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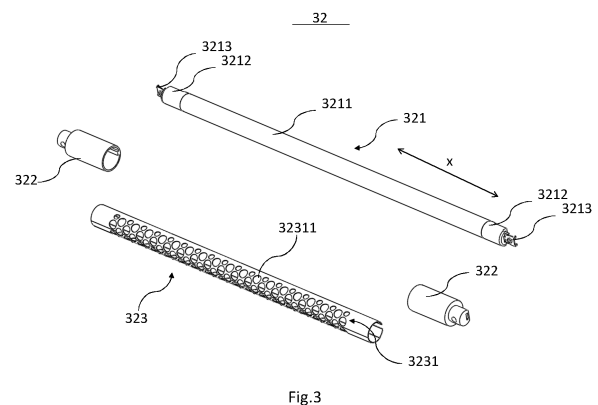
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(54) **HEATING ELEMENT, HEATING ASSEMBLY, AND MICROWAVE COOKING APPLIANCE**

(57) Disclosed in the present application are a heating element, a heating assembly, and a microwave cooking appliance. The heating element comprises a heating tube and a microwave shielding cover, wherein the heating tube comprises a heating body, and the heating body is a carbon fiber heating body or a graphite heating body; the microwave shielding cover covers the outer side of the heating tube; the microwave shielding cover comprises a transmission area, and the transmission area is arranged opposite the heating body; in the lengthwise direction or the circumferential direction of the heating tube, the transmission area covers at least part of the heating body; and the transmission area comprises at least one through hole, and the maximum opening size of any through hole is less than a quarter of the wavelength of microwaves emitted by a microwave cooking appliance. When the heating element is used in a microwave cooking appliance, during the process of both microwaves and the heating tube heating food, heat from the heating tube is radiated into a cooking cavity through the through hole of the transmission area, and under the shielding of the microwave shielding cover, the microwaves in the cooking cavity

are unable to pass through the microwave shielding cover and reach the position of the heating tube, thereby reducing the problem of sparking occurring when the heating tube is used in a microwave environment.



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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority and benefits from the following patent application, the entire disclosure of which is incorporated herein by reference: **[0002]** Chinese patent application No. 202311788614.6, entitled "HEATING COMPONENT, HEATING ASSEMBLY AND MICROWAVE COOKING APPLIANCE" and filed with China National Intellectual Property Administration on December 22, 2023.

TECHNICAL FIELD

[0003] The present application belongs to the technical field of household appliance, and in particular relates to a heating component, a heating assembly, and a microwave cooking appliance.

BACKGROUND

[0004] This section only provides background information related to the present disclosure, which is not necessarily the prior art.

[0005] In cooking appliances with microwave cooking function, a heating tube is also usually comprised, which is used to heat food together with microwaves to improve the cooking effect on the food.

[0006] In existing heating tubes, a heating body usually comprises carbon fiber or graphite. When the heating component is used in a microwave environment, the carbon fiber or graphite is prone to ignition, thereby reducing the safety during use.

SUMMARY

[0007] An object of the present application is to at least solve the problem of ignition that occurs when existing heating tubes are used in a microwave environment. This object is achieved through the following technical solutions.

[0008] A first aspect of the present application proposes a heating component, for use in a microwave cooking appliance and which comprises:

a heating tube comprising a heating body, the heating body being a carbon fiber heating body or a graphite heating body; and

a microwave shielding cover covering an outer side of the heating tube and comprising a transmission area; where the transmission area is arranged opposite to the heating body and at least covers at least a part of the heating body in a length direction or circumferential direction of the heating tube; the transmission area comprises at least one through hole, and the maximum opening size of any

through hole is less than one fourth of the wavelength of the microwave emitted from the microwave cooking appliance.

[0009] When the heating component in the present application is used in a microwave cooking appliance, during the process of heating the food inside a cooking chamber using microwave and the heating tube simultaneously, the heat of the heating tube is radiated into the cooking chamber through the through hole of the transmission area to achieve heating of the food inside the cooking chamber. The microwave inside the cooking chamber cannot pass through the microwave shielding cover and reach the position of the heating tube under the shielding of the microwave shielding cover, thereby reducing the problem of ignition that occurs when the heating tube is used in a microwave environment and thereby improving the safety during use.

[0010] In addition, the heating component according to the present application may also have the following additional technical features.

[0011] In some embodiments of the present application, the number of the through holes is at least two, all the through holes are distributed within the transmission area, and a spacing distance between any two adjacent through holes is greater than 0.5mm.

[0012] In some embodiments of the present application, a value of the porosity of the transmission area is in a range of 0.5 to 0.8.

[0013] In some embodiments of the present application, all the through holes form multiple rows of hole groups; and in the circumferential direction of the heating tube, at least two adjacent through holes of all the through holes are staggered.

[0014] In some embodiments of the present application, the microwave shielding cover further comprises a reflection area, the reflection area being arranged opposite to the transmission area; in the circumferential direction of the heating tube, a side of the reflection area is connected to a side of the transmission area, and an other side of the reflection area is connected to an other side of the transmission area.

[0015] In some embodiments of the present application, in the circumferential direction of the heating tube, a value of the center angle formed by the transmission area is in a range of 100° to 300°.

[0016] In some embodiments of the present application, the shape of the through hole is circle, ellipse, triangle, quadrilateral or pentagon.

[0017] In some embodiments of the present application, the shape of the through hole is circle, and the diameter of the through hole is d, where $3\text{mm} \leq d \leq 8\text{mm}$.

[0018] In some embodiments of the present application, the cross section of the microwave shielding cover is an annular structure in a direction perpendicular to the axial direction of the heating tube, and the annular

structure has a shape of a circle, ellipse, triangle, quadrilateral or pentagon.

[0019] In some embodiments of the present application, the microwave shielding cover is arranged coaxially with the heating tube; and/or

a wall thickness of the microwave shielding cover is larger than or equal to 1mm.

[0020] A second aspect of the present application proposes a heating assembly, which comprises the heating component as described above.

[0021] When the heating assembly in the present application is used in a microwave cooking appliance, during the process of heating the food inside a cooking chamber using microwave and the heating tube of the heating component simultaneously, the heat of the heating tube is radiated into the cooking chamber through the through hole of the transmission area to achieve heating of the food inside the cooking chamber. The microwave inside the cooking chamber cannot pass through the microwave shielding cover and reach the position of the heating tube under the shielding of the microwave shielding cover, thereby reducing the problem of ignition that occurs when the heating tube is used in a microwave environment and thereby improving the safety during use.

[0022] A third aspect of the present application proposes a microwave cooking appliance, which comprises the heating assembly as described above.

[0023] According to the microwave cooking appliance of the present application, during the process of heating the food inside a cooking chamber using microwave and the heating tube in the heating assembly simultaneously, the heat of the heating tube is radiated into the cooking chamber through the through hole of the transmission area to achieve heating of the food inside the cooking chamber. The microwave inside the cooking chamber cannot pass through the microwave shielding cover and reach the position of the heating tube under the shielding of the microwave shielding cover, thereby reducing the problem of ignition that occurs when the heating tube is used in a microwave environment and thereby improving the safety during use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Upon reading detailed description of the preferred embodiments below, various other advantages and benefits will become clear to those skilled in the art. The accompanying drawings are only used for the purpose of illustrating the preferred embodiments, and should not be considered as a limitation to the present application. Moreover, throughout the drawings, the same reference signs are used to denote the same components. In the drawings:

FIG. 1 schematically shows a schematic view of the structure of a microwave cooking appliance ac-

cording to an embodiment of the present application;

FIG. 2 schematically shows a schematic view of the structure of a heating component according to an embodiment of the present application;

FIG. 3 is a schematic view of an exploded structure of the heating component shown in FIG. 2;

FIG. 4 is a schematic view of the structure of a microwave shielding cover shown in FIG. 3;

FIG. 5 is a schematic view of the structure of the microwave shielding cover shown in FIG. 4 from another perspective;

FIG. 6 is a schematic view of a cross-sectional structure of the microwave shielding cover shown in FIG. 4;

FIG. 7 is a schematic view of the structure of an installation seat shown in FIG. 3;

FIG. 8 is a schematic view of the structure of the installation seat shown in FIG. 7 from another perspective;

FIG. 9 is a schematic view of the structure of a heating tube shown in FIG. 3; and

FIG. 10 shows a curve of center temperature and heating duration of the microwave cooking appliance at different porosities.

List of reference signs:

[0025]

100: microwave cooking appliance;

10: cabinet;

20: door;

30: heating assembly;

31: heat shield;

32: heating component;

321: heating tube;

3211: heating portion; 3212: connection portion; 32121: first limiting portion; 3213: wiring portion;

322: installation seat;

3221: receiving slot; 3222: opening; 3223: first abutment surface; 3224: second abutment surface; 3225: second limiting portion; 3226: first limiting structure; 3227: perforation hole; 3228: communication hole;

323: microwave shielding cover;

3231: transmission area; 32311: through hole; 3232: reflection area; 3233: second limiting structure; 3234: installation portion;

x: length direction of heating tube.

DETAILED DESCRIPTION

[0026] Hereinafter, exemplary embodiments of the present disclosure will be described in greater detail with reference to the accompanying drawings. Although the exemplary embodiments of the present disclosure are shown in the drawings, it should be understood that the present disclosure may be implemented in various forms and should not be limited by the embodiments set forth herein. On the contrary, these embodiments are provided to enable a more thorough understanding of the present disclosure and to fully convey the scope of the present disclosure to those skilled in the art.

[0027] It should be understood that the terms used herein are only for the purpose of describing specific exemplary embodiments, and are not intended to be limitative. Unless clearly indicated otherwise in the context, singular forms "a", "an", and "said" as used herein may also mean that plural forms are comprised. Terms "comprise", "comprise", "contain" and "have" are inclusive, and therefore indicate the existence of the stated features, steps, operations, elements and/or components, but do not exclude the existence or addition of one or more other features, steps, operations, elements, components, and/or combinations thereof. The method steps, processes, and operations described herein should not be interpreted as requiring them to be executed in the specific order described or illustrated, unless the order of execution is clearly indicated. It should also be understood that additional or alternative steps may be used.

