end portion hinders the entrance of grease flowing within the grease conduit by gravity into the end portion; in fact, such a grease flowing in the grease conduit, abuts perpendicularly the external lateral wall of the end portion of the connection duct, and it is very difficult that it can enter the end portion, which requires a longitudinal entrance.

[0091] In a preferred embodiment, the second cooking chamber outlet is fluidly connected, in addition to the vapour outlet duct, to the circulation system.

[0092] Preferably, the first cooking chamber outlet and the second cooking chamber outlet are selectively connected to the oven outlet via a second valve.

[0093] Preferably, the circulation system comprises a circulation pump, an aspiration conduit connecting the circulation pump to the first cooking chamber outlet and/or to the second cooking chamber outlet, and a delivery conduit connecting the circulation pump to a washing/rinsing liquid circulation outlet provided in the cooking chamber and configured for allowing washing/rinsing liquid to enter said cooking chamber.

[0094] It is underlined that a washing liquid can be for example water and/or water containing a detergent, while a rinsing liquid can be, for example water and/or water containing a descaling additive, or a brightener.

[0095] In an advantageous embodiment, the cleaning system comprises a washing/rinsing liquid introduction system configured for taking washing/rinsing liquid within the cooking chamber.

[0096] More preferably, the washing/rinsing liquid introduction system comprises an introduction conduit fluidly connected to the cooking chamber and configured for selectively supplying into the latter washing and/or rinsing liquid.

[0097] In a further preferred embodiment, the washing/rinsing liquid introduction system comprises a third valve for controlling the supply of washing and/or rinsing liquid through the introduction conduit.

[0098] In an advantageous embodiment, the washing/rinsing liquid circulation outlet and/or the outlet of the introduction conduit are positioned in an upper wall of the cooking chamber. In an advantageous embodiment, the outlet of the introduction conduit is separated from the washing/rinsing liquid circulation outlet.

[0099] In a further advantageous embodiment, the outlet of the introduction conduit into the cooking chamber coincides with the washing/rinsing liquid circulation outlet.

[0100] In a further advantageous embodiment, the aspiration conduit is fluidly connected to the second cooking chamber outlet via a by-pass conduit fluidly connecting the aspiration conduit to the vapour outlet duct, to which the second cooking chamber outlet is fluidly connected.

[0101] In a further advantageous embodiment, the by-pass conduit is fluidly connected to the grease conduit.

[0102] Preferably, the by-pass conduit is fluidly connected to the grease conduit via the above-mentioned connection duct.

[0103] Preferably, the cooking oven comprises a drain conduit fluidly connecting the oven outlet to the first cooking chamber outlet and to the second cooking chamber outlet.

[0104] More preferably, the drain conduit is fluidly connected to the oven outlet via the second valve.

[0105] Still more preferably, the aspiration conduit is selectively fluidly connected to the oven outlet via the drain conduit.

[0106] Preferably, the by-pass conduit is selectively fluidly connected to the oven outlet via the drain conduit.

[0107] Preferably, the grease conduit is selectively fluidly connected to the oven outlet via the drain conduit.

[0108] In an advantageous embodiment, the cooking oven comprises a quenching system for cooling down steam exiting from the cooking chamber.

[0109] Preferably, the quenching system comprises a quenching conduit for supplying cooling liquid within the vapour outlet duct.

[0110] In a preferred embodiment, the quenching conduit comprises an inlet positioned, in the operative position of the cooking oven, at a higher level with respect to the maximum level that washing/rinsing liquid can reach within the cooking chamber during the washing procedure of the cooking oven; this ensures that, even if washing/rinsing liquid should flow back through the quenching conduit, it wouldn't exit the latter with the risk of contaminating the water mains.

[0111] In a preferred embodiment, the vapour outlet duct comprises:

- a bottom region, positioned, in the operative position of the cooking oven, at least partially below the cooking chamber, and fluidly connected downstream of the second cooking chamber outlet,
- an end region protruding upwards from the bottom region, from which vapour is released in the environment.

[0112] Preferably, the quenching conduit comprises an outlet positioned within the bottom region of the vapour outlet duct; in this way quenching liquid is released in the vapour outlet duct quite far away from its end region. This arrangement of the outlet prevents that quenching liquid (e.g. water) exiting the quenching conduit is taken out of the vapour outlet duct due to the flow of vapour flowing therein.

[0113] Preferably, the bottom region of the vapour outlet duct is slightly inclined in such a way that liquid contained therein tends to flow, by gravity, in counter-current with respect to the vapour.

[0114] In a preferred embodiment, the by-pass conduit is connected to the vapour outlet duct at or in proximity to the initial region of the bottom region so that, due to the slope of the latter, condensed liquid present in such a bottom region flows by gravity into the by-pass conduit.

In an advantageous embodiment, the outlet of the quenching conduit comprises a quenching nozzle arranged within the bottom region and configured for spraying a jet of water against the vapour exiting the second cooking chamber outlet.

[0115] Advantageously, the cooking oven comprises a fourth valve for controlling the supply of cooling water through the quenching conduit.

[0116] Advantageously, the cooking oven comprises a perforated suction wall separating the cooking chamber from a heating chamber containing at least partially the heating device and a fan, wherein the fan is configured for circulating heated air through the cooking chamber and the heating chamber.

[0117] In an advantageous embodiment, the cooking

oven comprises a ventilation pipe fluidly connected to the cooking chamber and configured for selectively taking air from the external environment into the cooking chamber.

[0118] Preferably, the ventilation pipe comprises an outlet provided at the heating chamber. More preferably, the ventilation pipe is provided with a ventilation valve for selectively closing the ventilation pipe.

[0119] In an advantageous embodiment, the cooking oven comprises an overflow conduit directly fluidly connecting the vapour outlet duct to the oven outlet, and configured for directly discharging to the oven outlet the liquid present in the vapour outlet duct only if the level of the liquid in the vapour outlet duct exceeds a certain height.

[0120] In an advantageous embodiment, the circulation system is fluidly connected to the vapour outlet duct, and it is configured for taking washing/rinsing liquid from said cooking chamber into the vapour outlet duct, so as to wash the latter.

[0121] In a preferred embodiment, the cleaning system comprises a washing/rinsing additive supplying system configured for supplying washing and/or rinsing additives to the internal of the cooking chamber.

[0122] It is underlined that a washing additive can be, for example, a detergent, while a rinsing additive can be for example a descaling additive, a brightener, etc.

[0123] Preferably, the washing/rinsing additive supplying system comprises an additive drawer, loadable with a washing/rinsing additive and selectively fluidly connected or connectable to the circulation system in such a way to selectively supply a washing and/or rinsing additive to the latter.

[0124] More preferably, the additive drawer, is selectively fluidly connected or connectable to the aspiration conduit and/or delivery conduit.

[0125] Still more preferably, the cooking oven comprises a fifth valve for connecting the additive drawer to water supply mains.

[0126] In a further advantageous embodiment, the cooking oven comprises a sixth valve selectively connecting the additive drawer to the aspiration conduit and/or delivery conduit.

[0127] In a further advantageous embodiment, the cleaning system comprises a washing/rinsing additive multi-dosing system configured for supplying to the internal of the cooking chamber metered amounts of washing and/or rinsing additives.

[0128] Preferably, the washing/rinsing additive multi-dosing system comprises:

- one or more washing/rinsing additives containers filled or fillable with an amount of washing and/or rinsing additives sufficient for a plurality of washing/rinsing cycles;
- one or more washing/rinsing additives delivery conduits fluidly connecting such one or more washing/rinsing additives containers to the internal of the cooking chamber;
- one or more washing/rinsing additives pumps, configured for pumping a washing/rinsing additive out of the one or more washing/rinsing additives containers and delivery the washing/rinsing additives to the cooking chamber via one or more washing/rinsing additives delivery conduits.

[0129] In an advantageous embodiment, at least one of the one or more washing/rinsing additives containers is fluidly connected to the additive drawer.

[0130] In a further preferred embodiment, at least one of the one or more washing/rinsing additives containers is fluidly connected to the washing/rinsing liquid introduction system.

[0131] More preferably all the one or more washing/rinsing additives containers are fluidly connected to the introduction conduit.

[0132] Advantageously, the cooking oven comprises a steam supply system configured for producing and supplying steam into the cooking chamber.

[0133] Preferably, the steam supply system comprises a boiler configured for producing steam and fluidly connected to the cooking chamber so as to release into the latter the steam.

[0134] More preferably, the boiler comprises a water reservoir fillable with water, and a water heater for heating water loaded within the water reservoir.

[0135] In an advantageous embodiment, the steam supply system comprises:

- a water inlet conduit fluidly connected to the water reservoir and connected or connectable to water mains,
- a water outlet conduit fluidly connecting the water reservoir to the oven outlet.

[0136] Still preferably, the steam supply system comprises:

- a sixth valve associated to the water inlet conduit for controlling the delivery of water to the water reservoir,
- a eighth valve associated to the water outlet conduit for controlling the drain of liquid from the reservoir to the oven outlet.

[0137] Preferably, the steam supply system comprises a steam duct fluidly connecting the reservoir to the cooking chamber.

[0138] In an advantageous embodiment, the cleaning system is configured for supplying a washing/rinsing liquid to the steam supply system.

[0139] Preferably, the cleaning system is configured for supplying a washing/rinsing liquid to the boiler.

[0140] Preferably, the cleaning system comprises a boiler cleaning conduit, fluidly connecting the washing/rinsing additive supplying system to the boiler.

[0141] More preferably, the boiler cleaning conduit fluidly connects the water reservoir to the additive drawer.

[0142] Still preferably, the boiler cleaning conduit fluidly connects the water reservoir to the washing/rinsing additive multi-dosing system.

[0143] More preferably, the boiler cleaning conduit fluidly connects the water reservoir to one or more of said the or more washing/rinsing additives container.

[0144] Preferably, the cooking oven comprises an electronic controller, for example a programmed/programmable electronic board, for controlling one or more (preferably all the) functions of the cooking oven (e.g. the cooking procedure, the washing procedure, the electronic controllable components, etc.).

[0145] In a further aspect thereof, the invention relates to a cleaning method for cleaning a cooking oven according to one or more of above described embodiments of the invention, comprising the following steps:

- positioning one or more washing/rinsing additive tabs in the seat of the filter positioned within the cooking chamber;
- loading washing/rinsing liquid within the cooking chamber until the washing/rinsing liquid covers the one or more washing/rinsing additive tabs;
- melting the one or more washing/rinsing additive tabs with the washing/rinsing liquid and forming a washing/rinsing solution in the bottom wall of the cooking chamber.

[0146] This solution cleans the bottom wall of the cooking chamber, and can be drained, for example by one or more cooking chamber outlets.

[0147] In a further advantageous embodiment, in which the oven comprises a circulation system configured for pumping liquid out of the cooking chamber and for pumping such liquid, or a part thereof, again in the cooking chamber, the method preferably comprises:

- pumping the washing/rinsing solution out of the cooking chamber and pumping the washing/rinsing solution, or a part thereof, again in the cooking chamber using the circulation system. These and other features and advantages of the invention will be better apparent from the following description of some exemplary and non-limitative embodiments, to be read with reference to the attached drawings, wherein:

  - Fig. 1 is a schematic frontal view of a cooking oven according to the invention;
  - Fig. 2 is a schematic lateral view, with some parts removed for more clarity, of a first embodiment of a cooking oven according to the invention;
  - Fig. 3 is a schematic lateral view, with some parts removed for more clarity, of a second embodiment of a cooking oven according to the invention;
  - Fig. 4 is a schematic lateral view, with some parts removed for more clarity, of a third embodiment of a cooking oven according to the invention;
  - Fig. 5 is a schematic lateral view, with some parts removed for more clarity, of a fourth embodiment of a cooking oven according to the invention;
  - Fig. 6 is a schematic lateral view, with some parts removed for more clarity, of a fifth embodiment of a cooking oven according to the invention;
  - Fig. 7 is a detail of an advantageous embodiment of the first cooking chamber outlet of a cooking oven according the invention, in which a vortex preventing device is visible;
  - Fig. 8 is a detail of a schematic lateral view of the bottom region of the cooking chamber of an advantageous embodiment of a cooking oven according to the invention,
  - Fig. 9 is a flow chart schematically showing the phases of a procedure for cleaning an oven according to an embodiment of the invention,
  - Fig. 10 is a flow chart schematically showing the phases of a second embodiment of a procedure for cleaning an oven according to an embodiment of the invention,
  - Fig. 11 is a schematic lateral view of a filter of an oven according to the invention,
  - Fig. 12 is a detail of a schematic lateral view, with some parts removed for more clarity, of an advantageous embodiment of a cooking oven according to the invention;
  - Fig. 13 is a schematic view of the bottom wall of a cooking oven according to the invention, showing a washing/rinsing tab positioned in the seat of the filter;
  - Fig. 14 is a schematic perspective view of a further embodiment of filter of an oven according to the invention;
  - Fig. 15 is a schematic lateral view, with some parts removed for clarity, of a cooking oven according to the invention having the filter of figure 14.

[0148] With reference initially to Fig. 1, a cooking oven 1 according to the invention is schematically described.

[0149] It is underlined that all the functions of the oven can be advantageously controlled by a suitable electronic controller, for example a programmed/programmable electronic board, schematically illustrated in figure 2 by a dashed square 600.

[0150] The cooking oven comprises an external casing 200, containing a cooking chamber 2, wherein foodstuffs can be placed for being cooked; preferably, the cooking chamber is accessible via a door 2a.

[0151] In an advantageous embodiment, like in the ex-

amples of attached figures, the cooking chamber 2 contains a plurality of trays or racks 2b, wherein foodstuff, or pots or trays containing foodstuff, can be placed for being cooked.

[0152] The cooking chamber 2 has a bottom wall 3, preferably, but not necessarily, at least partially, basin-shaped, so as to better collect grease dripping from the foodstuffs being cooked. Advantageously, the bottom wall 3 is provided with a first cooking chamber outlet 4 positioned in such a way to receive grease or liquid dripped from the foodstuff being cooked and collected in the bottom wall 3.

[0153] In the advantageous examples illustrated in attached figures, the bottom wall 3 has a region 3a, preferably centrally positioned, which is basin shaped; in this advantageous example, the first cooking chamber outlet 4 is positioned centrally with respect to this basin-shaped region 3a. More preferably, the region 3a is at least partially funnel-shaped, at least at or in proximity to the inlet border 4a of first cooking chamber outlet 4, so as to favour the drain of the grease collected on such a region 3a to the first cooking chamber outlet 4. Preferably, if the trays or racks 2b are provided, the first cooking chamber outlet 4 is positioned centrally with respect to overlying trays or racks 2b, so as to effectively receive grease dripping from the foodstuff positioned on these trays or racks 2b.

[0154] The oven 1 also comprises a grease conduit 6 configured for draining grease from the cooking chamber 2; the first cooking chamber outlet 4 is fluidly connected to the grease conduit 6.

[0155] Advantageously, the grease conduit 6 is selectively connected or connectable to a grease container 60, positioned preferably outside the oven 1, and more preferably removable, in such a way that, when full, it can be removed for being emptied, and/or it can be replaced by an empty one.

[0156] In an advantageous embodiment, the grease conduit 6 is selectively connected or connectable to the grease container 60 via a first valve 11, that can be selectively opened and closed, automatically and/or manually, in order to allow grease dripping from the foodstuff to be collected in the grease container 60.

[0157] In a preferred embodiment, the grease conduit 6 is configured for draining grease exiting the first cooking chamber outlet 4 by gravity.

