



(51) International Patent Classification:
F25D 17/04 (2006.01)

(21) International Application Number:
PCT/IB2013/058080

(22) International Filing Date:
28 August 2013 (28.08.2013)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
TO2012U000146 29 August 2012 (29.08.2012) IT

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished
upon receipt of that report (Rule 48.2(g))

(54) Title: REFRIGERATING APPLIANCE, IN PARTICULAR FOR HOUSEHOLD USE, COMPRISING AT LEAST ONE
DEVICE FOR GENERATING OZONE AND/OR IONIZED AIR

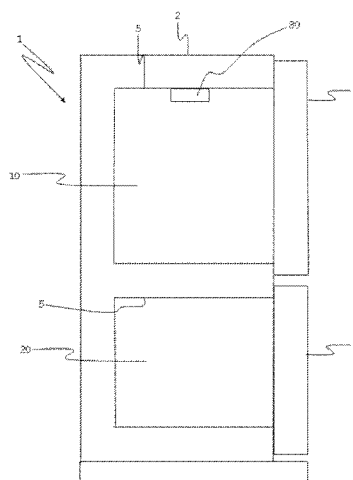


Fig. 1

(57) Abstract: The present invention relates to a refrigerating appliance (1), in particular for household use, comprising a structure (2) inside of which at least one compartment (10, 20) is obtained for preserving foodstuffs, said refrigerating appliance (1) comprising at least one device (30) for generating ozone and/or ionized air. The invention being characterized in that said device (30) is associated with a top wall (5) of said at least one compartment (10, 20).



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REFRIGERATING APPLIANCE, IN PARTICULAR FOR HOUSEHOLD USE, COMPRISING AT LEAST ONE DEVICE FOR GENERATING OZONE AND/OR IONIZED AIR

DESCRIPTION

The present invention relates to a refrigerating appliance, in particular for household use, comprising a device for generating ozone and/or ionized air according to the preamble of claim 1.

Reference will be prevalently made in the following description to a refrigerating appliance for household use, even though the present invention is not strictly limited to such an appliance.

It is known in the art a refrigeration appliance, in particular for household use, of the type comprising a structure inside of which at least one compartment is obtained for preserving foodstuff.

Refrigerating appliances known in the art typically comprise two compartments which are kept at different temperatures, thus providing at least two different food preservation states, in particular a refrigerator compartment suitable for preserving fresh food at a temperature between 0°C and 10°C and a freezer compartment suitable for preserving frozen food at a temperature between -15°C and -30°C; such refrigerating appliances are commonly referred to by those skilled in the art of household refrigeration as “double-door” or “combined” refrigerators, depending on the relative position of the two compartments. In a “double-door” refrigerating appliance, the freezer compartment is arranged above the refrigerator compartment, whereas in a “combined” refrigerating appliance the freezer compartment is located at the bottom.

It is also known in the art that, in order to avoid the growth and proliferation of potentially harmful bacteria inside a refrigerating appliance, in particular inside the refrigerator compartment, it is necessary to keep the foods below a certain temperature, usually approximately 4°C.

Said temperature in the refrigerator compartment of the refrigerating appliance, combined with regular cleaning thereof, should be sufficient to lower the presence of bacteria close to the allowed threshold.

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However, when bacteria find a fertile, not particularly clean environment, they tend to multiply quite rapidly.

Proper hygiene in the refrigerator is therefore fundamental to avoid unpleasant odours and moulds, as well as possible diseases (among which, for example, escherichia coli, salmonella and listeria) generated by bacteria that might easily proliferate inside refrigerating appliances.

Nevertheless, it is known that it is not always easy to properly clean a refrigerator, e.g. because of the presence of gaskets, in the pleats of which germs, moulds and bacteria might hide and then be difficult to remove.

Moreover, the user may not be able to keep an adequate temperature inside the refrigerating appliance, e.g. in the summer and/or because of improper food positioning in the compartments of the refrigerating appliance.

