



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.09.2020 Bulletin 2020/40

(51) Int Cl.:
F24C 15/20 (2006.01)

(21) Application number: **20165878.8**

(22) Date of filing: **26.03.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **TURHAN, Alparslan**
45030 Manisa (TR)
• **ASIK, Rustem**
45030 Manisa (TR)

(74) Representative: **Cayli, Hülya**
Paragon Consultancy Incorporated
Koza Sokak No: 63/2
GOP 06540 Ankara (TR)

(30) Priority: **29.03.2019 TR 201904709**

(71) Applicant: **Vestel Beyaz Eşya Sanayi ve Ticaret A.S.**
45030 Manisa (TR)

(54) **A COOKING DEVICE AND AN OPERATION METHOD FOR THE COOKING DEVICE**

(57) With the present invention, there is provided a cooking device (P) for cleaning the air containing unpleasant odour and formed inside the cooking compartment (1), and an operation method for the cooking device (P). The cooking device (P) comprises at least one air suction channel (2) which is in connection with the cooking compartment (1) from at least one side and receives the air inside the cooking compartment (1); at least one water tank (3) which is in connection with the air suction channel (2) and cools and filters the air from the air suction channel (2) by means of water; at least one filter chamber (5) comprising at least one filtering element; at least one vacuum pump (6) for sucking the air; at least one water inlet apparatus (8) for conveying water into the water tank (3); and at least one water outlet apparatus (9) for discharging the water in the water tank (3) to the outside. The method comprises the steps of: activating an odour blocking option; after activating the odour blocking option, operating the vacuum pump (6) to pass the air inside the cooking compartment (1) through the air suction channel (2), the water tank (3) and the filter chamber (5) so as to discharge the air to the outer environment (13) via the vacuum pump (6).

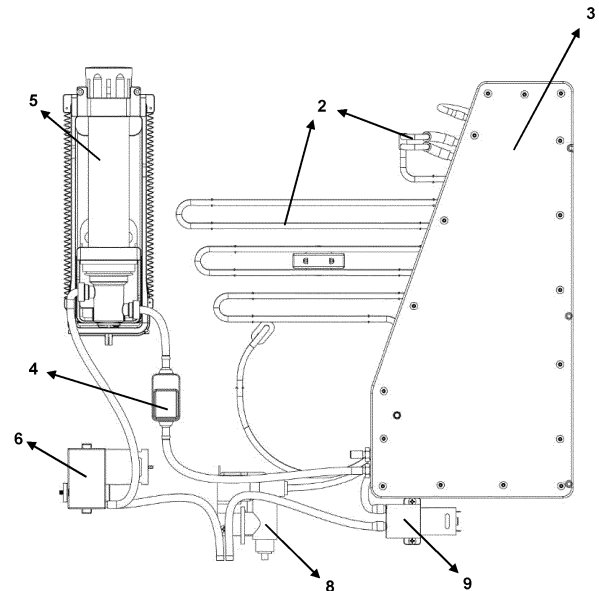


Figure – 4

Description

Technical Field

[0001] The present invention relates to a cooking device for cleaning the air containing unpleasant odour and formed inside the cooking compartment, and an operation method for the cooking device.

Background of the Invention

[0002] Oven-type cooking devices comprise at least one cooking compartment in which cooking process is performed. Food products to be cooked are preferably placed in a vessel, such as a pot or tray, for being heated and cooked in said compartment. During the cooking process, air containing various unpleasant odours may occur depending on the type of the food and the cooking temperature. In this case, leaving the odour-producing substances in the air inside the cooking compartment causes permanent odours to form in the cooking compartment, as well as said substances may form physical layers inside the cooking compartment. If the air containing odour-producing substances is discharged to outer environment, odours are created which may be annoying for users.

[0003] Within the known state of art, there are various applications for solving said problem. One of the solutions is use of external devices, such as an extraction hood, that discharge and/or filter the ambient air. In such applications, the air containing odours and discharged to the ambient by the cooking device is sucked by devices like extraction hoods. The air sucked can be filtered and re-sent to the environment where it is located, or it can be sent outside the building via a flue. However, in such applications, requiring an external device is both costly and creates a need for an extra space. Furthermore, in such applications, since not all of the odour-producing substances in air are sucked, odour of the ambient may not be eliminated sufficiently.

[0004] Another application covered by the known art includes discharging the air inside the cooking compartment outside the building via a transmission line which is connected from one side to the cooking compartment and from another side to the flue of the building. In such applications, however, the usage area of the cooking device may be limited as the air cannot be sucked in the cooking compartment sufficiently and a flue connection must be available in the environment where the cooking device is located.

Brief Description of the Invention

[0005] The present invention provides a cooking device for cleaning the air containing unpleasant odour and formed inside the cooking compartment, and an operation method for the cooking device. The cooking device comprises at least one air suction channel which is in

connection with the cooking compartment from at least one side and receives the air inside the cooking compartment; at least one water tank which is in connection with the air suction channel and cools and filters the air from the air suction channel by means of water; at least one filter chamber comprising at least one filtering element; at least one vacuum pump for sucking the air; at least one water inlet apparatus for conveying water into the water tank; and at least one water outlet apparatus for discharging the water in the water tank to the outside. Said method comprises the steps of: activating an odour blocking option; after activating the odour blocking option, operating the vacuum pump to pass the air inside the cooking compartment through the air suction channel, the water tank and the filter chamber so as to discharge the air to the outer environment via the vacuum pump.

[0006] In the cooking device and operation method according to the present invention, passing the air inside the cooking compartment respectively through the air suction channel, the water tank and the filter chamber so as to discharge the air to the outer environment via the vacuum pump enables the odour-producing substances in air to be filtered. Thus, air without unpleasant odour can be transmitted to the outer environment. Moreover, using a vacuum pump enables the air inside the cooking compartment to be sucked effectively. Since the vacuum pumps are relatively brittle, it is not safe to suck hot air through a vacuum pump. In order to solve this problem, the cooking device and the operation method according to the present invention cool the hot air received from the cooking compartment by passing the hot air through the water tank. Therefore, while some of the odour-producing substances in air are filtered in the water tank, the vacuum pump is used in a safe manner by decreasing the temperature of the air.

Object of the Invention

[0007] An object of the present invention is to provide a cooking device for cleaning the air containing unpleasant odour and formed inside the cooking compartment, and an operation method for the cooking device.

[0008] Another object of the present invention is to provide a cooking device and an operation method for the cooking device in order to prevent foul odours from remaining in the environment during cooking of foods that cause heavy odour (fish, etc.).

[0009] Yet a further object of the present invention is to provide a cooking device operating efficiently and reliably, and an operation method for the cooking device.

Description of the Invention

[0010] Exemplary embodiments of the cooking device according to the invention are illustrated in the attached drawings, in which:

Figure 1 is a perspective view of a semi-assembled cooking device according to the invention.

Figure 2 is another perspective view of a semi-assembled cooking device according to the invention.

Figure 3 is a top view of a semi-assembled cooking device according to the invention.

Figure 4 is a top view of an air cleaning system used in the cooking device according to the invention.

Figure 5 is a top view illustrating flow directions of an air cleaning system used in the cooking device according to the invention

Figure 6 is a perspective view of a filter chamber of the cooking device according to the invention in an open state.

Figure 7 is a perspective view of a filter chamber of the cooking device according to the invention in a closed state.

Figure 8 is a front view of an inner compartment of the cooking device according to the invention.

Figure 9 is a top perspective view of a water tank used in the cooking device according to the invention.

Figure 10 is a bottom perspective view of a water tank used in the cooking device according to the invention.

Figure 11 is an exploded view of a water tank used in the cooking device according to the invention.

Figure 12 is a side sectional view of a water tank used in the cooking device according to the invention.

Figure 13 is a top sectional view of a water tank used in the cooking device according to the invention.

Figure 14 is a perspective view of a negative-ion former used in the cooking device according to the invention.

Figure 15 is an exploded view of a negative-ion former used in the cooking device according to the invention.

Figure 16 is a side sectional view of a negative-ion former used in the cooking device according to the invention.

Figure 17 is a perspective view of a filter chamber used in the cooking device according to the invention in a closed state.

Figure 18 is a perspective view of a filter chamber used in the cooking device according to the invention in an open state.

Figure 19 is an exploded view of a filter chamber used in the cooking device according to the invention.

Figure 20 is a perspective view of a semi-assembled filter chamber used in the cooking device according to the invention.

Figure 21 is a top view of a filter chamber used in the cooking device according to the invention in a closed state.

Figure 22 is a top view of a filter chamber used in the cooking device according to the invention in an

open state.

Figure 23 is a perspective view of an air suction channel used in the cooking device according to the invention.

Figure 24 is a top view of an air suction channel in use, which is used in the cooking device according to the invention.

Figure 25 is a perspective view of a flue stop mechanism used in the cooking device according to the invention.

Figure 26 is an exploded view of a flue stop mechanism used in the cooking device according to the invention.

Figure 27 is a side view of a first position of a flue stop mechanism used in the cooking device according to the invention.

Figure 28 is a side view of a second position of a flue stop mechanism used in the cooking device according to the invention.

Figures 29-31 are side perspective views of a flue stop mechanism in use, which is used in the cooking device according to the invention.

Figure 32 is a front perspective view of a flue stop mechanism in use, which is used in the cooking device according to the invention.

Figure 33 is a front view of the cooking device according to the invention.

Figure 34 is a perspective view of a catalytic filter used in the cooking device according to the invention.

Figure 35 is a block diagram of an air cleaning system used in the cooking device according to the invention.

Figures 36-43 are temperature-time graphs of the water in the water tank used in the cooking device according to the invention.

Figures 44-45 are operating-time graphs of the vacuum pump, water inlet apparatus and water outlet apparatus components used in the cooking device according to the invention.

[0011] All the parts illustrated in figures are individually assigned a reference numeral and the corresponding terms of these numbers are listed below:

Cooking device	(P)
Device body	(G)
Device door	(K)
Front panel	(L)
Cooking program	(R)
Cleaning mode	(T)
Filtration	(F)
Cooking compartment	(1)
Cooking device flue	(1a)
Air suction channel	(2)
Water tank	(3)

(continued)

Tank body	(3a)
Tank cover	(3b)
Distribution plate	(3c)
Guiding element	(3d)
Sensor	(3e)
Sealing element	(3f)
Level indicator	(3g)
Level sensor	(3h)
Union	(3i)
Negative-ion former	(4)
Ion-former body	(4a)
Ion former cover	(4b)
Ion forming element	(4c)
Ion-former inlet	(4d)
Ion-former outlet	(4e)
Filter chamber	(5)
Filter body	(5a)
Filter head	(5b)
Filter cover	(5c)
Slide body	(5d)
Front slide plate	(5e)
Slide element	(5f)
Rack and pinion gear	(5g)
Gear damper	(5h)
Flexible element	(5i)
Clip protrusion	(5j)
Clip slot	(5k)
Vacuum pump	(6)
Flue cover mechanism	(7)
Flue cover body	(7a)
Motor	(7b)
Movement element	(7c)
Threaded part	(7d)
Connection element	(7e)
Movable plate	(7f)
Cover seal	(7g)
Support element	(7h)
Water inlet apparatus	(8)
Water outlet apparatus	(9)
Catalytic filter	(10)
Waste water fitting	(11)
Water supply network	(12)
Outer environment	(13)

Description of the Invention

[0012] Odours occurring during the cooking process in cooking appliances such as ovens can cause problems for the users. If the odour-producing substances are kept in the cooking compartment, the quality of the food may go down and contaminations occur at the cooking com-

partment. In case the odour-producing substances are sent out of the cooking compartment with air, users may be annoyed due to the odour. For that reason, with the present invention, there is provided a cooking device for cleaning the air containing unpleasant odour and formed inside the cooking compartment, and an operation method for the cooking device.

[0013] The cooking device (P) according to the present invention, as illustrated in figures 1-45, comprises at least one device body (G), at least one cooking compartment (1) provided in the device body (G), and at least one device door (K) controlling access into the cooking compartment (1). The cooking device (P) also comprises at least one air suction channel (2) which is in connection with the cooking compartment (1) from at least one side and receives the air inside the cooking compartment (1) in order to clean the air containing unpleasant odour and formed in the cooking compartment (1); at least one water tank (3) which is in connection with the air suction channel (2) and cools and filters the air from the air suction channel (2) by means of water; at least one filter chamber (5) comprising at least one filtering element; at least one vacuum pump (6) for sucking the air; at least one water inlet apparatus (8) for conveying water into the water tank (3); and at least one water outlet apparatus (9) for discharging the water in the water tank (3) to the outside. The cooking device also preferably comprises at least one negative-ion former (4) for charging the air, which leaves the water tank (3), with negative ions. Here, the vacuum pump (6) is located after the water tank (3), wherein the air cooled in the water tank (3) is sucked by the vacuum pump (6). The negative ion-former (4), the filter chamber (5) and the vacuum pump (6) may be positioned by different orders relative to each other. For example, while the air from the water tank (3) may pass, respectively, through the negative-ion former (4), filter chamber (5) and the vacuum pump (6); it may pass through the filter chamber (5), the vacuum pump (6) and the negative-ion former (4) respectively or by other alternative orders.

[0014] In an exemplary embodiment of the invention, once the vacuum pump (6) is operated, the air suction channel (2) starts to suck the air inside the cooking compartment (1). After the air, which is sucked from the cooking compartment, is passed through the air suction channel (2), it reaches the water tank (3). Air inside the cooking compartment during cooking process both has a high temperature and contains odour-producing substances. Thanks to the fact that this air is first passed through the water tank (3), temperature of the air is able to be decreased while retaining some of the odour-producing substances in the air by means of water. Air from the water tank (3) reaches the negative-ion former. Here, charging the air with negative ions enables the odour-producing substances in air to be charged with negative ions. Therefore, said substances adhere to a surface that they encounter, and leave the air. By passing the air through the filter chamber (5), it is ensured that other

odour-producing substances remaining in the air are also filtered. The air reaching the vacuum pump (6) is lowered in temperature and free of odour-producing substances. Therefore, it is possible to discharge said air reliably to the outer environment (13) by the vacuum pump (6).

[0015] In a preferred embodiment of the invention, the cooking device (P) comprises at least one water inlet apparatus (8) for sending water into the water tank (3), and at least one water outlet apparatus (9) for sending out the water in the water tank (3). The water inlet apparatus (8) is preferably in connection with a water supply network (12) (e.g. via a tap), and comprises at least one valve (e.g. a solenoid valve) for sending water (fresh/clean water) into the water tank (3) in a controlled manner. Here, also the water outlet apparatus (9) is preferably in connection with a waste water fitting (11) (e.g. a water drainage), and comprises at least another valve (e.g. a solenoid valve) for receiving water (contaminated/waste water) from the water tank (3) in a controlled manner. Here, while the air passed through the filtration (F) system may be sent to the outside environment (13), it may be delivered to the waste water fitting (11) directly or as a mixture with contaminated/waste water received from the water tank (3). In the cooking device (P) according to the present invention, as the air is passed through the water tank (3), water in the water tank (3) is both contaminated and the temperature thereof increases. Both cases cause the water tank (3) to fail to function properly over time. Thanks to the water inlet apparatus (8) and the water outlet apparatus (9), contaminated and/or heated water in the water tank (3) is discharged, and mains water being clean and relatively cold is delivered into the water tank (3). By this way, it is enabled that the water tank (3) efficiently performs its cooling and filtering functions. Process of sending out the contaminated and/or heated water inside the water tank (3) and sending clean and relatively cold mains water therein can be carried out at certain time periods (periodically). However, in an alternative embodiment, the cooking device (P) comprises at least one sensor (3e) which senses at least one property of the water inside the water tank (3). The sensor (3e) senses at least one property of the water inside the water tank (3), such as temperature and/or contamination level. In this embodiment, the cooking device (P) also comprises at least one control unit (not shown in the figures) which is in connection with the sensor (3e) and controls operation of the water inlet apparatus (8) and/or the water outlet apparatus (9) according to values received from the sensor (3e). Therefore, for example, if temperature or contamination level of the water inside the water tank (3) increases, fresh water is received into the water tank (3). In another preferred embodiment of the invention, the air suction channel (2) is in the form of a pipe. Here, the air suction channel (2) is preferably in the form of a curved (S-shaped) pipe. By this way, the air suction channel (2) is wound around a fan to perform pre-cooling of the water passing through the air suction channel (2). Here, a part of the air suction

channel (2) may also be located under said fan. In this embodiment, the air suction channel (2) is preferably made of a material that has a relatively high thermal conductivity coefficient. Further, the air suction channel (2) comprises surface-increasing elements (e.g. a fin). Thus, pre-cooling of water passing through the air suction channel (2) can be performed in a more efficient manner.

[0016] In another preferred embodiment of the invention, the water tank (3) comprises at least one hollow tank body (3a), and at least one tank cover (3b). The water tank (3) also comprises at least one distribution plate (3c) in the form of a perforated plate which is located in the tank body (3a), and at least one guiding element (3d) for passing the air received into the water tank (3) over the distribution plate (3c). In this embodiment, due to the fact that the air from the air suction pump (2) is passed over the distribution plate (3c) which is in the form of a perforated plate, the air comes as a bubble form and passes through the water in the water tank (3) with this bubble form. Therefore, both the heat exchange rate between water and air is increased, and odour-producing substances in air are retained by water much better. The water tank (3) preferably comprises at least one sealing element (3f) (e.g. a seal) provided between the tank body (3e) and the tank cover (3b). In another preferred embodiment, the water tank (3) further comprises at least one level sensor (3h) for sensing water level inside the tank body (3a). The level sensor (3h) may comprise at least one float or it may be a weight sensor or pressure sensor. Thus, amount of water inside the water tank (3) can be reliably detected. The water tank (3) may also comprise at least one level indicator (3g) for enabling the user to observe the amount of water therein. The water tank (3) also comprises a plurality of unions (3i) which provide connection of the water tank (3) with the air suction channel (2). Said unions (3i) are preferably made of brass material. These unions (3i) form an air/watertight connection structure thanks to the seals thereon. The tank body (3a) and/or the tank cover (3b) preferably comprise a hydrophobic coating. Similarly, the unions (3i) and/or the air suction channel (2) preferably comprise a hydrophobic coating, as well. By this way, said parts are prevented from being contaminated, thus ensuring a long service life.

[0017] In a preferred embodiment, the tank body (3a) and/or the tank cover (3b) are coated with a material with high thermal conductivity. Yet in an alternative embodiment, the tank body (3a) and/or the tank cover (3b) are made of a material with high heat convection coefficient (copper, aluminium, brass, alloy etc.). Here, the tank body (3a) and/or the tank cover (3b) can comprise surface increasing-elements (e.g. a fin) for increasing cooling efficiency. Here, in said embodiments, the water tank (3) can comprise cooling elements like fans and/or Peltier. Therefore, it is allowed that water inside the water tank (3) is cooled efficiently and that the water consumption is reduced. In an alternative embodiment, the water tank (3) comprises at least one liquid cooling arrange-

ment. In this embodiment, water inside the water tank (3) is enabled to be cooled via a cooling liquid.

[0018] In another preferred embodiment, the water tank (3) comprises at least one sterilization unit for sterilizing the water contained therein. The sterilization unit comprises at least one ultraviolet light source and/or at least one photocatalytic filter.

[0019] Air from the water tank (3) may comprise moisture as it is cooled by means of water. Moisture in this air may damage the components provided after the water tank (3). In order to prevent this, in a preferred embodiment of the invention, the cooking device (P) preferably comprises at least moisture holding element located at outlet of the water tank (3).

