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(71) Applicant: **Guangdong Arcair Appliance Co., Ltd.**
Guangdong 528318 (CN)

(72) Inventor: **LIANG, Haisheng**
Guangdong 528318 (CN)

(74) Representative: **Ipey**
Apex House
Thomas Street
Trethomas
Caerphilly CF83 8DP (GB)

(54) **AIR PURIFICATION MODULE AND KITCHEN APPLIANCE**

(57) The present disclosure provides an air purification module and a kitchen appliance. The air purification module is applied to the kitchen appliance. The air purification module includes: a housing, where an air channel is formed in the housing; an ion generation assembly disposed in the air channel; and, an air heating device disposed in the air channel, where the air heating device is spaced apart from the ion generation assembly and configured to heat air flowing through the air channel. In the above air purification module, the air heating device can heat air flowing through the air channel such that the air maintains a high temperature state and steam in the air is not prone forming condensed water before being expelled out of a flue. In this way, the flue maintains a dry state, thereby reducing bacteria breeding.

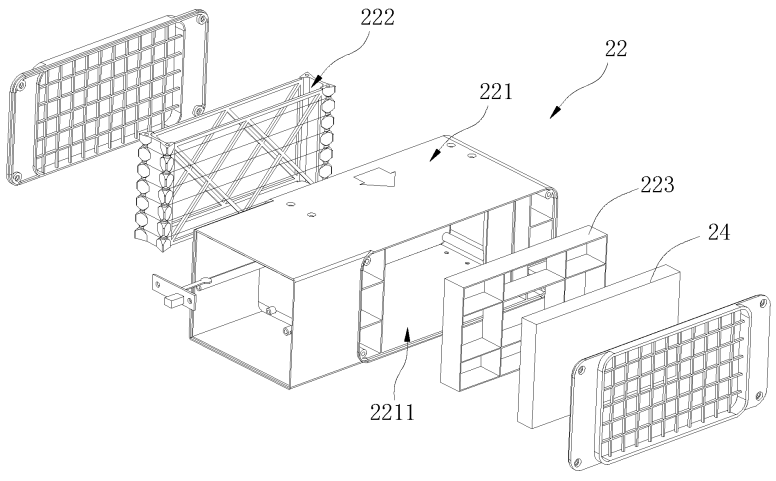

FIG.11

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of household appliance technologies, and in particular to an air purification module and a kitchen appliance.

BACKGROUND

[0002] Along with improvement of living level of people, range hood has become an indispensable household appliance. The range hood can suck oil fume of a kitchen to reduce an amount of oil fume inhaled by a user and mitigate the influence of the oil fume on the body of the user. When the range hood sucks oil fume, steam is prone to forming condensed water in a flue, such that the environment in the flue is humid and prone to breeding bacteria.

SUMMARY

[0003] The present disclosure provides an air purification module and a kitchen appliance.

[0004] In an embodiment of the present disclosure, the air purification module is applied to the kitchen appliance. The air purification module includes:

a housing, where an air channel is formed in the housing;
an ion generation assembly disposed in the air channel; and,
an air heating device disposed in the air channel, where the air heating device is spaced apart from the ion generation assembly and configured to heat air flowing through the air channel.

[0005] In the above air purification module, the air heating device may heat air flowing through the air channel, such that the air maintains a high temperature state. Steam in the air is not prone to forming condensed water before being expelled out of a flue, such that the flue maintains a dry state, thereby reducing breeding of bacteria.

[0006] In some embodiments, the ion generation assembly includes a frame and a plurality of turns of coil wound on the frame, and the plurality of turns of coil are used to generate ion after being applied with a voltage.

[0007] In some embodiments, the frame includes two connection plates spaced apart and the plurality of turns of coil are wound on the two connection plates.

[0008] In some embodiments, a plurality of limiting grooves spaced apart are formed on an edge of the connection plate, and each turn of coil is wound in one limiting groove.

[0009] In some embodiments, the frame further includes a plurality of connection strips connected with the connection plates, the plurality of connection strips are arranged staggeredly, the connection strips form a first channel for air to pass through, and the plurality of turns of coil surround the plurality of connection strips.

[0010] In some embodiments, the air heating device includes a heating frame and a heating element, the heating frame forms a second channel for air to pass through, and the heating element is disposed in the second channel.

[0011] In some embodiments, the ion generation assembly and the air heating device are arranged sequentially along an air flow direction.

[0012] An embodiment of the present disclosure further provides a kitchen appliance. The kitchen appliance includes an oil fume sucking device including a fan and an air purification module. The air purification module is connected with the fan and used to purify air expelled from the fan.

[0013] In some embodiments, the kitchen appliance further includes an electromagnetic heating device located above the oil fume sucking device.

[0014] In some embodiments, the kitchen appliance includes a shell. The shell includes a panel and a side plate connected with the panel. An edge of the panel and an edge of the side plate define an air inlet, the oil fume sucking device and the electromagnetic heating device both are accommodated inside the shell, and the oil fume sucking device is used to suck air through the air inlet.

[0015] Additional aspects and advantages of the embodiments of the present disclosure will be set out in the following descriptions, some of which become apparent from the following descriptions or are known by practicing the embodiments of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The above and/or additional aspects and advantages of the present disclosure will become obvious and easy to understand from the descriptions made for the embodiments in combination with the accompanying drawings.

FIG. 1 is a schematic diagram illustrating a use state of a kitchen appliance according to an embodiment of the present disclosure.

FIG. 2 is a schematic diagram illustrating another use state of a kitchen appliance according to an embodiment of the present disclosure.

FIG. 3 is a stereoscopic view illustrating a kitchen appliance according to an embodiment of the present disclosure.

FIG. 4 is an exploded view illustrating a kitchen appliance according to an embodiment of the present disclosure.

FIG. 5 is another exploded view illustrating a kitchen appliance according to an embodiment of the present disclosure.

FIG. 6 is a plan view illustrating a kitchen appliance according to an embodiment of the present disclo-

sure.

FIG. 7 is another exploded view illustrating a kitchen appliance according to an embodiment of the present disclosure.

FIG. 8 is another exploded view illustrating a kitchen appliance according to an embodiment of the present disclosure.

FIG. 9 is an exploded view illustrating an oil fume sucking device according to an embodiment of the present disclosure.

FIG.10 is a stereoscopic view illustrating a purification module of an oil fume sucking device according to an embodiment of the present disclosure.

FIG.11 is an exploded view illustrating a purification module of an oil fume sucking device according to an embodiment of the present disclosure.

FIG.12 is a stereoscopic view illustrating an ion generation assembly according to an embodiment of the present disclosure.

FIG.13 is a stereoscopic view illustrating an air heating device according to an embodiment of the present disclosure.

FIG.14 is an exploded view illustrating an electromagnetic heating device according to an embodiment of the present disclosure.

FIG. 15 is a schematic diagram illustrating a state of a kitchen appliance according to an embodiment of the present disclosure.

FIG. 16 is a structural schematic diagram illustrating a grid according to an embodiment of the present disclosure.

[0017] Numerals of the drawings are described below: kitchen appliance 100, shell 10, air inlet 102, panel 11, edge 111 of the panel 11, long edge 112, and short edge 113;

side plate 12, edge 121 of the side plate 12, first plate 122, second plate 123, first turning edge 124, second turning edge 125, bottom plate 13, air outlet 131, partition plate 14, first receiving space 141, second receiving space 142, air vent 143, filtering element 144, fitting block 145 and fitting groove 146;

oil fume sucking device 20, fan 21, volute casing 211, motor 212, wind wheel 213, air purification module 22, housing 221, air channel 2211, ion generation assembly 222, frame 2221, coil 2222, connection plate 2223, limiting groove 2224, connection strip 2225, first channel 2226, heating device 223, heating frame 2231, heating element 2232, second channel 2233, frame plate 2234, air guide cover 23, activated charcoal module 24, electromagnetic heating device 30, carrying frame 31, electromagnetic heating unit 32, a control component 33, a hinge device 40, inlet grid 50 and grid hole 51;

cooking bench 200 and accommodation hole 202.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] The embodiments of the present disclosure are described in detail below and the examples of the embodiments are shown in the accompanying drawings, where same or similar numerals represent same or similar elements or elements having same or similar functions throughout. The embodiments described by referring to the accompanying drawings below are merely illustrative and used only to explain the present disclosure and shall not be understood as limiting the present disclosure.

[0019] In the descriptions of the present disclosure, it is to be understood that orientation or position relationships indicated by the terms such as "center", "longitudinal", "transverse", "length", "width", "thickness", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", "clockwise" and "counterclockwise" are based on orientation or position relationships shown in the accompanying drawings, and used only to facilitate description of the present disclosure or simplified descriptions rather than indicate or imply that the indicated devices or elements must have a specific orientation and be constructed and operated at a specific orientation. Therefore, the orientation or position relationships shall not be understood as limiting of the present disclosure. Furthermore, the terms "first" and "second" are used only for the purpose of descriptions and shall not be understood as indicating or implying relative importance or implicitly indicating a number of the indicated technical features. Therefore, a feature limited by the "first" and "second" may explicitly or implicitly include one or more features. In the descriptions of the present disclosure, "plurality" has the meaning of two or more, unless otherwise stated clearly.

[0020] In the descriptions of the present disclosure, it is noted that the terms such as "installed", "mutually connected", and "connected" are to be broadly understood unless otherwise clearly stated and defined. For example, two elements may be fixedly connected, detachably connected, or integrally connected; two elements may be mechanically connected, or electrically connected or mutually communicated, or directly connected or indirectly connected by an intermediate medium, or internally communicated or in mutual interaction relationship. Persons of ordinary skill in the art may understand specific meanings of the above terms in the present disclosure according to a specific situation.

[0021] In the present disclosure, a first feature being "on" or "under" a second feature may be direct contact between the first feature and the second feature, or indirect contact between the first feature and the second feature by an intermediate medium therebetween, unless clearly stated and defined otherwise. Further, the first feature being "on", "over" and "above" the second feature may refer to that the first feature is just or obliquely above the second feature, or may only refer to that the first feature is higher than the second feature in horizontal height.

The first feature being "under", "beneath" and "below" the second feature may refer to that the first feature is just or obliquely below the second feature, or may only refer to that the first feature is smaller than the second feature in horizontal height.

[0022] The following disclosure provides many different embodiments or examples to implement different structures of the present disclosure. In order to simplify the present disclosure, components and disposals of specific examples are described below. Of course, these descriptions are only illustrative rather than limiting of the present disclosure. Further, in the different examples of the present disclosure, reference numerals and/or reference letters may be repeated and such repetitions are only used for simplification and clarity, and they themselves do not indicate any relationship between various embodiments and/or disposals discussed herein. Furthermore, although the examples of various specific processes and materials are provided herein, persons of ordinary skill in the art may be aware of application of other processes and/or use of other materials.

[0023] With reference to FIGS. 1 and 2, the present disclosure provides a kitchen appliance 100 which may be embedded into a cooking bench 200. Specifically, the cooking bench 200 may have an accommodation hole 202 in which at least part of the kitchen appliance 100 can be accommodated. For example, the kitchen appliance 100 may be totally accommodated in the accommodation hole 202 or partially accommodated in the accommodation hole 202. Generally, when the cooking bench 200 has a small thickness, a lower part of the kitchen appliance 100 protrudes out of a lower surface of the cooking bench 200. An upper part of the kitchen appliance 100 may be flushed with a countertop of the cooking bench 200.