[0028] Although terms "first", "second", "third" and the like may be used herein to describe multiple elements, components, regions, layers and/or sections, these elements, components, regions, layers and/or sections should not be limited by these terms. These terms may be only used to distinguish one element, component, region, layer or section from another region, layer or section. Unless clearly indicated in the context, terms such as "first", "second" and other numerical terms do not imply an order or sequence when they are used herein. Therefore, the first element, component, region, layer or section discussed below may be referred to as a second element, component, region,

layer or section without departing from the teachings of the exemplary embodiments.

[0029] For ease of description, spatial relative terms may be used herein to describe the relationship of one element or feature relative to another element or feature as shown in the drawings. These relative terms are, for example, "inner", "outer", "inside", "outside", "below", "under", "above", "over", etc. These spatial relative terms are intended to comprise different orientations of the device in use or in operation in addition to the orientation depicted in the drawings. For example, if the device in the figure is turned over, then elements described as "below other elements or features" or "under other elements or features" will then be oriented "above the other elements or features" or "over the other elements or features". Thus, the exemplary term "below" may comprise orientations of both above and below. The device can be otherwise oriented (rotated by 90 degrees or in other directions), and the spatial relationship descriptors used herein will be explained accordingly.

[0030] As shown in FIGS. 1 to 10, according to an embodiment of the present application, a heating component 32 is proposed, which comprises an installation seat 322, a microwave shielding cover 323, and a heating tube 321.

[0031] The heating tube 321 comprises a heating body, which is a graphite heating body or a carbon fiber heating body. The heating tube 321 is connected to the installation seat 322, and the microwave shielding cover 323 is fitted with the installation seat 322 and covers an outer side of the heating tube 321.

[0032] It should be understood that the heating body in the heating tube 321 is configured as a graphite heating body or a carbon fiber heating body, which enables the heating tube 321 to have advantages such as fast heating speed, high light intensity, good explicit effect, and strong thermal stability. However, the heating tube 321 is located in a microwave environment created by the microwave cooking appliance (the frequency of microwave emitted by the microwave cooking appliance is generally between 2000MHZ and 300MHZ). Due to the presence of carbon element in the graphite heating body or carbon fiber heating body, the heating tube 321 may have the problem of ignition during operation.

[0033] In the present application, the microwave shielding cover 323 refers to a component that has a shielding effect on microwaves, that is, when microwaves reach the microwave shielding cover 323, the microwave shielding cover 323 can reflect the microwaves to prevent them from propagating through the microwave shielding cover 323.

[0034] When the heating tube 321 is covered by the microwave shielding cover 323, the heating tube 321 is located inside the microwave shielding cover 323. When the heating component 32 is in the microwave environment, the microwave shielding cover 323 sepa-

rates the heating tube 321 from the microwave, preventing the microwave from reaching the position of the heating tube 321.

[0035] When the heating component 32 in the present application is used in a microwave cooking appliance 100, during the process of heating the food inside a cooking chamber using microwave and the heating tube 321 simultaneously, the heat of the heating tube 321 is radiated into the cooking chamber through the microwave shielding cover 323 to achieve heating of the food inside the cooking chamber. The microwave inside the cooking chamber cannot reach the position of the heating tube 321 under the shielding of the microwave shielding cover 323, thereby reducing the problem of ignition that occurs when the heating tube 321 is used in a microwave environment and thereby improving the safety during use.

[0036] It should be pointed out that in the present application, the microwave shielding cover 323 can be a metal or non-metal component. When the microwave shielding cover 323 is a metal component, the metal component can be a stainless steel component, etc. When the microwave shielding cover 323 is a non-metal component, the non-metal component can be a ceramic component, etc.

[0037] In addition, the shape of the microwave shielding cover 323 can be consistent with or different from the shape of the heating tube 321. In the present application, the shape of the microwave shielding cover 323 is approximately consistent with the shape of the heating tube 321, which can effectively reduce the overall volume of the heating component 32 and facilitate the layout and installation of the heating component 32 during use on the basis of using the microwave shielding cover 323 to cover the heating tube 321.

[0038] In addition, in the present application, the heating tube 321 is a cylindrical structure, and an extension direction of the cylindrical structure is a length direction x of the heating tube 321. At the same time, the heating tube 321 has a central axis, which is set along the length direction x of the heating tube 321, and the direction around the central axis is a circumferential direction of the heating tube 321.

[0039] In some embodiments of the present application, as shown in FIGS. 2 and 3, two installation seats 322 are provided on the heating tube 321, which are spaced apart in the length direction x of the heating tube 321, and which are respectively fitted with the microwave shielding cover 323.

[0040] In the present application, the heating tube 321 and the installation seats 322 are connected to each other. When the heating component 32 is used in the microwave cooking appliance 100, the installation seats 322 are connected and fixed to structural components of the microwave cooking appliance 100 to achieve the installation and fixation of the heating component 32.

[0041] Specifically, the two installation seats 322 are

respectively installed on the heating tube 321 and respectively fitted with the microwave shielding cover 323. By providing two installation seats 322, on the one hand, when the heating component 32 is used in the microwave cooking appliance 100, it can increase the connection positions between the heating component 32 and the structural components of the microwave cooking appliance 100, so that the connection strength and stability of the heating component 32 can be improved; on the other hand, it can increase the fitting positions of the microwave shielding cover 323, so as to improve the strength and stability of the microwave shielding cover 323.

[0042] It should be pointed out that the two installation seats 322 are spaced apart in the length direction x of the heating tube 321, and the connection positions of the installation seats 322 on the heating tube 321 can be at the ends of the heating tube 321 or on the body between the two ends.

[0043] In some embodiments of the present application, as shown in FIGS. 2, 3 and 9, the heating tube 321 comprises connection portions 3212 and a heating portion 3211. The heating body is arranged inside the heating portion 3211, and the number of connection portions 3212 is two. In the length direction x of the heating tube 321, one connection portion 3212 is installed on each of the two opposite ends of the heating tube 321 respectively, and one installation seat 322 is connected to each of the connection portions 3212 respectively.

[0044] Specifically, the two connection portions 3212 are respectively connected to the two opposite ends of the heating portion 3211 in the length direction x of the heating tube 321, and one installation seat 322 is installed and fixed on each of the connection portions 3212. The microwave shielding cover 323 covers the outer side of the heating tube 321 and is fitted with the two installation seats 322 respectively. At this time, the microwave shielding cover 323 can effectively cover the heating portion 3211 having the heating body, further reducing the transmission of microwaves to the position of the heating body, thereby further reducing the ignition problem of the heating component 32 in the microwave environment.

[0045] It should be understood that when the heating component 32 is used for heating, the heating body located inside the heating portion 3211 is energized. The heating body is a graphite heating body or a carbon fiber heating body with high resistance. After being energized, the heating body will emit light and heat, and the heat generated by the heating body can be radiated through the microwave shielding cover 323 to achieve heating and cooking of food. In the length direction x of the heating tube 321, the two connection portions 3212 are connected to the two opposite ends of the heating portion 3211, and are connected to the microwave shielding cover 323 through the installation seats 322, thereby reducing the obstruction between

the heating portion 3211 and the microwave shielding cover 323 and improving the thermal efficiency of the heating component 32.

[0046] In the present application, the heating portion 3211 comprises a glass tube, and the heating body is arranged inside the glass tube. One connection portion 3212 is connected and fixed at each of the two ends of the glass tube respectively. The glass tube needs to be vacuumed, so that the heating body can be in an approximate vacuum environment or the vacuum tube can be filled with inert gas, thereby reducing the oxidation and other reactions that occur during the heating process of the heating body.

[0047] In addition, the connection portion 3212 can be a metal component (such as a stainless steel component) or a non-metal component (such as a ceramic component), and the connection method between the connection portion 3212 and the glass tube is adhesive or snap-fit, etc.

[0048] It should be pointed out that in the present application, the fitting methods between the microwave shielding cover 323 and the installation seat 322 comprise insertion fit, snap-fit, welding fit, fastener connection fit or adhesive fit, etc.

[0049] In some embodiments of the present application, as shown in FIG. 2, the fitting methods between the microwave shielding cover 323 and the installation seat 322 comprise insertion fit.

[0050] Specifically, the heating tube 321 comprises the connection portions 3212 and the heating portion 3211. The heating body is arranged inside the heating portion 3211, and the number of connection portions 3212 is two. In the length direction x of the heating tube 321, one connection portion 3212 is installed on each of the two opposite ends of the heating tube 321 respectively, and one installation seat 322 is connected to each of the connection portions 3212 respectively.

[0051] The microwave shielding cover 323 comprises two installation portions 3234, which are respectively arranged at opposite ends of the microwave shielding cover 323 in the length direction x of the heating tube 321. When the microwave shielding cover 323 is fitted with the installation seats 322, the fitting method between the installation seats 322 and the installation portions 3234 of the microwave shielding cover 323 is insertion fit.

[0052] The insertion fit method between the microwave shielding cover 323 and the installation seats 322 is structurally simple and makes it easy to assemble. In addition, the insertion fit structure can achieve structural superposition at the insertion position, thereby increasing the structural strength of the connection position and improving the overall structural stability of the heating component 32.

[0053] It should be pointed out that the microwave shielding cover 323 is fitted with the installation seat 322 by insertion. During the implementation process, the installation portion 3234 of the microwave shielding

cover 323 can be inserted into the interior of the installation seat 322, or part of the structure of the installation seat 322 can be inserted into the interior of the installation portion 3234.

[0054] In some embodiments of the present application, as shown in FIG. 7, a receiving slot 3221 is provided on the installation portion 3234, and the receiving slot 3221 has an opening 3222. When assembling the heating component 32, the connection portion 3212 of the heating tube 321 is inserted into the interior of the receiving slot 3221 through the opening 3222 of the receiving slot 3221. The microwave shielding cover 323 covers the outer side of the heating tube 321, and the installation portion 3234 of the microwave shielding cover 323 is also inserted into the interior of the receiving slot 3221 through the opening 3222 of the receiving slot 3221. At this time, the installation portion 3234 is arranged between an inner side wall of the receiving slot 3221 and the connection portion 3212.