[0158] It is underlined, that in the present application *"by gravity"* means due only to the gravity force, so without the need of a dedicated fluid moving device, like for example a pump.

[0159] For example, stating that *"the grease conduit is configured for draining grease exiting the first cooking chamber outlet by gravity"* means that grease exiting the cooking chamber outlet is taken from the inlet to the outlet of the grease conduit due only to the effect of the gravity force, for example since the inlet is positioned higher than the outlet.

[0160] This can be obtained, for example, by orienting the grease conduit 6 vertically, or substantially vertically, when the cooking oven 1 is in its operative position.

[0161] It is underlined that in the present application *"operative position"*, is defined as a position in which the oven is installed to be operated, and it lies in a horizontal, or substantial horizontal, plane such as the floor of a room, or the internal bottom wall of a piece of furniture in which the oven is built-in.

[0162] Advantageously, the cooking oven further comprises a heating device 8 configured for heating the internal of the cooking chamber 2; the heating device 8 can be an electrical heater, or (as in the examples illustrated in attached figures) hot tubes wherein the hot fumes exiting a gas burner flows, a heat exchanger, etc.

[0163] Advantageously, the cooking oven 1 comprises a perforated suction wall 18 separating the cooking chamber 2 from a heating chamber 19 containing, at least partially, the heating device 8, and, preferably, a fan 20 configured for circulating heated air through the cooking chamber 2 and the heating chamber 19.

[0164] The cooking oven 1 comprises a vapour outlet duct 9 configured for discharging vapour from the cooking chamber 2; the vapour outlet duct 9 can advantageously discharge the vapour in the external environment around the cooking oven 1, or it can be advantageously connected to a vapour discharge system, preferably provided in the building where the cooking oven 1 is installed.

[0165] Advantageously, the vapour outlet duct 9 comprises a vapour outlet valve 45, for selectively opening/closing the vapour outlet duct 9, so as to regulate the discharge of the vapour in the external environment.

[0166] According to the invention, the bottom wall 3 of the cooking chamber 2 is provided with a second cooking chamber outlet 10, distinct from the first cooking chamber outlet 4 and fluidly connected to the vapour outlet duct 9.

[0167] Vapour present the cooking chamber 2, for example emitted from the foodstuff, and/or (like in the advantageously embodiments of figures 3 and 4) due to steam supplied in the cooking chamber 2 by a steam supply system 35, if the cooking oven is advantageously provided with such a steam supply system 35, is therefore discharged outside the cooking oven 1 passing through the second cooking chamber outlet 10 and the vapour outlet duct 9. Preferably, the first cooking chamber outlet 4 and the second cooking chamber outlet 10 are positioned on the bottom wall 3, and are reciprocally positioned and/or arranged, in such a way that the grease collected in the bottom wall 3 enters firstly/more easily the first cooking chamber outlet 4 than the second cooking outlet chamber 10, so that the possibilities that the grease enters the second cooking chamber outlet 10 are highly reduced.

[0168] This can be obtained for example, in advantageous embodiments, like in the examples illustrated in attached figures, if the inlet border 10a of the second cooking chamber outlet 10 is placed at a raised position with respect to the inlet border 4a of the first cooking chamber outlet 4; in this way the grease collected in the bottom 3 goes firstly into the first cooking chamber outlet

4, and therefore the possibilities that its level increases enough to enter the first cooking chamber outlet 10 are highly reduced.

[0169] In a further advantageous embodiment, like in the example of Figure 8, the cooking oven 1 can comprise a shield element 300 for preventing grease in particular grease falling from the overlying foodstuff being cooked, from entering the second cooking chamber outlet 10. Preferably, the shield element 300 is positioned over the second cooking chamber outlet 10, spaced apart from the inlet border 10a of the latter.

[0170] More preferably, the said shield element 300 protrudes from the lateral wall of the cooking chamber 2; advantageously the shield element 300 can be fixed to the lateral wall of the cooking chamber for example by welding and or screwing, and or bolts, etc.

[0171] In an advantageous embodiment, the shield element 300 can have a convex, preferably reversed V-shaped, cross section, so as to deflect away from the underlying second cooking chamber outlet 10 the grease droplets falling from the foodstuff being cooked.

[0172] In the advantageous embodiments illustrated in attached figures, the cooking oven 1 comprises a cleaning system 70, advantageously comprising a circulation system 7 configured for pumping liquid out of the cooking chamber 2 and for pumping such liquid, or a part thereof, again in the cooking chamber 2.

[0173] In preferred embodiments, like for example the ones illustrated in attached figures, the circulation system 7 comprises a circulation pump 7a, an aspiration conduit 7b connecting the circulation pump 7a to the first cooking chamber outlet 4 and/or to the second cooking chamber outlet 10, and a delivery conduit 7c connecting the circulation pump 7a to a washing/rinsing liquid circulation outlet 13 provided in the cooking chamber 2 and configured for allowing washing/rinsing liquid to enter the cooking chamber 2.

[0174] It is underlined that a washing liquid can be for example water and/or water containing a detergent, while a rinsing liquid can be, for example water and/or water containing a descaling additive or a brightener.

[0175] In an advantageous embodiment, like in the examples illustrated in attached figures, the aspiration conduit 7b fluidly connects the circulation pump 7a both to the first cooking chamber outlet 4 and to the second cooking chamber outlet 10.

[0176] According to the invention, the cooking oven 1 comprises a filter 410 arranged at least partially within the cooking chamber 2 for preventing solid bodies of prefixed dimensions from entering the one or more cooking chamber outlets (e.g. first cooking chamber outlet 4, and/or second cooking chamber outlet 10), while letting liquids flow from the cooking chamber 2 into the one or more cooking chamber outlets.

[0177] The filter 410 comprises a seat 420 configured for supporting a washing/rinsing additive tab 430 spaced from the bottom wall 3 of the cooking chamber 2.

[0178] Preferably, seat 420 is configured for supporting a plurality of washing/rinsing tabs 430.

[0179] Advantageously, the seat 420 is configured in such a way that a surface of a washing/rinsing additive tab 430 positioned therein and contacting the seat 420 is at least partially exposed to the internal of the cooking chamber 2. In this way, the surface of a tab 430 in contact with water during a cleaning process is increased, and therefore the melting of such a tab 430 is faster than in the case of positioning the tab directly on the bottom wall 3 of the cooking chamber 2.

[0180] In a preferred embodiment, the seat 420 comprises a perforated supporting surface 421, configured for supporting a washing/rinsing additive tab 430 spaced from the bottom wall 3 of the cooking chamber 2, and comprising a plurality of openings 422 allowing the passage of a liquid.

[0181] Preferably, the seat 420 is configured for laterally retaining a washing/rinsing additive tab 430 positioned therein. In this way it is ensured that the tab 430 rests in the seat 420 during the cleaning process, and that it does not fall, for example, on the bottom wall 3 of the cooking chamber 2.

[0182] Advantageously, the seat 420 comprises a lateral border 423 configured for encircling a washing/rinsing additive tab 430 positioned therein, so as to retain a washing/rinsing additive tab 430 within the seat 420.

[0183] Advantageously, the lateral border 423 is perforated, so as to allow passage of liquids. In this way, if the tab 430 contacts the lateral border 423, at least part of the surface of the tab 430 contacting the lateral border 423 is exposed to the internal of the cooking chamber 2, so that it can contact the washing/rinsing liquid during the cleaning phase.

[0184] In an advantageous embodiment, the lateral border 423 protrudes upwards from the perforated supporting surface 421, encircling the perimeter of the latter.

[0185] Preferably, the filter 410 is at least partially made of metal or of plastics.

[0186] More preferably, the filter 410 is totally made of metal or of plastics.

[0187] In a preferred embodiment, the filter 410 is at least partially made of mesh, for example a metallic mesh.

[0188] More preferably, at least the supporting surface 421 is made of mesh.

[0189] Preferably, at least the lateral border 423 is made of mesh.

[0190] Still more preferably, the filter 410 is completely made of mesh.

[0191] In an advantageous embodiment, the filter 410 comprises a perforated convex body 440 positioned or positionable at least partially within the cooking chamber 2, over one or more cooking chamber outlets.

[0192] Advantageously, the perforated convex body can be truncated-cone-shaped or truncated-pyramid-shaped or parallelepiped-shaped or cubic-shaped or cylindrical-shaped, or reverse-basin-shaped.

[0193] Advantageously, the filter 410 is arranged for

protecting all the one or more cooking chamber outlets.

[0194] In a different advantageous embodiment, the filter 410 can be arranged for protecting only one of the one or more cooking chamber outlets, or only some of the one or more cooking chamber outlets.

[0195] In the advantageous embodiment of figures 14 and 15, the filter 410 leans on the bottom wall 3 via spacing elements 450 defining, between the filter 410 and the bottom wall 3, one or more gaps 460 letting liquids flow from the cooking chamber 2 into the one or more cooking chamber outlets 4, 10, while preventing solid bodies of prefixed dimensions from entering the one or more cooking chamber outlets 4, 10.

[0196] It is underline that in the schematic view of figure 14, the openings of the filter 410 allowing the passage of a liquid are present, but not represented.

[0197] Preferably the spacing elements 450 are configured in such a way that the gaps 460 defined between the latter and the bottom wall 3 of the cooking chamber 2 can be entered by solid bodies having the same or higher dimensions of the solid bodies stopped by the filter 410. Preferably the spacing elements 450 are configured in such a way that the gaps 460 defined between the latter and the bottom wall 3 of the cooking chamber 2 can be entered by solid bodies having the same or higher dimensions of the solid bodies stopped by the filter 410. In the advantageous embodiment of figures 14 and 15, the one or more of said spacing elements 450 are a part of the filter 410.

[0198] Preferably, the one or more of said spacing elements 450 are a single piece-construction with the filter 410.

[0199] More preferably, the one or more spacing elements 450 protrude from a peripheral bottom flange 470 of the filter 410.

[0200] The spacing elements 450 advantageously abut against the bottom wall 3, so that the rest of the filter 410 is spaced from the latter.

[0201] In a further advantageous embodiment, not illustrated, one or more spacing elements can be part of the bottom wall, and they can advantageously abut against the filter.

[0202] In a further advantageous embodiment, not illustrated, one or more spacing elements can be separate spacers interposed between the filter and the bottom wall.

[0203] In an advantageous embodiment, like in the examples illustrated in attached figures, the cooking oven 1 comprises a vortex preventing device 100 positioned at the first cooking chamber outlet 4 and/or in the grease conduit 6, and configured for hindering the formation of vortexes in a stream of liquid exiting the cooking chamber 2 via the first cooking chamber outlet 4.

[0204] Advantageously, the vortex preventing device 100 can be an insert having preferably a cross-shaped, or star-shaped cross section, in which a plurality of wings 100a are advantageously defined, preferably form fitted within the first cooking chamber outlet 4; wings 100a partialize the opening of the first cooking chamber outlet 4, hindering the formation of vortexes in the liquid flow exiting the cooking chamber 2 through the first cooking chamber outlet 4.

[0205] Absence of vortexes is very important in the advantageous embodiments in which the oven is provided with above described circulation system 7, since vortexes could form bubbles that prevent the circulation pump 7a to prime properly.

[0206] In a further embodiment, not illustrated, a vortex preventing device 100 is positioned also at the second cooking chamber outlet 10.

[0207] Advantageously, the cooking oven 1 comprises an oven outlet 5, configured for draining liquid outside the cooking oven 1; advantageously the oven outlet 5 can be connected to the sewage pipes, not illustrated, of the building in which the cooking oven 1 is installed. Preferably, the first cooking chamber outlet 4 is fluidly connected, in addition to the grease conduit 6, also, preferably selectively, to the oven outlet 5.

[0208] Advantageously, the oven outlet 5 is provided with an air trap 5a, for preventing, when active (i.e. when filled with a liquid), gas to exit through said oven outlet 5.

[0209] In the advantageous embodiment in which the cooking oven 1 is provided with the circulation system 7, as in the examples of attached figures, the first cooking chamber outlet 4 can be fluidly connected to the circulation system 7.

[0210] In an advantageous embodiment, as in the examples of attached figures, the second cooking chamber outlet 10 is fluidly connected, in addition to the vapour outlet duct 9, to the oven outlet 5.

[0211] Preferably, the first cooking chamber outlet 4 and the second cooking chamber outlet 10 are selectively connected to the oven outlet 5 via a second valve 12, which can be manual or automatic.

[0212] Advantageously, the cooking oven 1 comprises a drain conduit 5b fluidly connecting the oven outlet 5 to the first cooking chamber outlet 4 and, preferably, to the second cooking chamber outlet 10.

[0213] Advantageously, the drain conduit 5b is fluidly connected to the oven outlet 5 via the second valve 12.

[0214] In a preferred embodiment, the second cooking chamber outlet 10 is fluidly connected, in addition to the vapour outlet duct 9, to the grease conduit 6.

[0215] In a preferred embodiment, the second cooking chamber outlet 10 is fluidly connected to the grease conduit 6 via a connection duct 50 whose end portion 50a protrudes within the grease conduit 6, substantially perpendicularly to the internal surface of the latter.

[0216] This positioning of the end portion 50a hinders the entrance of grease flowing within the grease conduit 6 by gravity into the end portion 50a; in fact, such a grease, flowing in the grease conduit 6, abuts perpendicularly against the external lateral wall of the end portion 50a of the connection duct 50, and it is very difficult that it can enter the end portion 50a which requires a longitudinal entrance.

[0217] Preferably, the aspiration conduit 7b of the circulation system 7 is fluidly connected to the second cooking chamber outlet 10 via a by-pass conduit 14 fluidly connecting the aspiration conduit 7b to the vapour outlet duct 9, to which the second cooking chamber outlet 10 is fluidly connected.

[0218] More preferably, the by-pass conduit 14 is fluidly connected to the grease conduit 6.

[0219] Even more preferably, the by-pass conduit 14 is fluidly connected to the grease conduit 6 via above described connection duct 50.

[0220] Advantageously, the aspiration conduit 7b of the circulation system 7 is selectively fluidly connected to the oven outlet 5 via the drain conduit 5b.

[0221] Advantageously, the by-pass conduit 14 is selectively fluidly connected to the oven outlet 5 via the drain conduit 5b.

[0222] Advantageously, the grease conduit 6 is selectively fluidly connected to the oven outlet 5 via the drain conduit 5b.

[0223] In an advantageous embodiment, the cleaning system 70 comprises a washing/rinsing liquid introduction system 16 configured for taking washing/rinsing liquid within the cooking chamber 2.

[0224] In an advantageous embodiment, the washing/rinsing liquid introduction system 16 comprises an introduction conduit 16a fluidly connected to the cooking chamber 2 and configured for selectively supplying into the latter washing and/or rinsing liquid.

[0225] In a preferred embodiment, the washing/rinsing liquid introduction system 16 comprises a third valve 16b for controlling the supply of washing and/or rinsing liquid through the introduction conduit 16a.

[0226] Advantageously, as in the examples illustrated in attached figures, the introduction conduit 16a can be connected, upstream the third valve, to water mains, not illustrated, provided in the building where the cooking oven 1 is installed.

[0227] Advantageously, the washing/rinsing liquid circulation outlet 13 and the outlet 16c of the introduction conduit 16a are positioned in an upper wall 23 of the cooking chamber 2. Preferably, the washing/rinsing liquid circulation outlet 13 and the outlet 16c of the introduction conduit 16a are positioned in an upper wall 23 of the cooking chamber 2, in proximity of the suction wall 18.

[0228] Preferably, the outlet 16c of the introduction conduit 16a is separated from the washing/rinsing liquid circulation outlet 3.