[0024] In the embodiments of the present disclosure, the kitchen appliance 100 may be an integrated appliance which integrates the functions of cooking foods and sucking oil fume and the like. Therefore, the kitchen appliance 100 of the present disclosure has a smaller volume and occupies smaller space in a kitchen compared with an appliance having independent functions.

[0025] In an embodiment, the kitchen appliance 100 and the cooking bench 200 may be of integral structure and detachably integrated together. In this way, the kitchen appliance 100 and the cooking bench 200 have a high cooperation degree and a high integration degree and do not require additional renovation for the kitchen (for example, a cooking bench 200 is constructed in the kitchen and an accommodating space is opened in the cooking bench 200 and the like). After the kitchen appliance 100 and the cooking bench 200 integrated together are disposed in a space of the kitchen, daily cooking can be performed for foods by using the cooking bench 200 and the kitchen appliance 100 integrated on the cooking bench 200. If a user needs to renovate and decorate the kitchen, the cooking bench 200 may be moved to leave the space of the kitchen, so as to facilitate construction work.

[0026] With reference to FIGS. 3 to 5, in an embodiment of the present disclosure, the kitchen appliance 100 includes a shell 10, an oil fume sucking device 20, an electromagnetic heating device 30 and a hinge device 40. The electromagnetic heating device 30, the oil fume sucking device 20 and the hinge device 40 are all accommodated inside the shell 10. The electromagnetic heating device 30 is used to heat foods by electromagnetic heating. The electromagnetic heating device 30 is located above the oil fume sucking device 20. The oil fume sucking device 20 is used to suck oil fume or the like produced by the electromagnetic heating device 30 during a food cooking process. The hinge device 40 is used to enable the electromagnetic heating device 30 to turn from inside the shell 10 to outside the shell 10 or from outside the shell 10 to inside the shell 10.

[0027] The electromagnetic heating device 30 being disposed above the oil fume sucking device 20 refers to that a relative position relationship between the oil fume sucking device 20 and the electromagnetic heating device 30 is an up-down relationship when the kitchen appliance 100 is in normal use and normal placement. By integrating the oil fume sucking device 20 and the electromagnetic heating device 30 into the shell 10, the kitchen appliance 100 is made more miniaturized and integrated, leading to smaller occupation space and improving a space utilization rate of a relatively crowded kitchen. Further, the oil fume sucking device 20 and the electromagnetic heating device 30 can be separated up and down, such that the entire structure of the kitchen appliance 100 helps assembly and disassembly.

[0028] The electromagnetic heating device 30 is disposed at an upper part of the kitchen appliance 100, which caters to the use habits of a user and thus helps the user to cook foods by using the electromagnetic heating device 30. The oil fume sucking device 20 is disposed at a lower part of the kitchen appliance 100, that is, the oil fume sucking device 20 is located under the electromagnetic heating device 30, and the oil fume sucking device 20 can generate a sucking force to suck and purify air. When the user cooks foods by using the electromagnetic heating device 30, the produced oil fume and water vapor etc. float in the air near the electromagnetic heating device 30 or in the space of the kitchen or deposit downwardly, and at this time, they can be sucked and purified by the oil fume sucking device 20. In this way, the kitchen appliance 100 and the kitchen can be kept clean, thus reducing labor for cleaning the kitchen.

[0029] Specifically, with continuous reference to FIGS. 3 to 5, the shell 10 includes a panel 11, a side plate 12, a bottom plate 13 and a partition plate 14. The side plate 12 is connected with the bottom plate 13 and the panel 11. The side plate 12 surrounds the electromagnetic heating device 30 and the oil fume sucking device 20. The bottom plate 13 and the panel 11 are oppositely disposed. The partition plate 14 is connected with the side plate 12 and located between the panel 11 and the bottom

plate 13.

[0030] The panel 11 is an external component of the kitchen appliance 100. The panel 11 may be used to carry a cooking device, for example, a cooking device such as a soup pot is placed on the panel 11 such that the electromagnetic heating device 30 can heat foods in the cooking device.

[0031] The panel 11 may be abutted against the cooking bench 200 or accommodated in the accommodation hole 202. In an example, the panel 11 partially covers the accommodation hole 202 as shown in FIG. 2, and in other words, the accommodation hole 202 may be partially exposed. An upper surface of the panel 11 may be flushed with or slightly higher or lower than a countertop of the cooking bench 200, such that the user can conveniently cook foods or clean the countertop of the cooking bench 200. In this embodiment, the upper surface of the panel 11 is higher than the countertop of the cooking bench 200.

[0032] The panel 11 may be made of microcrystalline glass. The microcrystalline glass has the advantages of high mechanical strength, excellent insulation performance, less dielectric loss, stable dielectric constant, chemical corrosion resistance, wear resistance, good thermal stability, high use temperature and ease of cleaning, and can be adjusted in thermal expansion coefficient in a wide range. Therefore, the panel 11 can be better adapted to the cooking environment and protect the electromagnetic heating device 30 hereunder.

[0033] As shown in FIG. 6, in this embodiment, an edge 111 of the panel 11 and an edge 121 of the side plate 12 define an air inlet 102, and the oil fume sucking device 20 is used to suck air through the air inlet. The edge 111 of the panel 11 and the edge 121 of the side plate 12 define the air inlet 102, such that the air inlet 102 is close to the panel 11, so as to help increase the efficiency of the oil fume sucking device 20 for sucking air. Furthermore, the air inlet 102 is defined by the edge 111 of the panel 11 and the edge 121 of the side plate 12, and thus there is no need to open a cutout on the panel 11, avoiding damaging the entire structure of the panel 11, helping molding of the panel 11 and improving the yield rate of the panel 11 in production process.

[0034] It can be understood that, as mentioned above, the panel 11 may be made of microcrystalline glass which is prone to breaking due to high brittleness. Therefore, in the embodiments of the present disclosure, it is not required to open a cutout on the panel 11, thereby maintaining the integrity of the panel 11 and increasing the yield rate of the panel 11 in production.

[0035] As mentioned above, the cooking device may be placed on the panel 11 and heated to cook food and thus the air inlet 102 is closer to the cooking device. In this case, during a working process, the kitchen appliance 100 can more easily suck oil fume, water vapor and foreign matters etc. produced during cooking. The oil fume sucking device 20 may be controlled to a relatively lower working power to achieve the purpose of energy saving and noise reduction.

[0036] As shown in FIG. 6, in some embodiments, the panel 11 may be a rectangular panel and may include a long edge 112, a short edge 113 connected with the long edge 112. The side plate 12 includes a first plate 122 and a second plate 123, the first plate 122 is disposed corresponding to the long edge 112 and the second plate 123 is disposed corresponding to the short edge 113. The short edge 113, a partial edge of the first plate 122 and an edge of the second plate 123 define the air inlet 102.

[0037] In this case, the panel 11 is substantially shaped like rectangle to form a beautiful and regular kitchen appliance 100. Further, the rectangular use space is large and thus the cooking device can be better placed on the panel 11 and the user can have larger operation space to cook foods on the panel 11. The air inlets 102 on both sides of the kitchen appliance 100 may suck oil fumes etc. floating above the kitchen appliance 100 and around the cooking device and will not affect the cooking operations of the user in front of the cooking bench 200, offering good experience.

[0038] Furthermore, the rectangular panel 11 is easy to cut for formation and difficult to break and thus the yield rate of the panel 11 can be increased and the manufacturing costs can be saved.

[0039] It is understood that the long edge 112 and the short edge 113 are straight edges or, sidelines of the long edge 112 and the short edge 113 both are straight lines. It is to be pointed out that the chamfering processing for the corners of the rectangular panel 11 is also within the scope of rectangular shape of the panel 11.

[0040] Specifically, the first plate 122 and the second plate 123 are enclosed to form a receiving space with an opening facing upward, and the panel 11 partially covers the opening, and thus the exposed opening forms the air inlet 102. In this embodiment, the edge of the first plate 122 is a top edge of the first plate 122 and the edge of the second plate 123 is a top edge of the second plate 123.

[0041] It is to be pointed out that in this embodiment, there are two air inlets 102 which are respectively located at both sides of length direction of the panel 11. In other embodiments, there may be one air inlet 102.

[0042] Furthermore, the short edge 113 of the panel 11 and the edge of the second plate 123 are equidistantly disposed, and in other words, a distance between each part of the short edge 113 of the panel 11 and a corresponding part of the edge of the second plate 123 is same. In this case, the air inlet 102 has a regular shape and is easy to form. In an example, the distance between the short edge 113 of the panel 11 and the edge of the second plate 123 is 25mm to 50mm. For example, the distance between the short edge 113 of the panel 11 and the edge of the second plate 123 may be 25mm, 30mm or 50mm or the like.

[0043] In some embodiments, the short edge 113 of the panel 11 and the edge of the second plate 123 are disposed in parallel. As discussed above, the sideline of

the short edge of the panel 11 is one straight line, and further, a sideline of the edge of the second plate 123 is also one straight line, and thus the two straight lines are parallel to each other. In this case, the shape of the air inlet 102 is regular, which is favorable for the aesthetics of the kitchen appliance 100 and easy molding of the kitchen appliance 100.

[0044] In some embodiments, the edge 111 of the panel 11 is a continuously extending structure, or the sideline of the edge 111 of the panel 11 is one straight line. As discussed above, the short edge 113 of the panel 11 is used to define the air inlet 102. Therefore, the short edge 113 of the panel 11 is a continuously extending structure and the sideline of the short edge 113 of the panel 11 is one straight line.

[0045] In some embodiments, the width of the air inlet 102 is disposed with equal width, or the width of each part of the air inlet 102 is equal. In this case, the shape of the air inlet 102 is regular, which helps air to uniformly enter each part of the air inlet 102, thereby improving the efficiency of the kitchen appliance 100 for sucking oil fume.

[0046] In some embodiments, no cutout is formed at the edge 111 of the panel 11. The cutout, for example, may be a cutout of regular shape such as a rectangular cutout.

[0047] As discussed above, the short edge 113 of the panel 11 is used to define the air inlet 102. At this time, no cutout is formed at the short edge 113 of the panel 11, such that the structure of the short edge 113 of the panel 11 is kept continuous, helping the molding of the panel 11.

[0048] As discussed above, the side plate 12 includes a first plate 122 and a second plate 123. Specifically, the first plate 122 and the second plate 123 may be fixed together by riveting or welding or the like. The first plate 122 and the second plate 123 may be made of a metal material, so as to increase the strength of the side plate 12.

[0049] As shown in FIG. 4, a first turning edge 124 is formed at the edge of the first plate 122, and a second turning edge 125 is formed at the edge of the second plate 123. The kitchen appliance 100 may be mounted on the cooking bench 200 by the first turning edge 124 and the second turning edge 125.

[0050] The bottom plate 13 may be made of a metal material. The bottom plate 13 is fixedly connected with the side plate 12 by welding or riveting or the like. By referring to FIG. 7, in an embodiment of the present disclosure, the oil fume sucking device 20 is mounted on the bottom plate 13. An air outlet 131 may be formed on the bottom plate 13, and the oil fume sucking device 20 may expel air out of the kitchen appliance 100 through the air outlet 131.