[0020] In another preferred embodiment of the invention, the cooking device (P) comprises at least one insulation layer located between the inner compartment (1) and the water tank (3). Thanks to the insulation layer providing thermal insulation, water inside the water tank (3) is prevented from heating due to the heat.

[0021] In another preferred embodiment of the invention, the negative-ion former (4) comprises at least one ion former body (4a), at least one ion former cover (4b) and at least one ion forming element (4c) located in the ion former body (4a). In this embodiment, air received from the ion former inlet (4d) is passed over an ion forming element (4c) to be charged with negative ions, and sent out of the ion former body (4a) by means of an ion former outlet (4e). The negative-ion former (4) also comprises at least one ozone generator, UV filter and/or at least one photocatalytic filter.

[0022] In another preferred embodiment of the invention, the filter chamber (5) comprises a filter portion which can be removed from the cooking device (P) and attached to the cooking device (P). Here, for example, the filter chamber (5) is provided at a location which is accessible through a front panel (L) of the cooking device. The filter chamber (5) preferably comprises at least one filter body (5a) comprising at least one filtering element, at least one filter head (5b) for air passage through the filter body (5a), the at least one filter head (5b) being in communication with the filter body (5a), at least one filter cover (5c), at least one slide body (5d) provided at the device body (G), at least one slide element (5f) which is connected from at least one side to the filter body (5a) and from at least another side to the slide body (5d) so as to move inside the slide body (5d). Here, the filter cover (5c) is preferably provided at a location which is accessible outside the cooking device (P) (e.g. at the front panel (L)). Therefore, the user is able to remove the filter element from the cooking device (P) by holding the filter cover (5c) in order to clean or replace the filter body (5a) if filter elements inside the filter body (5a) lose their functions. Here, the filter chamber (5) comprises at least one rack and pinion gear (5g) located in the slide body (5d) and at least one gear damper (5h) located at the slide element (5f) in order for the slide element (5f) to move controllably relative to the slide body (5d). While the slide

element (5f) moves relative to the slide body (5d), the gear damper (5h) moves controllably depending on the rack and pinion gear (5g). The filter chamber (5) also comprises at least one clip mechanism which prevents the slide element (5f) from moving relative to the slide body (5d). The clip mechanism comprises at least one clip slot (5k) located at a front slide plate (5e) of the slide body (5d), and at least one clip protrusion (5j) located at the slide element (5f) and adapted to be placed in the clip slot (5k). Connection between the clip slot (5k) and the clip protrusion (5j) is preferably in the form of a pull-push clip connection. Here, if a force is applied to the clip protrusion (5j) so that the clip protrusion (5j) is inserted in the clip slot (5k), the clip protrusion (5j) is attached to the clip slot (5k) (the clip mechanism is locked). If a force in the same direction is applied to the clip protrusion (5j) again, the clip protrusion (5j) is detached from the clip slot (5k) (the clip mechanism is unlocked). In this embodiment, the filter chamber (5) also comprises at least one flexible element (5i) (e.g. a spring) on which a compression force is generated while the slide element (5f) moves relative to the slide body (5d). Here, for example, in case the filter body (5a) connected to the slide element (5f) is located in the cooking device (P), a force is accumulated on the flexible element (5i) such that the filter body (5a) is pushed out of the cooking device (P). Here, movement of the filter body (5a) out of the cooking device (P) is prevented by the clip mechanism. When the user applies a force on the filter body (5a) through the filter cover (5c) such that the clip mechanism is unlocked; with the unlocking of the clip mechanism, the flexible element (5i) enables the slide element (5f) to move so that the filter body (5a) moves out of the cooking device (P). The filter element provided in the filter body (5a) may be a carbon-based filter or it may comprise a zeolite filter, an oil and particle retaining filter, a VOC gas retaining filter, a HEPA filter, an electrostatic filter or a photocatalytic filter.

[0023] During operation of the cooking device (P), an odour may not occur in the cooking compartment (1) according to the type of the food to be cooked and/or heated in the cooking compartment (1). In case of absence of an odour in the cooking compartment (1), operating the vacuum pump (6) leads unnecessary energy consumption. However, even when the absence of odour in the cooking compartment (1), air inside the compartment (e.g. air containing vapour) may be required to be sent to the outer environment (13). For that reason, in another preferred embodiment of the invention, the cooking device (P) comprises at least one cooking device flue (1a) for conveying the air inside the cooking compartment (1) to the outer environment (13). Here, connection between the cooking device flue (1a) and the cooking compartment (1) should be on when the vacuum pump (6) is not operated, and it must be off when the vacuum pump (6) is operated. Therefore, in another preferred embodiment of the invention, the cooking device (P) comprises at least one flue cover mechanism (7) for controlling air conduction between the cooking compartment (1) and the cook-

ing device flue (1a). The flue cover mechanism (7) comprises at least one flue cover body (7a); at least one motor (7b) located at the flue cover body (7a); at least one movement element (7c) which has a threaded part (7d) on at least one side thereof, and is moved by the motor (7b); and at least one movable plate (7f) which has, on at least one side thereof, at least one cover seal (7g) adapted to close a cooking device flue (1a) provided between the flue and the cooking compartment (1), which is in connection with the threaded part (7d) from at least another side thereof, and which is adapted to move, with the movement of the movement element (7c) (accordingly, the threaded part (7d)), between a position in which the cover seal (7g) thereof opens the cooking device flue (1a) and a position in which the cover seal (7g) thereof closes the cooking device flue (1a). Here, the flue cover mechanism (7) preferably comprises at least one connection element (7e) for connecting the movement element (7c) to the motor (7b). The flue cover mechanism (7) also comprises at least one support element (7h) preferably in the form of a rod which allows the movable plate (7f) to move linearly, wherein the at least one support element (7h) is connected to the flue cover body (7a) from at least one side thereof, and passes through at least one hole provided at the movable plate (7f) from at least another side thereof.

[0024] In another preferred embodiment of the invention, the cooking device (P) comprises at least one catalytic filter (10) which is located at a side of the air suction channel (2) communicating to the cooking compartment (1). By means of the catalytic filter (10), air received from the cooking compartment (1) can be filtered before being received into the air suction channel (2).

[0025] In another preferred embodiment of the invention, the cooking device (P) comprises at least one oil filter which is located at a side of the air suction channel (2) communicating to the cooking compartment (1). Thus, it is enabled that the oil generated during a cooking process of a food is filtered before passing to the suction channel (2). The oil filter is preferably detachable. By this way, it can be enabled that the user replaces or cleans the oil filter through the cooking compartment (1) if needed. In alternative embodiments, the oil filter may be located at any point where the air received from the cooking compartment (1) passes, instead of one side of the air suction channel (2) communicating to the cooking compartment (1).

[0026] In another preferred embodiment of the invention, the cooking device (P) comprises at least one gas sensor sensing VOC gases. The gas sensor is preferably provided at a location where the air sucked from the inner compartment (1) is conveyed to the outer environment (13). Therefore, it can be detected if there are VOC gases in the air that is conveyed to the outer environment (13).

[0027] With the present invention, there is also provided an operation method for a cooking device (P) which comprises at least one device body (G); at least one cooking compartment (1) provided in the device body (G); at

least one device door (K) controlling access into the cooking compartment (1); at least one air suction channel (2) which is in connection with the cooking compartment (1) from at least one side and receives the air inside the cooking compartment (1) in order to clean the air containing unpleasant odour and formed in the cooking compartment (1); at least one water tank (3) which is in connection with the air suction channel (2) and cools and filters the air from the air suction channel (2) by means of water; at least one filter chamber (5) comprising at least one filtering element; at least one vacuum pump (6) for sucking the air; at least one water inlet apparatus (8) for conveying water into the water tank (3); and at least one water outlet apparatus (9) for discharging the water in the water tank (3) to the outside. The operation method comprises the steps of: activating an odour blocking option; after activating the odour blocking option, operating the vacuum pump (6) to pass the air inside the cooking compartment (1) through the air suction channel (2), the water tank (3) and the filter chamber (5) so as to discharge the air to the outer environment (13) via the vacuum pump (6). Here, the odour blocking option can be activated by the user manually (e.g. by pushing a button provided at the cooking device (P)) or it can be activated automatically once the cooking device (P) is operated.

[0028] In a preferred embodiment of the invention, the operation method comprises the steps of: determining a water level inside the water tank (3) by at least one level sensor (3h); comparing the determined water level with a first threshold value (e.g. half of the height of the water tank (3)); and if the determined water level is below the first threshold value, sending water into the water tank (3) through a water inlet apparatus (8). In case the level sensor (3h) comprises a float, water intake process into water tank (3) is carried out when the water level decreases below a float provided at the bottom, and water intake process is stopped when the water level is aligned with a float provided at the top. Here, while water is sent to the water tank (3), inner pressure of the water tank (3) can increase. For that reason, the process of sending water into the water tank (3) is preferably started after the vacuum pump (6) is operated. By this way, high pressure in the water tank (3) is avoided. Here, moreover, while water is sent to the water tank (3), the water inlet apparatus (8) and the water outlet apparatus (9) may be operated together or the water inlet apparatus (8) and the water outlet apparatus (9) may be operated separately.

[0029] In another preferred embodiment of the invention, the operation method comprises the steps of: measuring a temperature and/or contamination level of the water inside the water tank (3) by at least one sensor (3e); comparing the measured temperature value with a second threshold value (e.g. 50-60°C) and/or the measured contamination level with a third threshold value; and if the measured temperature value is above the second threshold value and/or the measured contamination level is above the third threshold value, sending out the water

inside the water tank (3) by at least one water outlet apparatus (9) and sending water into the water tank (3) by at least one water inlet apparatus (8). Here, after the step of sending out the water inside the water tank (3) and sending water into the water tank (3) by at least one water inlet apparatus (8), temperature and/or contamination level of the water inside the water tank (3) is remeasured by the sensor (3e), wherein if the measured temperature value is above the second threshold value and/or the measured contamination level is above the third threshold value, the step of sending out the water inside the water tank (3) and sending water into the water tank (3) by at least one water inlet apparatus (8) is repeated at least once. However, here, if the measured temperature value is above the second threshold value and/or the measured contamination level is above the third threshold value even after said repetition, the second threshold value and/or the third threshold value is updated. Here, preferably, if the measured temperature value is above the second threshold value and/or the measured contamination level is above the third threshold value, the step of updating the second threshold value and/or the third threshold value is performed after a certain number of repetitions. Furthermore, if the measured temperature value is above the second threshold value, at least a fourth threshold value can also be updated in the step of updating the second threshold value. Similarly, if the measured contamination level is above the third threshold value, at least a fifth threshold value can also be updated in the step of updating the third threshold value. In order to update the second threshold value and the fourth threshold value, different rate of changes can be used, as well as using different rate of changes for the third threshold value and the fifth threshold value. In this embodiment, the method also comprises the steps of: after the step of sending out the water inside the water tank (3) by at least one water outlet apparatus (9) and sending water into the water tank (3) by at least one water inlet apparatus (8), re-measuring a temperature and/or contamination level of the water inside the water tank (3) by the sensor (3e); comparing the measured temperature value with a fourth threshold value (e.g. 20-30°C) and/or the measured contamination level with a fifth threshold value; and if the measured temperature value is above the fourth threshold value and/or the measured contamination level is above the third fifth threshold value, ceasing operation of both the water inlet apparatus (8) and the water outlet apparatus (9). Moreover, here, following completion of a cooking process by the cooking device (P), the processes of sending out the water inside the water tank (3) by the water outlet apparatus (9) and sending water into the water tank (3) by the water inlet apparatus (8) are repeated at least once (preferably third times). Therefore, the water tank (3) is enabled to be cleaned so that accumulation of contaminations inside the water tank (3) is prevented.

[0030] In another preferred embodiment of the invention, the operation method comprises a step of at least

one cleaning mode (T). Here, in the cleaning mode (T), all of the water inside the water tank (3) is sent out, and fresh water is received into the water tank (3). The cleaning mode (T) can be carried out whenever the odour blocking program is activated or when the system is used for a predetermined time period (e.g. 1 hour). Here, following the cleaning mode (T), the cover mechanism (7) is preferably opened.

[0031] In the water-temperature graph illustrated in Figure 36, there are shown time-varying values of the water temperature in the water tank when the odour blocking option (filtering) is activated. As shown in the graph, temperature of the water will continue to rise since the vacuum pump (6) is operated for this time period. Eventually, temperature value of water will reach the upper limit temperature (e.g. 50-60°C). In this case, the water outlet apparatus (9) will be activated and start to remove the water accumulated therein. When the water level reaches the bottom, the level sensor (3h) will give an alert and the water outlet apparatus (9) will stop operating. Simultaneously, the water inlet apparatus (8) will start operating for fresh water intake. When the water level rises, the water inlet apparatus (8) will stop operating and the water outlet apparatus (9) will operate again, and this cycle will continue until temperature of water inside the water tank (3) decreases to the lower limit temperature (e.g. 20-30°C). Water temperature that has decreased to the desired lower limit temperature will rise again due to continuous operation of the vacuum pump (6). When the water inside the water tank (3) reaches the upper limit temperature (e.g. 50-60°C); the same cycle will be repeated until the program of the cooking device (P) finishes. As a result, temperature of water inside the water tank (3) will give a fluctuating graph.

[0032] In the graphs of Figure 37 and Figure 39, dashed line represents end time of the cooking program (R). In both cases, the filtration (F) (odour blocking program) will stop operating and the cleaning mode (T) will be started for water intake into the water tank (3). Water intake into the water tank (3) may be performed immediately or after a predetermined time period (preferably 1-3 seconds). In Figure 37, the cleaning mode (T) starts during water intake into the water tank (3), while in Figure 39 the cleaning mode (T) starts when there is no water intake into the water tank (3).

[0033] In figure 38, there is shown an algorithm graph of another embodiment of the present invention. Here, after completion of the cooking program (R), the filtration (odour blocking program) continues to operate for a determined time period (preferably 10 minutes), and after that, the cleaning program (T) is activated. In the first line the cooking process (R) ends but the filtration (R) continues to operate. In the second line the filtration (R) completes its operation, as well, and the cleaning mode (T) starts. After the first line, temperature of air sucked from the cooking device (P) will decrease since the resistances are no more operated, and temperature of water inside the water tank (3) will rise more slowly. In this case,

odours resulting from the food cooked in the cooking device (P) after this stage will have been filtered and the user will encounter the minimum odour when she/he opens the device door (K). In Figure 38, the cleaning mode (T) starts during water intake into the water tank (3) while in Figure 40 the cleaning mode (T) starts when there is no water intake into the water tank (3).

[0034] Embodiments described above and illustrated in Figures 36-40 apply to cases where temperature of the inlet water of the water supply network (12) is below a value (e.g. temperatures below 25°C and less) and the vapour density in the inner compartment (1) of the cooking device (P) is low.

[0035] Since always having water inside the water tank (3) is not appropriate in terms of hygiene issues, preferably the water inside the water tank (3) after each odour blocking program is completely drained out after the cleaning cycle. In the cleaning mode (T), there can be one water intake or multiple intakes or discharges in place of the water discharged from the water tank (3) in the cleaning mode (T), depending on the size of the water tank (3). Water to be received into the water tank (3) may be received at the end of the cleaning mode (T) and kept in the water tank (3) until the next program starts or it may be received into the water tank (3) at the start of the program. The cleaning mode (T) may be at the end of the cooking program or at the beginning of the program. In a preferred embodiment the cleaning mode (T) is initiated automatically at the end of the cooking program. In an alternative embodiment, the cleaning mode (T) may be initiated controllably at the beginning and/or end of the cooking program based on a contamination information received from the sensor (3e).

[0036] Graph of Figure 41 shows a case where amount of food cooked in the cooking device (P) is low or where foods with little odour/vapour are cooked. In this case, temperature of water in the water tank (3) cannot exceed a determined maximum temperature level (e.g. 50-60°C) until the end of the cooking program (R). Due to the fact that the temperature does not reach the maximum level, there is no fresh water intake into the water tank (3) and the temperature value remains more or less constant until the end of the cooking program (R).

[0037] Graph of Figure 42 applies to the case where the mains water to be received into the water tank (3) fails to make temperature of water inside the water tank (3) reach the desired lower limit temperature, depending on the amount of water inside the water tank (3) and dense vapour inside the cooking device (P). In this case, there will be a number of water intakes into the water tank (3). In this graph, effects of operation cycles of the vacuum pump (6), the water outlet apparatus (9) and the water inlet apparatus (8) on the water temperature inside the water tank (3) are shown in detail. In the water tank (3), at the lower limit temperature and upper limit temperature of the water temperature (e.g. from 30°C to 50°C), only the vacuum pump (6) is operated and water temperature inside the water tank (3) is increased with

the effect of hot air sucked from the cooking device (P). After that, the information that the temperature has reached the upper limit temperature level (e.g. 50°C) is received by means of the sensor (3e), and the water outlet apparatus (9) is activated to discharge hot water therein. In this short period of time, water inside the water tank (3) becomes a little hotter since the dense superheated vapour which is likely to occur in the cooking device (P) is continued to be sucked into the water tank (3); however, as soon as the water outlet apparatus (9) is deactivated and the water inlet apparatus (8) is activated so as to provide fresh and cold water inside, the temperature of water starts to decrease. Then, water level will start to decrease when the water inlet apparatus (8) is deactivated and the water outlet apparatus (9) is operated. However, temperature of water continuously increases as the vacuum pump (6) operates without ceasing. At this point, because of the fact that there is no new water inlet but there is only water discharge from inside, the temperature of water in the water tank (3) will increase a little, again. Thereafter, temperature of water will decrease again with the new water inlet, and this cycle will be performed for a predetermined number of steps (e.g. 7 steps) until temperature of water inside the water tank (3) reaches the lower limit temperature (e.g. 30°C).

[0038] In the graph of Figure 43, in case the temperature of water inside the water tank (3) does not reach the desired lower limit temperature (e.g. 30°C) within the desired number of steps (e.g. 7 steps), lower and upper limit temperatures of the cycle are determined again. This will occur when the temperature of mains inlet water is above the determined value and/or in case excess dense/hot vapour is sucked from the cooking device (P). In this case, only the lower temperature limit may be increased, or the upper limit temperature values may be increased together with the lower limit temperature. The lower limit temperature and the upper limit temperature values may be increased with different values or different rates. For example, as illustrated in Figure 43, the lower limit temperature of 30°C may be increased to 40°C while the upper limit temperature may be increased from 50°C to 60°C.

[0039] The graph of Figure 44 shows operation times of the elements that provide air and water inlets/outlets for the water tank (3). As soon as the cooking program runs, the vacuum pump (6) continues to operate until the end of the program. Shortly after the operation of the vacuum pump (6), the water inlet apparatus (8) is operated to transfer fresh water therein. When the water level reaches the top, the water inlet apparatus (8) stops operating, and only the vacuum pump (6) is operated until the temperature of water reaches 50°C. Once the water has a temperature of 50°C, the water outlet apparatus (9) activates to discharge the waste water, and then it stops; and the water inlet apparatus (8) is re-operated to provide clean water. The water inlet apparatus (8) and the water outlet apparatus (9) are operated alternately in order to decrease temperature of water. When neither of

them is working, the water temperature rises from the lower limit temperature to the upper limit temperature.

[0040] In Figure 45, there is shown an algorithm graph of another embodiment of the present invention. This graph shows the case where a flow rate of the water outlet apparatus (9) enabling waste water to be discharged from the water tank (3) is above that of the water inlet apparatus (8) providing fresh water inlet. In this case, the water inlet apparatus (8) is able to operate unceasingly within a time interval (see Figures 42-43) until temperature of the water tank (3) decreases from the maximum to the minimum. As the flow rate of the water inlet apparatus (8) is lower than that of the water outlet apparatus (9), operation of the water inlet apparatus (8) does not give rise to increase in water level inside the water tank (3) while the water outlet apparatus (9) discharges the waste water inside.