[0229] In a further advantageous embodiment, not illustrated, the outlet of the introduction conduit 16a into the cooking chamber 2 coincides with the washing/rinsing liquid circulation outlet 13.

[0230] Advantageously, the cooking oven 1 comprises a quenching system 17 for cooling down steam exiting from the cooking chamber 2.

[0231] Preferably, the quenching system 17 comprises a quenching conduit 17a for supplying a cooling liquid within the vapour outlet duct 9.

[0232] The quenching liquid is preferably fresh water, coming from the water mains, not illustrated, of the building in which the cooking oven 1 is installed, to which the quenching conduit 17a can be fluidly connected.

[0233] Advantageously, the quenching conduit 17a comprises an inlet 170a positioned, in the operative position of the cooking oven 1, at a higher level with respect to the maximum level 500 that washing/rinsing liquid can reach within the cooking chamber 2 during the washing procedure of the cooking oven 1.

[0234] This ensures that, even if washing/rinsing liquid should flow back through the quenching conduit 17a, it wouldn't exit the latter with the risk of contaminating the water mains.

[0235] In a preferred embodiment, as in the examples illustrated in attached figures, the vapour outlet duct 9 comprises a bottom region 9a, positioned, in the operative position of the cooking oven 1, at least partially below the cooking chamber 2, and fluidly connected downstream of said second cooking chamber outlet 10.

[0236] More preferably, as in the examples of the attached figures, the bottom region 9a of the vapour outlet duct 9 is slightly inclined in such a way that liquid contained therein tends to flow, by gravity, in counter-current with respect to the vapour flowing through the bottom region 9a; in other words, the bottom region 9a is preferably inclined in such a way to define a backwards slope.

[0237] In a preferred embodiment, the by-pass conduit 14 is connected to the vapour outlet duct 9 at or in proximity to the initial region of the bottom region 9a so that, due to the slope of the latter, condensed liquid present in such a bottom region 9a flows by gravity into the by-pass conduit 14.

[0238] Preferably, the vapour outlet duct 9 comprises an end region 9b protruding upwards from the bottom region 9a, from which vapour is released in the environment.

[0239] Advantageously, the end region 9b is substantially vertical.

[0240] Preferably, the quenching conduit 17a comprises an outlet 1710b positioned within the bottom region 9a of the vapour outlet duct 9; since in this way quenching liquid is released in the vapour outlet duct quite far away from its end region 9a, this arrangement of the outlet 170b prevents that quenching liquid (e.g. water) exiting the quenching conduit 17a is taken out of the vapour outlet duct 9 by the flow of vapour, schematically illustrated with dotted arrows 400 in attached figures, flowing therein.

[0241] Preferably, the outlet 170b of the quenching conduit 17a comprises a quenching nozzle, not illustrated, arranged within the bottom region 9a and configured for spraying a jet of water against the vapour exiting the cooking chamber outlet 10.

[0242] In an advantageous embodiment, the quenching system 17 comprises a fourth valve 17c for controlling the supply of cooling water through the quenching con-

duit 17a.

[0243] Preferably, as in the examples illustrated in attached figures, the cooking oven 1 comprises a ventilation pipe 21 fluidly connected to the cooking chamber 2 and configured for selectively taking air from the external environment into the cooking chamber 2. Preferably, the ventilation pipe 21 comprises an outlet 21a provided at the heating chamber 19, more preferably in proximity to the fan 20.

[0244] Advantageously, the ventilation pipe 21 is provided with a controlled ventilation valve 22 for selectively closing the ventilation pipe 21.

[0245] Preferably, the cooking oven 1 comprises an overflow conduit 26 directly fluidly connecting the vapour outlet duct 9 to the oven outlet 5, and configured for directly discharging to the oven outlet 5 liquid present in the vapour outlet duct 9 only if the level of such a liquid exceeds a certain height. Advantageously, such height corresponds to the maximum level 500 allowed for the liquid within the cooking chamber 2.

[0246] Advantageously, like in the examples of attached figures, the circulation system 7 is fluidly connected to the vapour outlet duct 9, and it is configured for taking washing/rinsing liquid from the cooking chamber 2 into the vapour outlet duct 9, so as to wash the latter. Advantageously, the cleaning system 70 comprises a washing/rinsing additive supplying system 27 configured for supplying washing and/or rinsing additives to the internal of the cooking chamber 2.

[0247] In a preferred embodiment, the washing/rinsing additive supplying system 27 comprises an additive drawer 28, loadable with a washing/rinsing additive, and selectively fluidly connected or connectable to the circulation system 7, in such a way to selectively supply a washing and/or rinsing additive into the latter, and preferably to the aspiration conduit 7b and/or delivery conduit 7c.

[0248] Preferably, the washing/rinsing additive comprises a descaling additive.

[0249] Preferably, the cooking oven 1 comprises a fifth valve 29 for connecting the additive drawer 28 to water supply mains.

[0250] Preferably, the cooking oven 1 comprises a sixth valve 30 selectively connecting the additive drawer 28 to the aspiration conduit 7b and/or delivery conduit 7c.

[0251] In a further advantageous embodiment, like in the examples illustrated in figures 4 to 6, the cleaning system 70 comprises a washing/rinsing additive multidosing system 31 configured for supplying to the internal of the cooking chamber 2 metered amounts of washing and/or rinsing additives.

[0252] Preferably, the washing/rinsing additive multidosing system 31 comprises:

- one or more washing/rinsing additives containers 32a, 32b filled or fillable with an amount of washing and/or rinsing additives sufficient for a plurality of washing/rinsing cycles;
- one or more washing/rinsing additives delivery conduits 33a, 33b fluidly connecting such one or more washing/rinsing additives containers 32a, 32b to the internal of the cooking chamber 2;
- one or more washing/rinsing additives pumps 34a, 34b, configured for pumping a washing/rinsing additive out of the one or more washing/rinsing additives containers 32a, 32b and for delivering the washing/rinsing additives to the cooking chamber 2 via the one or more washing/rinsing additives delivery conduits 33a, 33b.

[0253] In advantageous embodiments, like the ones illustrated in the examples of figures 4 and 6, at least one of the one or more washing/rinsing additives containers 32a, 32bs (for example container 32a in figures 4 and 6) is fluidly connected to the additive drawer 28; in this way, the user can decide if using the cleaning system 70 as a *"single dose"* cleaning system, i.e. a system requiring to load the drawer 28 any time it has to be used (in this case the user uses the drawer 28 for loading the single dose of additive), or as a *"multi-dose"* system, i.e. a cleaning system in which the additive(s) have to be filled (or refilled), only sporadically, being enough for a plurality of washing/rinsing procedures.

[0254] Preferably, at least one of the one or more washing/rinsing additives containers 32a, 32b is fluidly connected to the washing/rinsing liquid introduction system 16, preferably to the introduction conduit 16a.

[0255] In an advantageous embodiment, like for example the one illustrated in figure 5, all the washing/rinsing additives containers 32a, 32b are fluidly connected to the introduction conduit 16a; in this case, the drawer 28 is preferably not provided, and the cleaning system 70 can be used only as a "multi-dose" system.

[0256] In advantageous embodiments, like for example the ones illustrated in figures 3 and 4, the cooking oven 1 comprises a steam supply system 35 configured for producing and supplying steam into the cooking chamber 2.

[0257] Advantageously the steam supply system 35 can comprise a boiler 36 configured for producing steam and fluidly connected to the cooking chamber 2 so as to release into the latter the steam.

[0258] Preferably, the boiler 36 comprises a water reservoir 37 fillable with water, and a water heater 38 for heating water loaded within the water reservoir 37.

[0259] Advantageously, the steam supply system 35 comprises:

- a water inlet conduit 39 fluidly connected to the water reservoir 37 and connected or connectable to water mains,
- a water outlet conduit 40 fluidly connecting the water reservoir 37 to the oven outlet 5. More preferably, the steam supply system 35 comprises:
- a seventh valve 41 associated to the water inlet conduit 39 for controlling the delivery of water to the wa-

ter reservoir 37,

- a eight valve 42 associated to the water outlet conduit 40 for controlling the drain of liquid from the reservoir 37 to the oven outlet 5.

[0260] Preferably, the steam supply system 35 comprises a steam duct 43 fluidly connecting the reservoir 37 to the cooking chamber 2, for supplying the steam from the reservoir 37 into the latter.

[0261] In advantageous embodiments, like in the examples of figures 3 and 4, the cleaning system 70 is configured for supplying a washing/rinsing liquid to the boiler 36.

[0262] In advantageous embodiments, like the ones illustrated in figures 3 and 4, the cleaning system 70 comprises a boiler cleaning conduit 44, fluidly connecting the washing/rinsing additive supplying system 27 to the boiler 36.

[0263] Preferably, like in the example of figures 3 and 4, the boiler cleaning conduit 44 fluidly connects the water reservoir 37 to the additive drawer 28.

[0264] In an advantageous embodiment, like in the example of figure 4, the boiler cleaning conduit 44 fluidly connects the water reservoir 37 to the washing/rinsing additive multi-dosing system 31. In this case, the boiler cleaning conduit 44 can preferably fluidly connect the water reservoir 37 to one or more of the one or more washing/rinsing additives container 32a, 32b.

[0265] The functioning of the oven according to the invention will be explained in relation to the different embodiments illustrated in attached figures; it is underlined that figure 1 is a schematic illustration of the external shape of a possible embodiment of a cooking oven 1 according to the invention, which fits all the internal layouts illustrated in the rest of the figures. It is also underlined that figures 11, 12 and 13 illustrate schematic details of the cooking oven according to the invention, which are also common to all the layouts illustrated in the rest of the figures.

[0266] With reference to the embodiment of figure 2, once the foodstuff has been loaded into the cooking chamber 2, and the door 2a closed, the cooking process can be started; the heating device 8 and the fan 20 are operated, advantageously by the electronic controller 600 of the cooking oven 1, according to a specific cooking program selected and/or programmed by a user.

[0267] Also ventilation valve 22 is controlled, advantageously by the electronic controller 600 of the cooking oven 1, for keeping fresh air from the external environment into the cooking chamber 2, advantageously according to the specific cooking program selected and/or programmed by the user.

[0268] During the cooking process, the vapour present in the cooking chamber 2, and the high internal temperature, increase the internal pressure, and, when the latter exceeds ambient pressure, vapour is expelled to external of the cooking chamber 2 via the second cooking chamber outlet 10 and the vapour outlet duct 9. Vapour outlet valve 45, if present, is controlled, preferably by the electronic controller 600, for selectively controlling the vapour discharge.

[0269] The quenching system 17, if provided, emits a jet of preferably fresh clean water, taken more preferably from external water mains, against the flow of vapour 400 flowing through the vapour outlet duct 9, cooling down and dehumidifying such a vapour; condensate resulting from this quenching process is collected in the bottom region 9a of the vapour outlet duct 9, and, preferably due to its slope, it is taken by gravity to the by-pass conduit 14, from which it is taken, still by gravity, to the drain conduit 5b, and to the oven outlet 5, from where it can be drained to the sewage pipes, not illustrated, of the building in which the cooking oven 1 is installed.

[0270] Advantageously, before reaching the oven outlet 5, the condensate reaches the air trap 5a (if provided), activating the latter (if not already activated by liquid present in the latter from previous usages of the cooking oven), so that vapour can't exit through it.

[0271] If condensate level within the vapour outlet duct 9 exceed the level of the overflow conduit 26, it is drained by the latter directly to the oven outlet 5 (passing through the air trap 5a, if present).

[0272] During the cooking process, grease can fall from the overlying foodstuff to the bottom 3 of the cooking chamber 2, and it is collected into the cooking chamber outlet 4 and taken to the grease conduit 6, from which it is collected into the grease container 60.

[0273] Having provided two separated cooking chamber outlets, one dedicated to collect grease, reduces the possibility that grease could obstruct the second cooking chamber outlet 10 taking to the vapour outlet duct 9.

[0274] In the advantageous embodiment in which the bottom wall 3 of the cooking chamber 2 has a region 3a at least partially funnel-shaped at least at or in proximity to the inlet border 4a of first cooking chamber outlet 4, grease collected on this region 3a is very effectively taken by gravity into the first cooking chamber outlet 4.

[0275] In the still more preferred embodiment in which the inlet border 10a of the second cooking chamber outlet 10 is placed at a raised position with respect to the inlet border 4a of the first cooking chamber outlet 4, if the grease collects in the bottom wall 3 of the cooking chamber, it enters firstly the first cooking chamber 4, and it is therefore drained to the grease conduit 6 before reaching the level of the inlet border of the second cooking chamber outlet 10.

[0276] In the advantageous embodiment, illustrated for example in figure 8, in which the cooking oven 1 comprises a shield element 300 for preventing grease from entering the second cooking chamber outlet 10, such a shield element 300 prevents also grease drops falling from the foodstuff being cooked to directly enter the second cooking chamber outlet 10.

[0277] It is underlined that the filter 410 prevents solid bodies (e.g. pieces of foodstuffs fallen from the trays 2b) of prefixed dimensions, to enter the first and second cook-

ing chamber outlets. After the end of cooking process, the oven can be cleaned by the cleaning system 70; a cleaning procedure or method can be advantageously activated by the electronic controller 600, which operates on the electrically/electronically operated components of the cleaning system 70.

[0278] A schematic flow chart of a possible cleaning procedure or method is illustrated in figure 9. The cleaning method advantageously starts with a washing phase 1000, in which, in the embodiment of figure 2, preferably after having emptied the cooking chamber 2, one or more washing tabs 430 are positioned in the seat 420 of the filter 410. Being spaced from the bottom 3 of the cooking chamber 2, the risk that the tab(s) 430 starts melting due to residual humidity, with the related corrosion problem, is highly reduced.

[0279] Then the door 2a can be closed, and, with the second valve 12 and the first valve 11 closed, third valve 16b can be opened (preferably automatically by the electronic controller 600), so that a liquid (e.g. water) enters the cooking chamber 2.

[0280] Once the liquid level or the liquid amount within the cooking chamber 2 has reached a prefixed washing value, third valve 16b can be closed (advantageously automatically by the electronic controller 600). It is underlined that the prefixed value of the liquid level at which the third valve 16b is closed has to be selected in such a way that the liquid within the cooking chamber 2 covers the one or more tabs 430 positioned in the seat 420.

[0281] The liquid level within the cooking chamber 2 can be preferably detected, for example by a suitable level sensor, not illustrated, present within the cooking chamber 2.

[0282] The amount of liquid within the cooking chamber 2 can be detected for example by a flowmeter, not illustrated measuring the amount of water entering through the third valve 16b, and communicating this amount to the electronic controller 600.

[0283] Advantageously, the flowmeter can be used also for detecting the liquid level within the cooking chamber 2, since the liquid level and the liquid amount within the cooking chamber are correlated; in this case, the data detected by the flowmeter can be advantageously transmitted to the electronic controller 600, which can be advantageously configured for calculating the liquid level from the amount of liquid entering through the third valve 16b. In a further advantageous embodiment, the amount or the level of liquid within the cooking chamber can be controlled, preferably by the electronic controller 600, by keeping the third valve 16b opened for a prefixed time.

[0284] When liquid contacts the tab(s) 430, it starts melting them, so as to form a washing solution. Then, the circulation pump 7a is preferably operated, so as to circulate the washing solution (i.e. water mixed with the melted tab(s) 430) through the circulation system 7. In particular, the washing solution is circulated through the first cooking chamber outlet 4, grease conduit 6, connection duct 50, drain conduit 5b, second cooking chamber outlet 10, bottom region 9a and at least part of the end region 9b of the vapour outlet duct 9, by-pass conduit 14, aspiration duct 7b, delivery duct 7c, circulation outlet 13, cooking chamber 2.