As a consequence, these problems may lead to bacteria proliferation inside refrigerating appliances.

Refrigerating appliances are known in the art which are built with antibacterial materials, the special technology of which destroys (typically in approximately twenty-four hours) any bacteria depositing on their surface.

However, such refrigerating appliances often cannot eliminate the bacteria which may be present inside of them in an effective, safe and sufficiently rapid manner.

It is also known in the art that a refrigerating appliance, in particular for household use, may include a device for generating a disinfectant substance.

It has however been observed that such known refrigerating appliances suffer from a number of drawbacks, which are substantially due to the particular realization and positioning of the device for generating the disinfectant substance.

In particular, in the refrigerating appliances known in the art said device for generating a disinfectant substance is arranged within an air recirculation duct.

Therefore, in such refrigerating appliances it is very difficult to position and secure the device for generating the disinfectant substance, in particular within said air recirculation ducts; as a consequence, such operations lead to a difficult and costly process for manufacturing the entire refrigerating appliance.

It is also apparent that such known refrigerating appliances require complex operations for maintaining the device for generating the disinfectant substance.

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A further drawback of known refrigerating appliances is that the device for generating the disinfectant substance can only work during the operating steps of the cooling air recirculation system, since it cannot effectively distribute the disinfectant substance in the compartments of said refrigerating appliances without the activation of a suitable fan included in said recirculation system.

In this frame, it is the main object of the present invention to provide a refrigerating appliance, in particular for household use, comprising a device for generating ozone and/or ionized air, which is adapted to overcome the above-described drawbacks.

In particular, it is one object of the present invention to provide a refrigerating appliance, in particular for household use, which is adapted to eliminate any bacteria which may be present inside of it in an effective, safe and sufficiently rapid manner.

It is another object of the present invention to provide a refrigerating appliance, in particular for household use, which is so realised that the steps required for positioning and securing a device for generating ozone and/or ionized air can be carried out in a simplified manner, while at the same time ensuring high precision and accuracy.

It is a further object of the present invention to provide a refrigerating appliance, in particular for household use, which is so realised as to reduce any discomfort and waste of time and resources when mounting and securing the device for generating ozone and/or ionized air, while also significantly lowering the costs incurred for manufacturing the whole refrigerating appliance.

It is yet another object of the present invention to design the refrigerating appliance in a manner such that the ozone and/or ionized-air generating system can work appropriately at any stage of the operation of the refrigerating appliance, and can effectively distribute ozone and/or ionized air inside the compartments of said refrigerating appliance even without the activation of a suitable fan.

These objects are achieved by the present invention through a refrigerating appliance, in particular for household use, that comprises a device for generating ozone and/or ionized air incorporating the features set out in the appended claims, which are intended to be an integral part of the present description.

Further objects, features and advantages of the present invention will become apparent from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

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- Fig. 1 is a sectional side view of a refrigerating appliance according to the present invention;
- Figs. 2a and 2b are perspective views of a component of the refrigerating appliance according to the present invention;
- Figs. 3a and 3b are perspective top views of the component of Figs. 2a and 2b.

Said description and said drawings are to be considered as non-limiting explanatory examples.

Referring now to the annexed drawings, Fig. 1 shows a schematic sectional view of a refrigerating appliance, in particular for household use, in accordance with the present invention, designated as a whole by reference numeral 1.

Said refrigerating appliance 1 comprises a structure 2 inside of which at least one compartment 10, 20 is obtained for preserving foodstuff, said structure 2 comprising at least one door 3, 4 for closing said at least one compartment 10, 20.

Said refrigerating appliance 1 preferably comprises:

- a refrigerator compartment 10, in particular suitable for preserving fresh food at a temperature between 0°C and 10°C, and adapted to be closed by a first door 3,
- a freezer compartment 20, in particular suitable for preserving frozen food at a temperature between -15°C and -30°C, and adapted to be closed by a second door 4.