[0051] With reference to FIG. 8, the partition plate 14 partitions the space enclosed by the side plate 12 to form a first receiving space 141 and a second receiving space 142. The first receiving space 141 is in communication with the air inlet 102, and the first receiving space 141 is further in communication with the second receiving space 142. The electromagnetic heating device 30 is mounted inside the first receiving space 141. The oil fume sucking device 20 is mounted inside the second receiving space 142. The oil fume sucking device 20 may suck oil fume from the air inlet 102 through the first receiving space 141 and expel oil fume out of the kitchen appliance 100 through the air outlet 131.

[0052] Specifically, an air vent 143 is formed on the partition plate 14, and the air vent 143 is in communication with the first receiving space 141 and the second receiving space 142. The air vent 143 is covered with a filtering element 144, that is, the filtering element 144 covers the air vent 143. The filtering element 144 is used to perform primary filtering for oil fume to filter out substances with large particles. The filtering element 144 is provided with a movable fitting block 145, and a fitting groove 146 is formed on the partition plate 14. The filtering element 144 is detachably connected with the partition plate 14 through cooperation of the fitting groove 146 and the movable fitting block 145.

[0053] In an embodiment of the present disclosure, in order to make the volume of the filtering element 144 smaller to facilitate cleaning the filtering element 144, two filtering elements 144 may be disposed. In other embodiments, one or three or more filtering elements 144 may be disposed.

[0054] With reference to FIG. 9, the oil fume sucking device 20 includes a fan 21, an air purification module 22 connected with the fan 21, and an air guide cover 23 connected with the air purification module 22. The fan 21 is used to expel air into the air purification module 22. The air purification module 22 is used to purify air expelled from the fan 21. The air guide cover 23 is used to expel the purified air out of the kitchen appliance 100.

[0055] Specifically, the fan 21 includes a volute casing 211, a motor 212 and a wind wheel 213, where the motor 212 and the wind wheel 213 are located inside the volute casing 211, and the motor 212 is connected with the wind wheel 213. The motor 212 may drive the wind wheel 213 to rotate so as to suck air from the air inlet 102. Furthermore, the oil fume particles are cut into smaller ones, such that the oil fume particles can be more easily purified in the oil fume sucking device 20.

[0056] With reference to FIGS 10 and 11, the air purification module 22 includes a housing 221, an ion generation assembly 222 and an air heating device 223. An air channel 2211 is formed in the housing 221. The ion generation assembly 222 and the air heating device 223 are both disposed in the air channel 2211. The air heating device 223 and the ion generation assembly 222 are spaced apart. The air heating device 223 is used to heat air flowing through the air channel 2211.

[0057] Thus, the air heating device 223 can heat air flowing through the air channel 2211, and thus the air maintains a high temperature state and steam in the air is not prone to forming condensed water before being

expelled out of a flue (for example, fume exhaust tube). This way, the flue can maintain a dry state, reducing bacteria breeding.

[0058] It can be understood that, during a cooking process, a large amount of water vapor can be produced and this water vapor is expelled out of room along with oil fume. If the air has a large content of water vapor, the water vapor is prone to forming condensed water upon contacting with cold objects such as fume exhaust tube, and this condensed water may flow into the kitchen appliance or provide breeding environment for bacteria. Therefore, in the present disclosure, the air heating device 223 increases the temperature of the oil fume and the like, such that water vapor is not prone to forming condensed water, thus reducing bacteria breeding and improving the user experience.

[0059] Specifically, with reference to FIG. 12, in an embodiment, the ion generation assembly 222 includes a frame 2221 and a plurality of turns of coil 2222 wound on the frame 2221. The plurality of turns of coil 2222 are used to generate ion after being applied with a voltage. Thus, after being applied with a high voltage, the plurality of turns of coil 222 may ionize air around to form negative ions. In this way, substances such as benzene in oil fume can be decomposed into gas harmless to human body.

[0060] Furthermore, in an embodiment, the frame 2221 includes a two connection plates 2223 spaced apart, and the plurality of turns of coil 2222 are wound on the two connection plates 2223. Therefore, the two connection plates 2223 can provide support for the plurality of turns of coil 2222, such that the plurality of turns of coil 2222 can work normally. Specifically, the connection plate 2223 may be made of an insulation material, for example, plastic, so as to prevent occurrence of short circuiting to the coil 2222.

[0061] It is noted that, the connection plate 2223 may be regularly shaped, for example, like a cuboid, or irregularly shaped. The specific shape of the connection plate 2223 is not limited herein.

[0062] In an embodiment of the present disclosure, a plurality of limiting grooves 2224 spaced apart are formed on an edge of the connection plate 2223, and each turn of coil 2222 is wound in one limiting groove 2224. Therefore, a plurality of limiting grooves 2224 may enable the coil 2222 to be easily wound on the connection plates 2223, so as to increase the manufacturing efficiency of the air purification module. In addition, the limiting groove 2224 may also prevent occurrence of phenomena such as short circuiting between two adjacent turns of coil 2222 due to contact.

[0063] Specifically, the limiting groove 2224 may be shaped like triangle, square or the like as long as the limiting groove 2224 can prevent the coil 2222 from sliding on the connection plates 2223.

[0064] In some embodiments, the frame 2221 may further include a plurality of connection strips 2225 connected with the connection plates 2223. The plurality of connection strips 2225 are arranged staggeredly to form a first channel 2226 for air to pass through. The plurality of turns of coil 2222 surround the plurality of connection strips 2225.

[0065] In this case, the connection strips 2225 can fix the positions of the connection plates 2223 to prevent relative movement of the connection plates 2223. In addition, the connection strips 2225 can also allow air to pass through the ion generation assembly 222, so as to enable the ion generation assembly 222 to ionize and purify air.

[0066] With reference to FIG. 13, in some embodiments, the air heating device 223 includes a heating frame 2231 and a heating element 2232. The heating frame 2231 forms a second channel 2233 for air to pass through and the heating element 2232 is disposed in the second channel 2233. Thus, the heating element 2232 can generate heat once powered on, so as to heat air flowing through the second channel 2233. Therefore, the air flowing through the second channel 2233 maintains a high temperature.

[0067] Specifically, the heating frame 2231 includes a plurality of frame plates 2234 which define the second channels 2233. A cross section of the second channel 2233 may be square, or circular or the like, which is not limited herein.

[0068] In some embodiments, the ion generation assembly 222 and the air heating device 223 are disposed sequentially along an air flowing direction. In other words, the ion generation assembly 222 is disposed upstream of the air heating device 223, such that oil fume or the like may firstly flow through the ion generation assembly 222 to slow down and then through the air heating device 223 at a slow speed, so as to enable the air heating device 223 to more effectively heat air.

[0069] As shown in FIG. 11, in some embodiments, the air purification module 22 may further include an activated charcoal module 24 disposed inside the housing 221. The activated charcoal module 24 is located downstream of the air channel 2211. Thus, the activated charcoal module 24 may adsorb substances harmful to human body, for example, benzene, particulate matters and the like.

[0070] The air guide cover 23 is inserted through the air outlet 131 as shown in FIG. 7. In an embodiment of the present disclosure, the air guide cover 23 may expel air downwardly out of the kitchen appliance 100. The air guide cover 23 may be connected with a component such as an exhaust tube, so as to expel air from the air guide cover 23 out of a kitchen.

[0071] With reference to FIG. 14, in an embodiment, the electromagnetic heating device 30 includes a carrying frame 31, an electromagnetic heating unit 32, and a control component 33. The electromagnetic heating unit 32 is disposed in the carrying frame 31 and the control component 33 is disposed on the carrying frame 31 to control a working state of the electromagnetic heating unit 32.

[0072] There may be a plurality of electromagnetic

heating units 32 which are arranged in a matrix. In an embodiment of the present disclosure, there are four electromagnetic heating units 32, above which a plurality of cooking devices can be placed. A user can heat the cooking devices by using a plurality of electromagnetic heating units 32 so as to cook foods at the same time, thus improving the cooking efficiency. If all the electromagnetic heating units 32 are not required to be started, one or more electromagnetic heating units 32 may be controlled to be turned off by using the control component 33. A plurality of electromagnetic heating units 32 may be arranged in a matrix to present good aesthetics. Further, when the cooking devices are placed above the electromagnetic heating units 32, good aesthetics can also be achieved, thus improving the user experience. In addition, its disposal is easy, reducing the implementation difficulty. Of course, the above number of the electromagnetic heating units 32 is only illustrative and shall not be understood as limiting of the present disclosure. In more implementations, there may be one electromagnetic heating unit 32 disposed to simplify the structure of the electromagnetic heating device 30 and the kitchen appliance 100. In addition, there may be two, or three, or five electromagnetic heating units 32 or the like, which is not limited herein.

[0073] The control component 33 may include a button by which a user can control a use state of the kitchen appliance 100.

[0074] With reference to FIG. 15, in an embodiment, the hinge device 40 may drive the electromagnetic heating device 30 to rotate relative to the shell 10 so as to enable the electromagnetic heating device 30 to be at least partially placed outside the shell 10.

[0075] Specifically, the hinge device 40 may be driven by hand to enable the electromagnetic heating device 30 to rotate relative to the shell 10 or driven electrically to enable the electromagnetic heating device 30 to rotate relative to the shell 10, or driven by combination of human power and electric power to enable the electromagnetic heating device 30 to rotate relative to the shell 10. When the hinge device 40 is driven, the shell 10 remains stationary relative to the electromagnetic heating device 30, and the electromagnetic heating device 30 and the panel 11 change from a first state (horizontal state) to a second state (inclined state). In this case, the electromagnetic heating device 30 and the panel 11 are separated from the shell 10 and rotated outwardly from the shell 10, helping the user to clean the interior of the kitchen appliance 100.

[0076] In an example, when the kitchen appliance 100 changes from the first state to the second state, the electromagnetic heating device 30 rotates relative to the shell 10 by an angle greater than or equal to 90 degrees.

[0077] When the panel 11 and the electromagnetic heating device 30 rotate 0 degree relative to the shell 10 (that is, when the panel 11 and the electromagnetic heating device 30 remain stationary), the panel 11 and the electromagnetic heating device 30 are substantially parallel to the ground and the countertop of the cooking bench 200 and the kitchen appliance 100 is in the first state as shown in FIG. 2. When the panel 11 and the electromagnetic heating device 30 rotate 90 degrees relative to the shell 10, the panel 11 and the electromagnetic heating device 30 are substantially perpendicular to the ground and the countertop of the cooking bench 200. When the panel 11 and the electromagnetic heating device 30 rotate relative to the shell 10 by an angle greater than or equal to 90 degrees, the panel 11 and the electromagnetic heating device 30 are completely separated from the shell 10. At this time, a space between the panel 11/the electromagnetic heating device 30 and the shell 10 is large, helping the user to clean the kitchen appliance 100.

[0078] Moreover, when the panel 11 and the electromagnetic heating device 30 rotate at an angle of 30 to 70 degrees, the panel 11 and the electromagnetic heating device 30 can be stopped at any current position; when the panel 11 and the electromagnetic heating device 30 rotate at an angle of 0 to 30 degrees, if no external force is applied to the panel 11 and the electromagnetic heating device 30, the panel 11 and the electromagnetic heating device 30 may switch to the first state slowly, achieving safe operation. In addition, the damping of the hinge device 40 may also be adjusted. By rotating a damping piece (not shown) in the hinge device 40, an operation force for rotating the panel 11 and the electromagnetic heating device 30 can be adjusted to further improve safety.