[0055] The connection portion 3212 of the heating tube 321 and the installation portion 3234 of the microwave shielding cover 323 are respectively inserted into the receiving slot 3221 of the installation seat 322, so that the installation seat 322 can protect the end of the heating tube 321 and the end of the microwave shielding cover 323, thereby reducing damage to the heating tube 321 and the microwave shielding cover 323 caused by external impacts.

[0056] In addition, the heating tube 321 is completely enclosed by the installation seat 322 and the microwave shielding cover 323, which can effectively protect the heating tube 321, reduce the impact of external factors on the heating tube 321, and thus reduce the possibility of damage to the heating tube 321.

[0057] In addition, in the present application, the installation seat 322 is a component made of thermal insulation material, which is a poor conductor of heat, such as ceramic, etc. Setting the installation seat 322 as a component made of thermal insulation material can reduce the transfer of heat of the heating component 32 through the installation seat 322 during use. Therefore, when the heating component 32 is applied to the microwave cooking appliance 100, the possibility of heat transfer from the heating component 32 to other structural components can be reduced, and the situation of the heating component 32 heating and damaging other structural components of the microwave cooking appliance 100 can be reduced.

[0058] It should be understood that there are two installation seats 322, two connection portions 3212 of the heating tube 321 in the length direction x of the heating tube 321, and two installation portions 3234 of the microwave shielding cover 323. When assembling the heating component 32, one connection portion 3212 of the heating tube 321 is first inserted into the receiving slot 3221 of one installation seat 322, and then the cylindrical microwave shielding cover 323 is sleeved onto the outer side of the heating tube 321

(the inner side wall of the microwave shielding cover 323 is spaced apart from the outer surface of the heating tube 321), so that the installation portion 3234 of the microwave shielding cover 323 is inserted into the receiving slot 3221 of one installation seat 322. Then the other installation seat 322 is sleeved onto the other installation portion 3234 of the heating tube 321 and the other installation portion 3234 of the microwave shielding cover 323. The connection portion 3212 is connected and fixed with the installation seat 322, and the connection and fixing methods comprise but are not limited to snap-fit or bonding. The microwave shielding cover 323 is sandwiched between the two installation seats 322, and the microwave shielding cover 323 can be connected to the two installation seats 322 (by adding high-temperature adhesive between them), or not connected to the two installation seats 322.

[0059] In some embodiments of the present application, as shown in FIGS. 2, 3, 5 and 7, there are two installation seats 322, and each installation seat 322 is provided with the receiving slot 3221 with the opening 3222. A first limiting structure 3226 is provided on the inner side wall of the receiving slot 3221, and there are two connection portions 3212 of the heating tube 321 in the length direction x of the heating tube 321. There are two installation portions 3234 of the microwave shielding cover 323, and each installation portion 3234 is provided with a second limiting structure 3233.

[0060] When assembling the heating component 32, one connection portion 3212 of the heating tube 321 is inserted into the receiving slot 3221 of one installation seat 322, and then the cylindrical microwave shielding cover 323 is sleeved onto the outer side of the heating tube 321, so that the installation portion 3234 of the microwave shielding cover 323 is inserted into the receiving slot 3221 of one installation seat 322. The second limiting structure 3233 and the first limiting structure 3226 are fitted with each other, and then the other installation seat 322 is sleeved onto the other installation portion 3234 of the heating tube 321 and the other installation portion 3234 of the microwave shielding cover 323 (the second limiting structure 3233 of the installation portion 3234 of the microwave shielding cover 323 is fitted with the first limiting structure 3226 of the receiving slot 3221 of the installation seat 322). Finally, the connection portion 3212 is connected and fixed with the installation seat 322, and the microwave shielding cover 323 is sandwiched between the two installation seats 322.

[0061] In the circumferential direction of the heating tube 321, the first limiting structure 3226 and the second limiting structure 3233, which are in a fitted state, can limit the displacement of the microwave shielding cover 323, that is, can limit the rotation of the microwave shielding cover 323 relative to the heating tube 321, thereby effectively maintaining the installation position of the microwave shielding cover 323 and reducing the influence of the rotation of the microwave

shielding cover 323 relative to the heating tube 321 on the heating efficiency of the heating component 32.

[0062] It should be pointed out that in the present application, the first limiting structure 3226 and the second limiting structure 3233 are concave and convex fitting structures, that is, they are embedded with each other to achieve the limiting function through embedding. The embedded structure is simple, easy to process and manufacture, and can effectively reduce the manufacturing cost of the heating component 32.

[0063] In some embodiments of the present application, as shown in FIG. 2, the microwave shielding cover 323 is fitted with the installation seat 322 by insertion. The installation portion 3234 of the microwave shielding cover 323 is inserted into the receiving slot 3221 of the installation seat 322, and the first limiting structure 3226 located on the inner side wall of the receiving slot 3221 is fitted with the second limiting structure 3233 located on the installation portion 3234 to limit the rotation of the microwave shielding cover 323 relative to the heating tube 321. One of the first limiting structure 3226 and the second limiting structure 3233 is a protrusion structure, and the other is a groove structure or a notch structure.

[0064] Specifically, when the groove structure or notch structure is formed on the inner side wall of the receiving slot, it runs through the opening 3222 of the receiving slot 3221. When the groove structure or notch structure is formed on the installation portion 3234 of the microwave shielding cover 323, it runs through the end of the installation portion 3234. When the protrusion structure is formed on the inner side wall of the receiving slot 3221, it protrudes relative to the inner side wall of the receiving slot 3221. When the protrusion structure is formed on the installation portion 3234, it protrudes on an outer peripheral surface of the protrusion structure.

[0065] Taking the first limiting structure 3226 being a protrusion structure and the second limiting structure 3233 being a notch structure as an example, the notch structure is formed on the outer peripheral surface of the installation portion 3234 of the microwave shielding cover 323 and runs through the end of the installation portion 3234. The notch structure extends in the length direction x of the heating tube 321, and the protrusion structure is formed on the inner side wall of the receiving slot 3221 of the installation seat 322. During assembly, the notch structure is aligned with the protrusion structure, and the installation portion 3234 is inserted into the receiving slot 3221 through the opening 3222 of the receiving slot 3221. During the insertion process, the protrusion structure slides into the notch structure of the installation portion 3234 to achieve the embedded installation between the two. When the protrusion structure is pressed against the closed end of the notch structure (the end away from the through end of the notch structure), the microwave shielding cover 323 is installed in place.

[0066] In some embodiments of the present application, as shown in FIGS. 7 and 9, the installation seat 322 is provided with the receiving slot 3221, which has the opening 3222. The installation portion 3234 of the microwave shielding cover 323 is inserted into the receiving slot 3221 through the opening 3222. A first abutment surface 3223 intersecting with the length direction x of the heating tube 321 is provided in the receiving slot 3221. After the installation portion 3234 of the microwave shielding cover 323 is installed in place in the receiving slot 3221, the installation portion 3234 is pressed against the first abutment surface 3223, and the first abutment surface 3223 is used to limit the installation portion 3234, thereby reducing the displacement of the microwave shielding cover 323 in the length direction x of the heating tube 321 and reducing the influence of the movement of the microwave shielding cover 323 relative to the heating tube 321 on the heating efficiency of the heating component 32.

[0067] It should be pointed out that a first protruding portion is provided in the receiving slot 3221, and the first abutment surface 3223 is formed on the first protruding portion. The first abutment surface 3223 can be arranged parallel to or at an angle to the plane of the opening 3222 of the receiving slot 3221. The side surface of the installation portion 3234 that abuts with the first abutment surface 3223 is adapted to the first abutment surface 3223.

[0068] In some embodiments of the present application, as shown in FIGS. 7 and 9, the installation seat 322 is provided with the receiving slot 3221, which has the opening 3222. The installation portion 3234 of the microwave shielding cover 323 is inserted into the receiving slot 3221 through the opening 3222. A first abutment surface 3223 and a second abutment surface 3224, which intersect with the length direction x of the heating tube 321, are provided in the receiving slot 3221. The first abutment surface 3223 is located between the second abutment surface 3224 and the opening 3222 of the receiving slot 3221.

[0069] The heating tube 321 and the microwave shielding cover 323 are respectively inserted into the receiving slot 3221 through the opening 3222. The installation portion 3234 of the microwave shielding cover 323 is pressed against the first abutment surface 3223, and the connection portion 3212 of the heating tube 321 is pressed against the second abutment surface 3224. The first abutment surface 3223 and the second abutment surface 3224 are used to limit the installation portion 3234 and the connection portion 3212 respectively, thereby reducing the displacement of the microwave shielding cover 323 and the heating tube 321 in the length direction x of the heating tube 321, and further reducing the influence of the movement of the microwave shielding cover 323 or the heating tube 321 on the heating efficiency of the heating component 32.

[0070] It should be pointed out that a second protruding portion is provided inside the receiving slot 3221,

and the second abutment surface 3224 is formed on the second protruding portion. The second abutment surface 3224 can be arranged parallel to or at an angle to the plane of the opening 3222 of the receiving slot 3221. The side surface of the connection portion 3212 that abuts with the second abutment surface 3224 is adapted to the first abutment surface 3223.

