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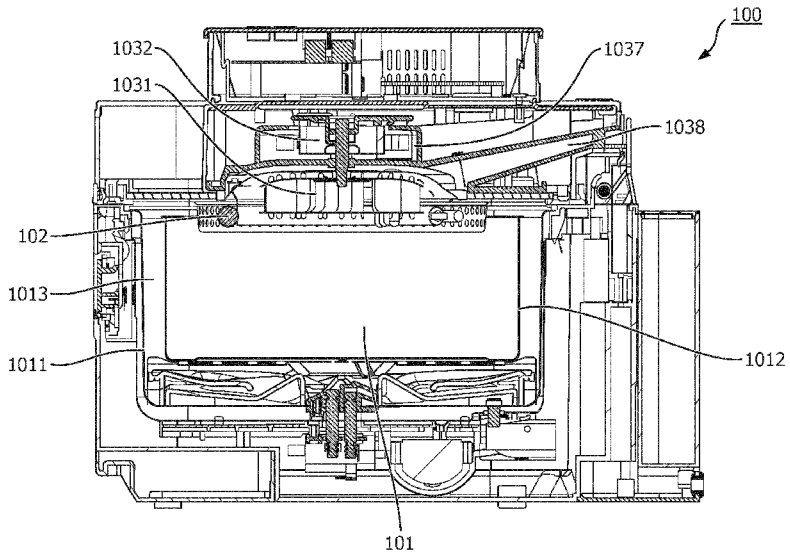

FIG. 3

(57) Abstract: The present disclosure provides an apparatus for preparing food. The apparatus includes: a food preparation chamber (101), the food preparation chamber (101) having an outer pot (1011) and an inner pot (1012), and an air circulation channel (1013) being provided between the outer pot (1011) and the inner pot (1012); a heating device (102) for heating air in the food preparation chamber (101); a fan (103) for driving the air and then causing the air to at least partially enter the air circulation channel (1013); and a heat shield (104), the heat shield (104) being disposed above the food preparation chamber (101) and having a downward curved or inclined surface extending outward.

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APPARATUS FOR PREPARING FOOD

FIELD OF TECHNOLOGY

[0001] The present disclosure relates to the field of kitchen appliances, in particular to an apparatus for preparing food.

BACKGROUND

[0002] At present, kitchen apparatuses such as ovens and steamers are becoming more and more popular, especially air fryers, which are welcomed by the market and consumers because of their ease of preparing food.

[0003] A structure of this type of apparatus is described in the Chinese patent No. CN10150462B. As shown in FIG. 1, the apparatus includes a food preparation chamber 2, the food preparation chamber having a bottom wall 5 through which air may pass and an air exhaust opening 6 in the top; a fan 7 driven by an electric motor 8, used for enabling hot air to pass through the bottom wall 5, the food preparation chamber 2, and the exhaust opening 6 in sequence; an air guide device 9, located between an inner wall 3 and an outer wall 4 of the food preparation chamber 2 and used for returning air to the bottom wall 5 separated from the food preparation chamber 2 via the exhaust opening 6; and a heat radiation device 10, located on an upper portion of the food preparation chamber 2. By means of this structure, the bottom of food in the food preparation chamber 2 may also be effectively heated.

[0004] As shown in the example, in the prior art, the motor, the fan and a heater included in this type of apparatus are vertically distributed. The overall combined height of the three is high, typically reaching about 150 mm or more. As shown in FIG. 2, a head of the apparatus has a high height (h_1), the head occupies a large space, the cooking space is small, and at the same time, the overall height (h_2) of the apparatus is also high. On the other hand, under the condition that the overall external dimensions of the apparatus are not changed, the only way to increase the volume of an inner pot of the food preparation chamber is to compress the spacing between the inner wall 3 and the outer wall 4. However, if the spacing is reduced, the heated air may not well enter a channel 9 between the inner and outer walls, thus weakening the circulation of hot air during food preparation and weakening the effect of heating the bottom

of food.

SUMMARY

[0005] The present disclosure is provided to present in simplified form some of the concepts that will be further described in the following specific implementations. The present disclosure is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to help determine the scope of the claimed subject matter.

[0006] One of the objects of the present disclosure is to provide an improved apparatus for preparing food. By the adoption of the improved internal structural design, the food cooking space is enlarged without reducing the effect of heating the bottom of food. In addition, by compressing the combined height of core parts of the apparatus, the height of a head is reduced, so that the overall height of the apparatus is reduced, or additional functional components, such as a visual window, parts with a water supplementing function and parts with a steam function, may be added while the volume remains unchanged.

[0007] According to one aspect of the present disclosure, an apparatus for preparing food is provided. The apparatus includes: a food preparation chamber, the food preparation chamber having an outer pot and an inner pot, and an air circulation channel being provided between the outer pot and the inner pot; a heating device for heating air in the food preparation chamber; a fan for driving the air and then causing the air to at least partially enter the air circulation channel; and a heat shield, the heat shield being disposed above the food preparation chamber and having a downward curved or inclined surface extending outward. By providing the heat shield, air may be more efficiently guided into the air circulation channel, so that the effect of heating the bottom of food in the food preparation chamber is improved. Moreover, the spacing of the air circulation channel may be reduced, so that the volume of the inner pot of the food preparation chamber is increased.

[0008] According to a further embodiment of the present disclosure, the fan is a centrifugal fan disposed above the food preparation chamber, the fan has an impeller and a motor disposed above the impeller, and the heat shield is disposed between the impeller and motor. In this way, the heat shield may be closer to the impeller, which is conducive to improving the air guide effect.

[0009] According to a further embodiment of the present disclosure, the heat shield is close to the impeller and covers a top of the impeller. In this way, the interlayer space between the top of the impeller and the heat shield may be compressed, and less air flows out of and accumulates on the top of the impeller, so that the overall air circulation efficiency of the food preparation chamber is improved.

[0010] According to a further embodiment of the present disclosure, the impeller includes a bottom hub, a closed top hub, and blades fixed between the top hub and the bottom hub, where the top hub is provided as a curved surface. The impeller has the closed curved top hub which matches the heat shield provided above and close to the top hub, so that air flowing out of the centrifugal fan may be more accurately guided into the air circulation channel, thereby improving the effect of heating the bottom of the food. Moreover, the spacing of the air circulation channel may be decreased, so that the volume of the inner pot in the food preparation chamber is increased.

[0011] According to a further embodiment of the present disclosure, the curved surface of the top hub has a radian of 10-30°. In this way, air guidance may match the arrangement of the inner and outer pots and the air circulation channel.

[0012] According to a further embodiment of the present disclosure, an outer surface of the top hub is provided with one or more spoiler blades. In this way, the air flow speed in the interlayer space may be increased, which achieves local heat dissipation and cooling.

[0013] According to a further embodiment of the present disclosure, the bottom hub of the impeller is closed, a first hole for allowing a drive shaft of the motor to pass through is provided in a center of the top hub of the impeller, and a second hole for sucking in the air is provided in a center of the bottom hub, and a diameter of the first hole is smaller than a diameter of the second hole. In this way, it may be ensured that the air sucked in by the fan flows out horizontally, and the fan is completely separated from the air sucked in to avoid airflow conflicts that may weaken the air circulation and guide effect of the fan. The opening in the top hub is as small as possible to help block air from flowing out upward.