[0041] In another embodiment of the present invention, after the cleaning mode (T) is activated, water sent to the water tank (3) can be heated here or it can be heated and sent to/received from the water tank (3). The water heated by resistances located at the outlet/inlet of the water inlet apparatus (8) or at the water tank (3) will help better cleaning of oil and other waste materials remained in the water tank (3).

[0042] In another embodiment of the present invention, it can be found out that a food producing a large amount of odour and vapour is cooked in the cooking device (P) according to the information received from the pressure sensors that are provided at the vacuum pump (6) and/or the cooking compartment (1). In order to suck all of these gases from the food into the filtration (F) system and filter to prevent odour escape to the environment, power of the vacuum pump (6) can be changed based on the information received from sensors. Yet in an alternative embodiment, a possible blockage can be detected by means of at least one pressure sensor preferably located at the inlet of the vacuum pump (6). Therefore, for example when a blockage is detected, operation of the filtration (F) system can be ceased and/or the user can be provided with an alert. Here, operating power of the vacuum pump (6) can be adjusted according to the information from the pressure sensor or temperature of water inside the water tank (3). While adjusting operating power of the vacuum pump (6), power of the vacuum pump (6) is increased, decreased or kept constant.

[0043] In order to prevent odour escape outside the cooking device (P), pressure in the cooking device (P) should be equal to the atmospheric pressure. For example, the vacuum pump (6) will adjust the pressure (x) that it generates inside the cooking device (P) in use such that the pressure is $-3\text{Pa} > x > -5\text{Pa}$ relative to the atmospheric pressure. If a food producing low odour and vapour is cooked in the cooking device (P), power of the vacuum pump (6) will be excessive for the sufficient suction and the minus pressure value will be above the required value $x < -5\text{Pa}$. In this case, power of the vacuum pump (6) is decreased to avoid heat and energy losses.

If a food producing much more odour and vapour is cooked in the cooking device (P), power of the vacuum pump (6) will be insufficient for the sufficient suction and the minus pressure value will be below the required value $x < -3\text{Pa}$. Yet in this case, power of the vacuum pump (6) is increased so that possible odours that may escape uncontrollably out of the cooking device (P) are prevented.

[0044] In another embodiment of the present invention, if the air sucked from the cooking device (P) cannot reach a predicted temperature value within a certain time period in the water tank (3), it will be detected that a small amount of vapour and odour is produced by the cooked foods and the power of the vacuum pump (6) will be automatically reduced. By this way, there will be no air suction from the cooking device (P) more than adequate, and electricity consumption will not be increased unnecessarily. If the maximum temperature is obtained before the predicted time period, sensors will detect presence of a food producing much more vapour and odour in the cooking device (P). In this case, power of the vacuum pump (6) will be increased to prevent odour escape outside the cooking device (P).

[0045] In another embodiment of the present invention, a rate of increase in the temperature of the water inside the water tank (3) in one unit time is measured, and if the measured rate is above a predicted value, different methods can be implemented in order to decrease temperature of the water tank (3) other than the method of cooling by means of water. In this case, instead of adding or removing additional mains water to the water tank, a fan, peltier or heat exchangers can be used to decrease the temperature of water tank (3) so that unnecessary water consumption is avoided.

[0046] In another embodiment of the present invention, a water turbidity sensor to be used in the water tank (3) will detect level of contaminations inside the tank (3), and the cleaning mode (T) may be activated before or after the cooking program based on the turbidity level.

[0047] In another embodiment of the present invention, instead of operating continuously during filtration (F) period, the vacuum pump (6) may be operated intermittently (e.g. 3 minutes of operation followed by a 1 minute of ceasing) against possible blockages in the filtration (F) system. Here, operation of the vacuum pump (6) is continued for a predetermined period after completion of the cooking process.

[0048] In an exemplary embodiment of the invention, functioning of the method is as follows:

- After activating the Odour Blocking option through the front panel (L), the vacuum pump (6) will be operated continuously.
- Once the filtration (F) system is operated in the first place, the water tank (3) will be filled with water until an upper float provided at the level sensor (3h) gives an alert.

- Only the vacuum pump (6) and the water inlet apparatus (8) will be operated in the stage of water filling.
- Before filling the water tank (3) with water, the vacuum pump (6) will be operated preferably 1-5 seconds before the operation of the water inlet apparatus (8) in order to prevent explosion of the water tank (3) and avoid passage of the water through pipes to the inside of the cooking device (P) due to the pressure formed.
- Vacuum pump (6) will continue to operate after the water tank (3) is filled with water. The water outlet apparatus (9) and the water inlet apparatus (8) will be turned off.
- When temperature of water inside the water tank (3) reaches 50-60°C, the water outlet apparatus (9) will be operated to start discharging waste/hot water according to the information received from the sensor (3h). Here, the vacuum pump (6) continues to operate.
- The water outlet apparatus (9) will be operated until a lower float provided at the level sensor (3h) gives an alert; and following the alert that indicates decrease of water level, the water outlet apparatus (9) will stop discharging water, rather the water inlet apparatus (8) will be operated to begin sending fresh water therein.
- The water inlet apparatus (8) will operate until an upper float provided at the level sensor (3h) gives an alert that indicates increase of water level, it will stop its operation after the alert, and instead, the water outlet apparatus (9) will be operated to discharge water.
- This cycle will be continued until temperature of water decreases up to 20-30°C.
- When an alert indicating decrease of water temperature up to 20-30°C is received from the sensor (3e);
 - If the water outlet apparatus (9) is active and receives water from inside at that moment, it will stop operating and the water inlet apparatus (8) will be operated to increase water level until the upper float provided at the level sensor (3h) gives an alert. After the alert, the water inlet apparatus (8) will stop operating to cease water intake into the water tank (3).
 - If the water inlet apparatus (8) is active and receives water inside at that moment, it will continue to operate and will be operated to increase water level until the upper float provided at the level sensor (3h) gives an alert. After the alert, the water inlet apparatus (8) will stop operating to cease water intake into the water tank (3).
- The water outlet apparatus (9) and the water inlet apparatus (8) will not be operated until the temperature increases from 20-30°C to preferably 50-60°C.

However, the vacuum pump (6) will continue to operate.

- When the temperature reaches 50-60°C, the same cycle will be repeated until the temperature decreases to 20-30°C.
- The vacuum pump (6) is preferably operated unceasingly during the whole odour removing process.
- Each time the odour blocking program is activated or the system is used for a predetermined period (e.g. 1 hour), cleaning mode (T) for the water tank (3) will be activated automatically.
- In the cleaning mode (T), firstly, the water outlet apparatus (9) will be operated to remove waste water remaining inside and the water level will be decreased, and then, the water outlet apparatus (9) will be stopped and the vacuum pump (6) will operate.
- Preferably 1-5 seconds after the operation of the vacuum pump (6), the water inlet apparatus (8) will start to operate to fill the water tank (3). When the water level reaches the upper float provided at the level sensor (3h), the vacuum pump (6) will be stopped together with the water inlet apparatus (8), and the water outlet apparatus (9) will start to operate again.
- This cycle is preferably carried out 3 times or more in total. Once the operation of the water outlet apparatus (9) is completed at the end of the cleaning cycles, the cleaning mode (T) will have been completed, as well.

[0049] In the cooking device (P) and operation method according to the present invention, passing the air inside the cooking compartment (1) respectively through the air suction channel (2), the water tank (3) and the filter chamber (5) so as to discharge the air to the outer environment (13) via the vacuum pump (6) enables the odour-producing substances in air to be filtered. Thus, air without unpleasant odour can be transmitted to the outer environment (13). Moreover, using a vacuum pump (6) enables the air inside the cooking compartment (1) to be sucked effectively. Since the vacuum pumps (6) are relatively brittle, it is not safe to suck hot air through a vacuum pump (6). In order to solve this problem, the cooking device (P) and the operation method according to the present invention cool the hot air received from the cooking compartment (1) by passing the hot air through the water tank (3). Therefore, while some of the odour-producing substances in air are filtered in the water tank (3), the vacuum pump (6) is used in a safe manner by decreasing the temperature of the air.

Claims

1. A cooking device (P) comprising at least one device body (G), at least one cooking compartment (1) provided in the device body (G), and at least one device door (K) controlling access into the cooking compartment (1), **characterized by** comprising:

- at least one air suction channel (2) which is in connection with the cooking compartment (1) from at least one side and receives the air inside the cooking compartment (1);
 - at least one water tank (3) which is in connection with the air suction channel (2) and cools and filters the air from the air suction channel (2) by means of water;
 - at least one filter chamber (5) comprising at least one filtering element;
 - at least one vacuum pump (6) for sucking the air;
 - at least one water inlet apparatus (8) for conveying water into the water tank (3); and
 - at least one water outlet apparatus (9) for discharging the water in the water tank (3) to the outside.
2. A cooking device (P) according to Claim 1, **characterized by** comprising at least one negative-ion former (4) for charging the air, which leaves the water tank (3), with negative ions.
 3. A cooking device (P) according to Claim 1, **characterized by** comprising at least one sensor (3e) which senses at least one property of the water inside the water tank (3).
 4. A cooking device (P) according to Claim 3, **characterized by** comprising at least one control unit which is in connection with the sensor (3e) and controls operation of the water inlet apparatus (8) and/or the water outlet apparatus (9) according to values received from the sensor (3e).
 5. A cooking device (P) according to Claim 1, **characterized in that** the water tank (3) comprises at least one hollow tank body (3a) and at least one tank cover (3b).
 6. A cooking device (P) according to Claim 5, **characterized in that** the water tank (3) comprises at least one distribution plate (3c) in the form of a perforated plate which is located in the tank chamber (3a), and at least one guiding element (3d) for passing the air received in the water tank (3) over the distribution plate (3c).
 7. A cooking device (P) according to Claim 1, **characterized in that** the negative-ion former (4) comprises at least one ion former body (4a), at least one ion former cover (4b), at least one ion forming element (4c) located in the ion former body (4a), at least one ozone generator, UV filter and/or at least one photocatalytic filter.
 8. A cooking device (P) according to Claim 1, **characterized in that** the filter chamber (5) comprises a filter portion which can be removed from the cooking device (P) and attached to the cooking device (P).
 9. A cooking device (P) according to Claim 1 or Claim 8, **characterized in that** the filter chamber (5) comprises at least one filter body (5a) comprising at least one filtering element, wherein the filtering element is a carbon-based filter and/or the filtering element comprises a zeolite filter, an oil and particle retaining filter, a VOC gas retaining filter, a HEPA filter, a catalytic filter, an electrostatic filter or a photocatalytic filter; at least one filter head (5b) for air passage through the filter body (5a), the at least one filter head (5b) being in communication with the filter body (5a); at least one filter cover (5c); at least one slide body (5d) provided at the device body (G); at least one slide element (5f) which is connected from at least one side to the filter body (5a), and from at least another side to the slide body (5d) so as to move inside the slide body (5d).
 10. An operation method for a cooking device (P) which comprises at least one device body (G); at least one cooking compartment (1) provided in the device body (G); at least one device door (K) controlling access into the cooking compartment (1); at least one air suction channel (2) which is in connection with the cooking compartment (1) from at least one side and receives the air inside the cooking compartment (1) in order to clean the air containing unpleasant odour and formed in the cooking compartment (1); at least one water tank (3) which is in connection with the air suction channel (2) and cools and filters the air from the air suction channel (2) by means of water; at least one filter chamber (5) comprising at least one filtering element; at least one vacuum pump (6) for sucking the air; at least one water inlet apparatus (8) for conveying water into the water tank (3); and at least one water outlet apparatus (9) for discharging the water in the water tank (3) to the outside, the method **characterized by** comprising the steps of:
 - activating an odour blocking option, wherein the odour blocking option is activated manually by the user;
 - after activating the odour blocking option, operating the vacuum pump (6) to pass the air inside the cooking compartment (1) through the air suction channel (2), the water tank (3) and the filter chamber (5) so as to discharge the air to the outer environment (13) via the vacuum pump (6).
 11. An operation method according to Claim 10, **characterized by** comprising a cleaning mode (T) which comprises the steps of sending out all of the water inside the water tank (3), and receiving fresh water into the water tank (3).

12. An operation method according to Claim 10, **characterized by** comprising the steps of: measuring a temperature value of the water inside the water tank (3) by at least one sensor (3e); comparing the measured temperature value with a second threshold value; and if the measured temperature value is above the second threshold value, sending out the water inside the water tank (3) by at least one water outlet apparatus (9) and sending water into the water tank (3) by at least one water inlet apparatus (8). 5 10
13. An operation method according to Claim 12, **characterized by** comprising the steps of: after the step of sending out the water inside the water tank (3) and sending water into the water tank (3) by at least one water inlet apparatus (8), re-measuring temperature value of the water inside the water tank (3) by the sensor (3e); and, if the measured temperature value is above the second threshold value, repeating, at least once, the step of sending out the water inside the water tank (3) and sending water into the water tank (3) by at least one water inlet apparatus (8). 15 20
14. An operation method according to Claim 10, **characterized by** comprising the steps of: measuring a contamination level of the water inside the water tank (3) by at least one sensor (3e); comparing the measured contamination level with a third threshold value; and, if the measured contamination level is above the third threshold value, sending out the water inside the water tank (3) by at least one water outlet apparatus (9) and sending water into the water tank (3) by at least one water inlet apparatus (8). 25 30 35
15. An operation method according to Claim 14, **characterized by** comprising the steps of: after the step of sending out the water inside the water tank (3) and sending water into the water tank (3) by at least one water inlet apparatus (8), re-measuring contamination level of the water inside the water tank (3) by the sensor (3e); and, if the measured contamination level is above the third threshold value, repeating, at least once, the step of sending out the water inside the water tank (3) and sending water into the water tank (3) by at least one water inlet apparatus (8). 40 45