[0079] In an example, when a user needs to clean the internal structure of the kitchen appliance 100, a switch of the hinge device 40 may be turned on to drive the panel 11 and the electromagnetic heating device 30 to separate from the shell 10. When the panel 11 and the electromagnetic heating device 30 rotate to an angle desired by the user, the switch may be turned off to allow the panel 11 and the electromagnetic heating device 30 to stop rotating and stay at the current rotation position. In another example, the user may lift the panel 11 and the electromagnetic heating device 30 a distance to avoid collision of the shell 10 with the panel 11 and the electromagnetic heating device 30 during rotation, and then an external force is applied along a rotation direction of the panel 11 and the electromagnetic heating device 30 to push the panel 11 and the electromagnetic heating device 30, thus achieving the rotation of the panel 11 and the electromagnetic heating device 30 relative to the shell 10. When the panel 11 and the electromagnetic heating device 30 rotate to an angle desired by the user, pushing may be stopped to enable the panel 11 and the electromagnetic heating device 30 to stop rotating and stay at the current rotation position.

[0080] With reference to FIG. 2, in some embodiments, the kitchen appliance 100 further includes an inlet grid 50 disposed at the air inlet 102 to cover the air inlet 102. Thus, the inlet grid 50 can prevent matters of large volume from entering the kitchen appliance 100, thereby

avoiding occurrence of poor phenomena such as unsmooth ventilation and bacteria breeding and the like due to accumulation of foreign matters in the kitchen appliance 100.

[0081] The inlet grid 50 may be made of a low-density material such as aluminum material to reduce the weight of the inlet grid 50.

[0082] In an embodiment, the inlet grid 50 is detachably disposed on the shell 10 such that the electromagnetic heating device 30 can be moved out of the shell 10 after the inlet grid 50 is removed, so as to clean the interior of the kitchen appliance 100.

[0083] With reference to FIG. 16, in some embodiments, the inlet grid 50 forms a plurality of grid holes 51 in communication with the air inlet 102. The grid hole 51 is an elongated shape with a length L being in a range of 250 to 350mm and a width W being in a range of 4 to 6mm. For example, the grid hole 51 has a length L of 250mm, 270mm, 300mm and 350mm and the like, and has a width W of 4mm, 5mm, and 6mm and the like.

[0084] When the grid hole 51 is in the above range, an air sucking static pressure of the oil fume sucking device 20 can be increased to improve the air sucking effect. Further, the noise of the air channel of the kitchen appliance 100 can be reduced.

[0085] In an embodiment of the present disclosure, a plurality of grid holes 51 are arranged in parallel along a length direction of the panel 11. The length of each of the grid holes 51 extends along a width direction of the panel 11.

[0086] In an embodiment, the kitchen appliance 100 generally works in the following process: after the oil fume sucking device 20 is started, the oil fume sucking device 20 forms an air current to suck air such as oil fume above the panel 11, and the air such as oil fume passes through the grid holes 51, the air inlets 102, the first receiving space 141 and then into the volute casing 211 and then is expelled into the air purification module 22 under the action of the wind wheel 213, and then purified in the air purification module 22 and then expelled out of the shell 10.

[0087] In conclusion, in an embodiment of the present disclosure, the air purification module 22 includes a housing 221, an ion generation assembly 222 and an air heating device 223. An air channel 2211 is formed in the housing 221. The ion generation assembly 222 and the air heating device 223 both are disposed inside the air channel 2211. The ion generation assembly 222 and the air heating device 223 both are spaced apart. The air heating device 223 is used to heat air flowing through the air channel 2211.

[0088] Thus, the air heating device 223 can heat air flowing through the air channel 2211, and thus the air maintains a high temperature state and steam in the air is not prone to forming condensed water before being expelled out of a flue (for example, fume exhaust tube). This way, the flue can maintain a dry state, reducing bacteria breeding.

[0089] In the descriptions of the present disclosure, the descriptions made by referring to "some embodiments", "one embodiment", "certain embodiments", "illustrative embodiments", "example" "specific example" or "some examples" are meant to indicate that specific features, structures, materials or characteristics described in combination with the embodiments or examples are included in at least one embodiment or example of the present disclosure. In the present disclosure, the illustrative expressions of the above terms do not necessarily refer to a same embodiment or example. Furthermore, the described specific features, structures, materials or characteristics may be combined in proper way in one or more embodiments or examples.

[0090] Furthermore, the terms "first" and "second" are used for the purpose of descriptions only and shall not be understood as indicating or implying relative importance or implicitly indicating a number of the indicated technical features. Therefore, a feature limited by the "first" and "second" may explicitly or implicitly include at least one feature. In the descriptions of the present disclosure, "plurality" has the meaning of at least two, for example, two or three, unless otherwise stated clearly.

[0091] Although the above shows and describes the embodiments of the present disclosure, it may be understood that the above embodiments are illustrative and shall not be understood as limiting of the present disclosure. Persons of ordinary skill in the art may make changes, modifications, replacements and variations to the above embodiments within the scope of the present disclosure, and the scope of the present disclosure is limited by the claims and its equivalents.

Claims

1. An air purification module, being applied to a kitchen appliance and comprising:

   a housing, wherein an air channel is formed in the housing;
   an ion generation assembly disposed in the air channel; and,
   an air heating device disposed in the air channel, wherein the air heating device is spaced apart from the ion generation assembly and configured to heat air flowing through the air channel.

2. The air purification module of claim 1, wherein, the ion generation assembly comprises a frame and a plurality of turns of coil wound on the frame, and the plurality of turns of coil are used to generate ion after being applied with a voltage.

3. The air purification module of claim 2, wherein the frame comprises two connection plates spaced apart and the plurality of turns of coil are wound on the two connection plates.

4. The air purification module of claim 3, wherein a plurality of limiting grooves spaced apart are formed on an edge of the connection plate and each turn of coil is wound in one limiting groove.

5. The air purification module of claim 3, wherein the frame further comprises a plurality of connection strips connected with the connection plates, the plurality of connection strips are arranged staggeredly, the connection strips form a first channel for air to pass through, and the plurality of turns of coil surround the plurality of connection strips.

6. The air purification module of claim 1, wherein the air heating device comprises a heating frame and a heating element, the heating frame forms a second channel for air to pass through, and the heating element is disposed in the second channel.

7. The air purification module of claim 1, wherein the ion generation assembly and the air heating device are arranged sequentially along an air flow direction.

8. A kitchen appliance, comprising an oil fume sucking device, wherein the oil fume sucking device comprises:

a fan; and
the air purification module according to any one of claims 1 to 7, wherein the air purification module is connected with the fan and used to purify air expelled from the fan.

9. The kitchen appliance of claim 8, further comprising an electromagnetic heating device located above the oil fume sucking device.

10. The kitchen appliance of claim 9, comprising a shell, wherein the shell comprises a panel and a side plate connected with the panel, an edge of the panel and an edge of the side plate define an air inlet, the oil fume sucking device and the electromagnetic heating device both are accommodated inside the shell, and the oil fume sucking device is used to suck air through the air inlet.