It should be noted that the refrigerating appliance 1 shown in Fig. 1 is a “combined” one, in that the freezer compartment 20 is located under the refrigerator compartment 10; it is however clear that the refrigerating appliance 1 according to the present invention may be of a different type as well.

Also, Fig. 1 shows rather thick walls of the structure 2, to indicate the presence of a layer of thermally insulating material; normally, the thickness of the insulating material depends on the type of cell (i.e. on the cell's operating temperatures) and, of course, on the type of insulating material in use; this is common and well known to those skilled in the art.

The refrigerating appliance 1 comprises at least one device for generating ozone and/or ionized air, designated as a whole by reference numeral 30 in the annexed drawings.

In accordance with the present invention, said at least one device 30 is associated with a top wall 5 of said at least one compartment 10, 20.

In a preferred embodiment, said at least one device 30 is associated with a top wall 5 of a

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refrigerator compartment 10; it is however clear that, in accordance with the present invention, the refrigerating appliance 1 may comprise a device 30 associated with a top wall 5 of a freezer compartment 20, or that the refrigerating appliance 1 may comprise a device 30 associated with a top wall 5 of a refrigerator compartment 10 and a device 30 associated with a top wall 5 of a freezer compartment 20.

It must be pointed out that the term “top wall” refers to a wall of the compartment 10, 20 acting as a ceiling of said at least one compartment 10, 20 when the refrigerating appliance 1 is in the operating condition, i.e. a condition in which it can store foodstuffs to be preserved.

The particular provisions of the present invention allow to provide a refrigerating appliance 1, in particular for household use, which is so realised that the steps required for positioning and securing a device 30 for generating ozone and/or ionized air can be carried out in a simplified manner, while at the same time ensuring high precision and accuracy.

Furthermore, such provisions allow to provide a refrigerating appliance 1, in particular for household use, which is so realised as to reduce any discomfort and waste of time and resources when mounting, securing and maintaining the device 30, while also significantly lowering the costs incurred for manufacturing the whole refrigerating appliance 1.

In addition, the particular positioning of the device 30 allows to provide a refrigerating appliance 1 wherein said device 30 can operate properly at any stage of the operation of the refrigerating appliance, since it is not bound to the operation of a cooling air recirculation fan, as is necessarily the case in the prior art, where a device for generating ozone and/or ionized air is positioned within a cooling air recirculation duct.

As can be seen in particular in Figures 2a-2b and 3a-3b, the device 30 comprises a body 31 provided with a plurality of holes 32 to allow ozone and/or ionized air to come out of said device 30.

The body 31 is adapted to contain an ozone and/or ionized-air generating element 33 (visible in Fig. 3b), in particular said generating element 33 being arranged in the proximity of said plurality of holes 32. Preferably, said generating element 33 is suitable for generating ozone and/or ionized air to disinfect the compartment 10, 20 of the refrigerating appliance 1 with which the device 30 is associated. Since ozone and ionized

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air are heavier than the air inside the compartment 10, 20 of the refrigerating appliance 1, the positioning of the device 30 according to the present invention can ensure the distribution of ozone and/or ionized air in said compartment 10, 20 even in the absence of a forced air flow generated by a fan, which is therefore not required for the proper operation of the device 30. This advantageously leads to considerable energy savings.

The body 31 is also adapted to contain a module 34 (represented by a dashed line in Fig. 3b), in particular of the electronic type, for powering and timing the device 30; in addition, said body 31 of the device 30 is equipped with a housing 35 adapted to house the module 34.

Preferably, the body 31 comprises visualising means 36 that allow to signal to the user the operating phases of the device 30. In particular, in Figs. 2a and 2b said visualising means 36 comprise at least one LED (Light Emitting Diode) adapted to light up in order to signal to the user an activated condition of the device 30; it is however clear that said visualising means 36 may be different than shown.