[0285] Preferably, during the washing phase 1000, more preferably after all the liquid is loaded into the cooking chamber, and before switching on the circulation pump 7a, the heating device 8 is operated, so as to improve the degreasing effect of the washing solution. More preferably the heating device 8 is operated for keeping the temperature within the cooking chamber at a prefixed temperature (e.g. 140°C), or within a range of temperatures (e.g. 120-160°C), to which corresponds a temperature of the water comprised between 70-80°C.

[0286] Preferably, during the washing phase 1000, more preferably during activation of circulation pump 7a, the fan 20 is operated, so as to distribute the liquid falling from the circulation outlet 13 on all the surfaces internal to the cooking chamber 2.

[0287] Advantageously, the vortex preventing device 100 prevents the formation of air bubble that could prevent circulation pump 7a from properly priming.

[0288] At the end of the washing phase 1000 (e.g. after a certain time, counted for example by the electronic controller 600 has elapsed from the beginning of this phase), circulation pump 7a is stopped, and the second valve 12 is opened (preferably automatically by the electronic controller 600), so as to drain the washing solution, advantageously by gravity, through the oven outlet 5.

[0289] In a further advantageous embodiment, in the washing phase 1000 the washing solution can be drained from the cooking chamber 2 without being recirculated; in this case only the bottom wall 3 of the cooking chamber 2 is washed.

[0290] Preferably, but not necessarily, during the washing phase 1000, after a certain time has lapsed from the switching on of the circulation pump 7a, a further amount of water can be loaded into the cooking chamber 2 by opening the third valve 16b, for example for a certain time, or until the quantity of water flown through the introduction conduit 16a, measured by a flowmeter (if provided), has reached a prefixed threshold, or until the liquid level within the cooking chamber 2 reaches a prefixed level. This further amount of water can be loaded while the circulation pump 7a is working, or the circulation pump 7a can be switched off during the further water loading.

[0291] Advantageously the washing solution can be heated again during and/or after the loading of the further amount of water, by activating the heating device 8.

[0292] The cleaning method advantageously comprises one or more rinsing phases 2000, 2001 in which, after closing the second valve 12 (which can be done automatically by the electronic controller 600), third valve 16b is opened again (preferably automatically by the electronic controller 600), so as to take rinsing water within the cooking chamber 2.Once the rinsing water level or the amount within the cooking chamber 2 has reached a

prefixed rinsing value, third valve 16b can be closed (advantageously automatically by the electronic controller 600).

[0293] Preferably, but not necessarily, before start loading the rinsing water, one or more rinsing tabs (e.g. containing a brightener agent), can be positioned in the seat 420 of the filter 410, so as to be melted by the incoming rinsing water; in this case, the prefixed value of the rinsing water level at which the third valve 16b is closed has to be selected in such a way that the liquid within the cooking chamber 2 covers the one or more tabs 430 positioned in the seat 420, so that such a liquid can melt them.

[0294] The liquid level within the cooking chamber 2 can be preferably detected, for example by a suitable level sensor, not illustrated, present within the cooking chamber 2.

[0295] The amount of liquid within the cooking chamber 2 can be detected for example by a flowmeter, not illustrated measuring the amount of water entering through the third valve 16b, and communicating this amount to the electronic controller 600.

[0296] Advantageously, the flowmeter can be used also for detecting the liquid level within the cooking chamber 2, since the liquid level and the liquid amount within the cooking chamber are correlated; in this case, the data detected by the flowmeter can be advantageously transmitted to the electronic controller 600, which can be advantageously configured for calculating the liquid level from the amount of liquid entering through the third valve 16b. In a further advantageous embodiment, the amount or the level of liquid within the cooking chamber can be controlled, preferably by the electronic controller 600, by keeping the third valve 16b opened for a prefixed time.

[0297] Then, preferably, circulation pump 7a is operated, so as to circulate the rinsing water through the circulation system 7, and to remove residuals of detergent possibly remained therein.

[0298] In particular, the rinsing water is circulated through the first cooking chamber outlet 4, grease conduit 6, connection duct 50, drain conduit 5b, second cooking chamber outlet 10, bottom region 9a and at least part of the end region 9b of the vapour outlet duct 9, by-pass conduit 14, aspiration duct 7b, delivery duct 7c, circulation outlet 13, cooking chamber 2.

[0299] Once a rinsing phase 2000, 2001 is completed (e.g. after a certain time, counted for example by the electronic controller 600 has elapsed from the beginning of this phase), circulation pump 7a is stopped, and the second valve 12 is opened (preferably automatically by the electronic controller 600), so as to drain the rinsing water, advantageously by gravity, through the oven outlet 5.

[0300] One or more further rinsing phases, equal or substantially equal to the one just described, can be performed.

[0301] Preferably, during the rinsing phases 2000, 2001 the fan 20 is activated, so as to better distribute the rinsing liquid/clean water on all the surfaces internal to the cooking chamber 2.

[0302] Advantageously, before the last rinsing phase 2001, a descaling phase 3000 can be performed, which, in the embodiment of Figure 2, is advantageously almost equal to a rinsing phase 2000, 2001, with the difference that during the descaling phase 3000 a descaling additive, for example a descaling tab, can be loaded (e.g. manually) into the seat 420 of the filter 410, so as to generate a descaling solution (i.e. water and descaling additive), which is circulated by the circulation system 7, so as to descale the surfaces that it contacts. Preferably, the cleaning method can comprise, before the washing phase 1000, a soaking phase 4000; preferably, in the soaking phase 4000, with the second valve 12 and the first valve 11 closed, third valve 16b can be opened (preferably automatically by the electronic controller 600), preferably until a prefixed water level or amount is reached within the cooking chamber 2, and/or a prefixed time has lapsed until the third valve 16b has been opened. In the soaking phase 4000, heating device 8 is preferably switched on, so as to heat the water collected in the bottom 3 of the cooking chamber 2; then, after a certain time has lapsed, the second valve 12 is opened, and soaking water is drained via the oven drain 5. Then the washing phase 1000 can be performed.

[0303] With reference to the embodiment of figure 3, the functioning of the cooking oven according to the invention is the following.

[0304] Once the foodstuff has been loaded into the cooking chamber 2, and the door 2a closed, the cooking process can be started; the heating device 8 and the fan 20 are operated, advantageously by the electronic controller 600 of the cooking oven 1, according to a specific cooking program selected and/or programmed by a user.

[0305] Also ventilation valve 22 is controlled, advantageously by the electronic controller 600 of the cooking oven 1, for keeping fresh air from the external environment into the cooking chamber 2, advantageously according to the specific cooking program selected and/or programmed by the user.

[0306] During the cooking process, the steam supply system 35 can be operated, preferably by the electronic controller 600, according to the specific cooking program selected and/or programmed by a user, in order to take a prefixed steam amount into the cooking chamber 2. In particular, after water is loaded into the water reservoir 37 via the seventh valve 41, water heater 38 can be operated in order to heat such water and generate steam, which is taken into the cooking chamber 2 via the steam duct 43.

[0307] During the cooking process, the vapour present in the cooking chamber 2, the steam supplied by the steam supply system 35 (if present) and the high internal temperature, increase the internal pressure, and, when the latter exceeds ambient pressure, vapour is expelled to external of the cooking chamber 2 via the second cooking chamber outlet 10 and the vapour outlet duct 9. Vapour outlet valve 45, if present, is controlled, preferably

by the electronic controller 600, for selectively controlling the vapour discharge.

[0308] The quenching system 17, if provided, emits a jet of preferably fresh clean water, taken more preferably from external water mains, against the flow of vapour 400 flowing through the vapour outlet duct 9, cooling down and dehumidifying such a vapour; condensate resulting from this quenching process is collected in the bottom region 9a of the vapour outlet duct 9, and, preferably due to its slope, it is taken by gravity to the by-pass conduit 14, from which it is taken, still by gravity, to the drain conduit 5b, and to the oven outlet 5, from where it can be drained to the sewage pipes, not illustrated, of the building in which the cooking oven 1 is installed.

[0309] Advantageously, before reaching the oven outlet 5, the condensate reaches the air trap 5a (if provided), activating the latter (if not already activated by liquid present from previous usages of the cooking oven), so that vapour can't exit through it.

[0310] If condensate level within the vapour outlet duct 9 exceeds the level of the overflow conduit 26, it is drained by the latter directly to the oven outlet 5 (passing through the air trap 5a, if present).

[0311] During the cooking process, grease can fall from the overlying foodstuff to the bottom 3 of the cooking chamber 2, and it is collected into the cooking chamber outlet 4 and taken to the grease conduit 6, from which it is collected into the grease container 60.

[0312] Having provided two separated cooking chamber outlets, one dedicated to collect grease, reduces the possibility that grease could obstruct the second cooking chamber outlet 10 taking to the vapour outlet duct 9.

[0313] In the advantageous embodiment in which the bottom wall 3 of the cooking chamber 2 has a region 3a at least partially funnel-shaped at least at or in proximity to the inlet border 4a of first cooking chamber outlet 4, grease collected on this region 3a is very effectively taken by gravity into the first cooking chamber outlet 4.

[0314] In the still more preferred embodiment in which the inlet border 10a of the second cooking chamber outlet 10 is placed at a raised position with respect to the inlet border 4a of the first cooking chamber outlet 4, if the grease collects in the bottom wall 3 of the cooking chamber, it enters firstly the first cooking chamber 4, and it is therefore drained to the grease conduit 6 before reaching the level of the second cooking chamber outlet 10.

[0315] In the advantageous embodiment, illustrated for example in figure 8, in which the cooking oven 1 comprises a shield element 300 for preventing grease from entering the second cooking chamber outlet 10, such a shield element 300 prevents also grease droplets falling from the foodstuff being cooked to directly enter the second cooking chamber outlet 10. Also in this embodiment, the filter 410 prevents solid bodies (e.g. pieces of foodstuffs fallen from the trays 2b) of prefixed dimensions, to enter the first and second cooking chamber outlets.

[0316] After the cooking process, the oven can be cleaned by the cleaning system 70; a cleaning method can be advantageously activated by the electronic controller 600, which operates on the electrically/electronically operated components of the cleaning system 70.

[0317] Schematic flow chart illustrated in figure 10 illustrates the phases of a possible cleaning method applied to the layout of figure 3.

[0318] The cleaning method advantageously comprises a steam supply system descaling phase 5000, in which the water reservoir 37 of the steam supply system 35 is preferably emptied by opening the eight valve 42, and a descaling additive is loaded in the additive drawer 28. Then, with seventh valve 41, eight valve 42, and sixth valve 30 closed, the fifth valve 29 is opened (preferably automatically by the electronic controller 600), so that clean water enters the additive drawer 28, melts, preferably only partially, the descaling additive contained therein, forming a descaling solution (i.e. water and descaling additive) which is taken, due to the pressure of the water in the water mains, into the water reservoir 37 through the boiler cleaning duct 44.

[0319] Preferably, the water reservoir is only partially filled with the descaling solution coming from the drawer 28, since a part of the descaling additive should preferably remain in the additive drawer for being used in a further step of cleaning method.

[0320] Advantageously the amount of water loaded into the water reservoir is controlled by a flowmeter, not illustrated, provided at or in series with the fifth valve 29, and preferably controlled by the electronic controller 600 in such a way to close the valve after a prefixed amount of water has flown into the additive drawer 28.

[0321] The electronic controller 600 is also preferably configured in such a way that, in addition or in alternative to the flowmeter, a time-based control of the opening of the fifth valve 29 is performed; in other words, the valve is closed after a certain prefixed time has lapsed until its opening.

[0322] More preferably, some further water is loaded into the water reservoir 37 by opening (preferably automatically by the electronic controller 600) the seventh valve 41, until a prefixed level within the reservoir 37 is reached, and/or a prefixed time has lapsed until the opening of such seventh valve 41. In this way a prefixed concentration of descaling additive in the descaling solution contained in the water reservoir is obtained. Then the seventh valve 41 is closed.

[0323] Advantageously, the water heater 38 is switched on (preferably automatically by the electronic controller 600), so as to increase the descaling effect.

[0324] Preferably, the water heater 38 is controlled, preferably by the electronic controller 600, in order to keep a prefixed temperature within the reservoir 37, for example 80°C; preferably the temperature is measured by a temperature sensor, not illustrated, provided in the water reservoir 37.

[0325] Preferably, the descaling solution is kept into the water reservoir 37 for a prefixed time, more preferably one hour and a half. Preferably, this time can be regulated

by the user, for example operating on a user interface of the cooking oven 1.

[0326] The method for cleaning a cooking oven according to the advantageous embodiment of figure 3, advantageously comprises also a washing phase 1000 in which, preferably after having emptied the cooking chamber 2, one or more washing tabs 430 are positioned in the seat 420 of the filter 410. Being spaced from the bottom 3 of the cooking chamber 2, the risk that the tab(s) 430 starts melting due to residual humidity, with the related corrosion problem, is highly reduced.

[0327] It is underlined that the steam supply system descaling phase 5000 and the washing phase 1000 can start contemporaneously, or one can start before the other.

[0328] Advantageously, in the washing phase 1000, preferably while the water reservoir 37 is being descaled, or before or after this phase, with the second valve 12 and the first valve 11 closed, third valve 16b can be opened (preferably automatically by the electronic controller 600)), so that a liquid (e.g. water) enters the cooking chamber 2.

[0329] The liquid level or amount within the cooking chamber 2 is preferably detected, for example by a suitable level sensor, not illustrated, present within the cooking chamber 2, and/or by a flowmeter, not illustrated measuring the amount of water entering through the third valve 16b, and communicating this amount to the electronic controller 600, which is configured for calculating the liquid level from the amount of liquid entering through the third valve 16b.

[0330] Once the liquid level or amount within the cooking chamber 2 has reached a prefixed value, and/or after a certain time has lapsed, third valve 16b is closed (advantageously automatically by the electronic controller 600). It is underlined that the prefixed value of the liquid level at which the third valve 16b is closed has to be selected in such a way that the liquid within the cooking chamber 2 covers the one or more tabs 430 positioned in the seat 420.When liquid contacts the tab(s) 430, it starts melting them, so as to form a washing solution. The, circulation pump 7a is operated, so as to circulate the washing solution (i.e. water mixed with the melted tab(s) 430)) through the circulation system 7.

[0331] In particular, the washing solution is circulated through the first cooking chamber outlet 4, grease conduit 6, connection duct 50, drain conduit 5b, second cooking chamber outlet 10, bottom region 9a and at least part of the end region 9b of the vapour outlet duct 9, by-pass conduit 14, aspiration duct 7b, delivery duct 7c, circulation outlet 13, cooking chamber 2. Preferably, during the washing phase 1000, more preferably after all the liquid is loaded into the cooking chamber 2, and before switching on the circulation pump 7a, the heating device 8 is operated, so as to improve the degreasing effect of the washing solution. More preferably the heating device 8 is operated for keeping the temperature within the cooking chamber at a prefixed temperature (e.g. 140°C), or within a range of temperatures (e.g. 120-160°C), to which corresponds a temperature of the water comprised between 70-80°C.

[0332] Preferably, during the washing phase 1000, more preferably while the circulation pump 7a is operated, the fan 20 is operated, so as to distribute the liquid falling from the circulation outlet 13 on all the surfaces internal to the cooking chamber 2.