[0071] In addition, a first limiting portion 32121 is provided on the connection portion 3212 of the heating tube 321, and a second limiting portion 3225 is provided on the second protruding portion. The first limiting portion 32121 is a first flat surface formed on the outer peripheral surface of the connection portion 3212, and the first flat surface runs through the end of the connection portion 3212. The second limiting portion 3225 is a second flat surface formed on the second protruding portion, and the second flat surface intersects with the second abutment surface 3224. When the connection portion 3212 is inserted into the receiving slot 3221, the first flat surface of the connection portion 3212 is aligned with the second flat surface of the receiving slot 3221, and then the connection portion 3212 is inserted into the interior of the receiving slot 3221 through the opening 3222. After the connection portion 3212 is inserted in place, a part of the body of the connection portion 3212 is pressed against the second abutment surface 3224, the other part of the body of the connection portion 3212 is accommodated in a receiving space enclosed by the second protruding portion and the inner wall of the receiving slot 3221, and the first flat surface and the second flat surface abut with each other. Through the abutting arrangement between the first flat surface and the second flat surface, the heating tube 321 can be restricted from rotating relative to the installation seat 322, thereby reducing the influence of the rotation of the heating tube 321 on the heating efficiency.

[0072] In some embodiments of the present application, as shown in FIGS. 2 and 7 to 9, the heating tube 321 further comprises a wiring portion 3213, which is electrically connected to the heating body, and which passes out of the connection portion 3212 of the heating tube 321. A perforation hole 3227 is provided on the installation seat 322, and the perforation hole 3227 is communicated with the interior of the receiving slot 3221 in the length direction x of the heating tube 321.

[0073] When assembling the heating tube 321, the connection portion 3212 of the heating tube 321 is inserted into the receiving slot 3221 through the opening 3222, and the wiring portion 3213 protruding on the connection portion 3212 passes out of the receiving slot 3221 and the perforation hole 3227. After the installation seat 322 and the heating tube 321 are installed in place, a part of the wiring portion 3213 protrudes on the outer side of the installation seat 322. By setting the wiring portion 3213, the electrical lead out of the heating body is achieved, thereby improving the wiring operation during the use of the heating compo-

nent 32.

[0074] It should be pointed out that in the present application, the wiring portion 3213 is a flat metal piece, and the shape of the perforation hole 3227 is adapted to the shape of the wiring portion 3213 to facilitate the wiring portion 3213 to pass out.

[0075] In addition, the installation seat 322 is provided with a communication hole 3228, which is communicated with the perforation hole 3227 and arranged such that it intersects with the perforation hole 3227. After the heating tube 321 and the installation seat 322 are installed in place, screws or other fasteners are used to pass through the communication hole and fit with the wiring portion 3213 located inside the perforation hole to fix the wiring portion 3213 with the installation seat 322.

[0076] In some embodiments of the present application, as shown in FIGS. 3 to 6, a transmission area 3231 is provided on the microwave shielding cover 323, and the transmission area 3231 is arranged corresponding to the heating portion 3211 of the heating tube 321. In the length direction x of the heating tube 321, the transmission area 3231 at least covers at least part of the heating portion 3211, and in the circumferential direction of the heating tube 321, the transmission area 3231 also at least covers at least part of the heating portion 3211. A through hole 32311 is provided in the transmission area 3231, and the number of through hole 32311 is at least one. The maximum opening size of the through hole 32311 is less than one fourth of the wavelength of the microwave.

[0077] Specifically, the microwave shielding cover 323 covers the outer side of the heating tube 321, and the microwave shielding cover 323 can be used to shield the heating tube 321 from microwaves, so as to reduce the problem of ignition of the heating body when the heating component 32 operates in a microwave environment. The transmission area 3231 with the through hole 32311 is provided on the microwave shielding cover 323, and the opening size of the through hole 32311 is set to reduce the obstruction of the microwave shielding cover 323 to the heating tube 321, so as to quickly release the heat during the operation of the heating tube 321 and effectively improve the heating efficiency of the heating component 32.

[0078] It should be understood that the maximum opening size of the through hole 32311 is set to be less than one fourth of the wavelength of the microwave. When the microwave reaches the position of the through hole 32311, it cannot pass through the through hole 32311 and reach the position of the heating tube 321, so as to reduce the problem of ignition of the heating body of the heating tube 321. At the same time, the heat generated during the operation of the heating tube 321 can be directly radiated to the outer side of the microwave shielding cover 323 through the through hole 32311, reducing the obstruction of the microwave shielding cover 323 to heat release of the heating tube

321.

[0079] It should be pointed out that in the present application, in the length direction x of the heating tube 321, the transmission area 3231 can cover all or part of the length of the heating tube 321; at the same time, in the circumferential direction of the heating tube 321, the transmission area 3231 can cover all or part of the circumferential surface of the heating tube 321. Whether in the length direction x of the heating tube 321 or in the circumferential direction of the heating tube 321, the larger the area of the heating tube 321 covered by the transmission area 3231, the worse the obstruction to the heating tube 321. This allows more heat from the heating tube 321 to be radiated to the outer side of the microwave shielding cover 323 through the through hole 32311, thereby improving the heating efficiency of the heating component 32.

[0080] In the present application, the number of through hole 32311 can be 1, 2, 10, 50, 100, 300, 400, 500, 600, 800, 1000, etc. As the number of through holes 32311 increases, the microwave shielding cover 323 provides less obstruction to the heat of the heating tube 321. When the number of through holes 32311 increases, the heating efficiency of the heating component 32 can be improved.

[0081] In some embodiments of the present application, as shown in FIGS. 3 to 6, the number of through holes 32311 provided in the transmission area 3231 is at least two. All the through holes 32311 are distributed within the transmission area 3231. Among all the through holes 32311, any two adjacent through holes 32311 have a spacing distance between them, which is greater than 0.5mm.

[0082] Specifically, setting the number of through holes 32311 to at least two can increase the number of through holes 32311, increase the opening area on the microwave shielding cover 323, improve the transmissivity of the microwave shielding cover 323, and further reduce the obstruction to the heating tube 321 on the basis of achieving microwave shielding, thereby further improving the heating efficiency of the heating component 32.

[0083] It should be understood that the distance between two adjacent through holes 32311 can be 0.5mm, 0.7mm, 0.9mm, 1mm, 1.2mm, 1.4mm, 1.6mm, 1.8mm, 2mm, etc. When the spacing distance between two adjacent through holes 32311 is smaller, the transmissivity of the shielding cover is higher. When the distance between two adjacent through holes 32311 is larger, the structural strength of the shielding cover is higher.

[0084] In the present application, the microwave shielding cover 323 is a metal component (such as a stainless steel component), and the through holes 32311 are formed on the shielding cover by stamping. At this time, the minimum distance between two adjacent through holes 32311 is 1mm to meet the requirements of punching processing. At the same time, the

microwave shielding cover 323 can have a certain structural strength, which can improve the protective performance of the microwave shielding cover 323 for the heating tube 321.

[0085] In some embodiments of the present application, as shown in FIGS. 3 to 6, several through holes 32311 are provided in the transmission area of the microwave shielding cover 323, and the several through holes 32311 are distributed in the transmission area 3231. The porosity of the transmission area 3231 is m , where $0.5 \leq m \leq 0.8$.

[0086] It should be understood that when the porosity in the transmission area 3231 is smaller than 0.5, the opening area in the transmission area 3231 is small, which has a limited effect on improving the heating efficiency of the heating component 32. When the porosity in the transmission area 3231 is larger than 0.8, the opening area in the transmission area 3231 is large, but the structural strength of the microwave shielding cover 323 deteriorates.

[0087] In the present application, by setting the porosity of the transmission area 3231, the microwave shielding cover 323 can have a good structural strength on the basis of effectively shielding the microwaves, thereby improving the protective performance of the microwave shielding cover 323 for the heating tube 321 and reducing the damage to the heating tube 321 caused by impact.

[0088] In the present application, the area of the transmission area 3231 is A_{all} , the opening area of a single through hole 32311 is A_{hole} , the number of through holes 32311 is n , and the porosity of the transmission area 3231 is B , where $B = n * A_{hole} / A_{all}$. Taking the transmission area 3231 being as a rectangle and the through hole 32311 being a circular hole as an example, $A_{all} = L * M$, where L is the length of one side of the rectangular transmission area 3231, M is the length of another side of the rectangular transmission area 3231, $A_{hole} = \pi r^2$, where r is the radius of the circular through hole 32311.

[0089] It should be pointed out that in the present application, the value of the porosity m can be 0.5, 0.55, 0.6, 0.65, 0.7, 0.75 and 0.8.

[0090] As shown in FIG. 10, the horizontal axis is the time axis and the vertical axis is the temperature axis. m_1 is 0.8, m_2 is 0.6, m_3 is 0.55, and m_4 is 0.5. Through comparison, it can be seen that under the condition of heating to the same temperature, the higher the porosity, the shorter the time used.

[0091] In some embodiments of the present application, as shown in FIGS. 3 to 6, several through holes 32311 are provided in the transmission area 3231 of the microwave shielding cover 323. The several through holes 32311 form multiple rows of hole groups, and the through holes 32311 in each row of hole groups are arranged in a straight line. Each hole group is set in the length direction x of the heating tube. In the circumferential direction of the heating tube 321, multiple rows

of hole groups are spaced apart, and two adjacent through holes 32311 in two adjacent rows of hole groups are staggered. Specifically, several through holes 32311 are arranged in multiple rows of hole groups to facilitate processing and manufacturing, thereby improving processing efficiency. At the same time, two adjacent through holes 32311 in two adjacent rows of hole groups are staggered, which can further improve the porosity of the transmission area 3231, thereby further enhancing the heating efficiency of the heating component 32.

[0092] In some embodiments of the present application, several through holes 32311 are provided in the transmission area 3231 of the microwave shielding cover 323. The several through holes 32311 form multiple rows of hole groups, and the through holes 32311 in each row of hole groups are arranged in a straight line. Each hole group is set in the circumferential length direction of the heating tube. In the length direction x of the heating tube 321, multiple rows of hole groups are spaced apart, and two adjacent through holes 32311 in two adjacent rows of hole groups are staggered. Specifically, several through holes 32311 are arranged in multiple rows of hole groups to facilitate processing and manufacturing, thereby improving processing efficiency. At the same time, the through holes 32311 in two adjacent rows of hole groups are staggered, which can further improve the porosity of the transmission area 3231, thereby further enhancing the heating efficiency of the heating component 32.