[0014] According to a further embodiment of the present disclosure, the curved or inclined surface is connected to a top of the outer pot. In this way, the curved or inclined surface of the heat shield may more efficiently guide the air flowing out of the fan into the air

circulation channel.

[0015] According to a further embodiment of the present disclosure, the heating device is horizontally disposed around the impeller. In this way, compared to the prior art where the heating device and the impeller are disposed vertically, the combined height of the heating device, the impeller, and the motor may be significantly reduced, so that the height of the head portion is reduced, the overall height of the apparatus is reduced, and the dimensions are more compact, or the space saved may also be used for mounting of other functional components to expand the functions of the apparatus.

[0016] According to a further embodiment of the present disclosure, the heating device is disposed at a bottom edge of the impeller. In this way, the probability that food on an upper layer of the inner pot is burnt due to turbulence is reduced.

[0017] According to a further embodiment of the present disclosure, the heating device is a carbon fiber or graphene heater, and the heating device includes a power adjusting device for controlling heating power of heating device to be adjustable within a range of 500-2400 W. By the adoption of the high power density heater, the maximum heating power required may be ensured under the condition that the surface area of the heating device is reduced. Moreover, different heating powers are selected according to the characteristics of different ingredients, which improves the cooking effect.

[0018] According to a further embodiment of the present disclosure, the motor is a brushless direct current motor and is configured to be steplessly speed adjustable within a range of 1000-5000 rpm. In this way, the apparatus may achieve the advantages of high speed, high efficiency and low noise. Moreover, different air pressures and speeds may be selected according to the characteristics of different ingredients, which improves the cooking effect.

[0019] According to a further embodiment of the present disclosure, a spacing of the air circulation channel is smaller than 16 mm. By reducing the spacing, the volume of the inner pot of the food preparation chamber may be increased under the condition that the external dimensions of the apparatus remain unchanged.

[0020] According to a further embodiment of the present disclosure, the apparatus is an air fryer.

[0021] According to a further embodiment of the present disclosure, the air fryer

includes a head portion disposed on an upper half part of a body of the air fryer, and a frying basket portion disposed on and capable of being pulled out of a lower half part of the body of the air fryer, where the heating device, the fan and the heat shield are disposed in the head portion, and an overall combined height of the heating device, the fan and the heat shield is 50 mm or below. Through the reduction of the overall combined height of the heating device, the fan and the heat shield, the overall height of the head portion and the apparatus is reduced, or other functional components may be added.

[0022] These and other features and advantages will become apparent by reading the following detailed description and referring to the associated accompanying drawings. It should be understood that the preceding general description and the following detailed description are merely illustrative and are not intended to limit the aspects for which protection is claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] In order to understand in detail the manner in which the above features of the present disclosure are used, the above briefly outlined content may be described in more detail with reference to embodiments, some of which are shown in the accompanying drawings. It should be noted, however, that the accompanying drawings only show some typical aspects of the present disclosure and should not be considered as limiting the scope thereof, as the description may allow for other equally valid aspects.

[0024] FIG. 1 illustrates a schematic diagram of an internal structure of a food preparation apparatus in the prior art.

[0025] FIG. 2 illustrates a schematic diagram of a head and overall height of a food preparation apparatus in the prior art.

[0026] FIG. 3 illustrates a cross-sectional structural view of an apparatus for preparing food according to a first exemplary embodiment of the present disclosure.

[0027] FIG. 4 illustrates a schematic diagram of internal air circulation during operation of an apparatus for preparing food according to a first exemplary embodiment of the present disclosure.

[0028] FIG. 5 illustrates a partially enlarged cross-sectional view of an apparatus for

preparing food according to a first exemplary embodiment of the present disclosure.

[0029] FIG. 6 illustrates a schematic diagram of a head and overall height of an apparatus for preparing food according to a first exemplary embodiment of the present disclosure.

[0030] FIG. 7 illustrates a partially enlarged cross-sectional view of a fan impeller and a heat shield according to a first exemplary embodiment of the present disclosure.

[0031] FIG. 8 (a) to FIG. 8(d) illustrate a top view, a side view, a top view, and a three-dimensional perspective view, respectively, of a fan impeller according to a first exemplary embodiment of the present disclosure.

[0032] FIG. 9 illustrates a schematic view of spoiler blades of a fan impeller according to a first exemplary embodiment of the present disclosure.

[0033] FIG. 10 illustrates an overall exterior view of an apparatus for preparing food according to a second exemplary embodiment of the present disclosure.

[0034] Description of reference numerals:

[0035] 100 Apparatus for preparing food; 101 Food preparation chamber; 1011 Outer pot; 1012 Inner pot; 1013 Air circulation channel; 102 Heating device; 103 Fan; 1031 Impeller; 1032 Motor; 1033 Top hub; 1034 Bottom hub; 1035 Blade; 1036 Spoiler blade; 1037 Cooling air blade; 1038 Air duct; 200 Air fryer; 201 Functional component

DESCRIPTION OF THE EMBODIMENTS

[0036] Embodiments of the present disclosure will be described in more detail below with reference to the accompanying drawings. While some embodiments of the present disclosure are shown in the accompanying drawings, it is to be understood that the present disclosure may be implemented in various forms and should not be construed as being limited to the embodiments set forth herein; rather, these embodiments are provided for a more thorough and complete understanding of the present disclosure. It is to be understood that the accompanying drawings and embodiments of the present disclosure are merely for exemplary purposes and are not intended to limit the scope of protection of the present disclosure.

[0037] In the description of the present disclosure, it is to be noted that, unless otherwise indicated, "a plurality of" means two or more; and the terms "upper", "lower", "left",

"right", "inner", "outer", etc., indicate an orientation or positional relationship only for the purpose of facilitating the description of the present disclosure and simplifying the description, and are not intended to indicate or imply that the device or element referred to must be of a particular orientation, be constructed and operated with a particular orientation, and therefore are not to be construed as limitations of the present disclosure. In addition, the terms "first", "second", "third", etc. are used for descriptive purposes only and are not to be construed as indicating or implying relative importance. "Vertical" is not strictly vertical, but within the error allowed. "Parallel" is not strictly parallel, but within the error allowed.

[0038] Orientation words appearing in the following description are orientations shown in the drawings and are not intended to limit the specific structure of the present disclosure. In the description of the present disclosure, it is also to be noted that, unless otherwise expressly specified and limited, the terms "mounted", "connected" and "connecting" are to be understood in a broad sense, for example, it may be a fixed connection, or a removable connection, or an integral connection; or it may be a direct connection or an indirect connection through an intermediate medium. For those of ordinary skill in the art, the specific meaning of the above terms in the present disclosure may be understood depending on the particular circumstances.

[0039] Reference herein to "embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment may be included in at least one embodiment of the present disclosure. The phrase at various locations in the description does not necessarily refer to the same embodiment, or an independent or alternative embodiment mutually exclusive of other embodiments. It is to be expressly and implicitly understood by a person of ordinary skill in the art that the embodiments described herein may be combined with other embodiments.

[0040] In the description of the embodiments of the present disclosure, the term "and/or" is merely an association relationship describing associated objects, indicating that there may be three relationships, for example, A and/or B may indicate: there are three cases of A alone, A and B together, and B alone. In addition, the character "/", as used herein, generally indicates that the associated objects are of an "or" relationship.