[0333] Advantageously, the vortex preventing device 100 prevents the formation of air bubble that could prevent circulation pump 7a from properly priming.

[0334] At the end of the washing phase 1000 (e.g. after a certain time, counted for example by the electronic controller 600 has elapsed from the beginning of this phase), circulation pump 7a is stopped, and the second valve 12 is opened (preferably automatically by the electronic controller 600), so as to drain the washing solution, advantageously by gravity, through the oven outlet 5.

[0335] Preferably, but not necessarily, during the washing phase 1000, after a certain time has lapsed from the switching on of the circulation pump 7a, a further amount of water can be loaded into the cooking chamber 2 by opening the third valve 16b, for example for a certain time, or until the quantity of water flown through the introduction conduit 16a, measured by a flowmeter (if provided), or until the water level within the cooking chamber 2, has reached a prefixed value. This further amount of water can be loaded while the circulation pump 7a is working, or the circulation pump 7a can be switched off during the further water loading. Advantageously the washing solution can be heated again during and/or after the loading of the further amount of water, by activating the heating device 8.

[0336] The cleaning method advantageously comprises a rinsing phase 2000 in which, after closing the second valve 12 (which can be done automatically by the electronic controller 600), third valve 16b is opened again (preferably automatically by the electronic controller 600), so as to take clean rinsing within the cooking chamber 2.

[0337] Once the rinsing water level or amount within the cooking chamber 2 has reached a prefixed value, third valve 16b can be closed (advantageously automatically by the electronic controller 600).

[0338] Preferably, but not necessarily, before start loading the rinsing water, one or more rinsing tabs (e.g. containing a brightener agent), can be positioned in the seat 420 of the filter 410, so as to be melted by the incoming rinsing water; in this case, the prefixed value of the rinsing water level at which the third valve 16b is closed has to be selected in such a way that the liquid within the cooking chamber 2 covers the one or more tabs 430 positioned in the seat 420, so that such a liquid can melt them. The liquid level within the cooking chamber 2 can be preferably detected, for example by a suitable level sensor, not illustrated, present within the cooking chamber 2.

[0339] The amount of liquid within the cooking cham-

ber 2 can be detected for example by a flowmeter, not illustrated measuring the amount of water entering through the third valve 16b, and communicating this amount to the electronic controller 600.

[0340] Advantageously, the flowmeter can be used also for detecting the liquid level within the cooking chamber 2, since the liquid level and the liquid amount within the cooking chamber are correlated; in this case, the data detected by the flowmeter can be advantageously transmitted to the electronic controller 600, which can be advantageously configured for calculating the liquid level from the amount of liquid entering through the third valve 16b. In a further advantageous embodiment, the amount or the level of liquid within the cooking chamber can be controlled, preferably by the electronic controller 600, by keeping the third valve 16b opened for a prefixed time.

[0341] Then, preferably, circulation pump 7a is operated, so as to circulate the rinsing water through the circulation system 7, and to remove residuals of detergent possibly remained therein.

[0342] In particular, the rinsing water is circulated through the first cooking chamber outlet 4, grease conduit 6, connection duct 50, drain conduit 5b, second cooking chamber outlet 10, bottom region 9a and at least part of the end region 9b of the vapour outlet duct 9, by-pass conduit 14, aspiration duct 7b, delivery duct 7c, circulation outlet 13, cooking chamber 2.

[0343] At the end of the rinsing phase 2000 (e.g. after a certain time, counted for example by the electronic controller 600 has elapsed from the beginning of this phase), circulation pump 7a is stopped, and the second valve 12 is opened (preferably automatically by the electronic controller 600), so as to drain the rinsing water, advantageously by gravity, through the oven outlet 5.

[0344] Preferably, during the rinsing phases 2000, 2001 the fan 20 is activated, so as to better distribute the rinsing water on all the surfaces internal to the cooking chamber 2.

[0345] One or more further rinsing phases 2001, equal or substantially equal to the one just described, can be performed.

[0346] After one or more rinsing phases, a descaling phase 3000 is advantageously performed.

[0347] In the embodiment of figure 3, preferably, in the descaling phase 3000, with first valve 11 and second valve 12 closed, and sixth valve 30 opened, fifth valve 29 is opened (preferably automatically by the electronic controller 600), so that clean water enters the additive drawer 28, melts, preferably completely, the descaling additive contained therein, forming a descaling liquid (i.e. water and descaling additive), and goes by gravity through sixth valve 30, to the aspiration conduit 7b.

[0348] Advantageously the amount of water loaded into the additive drawer 28 is controlled by a flowmeter, not illustrated, provided at or in series with the fifth valve 29, and preferably controlled by the electronic controller 600 in such a way to close the valve after a prefixed amount of water has flown into the additive drawer 28.

[0349] The electronic controller 600 is also preferably configured in such a way that, in addition or in alternative to the flowmeter, a time-based control of the opening of the fifth valve 29 is performed; in other words, the valve is closed after a certain prefixed time has lapsed until its opening.

[0350] In a further advantageous embodiment, in the descaling phase 3000, in addition or alternatively to loading a descaling additive into the additive drawer 28, a descaling additive, for example a descaling tab, can be loaded (e.g. manually) into the seat 420 of the filter 410, so as to generate a descaling solution (i.e. water and descaling additive) when melted by the water loaded into the cooking chamber 2.

[0351] In the descaling phase 3000, circulation pump 7a is advantageously operated, so as to circulate the descaling liquid (i.e. water mixed with the descaling additive present in the additive drawer 28) through the circulation system 7.

[0352] In particular, the descaling liquid is circulated through the first cooking chamber outlet 4, grease conduit 6, connection duct 50, drain conduit 5b, second cooking chamber outlet 10, bottom region 9a and at least part of the end region 9b of the vapour outlet duct 9, by-pass conduit 14, aspiration duct 7b, delivery duct 7c, circulation outlet 13, cooking chamber 2. Preferably, during the descaling phase 3000, the heating device 8 is operated, so as to improve the descaling effect of the descaling liquid.

[0353] Preferably, during the descaling phase 3000, the fan 20 is operated, so as to distribute the descaling liquid falling from the circulation outlet 13 on all the surfaces internal to the cooking chamber 2.

[0354] At the end of the descaling phase 3000 (e.g. after a certain time, counted for example by the electronic controller 600 has elapsed from the beginning of this phase), circulation pump 7a is stopped, and the second valve 12 is opened (preferably automatically by the electronic controller 600), so as to drain the descaling liquid, advantageously by gravity, through the oven outlet 5.

[0355] Preferably, but not necessarily, at the same time with the completion of the descaling phase 3000, the steam supply system descaling phase 5000 can be completed; in this case, preferably automatically by the electronic controller 600, water heater 38 is switched off, eight valve 42 is opened, and the descaling solution present in the water reservoir 37 drained, advantageously by gravity, through the oven outlet 5.

[0356] Finally, a further rinsing phase 2001, equal to the ones described above, can be performed, so as to remove possible residuals of descaling solution from the internal of the oven.

[0357] In addition, with reference to figure 3, the cleaning method preferably comprises a steam supply system rinsing phase 6000, comprising closing the eight valve 42 and opening the seventh valve 41 for a prefixed time, and/or until a prefixed water level is reached within the water reservoir, so as to load clean water within the water

reservoir 37, and finally, after a prefixed time has lapsed, opening the eight valve 42, so as to drain, by gravity, rinsing water via the oven outlet 5.

[0358] Preferably, the cleaning method can comprise, before the washing phase 1000, a soaking phase 4000; preferably, in the soaking phase 4000, with the second valve 12 and the first valve 11 closed, third valve 16b can be opened (preferably automatically by the electronic controller 600), preferably until a prefixed water level or amount is reached within the cooking chamber 2, and/or a prefixed time has lapsed until the third valve 16b has been opened. In the soaking phase 4000, heating device 8 is switched on, so as to heat the water collected in the bottom 3 of the cooking chamber 2; then, after a certain time has lapsed, the second valve 12 is opened, and soaking water is drained via the oven drain 5. Then the washing phase 1000 can be performed.

[0359] The cleaning method of the advantageous embodiment of the oven illustrated in figure 4, advantageously differs from the method described with reference to the oven of figure 3 only because:

- during the washing phase 1000 , in addition or alternatively to a washing tab 430 positioned within the seat 420 of the filter 410, a washing agent can be taken directly into the introduction system 16, preferably into the introduction conduit 16a, by operating additive pump 34b, in such a way to pump the washing additive out of the additive container 32b and pump the washing additive in the introduction system 16;
- during the steam supply system descaling phase 5000, preferably, the descaling additive is not manually loaded into the additive drawer 28, but it is loaded into the additive drawer by operating additive pump 34a, in such a way to pump the descaling additive out of the additive container 32a and to pump the descaling additive in the additive drawer 28;
- during the descaling phase 3000, preferably, the descaling additive, in addition or alternatively to be manually loaded into the additive drawer 28, and/or to be loaded ad a descaling tab into the seat 420 of the filter 410, it can be loaded into the additive drawer by operating additive pump 34a, in such a way to pump the descaling additive out of the additive container 32a and to pump the descaling additive in the additive drawer 28;

[0360] In the advantageous embodiment of figure 4, the amount of descaling additive supplied to the additive drawer 28 can be advantageously controlled by operating the additive pump 34a for a prefixed time, and/or by measuring the amount of liquid flowing through additive delivery conduit 33a, for example by a flowmeter, not illustrated.

[0361] In the advantageous embodiment of figure 4, preferably, during the cleaning method, the amount of washing agent supplied to the introduction system 16 is controlled by operating the additive pump 34b for a prefixed time, and/or by measuring the amount of liquid flowing through additive delivery conduit 33b, for example by a flowmeter, not illustrated.

[0362] It is underlined that in the advantageous embodiment of figure 4, an additive can be loaded also manually into the additive drawer 28 (for example if the additive container 32a is empty, and/or for adding a further kind of additive in addition to the one contained in additive container 32a), and/or in the seat 420 of the filter 410 as a tab 430.

[0363] The cleaning method of the advantageous embodiment of oven illustrated in figure 5 differs from the method described with reference to the oven of figure 1 only because:

- during the washing phase 1000 , in addition or alternatively to a washing tab 430 positioned within the seat 420 of the filter 410, a washing agent can be taken directly into the introduction system 16, preferably into the introduction conduit 16a, by operating additive pump 34b, in such a way to pump the washing additive out of the additive container 32b and pump the washing additive in the introduction system 16, from which it is taken, together with the water entering the third valve 16b, into the cooking chamber 2;
- during the descaling phase 3000, in addition or alternatively to a descaling tab 430 positioned within the seat 420 of the filter 410, a descaling additive can be loaded into the introduction system by operating additive pump 34a, in such a way to pump the descaling additive out of the additive container 32a and to pump the washing additive in the introduction system 16, from which it is taken, together with the water entering the third valve 16b, into the cooking chamber 2.

[0364] In the advantageous embodiment of figure 5, during the cleaning method, the amount of descaling additive supplied to introduction system 16 can be advantageously controlled by operating the additive pump 34a for a prefixed time, and/or by measuring the amount of liquid flowing through additive delivery conduit 33a, for example by a flowmeter, not illustrated.

[0365] In the advantageous embodiment of figure 5, during the cleaning method, the amount of washing agent supplied to the introduction system 16 is controlled by operating the additive pump 34b for a prefixed time, and/or by measuring the amount of liquid flowing through additive delivery conduit 33b, for example by a flowmeter, not illustrated.

[0366] The cleaning method of the advantageous embodiment of the oven illustrated in figure 6, preferably differs from the embodiment of the method described with reference to the oven of figure 1 only because:

- during the washing phase 1000, in addition or alter-

natively to a washing tab 430 positioned within the seat 420 of the filter 410, a washing agent can be taken directly into the introduction system 16, preferably into the introduction conduit 16a, by operating additive pump 34b, in such a way to pump the washing additive out of the additive container 32b and pump the washing additive in the introduction system 16, from which it is taken, together with the water entering the third valve 16b, into the cooking chamber 2;

- during the descaling phase 3000, in addition or alternatively to a descaling tab 430 positioned within the seat 420 of the filter 410, the descaling additive can be loaded into the additive drawer 28 by operating additive pump 34a, in such a way to pump the descaling additive out of the additive container 32a and to pump the descaling additive in the additive drawer 28.

[0367] In the advantageous embodiment of figure 6, during the cleaning method, the amount of descaling additive supplied to the additive drawer 28 can be advantageously controlled by operating the additive pump 34a for a prefixed time, and/or by measuring the amount of liquid flowing through additive delivery conduit 33a, for example by a flowmeter, not illustrated.

[0368] In the advantageous embodiment of figure 6, during the cleaning method, the amount of washing agent supplied to the introduction system 16 is controlled by operating the additive pump 34b for a prefixed time, and/or by measuring the amount of liquid flowing through additive delivery conduit 33b, for example by a flowmeter, not illustrated.

[0369] It is underlined that in the advantageous embodiment of figure 6 it is possible loading also manually an additive into the additive drawer 28 (for example if the additive container 32a is empty, and/or for adding a further kind of additive in addition to the one contained in additive container 32a) and/or in the seat 420 of the filter 410, in form of tab 430.

[0370] It is seen therefore how the invention achieves the proposed aim and objects, there being provided a cooking oven that, thanks to the seat provided in the filter for keeping the washing/rinsing tabs spaced from the bottom of the cooking chamber, ensures an optimal cleaning of the oven, at the same time reducing the risk that the bottom wall of the latter can be corroded by a too high concentration of cleaning agent.

[0371] In addition, positioning the washing/rinsing tabs in a filter which is positioned within the cooking chamber in such a way to intercept all the liquid flowing to the one or more cooking chamber outlets, guarantees that all such liquid contacts the tabs, improving and accelerating the melting of the latter.

Claims

1. Cooking oven (1) for foodstuffs comprising:

- a cooking chamber (2), wherein foodstuffs can be placed for being cooked, having a bottom wall (3) provided with one or more cooking chamber outlets (4, 10);
- a cleaning system (70) comprising a washing/rinsing liquid introduction system (16) configured for taking washing/rinsing liquid within the cooking chamber (2), and for draining said washing/rinsing liquid from said cooking chamber (2) via said one or more cooking chamber outlets (4, 10),
- a filter (410) arranged at least partially within said cooking chamber (2) for preventing solid bodies of prefixed dimensions from entering said one or more cooking chamber outlets (4, 10), while letting liquids flow from said cooking chamber (2) into said one or more cooking chamber outlets (4, 10),

characterized in that

said filter (410) comprises a seat (420) configured for supporting a washing/rinsing additive tab (430) spaced from said bottom wall (3) of said cooking chamber (2).

2. Cooking oven (1) according to claim 1, wherein said seat (420) is configured in such a way that a surface of a washing/rinsing additive tab (430) positioned therein and contacting said seat (420) is at least partially exposed to the internal of the cooking chamber (2).

3. Cooking oven (1) according to claim 2, wherein said seat (420) comprises a perforated supporting surface (421), configured for supporting a washing/rinsing additive tab (430) spaced from said bottom wall (3) of said cooking chamber (2), and comprising a plurality of openings (422) allowing the passage of a liquid.

4. Cooking oven (1) according to one or more of the previous claims, wherein said seat (420) is configured for laterally retaining a washing/rinsing additive tab (430) positioned therein.

5. Cooking oven (1) according to claim 4, wherein said seat (420) comprises a lateral border (423) configured for encircling a washing/rinsing additive tab (430) positioned therein, so as to retain said a washing/rinsing additive tab (430) within said seat (420).