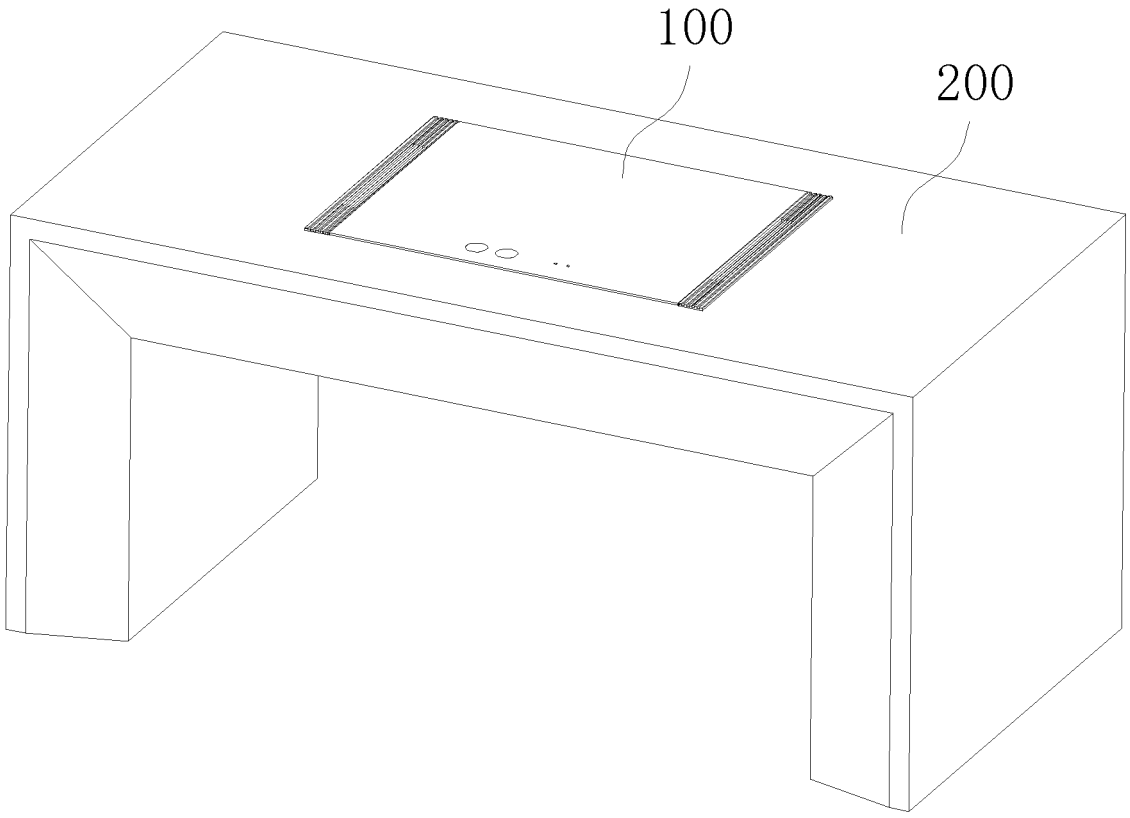

FIG.1

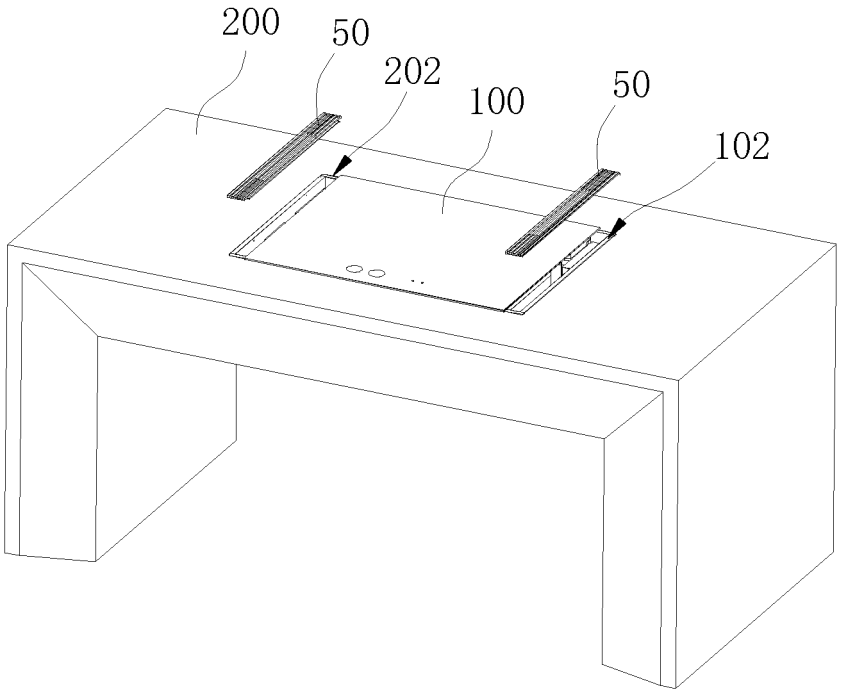

FIG.2

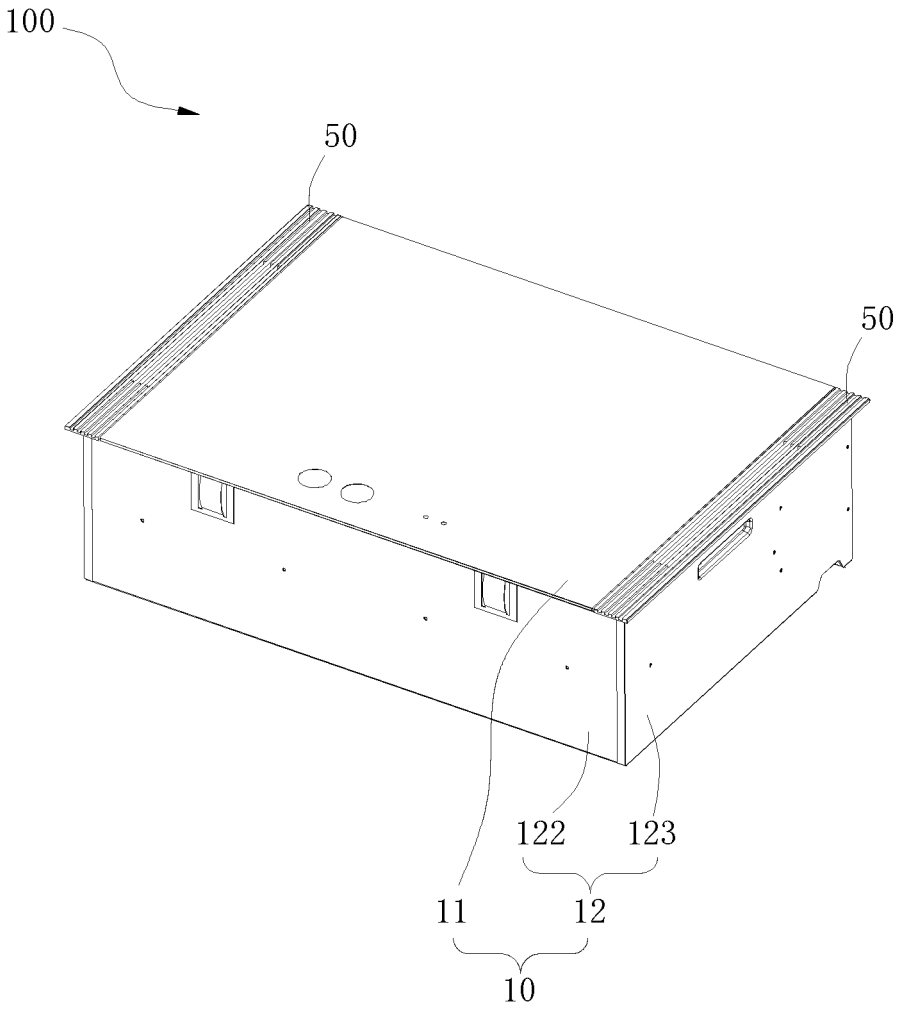

FIG.3

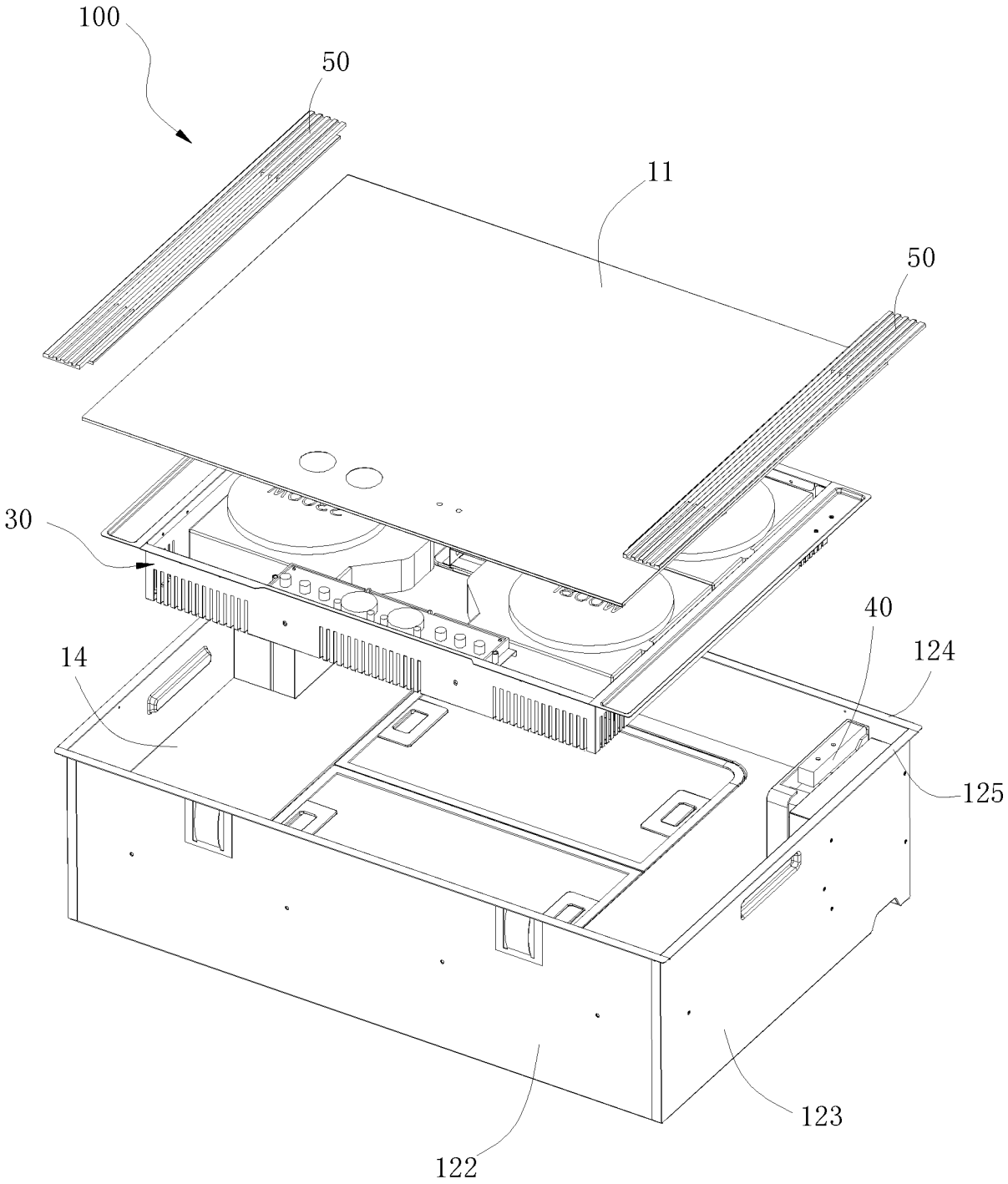

FIG.4

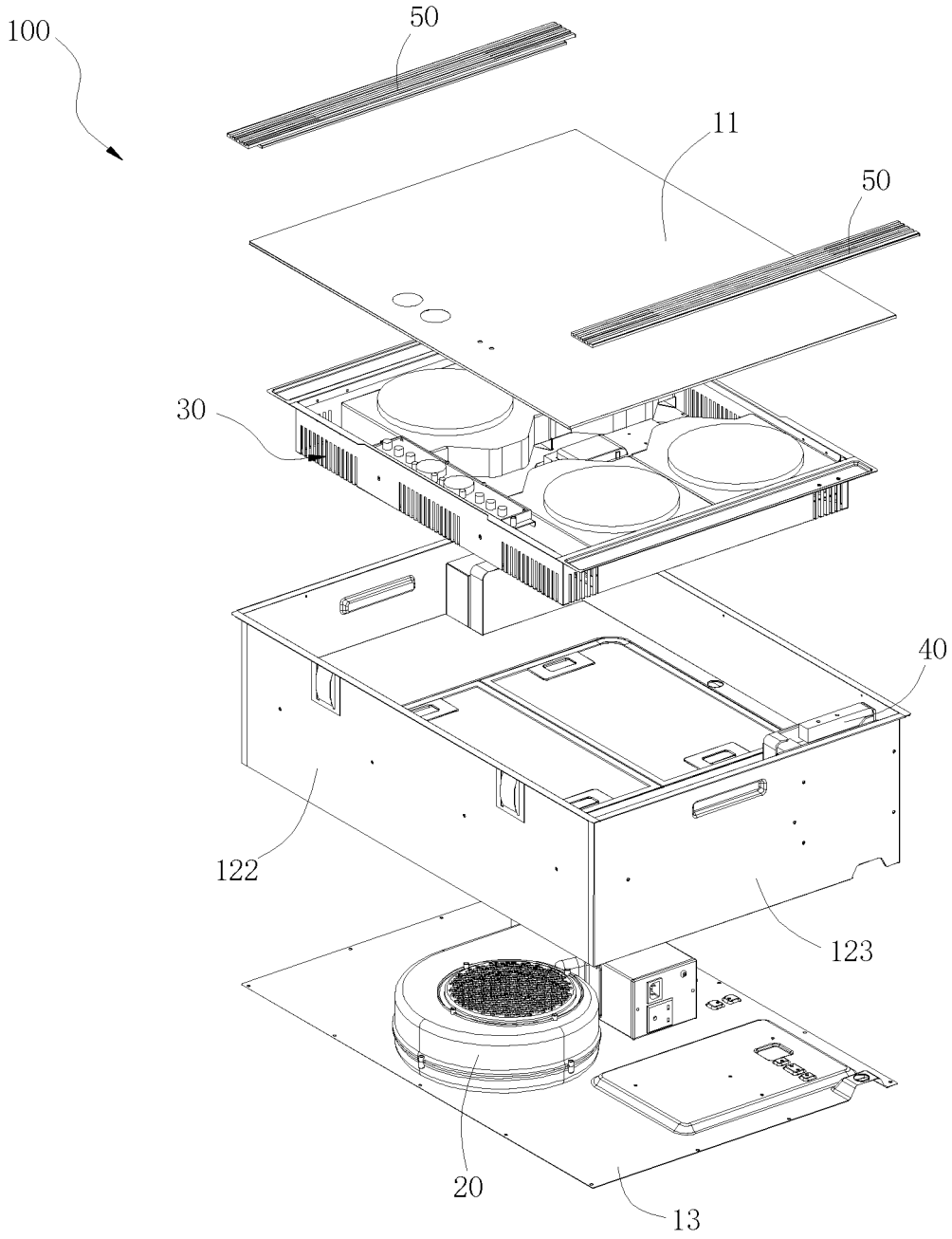