[0041] It is to be noted that, for ease of description, each of the accompanying drawings of the present disclosure is described using an air fryer as an example of an apparatus for

preparing food. However, it is to be appreciated that the structure and improvements of the present disclosure are not only applicable to air fryers, but may be applicable to any food preparation apparatus that prepares food by means of heat radiation and hot air circulation, such as ovens and steamers.

[0042] The principles of the present disclosure will be described below in connection with FIG. 3 to FIG. 10, where FIG. 3 to FIG. 9 relate to a first exemplary embodiment of the present disclosure and FIG. 10 relates to a second exemplary embodiment of the present disclosure.

[0043] As shown in FIG. 3, an apparatus 100 for preparing food (hereinafter referred to as "apparatus 100") may include a food preparation chamber 101. The food preparation chamber 101 may have an outer pot 1011 and an inner pot 1012, and an air circulation channel 1013 is provided between the outer pot 1011 and the inner pot 1012. In the example where the apparatus 100 for preparing food is an air fryer, the inner pot 1012 is also sometimes referred to as a frying basket or food basket for accommodating food to be prepared. A bottom of the inner pot 1012 may have an opening and communicate with the air circulation channel 1013.

[0044] A heating device 102 and a fan 103 are disposed on an upper portion of the interior of the food preparation chamber 101. The fan 103 may be a centrifugal fan. As shown in FIG. 4, air flows into the fan 103 from a bottom of the fan 103, and flows out of the fan 103 in a horizontal direction. It will be appreciated that the fan 103 may also be disposed at any other position in the apparatus 100 that is suitable for realizing the circulation of air in the food preparation chamber and, depending on the position where the fan is disposed, the fan may also not be a centrifugal fan, but rather some other type of fan adapted to the air flow direction that needs to be realized.

[0045] The fan 103 may include an impeller 1031 and a motor 1032 disposed above the impeller 1031. Under the action of the heating device 102, heated air may be driven by the fan 103 to flow in the food preparation chamber 101, at least partially enter the air circulation channel 1013, pass through the opening in the bottom of the inner pot 1012, and return to the inner pot 1012, so as to form air circulation and heat food in the inner pot 1012, particularly the bottom of the food. The impeller 1031 may be a curved centrifugal impeller, which may further improve the consistency of the blowing direction of an air outlet of the fan 103, and at

the same time, ensure the negative pressure and the size of a negative pressure area of an air inlet, thereby increasing the speed and uniformity of hot air flow in the fryer.

[0046] In the illustrated example, the apparatus 100 further includes a heat shield 104 disposed on the upper portion of the food preparation chamber 101 for blocking upward transfer of heat in the food preparation chamber 101. Preferably, the heat shield 104 may be disposed between the impeller 1031 and the motor 1032 of the fan 103. Cooling air blades 1037 for decreasing the temperature in the chamber above the heat shield, and an air duct 1038 for distributing air inside the chamber to the outside of the apparatus 100 may be disposed on the periphery of the motor. The heat shield 104 may have a hole, and the aperture of the hole may be as small as possible, , for example, only allowing a drive shaft of the motor 1032 to pass through, thus avoiding reducing the insulating effect of the heat shield. Additionally, further preferably, the heat shield 104 may be close to the impeller 1031 and cover a top of the impeller 1031, which may help to guide a small amount of air flowing out from the upper portion of the fan 103 to the outside as well, thus allowing more hot air to enter the air circulation channel 1013. It is envisioned that the more air that enters the air circulation channel 1013, the better the effect of heating the bottom of the food. Thus, the heat shield 104 may be curved or inclined from the center to the outer side, as shown in the partially enlarged view of FIG. 5. In one example, the heat shield 104 may have, at the top of the impeller, a surface adapted to the top of the impeller, and have a pronounced curved or inclined surface at a position substantially near an edge of the top of the impeller, so that both air flowing out of the top of the impeller 1031 and air flowing out of the outer side of the impeller 1031 are guided to the air circulation channel 1013 under the guiding action of the heat shield 104. In another example, the curved or inclined surface of the heat shield 104 may be connected to the top of the outer pot 1011 so as to directly guide air into the air circulation channel 1013.

[0047] Unlike the prior art where the heating device is typically vertically disposed under the impeller, in the embodiments of the present disclosure, the heating device 102 may be horizontally disposed around the impeller 1031 of the fan 103, and form an axially nested structure with the impeller 1031. This structure significantly compresses the combined height of the heating device, the impeller, and the motor, and the combined height may be reduced to about 50 mm or less, as shown in FIG. 6. By comparing FIG. 6 with FIG. 2, it can be seen that

by the adoption of the structure, the head height (h_1) is smaller, so that the cooking space may be larger under the condition that the overall height (h_2) of the apparatus remains unchanged.

[0048] Compared with the existing heating device disposed below the impeller, the heating device 102 of the present disclosure has a small surface area, so the heating device 102 may be a carbon fiber or graphene or other high power density heaters, for example, a heating tube made of carbon fiber or graphene. Moreover, the middle may be hollowed out to ensure the maximum power output of the heating device 102, for example, the maximum output power of 2400 W may be achieved. In addition, the heating device 102 may further include a power adjusting device (not shown), such as a silicon controlled rectifier, to control the heating power of the heating device to be adjustable within, for example, a range of 500-2400 W, so that different heater powers are provided according to different food characteristics to ensure the cooking effect.

[0049] According to a further embodiment of the present disclosure, as shown in the partially enlarged view of FIG. 7, the heating device 102 may be provided at a bottom edge of the impeller 1031. Since the middle of the heating device 102 is hollowed out and the power density per unit surface area is high, the surface of the heating tube needs to dissipate heat quickly. By providing the heating device 102 at the bottom edge of the impeller 1031, high-speed air blown from the impeller 1031 may cool the surface of the heating device 102, at the same time, air that has blown the surface of the heating device 102 is also heated, and the heated hot air is blown into the air circulation channel 1013 to heat the food in the fryer, which helps to improve the cooking effect of the food. On the other hand, compared with the manner of providing the heating device below the fan, providing the heating device at the bottom edge of the impeller is conducive to reducing the probability that food on an upper layer of the inner pot is burnt due to turbulence.

[0050] According to a further embodiment of the present disclosure, the motor 1032 may be a brushless direct current motor, also referred to as a BLDC motor. The BLDC motor may achieve stepless speed regulation, for example, the rotation speed of the fan impeller may be controlled to be adjustable within the range of 1000-5000 rpm, so as to control the air pressure and air volume of the hot air in the food preparation chamber. As a result, both the impeller air speed and the heating power of the apparatus of the present disclosure may be

independently adjusted. In the air fryer of the prior art, both the heater power and the motor speed are fixed values, the cooking effect relies more on frequent manual operation, and for a user who uses the air fryer for the first time, the one-time success rate of cooking is low. Compared to the prior art, the apparatus of the present disclosure may select different motor speeds, different heating powers, and different combinations of motor speeds and heating powers according to the characteristics of different ingredients. For example, for meat that requires high temperature and fast cooking, high-temperature high power (1800 W) and high air speed (10-12 meters per second, corresponding to the air blade rotation speed of about 5000 rpm) may be used; and for broccoli, enoki mushrooms, cabbage and other vegetable ingredients, medium-temperature medium power (1000 W) and medium air speed (5-7 meters per second, corresponding to the air blade rotation speed of about 2400 rpm) may be used. As a result, the apparatus may provide the user with a plurality of preset programs with different cooking parameters for different types of ingredients, while the user is also allowed to freely adjust the heating power and the air blade rotation speed as needed, thereby improving the cooking effect.