6. Cooking oven (1) according to claim 5, wherein said lateral border (423) is perforated, so as to allow passage of liquids.

7. Cooking oven (1) according to claim 5 or 6 when depending on claim 3, wherein said lateral border (423) protrudes upwards from said perforated supporting surface (421), encircling the perimeter of the latter.

8. Cooking oven (1) according to one or more of the previous claims, wherein said filter (410) is at least partially made of metal or of plastics.

9. Cooking oven (1) according to one or more of the previous claims, wherein said filter (410) is at least partially made of mesh.

10. Cooking oven (1) according to one or more of the previous claims, wherein said filter (410) comprises a perforated convex body (440) positioned or positionable at least partially within said cooking chamber (2), over said one or more cooking chamber outlets (4, 10).

11. Cooking oven (1) according to claim 10 wherein said perforated convex body (440) is truncated-cone-shaped or truncated-pyramid-shaped or parallelepiped-shaped or cubic-shaped or cylindrical-shaped, or reverse-basin-shaped.

12. Cooking oven (1) according to one or more of the previous claims, wherein said filter (410) leans on said bottom wall (3) via spacing elements (450) defining, between said filter (410) and said bottom wall (3), one or more gaps (460) letting liquids flow from said cooking chamber (2) into said one or more cooking chamber outlets (4, 10), while preventing solid bodies of prefixed dimensions from entering said one or more cooking chamber outlets (4, 10).

13. Cooking oven (1) according to claim 12, wherein one or more of said spacing elements (450) are a part of said filter (410).

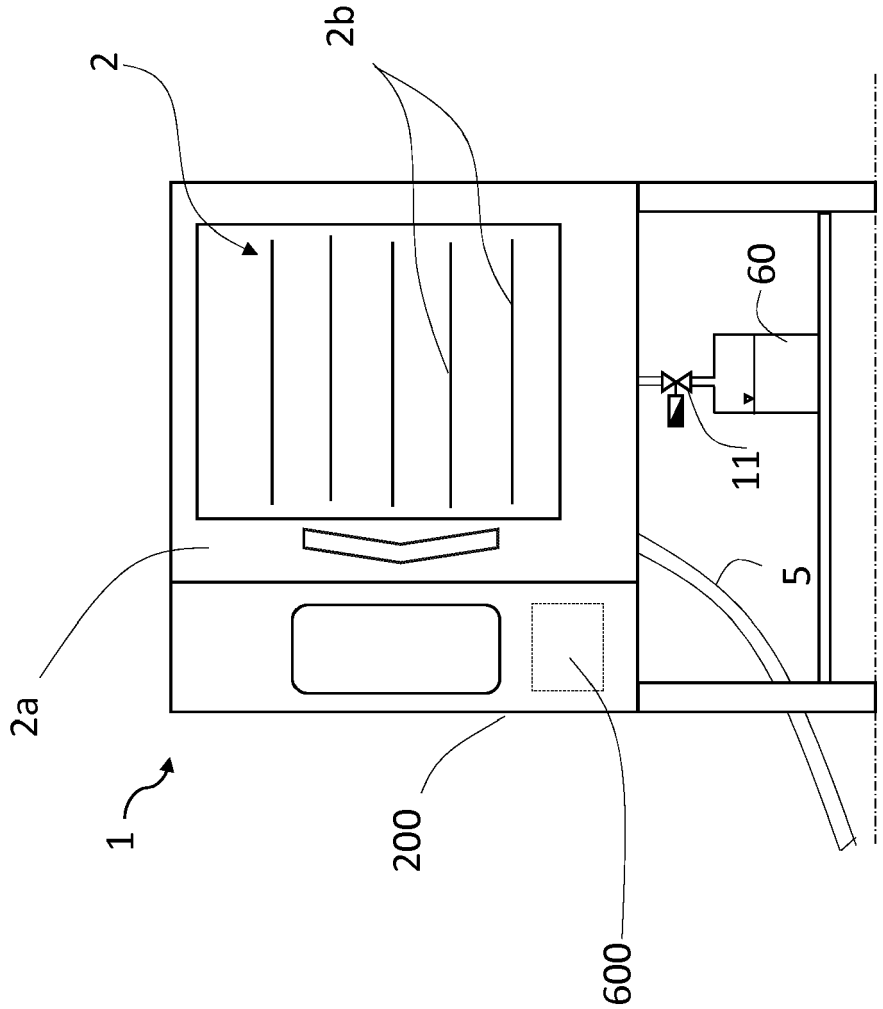
14. Cleaning method for cleaning a cooking oven (1) according to one or more of the previous claims, comprising the following steps:

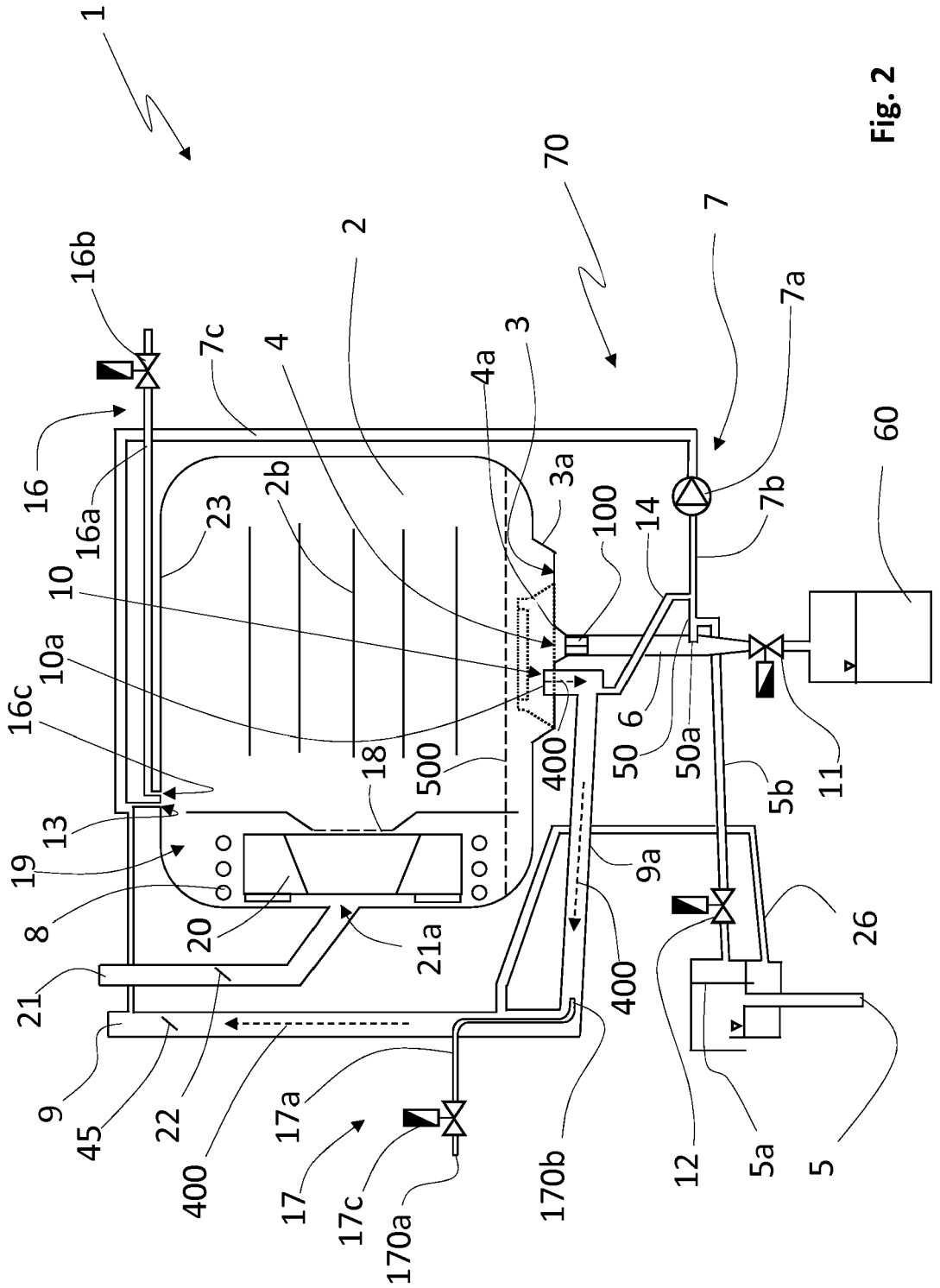
    - positioning one or more washing/rinsing additive tabs (430) in the seat (420) of the filter (410) positioned within said cooking chamber (2);
    - loading washing/rinsing liquid within said cooking chamber until said washing/rinsing liquid covers said one or more washing/rinsing additive tabs (430);
    - melting said one or more washing/rinsing additive tabs (430) with said washing/rinsing liquid and forming a washing/rinsing solution in the bottom wall (3) of said cooking chamber (2).

15. Cleaning method, according to claim 14, wherein said oven comprises a circulation system (7) configured for pumping liquid out of said cooking chamber (2) and for pumping such liquid, or a part thereof, again in said cooking chamber (2) wherein said method comprises:

    - pumping said washing/rinsing solution out of said cooking chamber (2) and pumping said washing/rinsing solution, or a part thereof, again in said cooking chamber (2) using said circulation system (7).

Fig. 1

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5b
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170b
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5a
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Fig. 2

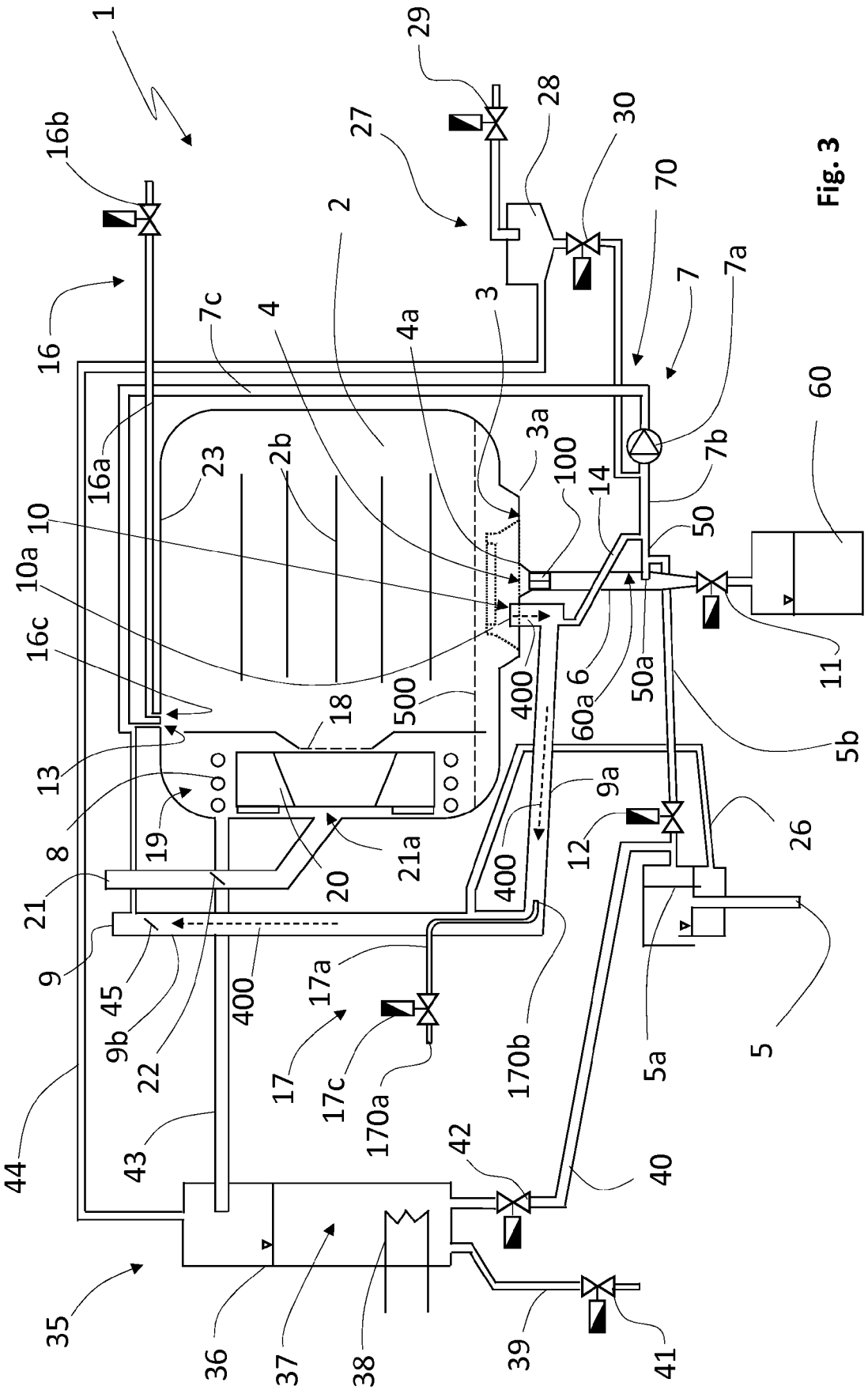
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Fig. 3

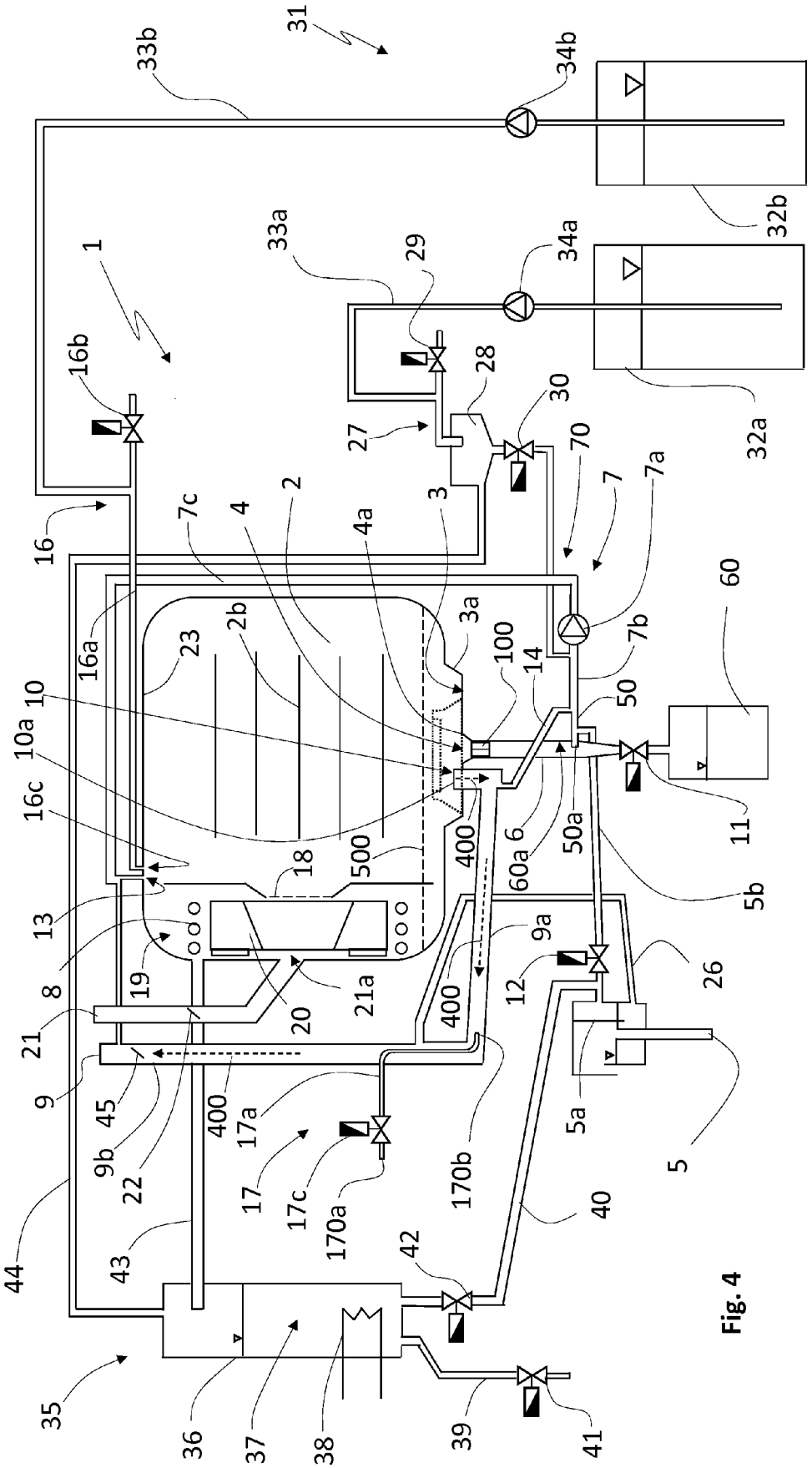
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Fig. 4