FIG.5

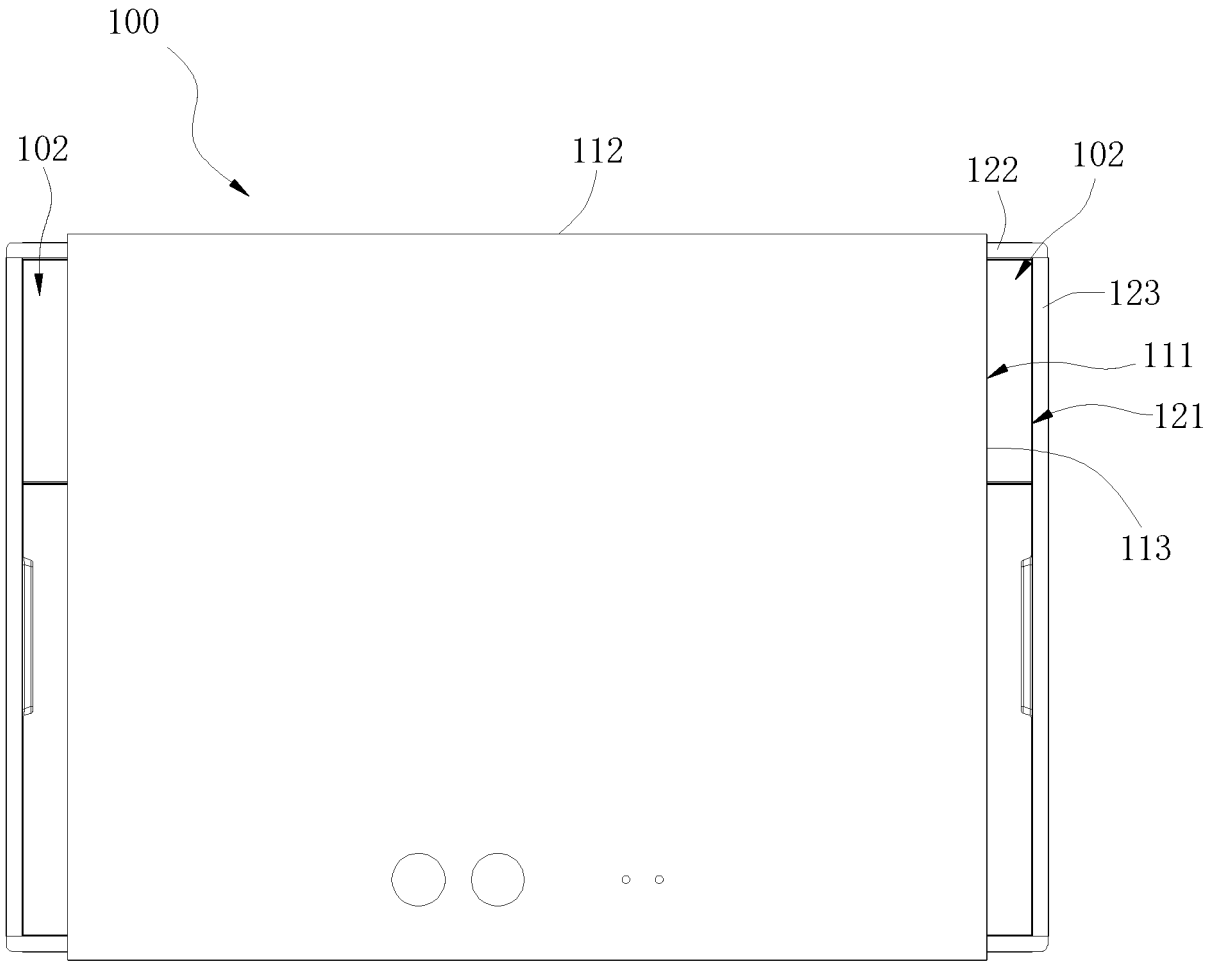

FIG.6

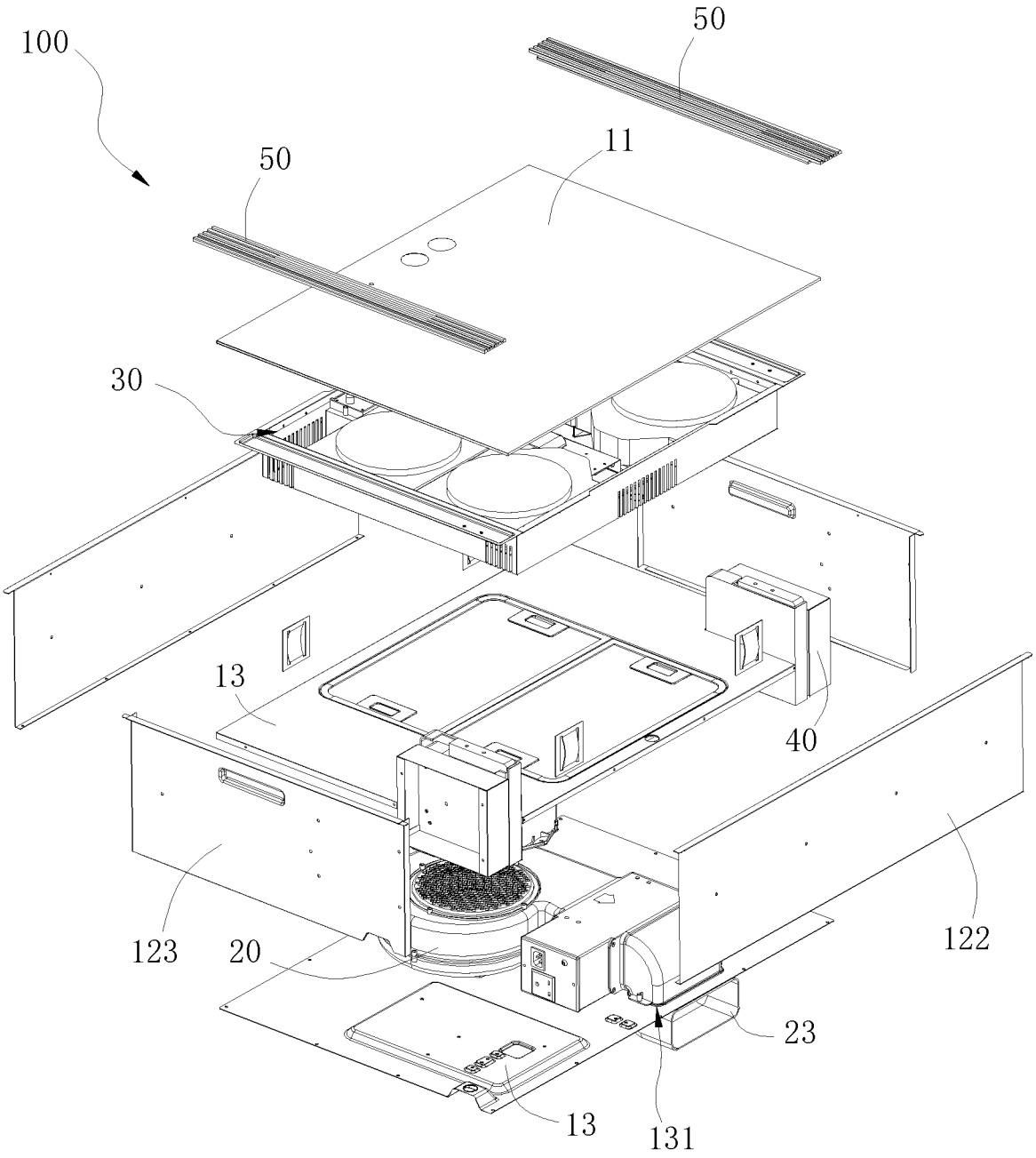

FIG.7

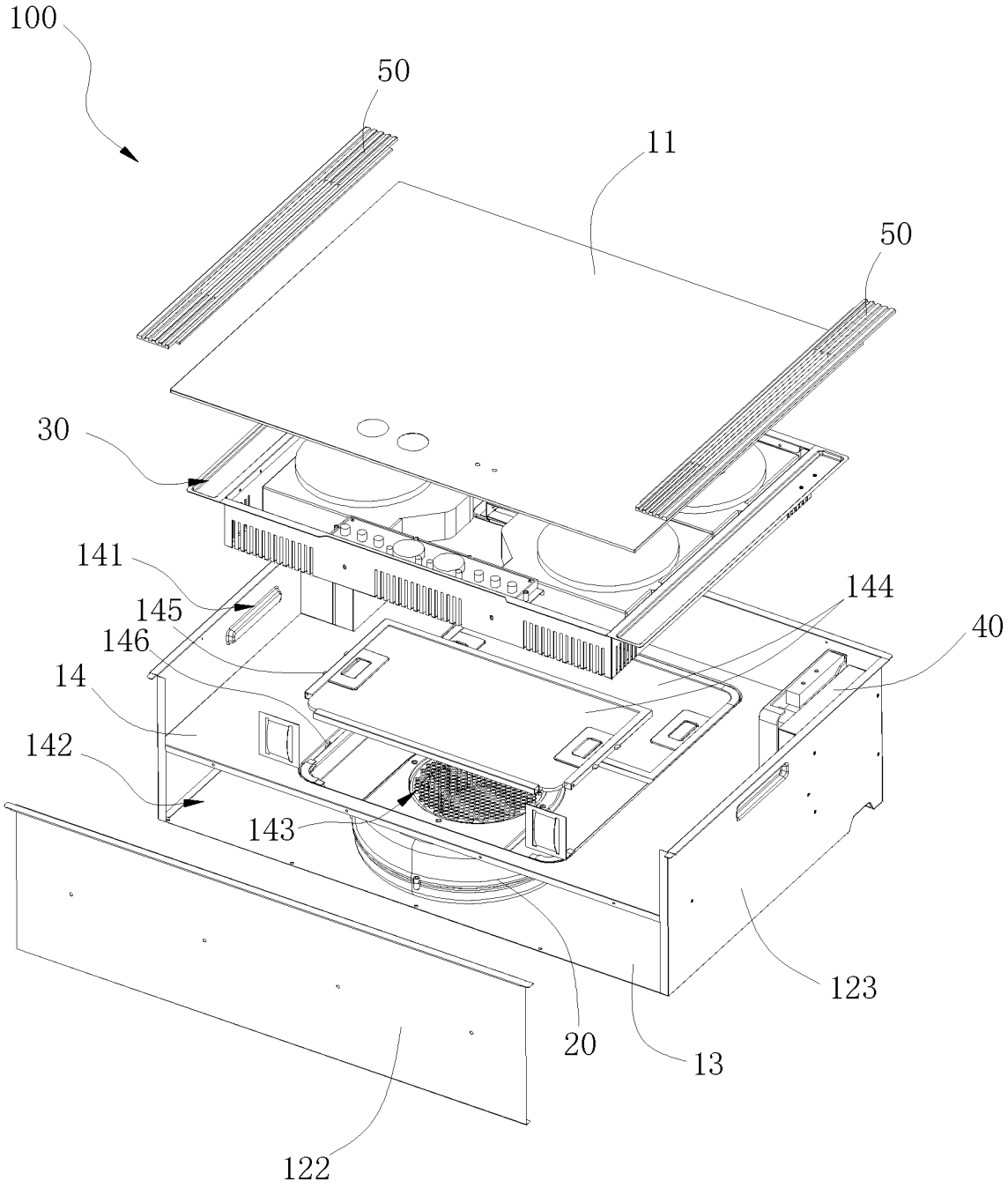

FIG.8

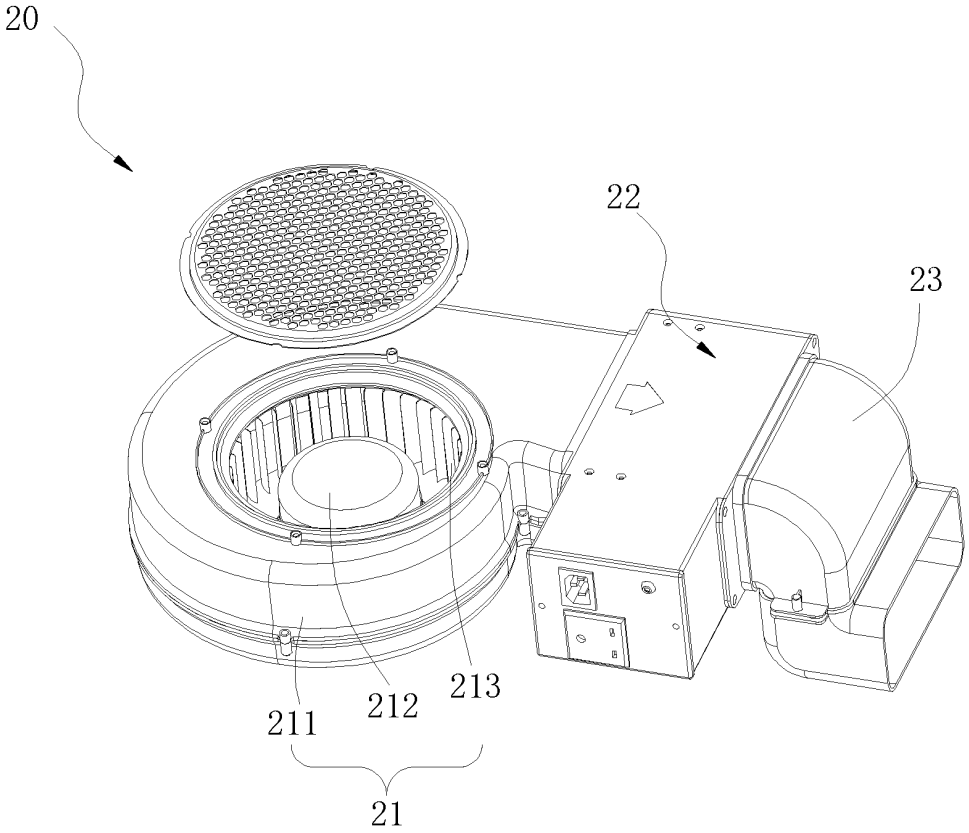

FIG.9

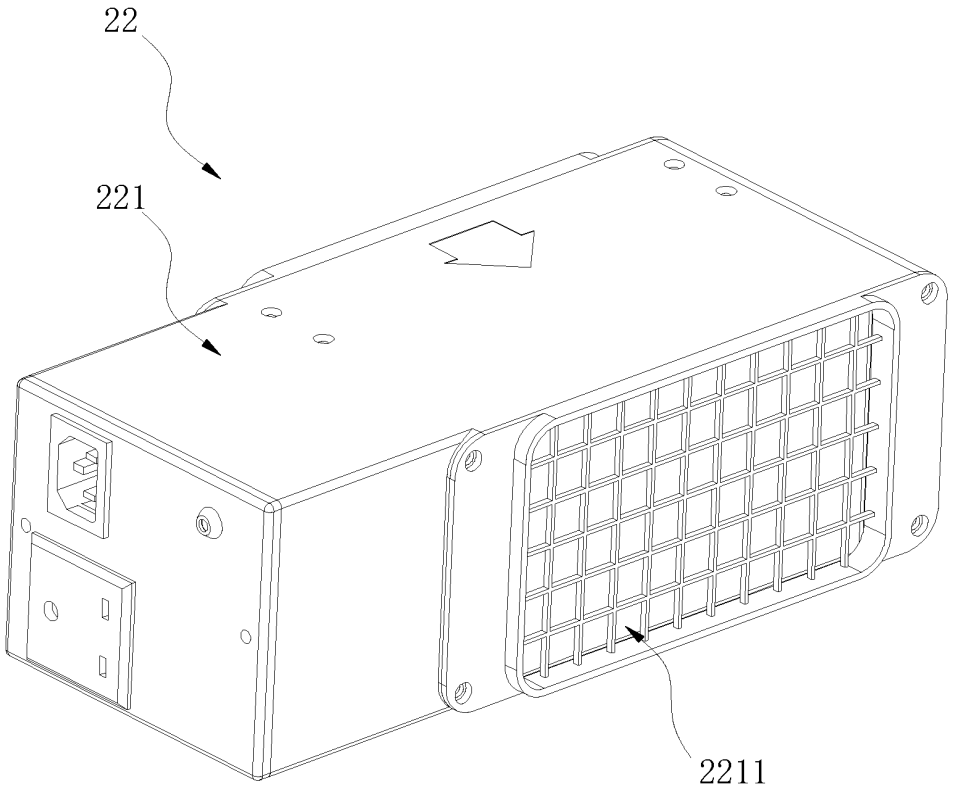