[0051] According to a further embodiment of the present disclosure, as shown in FIG. 8(a) to FIG. 8(d), the impeller 1031 of the centrifugal fan 103 may include a top hub 1033 and a bottom hub 1034, and blades 1035 are fixed between the top hub 1033 and the bottom hub 1034. In a further embodiment of the present disclosure, the top hub 1033 may be closed while the bottom hub 1034 is not closed. A center of the closed top hub 1033 may have a first hole that only allows the drive shaft of the motor 1032 to pass through, thereby minimizing air flowing out to a position above the impeller. In this embodiment, the closed top hub may further enhance the centrifugal effect of the blades 1035 on air sucked in from the bottom of the impeller, and guide most of the air to the outside in the horizontal direction. In addition, a small amount of air that escapes from the hole in the top hub may also be guided to flow out in the horizontal direction under the action of the heat shield above the impeller.

[0052] In another further embodiment of the present disclosure, the top hub 1033 may not be closed while the bottom hub 1034 is closed. A center of the closed bottom hub 1034 may have a second hole for sucking in air. In this embodiment, the closed bottom hub and the heat shield above the impeller form an interlayer, and air is sucked in via the second hole and then guided out in the horizontal direction by the combined action of the blades 1035 and the heat

shield. In addition, the closed bottom hub may ensure that the air sucked in flows out horizontally, and is completely separated from the air sucked in to avoid airflow conflicts that may weaken the air circulation and guide effects of the fan.

[0053] In yet a further embodiment of the present disclosure, both the top hub 1033 and the bottom hub 1034 may be closed. Similarly, the center of the top hub 1033 has a first hole that allows the drive shaft of the motor 1032 to pass through, and the center of the bottom hub 1034 has a second hole for sucking in air. The diameter of the first hole may be smaller than the diameter of the second hole. For example, the diameter of the first hole may be as small as possible to only allow the drive shaft of the motor to pass through, thereby minimizing air flowing out to a position above the impeller; while the diameter of the second hole is significantly greater than the diameter of the first hole, for example, matching the width of the blades 1035, thereby ensuring the air intake volume of the centrifugal fan 103. In this embodiment, the closed top hub 1033 and the closed bottom hub 1034 together enhance the air circulation and guide effects of the centrifugal fan.

[0054] According to a further embodiment of the present disclosure, the closed top hub 1033 of the impeller 1031 is a curved surface. As shown in FIG. 2, FIG. 5, FIG. 7, and FIG. 8(b), the top hub 1033 is a curved surface that is curved downward at a certain radian from the center to the periphery. The radian of the curved surface may match the height of the inner pot, for example, the radian may be set to be 10-30°. Alternatively, a specific radian may be designed by taking into account the actual fan size and performance, the mounting position of the fan, the positions of the inner and outer pots, the inlet position of the air circulation channel, and so on, so that air blown out of the fan 103 is directional and more likely to enter the air circulation channel 1013. In addition, in the case where the top hub 1033 is a curved surface, the curved or inclined surface of the heat shield 104 may be adapted to the curved surface of the top hub 1033, so that the heat shield 104 is closer to the top of the fan 103 while covering the fan 103, and accordingly the directional air guide effect of the fan is improved. In an alternative embodiment of the present disclosure, when the top hub 1033 has a closed curved surface, the heat shield 104 may not be a curved or inclined surface. An improved air guide effect may also be shown under the action of the curved top hub 1033, i.e., air is directly guided to the air circulation channel 1013.

[0055] According to a further embodiment of the present disclosure, one or more spoiler blades 1036 may be disposed on an outer surface of the top hub 1033 of the impeller 1031, as shown in FIG. 9. As previously mentioned, the heat shield may be close to the top of the fan 103, but there is still a gap between the two to form the interlayer space. By providing the spoiler blades 1036, the air flow speed in the interlayer space may be increased, which achieves local heat dissipation and cooling.

[0056] By means of the above-described first exemplary embodiment of the present disclosure, the orderliness of air flow in the food preparation chamber of the apparatus 100 during food preparation may be significantly improved, and air may be effectively directed towards the air circulation channel between the inner and outer pots on the outer side, so that a narrower spacing of the air circulation channel may be supported, for example, the spacing may be narrowed from the conventional spacing of 18-20 mm to 16 mm or below, preferably, to 12 mm or below or to 8 mm or below, thereby expanding the volume of the inner pot.

[0057] FIG. 10 illustrates an overall exterior view of an apparatus for preparing food according to a second exemplary embodiment of the present disclosure. According to the second exemplary embodiment of the present disclosure, as shown in FIG. 10, the apparatus for preparing food is an air fryer 200. The air fryer includes a head portion disposed on an upper half part of a body, and a frying basket portion disposed on and capable of being pulled out of a lower half part of the body. The interior of the air fryer has an internal structure and features similar to those of the apparatus described in the first exemplary embodiment, where the heating device, the centrifugal fan, and the heat shield are disposed in the head portion, the food preparation chamber is disposed in the frying basket portion, and the inner and outer pot structures are also used. The fan motor, the impeller, and the heating device are still of an axially nested structure to achieve a compressed combined height, for example, 50 mm or below.

[0058] Unlike the first exemplary embodiment where a low height of the head portion is achieved, in the second exemplary embodiment, the original height of the head portion may be maintained, and under the condition that the volume remains substantially unchanged, the space saved may be used to add additional functional components 201, such as a visual window assembly for a user to view the food preparation, and a water supplementing assembly or steam

assembly for adding water or steam to the food preparation chamber to maintain the humidity of the food. By means of these functional components, the cooking effect of the apparatus may be improved, and the user experience is further enhanced.

[0059] What has been described above includes examples of various aspects of the claimed subject matter. It is, of course, impossible to describe every conceivable combination of assemblies or methods for the purpose of depicting the claimed subject matter, but a person of ordinary skill in the art should recognize that many further combinations and arrangements of the claimed subject matter are possible. Therefore, the disclosed subject matter is intended to cover all such alterations, modifications and variations that fall within the spirit and scope of the appended claims.

CLAIMS

1. An apparatus (100) for preparing food, comprising:

a food preparation chamber (101), the food preparation chamber (101) having an outer pot (1011) and an inner pot (1012), and an air circulation channel (1013) being provided between the outer pot (1011) and the inner pot (1012);

a heating device (102) for heating air in the food preparation chamber (101);

a fan (103) for driving the air and then causing the air to at least partially enter the air circulation channel (1013); and

a heat shield (104), the heat shield (104) being disposed above the food preparation chamber (101) and having a downward curved or inclined surface extending outward.

2. The apparatus (100) according to claim 1, characterized in that the fan (103) is a centrifugal fan disposed above the food preparation chamber (101), the fan (103) has an impeller (1031) and a motor (1032) disposed above the impeller (1031), and the heat shield (104) is disposed between the impeller (1031) and the motor (1032).

3. The apparatus (100) according to claim 2, characterized in that the heat shield (104) is close to the impeller (1031) and covers a top of the impeller (1031).