50

55

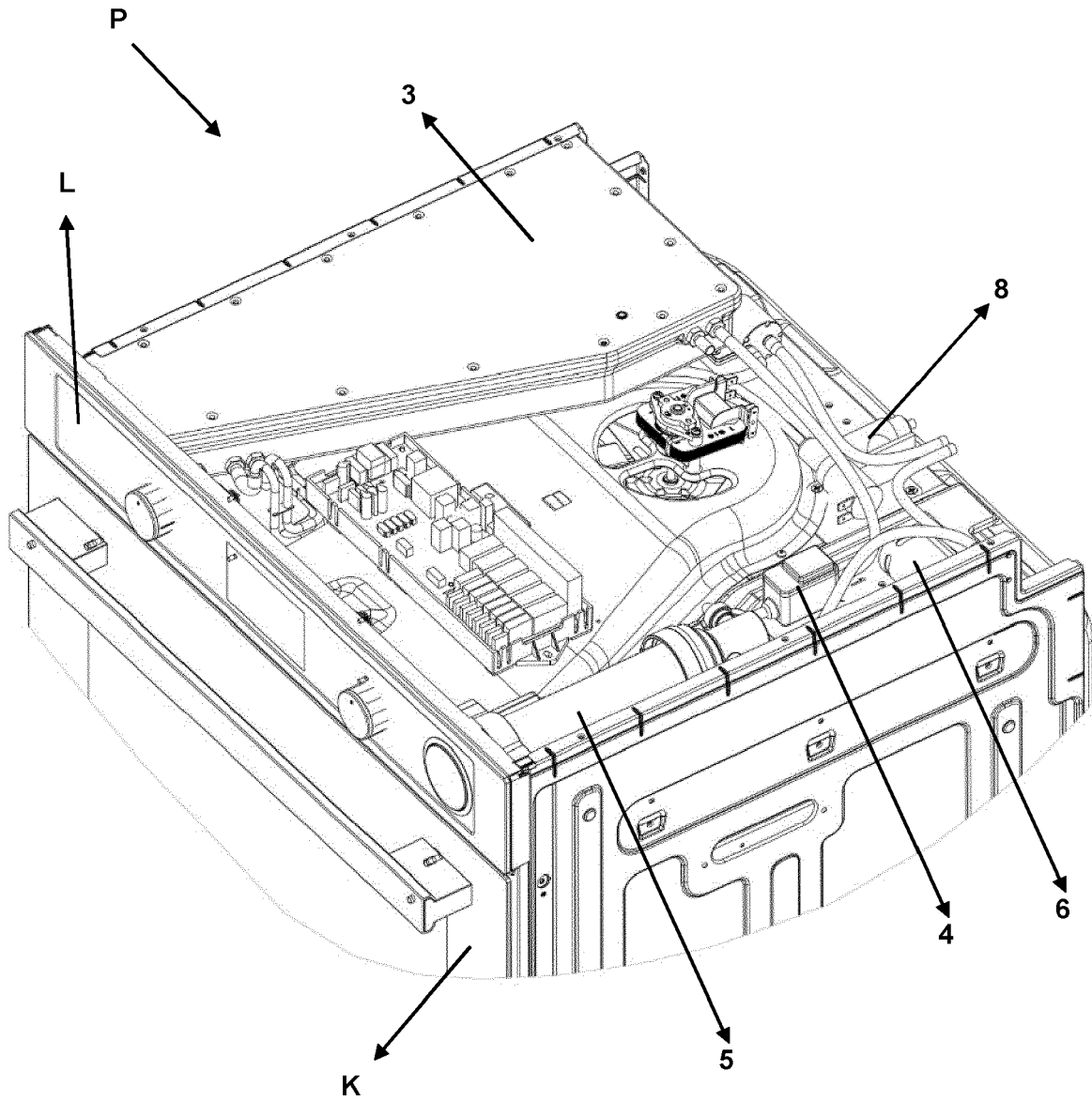


Figure – 2

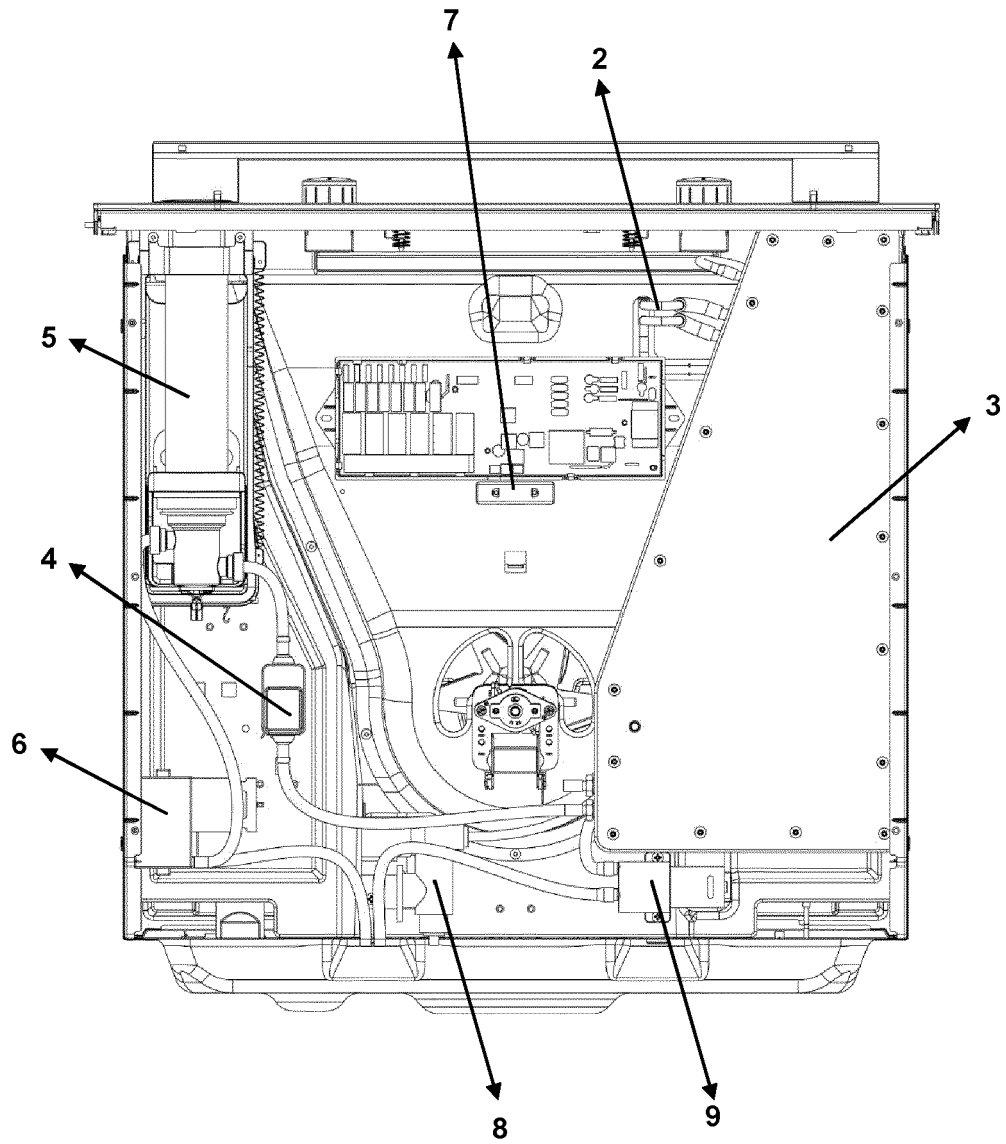


Figure – 3

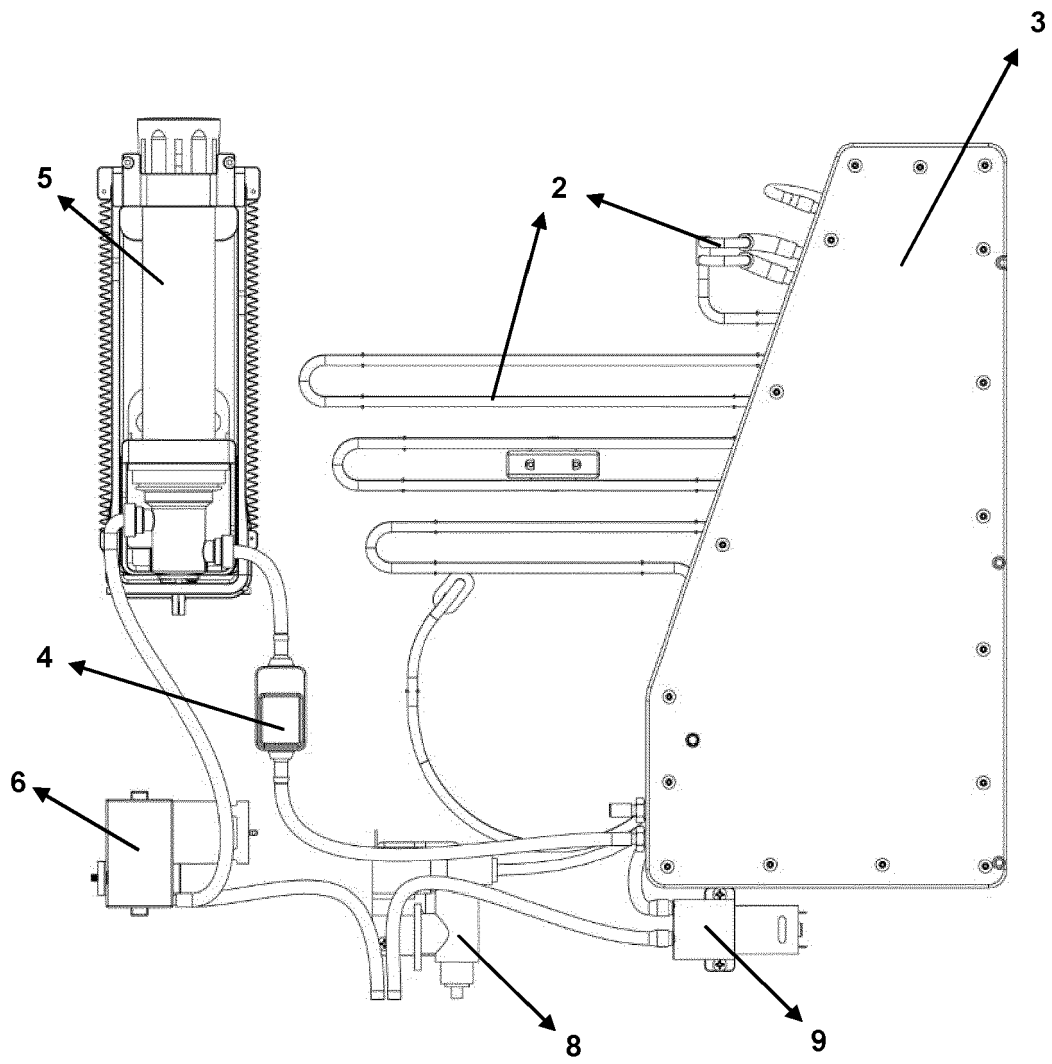


Figure – 4

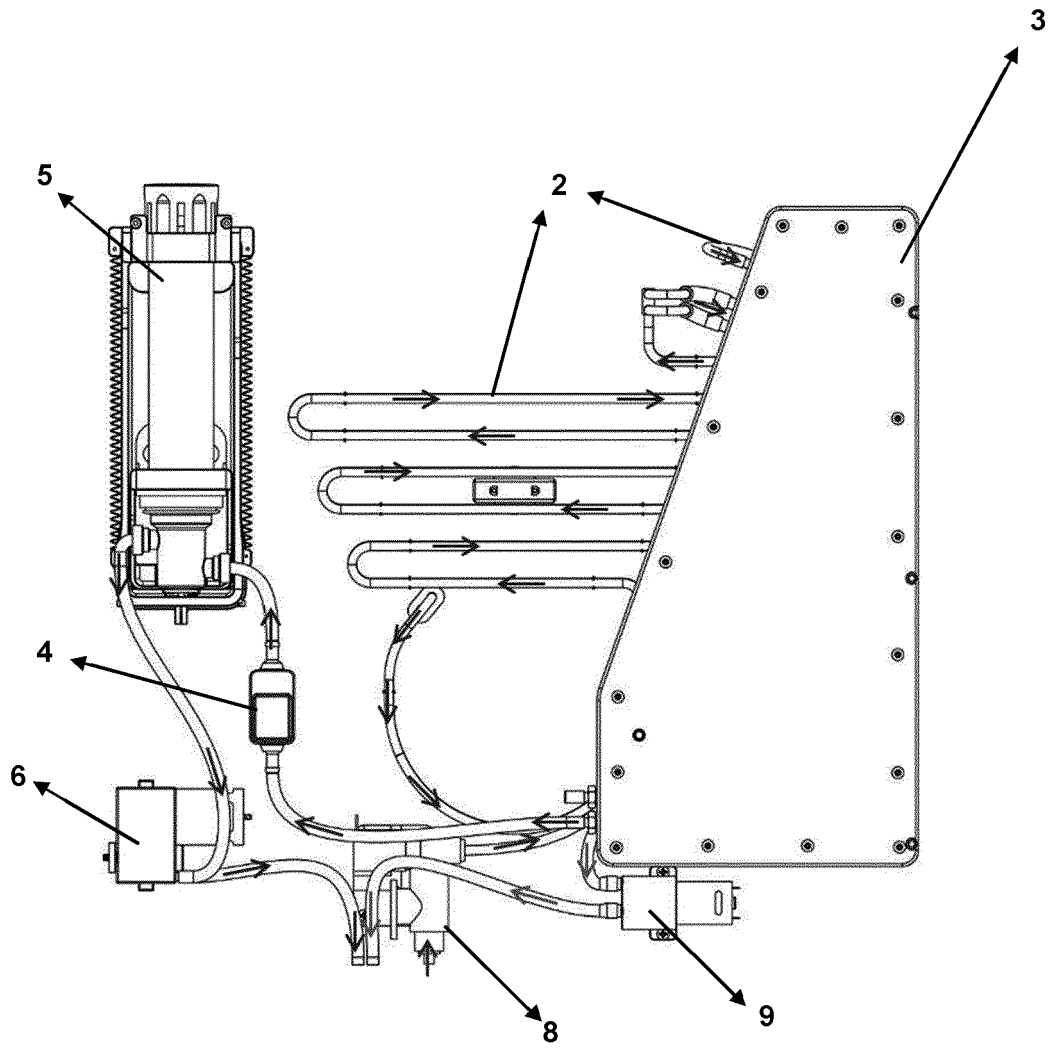


Figure – 5

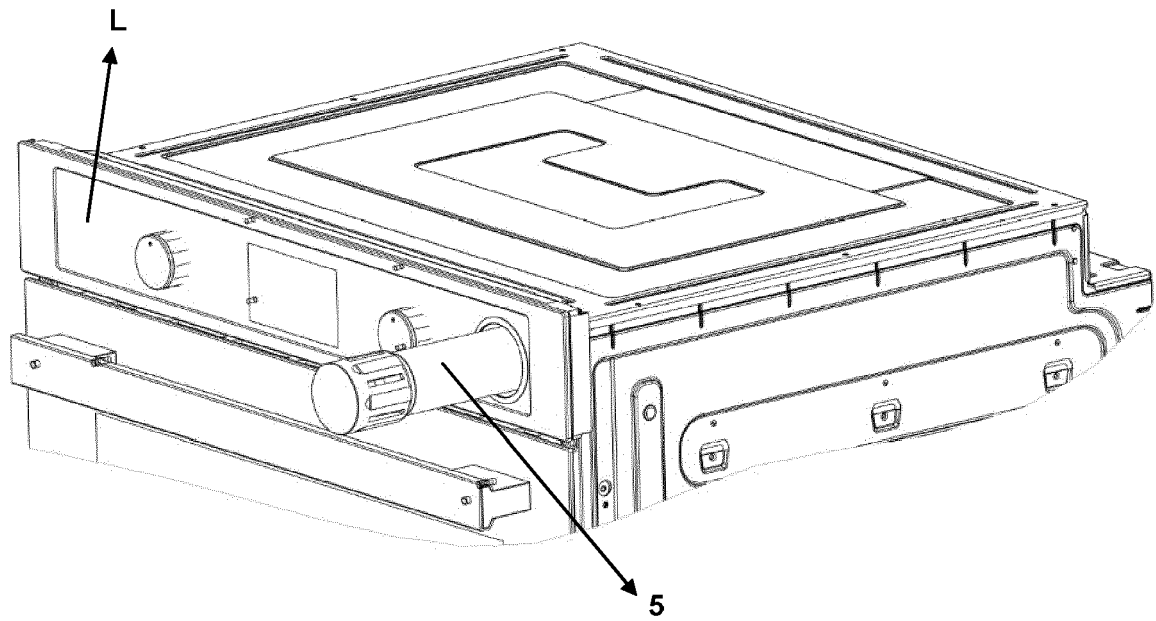


Figure – 6

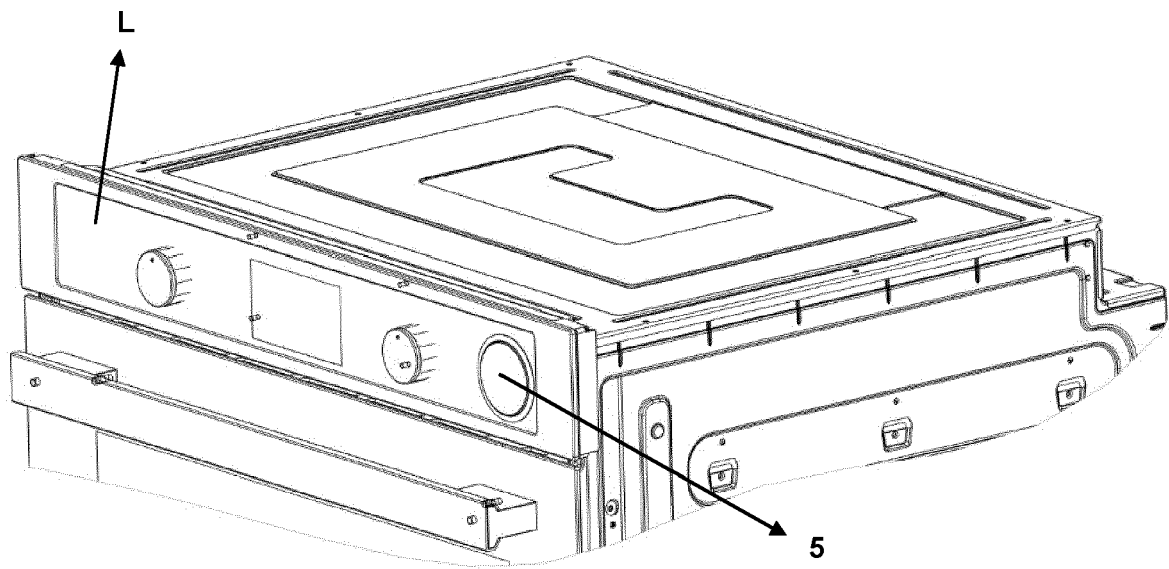


Figure – 7

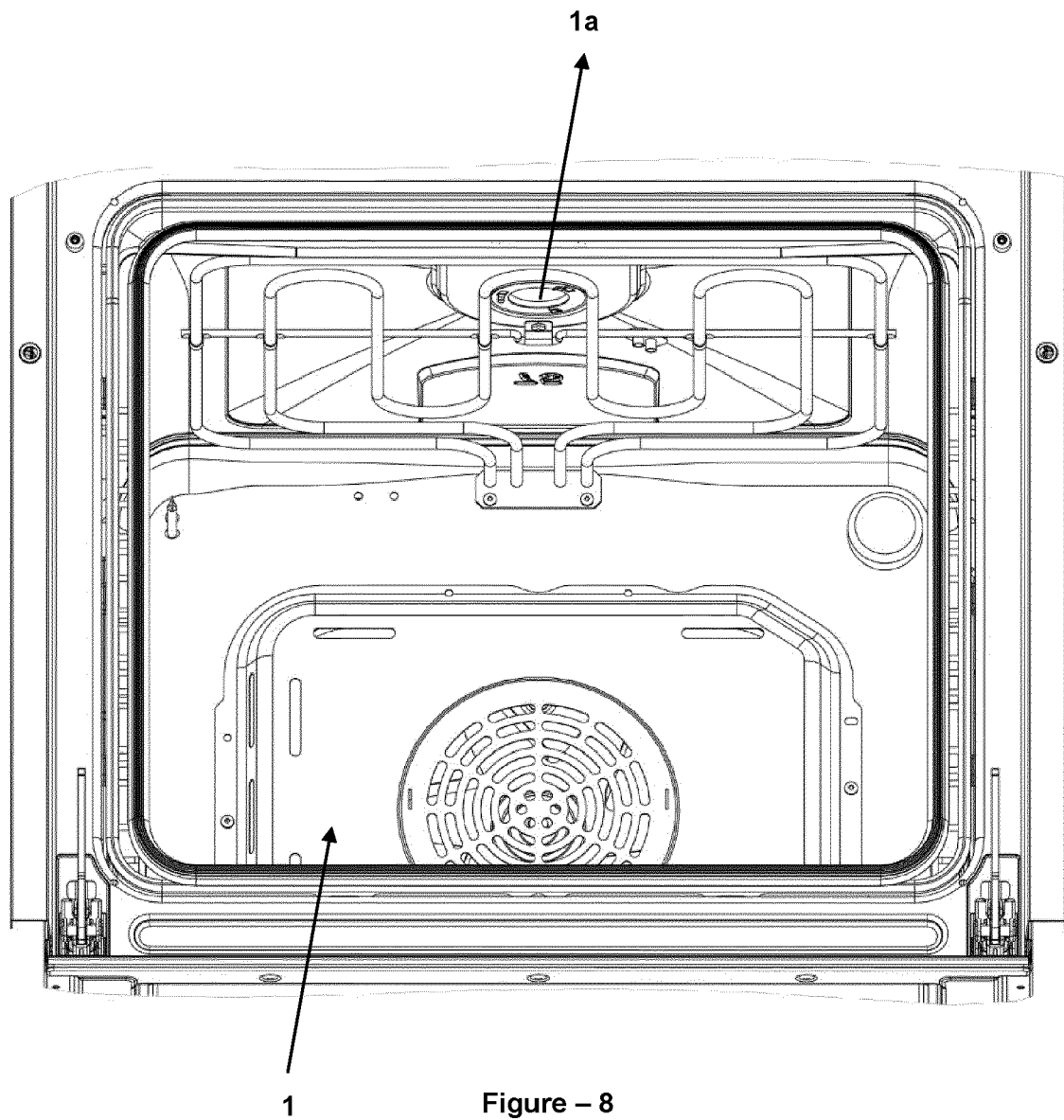


Figure – 8

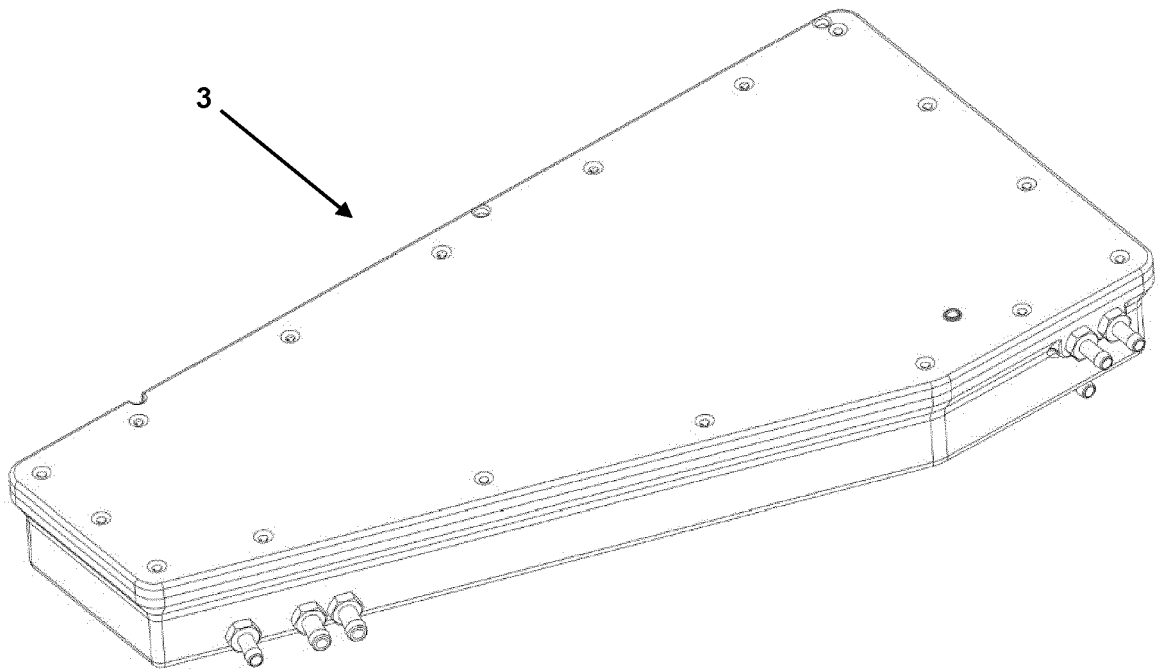


Figure – 9

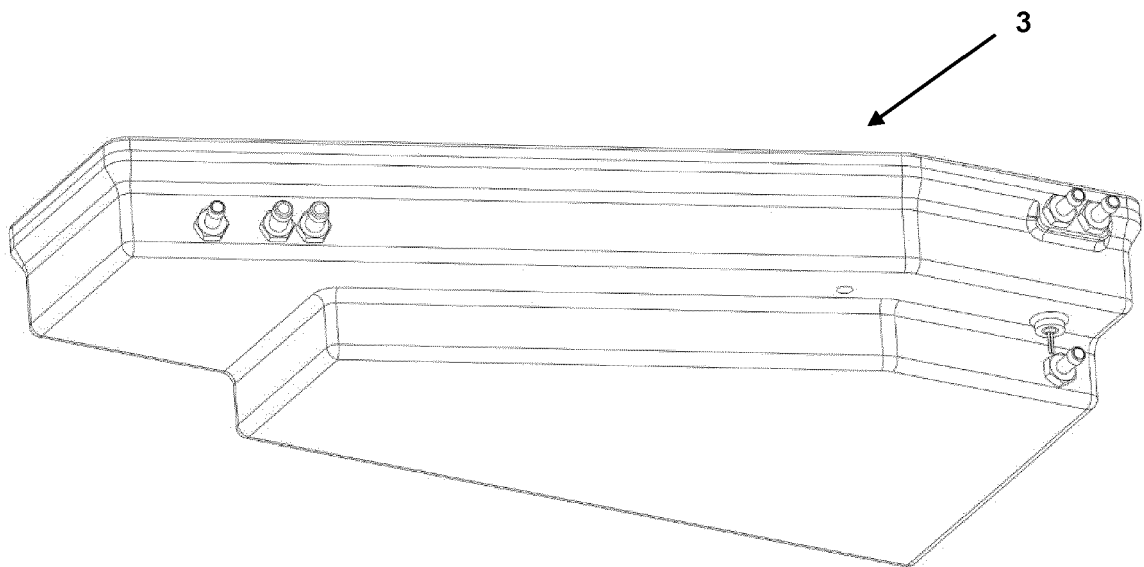


Figure – 10

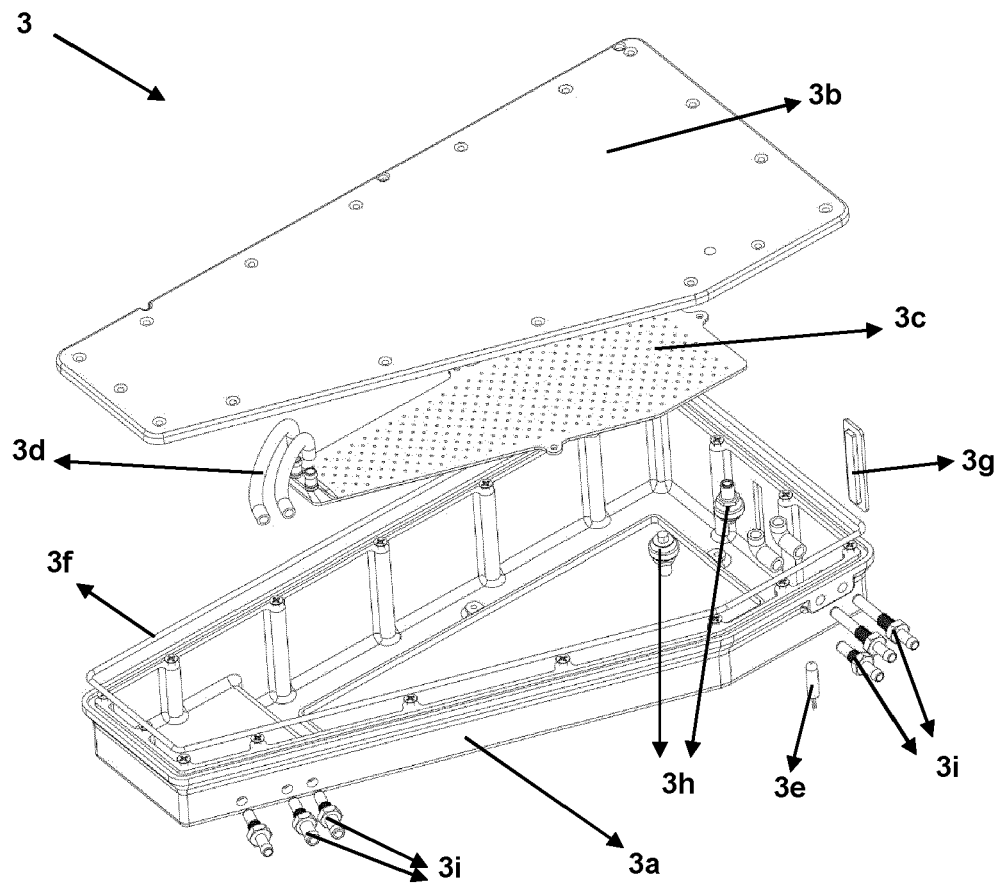


Figure – 11

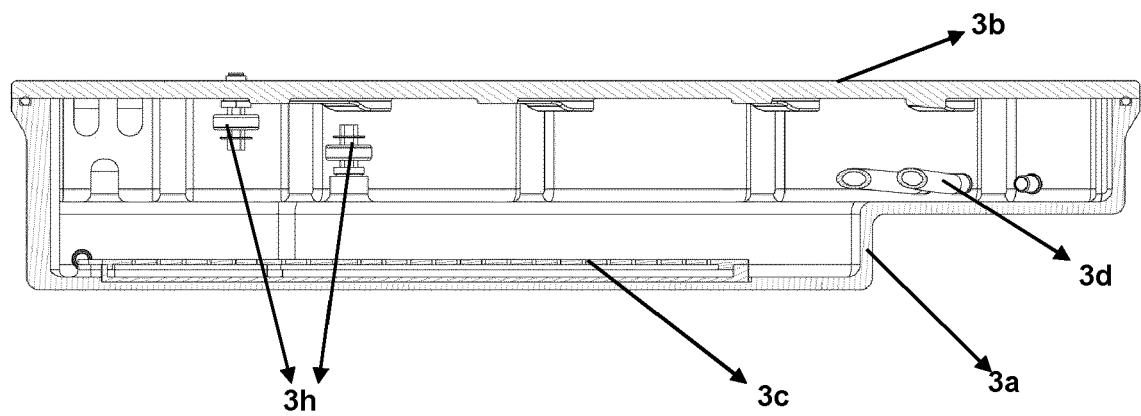


Figure – 12

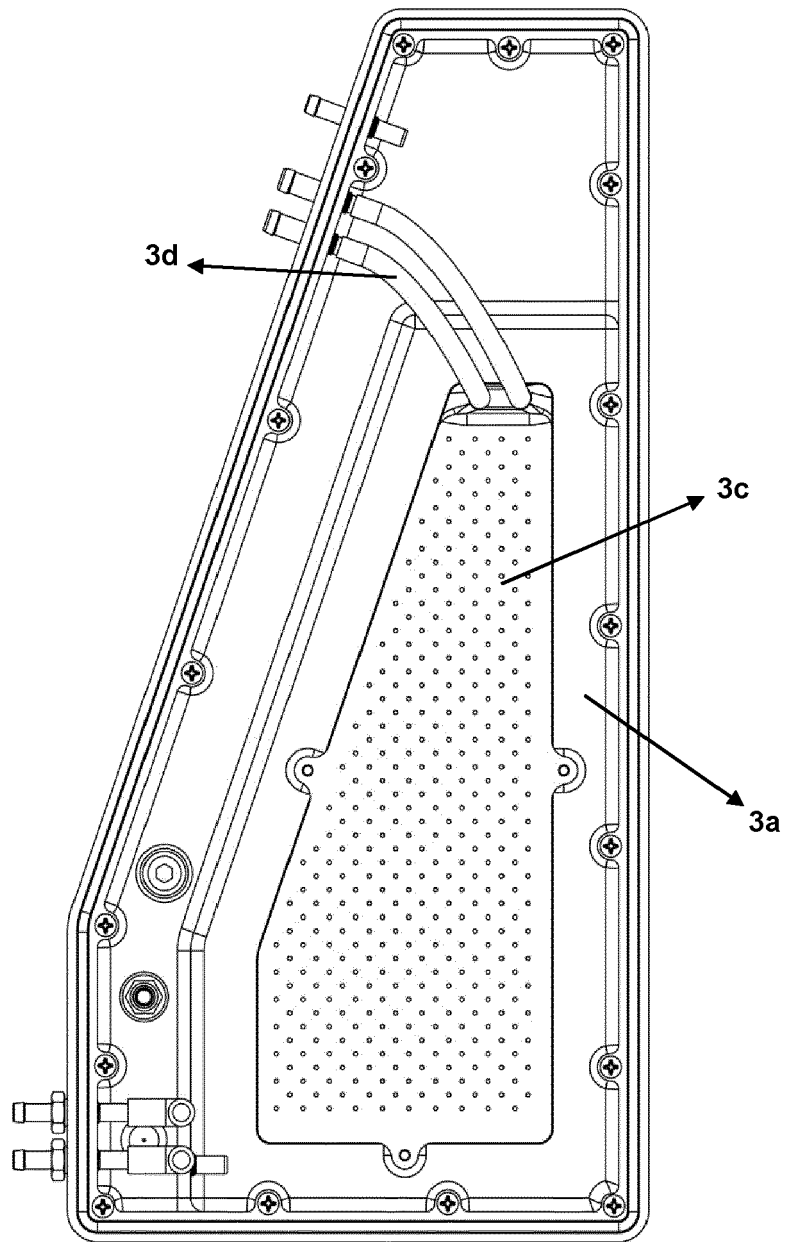


Figure – 13

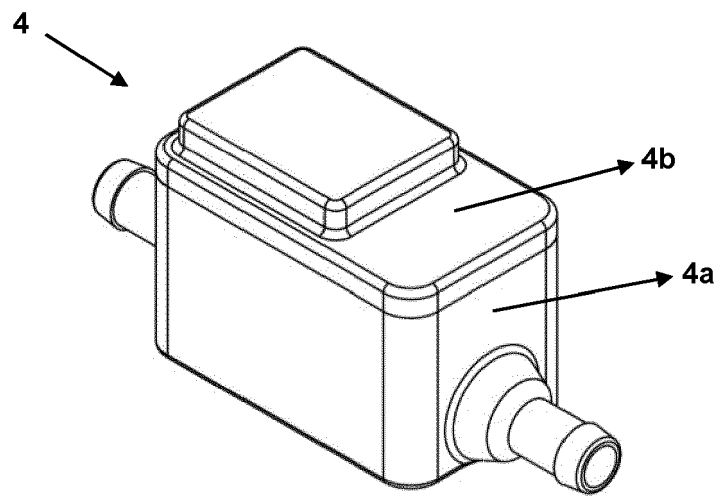


Figure – 14

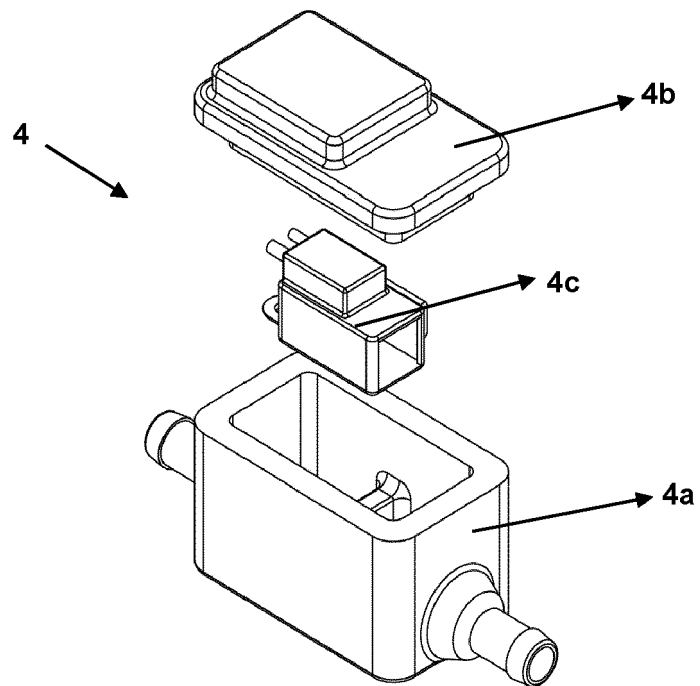