FIG.10

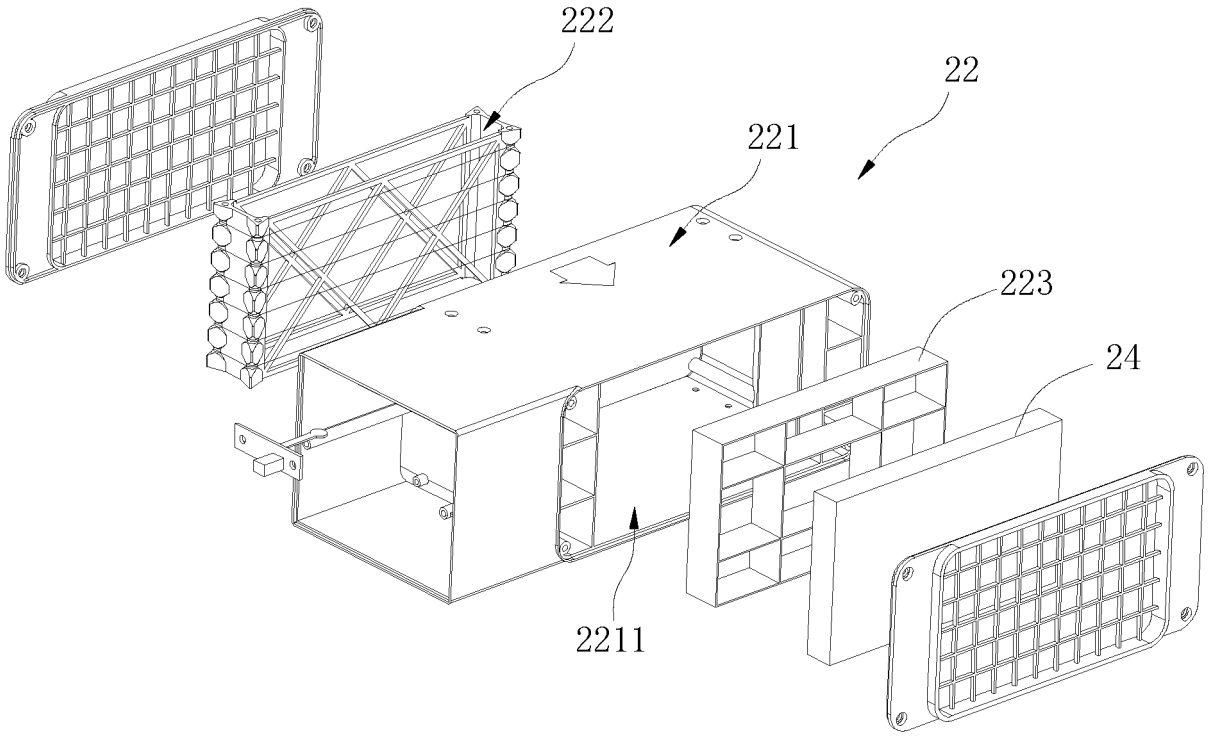
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FIG.11

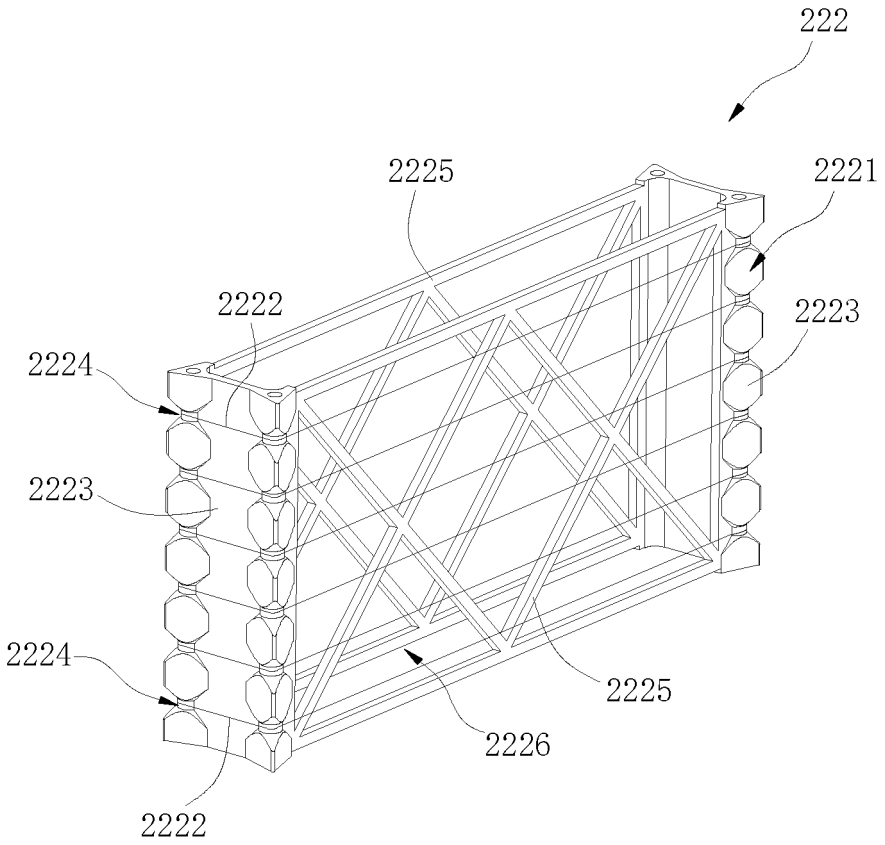
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FIG.12