The device 30 is then preferably associated with activating means (not shown in the drawings) that allow enabling and/or disabling an ozone and/or ionized-air emission function. Said activating means may be arranged on the body 31 of the device 30 and/or on the refrigerating appliance 1, and are connected to the device 30, in particular to said module 34 of the device 30.

In particular, if the device 30 is an electronic one, said activating means may comprise an electronic interface; as an alternative, if the device 30 is an electromechanical one, said activating means may comprise a switch.

In a preferred embodiment, the body 31 of the device 30 is shaped substantially like a half-shell (as clearly shown in Figures 3a and 3b); also, the device 30 is adapted to be associated with said top wall 5 through fastening means 37.

Furthermore, the refrigerating appliance 1 according to the present invention is preferably of the no-frost type or of the ventilated static type.

The features and advantages of a refrigerating appliance, in particular for household use, according to the present invention are apparent from the above description.

In fact, the particular positioning of the device 30 for generating ozone and/or ionized air according to the present invention is such that the steps required for securing said device 30 inside the refrigerating appliance 1 can be carried out in a simplified manner, while at

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the same time ensuring high precision and accuracy.

Furthermore, said provision allows to provide a refrigerating appliance 1, in particular for household use, which is so realised as to reduce any discomfort and waste of time and resources when mounting, securing and maintaining the device 30, while also significantly lowering the costs incurred for manufacturing the whole refrigerating appliance 1.

A further advantage of the refrigerating appliance 1 according to the present invention is that the device 30 is positioned in a manner such that it can work properly at any stage of the operation of the refrigerating appliance, in particular said device 30 not being bound to the operation of a cooling air recirculation fan to ensure circulation of ozone and/or ionized air inside said refrigerating appliance 1.

Consequently, a further advantage of the refrigerating appliance 1 according to the present invention is that it advantageously provides considerable energy savings, in that it still ensures an optimal distribution of ozone and/or ionized air in said compartment 10, 20 even in the absence of a forced air flow generated by a fan.

It is however clear that many changes may be made to the refrigerating appliance, in particular for household use, according to the present invention, and that in its practical implementation the various components may have different shapes and arrangements or be replaced with other technically equivalent elements without departing from the novelty spirit of the inventive idea.

It can therefore be easily understood that the present invention is not limited to the above-described refrigerating appliance, in particular for household use, but may be subject to many modifications, improvements or replacements of equivalent parts and elements without departing from the inventive idea, as clearly specified in the following claims.

CLAIMS

1. A refrigerating appliance (1), in particular for household use, comprising a structure (2) inside of which at least one compartment (10, 20) is obtained for preserving foodstuffs, said refrigerating appliance (1) comprising at least one device (30) for generating ozone and/or ionized air,

characterized in that

said device (30) is associated with a top wall (5) of said at least one compartment (10, 20).

2. A refrigerating appliance (1) according to claim 1, characterized in that said at least one device (30) is associated with a top wall (5) of a refrigerator compartment (10).

3. A refrigerating appliance (1) according to one or more of the preceding claims, characterized in that said device (30) comprises a body (31) provided with a plurality of holes (32) to allow the disinfectant substance to come out of said device (30).

4. A refrigerating appliance (1) according to claim 3, characterized in that said body (31) is adapted to contain an ozone and/or ionized-air generating element (33).

5. A refrigerating appliance (1) according to one or more of claims 3 and 4, characterized in that said body (31) is adapted to contain a module (34), in particular of the electronic type, for powering and timing the device (30).

6. A refrigerating appliance (1) according to one or more of the preceding claims, characterized in that said body (31) comprises visualising means (36) to signal the operating phases of the device (30).

7. A refrigerating appliance (1) according to one or more of the preceding claims, characterized in that said device (30) is preferably associated with activating means that allow enabling and/or disabling an ozone and/or ionized-air emission function.

8. A refrigerating appliance (1) according to claim 7, characterized in that said activating means are arranged on the body (31) of the device (30).