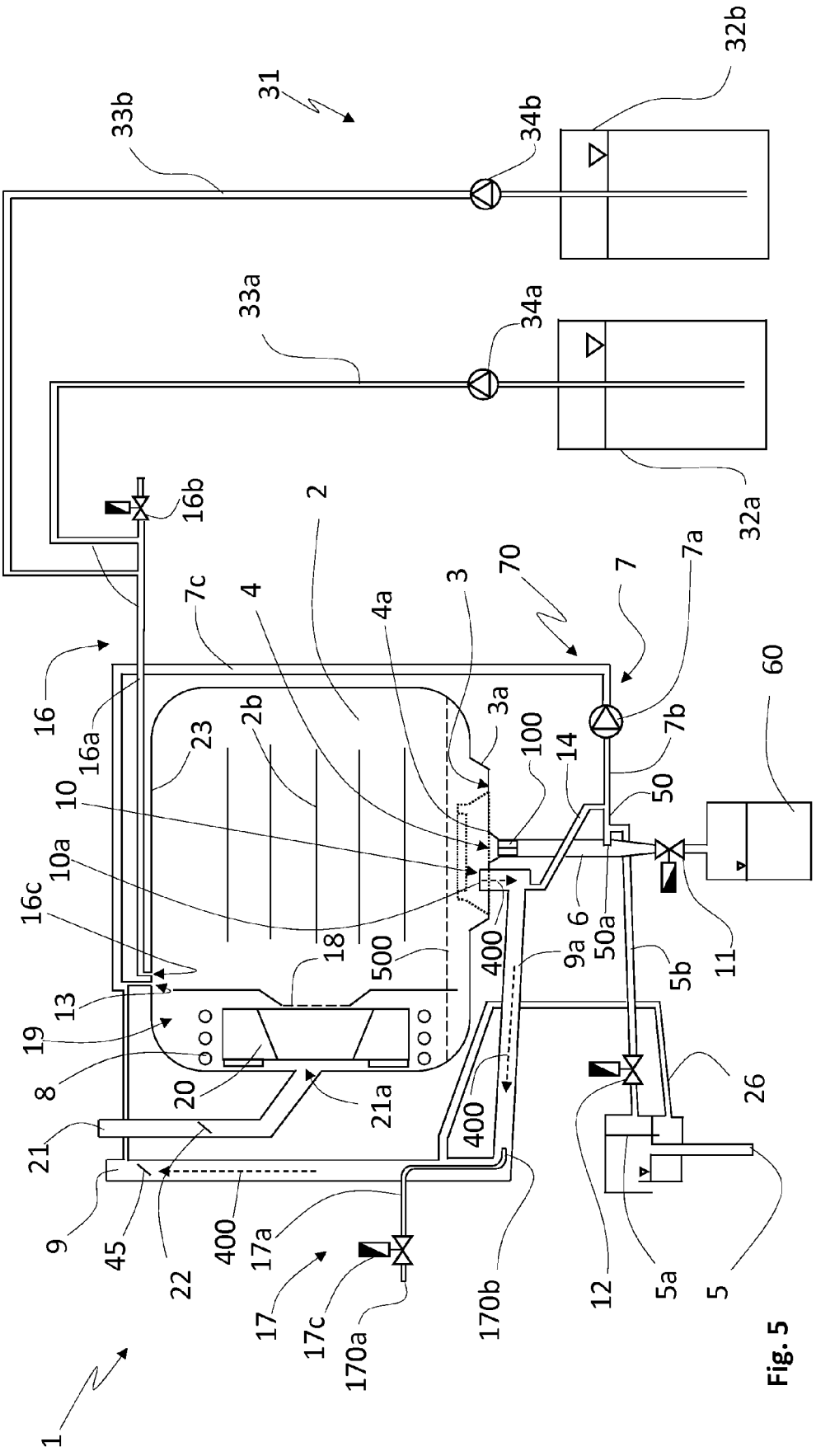
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Fig. 5

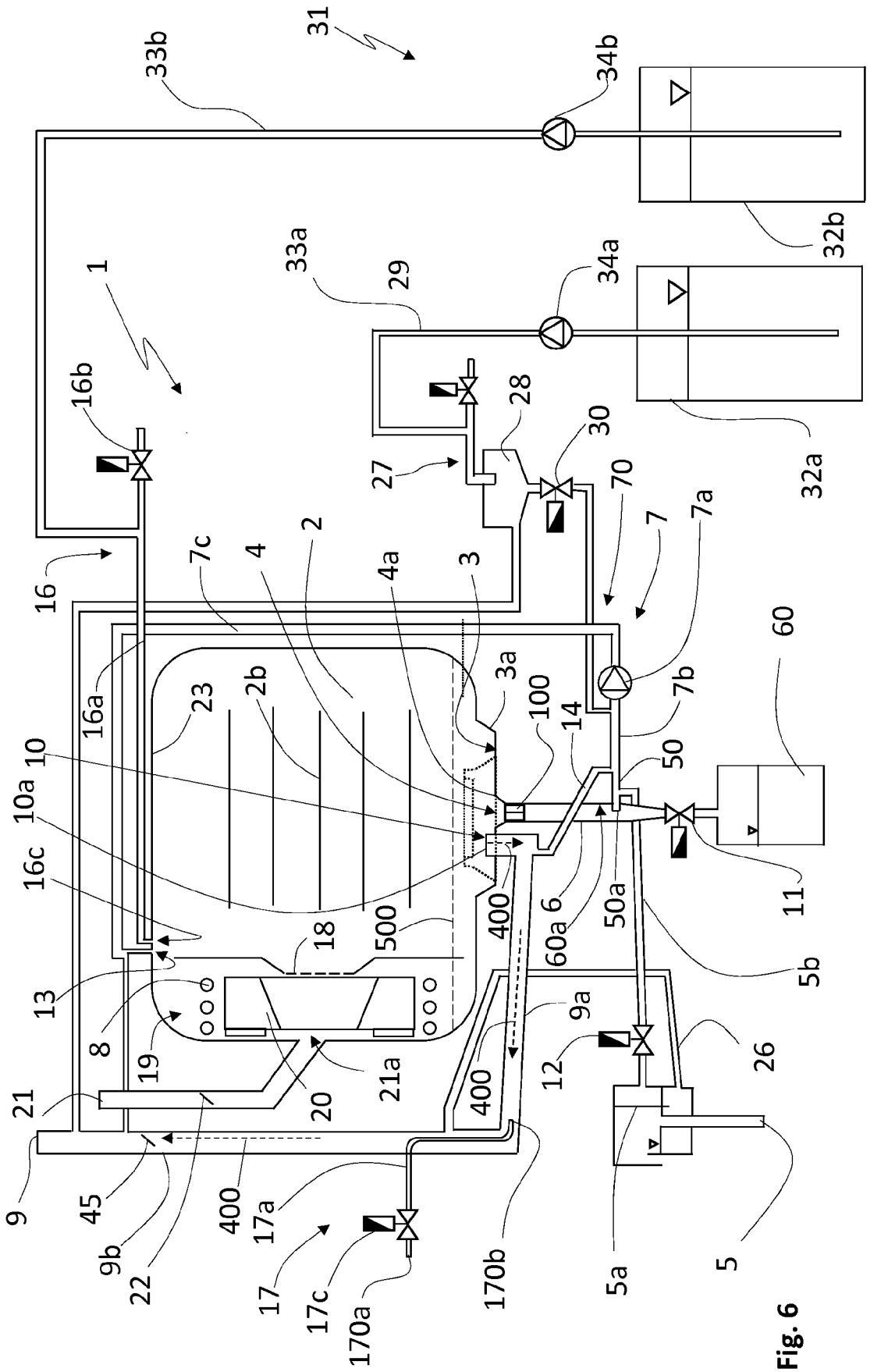
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Fig. 6