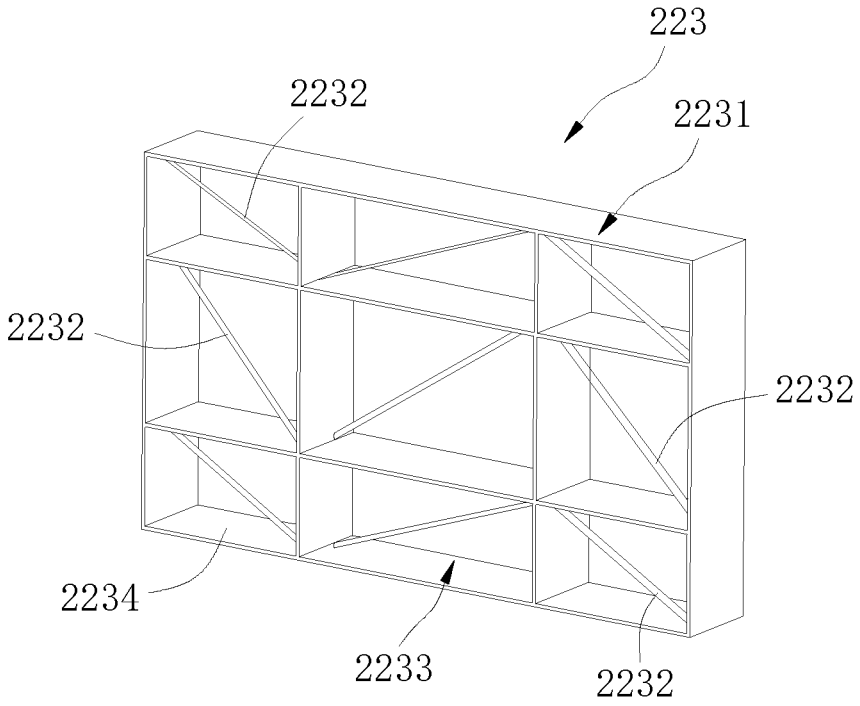

FIG.13

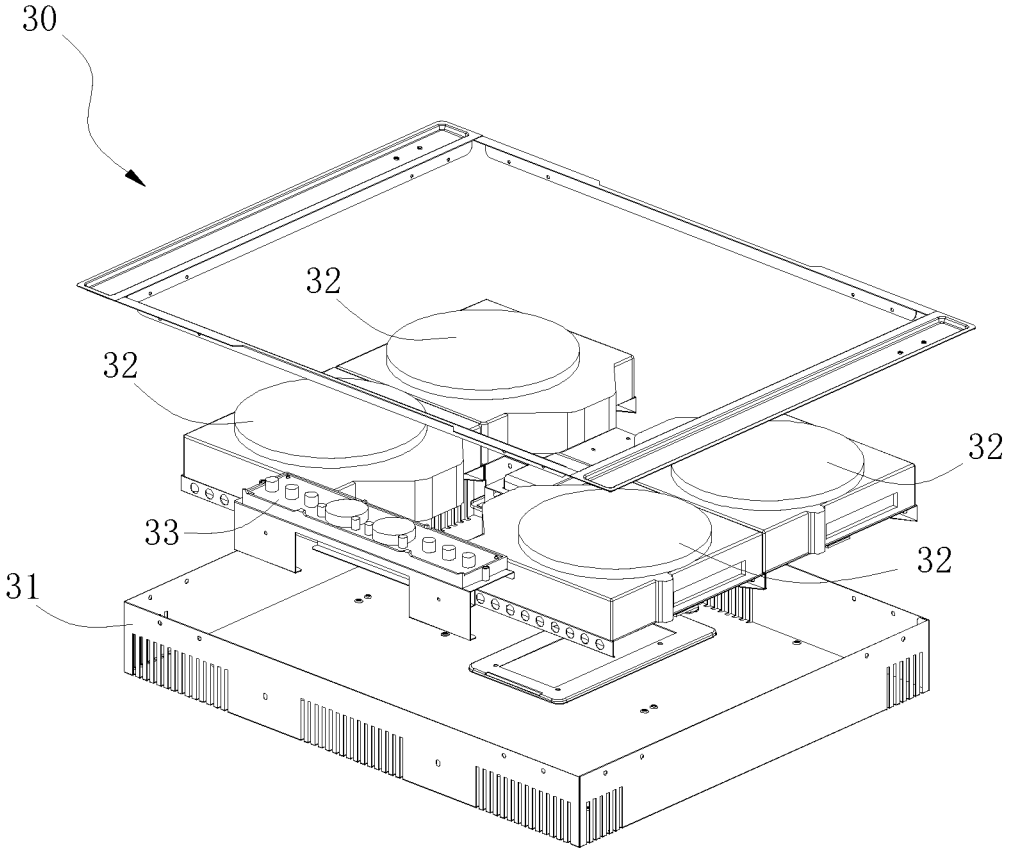

FIG.14

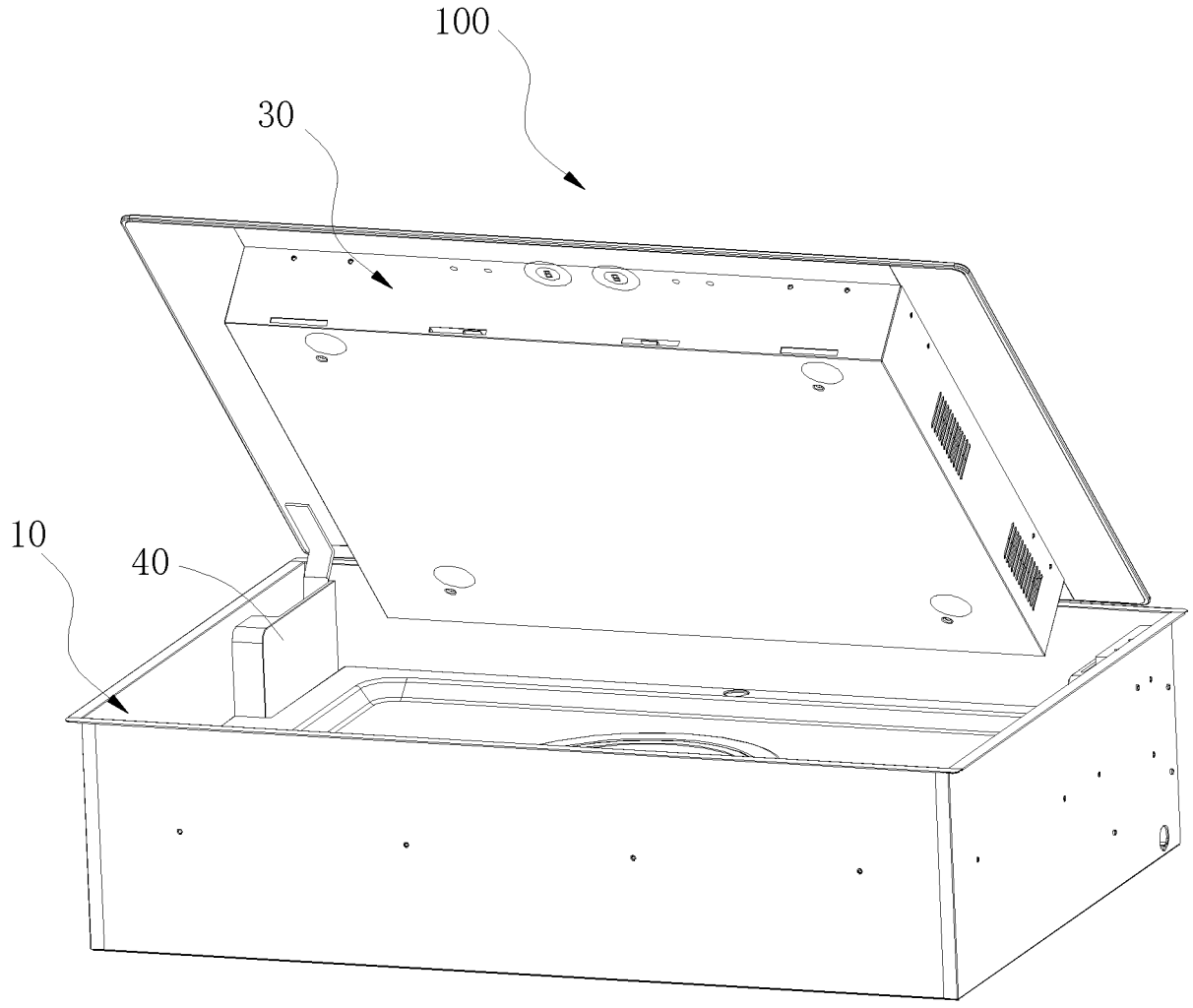

FIG.15

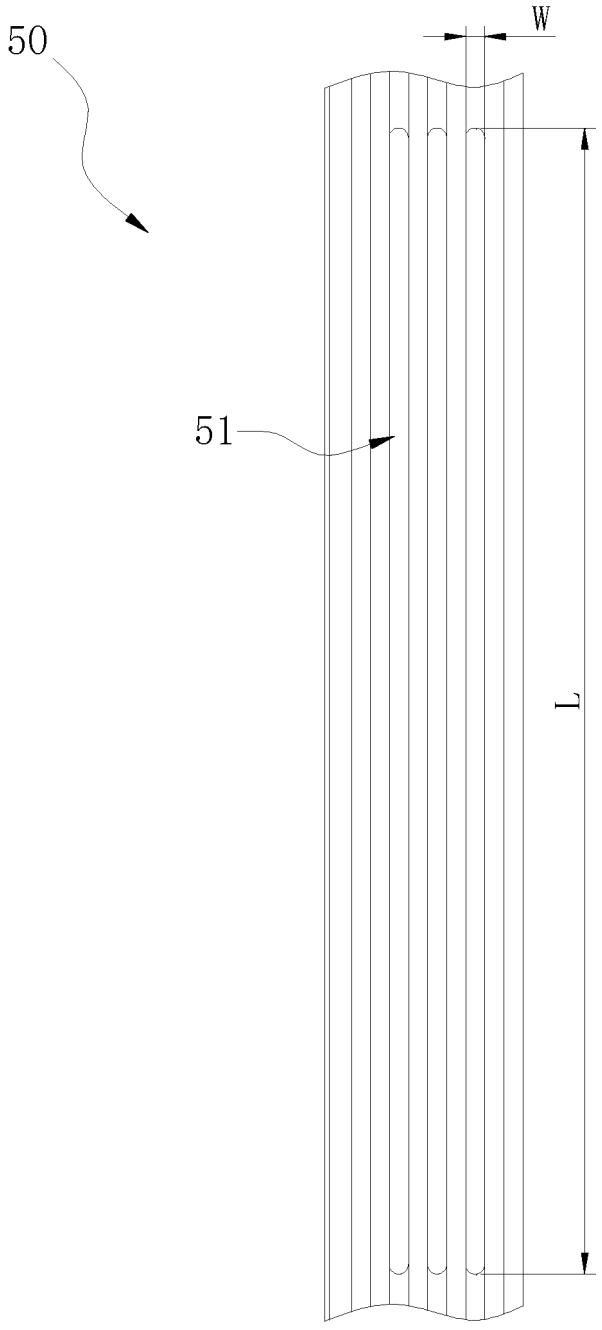

FIG.16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/114991

A. CLASSIFICATION OF SUBJECT MATTER

F24C 15/20(2006.01)i; B03C 3/02(2006.01)i; B03C 3/34(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24C, B03C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS, DWPI, VEN, CNKI: 空气净化, 空气加热, 离子, 离子发生, 加热, 线圈, 净化, 风机, 风道, 通道, 电磁空气加热, 电磁加热, 电磁, 过滤, ion+, heat+, electromagneti+, purified, purger, filter, fan, duct, coil

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	CN 206300240 U (SUZHOU LYULAN ENVIRONMENTAL PROTECTION SERVICE CO., LTD.) 04 July 2017 (2017-07-04) description, paragraphs [0003]-[0019], and figures 1-2	2-5
Y	CN 207254070 U (NANJING YUANHENG ENVIRONMENTAL RESEARCH INSTITUTE CO., LTD.) 20 April 2018 (2018-04-20) description, paragraphs [0004]-[0026], and figures 1-2	2-5
A	CN 109275217 A (GUIZHOU EDUCATION UNIVERSITY) 25 January 2019 (2019-01-25) entire document	1-10
A	CN 207317127 U (TIANJIN BINHAI ENVIRO TECHNOLOGIES, INC.) 04 May 2018 (2018-05-04) entire document	1-10

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
02 November 2020	**17 November 2020**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/114991

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Information on patent family members

International application No.
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