[0093] In some embodiments of the present application, a transmission area 3231 and a reflection area 3232 are provided on the microwave shielding cover 323; the transmission area 3231 is opposite to the reflection area 3232, and in the circumferential direction of the heating tube 321, two opposite sides of the reflection area 3232 are respectively connected to the transmission area 3231.

[0094] It should be understood that the side surface of the reflection area 3232 that faces the heating tube 321 is a reflection surface, which has a reflection function. When the heat radiation light generated by the heating body is irradiated onto the reflection surface, the reflection surface reflects the radiation light to change the direction of propagation of the radiation light. Since the reflection area 3232 is arranged opposite to the transmission area 3231, the radiation light reflected by the reflection surface can be radiated out of the microwave shielding cover 323 through the through holes 32311 in the transmission area 3231.

[0095] Specifically, when the heating component 32 is applied to the microwave cooking appliance 100, one side of the microwave shielding cover 323 that has the transmission area 3231 is communicated with the cooking chamber and arranged opposite to the heated food. When the heating component 32 is in operation, the heating body inside the heating tube 321 is energized, and the energized heating body emits light and

heat. The heat generated by the heating body is quickly radiated into the cooking chamber through the through holes 32311 in the transmission area 3231 to heat and cook the food. By setting the reflection area 3232, the heat released by the heating body on the side of the reflection area 3232 is reflected toward the side of the transmission area 3231 through the reflection area 3232, and radiated into the cooking chamber through the through holes 32311 in the transmission area 3231, so that more heat generated by the heating tube 321 is quickly radiated into the cooking chamber, thereby further improving the heating efficiency of the heating component 32.

[0096] It should be pointed out that a reflective coating (such as silver coating) can also be provided on the reflection surface to further enhance the reflection ability of the reflection surface, which can further improve the heating efficiency of the heating component 32.

[0097] In some embodiments of the present application, as shown in FIG. 6, the transmission area 3231 and the reflection area 3232 are provided on the microwave shielding cover 323; in the circumferential direction of the heating tube 321, two opposite sides of the reflection area 3232 are respectively connected to the transmission area 3231, and in the circumferential direction of the heating tube 321, the value of center angle formed by the transmission area 3231 is in a range of 100° to 300° .

[0098] Specifically, when the heating component 32 is in operation, the heating body inside the heating tube 321 is energized, and the energized heating body emits light and heat. The heat generated by the heating body is quickly radiated into the cooking chamber through the through holes 32311 in the transmission area 3231 to heat and cook the food. The larger the coverage of the transmission area 3231 in the circumferential direction of the heating tube 321, the worse the heat blocking effect of the microwave shielding cover 323 on the heating tube 321, i.e., the more the heat directly radiated from the heating tube 321 to the outer side of the microwave shielding cover 323.

[0099] When the heating component 32 is used in the microwave cooking appliance 100, the cooking chamber is arranged on the side of the heating component 32, and the transmission area 3231 is communicated with the cooking chamber. Therefore, by controlling the area covered by the transmission area 3231 in the circumferential direction of the heating tube 321, directional radiation of the heat from the heating tube 321 can be achieved, thereby reducing heat loss and also effectively improving the heating efficiency of the heating component 32.

[0100] In the present application, the center angle formed by the transmission area 3231 in the circumferential direction of the heating tube 321 is a (the center angle formed by the reflection area 3232 in the circumferential direction of the heating tube 321 is b, $b=360^\circ-a$), where $100^\circ \leq a \leq 300^\circ$. When the heating component

32 is used in the microwave cooking appliance 100, it can increase the heat radiation area of the heating component 32, effectively reducing energy consumption on the basis of improving the heating efficiency.

[0101] It should be pointed out that the specific value of a can be 100° , 110° , 120° , 130° , 140° , 150° , 160° , 170° , 180° , 181° , 182° , 183° , 184° , 185° , 187° , 190° , 200° , 210° , 230° , 240° , 250° , 260° , 270° , 280° , 290° and 300° .

[0102] In some embodiments of the present application, the shape of the through holes 32311 comprises but is not limited to circle, triangle, ellipse, quadrilateral, pentagon, etc. By setting the shape of the through holes 32311, the through holes 32311 can be arranged according to specific application scenarios to meet practical needs in use.

[0103] It should be understood that in the present application, when the number of the through holes 32311 in the transmission area 3231 is multiple, the shape of the through holes 32311 can be completely the same, partially the same, or completely different. When the shape of the through holes 32311 is exactly the same, it can facilitate processing and improve the processing efficiency. When the shape of the through holes 32311 is partially the same or completely different, the porosity of the transmission area 3231 can be increased by changing the shape of the through holes 32311, thereby improving the transmissivity of the transmission area 3231.

[0104] In some embodiments of the present application, as shown in FIGS. 3 to 6, the transmission area 3231 of the microwave shielding cover 323 comprises the through holes 32311, which are circular in shape and have a diameter of d, where $3\text{mm} \leq d \leq 8\text{mm}$.

[0105] Specifically, the through holes 32311 are set in a circular shape for ease of processing and manufacturing. In addition, setting the diameter of the circular through holes 32311 to be between 3mm and 8mm can effectively increase the opening area on the basis of achieving microwave shielding, thereby improving the porosity of the transmission area 3231 and thus improving the heating efficiency of the heating component 32.

[0106] It should be pointed out that the value of d can specifically be 3mm, 3.5mm, 4mm, 4.5mm, 5mm, 5.5mm, 6mm, 6.5mm, 7mm, 7.5mm and 8mm.

[0107] In addition, when the number of the through holes 32311 is multiple, the diameter of the through holes 32311 can be completely the same, partially the same, or completely different. When the diameter of the through holes 32311 is completely the same, it can facilitate processing and improve the processing efficiency. When the diameter of the through holes 32311 is partially the same or completely different, the porosity of the transmission area 3231 can be increased by changing the diameter of the through holes 32311, thereby improving the transmissivity of the transmission area 3231.

[0108] In some embodiments of the present application, the cross section of the microwave shielding cover 323 is an annular structure in a direction perpendicular to the axial direction of the heating tube 321, comprising but not limited to triangle, quadrilateral, pentagon, circle or ellipse.

[0109] Specifically, by setting the annular structure, the microwave shielding cover 323 can be arranged according to specific application scenarios to meet practical needs in use.

[0110] It should be understood that the shape of the annular structure is consistent with the cross-sectional shape of the heating tube 321 (the cross section in the direction perpendicular to the axial direction of the heating tube 321), so that the microwave shielding cover 323 can be better adapted to the heating tube 321. For example, the cross-sectional shape of the heating tube 321 (the cross section in the direction perpendicular to the axial direction of the heating tube 321) is circular, and the annular structure is circular.

[0111] In some embodiments of the present application, the heating tube 321 is arranged coaxially with the microwave shielding cover 323. Through the coaxial arrangement of the two, in the direction perpendicular to the length direction x of the heating tube 321, the heating tube 321 and the microwave shielding cover 323 are set at equal distance from each other, thereby reducing the damage to the heating tube 321 caused by local deformation of the microwave shielding cover 323.

[0112] In some embodiments of the present application, a wall thickness of the microwave shielding cover 323 is larger than or equal to 1mm. By setting the microwave shielding cover 323, the overall weight can be effectively controlled on the basis of achieving microwave shielding through the microwave shielding cover 323, thereby effectively controlling the overall weight of the heating component 32.

[0113] It should be pointed out that as shown in FIG. 6, in the present application, the thickness of the microwave shielding cover 323 is d , where the value of d can be 1mm, 1.5mm, 2mm, 2.5mm, 3mm, 3.5mm and 4mm.

[0114] As shown in FIG. 1, a second aspect of the present application proposes a heating assembly 30, which comprises the heating component 32 as described above.

[0115] When the heating assembly 30 in the present application is used in the microwave cooking appliance 100, during the process of heating the food inside the cooking chamber using microwave and the heating tube 321 of the heating component 32 simultaneously, the heat of the heating tube 321 is radiated into the cooking chamber through the microwave shielding cover 323 to achieve heating of the food inside the cooking chamber. The microwave inside the cooking chamber cannot reach the position of the heating tube 321 under the shielding of the microwave shielding cover 323,

thereby reducing the problem of ignition that occurs when the heating tube 321 is used in a microwave environment and thereby improving the safety during use.

[0116] It should be pointed out that the heating assembly 30 further comprises a heat shield 31, which has an installation space. The heating component 32 is fitted with the heat shield 31, so that at least the part of the heating tube 321 that has the heating body is arranged in the installation space. When the heating assembly 30 is used in the microwave cooking appliance 100, the heat shield 31 is installed and fixed on a cabinet 10 of the microwave cooking appliance 100, and an open end of the heat shield 31 is communicated with the cooking chamber inside the cabinet 10 to heat and cook the food inside the cooking chamber by energizing the heating tube 321.

[0117] As shown in FIG. 1, a third aspect of the present application proposes a microwave cooking appliance 100, which comprises the heating assembly 30 as described above.

[0118] According to the microwave cooking appliance 100 of the present application, during the process of heating the food inside the cooking chamber using microwave and the heating tube 321 in the heating assembly 30 simultaneously, the heat of the heating tube 321 is radiated into the cooking chamber through the microwave shielding cover 323 to achieve heating of the food inside the cooking chamber. The microwave inside the cooking chamber cannot reach the position of the heating tube 321 under the shielding of the microwave shielding cover 323, thereby reducing the problem of ignition that occurs when the heating tube 321 is used in a microwave environment and thereby improving the safety during use.

[0119] It should be pointed out that as shown in FIG. 1, the microwave cooking appliance 100 further comprises a cabinet 10 and a door 20. The cabinet 10 is provided with a cooking chamber, which has a pick-up/drop-off port. The door 20 is pivotally connected to the cabinet 10, and the opening or closing of the pick-up/drop-off port is achieved through the pivoting of the door 20 relative to the cabinet 10.