9. A refrigerating appliance (1) according to claim 7, characterized in that said activating means are arranged on the refrigerating appliance (1) and are connected to the device (30), in particular to said module (34) of the device (30).

10. A refrigerating appliance (1) according to one or more of the preceding claims, characterized in that it is of the no-frost type or of the ventilated static type.

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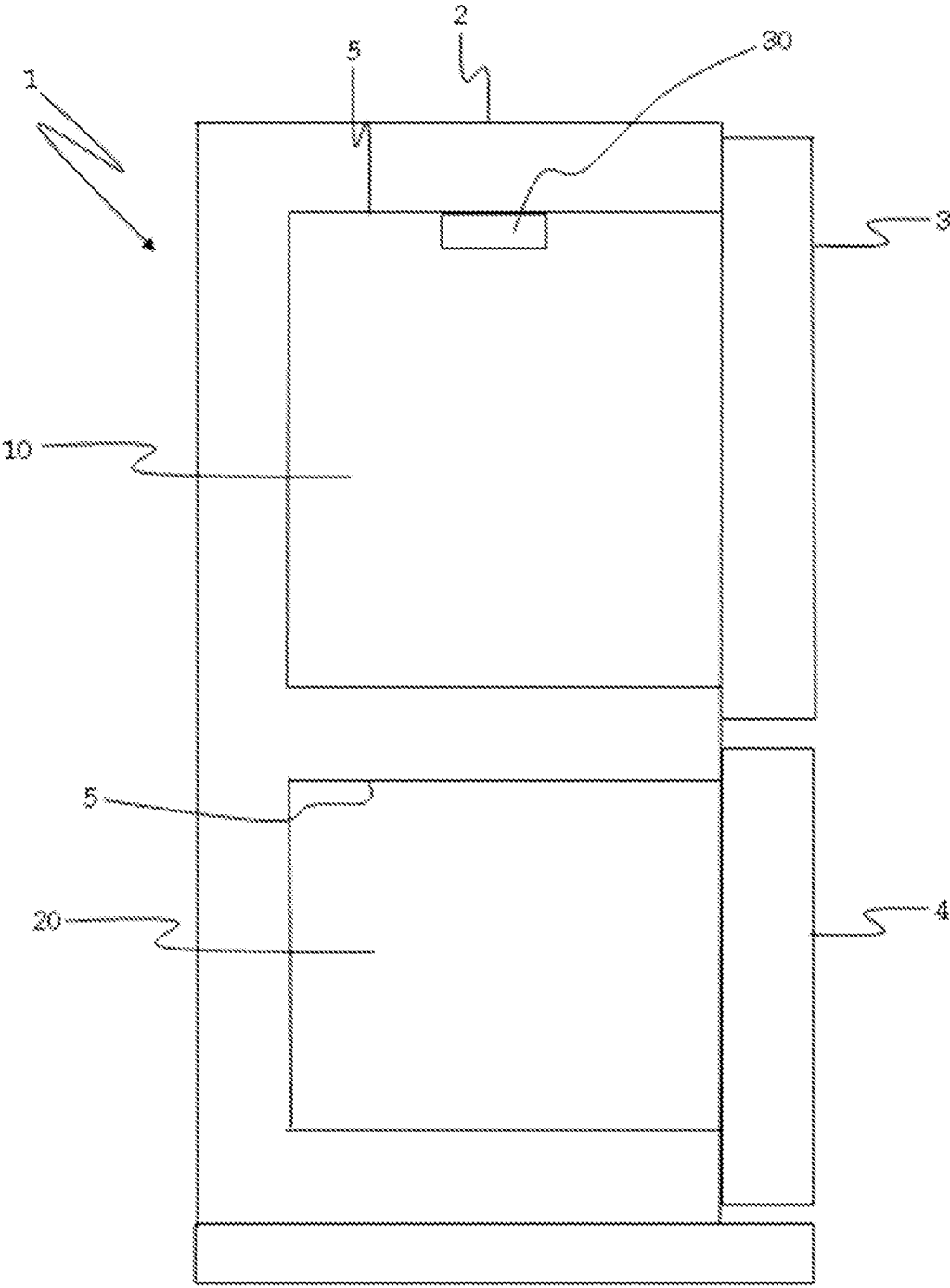