Figure – 15

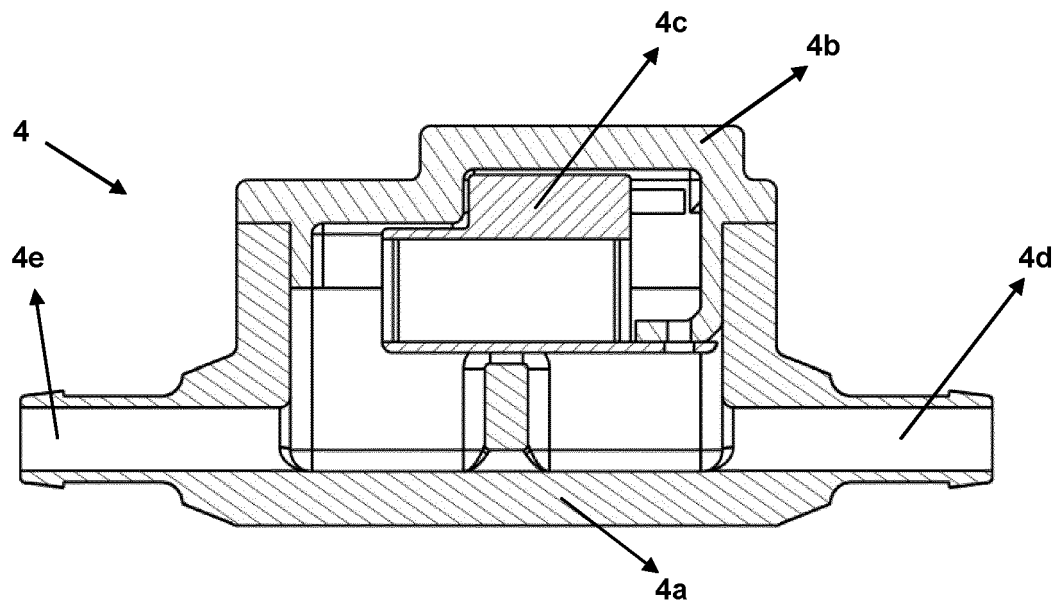


Figure – 16

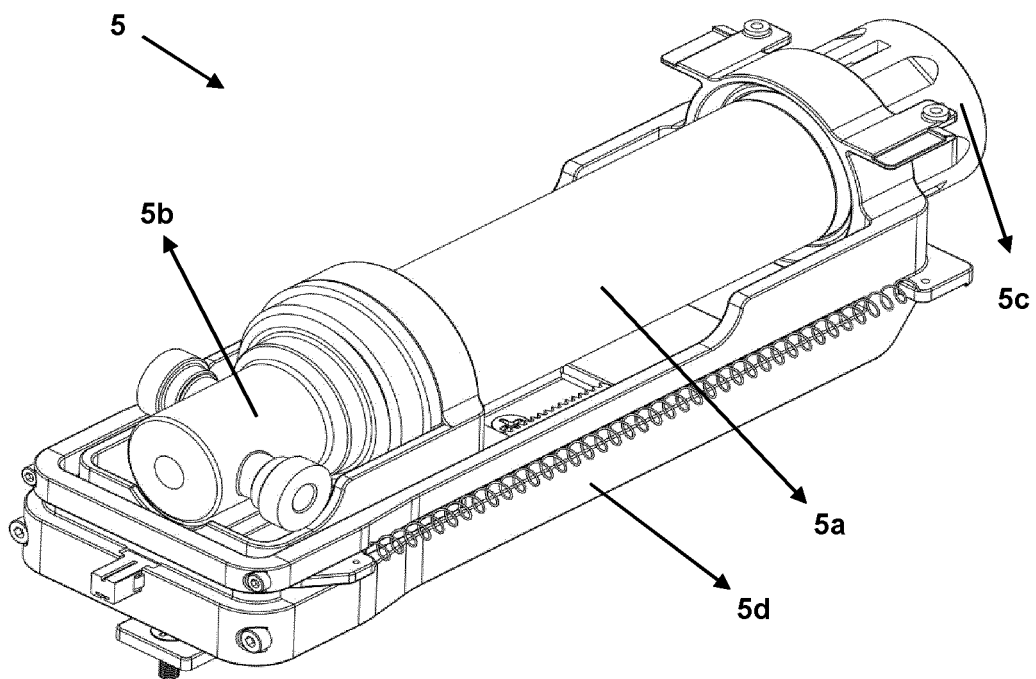


Figure – 17

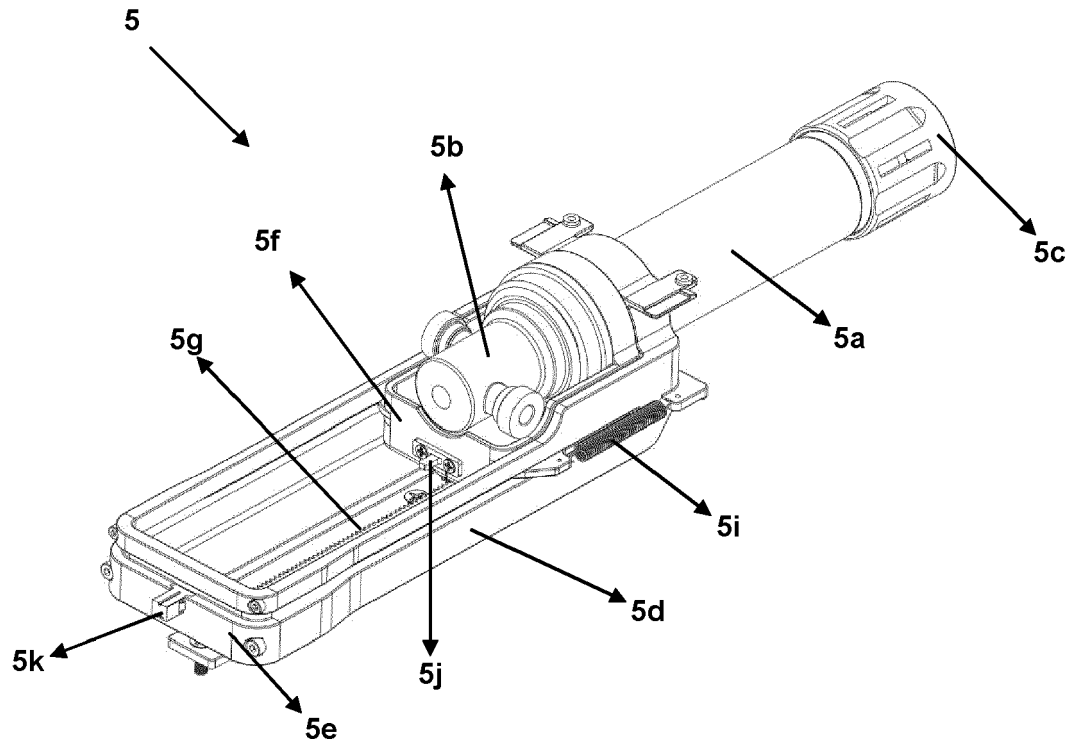


Figure – 18

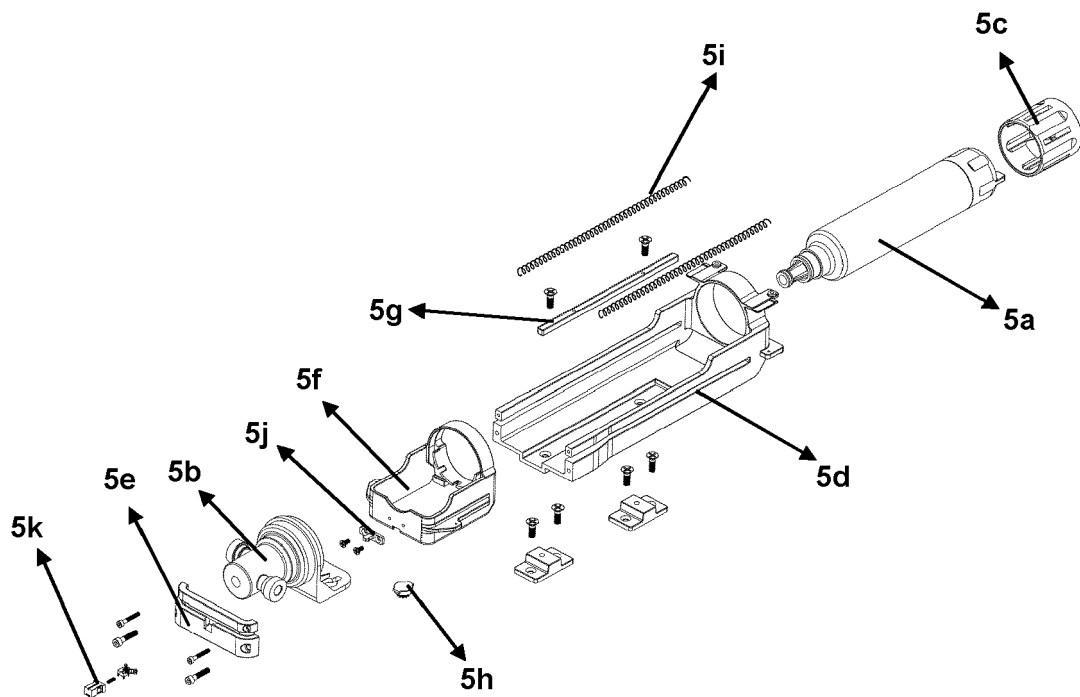


Figure – 19

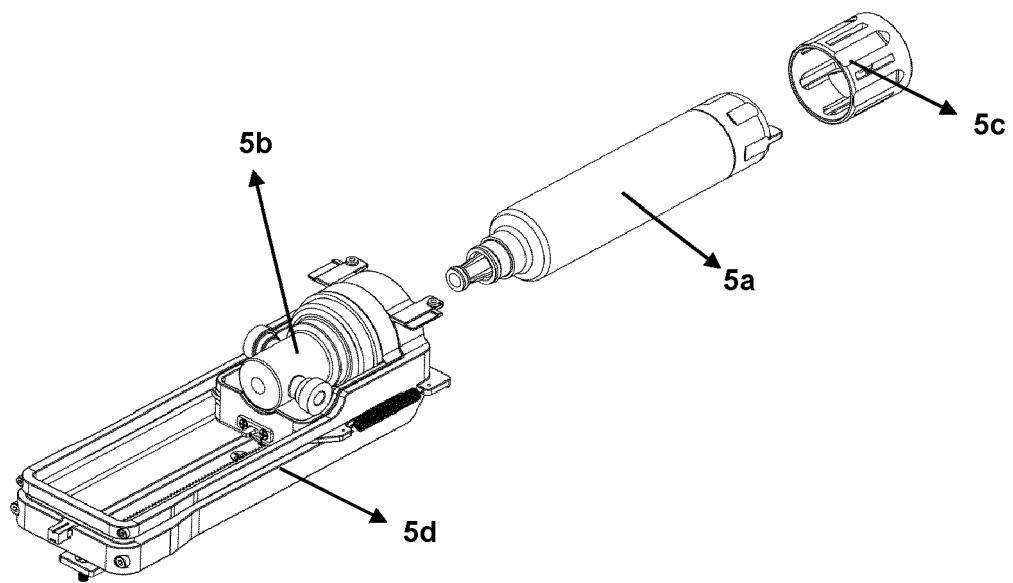


Figure – 20

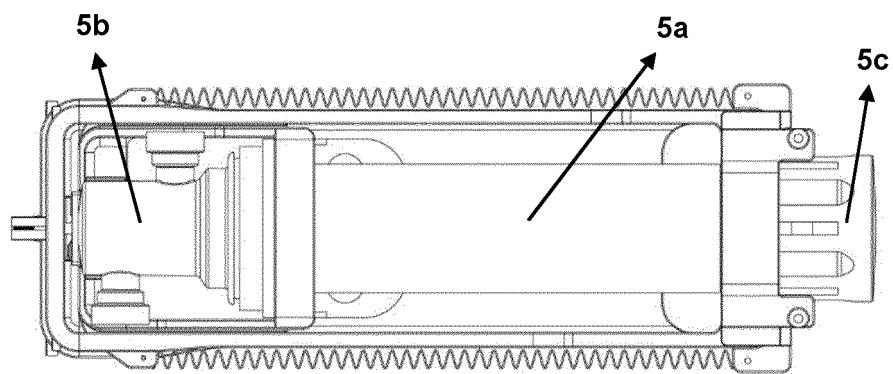


Figure – 21

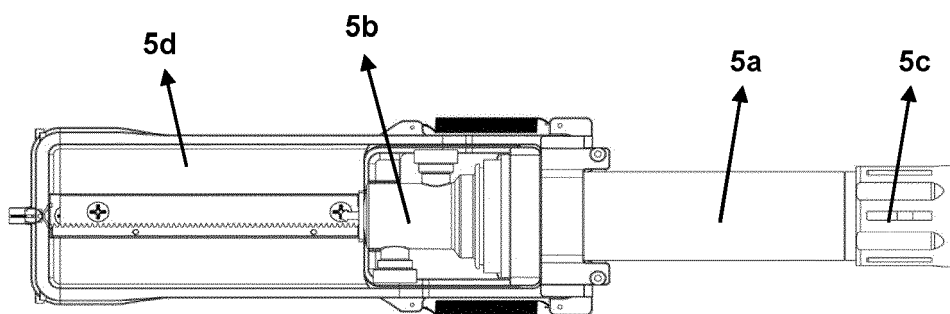


Figure – 22

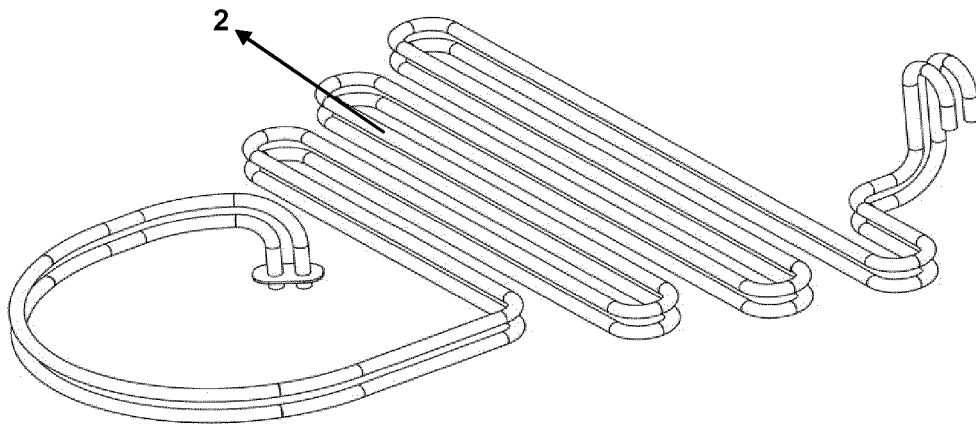


Figure – 23

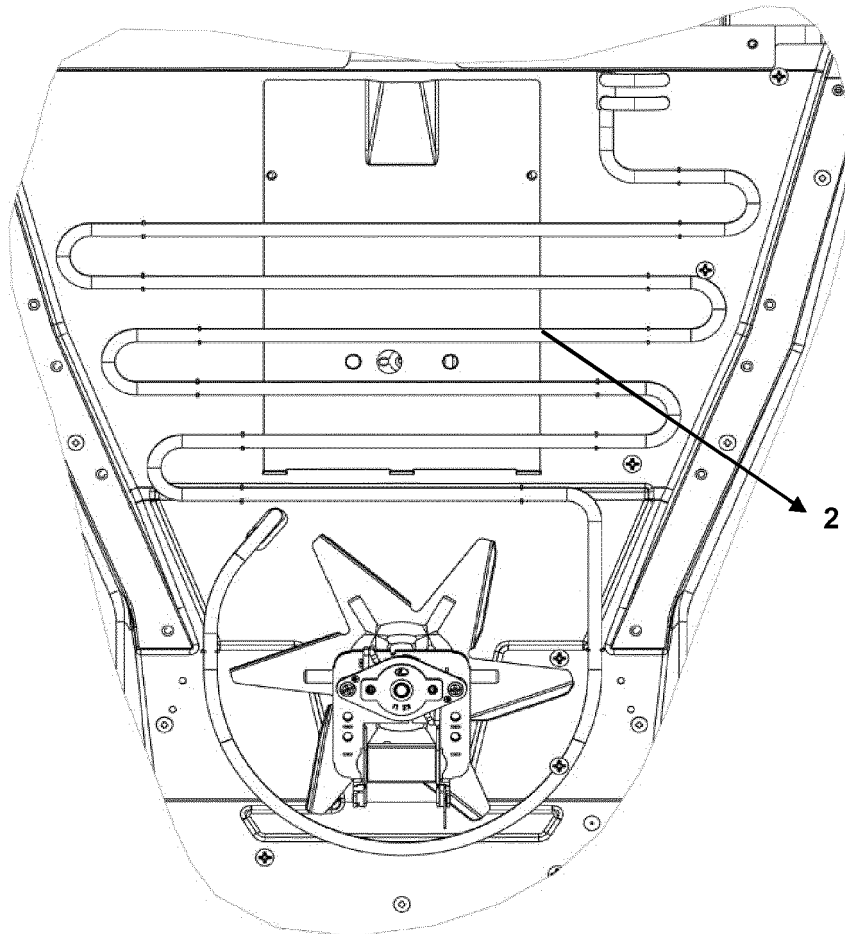


Figure – 24

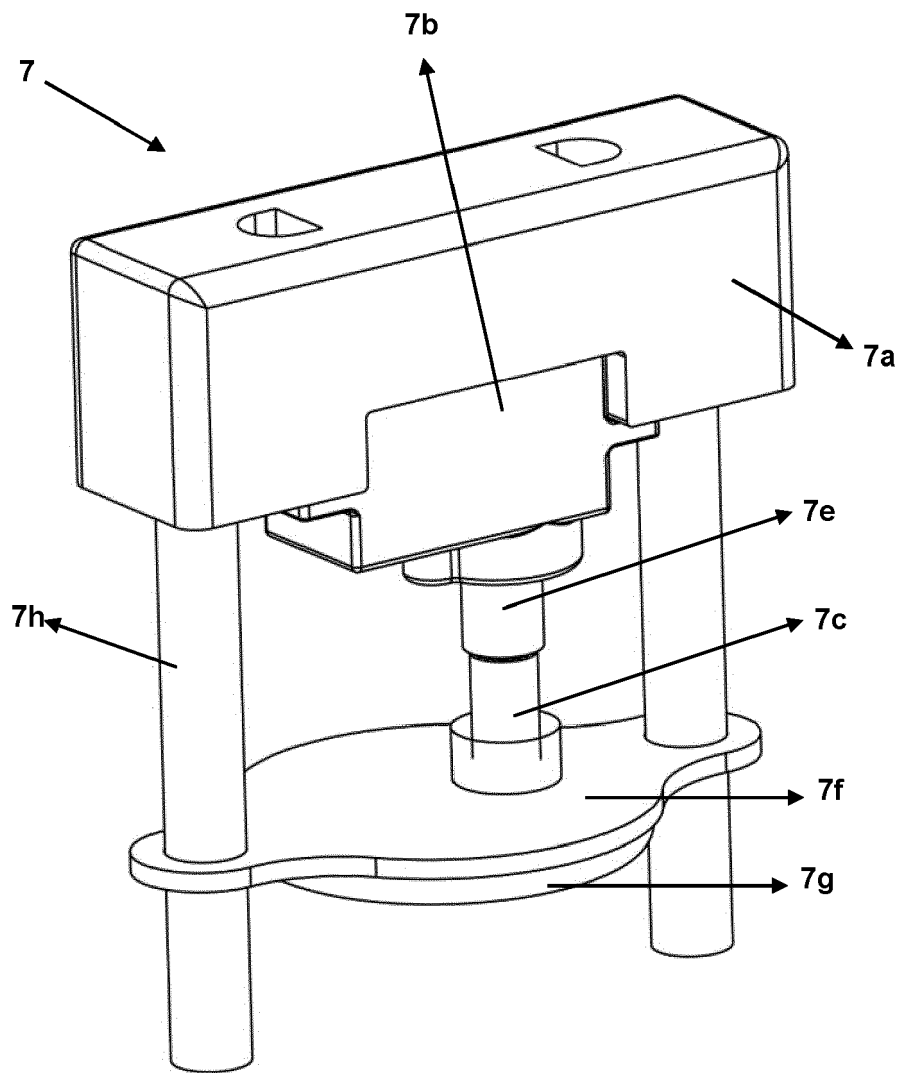


Figure – 25

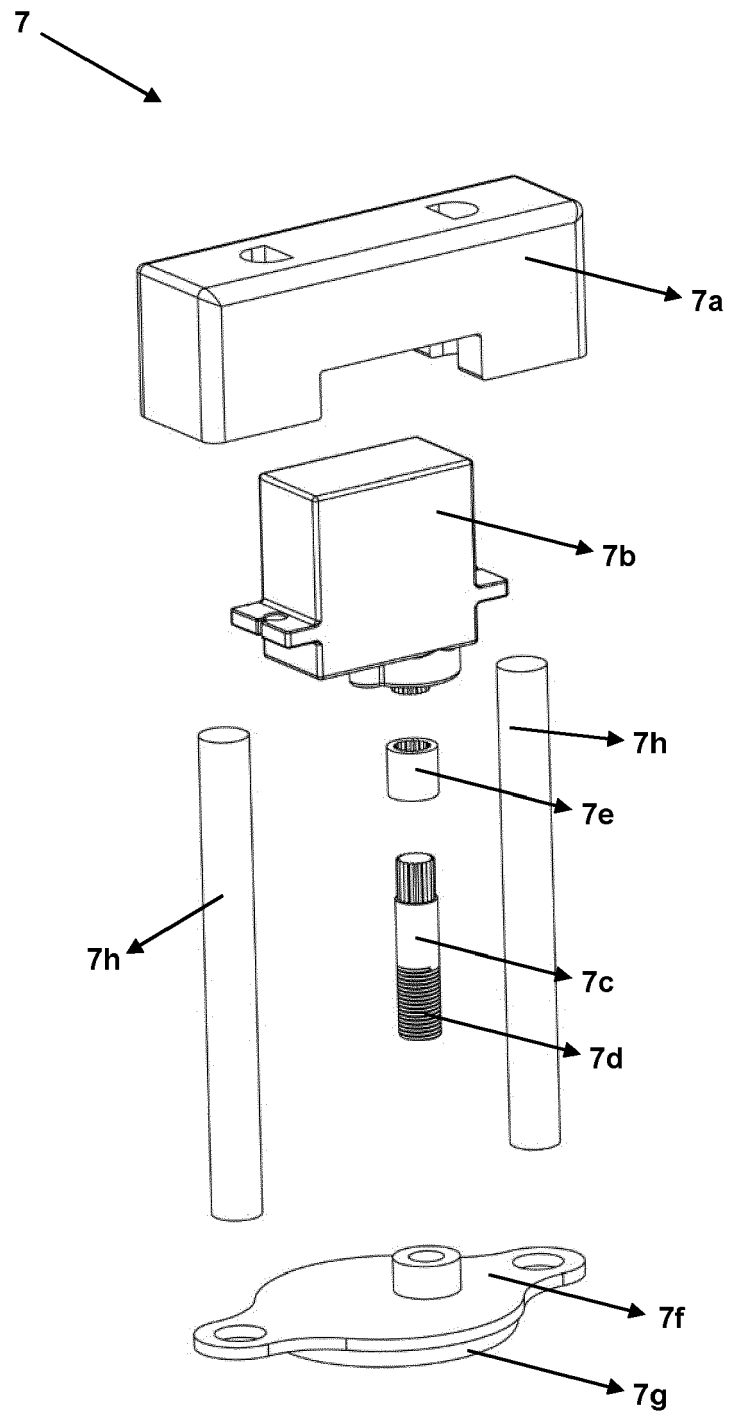


Figure – 26

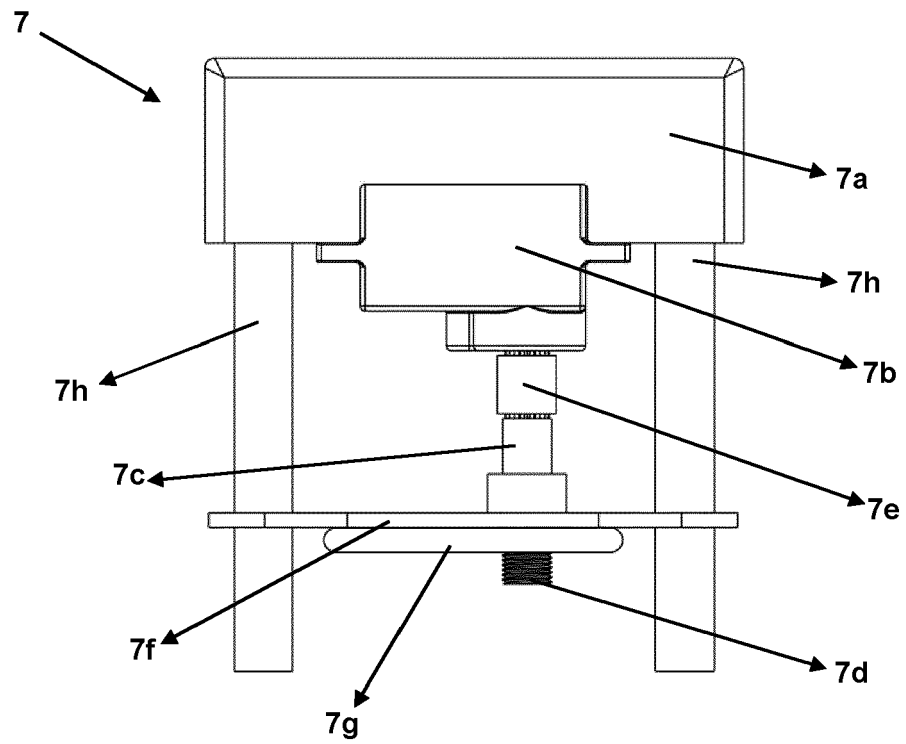


Figure – 27

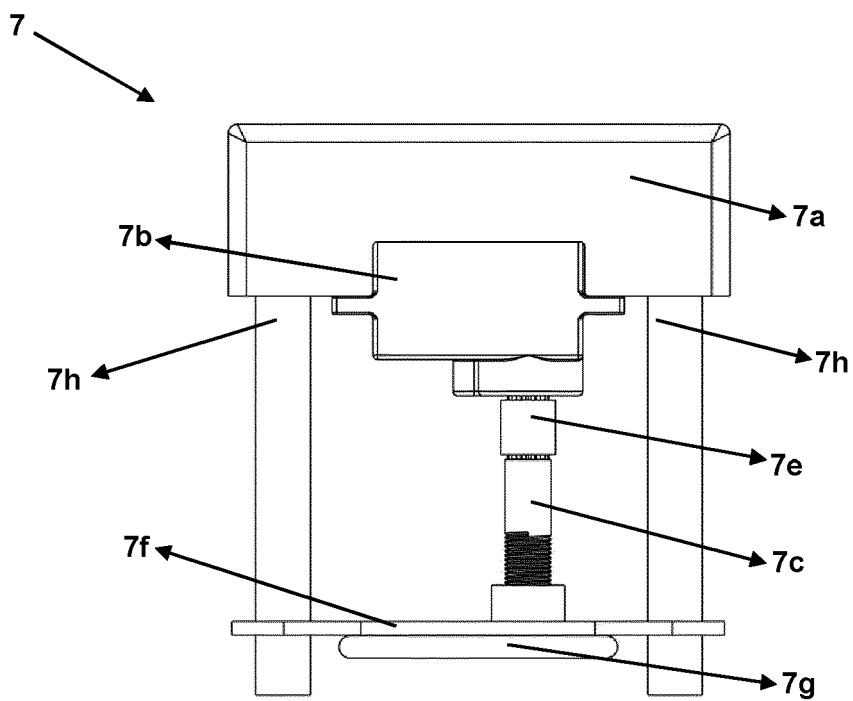


Figure – 28

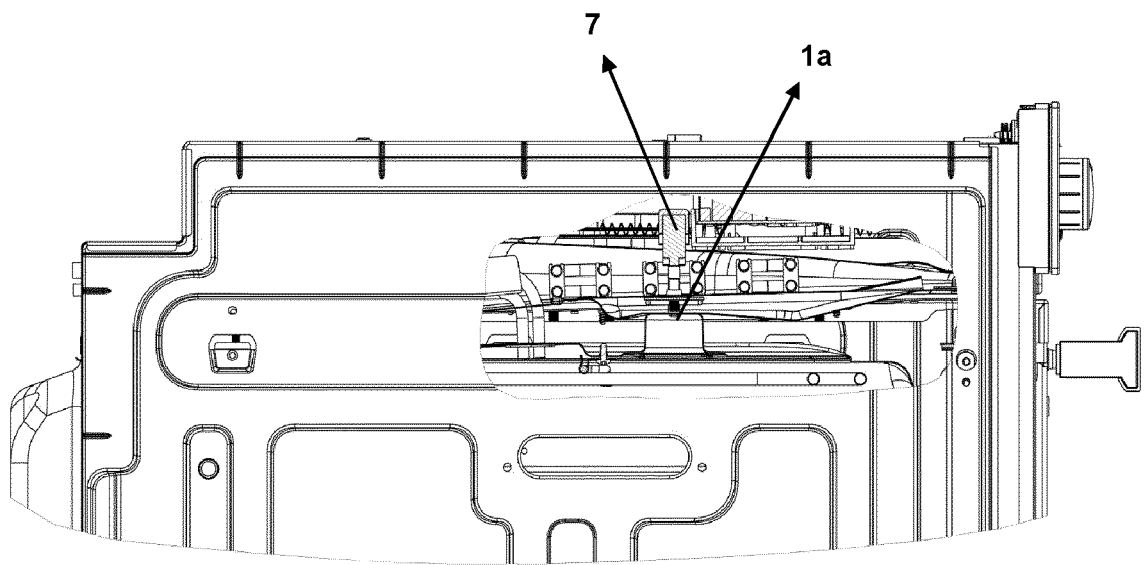