[0120] In the present application, the microwave cooking appliance described above can be a microwave oven or a microwave, steaming and baking all-in-one machine, etc. For ease of description, the present application is only described by taking the microwave cooking appliance being a microwave oven as an example. For the structure of other parts of the microwave oven, reference can be made to the prior art, and a repeated description will be omitted in the present application.

[0121] Described above are only specific preferred embodiments of the present application, but the scope of protection of the present application is not limited to this. Any changes or replacements that can be easily conceived by those skilled in the art within the technical scope disclosed by the present application should be

covered within the scope of protection of the present application. Therefore, the scope of protection of the present application should be accorded with the scope of protection of the claims.

Claims

1. A heating component, for use in a microwave cooking appliance, comprising:

a heating tube comprising a heating body, the heating body being a carbon fiber heating body or a graphite heating body; and
a microwave shielding cover covering an outer side of the heating tube and comprising a transmission area; wherein the transmission area is arranged opposite to the heating body and at least covers at least a part of the heating body in a length direction or a circumferential direction of the heating tube; wherein the transmission area comprises at least one through hole, and a maximum opening size of any through hole is less than one fourth of a wavelength of a microwave emitted from the microwave cooking appliance.

2. The heating component according to claim 1, wherein the number of the through holes is at least two, all the through holes are distributed within the transmission area, and a spacing distance between any two adjacent through holes is greater than 0.5mm.

3. The heating component according to claim 2, wherein a value of a porosity of the transmission area is in a range of 0.5 to 0.8.

4. The heating component according to claim 2, wherein in the circumferential direction of the heating tube, at least two adjacent through holes of all the through holes are staggered.

5. The heating component according to claim 1, wherein the microwave shielding cover further comprises a reflection area, the reflection area being arranged opposite to the transmission area; in the circumferential direction of the heating tube, a side of the reflection area is connected to a side of the transmission area, and an other side of the reflection area is connected to an other side of the transmission area.

6. The heating component according to claim 5, wherein in the circumferential direction of the heating tube, a value of a center angle formed by the transmission area is in a range of 100° to 300°.

7. The heating component according to claim 1, wherein a shape of the through hole is circle, ellipse, triangle, quadrilateral or pentagon.

8. The heating component according to claim 7, wherein the shape of the through hole is circle, and a diameter of the through hole is d , where $3\text{mm} \leq d \leq 8\text{mm}$.

9. The heating component according to any one of claims 1 to 8, wherein a cross section of the microwave shielding cover is an annular structure in a direction perpendicular to an axial direction of the heating tube, and the annular structure has a shape of a circle, ellipse, triangle, quadrilateral or pentagon.

10. The heating component according to any one of claims 1 to 8, wherein the microwave shielding cover is arranged coaxially with the heating tube; and/or
a wall thickness of the microwave shielding cover is larger than or equal to 1mm.