Fig. 1

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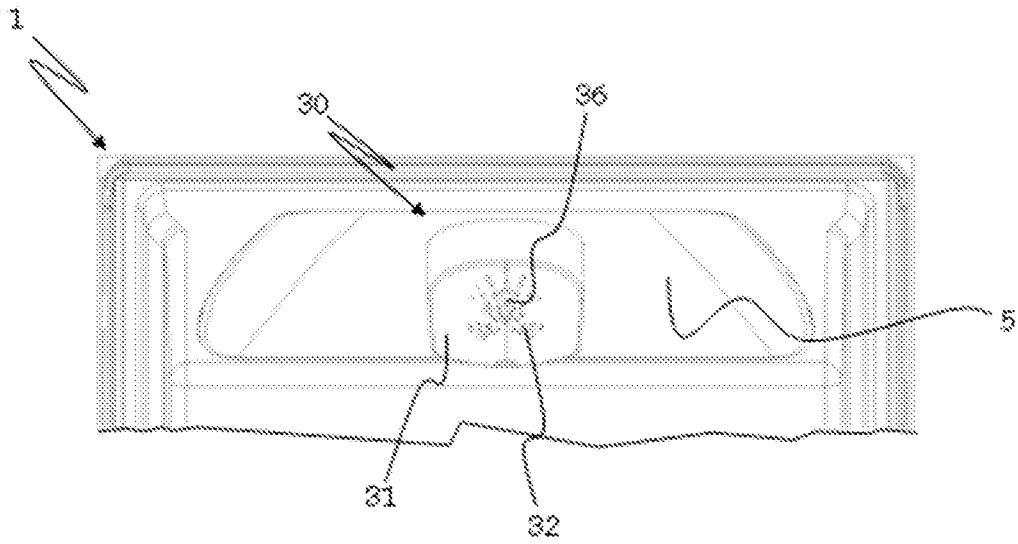