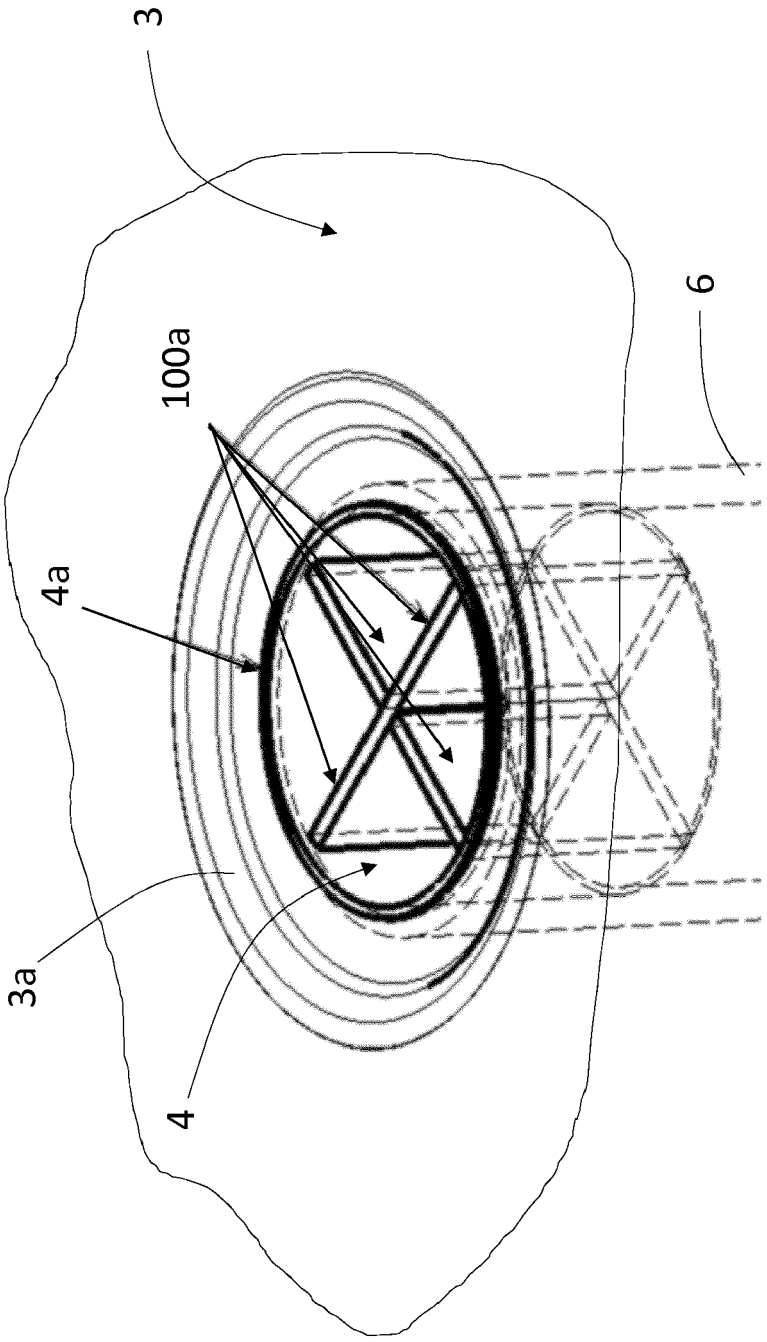

Fig. 7

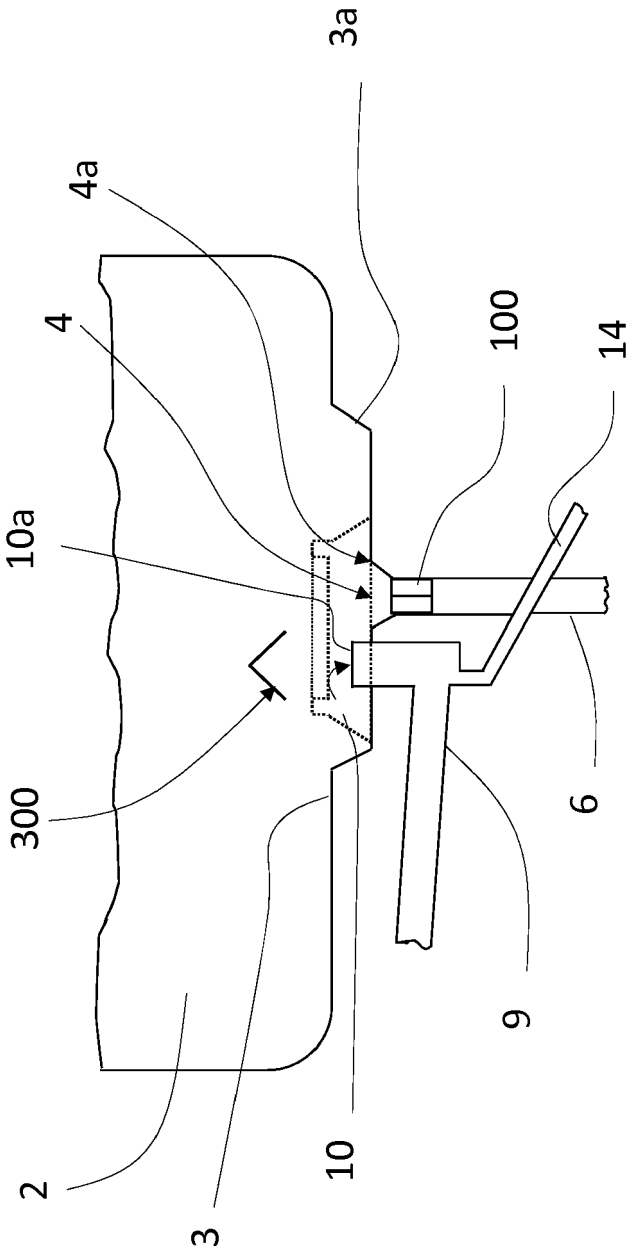

Fig. 8

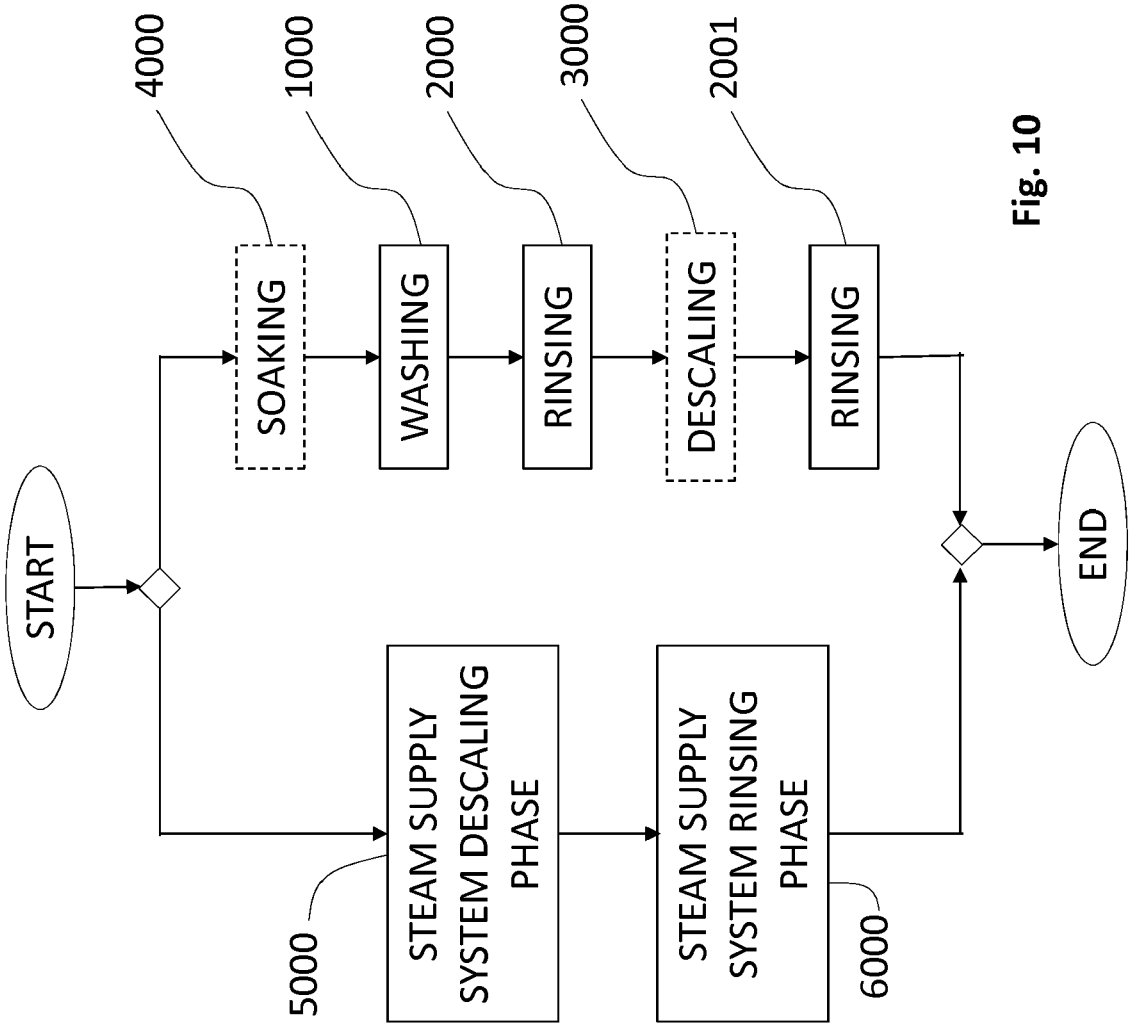
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Fig. 10

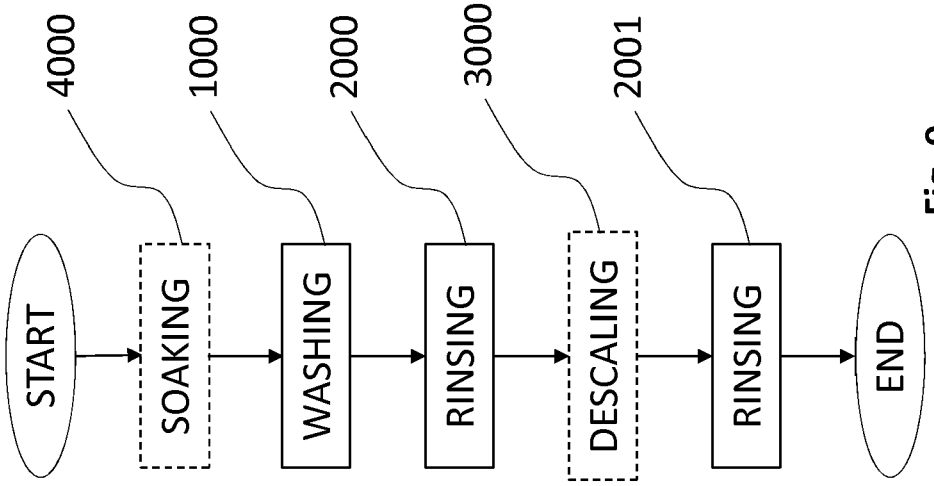
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Fig. 9

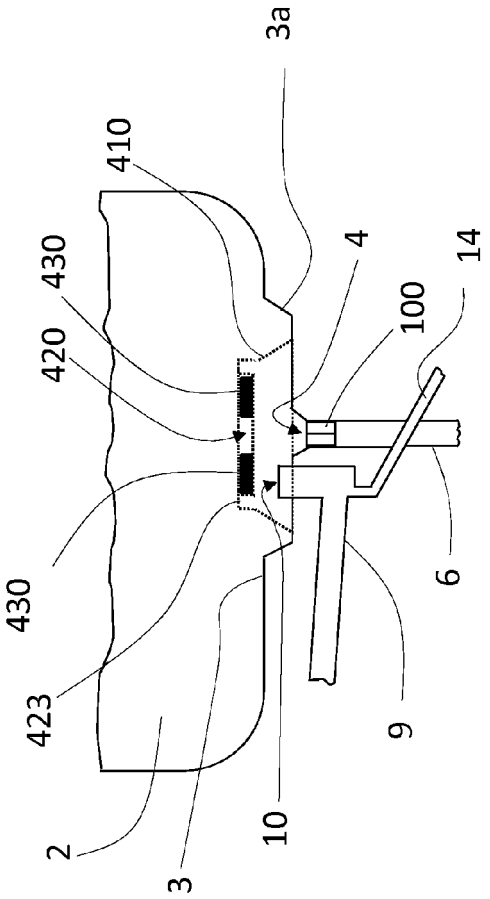

Fig. 12

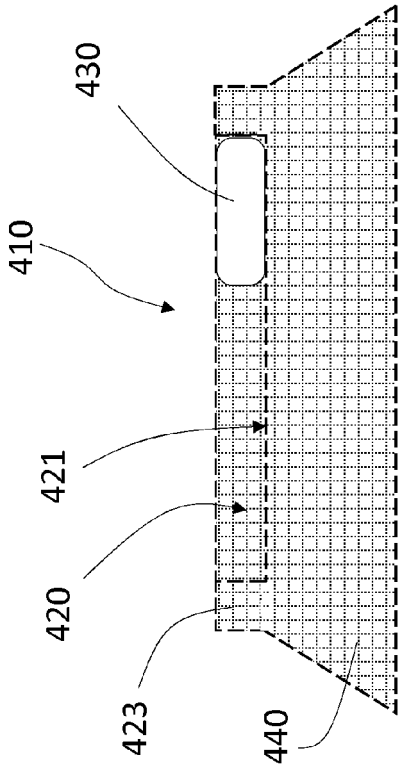

Fig. 11

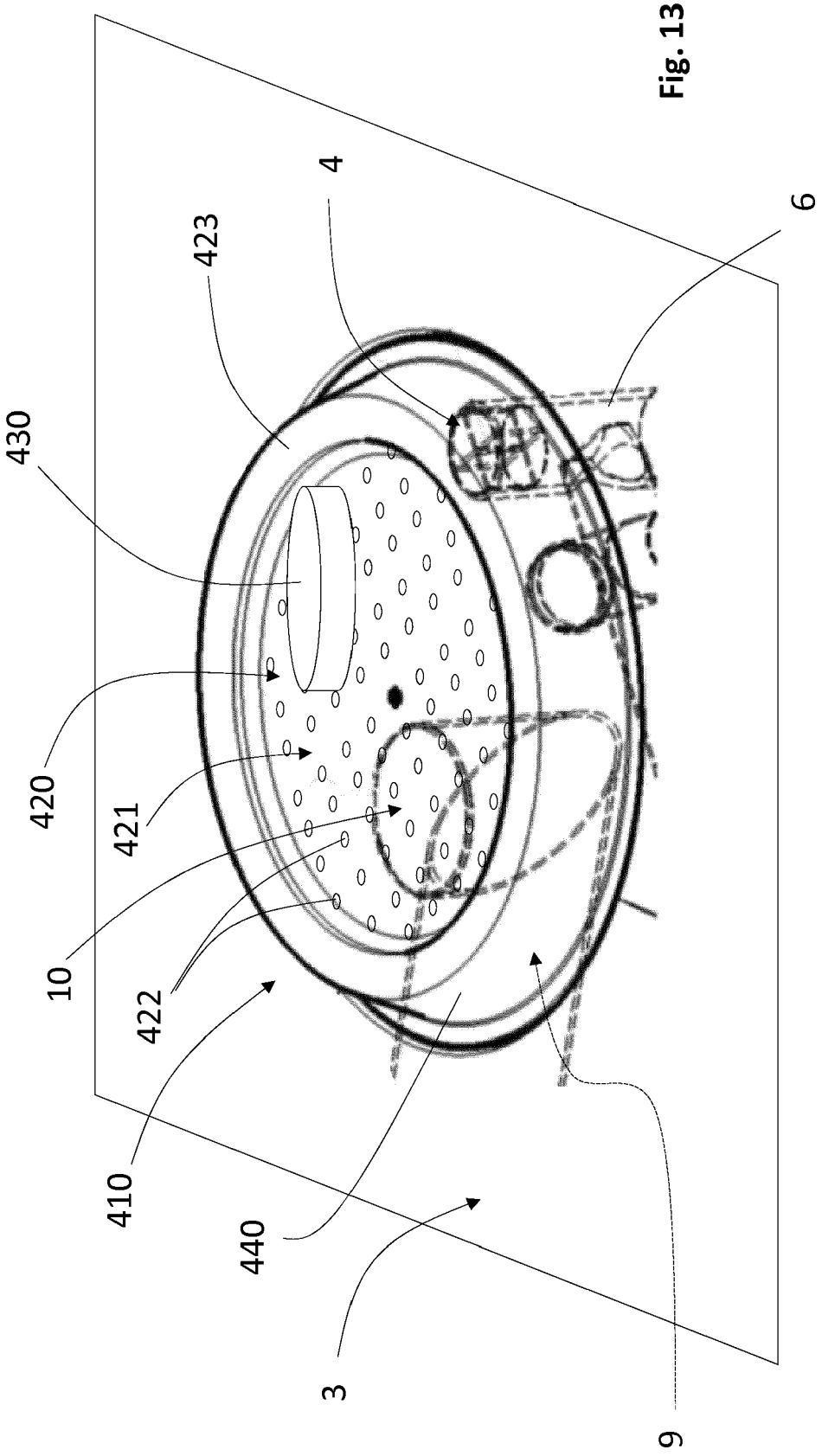

Fig. 13

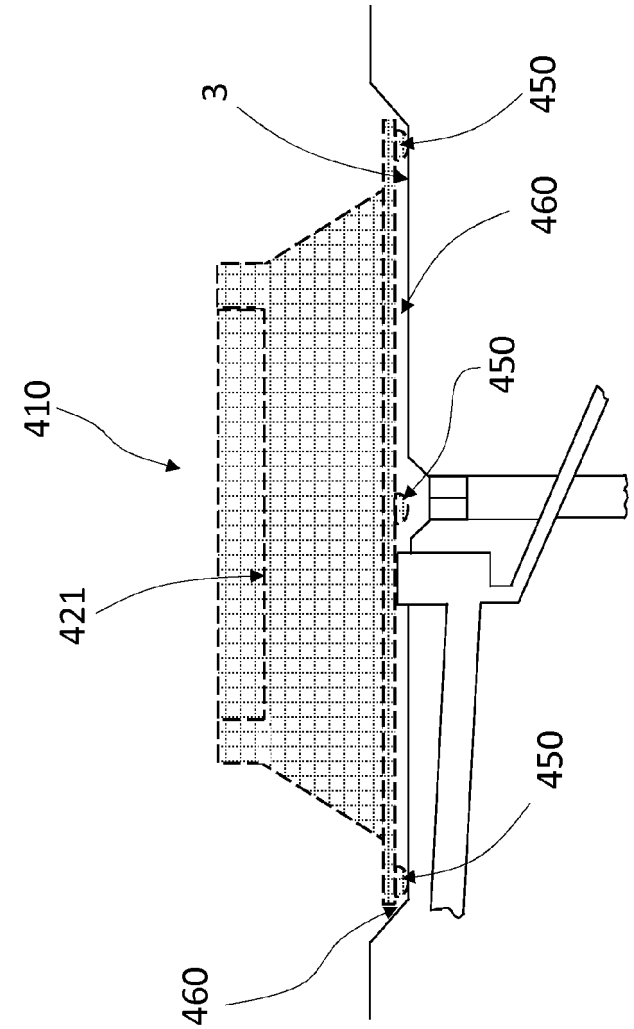

Fig. 15

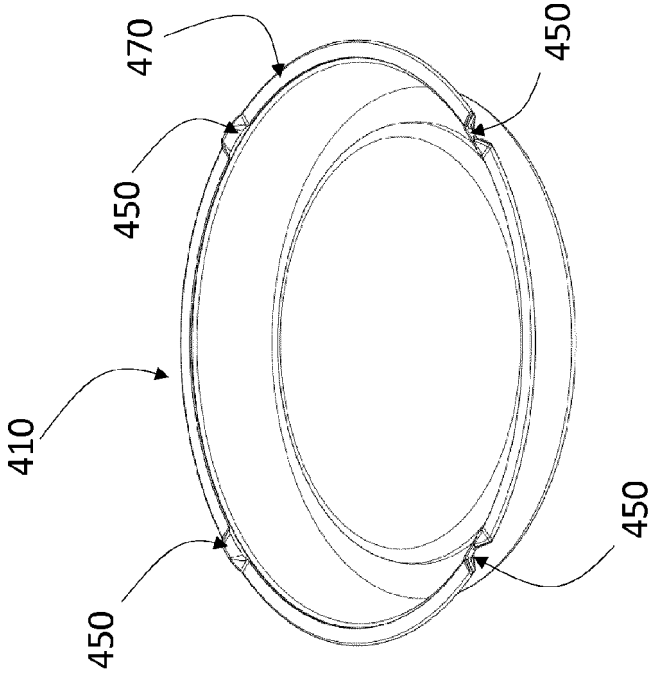

Fig. 14

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EUROPEAN SEARCH REPORT

Application Number
EP 19 15 9489

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	EP 1 978 309 A1 (ALTO SHAAM INC [US]) 8 October 2008 (2008-10-08) * paragraphs [0036] - [0039]; figures 6,7 *	1-15	INV. F24C14/00
X	WO 2016/020375 A1 (BSH HAUSGERÄTE GMBH [DE]) 11 February 2016 (2016-02-11) * figures 1-3 * * page 5, line 1 * * page 11, lines 20-28 * * page 12, lines 11-15 *	1-5,8,9, 14,15	
X	US 2013/146094 A1 (RIEFENSTEIN LUTZ [DE] ET AL) 13 June 2013 (2013-06-13) * paragraphs [0021], [0033]; figures 1-6 *	1-5,8, 10,14,15	

TECHNICAL FIELDS SEARCHED (IPC)

F24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 July 2019	Fest, Gilles

CATEGORY OF CITED DOCUMENTS

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12-07-2019

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