4. The apparatus (100) according to claim 3, characterized in that the impeller (1031) comprises a bottom hub (1034), a closed top hub (1033), and blades (1035) fixed between the top hub (1033) and the bottom hub (1034), wherein the top hub (1033) is a curved surface.

5. The apparatus (100) according to claim 4, characterized in that the curved surface of the top hub (1033) of the impeller (1031) has a radian of 10-30°.

6. The apparatus (100) according to claim 4, characterized in that an outer surface of the top hub (1033) is provided with one or more spoiler blades (1036).

7. The apparatus (100) according to claim 4, characterized in that the bottom hub (1034) of the impeller (1031) is closed, a first hole for allowing a drive shaft of the motor (1032) to pass through is provided in a center of the top hub (1033), a second hole for sucking in the air is provided in a center of the bottom hub (1034), and a diameter of the first hole is smaller than a diameter of the second hole.

8. The apparatus (100) according to claim 1, characterized in that the curved or inclined

surface of the heat shield (104) is connected to a top of the outer pot.

9. The apparatus (100) according to claim 2, characterized in that the heating device (102) is horizontally disposed around the impeller (1031).

10. The apparatus (100) according to claim 9, characterized in that the heating device (102) is provided at a bottom edge of the impeller (1031).

11. The apparatus (100) according to claim 1, characterized in that the heating device (102) is a carbon fiber or graphene heater, and the heating device (102) comprises a power adjusting device for controlling heating power of the heating device (102) to be adjustable within a range of 500-2400 W.

12. The apparatus (100) according to claim 1, characterized in that the motor (1032) is a brushless direct current motor and is configured to be steplessly speed adjustable within a range of 1000-5000 rpm.

13. The apparatus (100) according to claim 1, characterized in that a spacing of the air circulation channel (1013) is smaller than 16 mm.

14. The apparatus (100) according to any one of claims 1-13, characterized in that the apparatus (100) is an air fryer.

15. The apparatus (100) according to claim 14, characterized in that the air fryer comprises a head portion disposed on an upper half part of a body of the air fryer, and a frying basket portion disposed on and capable of being pulled out of a lower half part of the body of the air fryer, wherein the heating device (102), the fan (103) and the heat shield (104) are disposed in the head portion, and an overall combined height of the heating device (102), the fan (103) and the heat shield (104) is 50 mm or below.