Figure – 29

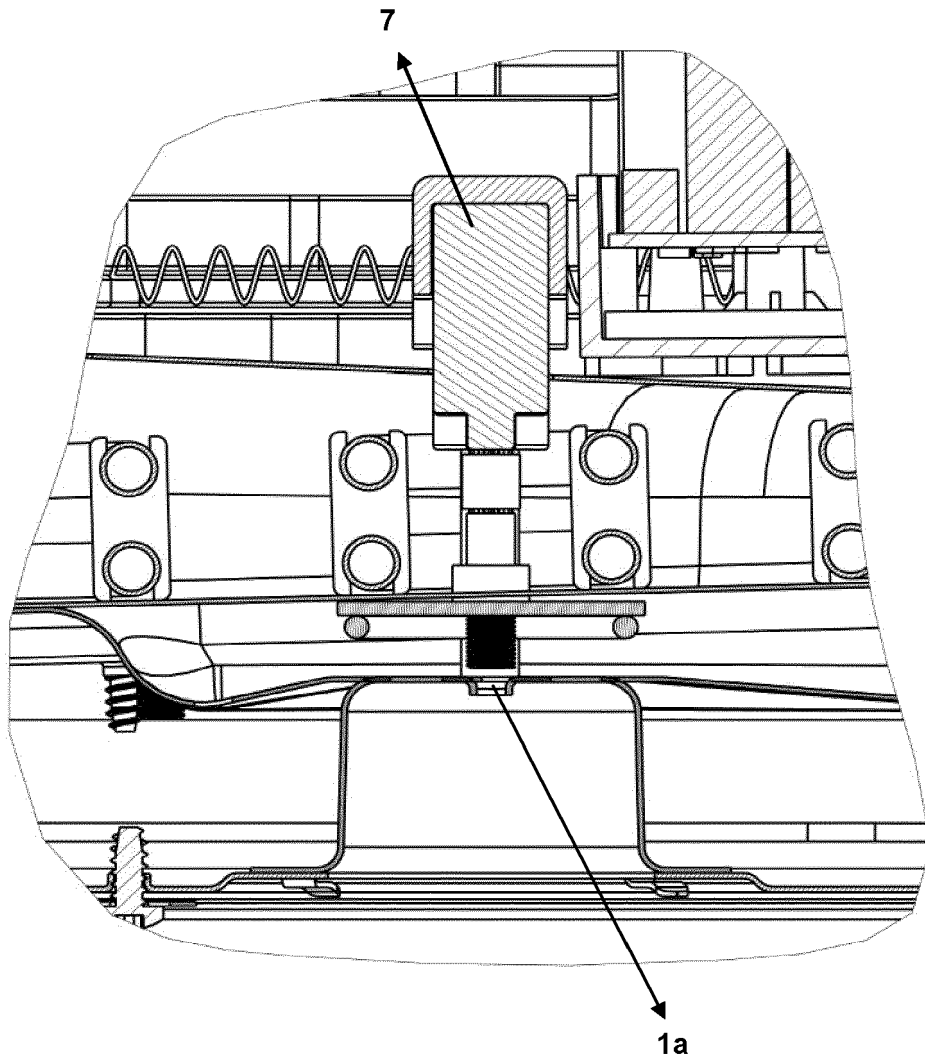


Figure - 30

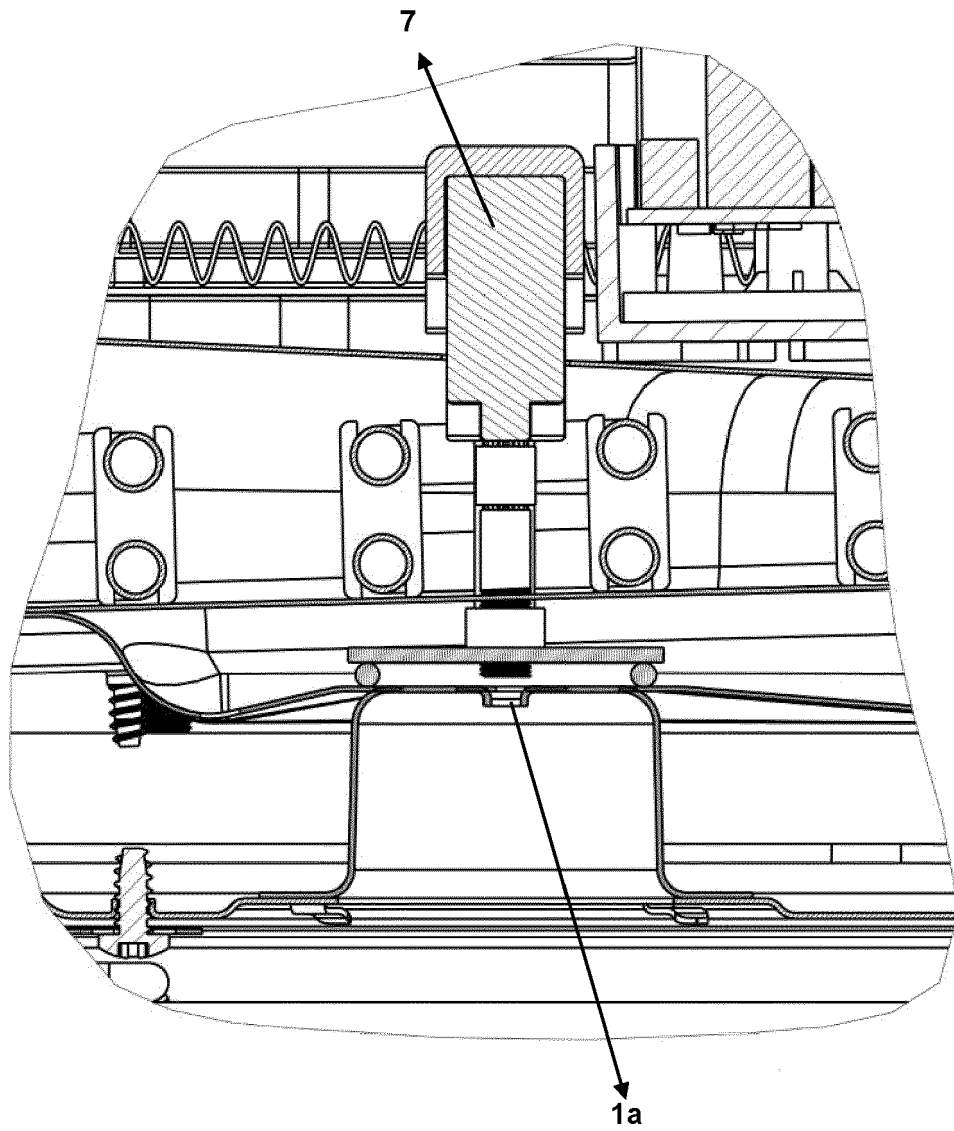


Figure - 31

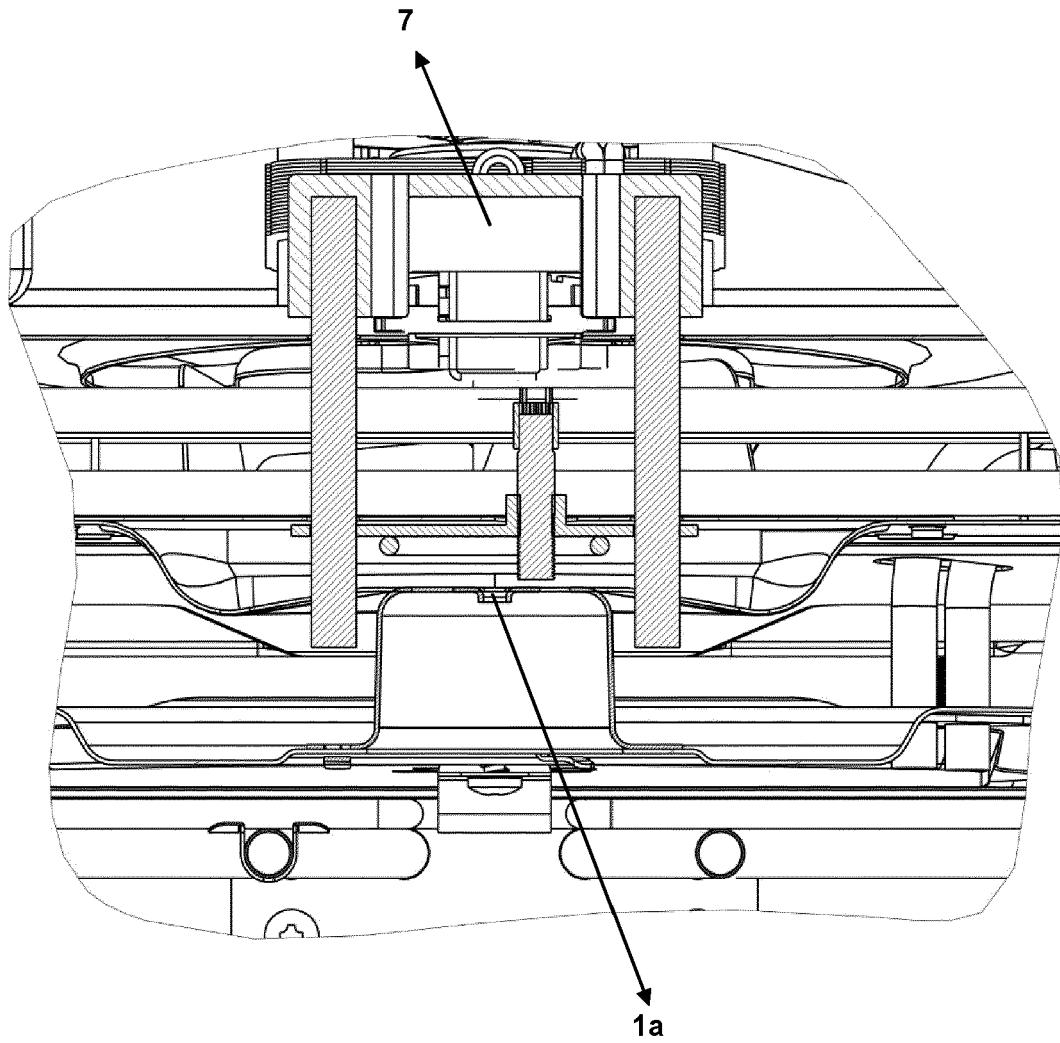


Figure – 32

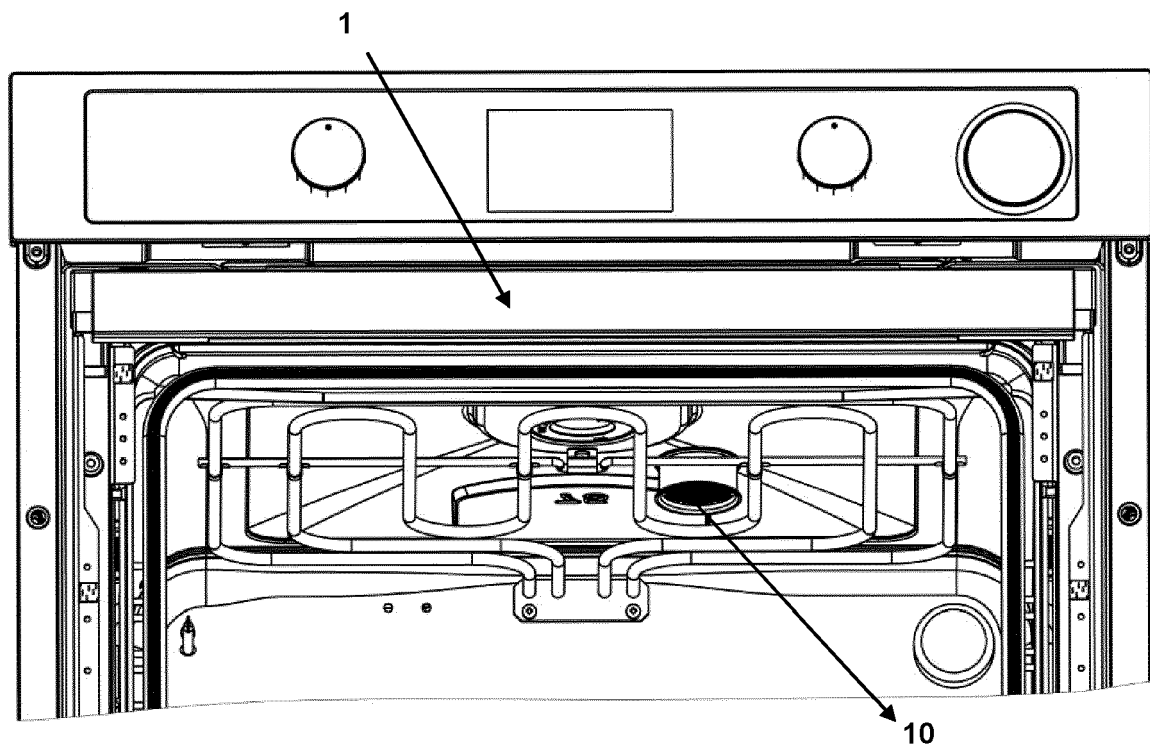


Figure – 33

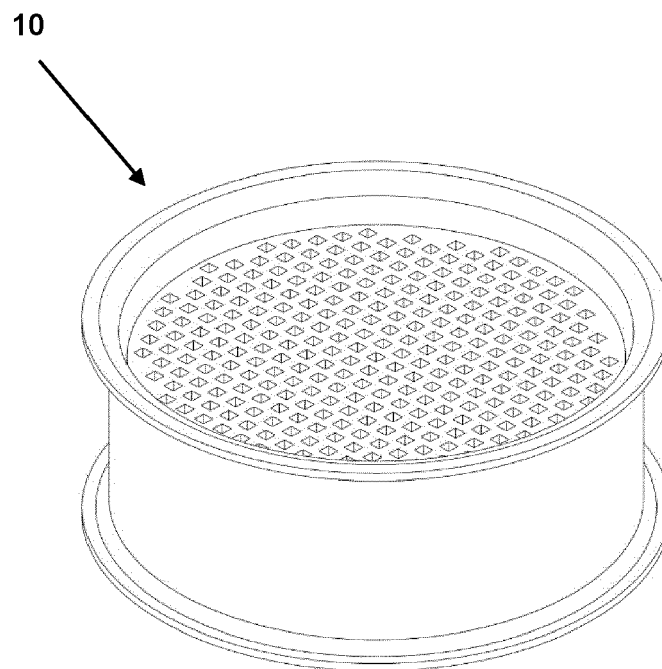


Figure – 34

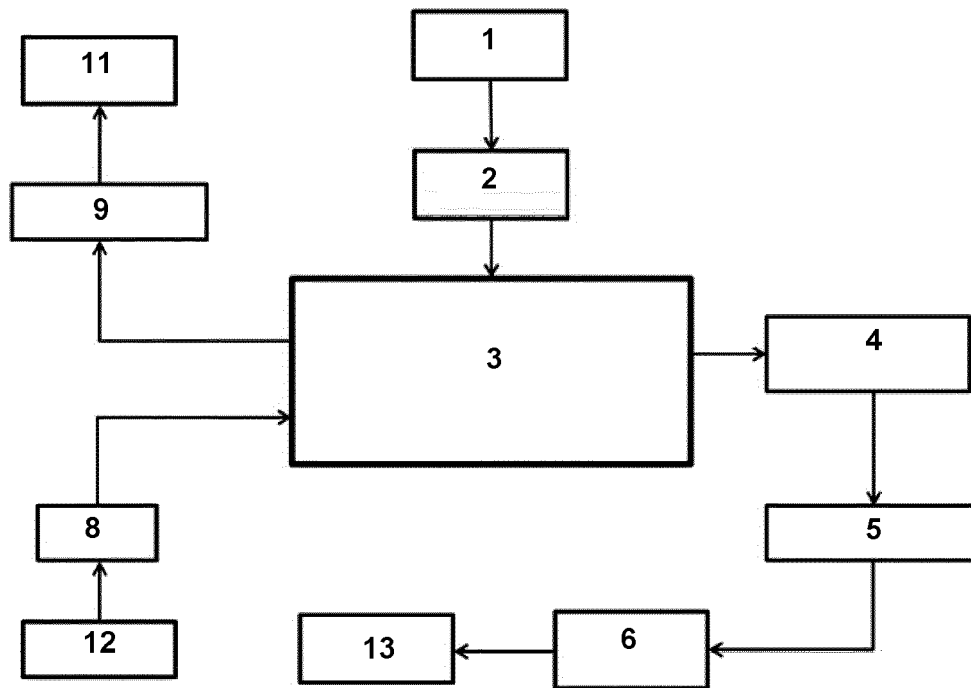


Figure – 35

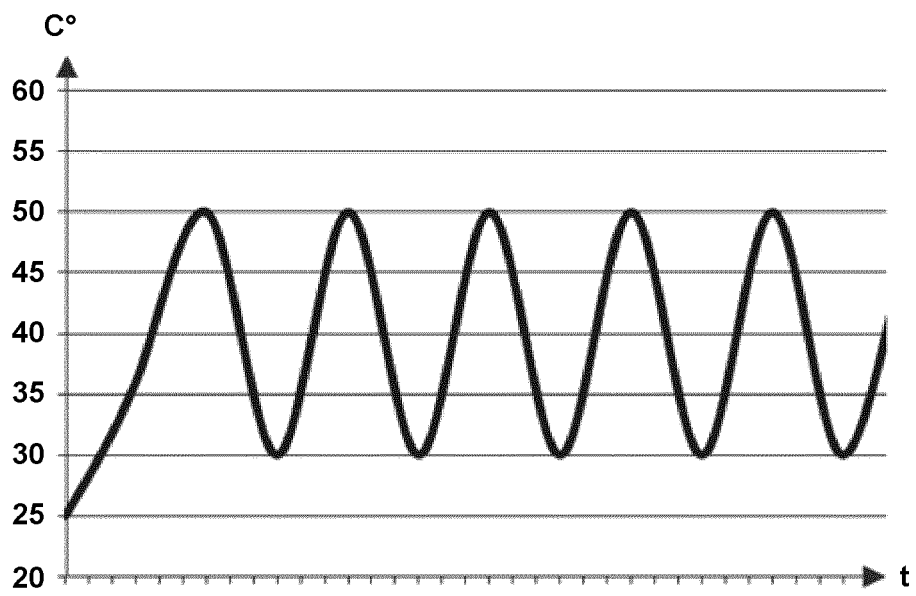


Figure – 36

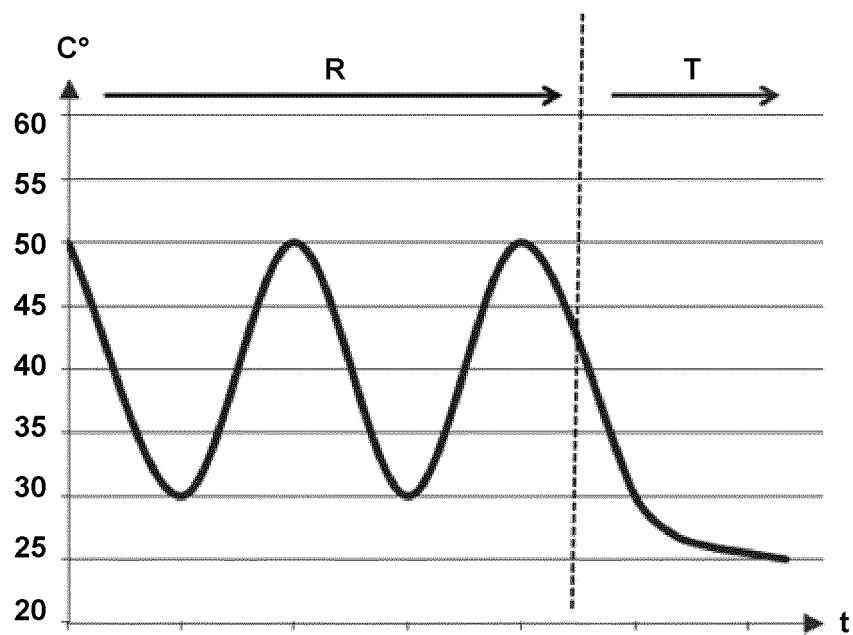


Figure – 37

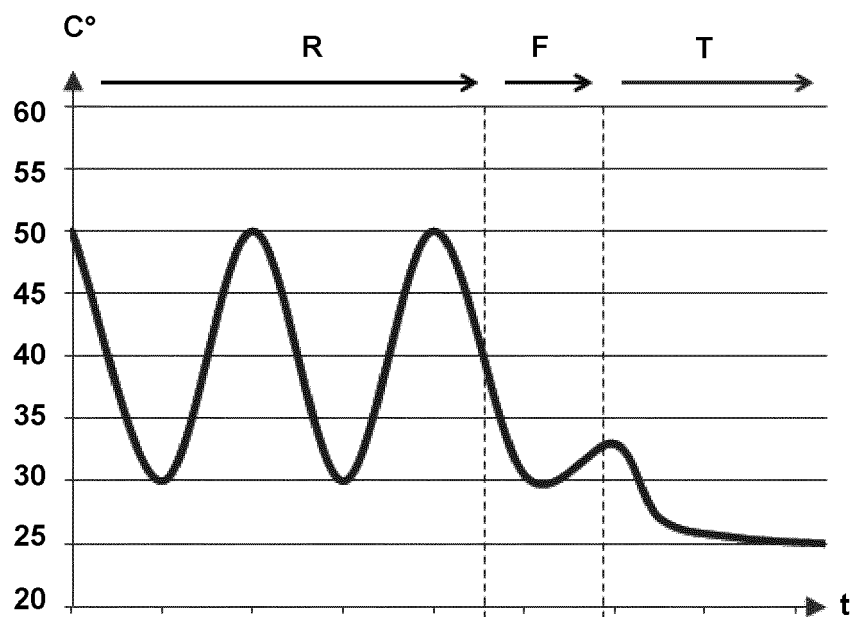


Figure – 38

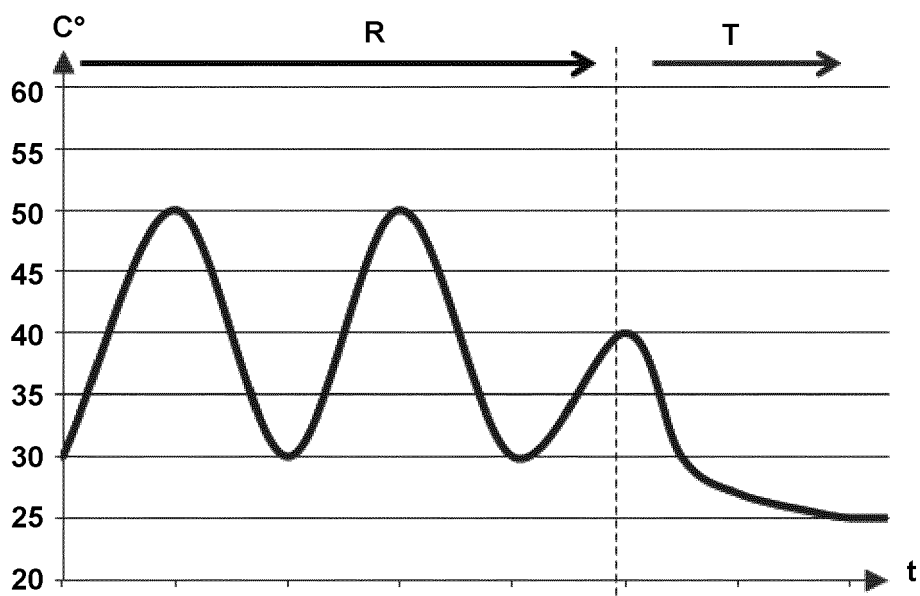


Figure – 39

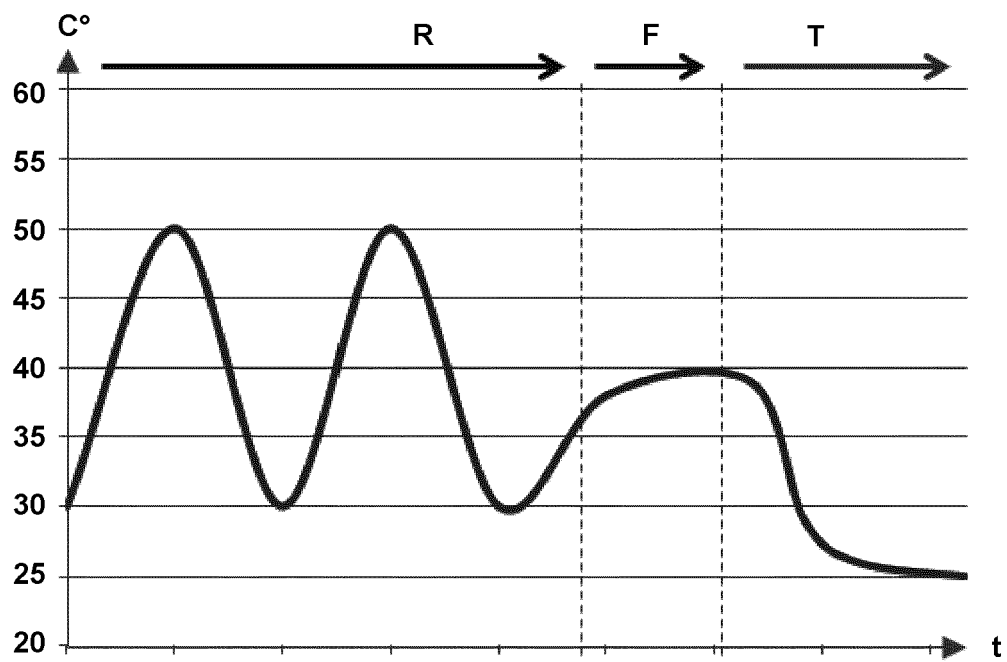


Figure – 40

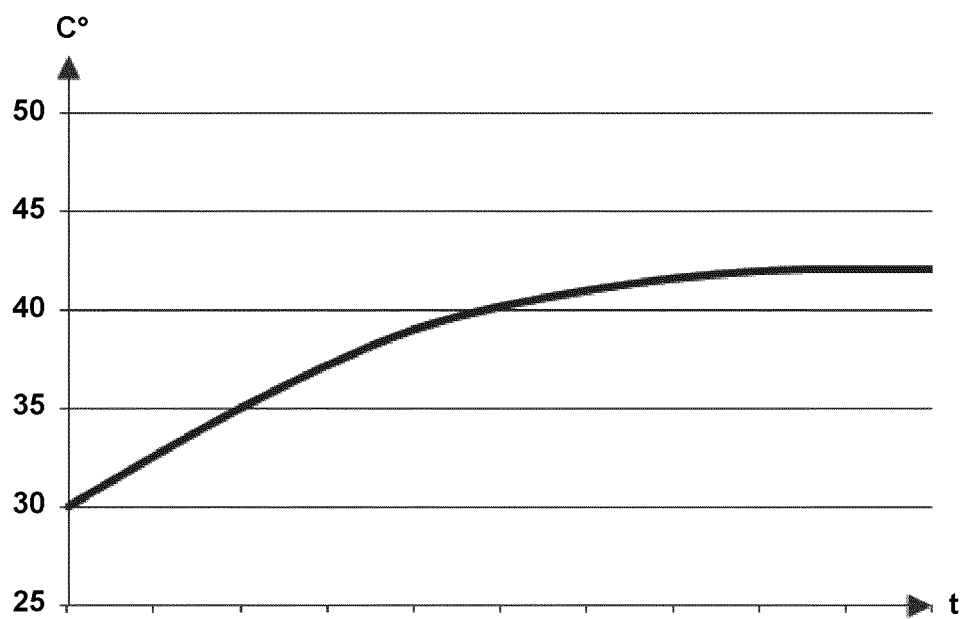


Figure – 41

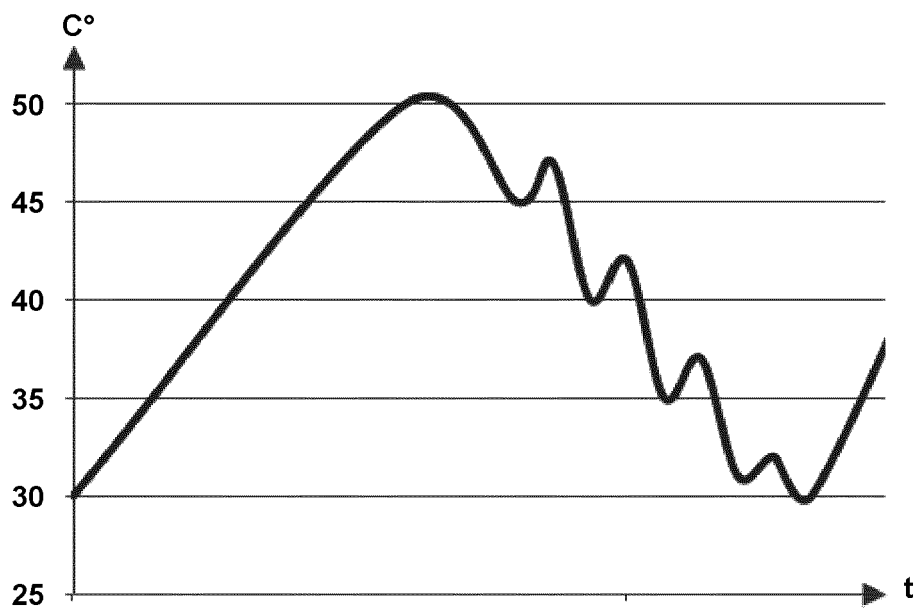


Figure – 42