Fig. 2a

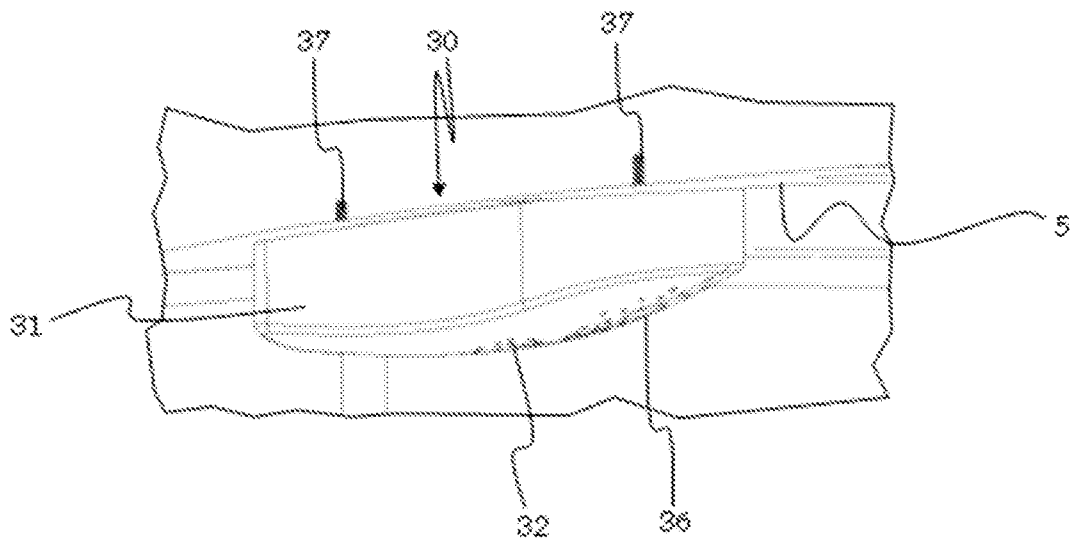


Fig. 2b

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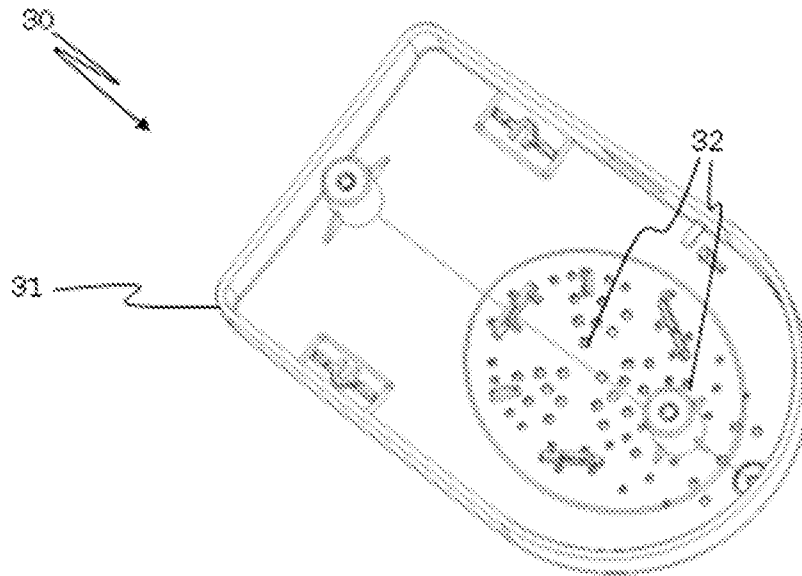


Fig. 3a

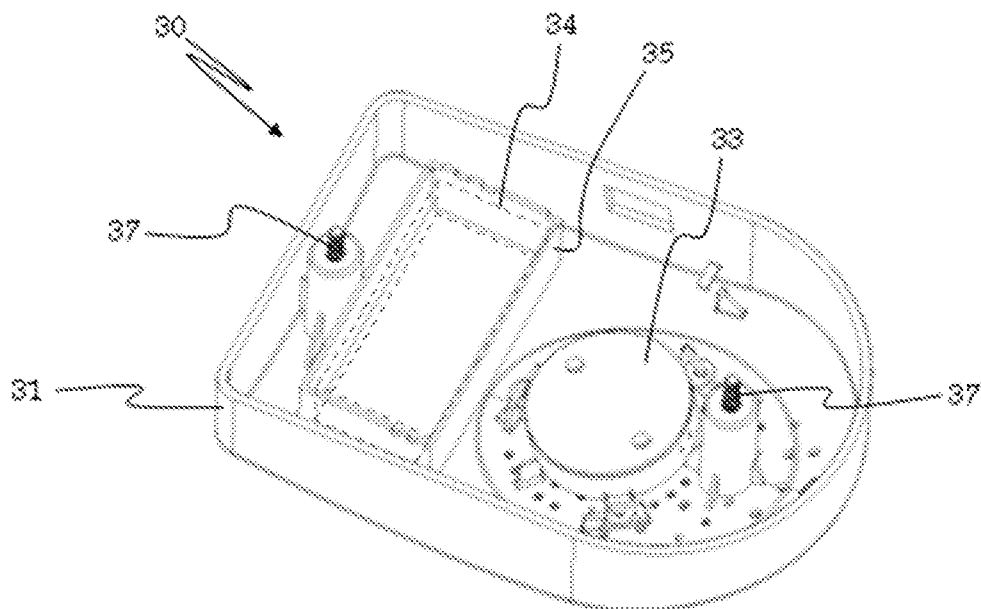


Fig. 3b