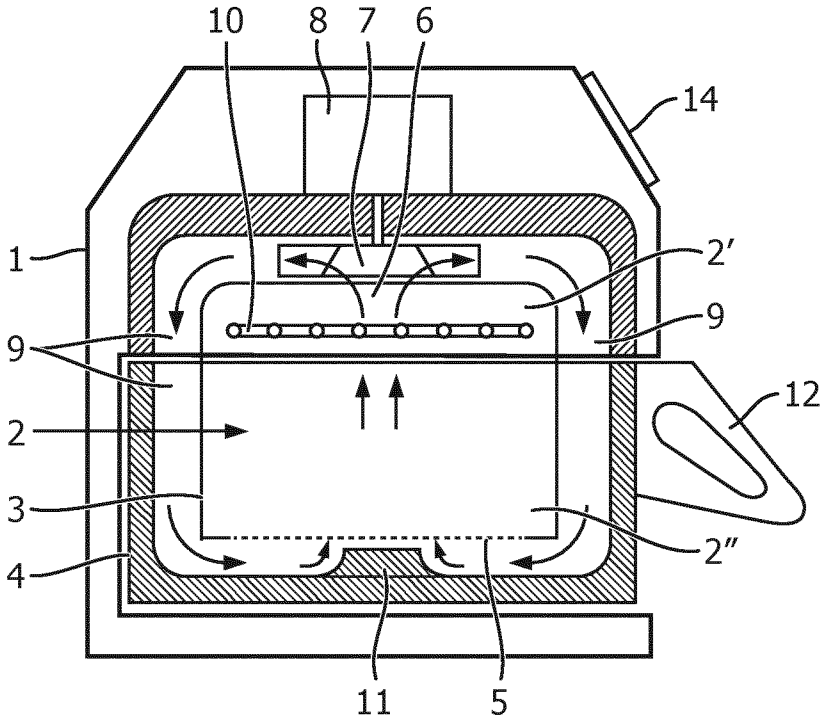

FIG. 1

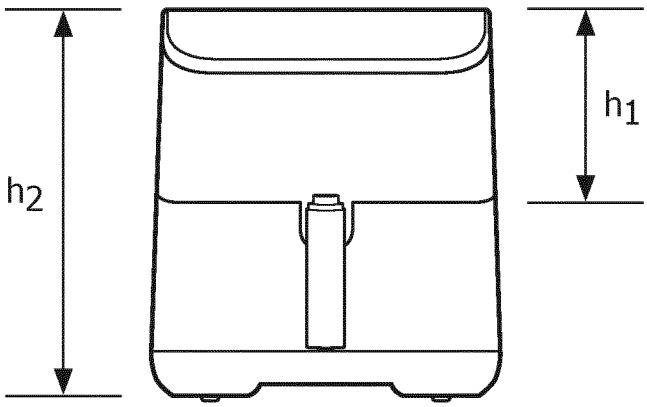

FIG. 2

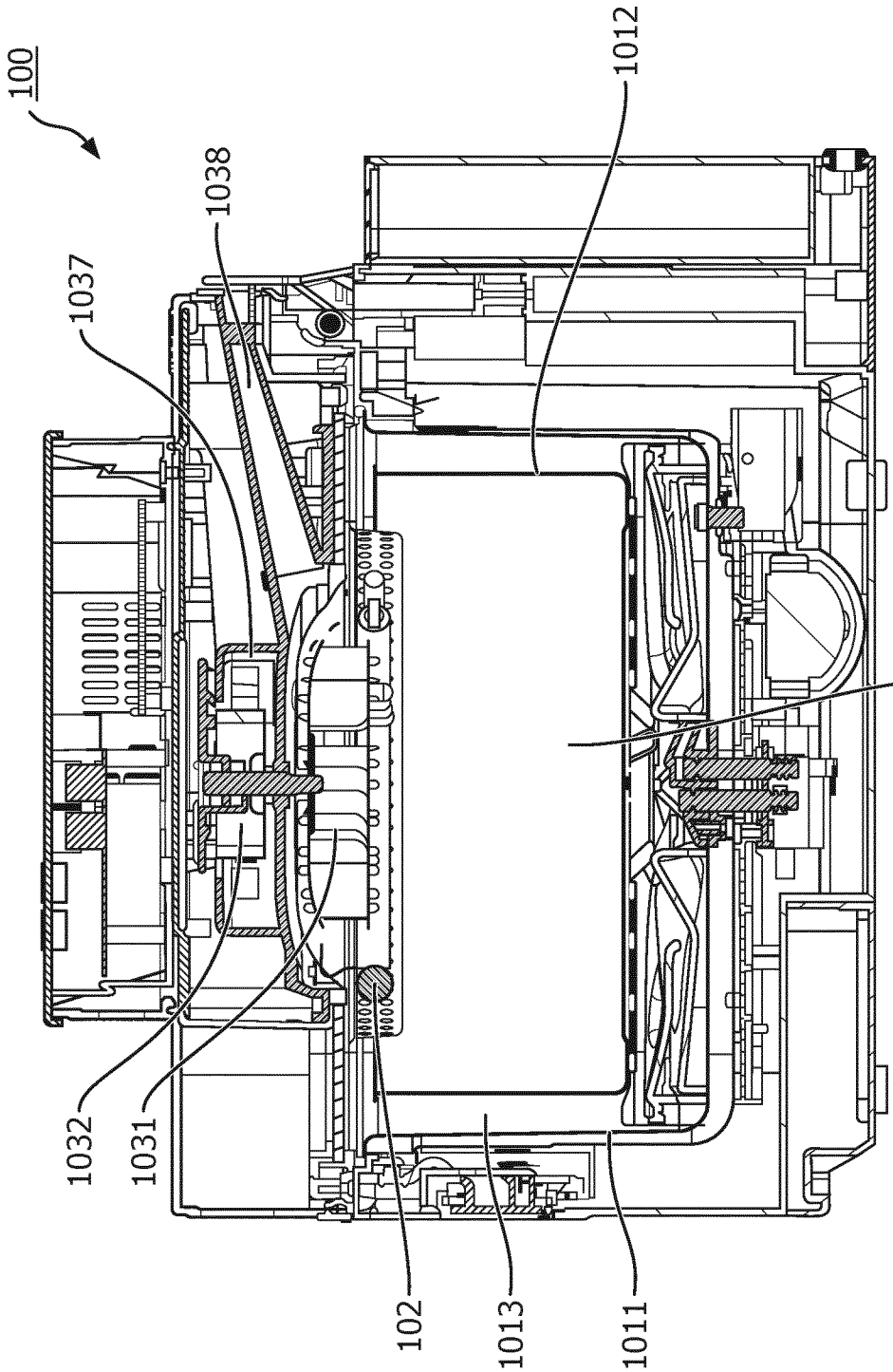

FIG. 3

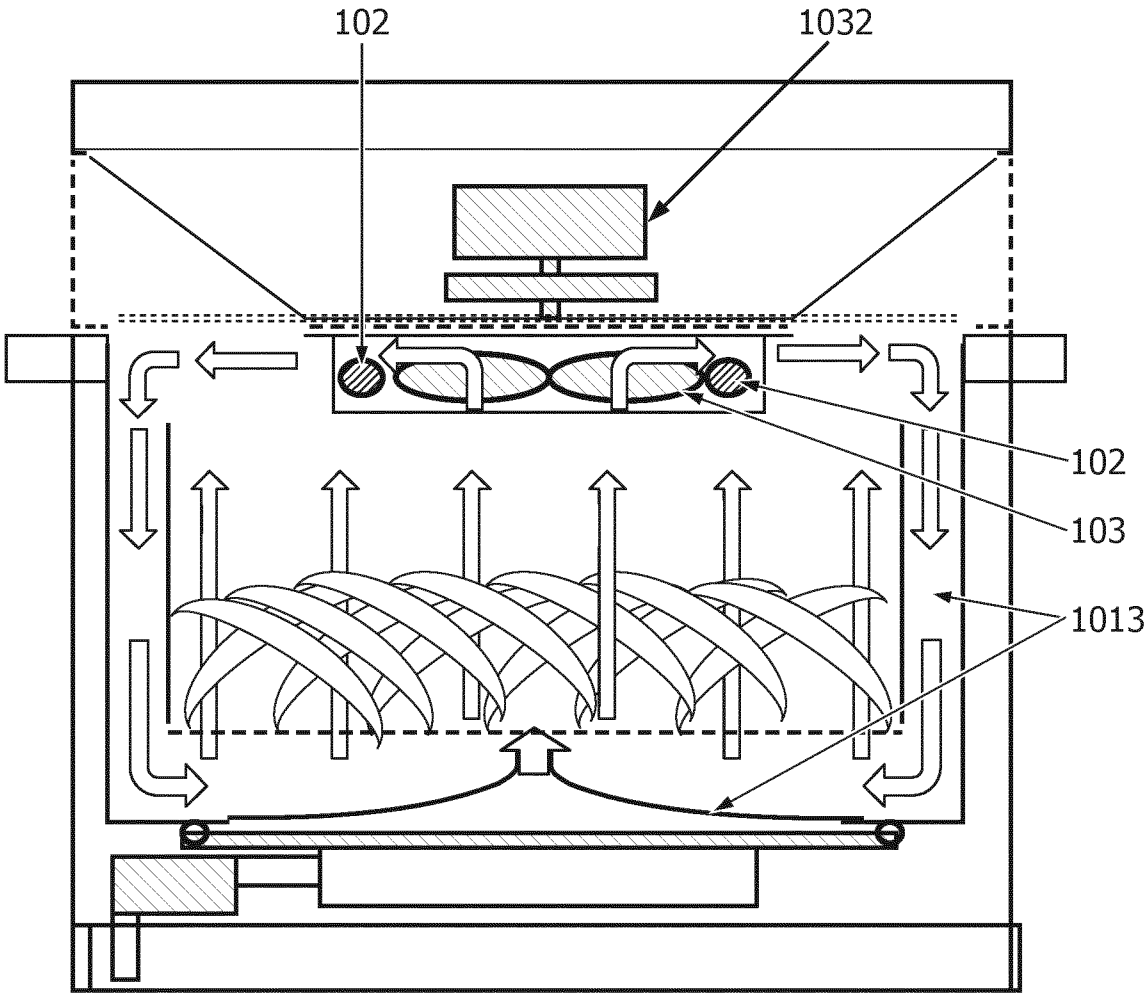

FIG. 4

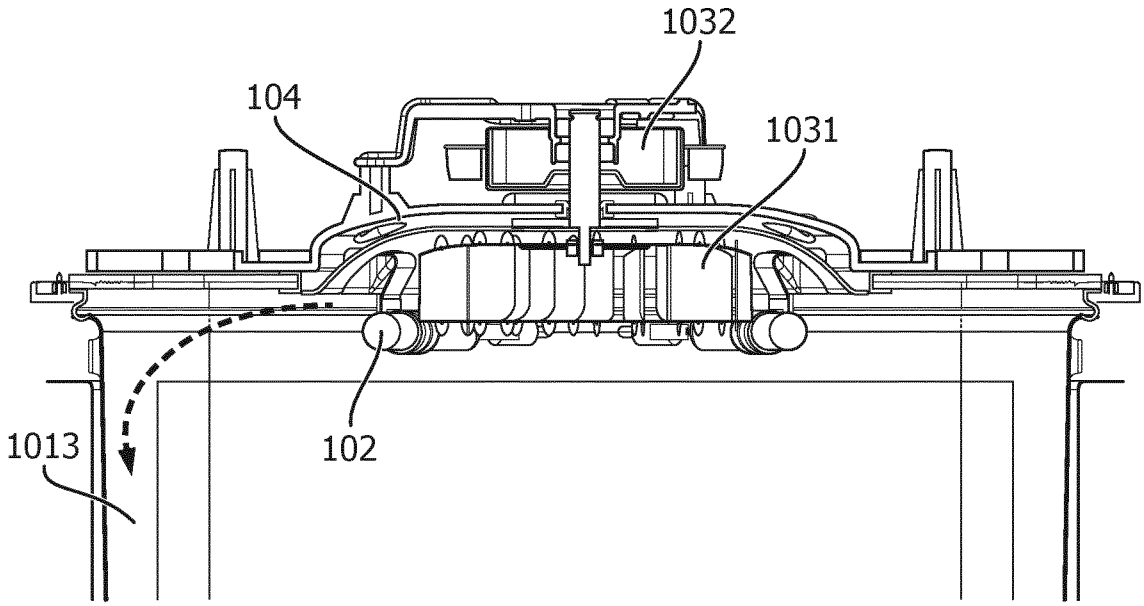

FIG. 5

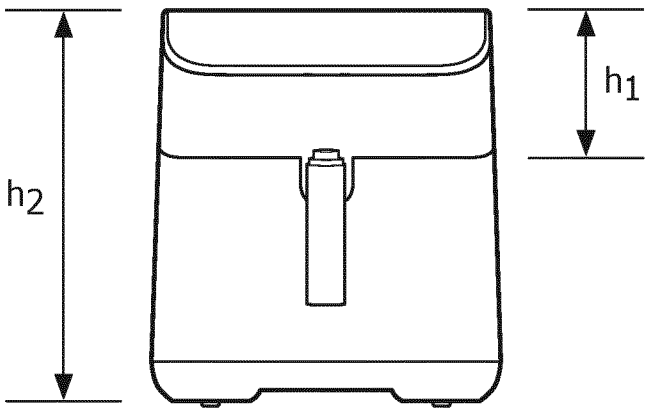

FIG. 6

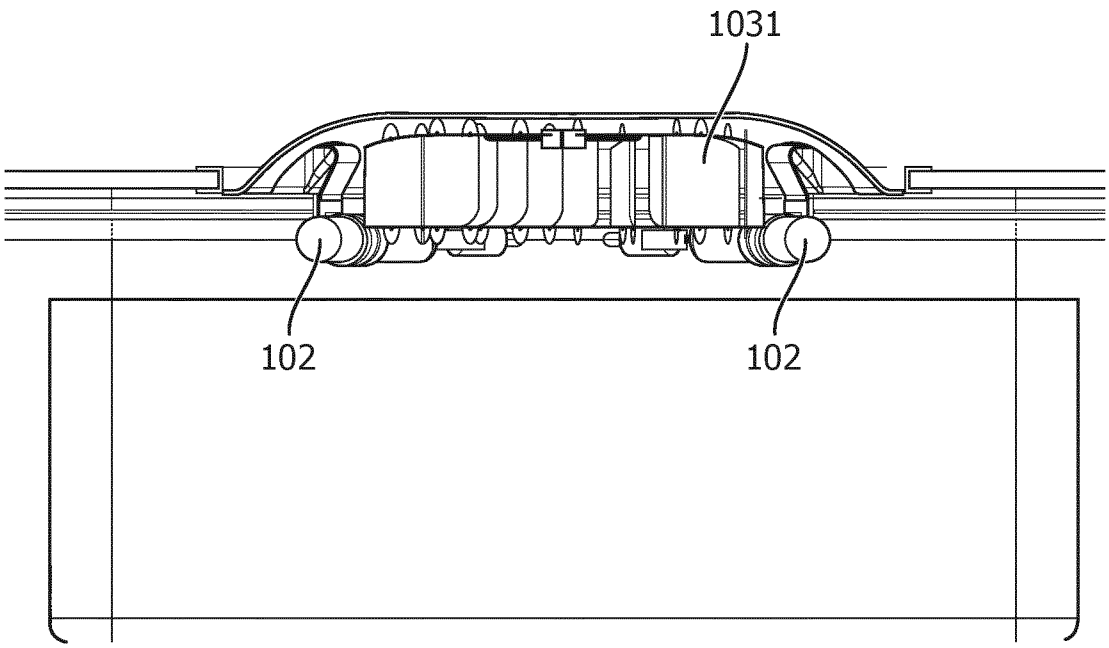

FIG. 7

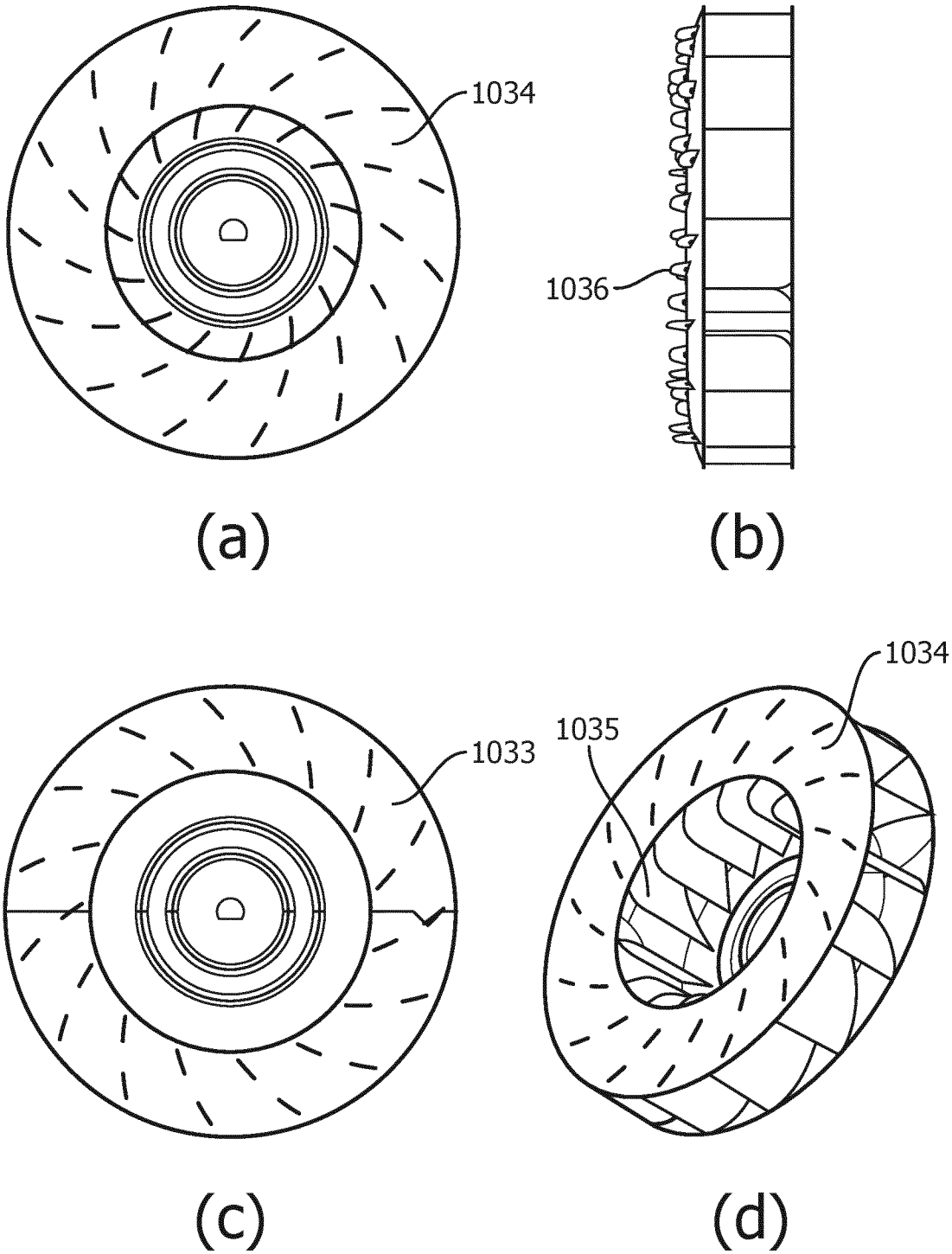

FIG. 8

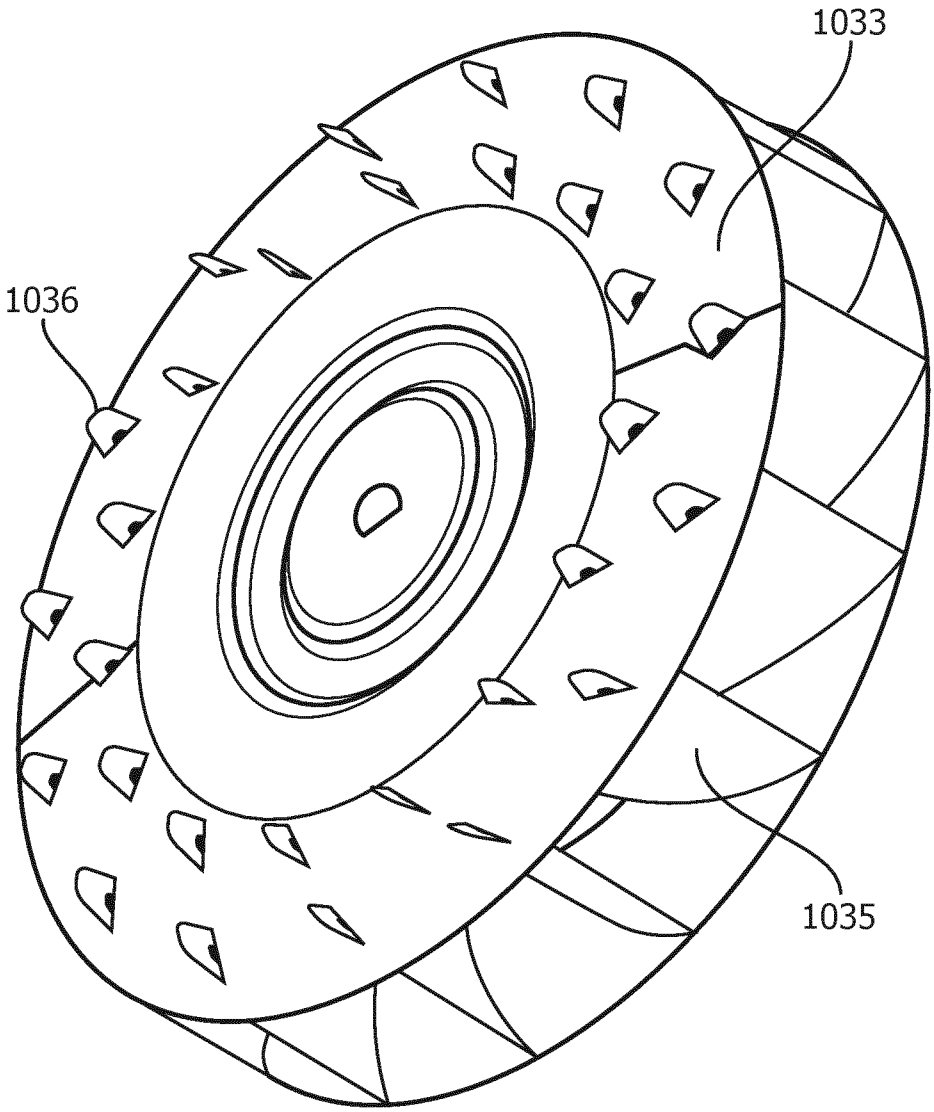

FIG. 9

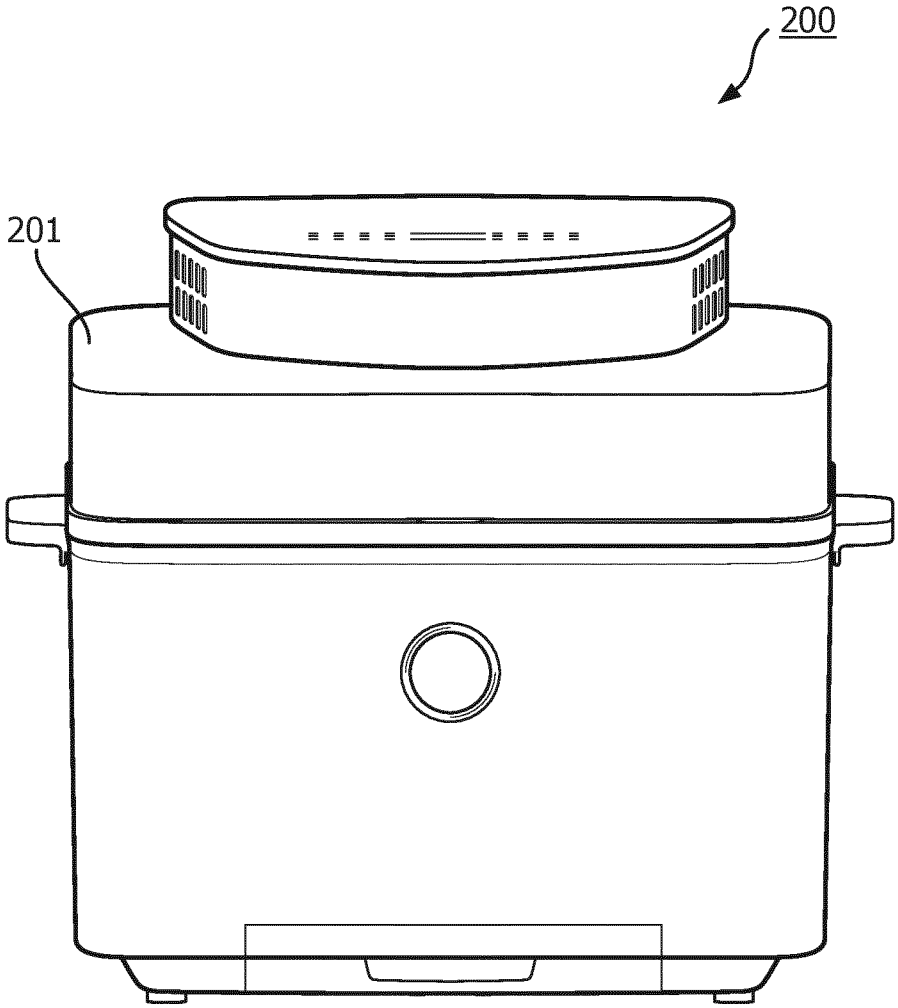

FIG. 10

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/054391

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J37/06
ADD.

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)
A47J

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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2023/015314 A1 (HIETBRINK INGRID [NL]) 19 January 2023 (2023-01-19) paragraphs [0010] - [0025]; claims; figures	1-15
X	CN 205 286 115 U (JOYOUNG CO LTD) 8 June 2016 (2016-06-08)	1-3,8-15
A	abstract; figures	4-7

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 April 2024	14/05/2024

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Acerbis, Giorgio

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2024/054391

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2023015314 A1	19-01-2023	CN 114828707 A	29-07-2022
		EP 3838086 A1	23-06-2021
		EP 4076112 A1	26-10-2022
		KR 20220106229 A	28-07-2022
		US 2023015314 A1	19-01-2023
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CN 205286115 U	08-06-2016	NONE	