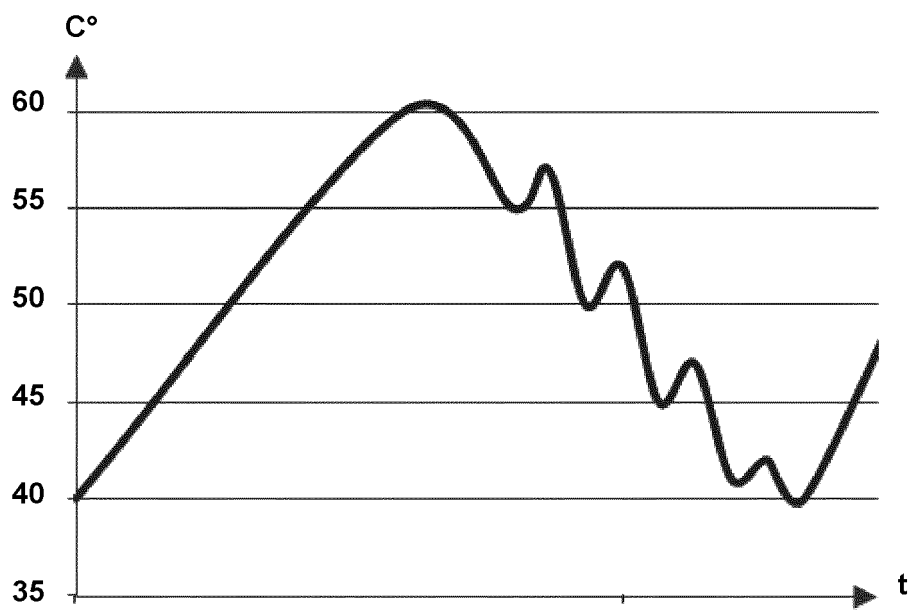


Figure – 43

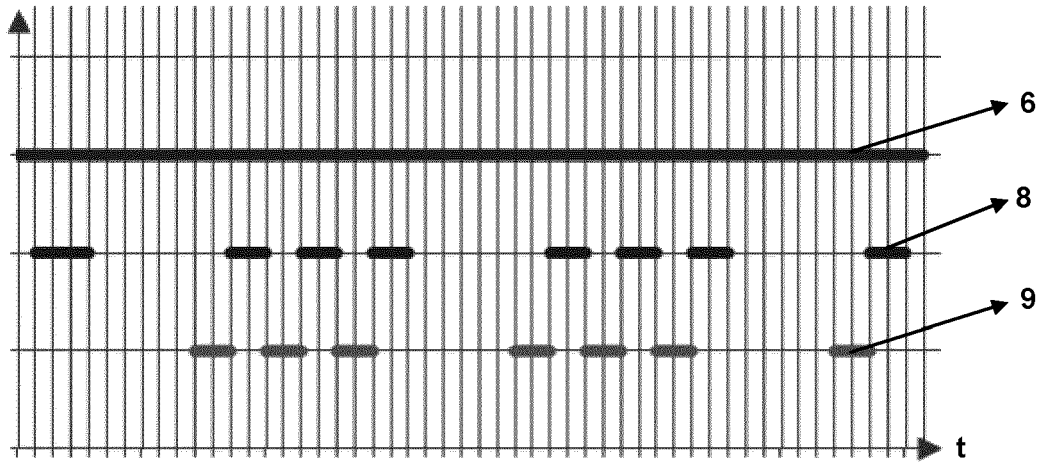


Figure – 44

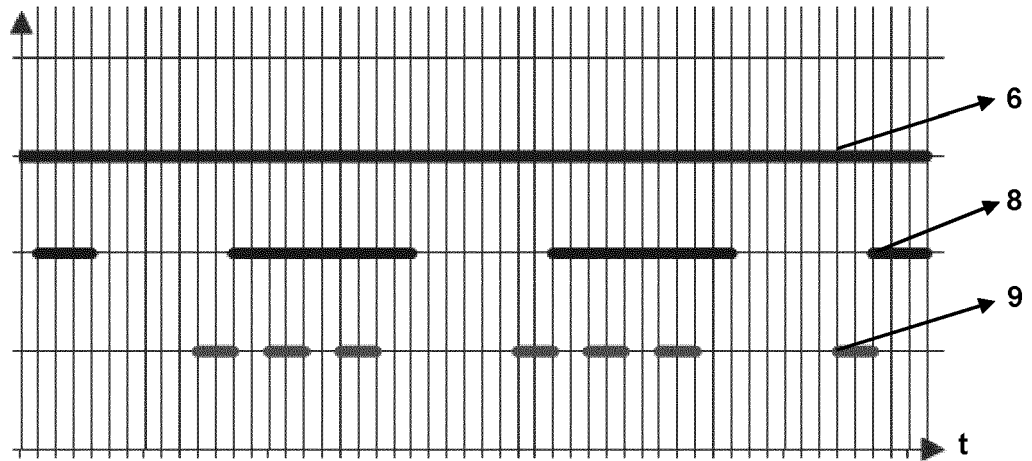


Figure – 45



EUROPEAN SEARCH REPORT

Application Number
EP 20 16 5878

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	DE 10 2010 063941 A1 (BSH BOSCH SIEMENS HAUSGERÄTE [DE]) 28 June 2012 (2012-06-28)	1	INV. F24C15/20
A	* figure 1 * * paragraph [0001] * * paragraph [0027] *	2-15	
Y	US 6 238 463 B1 (HELM PETER [DE]) 29 May 2001 (2001-05-29) * column 1, line 48 - column 1, line 57 * * figure 1 *	1	
A	EP 1 921 387 A2 (GRANDI ANGELO CUCINE SPA [IT]) 14 May 2008 (2008-05-14) * paragraph [0029]; figure 2 *	1-15	
A	JP 2018 031506 A (TIGER VACUUM BOTTLE CO LTD) 1 March 2018 (2018-03-01) * paragraphs [0035], [0038] - [0040], [0086], [0116], [0117]; figures 5, 6, 8 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 20 July 2020	Examiner Jalal, Rashwan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03/82 (P04C01)

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

EP 20 16 5878

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

20-07-2020

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102010063941 A1	28-06-2012	NONE	
US 6238463 B1	29-05-2001	DE 59808073 D1 EP 0981028 A1 US 6238463 B1	28-05-2003 23-02-2000 29-05-2001
EP 1921387 A2	14-05-2008	CN 101172019 A EP 1921387 A2 US 2008105138 A1	07-05-2008 14-05-2008 08-05-2008
JP 2018031506 A	01-03-2018	NONE	

15

20

25

30

35

40

45

50

55

EPO FORM P0459

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