11. A heating assembly, comprising a heating component according to any one of claims 1 to 10.

12. A microwave cooking appliance, comprising a heating assembly according to claim 11.

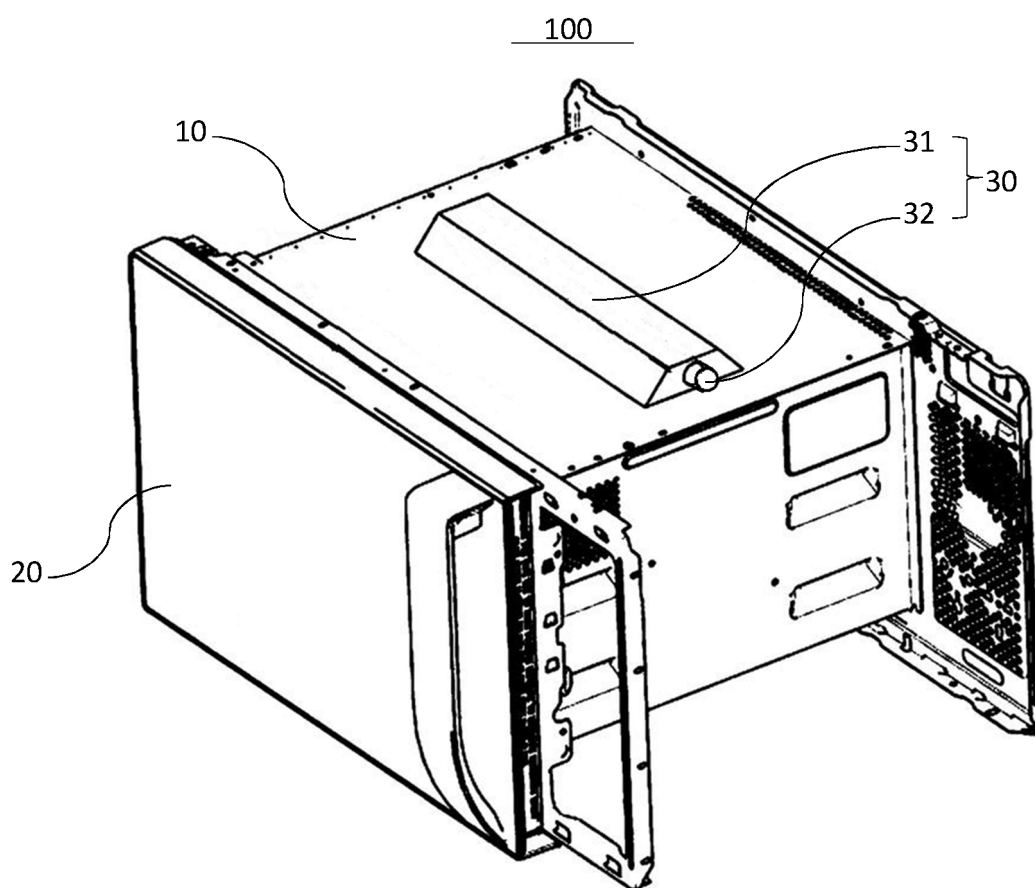


Fig.1

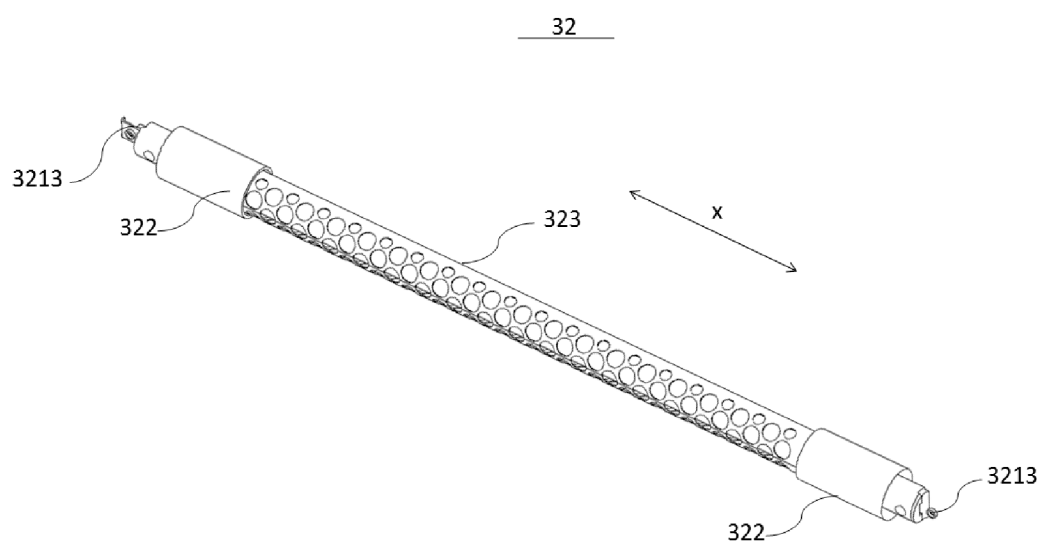


Fig.2

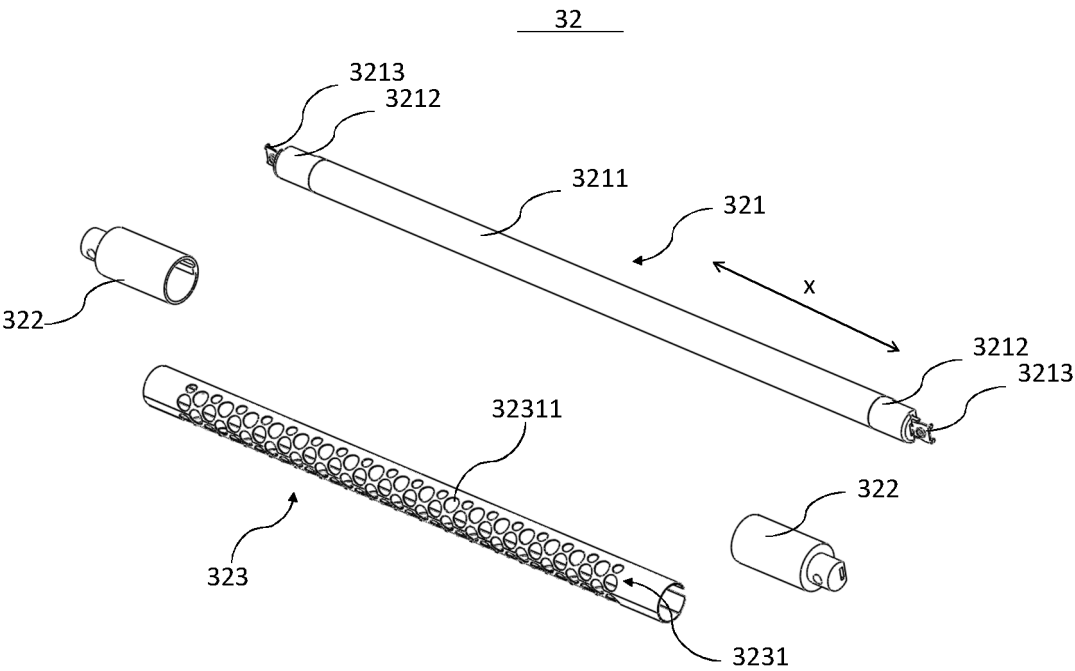


Fig.3

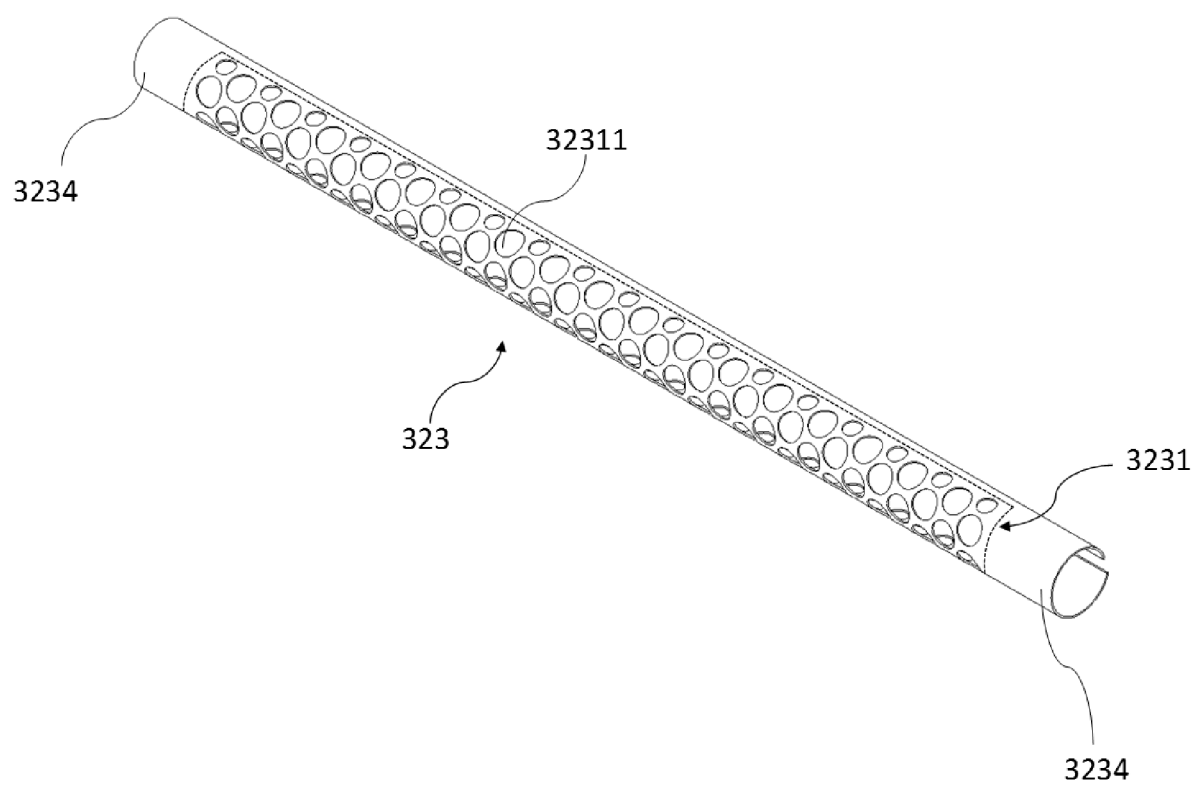


Fig.4

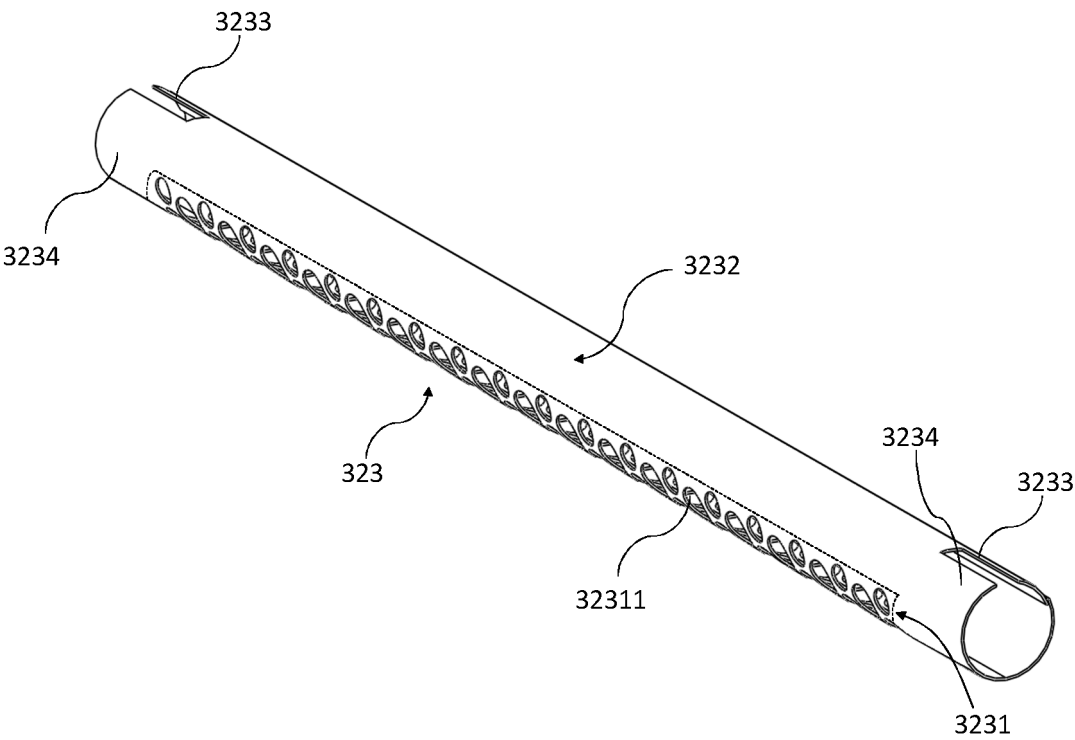


Fig.5

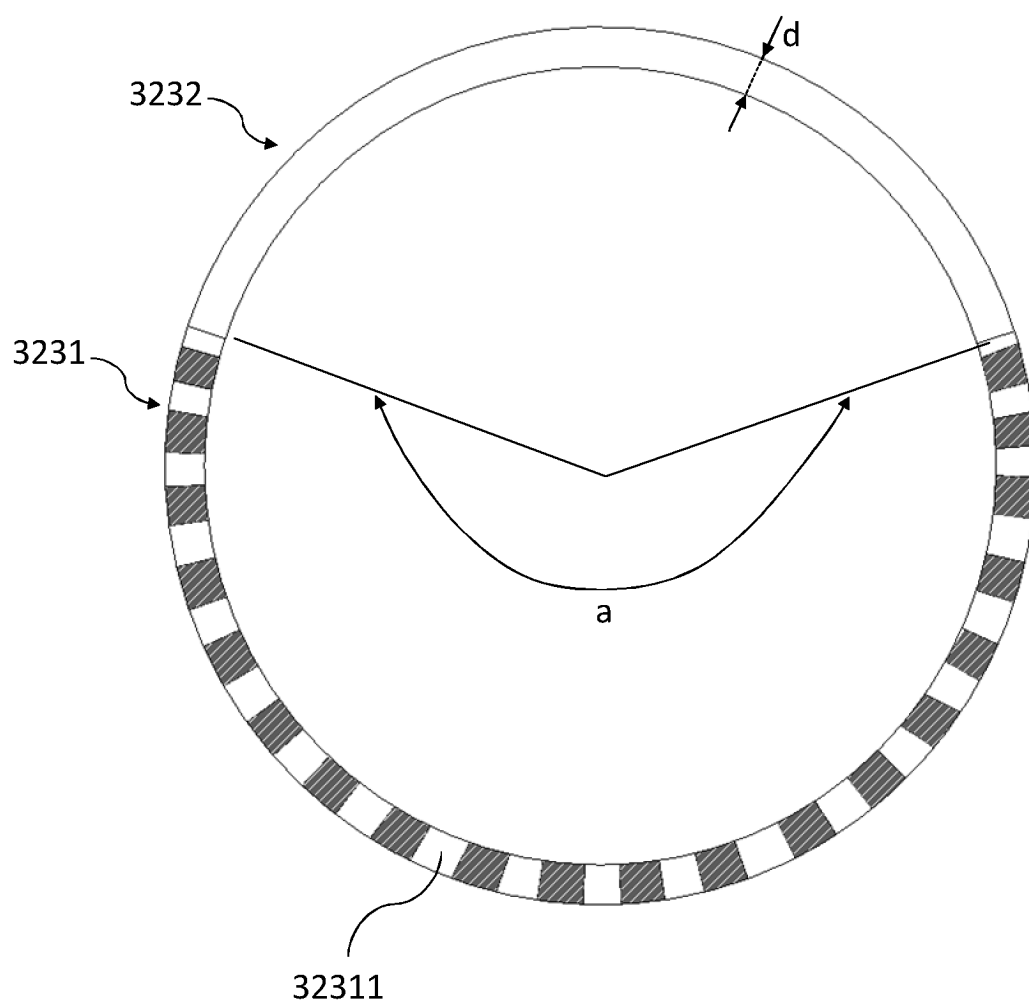


Fig. 6

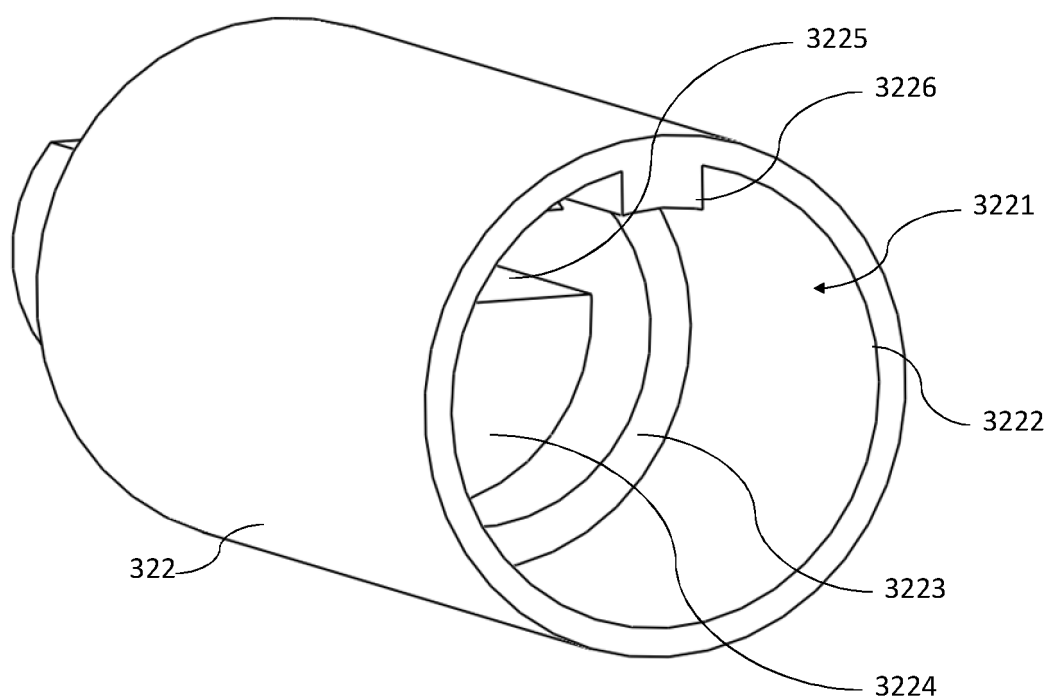


Fig.7

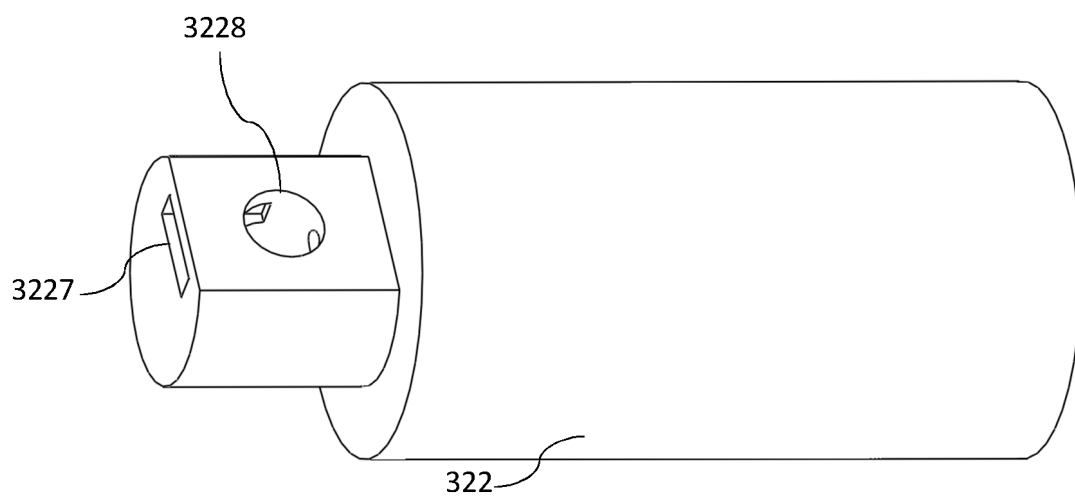


Fig.8

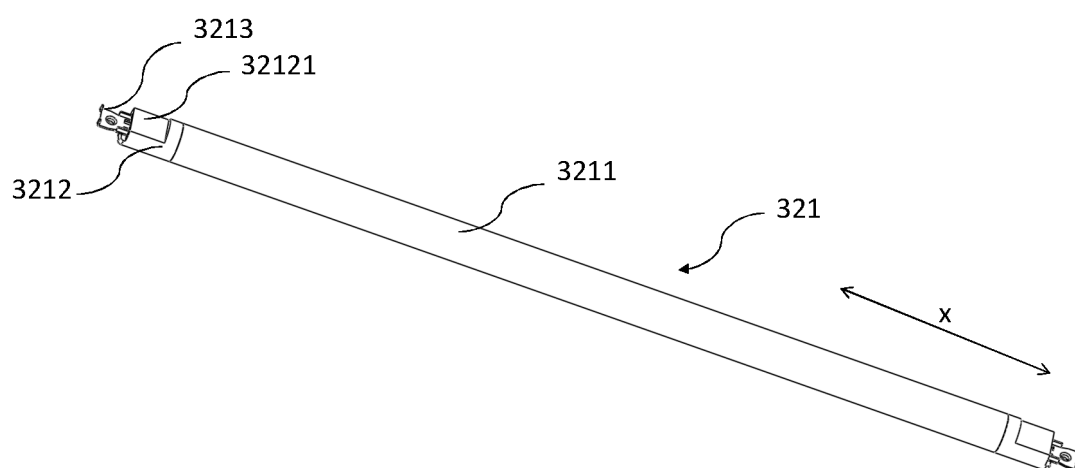


Fig.9

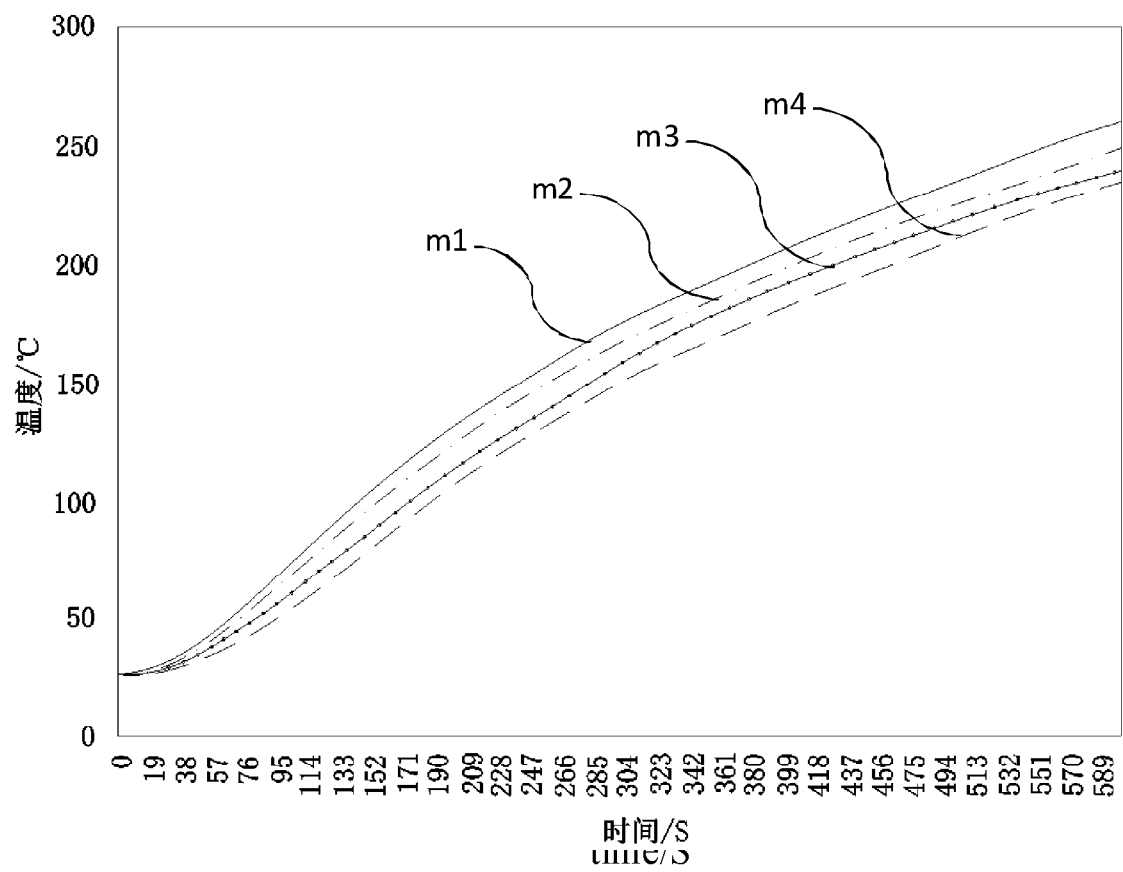


Fig.10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/086436

A. CLASSIFICATION OF SUBJECT MATTER

H05B6/76(2006.01)i; H05B6/64(2006.01)i; F24C15/36(2006.01)i; F24C7/02(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)

IPC: H05B F24C

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, CNTXT, CNKI, WPABS, DWPI, WOTXT, EPTXT, USTXT: 发热, 电热, 加热, 管, 件, 器, 元件, 装置, 石墨, 碳纤维, 孔, 口, 缝, 隙, 四分之一波长, 1/4波长, 微波, 屏蔽, 抑制, 扼流, 阻止, 阻波, heat+, tube?, graphite, carbon fiber, hole, aperture, opening, gap, quarter wavelength, microwave, prevent, shield

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 117715260 A (GUANGDONG MIDEA KITCHEN APPLIANCES MANUFACTURING CO., LTD. et al.) 15 March 2024 (2024-03-15) claims 1-12	1-12
X	CN 105283105 A (KENWOOD LTD.) 27 January 2016 (2016-01-27) description, paragraphs [0023]-[0039], and figures 1-6	1-12
X	CN 106152190 A (GUANGDONG MIDEA KITCHEN APPLIANCES MANUFACTURING CO., LTD. et al.) 23 November 2016 (2016-11-23) description, paragraphs [0046]-[0048], and figures 1 and 2	1-12
A	CN 216700372 U (GUANGDONG MIDEA KITCHEN APPLIANCES MANUFACTURING CO., LTD. et al.) 07 June 2022 (2022-06-07) entire document	1-12
A	CN 101493235 A (GUANGDONG GALANZ ENTERPRISES CO., LTD.) 29 July 2009 (2009-07-29) entire document	1-12

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

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"D" document cited by the applicant in the international application	"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
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"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	

Date of the actual completion of the international search 30 July 2024	Date of mailing of the international search report 26 August 2024
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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